Program Schedule and Abstract Book

AMIA 2015 Annual Symposium
November 13 - 18, 2015

The Program Report was last updated August 23, 2015 at 01:00 AM EDT. To view the most recent meeting schedule online, visit https://amiaannual2015.abstractcentral.com/planner.jsp
Friday, November 13, 2015

<table>
<thead>
<tr>
<th>Time</th>
<th>Session or Event Info</th>
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<tbody>
<tr>
<td>6:00 PM-9:00 PM</td>
<td>Yosemite A (Hilton San Francisco Union Square), <strong>ANI Governing Directors Dinner</strong>, Special Event</td>
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Saturday, November 14, 2015

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<thead>
<tr>
<th>Time</th>
<th>Session or Event Info</th>
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<tbody>
<tr>
<td>8:00 AM-4:00 PM</td>
<td>Franciscan A (Hilton San Francisco Union Square), <strong>AMIA Board of Directors Meeting</strong>, Business Meeting</td>
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<tr>
<td>10:00 AM-10:30 AM</td>
<td>Room: TBD (Hilton San Francisco Union Square), <strong>Coffee Break</strong>, Social Event</td>
</tr>
<tr>
<td>2:30 PM-3:00 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), <strong>Coffee Break</strong>, Social Event</td>
</tr>
<tr>
<td>8:30 AM-12:00 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), <strong>T02: A Problem Well Stated is Half Solved: A Case-Based Tutorial About Approaching Evaluation and Technical Assistance Projects Through Informatics Problem-Solving</strong>, Tutorial</td>
</tr>
<tr>
<td>8:30-8:30 AM</td>
<td><strong>A Problem Well Stated is Half Solved: A Case-Based Tutorial About Approaching Evaluation and Technical Assistance Projects Through Informatics Problem-Solving</strong> H. Tolentino; L.H. Franzke; S.R. Papagari Sangareddy; C. Pepper</td>
</tr>
<tr>
<td>8:30 AM-4:30 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), <strong>T03: An introduction to Natural Language Processing Methods in Clinical Research</strong>, Tutorial</td>
</tr>
<tr>
<td>8:30-8:30 AM</td>
<td>An introduction to Natural Language Processing methods in clinical research S.L. DuVall; P.R. Alba; O.V. Patterson</td>
</tr>
<tr>
<td>8:30 AM-4:30 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), <strong>T04: AMIA 2015 CMIO Workshop</strong>, Tutorial</td>
</tr>
<tr>
<td>8:30-8:30 AM</td>
<td><strong>AMIA 2015 CMIO Workshop</strong> P. Fu; R. Schreiber; J. Hollberg; J. Kannry</td>
</tr>
<tr>
<td>1:00 PM-4:30 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), <strong>T05: Practical Modeling Issues: Representing Coded and Structured Patient Data in EHR Systems</strong>, Tutorial</td>
</tr>
<tr>
<td>1:00-1:00 PM</td>
<td><strong>Practical Modeling Issues: Representing Coded and Structured Patient Data in EHR Systems</strong> S.M. Huff</td>
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<tr>
<td>1:00 PM-4:30 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), <strong>T06: The Art and Science of Writing Items for High Stakes Exams</strong>, Tutorial</td>
</tr>
<tr>
<td>1:00-1:00 PM</td>
<td>The Art and Science of Writing Items for High Stakes Exams B. Munger; J. Finnell</td>
</tr>
<tr>
<td>8:30 AM-12:00 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), <strong>WG01: Biomedical and Health Informatics Curricula: Development of Recommendations for Evaluation Courses (Sponsored by the Evaluation Working Group)</strong>, Working Group Pre-symposium</td>
</tr>
<tr>
<td>8:30-8:30 AM</td>
<td>Biomedical and Health Informatics Curricula: Development of Recommendations for Evaluation Courses C.K. Craven; E. Eisenstein; S. Khairat; F. Magrabi; C. Weir</td>
</tr>
<tr>
<td>8:30 AM-12:00 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), <strong>WG02: Clinical Data and Patient-Powered Research Networks (sponsored by the Clinical Research Informatics Working Group)</strong>, Working Group Pre-symposium</td>
</tr>
<tr>
<td>8:30-8:30 AM</td>
<td>Clinical Research Informatics Working Group Pre-symposium: Clinical Data and Patient-Powered Research Networks A.E. Solomonides</td>
</tr>
<tr>
<td>8:30 AM-4:30 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), <strong>WG03: Tools and Resources Demonstration and 'Connectathon' (Sponsored by Natural Language Processing Working Group)</strong>, Working Group Pre-symposium</td>
</tr>
<tr>
<td>8:30-8:30 AM</td>
<td>Natural Language Processing Working Group Pre-Symposium: Tools and Resources Demonstration and 'Connectathon' S. Meystre; H. Liu; K.B. Cohen; J.C. Denny; P.J. Haug; J.D. Patrick; G. Savova; O. Uzuner; H. Xu</td>
</tr>
<tr>
<td>8:30 AM-4:30 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), <strong>WG04: Linking Biomedical Imaging and Clinical Data: Challenges and Opportunities (Sponsored by the Biomedical Imaging Informatics Working Group)</strong>, Working Group Pre-symposium</td>
</tr>
<tr>
<td>8:30-8:30 AM</td>
<td>Linking Biomedical Imaging and Clinical Data: Challenges and Opportunities V. Pai; J. Saltz; D. Rubin; Y. DeBois; A. Sharma; W. Hsu</td>
</tr>
<tr>
<td>8:30 AM-4:30 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), <strong>WG05: Evaluation Methods and Frameworks for Measuring Effectiveness and Impact of eHealth Systems Implementations in Low Resource Environments (Sponsored by the Global Health Informatics Working Group)</strong>, Working Group Pre-symposium</td>
</tr>
<tr>
<td>8:30-8:30 AM</td>
<td>GHI Presymposium - Evaluation Methods and Frameworks for Measuring Effectiveness and Impact of eHealth Systems Implementations in Low Resource Environments J. Richards; H.S. Fraser; J. Talmon</td>
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Sunday, November 15, 2015

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<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>8:30 AM-4:30 PM</td>
<td><strong>WG06: Data Mining for Medical Informatics (DMMI) – Predictive Analytics</strong></td>
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<tr>
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<td>(Sponsored by the Knowledge Discovery and Data Mining Working Group)</td>
</tr>
<tr>
<td>8:30-8:30 AM</td>
<td>Data Mining for Medical Informatics (DMMI) – Predictive Analytics F. Wang; G. Stiglic; N. Peek; N. Shah; A. Perer</td>
</tr>
<tr>
<td>8:30 AM-4:30 PM</td>
<td><strong>WG07: Transdisciplinary “Maker Health” Faire</strong></td>
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<td>(Sponsored by the Nursing Informatics Working Group)</td>
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<tr>
<td>8:30-8:30 AM</td>
<td>Transdisciplinary “Maker Health” Faire; An AMIA NIWG Pre-Symposium Tutorial P. Abbott; J. Gomez-Marques; P. Brennan; J. Goldman; M. Taylor; M. Topaz; A. Young; M. QUINN; T. Rausch; S. Hull</td>
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<tr>
<td>1:00 PM-4:30 PM</td>
<td><strong>WG08: Public Health Community Platform: A solution for a modern public health enterprise</strong></td>
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<td>(Sponsored by the Public Health Informatics Working Group)</td>
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<tr>
<td>1:00-1:00 PM</td>
<td>Public Health Community Platform: A solution for a modern public health enterprise M. Rennick; A. Davidson; J. Loonsk; A. Chi; R. Gamache; P. Soper; B.L. Massoudi</td>
</tr>
<tr>
<td>1:00 PM-4:30 PM</td>
<td><strong>WG09: Primary Care and EMRs in the 21st Century – Why Haven’t We Got it Right Yet and How Can We Make it Better?</strong></td>
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<tr>
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<td>(Sponsored by the Primary Care Informatics Working Group)</td>
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<tr>
<td>1:00-1:00 PM</td>
<td>Primary Care and EMRs in the 21st Century – Why Haven’t We Got it Right Yet and How Can We Make it Better? S.J. Morgan; D.M. Newman; W. Sumner; M.E. Kordek</td>
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<tr>
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<td>8:00 AM-12:00 PM</td>
<td><strong>Franciscan D (Hilton San Francisco Union Square)</strong></td>
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<td></td>
<td>10x10 with OHSU In-person Session (10x10 students only), Special Event</td>
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<td>8:00 AM-12:00 PM</td>
<td><strong>Plaza B (Hilton San Francisco Union Square)</strong></td>
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<td>10x10 with the VA In-person Session (10x10 students only), Special Event</td>
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<td>8:00 AM-12:00 PM</td>
<td><strong>Union Square 3 (Hilton San Francisco Union Square)</strong></td>
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<td>10x10 with UAB In-person Session (10x10 students only), Special Event</td>
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<td>8:00 AM-12:00 PM</td>
<td><strong>Union Square 4 (Hilton San Francisco Union Square)</strong></td>
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<td>10x10 with University of Texas In-person Session (10x10 students only), Special Event</td>
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<tr>
<td>6:30 PM-9:30 PM</td>
<td>ACMI Dinner and Induction of Fellows (fellows only), Special Event</td>
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<tr>
<td>8:30 AM-10:00 AM</td>
<td>ACMI Executive Committee Meeting, Business Meeting</td>
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<tr>
<td>5:30 PM-7:00 PM</td>
<td>Clinical Information Systems Working Group Meeting, Business Meeting</td>
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<tr>
<td>10:00 AM-10:30 AM</td>
<td>Coffee Break, Social Event</td>
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<tr>
<td>8:30 AM-12:00 PM</td>
<td>Developing Leadership Within AMIA: Pathways to Success, Tutorial</td>
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<tr>
<td>8:30-8:30 AM</td>
<td>Developing Leadership Within AMIA: Pathways to Success S.E. Labkoff; P. Payne</td>
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<tr>
<td>7:30 PM-10:00 PM</td>
<td>Ethical, Legal, and Social Issues Working Group Meeting, Business Meeting</td>
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<td>7:00 PM-9:00 PM</td>
<td>Item Writers Meeting, Business Meeting</td>
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<tr>
<td>5:00 PM-5:30 PM</td>
<td>Knowledge Representation and Semantics Working Group Meeting, Business Meeting</td>
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<tr>
<td>8:00 PM-10:00 PM</td>
<td>New Member Reception, Special Event</td>
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<tr>
<td>8:00 AM-12:00 PM</td>
<td>Nursing Informatics Special Event, Special Event</td>
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<tr>
<td>8:00 AM-12:00 PM</td>
<td>Nursing Informatics Working Group Special Event, Special Event</td>
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<tr>
<td>1:30 PM-3:00 PM</td>
<td>Opening Plenary Session and Keynote Presentation: Dr. Aviel D. Rubin, PhD, Special Event</td>
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<tr>
<td>3:30 PM-5:00 PM</td>
<td>S01: Interactive Panel - Open Architecture for Pathways and Care Coordination, Interactive Panel, Clinical Informatics</td>
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<tr>
<td>3:30 PM-5:00 PM</td>
<td>Open Architecture for Pathways/Care Coordination R.A. Greenes; M. Burton; O. Diaz; K. Toussaint</td>
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<tr>
<td>3:30 PM-5:00 PM</td>
<td>S02: Didactic Panel - The Sociotechnical Perspective in Biomedical Informatics: What do We Understand and Measure?, Didactic Panel, Clinical Workflow and Human Factors</td>
</tr>
<tr>
<td>3:30 PM-5:00 PM</td>
<td>The sociotechnical perspective in biomedical informatics: what do we understand and measure? J.S. Ancker; J. Aarts; A.W. Kushniruk; D.F. Sittig; J.S. Ash</td>
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<tr>
<td>3:30 PM-5:00 PM</td>
<td>S03: Didactic Panel</td>
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<td>3:30 PM-5:00 PM</td>
<td>S04: Papers</td>
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<td>3:30-3:52 PM</td>
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<td>3:52-4:14 PM</td>
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<td>4:14-4:36 PM</td>
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<td>4:36-4:58 PM</td>
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<td>3:30 PM-5:00 PM</td>
<td>S05: Papers</td>
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<td>4:36-4:58 PM</td>
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<td>3:30 PM-5:00 PM</td>
<td>S06: Papers</td>
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<td>3:30-3:52 PM</td>
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<td>3:52-4:14 PM</td>
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<tr>
<td>4:14-4:36 PM</td>
<td>Using Workflow Modeling to Identify Areas to Improve Genetic Test Processes in the University of Maryland Translational Pharmacogenomics Project</td>
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<tr>
<td>4:36-4:58 PM</td>
<td>Identifying the Clinical Laboratory Tests from Unspecified &quot;Other Lab Test&quot; Data for Secondary Use</td>
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<tr>
<td>3:30 PM-5:00 PM, Room: TBD (Hilton San Francisco Union Square), S07: Papers/Podium Presentations: Lost and Found, Miscellaneous I</td>
<td>Papers/Podium Presentations</td>
</tr>
<tr>
<td>3:30-3:52 PM</td>
<td>AMIA members' &quot;vital signs&quot;: what the HIT implementation listserv says about goals for AMIA and for medical informatics</td>
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<tr>
<td>3:52-4:14 PM</td>
<td>A Multidimensional Data Warehouse for Community Health Centers</td>
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<tr>
<td>4:14-4:36 PM</td>
<td>Status of the Health Center-Controlled Network Program: Advancing Health Care Quality through Health Information Technology at Community Health Centers</td>
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<tr>
<td>4:36-4:58 PM</td>
<td>A Framework for Person-centered, Community-wide Care Coordination</td>
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<tr>
<td>3:30 PM-5:00 PM, Room: TBD (Hilton San Francisco Union Square), S08: Podium Presentations: Nursing Informatics, Podium Presentations, Clinical Informatics</td>
<td>Podium Presentations, Clinical Informatics</td>
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<tr>
<td>3:30-3:52 PM</td>
<td>Representing Nursing Content within a Multi-Disciplinary Terminology</td>
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<tr>
<td>3:52-4:14 PM</td>
<td>Making nursing visible in health information systems</td>
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<tr>
<td>4:14-4:36 PM</td>
<td>The Hidden Life of Nurses' Cognitive Artifacts</td>
</tr>
<tr>
<td>3:30 PM-5:00 PM, Room: TBD (Hilton San Francisco Union Square), S09: Podium Presentations: Information Retrieval and Data Capture, Podium Presentations, NLP, Information Extraction and Retrieval</td>
<td>Podium Presentations, NLP, Information Extraction and Retrieval</td>
</tr>
<tr>
<td>3:30-3:52 PM</td>
<td>Capturing Preventive Care Services: Comparing Data Obtained from Manual Chart Review, Automated EHR Extraction, and Insurance Claims</td>
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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>3:52-4:14 PM</td>
<td>Comparing Weight Redistribution and Distance Imputation Methods for Missing Data in Clear-text and Encrypted Record Linkage</td>
<td>T.C. Ong; L. Schilling; M.G. Kahn</td>
</tr>
<tr>
<td>4:36-4:58 PM</td>
<td>Improving Retrieval of PubMed Articles Using the TopicalMeSH Representation</td>
<td>Z. Yu; E.V. Bernstam; T. Cohen; B.C. Wallace; T.R. Johnson</td>
</tr>
<tr>
<td>3:30 PM-5:00 PM</td>
<td>Systems Demonstrations - Advanced NLP Solutions, Systems Demonstrations, NLP, Information Extraction and Retrieval</td>
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<tr>
<td>3:30-4:15 PM</td>
<td>RapTAT: A Tool for Assisted Annotation and Reviewer Training via Online Machine Learning</td>
<td>G.T. Gobbel; R.M. Reeves; B.R. South; W. Chapman; J. Jarman; S. Lay; M.E. Matheny</td>
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<tr>
<td>4:15-5:00 PM</td>
<td>SEMCARE - Semantic Data Platform for Healthcare</td>
<td>P. Daumke; C. Riede; T. Fassbender; A. Honrado; M. Kreuzthaler; P. López-Garcia; S. Schulz; E. van Mulligen; H. van Haagen; J. Kors; H. Gonna; X. Wang; E. Behr</td>
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<tr>
<td>3:30 PM-5:00 PM</td>
<td>Featured Presentation - ACMI Debate: Patients Should Have Detailed Control of Access to their EHR Data</td>
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<tr>
<td>8:00 AM-12:00 PM</td>
<td>Student Paper Competition, Special Event</td>
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<tr>
<td>8:30 AM-12:00 PM</td>
<td>Innovations in Standards &amp; Standards Development: Advances in Standards Methodologies &amp; Implementation, Tutorial</td>
<td>C. Jaffe; D.B. Fridsma; S. Huff; C. Chute; J.D. Halamka; W.E. Hammond</td>
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<tr>
<td>8:30-8:30 AM</td>
<td>Innovations in Standards &amp; Standards Development: Advances in Standards Methodologies &amp; Implementation, Tutorial</td>
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<tr>
<td>8:30 AM-12:00 PM</td>
<td>Building Successful Natural Language Processing Applications in Clinical Research and Healthcare Operations, Tutorial</td>
<td>Y. Huang; H. Xu; J.C. Denny</td>
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<tr>
<td>Time</td>
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<td>Presenter(s)</td>
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<tr>
<td>8:30 AM-12:00 PM</td>
<td><strong>T09: Aligning Consumer Health Informatics Tools with Patient Work: Strategies for Fieldwork in Home and Community Settings</strong></td>
<td>R. Valdez; R.J. Holden; T. Veinot; L.L. Novak</td>
</tr>
<tr>
<td>8:30 AM-12:00 PM</td>
<td><strong>T10: Clinical Decision Support: A Practical Guide to Developing Your Program to Improve Outcomes</strong></td>
<td>R.A. Jenders; J.A. Osheroff; J.M. Teich; D.F. Sittig; R.E. Murphy</td>
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<tr>
<td>5:00 PM-7:00 PM</td>
<td><strong>Welcome Reception</strong></td>
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<tr>
<td>8:30 AM-12:00 PM</td>
<td><strong>T11: Patient Engagement and Consumer-Facing Health Information Technologies</strong></td>
<td>J.S. Wald; D.Z. Sands</td>
</tr>
<tr>
<td>8:30 AM-12:00 PM</td>
<td><strong>T12: Using R for Healthcare Data Science</strong></td>
<td>V. Huser; L.K. Wiley</td>
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<tr>
<td>8:30 AM-12:00 PM</td>
<td><strong>T13: Introduction to Biomedical Informatics</strong></td>
<td>J.W. Hales; C. Cimino</td>
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<tr>
<td>5:00 PM-7:00 PM</td>
<td><strong>Welcome Reception</strong></td>
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<td>8:30 AM-12:00 PM</td>
<td><strong>WG10: Introduction to Visual Analytics in Healthcare (sponsored by Visual Analytics Working Group)</strong></td>
<td>J.J. Caban; D. Gotz; A. Perer</td>
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<td>9:00 PM-10:30 PM</td>
<td><strong>WINE - Women in Informatics Networking Event</strong></td>
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<td>8:00 PM-10:00 PM</td>
<td><strong>Imperial A (Hilton San Francisco Union Square)</strong>, <em>&quot;No Matter Where&quot; Movie Premier</em>, Special Event</td>
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<td>12:00 PM-1:30 PM</td>
<td><strong>Union Square 2 (Hilton San Francisco Union Square)</strong>, <em>JAMIA Associate Editors Meeting</em>, Business Meeting</td>
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<td>6:30 PM-8:00 PM</td>
<td><strong>Plaza B (Hilton San Francisco Union Square)</strong>, <em>JAMIA Editorial Board Meeting</em>, Business Meeting</td>
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<tr>
<td>7:00 AM-8:30 AM</td>
<td><strong>Union Square 4 (Hilton San Francisco Union Square)</strong>, <em>Academic Forum Executive Committee Meeting</em>, Business Meeting</td>
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<td>12:30 PM-1:30 PM</td>
<td><strong>Continental 1/2/3 (Hilton San Francisco Union Square)</strong>, <em>ACMI &quot;Meet the Experts&quot;: Adam Wilcox, PhD, Intermountain Healthcare</em>, Special Event</td>
<td></td>
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<tr>
<td>12:30 PM-1:30 PM</td>
<td><strong>Plaza A (Hilton San Francisco Union Square)</strong>, <em>ACMI &quot;Meet the Experts&quot;: Eneida Mendonca, MD, University of Wisconsin-Madison</em>, Special Event</td>
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<tr>
<td>12:30 PM-1:30 PM</td>
<td><strong>Continental 7/8/9 (Hilton San Francisco Union Square)</strong>, <em>ACMI &quot;Meet the Experts&quot;: Jacqueline Merrill, RN, MPH, PhD, Columbia University</em>, Special Event</td>
<td></td>
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<tr>
<td>12:30 PM-1:30 PM</td>
<td><strong>Imperial B (Hilton San Francisco Union Square)</strong>, <em>ACMI &quot;Meet the Experts&quot;: Mor Peleg, PhD, University of Haifa</em>, Special Event</td>
<td></td>
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<td>12:30 PM-1:30 PM</td>
<td><strong>Yosemite A/B (Hilton San Francisco Union Square)</strong>, <em>ACMI &quot;Meet the Experts&quot;: Paul Harris, PhD, Vanderbilt University</em>, Special Event</td>
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<tr>
<td>12:30 PM-1:30 PM</td>
<td><strong>Yosemite C (Hilton San Francisco Union Square)</strong>, <em>ACMI &quot;Meet the Experts&quot;: Philip Payne, PhD, The Ohio State University</em>, Special Event</td>
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<tr>
<td>12:30 PM-1:30 PM</td>
<td><strong>Imperial A (Hilton San Francisco Union Square)</strong>, <em>ACMI &quot;Meet the Experts&quot;: Ross Koppel, PhD, University of Pennsylvania</em>, Special Event</td>
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<tr>
<td>12:30 PM-1:30 PM</td>
<td><strong>Plaza B (Hilton San Francisco Union Square)</strong>, <em>ACMI &quot;Meet the Experts&quot;: Umberto Tachinardi, MD, University of Wisconsin-Madison</em>, Special Event</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td><strong>Union Square 3 (Hilton San Francisco Union Square)</strong>, <em>Awards Committee Meeting</em>, Business Meeting</td>
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<tr>
<td>8:00 PM-10:00 PM</td>
<td><strong>Union Square 2 (Hilton San Francisco Union Square)</strong>, <em>Biomedical Imaging Informatics Working Group Meeting</em>, Business Meeting</td>
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<tr>
<td>12:00 PM-1:30 PM</td>
<td><strong>Franciscan B (Hilton San Francisco Union Square)</strong>, <em>Cerner Corporate Roundtable (by invitation)</em>, Corporate</td>
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<tr>
<td>8:00 PM-10:00 PM</td>
<td><strong>Union Square 15/16 (Hilton San Francisco Union Square)</strong>, <em>Clinical Decision Support Working Group Meeting</em>, Business Meeting</td>
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<tr>
<td>8:00 PM-10:00 PM</td>
<td><strong>Plaza A (Hilton San Francisco Union Square)</strong>, <em>Clinical Research Informatics Working Group Meeting</em>, Business Meeting</td>
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<td>Time</td>
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<td>Event Description</td>
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<tr>
<td>10:00 AM-10:30 AM</td>
<td>Room: TBD (Hilton San Francisco Union Square)</td>
<td>Coffee Break, Social Event</td>
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<tr>
<td>8:00 PM-10:00 PM</td>
<td>Franciscan C (Hilton San Francisco Union Square)</td>
<td>Consumer and Pervasive Health Informatics Working Group Meeting, Business Meeting</td>
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<tr>
<td>12:00 PM-1:30 PM</td>
<td>Franciscan C (Hilton San Francisco Union Square)</td>
<td>ConvergeHEALTH by Deloitte (by invitation), Corporate</td>
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<tr>
<td>7:00 AM-8:30 AM</td>
<td>Union Square 2 (Hilton San Francisco Union Square)</td>
<td>Ethics Committee Meeting, Business Meeting</td>
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<tr>
<td>12:00 PM-1:30 PM</td>
<td>Franciscan D (Hilton San Francisco Union Square)</td>
<td>FDB Corporate Roundtable (by invitation), Corporate</td>
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<tr>
<td>8:00 PM-10:00 PM</td>
<td>Yosemite A/B (Hilton San Francisco Union Square)</td>
<td>Global Health Informatics Working Group Meeting, Business Meeting</td>
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<tr>
<td>12:00 PM-1:30 PM</td>
<td>Franciscan A (Hilton San Francisco Union Square)</td>
<td>IMO Corporate Roundtable (by invitation), Corporate</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td>Franciscan C (Hilton San Francisco Union Square)</td>
<td>Industry Advisory Council Meeting, Business Meeting</td>
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<tr>
<td>7:00 AM-8:30 AM</td>
<td>Union Square 15 (Hilton San Francisco Union Square)</td>
<td>International Affairs Committee Meeting, Business Meeting</td>
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<tr>
<td>8:00 PM-10:00 PM</td>
<td>Continental 1/2/3 (Hilton San Francisco Union Square)</td>
<td>Knowledge Discovery and Data Mining Working Group Meeting, Business Meeting</td>
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<tr>
<td>7:00 AM-8:30 AM</td>
<td>Franciscan A (Hilton San Francisco Union Square)</td>
<td>Meditech Corporate Roundtable (by invitation), Corporate</td>
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<td>5:00 PM-6:30 PM</td>
<td>Union Square 2 (Hilton San Francisco Union Square)</td>
<td>Membership Committee Meeting, Business Meeting</td>
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<td>5:00 PM-6:30 PM</td>
<td>Union Square 4 (Hilton San Francisco Union Square)</td>
<td>MOC Committee Meeting, Business Meeting</td>
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<td>8:00 PM-10:00 PM</td>
<td>Franciscan A (Hilton San Francisco Union Square)</td>
<td>Natural Language Processing Working Group Meeting, Business Meeting</td>
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<td>8:00 PM-10:00 PM</td>
<td>Franciscan D (Hilton San Francisco Union Square)</td>
<td>Open Source Working Group Meeting, Business Meeting</td>
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<td>8:00 PM-10:00 PM</td>
<td>Union Square 5/6 (Hilton San Francisco Union Square)</td>
<td>Pharmacoinformatics Working Group Meeting, Business Meeting</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square)</td>
<td>Poster Session I (Authors present), Poster</td>
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<td>5:00 PM-6:30 PM</td>
<td>Design, Development, and Initial Application of a Systematic, Semi-Automated Predictive Analytics Framework for Health Care</td>
<td>Abdelrahman; K. Kawamoto</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td>Knowledge Base Acquisition For Rare Concepts Using Manual Bootstrapping</td>
<td>P.R. Alba; S.L. DuVall; J. LaFleur; A.P. Bress; O.V. Patterson</td>
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<td>5:00 PM-6:30 PM</td>
<td>Increase in Prescriber Error Rates Following Implementation of Computerized Physician Order Entry</td>
<td>G.B. Alexander; G.M. Ramos</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td>Decision Analysis for Oropharyngeal Cancer in Radiotherapy</td>
<td>A.K. Aljadaan; J.H. Gennari; M.H. Phillips; W.P. Smith</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td>Enhancing Use of the Problem List in the Inpatient Setting</td>
<td>C.H. Andrus; K. O'Bryan; P. Asaro; S.P. Hmiel; F.B. Yu</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td>A Smartphone-based Gait Assessment System for the Elderly</td>
<td>N. Arisaka; K. Mizuno; Y. Shiba; N. Mamorita; H. Tsuruta</td>
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<td>5:00 PM-6:30 PM</td>
<td>Evaluation of a Self-Triage Decision Aid System in Pregnancy-Induced Hypertension and Diabetes Mellitus: Preliminary Results of a Randomized Control Trial</td>
<td>A. Aslani; f. tara; L. Galichi; S. Madani; A. Abu-Hanna; S. Eslami</td>
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<td>5:00 PM-6:30 PM</td>
<td>Using indirect and direct methods enhances online health community research.</td>
<td>U. Backonja; A. Park; A.L. Hartzler; M.N. Taylor; T. Griffiths; W. Pratt</td>
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<td>5:00 PM-6:30 PM</td>
<td>Data Error Transparency in Health Information Exchange</td>
<td>G.B. Baker; S. He; D.K. Mann; P. RanadeKharkar; S.N. Thornton</td>
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<td>5:00 PM-6:30 PM</td>
<td>Integrating Conceptual Models to Inform the Design of a Family Health Information Management System for Hispanic Dementia Caregivers</td>
<td>S. Bakken; M. Granja; N.M. Suero-Tejeda; S. Stonbraker; R.J. Lucero</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td>Predicting Future Anxiety and Depression Diagnoses among College Students Utilizing Electronic Health Data</td>
<td>J. Zhang; H. Wu; J. Turner; A. Keller; L. Barnes</td>
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<td>5:00 PM-6:30 PM</td>
<td>Visualization of Clinical Decision Support Failures</td>
<td>M.A. Basit; A. Wright</td>
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<td>5:00 PM-6:30 PM</td>
<td>Social Network Analysis: Data Collection Challenges and Solutions</td>
<td>M.M. Benham-Hutchins; B. Brewer</td>
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<td>5:00 PM-6:30 PM</td>
<td>Demographic Factors Associated with Differences between New York Inpatient Medicare Charges and Payments for (DRG 065) Stroke</td>
<td>B. Berkovich; E.S. Stearman; C.W. Johnson</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td>Adoption of Electronic Health Records in U.S. nursing homes</td>
<td>R.I. Bjarnadottir; C.T. Herzig; J. Travers; P.W. Stone</td>
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<td>5:00 PM-6:30 PM</td>
<td>Development and implementation of a Floor Admit Reevaluation Alert (FARA) in a large academic emergency department</td>
<td>J. Booth; E.S. Berner; J.A. Alsip</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td>Reducing Healthcare Costs through Medical Recommendations</td>
<td>L. Bouayad; B. Padmanabhan; K. Chari</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td>Developing Intermediary Medication Phenotypes via Metabolomics</td>
<td>M.K. Breitenstein; R.M. Weinshilboum; J. Pathak; L. Wang</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td>The Internet: A Source of Near Real Time Infectious Disease Information</td>
<td>J.J. Brixey; C.P. Pepper; J. Brixey</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Literature Review of Medication-Related Clinical Decision Support</td>
<td>C.L. Brown; S.P. Slight; A.K. Husband; N. Watson; D.W. Bates</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td>Cohort Selection Tool for Efficient Exploration of Patient Data</td>
<td>A. Bucur; J.V. Leeuwen; N. Chen; B. Claerhout; K. de Schepper; D. Perez-Rey; S. Paraiso-Medina; K. Mehta</td>
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<td>5:00 PM-6:30 PM</td>
<td>Automated searches for personalized evidence to prevent hospital</td>
<td>A. Cahan; S.E. Shooshan; L.M. Rodriguez; D. acquired infection</td>
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<td>5:00 PM-6:30 PM</td>
<td>A graph data model facilitates analysis of collaboration in an</td>
<td>M. Carson; S. Gravenor; Y. Lee; D. emergency department</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Comparison of Clinical Decision Support Interventions from</td>
<td>B. Celik; P. Eghbali Alamdari; K. Bavuso; E. Yoshida; S.M. Maviglia; T. Commercial and Internally Developed Electronic Health Records</td>
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<td>5:00 PM-6:30 PM</td>
<td>Predicting Clinical Laboratory Turnaround Time</td>
<td>A. Cheng; M. Beller; J.C. Denny</td>
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<td>5:00 PM-6:30 PM</td>
<td>Identifying High Risk of Hospitalization Among Long-Term Care Patients Using Conditional Inference Tree</td>
<td>S. Chin</td>
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<td>5:00 PM-6:30 PM</td>
<td>Appropriateness of Overrides of Age-specific Medication Alerts for</td>
<td>I. Cho; D. Seger; S.P. Slight; K.C. Nanji; P.C. Elderly Outpatients</td>
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<td>5:00 PM-6:30 PM</td>
<td>Design guidelines for effective data visualization of sensor monitoring</td>
<td>Y. Choi; G. Demiris; A. Samuel; D. data</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td>Bring Your Own Device: From PDA To Smart Mobile Devices</td>
<td>K. Martinez; K. Courtney; E.M. Borycki; N. Frisch</td>
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<td>5:00 PM-6:30 PM</td>
<td>Design and Evaluation of an Infection-Risk Monitoring Application</td>
<td>M. Cowperthwaite; A. Ramakrishnan; M. Burnett; M. Webb; D. Fox</td>
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<td>5:00 PM-6:30 PM</td>
<td>Inexpensive Radio Communications System for Wheelchair Users</td>
<td>J.R. Sprague; D.W. Curtis</td>
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<td>5:00 PM-6:30 PM</td>
<td>Feasibility of Converting the Medicare Synthetic Public Use Data Into a Standardized Data Model for Clinical Research Informatics</td>
<td>M. Danese; E.A. Voss; J. Duryea; M. Gleeson; R. Duryea; A. Matcho; D. O'Hara; W.E. Stephens; A. Perotte; L. Evans; C.G. Reich</td>
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<td>5:00 PM-6:30 PM</td>
<td>Predicting the Factors of Improvement of Health Status of Home Health Care Patients: A Holistic Data Mining Approach</td>
<td>S. Dey; K. Hauwiller; P. Yadav; M. Steinbach; G. Simon; V. Kumar; C.W. Delaney; B.L. Westra</td>
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<td>5:00 PM-6:30 PM</td>
<td>Patient Centered Medical Home (PCMH) Team Huddle Tool</td>
<td>N.V. Do; T.J. Newton; R. Barnhill; E.A. Shry</td>
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<td>5:00 PM-6:30 PM</td>
<td>Using social media data to analyze patient satisfaction of health care facilities</td>
<td>K. Doyon; Q.T. Zeng; R. Morris; C.A. Smith; Y. Shao</td>
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<td>5:00 PM-6:30 PM</td>
<td>Initial Approach to Creating an Interactive User Interface Design Tool to Enhance User-Centered Design</td>
<td>K.R. Dufendach; K.M. Unertl; C.U. Lehmann</td>
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<td>5:00 PM-6:30 PM</td>
<td>User Adherence to a Web-Based Application for Youth with mild TBI</td>
<td>J.R. Dyas; J. Dexheimer; B. Kurowski; S.L. Wade; N. Zhang; L. Babcock</td>
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<td>5:00 PM-6:30 PM</td>
<td>Developing a Nurse Driven Telemetry Protocol Using a Sociotechnical Model</td>
<td>R.R. Enck; D. Ariosto</td>
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<td>5:00 PM-6:30 PM</td>
<td>The Evolution of a Clinical Decision Support Request Form</td>
<td>S.X. Fei; S. Bouyer Ferullo; C. Lagor; S.M. Maviglia; E. Yoshida</td>
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<td>5:00 PM-6:30 PM</td>
<td>Implementing automated delivery of evidence-based medication safety information to the point of care</td>
<td>J. Finkelstein; H.Z. Adams; Q. Chen; K. Lin; C. Friedman</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Baseline Assessment of the Dispensary Workflow in the Birmingham Free Clinic: A Time-Motion Study of Pharmacist Tasks</td>
<td>A Fisher; M.Q. Ding; H. Hochheiser; G.P. Douglas</td>
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<td>5:00 PM-6:30 PM</td>
<td>Determining the Factors Relevant to Patient Handoff by Role and Patient Population</td>
<td>K.L. Fleming; R.A. McKelvy; N.C. Gonzalez; W.B. Webb; R.L. Shapiro</td>
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<td>5:00 PM-6:30 PM</td>
<td>Implementation of a Clinical Decision Support Tool to Improve Guideline Compliance in the Prevention of Early-Onset Group B Streptococcus Infections in Neonates</td>
<td>L.K. Francois Watkins; D.A. McLean; M. Nihen; J.M. Wortham; M. Crum; P. Carner; M. Jordan; S. Schrag</td>
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<td>5:00 PM-6:30 PM</td>
<td>Contextual Computing: Tracking Healthcare Providers in the Emergency Department via Bluetooth Beacons</td>
<td>J. Frisby; V. Smith; V.L. Patel</td>
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<td>5:00 PM-6:30 PM</td>
<td>Evaluating Mobile Information Use in Undergraduate Nursing Programs: Moving from Access to Interpretation and Application?</td>
<td>K. Furlong; G. Doyle; L. Secco; J. Bailey</td>
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<td>5:00 PM-6:30 PM</td>
<td>Dashboard Visualizations of Emergency Department Throughput Metrics</td>
<td>S. Gantela; T.R. Johnson; N.G. Okafor; D. Robinson; A. Mehta; C.L. Maddow; B. King; T. Chacko; S. Shifarray; V. Nguyen; A. Stanley; A. Franklin</td>
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<td>5:00 PM-6:30 PM</td>
<td>Evaluating the Effect of a Nursing Flowsheet Merge on Clinical Nursing Documentation Efficiency in a Research Hospital</td>
<td>K. Gartrell; H. Mayberry; M.C. Krumlauf; M.E. Nansel; M. Raju; G.R. Wallen; C.W. Brennan</td>
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<td>5:00 PM-6:30 PM</td>
<td>Development and Validation of a Measure for EHR Related Unintended Consequences with Direct Care Registered Nurses</td>
<td>S.M. Gephart; J.L. Dye; A. Bristol; B. Finley; J.M. Carrington</td>
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<td>5:00 PM-6:30 PM</td>
<td>Streamlining Access to Cancer Data - An Institutional Experience</td>
<td>L. Goldstein; R. Ottesen; K. Olsen; J. Nikowitz; J.C. Niland</td>
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<td>5:00 PM-6:30 PM</td>
<td>Automating Personal Health Record Mammography Messages to Improve Mammography Screening Rates</td>
<td>D. Kaelber; P.J. Greco; v. goyal</td>
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<td>5:00 PM-6:30 PM</td>
<td>iDECIDE Smartphone App for Personalized Messages for Nutrition and Fitness Goals</td>
<td>I. van Woerden; L. Spano; P. Neto; D.L. Groat; M.A. Grando</td>
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<td>5:00 PM-6:30 PM</td>
<td>Identifying Children with Technology Dependence through Use of Administrative Data</td>
<td>B. Hafeez; B. Haridas; A.D. Patel; Z.M. Grinspan</td>
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<td>5:00 PM-6:30 PM</td>
<td>Using a Socio-Technical Framework to Understand Technology Use Among Health Care Innovation Award Community Resource Planning Awardees</td>
<td>S.N. Haque; L. Rojas-Smith; D.J. Holden</td>
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<td>5:00 PM-6:30 PM</td>
<td>Before-after implementation of the sniffer for the detection of failure to recognize and treat severe sepsis</td>
<td>A.M. Harrison; C. Thongprayoon; J.G. Park; D.E. Craig; C.M. Clements; D.G. Goyal; J.L. Elmer; O. Gajic; B.W. Pickering; V. Herasevich</td>
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<td>5:00 PM-6:30 PM</td>
<td>Conducting health insurance surveillance with electronic health record</td>
<td>B. Hatch; C. Tillotson; H. Angier; M. Marino; M. Hoopes; N. Huguet; R. Gold; J.E. DeVoe</td>
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<td>5:00 PM-6:30 PM</td>
<td>Identifying ECG Features in Congenital Heart Disease Using Variants of Dynamic Time Warping</td>
<td>E. Hendryx; C. Rusin; B. Riviere</td>
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<td>5:00 PM-6:30 PM</td>
<td>'Smart Snack Box' System for Recording Snacking Behavior T.Hishiki; H. Yasui; Y. Matsunaga; T. Tamura</td>
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<td>5:00 PM-6:30 PM</td>
<td>Displaying Price Information Lowers Cost and Quantity of Medical Tests: A Systematic Review of the Impact of Price Transparency K.Homann; A. Rule; S.G. Kerzner</td>
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<td>5:00 PM-6:30 PM</td>
<td>Stakeholder Perspectives on Policy Implications Post the Conclusion of the State HIE Program L. Hovey; P. Ubri; P. Dullabh</td>
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<td>5:00 PM-6:30 PM</td>
<td>Migration of a Computerized Anticoagulation Clinic to a Commercially-Developed EHR P. Hu; M. Hedrick; A. Ramsey; C. Radek; K. Huffman; A. Miklius; A. Wilcox</td>
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<td>5:00 PM-6:30 PM</td>
<td>ArticlesAboutMe.org: Disseminating Clinical Trials Results to Patients V. Huser; A. Yaman; C. Weng; J.J. Cimino</td>
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<td>5:00 PM-6:30 PM</td>
<td>Examining Cancer Case Reporting Processes and Timeliness: Preliminary Results A. Jabour; B.E. Dixon; J.F. Jones; D. Haggstrom</td>
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<td>5:00 PM-6:30 PM</td>
<td>Representation of Clinical Practice Guideline Data Elements Using the Health Level Seven Fast Healthcare Interoperability Resources (FHIR) Standard as a Proposed Data Formalism for the Arden Syntax R.A. Jenders</td>
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<td>5:00 PM-6:30 PM</td>
<td>Harmonization of Quality Data Model with HL7 FHIR to Support EHR-driven Phenotype Authoring and Execution: A Pilot Study G. Jiang; H.R. Solbrig; R.C. Kiefer; L. Rasmussen; H. Mo; J.A. Pacheco; E. Montague; J. Xu; P. Speltz; W.K. Thompson; J.C. Denny; C. Chute; J. Pathak</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Case Study on the Effectiveness of an In-house Physician Rating Tool in Outpatient Clinics R. Liu; J. Jiang; N. Goonawardene; S.S. Tan</td>
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<td>5:00 PM-6:30 PM</td>
<td>Selection of a Database Engine for the National Master Patient Index of Malawi C. Kachaie; B. Mhango; M. Bwanali; S.L. Mumba; J.U. Espino; G.P. Douglas</td>
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<td>5:00 PM-6:30 PM</td>
<td>Implementing an EMR-based &quot;No Opiate&quot; Policy In The Emergency Department Z.P. Kahler; P. Musey; J. Finnell; A. Johnson; C. Saupp; C. Strachan; C. Shufflebarger</td>
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<td>5:00 PM-6:30 PM</td>
<td>Question Types in Online Health Communities S. Kanthawala; C. VanDam; B. Given; J. Chai; A. Vermeesch; M. Huebner; J. Crowley; J. Huh</td>
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<td>5:00 PM-6:30 PM</td>
<td>OpenMRS and FHIR: The Promise of a Domain Independent API for serving Healthcare Needs Across Underserved Settings S.N. Kasthurirathne; H. Kumara; B. Mamlín; P.G. Biondich</td>
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<td>An Easy-to-Use Clinical Text De-identification Tool for Clinical Scientists: NLM Scrubber</td>
<td>M. Kayaalp; A. Browne; Z. Dodd; P. Sagan; C.J. McDonald</td>
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<td>5:00 PM-6:30 PM</td>
<td>Understanding the patient through visualization to improve provider-patient communication in hospitals: Know your patient to personalize your communication.</td>
<td>M. Khelifi; L. Kendall; S.R. Mishra; B. Aaronson; A. Pollack; A. Miller; W. Pratt</td>
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<td>5:00 PM-6:30 PM</td>
<td>Improving Detection of Reasons Not to Take a Medication by Leveraging Medication Prescription Status</td>
<td>Y. Kim; J.H. Garvin; J. Heavirland; S. Meystre</td>
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<td>5:00 PM-6:30 PM</td>
<td>The Scalable Collaborative Infrastructure for a Learning Health System</td>
<td>J.G. Klann; M. Natter; D. MacFadden; S.R. Weiler; K. Mandl; S.N. Murphy</td>
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<td>5:00 PM-6:30 PM</td>
<td>Interactive Voice Response Technology: Promises and Pitfalls in Facilitating Patient-Reported Monitoring for Adverse Drug Reactions</td>
<td>E.V. Klinger; A. Salazar; J. Medoff; M.G. Amato; P.C. Dykes; J. Haas; D.W. Bates; G. Schiff</td>
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<td>5:00 PM-6:30 PM</td>
<td>BigMouth: Development of a Scalable Infrastructure to Support Multi Institutional Data Sharing for Dentistry</td>
<td>K. Kookal; D. Tran; R.J. Applegate; H. Spallek; E. Kalenderian; J. White; E.V. Bernstam; M.F. Walji</td>
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<td>5:00 PM-6:30 PM</td>
<td>Clostridium Difficile Repeat Ordering Difficult to Control without CDS</td>
<td>V. Kothapeta; A. Caligiuri; K. Bock; M. Oppenheim; E. Behiri</td>
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<td>5:00 PM-6:30 PM</td>
<td>Visual Exploration of Temporal Data in Electronic Medical Records</td>
<td>J. Krause; N. Razavian; E. Bertini; D. Sontag</td>
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<td>Errors with Manual Phenotype Validation: Case Study and Implications</td>
<td>P. Kukhareva; C.J. Staes; T.J. Tippetts; P.B. Warner; D.E. Shields; H. Mueller; K. Noonan; K. Kawamoto</td>
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<td>5:00 PM-6:30 PM</td>
<td>Archetype Based Nationwide Electronic Health Record Development in Japan</td>
<td>N. Kume; S. Kobayashi; K. Araki; S. Inoue; H. Yoshihara</td>
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<td>5:00 PM-6:30 PM</td>
<td>Integrating Usability Engineering into Undergraduate and Graduate Health Informatics Curricula</td>
<td>A.W. Kushniruk; E.M. Borycki</td>
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<td>5:00 PM-6:30 PM</td>
<td>Evaluation of Simulated Computerized Provider Order Entry Rules Toward Evidence Based Blood Utilization</td>
<td>J.P. Lavoie; W. Miller; M. Kim</td>
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<td>5:00 PM-6:30 PM</td>
<td>The Master Data Element Visualization: A Consolidated View of the EHR Data at Intermountain Healthcare</td>
<td>J. Lee; F. Sakaguchi; J. Mundt; B.B. Dodds; N. Hobbs; K. Holzhauser; S.M. Huff</td>
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<td>Quantifying the Complexity of Discharge Planning in the Inpatient Cardiology Unit</td>
<td>Y. Lee; C.M. Benacka; M. Carson; G. Shier Kricke; P. Kansal; N. Soulakis</td>
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<td>Design of a Knowledge Exchange for Community Health Workers</td>
<td>H. Lehmann; M.C. Gibbons; R. Singlerman; S. King; J. Warren; J. May</td>
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<td>5:00 PM-6:30 PM</td>
<td>Drug-Disease Associations in Guidelines, Drug Labels, and Practice</td>
<td>T. Leung; M. Dumontier</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Deep Learning Framework for Improving Medical Information Retrieval</td>
<td>D. Li; S. Mehrabi; Y. Yu; H. Liu</td>
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<td>Designing iSee, the intelligent Search expansion tool</td>
<td>K. Lin; D. Friedman; H. Kim</td>
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<td>5:00 PM-6:30 PM</td>
<td>An analysis of PubMed4Hh App User Distribution</td>
<td>F. Liu; P. Fontelo</td>
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<td>5:00 PM-6:30 PM</td>
<td>Developing Clinical Decision Support for Patient Self-Management: A Prototype for Symptom Management in Cancer Patients</td>
<td>D.F. Lobach; J.L. Abrahm; D. Berry; M.S. Rabin; I. Braun; M. Nayak; M.E. Cooley</td>
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<td>Mapping workflows in a surgical clinic to guide implementation of a patient-centered postoperative mHealth wound assessment system</td>
<td>R.J. Lordon; H.L. Evans; A.L. Hartzler; C. Armstrong; S. Whitehead; P. Sanger; W.B. Lober</td>
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<td>Designing a Plan Do Study Act Framework to Promote Proper Utilization of Early Detection Technology in the Acute Care Setting</td>
<td>G. Lowenthal; P.C. Dykes; S.R. Lipsitz; C.S. Yoon; R. Rozenblum; P.G. An; S. Salvucci; C. Shaughnessy; D.W. Bates</td>
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<td>Generating the MEDLINE N-Gram Set</td>
<td>C.J. Lu; D.L. Tormey; L. McCreedy; A.C. Browne</td>
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<td>5:00 PM-6:30 PM</td>
<td>Bridging the Representation Gap of Medical Image and Clinical Note through Semantic Association Mining</td>
<td>J. Luo; T.B. Patrick</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Framework for Incorporating Changes to a Reference Terminology on a Mapped Enterprise Terminology Subset</td>
<td>S. Madani; T. Rosenbloom</td>
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<td>Quantitative Evaluation of Dysarthria and Development of Vowel Sound Voice Training System</td>
<td>H. Maeda; N. Arisaka; W. Hata; N. Mamorita; I. Ishizaka; K. Yamashita; H. Tsuruta</td>
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<td>User-Centered Design of an Application to Aid in the Safe Return to Work of Injured Farm Workers</td>
<td>A. Mahnke; L. Verhagen; B. Weichelt; I.A. Reyes; W. Ray; M. Keifer</td>
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<td>5:00 PM-6:30 PM</td>
<td>Responders and Nonresponders: Nurse Practitioner and Physical Therapist Personal Perceptions of Activity Monitors for Patient Use</td>
<td>P.J. Mancuso; S. Myneni</td>
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<td>ICan'tCount: A mobile app for helping children with dyscalculia</td>
<td>A. Marchesini; V. Maurelli; S. Pantano; G. Vacante; M. Coniglio; G. Palermo; V. Tauro; A. Accardo; S.R. Marceglia</td>
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<td>Optic disc and macula detection in fundus images by means of template matching</td>
<td>L. Rodríguez Quiñones; M. Martinez-Castellanos; M. Martinez-Perez; S. Salinas-Longoria; T. Garduno-Alvarado</td>
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<td>High Level Architecture and Evaluation of Patient Linkages for READY - An Electronic Measurement Tool for Rheumatoid Arthritis</td>
<td>P. Mathur; L.A. Southern; A. Bharat; S. Wang; C. Heckler; O. Lele; P.J. Embi; J.R. Curtis</td>
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<td>Clinician Evaluation of Clinical Decision Support Alert and Response Appropriateness</td>
<td>A.B. McCoy; E.J. Thomas; M. Krousel-Wood; D.F. Sittig</td>
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<td>5:00 PM-6:00 PM</td>
<td>A Taxonomic Analysis of Programming Errors in Electronic Health Records (EHRs) which Lead to Clinical Decision Support Malfunctions</td>
<td>D.S. McEvoy; S.T. Hussain; T. Hickman; D.F. Sittig; A. Wright</td>
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<td>5:00 PM-6:00 PM</td>
<td>Visualization of Laboratory, Vital, Precaution and Patient Status Data to Optimize Time on Task and Use Related Hazards</td>
<td>R.A. McKelvy; N.C. Gonzalez; K.L. Fleming; W.B. Webb; R.L. Shapiro</td>
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<td>Exploring Gaps of Family History Documentation in EHR for Precision Medicine - A Case Study of Familial Hypercholesterolemia Ascertainment</td>
<td>S. Mehrabi; M.S. Safarova; I.J. Kullo; H. Liu</td>
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<td>SCILHS Data Mart Creation Plugin</td>
<td>M. Mendis; J. Donahoe; J.G. Klann; V. Raghavan; L.C. Phillips; A. Turchin; S.N. Murphy</td>
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<td>Assessing and Simulating Scheduling Processes in Community Health Centers</td>
<td>I. Mohammadi; A. Turkcan; T. Toscos; A. Miller; K. Kunjan; B.N. Doebbeling</td>
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<td>Using Natural Language Processing to Facilitate Medical Record Abstraction in Epidemiological Studies</td>
<td>C.R. Moore; K. Shaffer; A. Kucharska-Newton; S.W. Haas; G. Heiss</td>
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<td>Implementing Customizable Asthma Action Plans into an Electronic Medical Record</td>
<td>S.J. Morgan; H.Z. Ramelson</td>
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<td>RECRUIT: Roadmap to Enhance Clinical trial Recruitment Using Information Technology</td>
<td>T. Motiwalla; C. Shivade; S. Raje; A.M. Lai; P. Payne</td>
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<td>Variation in EHR Implementations and the Impact on Safety of Test Result Follow-up</td>
<td>D.R. Murphy; M.W. Smith; D.F. Sittig; E. Russo; H. Singh</td>
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<td>Network Infrastructure for Large Scale Regional Medical Information Network</td>
<td>N. Nakamura; M. Nakayama; T. Suganuma; N. Shiratori; T. Tominaga</td>
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<td>Automated Approach to Extract Cardiovascular Phenotypes from Echocardiography Reports</td>
<td>C. Nath; M. Albaghdadi; S.R. Jonnalagadda</td>
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<td>5:00 PM-6:30 PM</td>
<td>Early Detection of Heart Failure using Data Driven Modeling Approaches on Electronic Health Records: How far can one go without Domain Knowledge?</td>
<td>K. Ng; Y. Wang; J. Hu; W. Stewart; S.R. Steinhubl; C. deFilippi</td>
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<td>Multi-Agent (Team) Microworld Environments for Healthcare</td>
<td>V. Nguyen; A. Franklin</td>
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<td>The TISS Standard for electronic exchange of information in the private health insurance sector in Brazil</td>
<td>S.P. Oliveira; J. Riani Costa</td>
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<td>BEST PRACTICES AND DESIGN EXPERIENCES IN HEALTH INFORMATION TECHNOLOGY (HIT) SYSTEMS: A PRIMER</td>
<td>G. Opoku-Boateng</td>
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<td>Nurses’ Use of Electronic Health Records to Document Symptoms in Inpatient Settings: Preliminary Systematic Review Results</td>
<td>M. Ozkaynak; B. Reeder; L. Hoffeecker; M.B. Makic; K. Sousa</td>
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<td>Privacy Preserving Sequential Pattern Mining Across Multiple Medical Sites</td>
<td>D. Pal; T. Chen; J. Thomas</td>
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<td>Perceptions of Health Information Technology Risks by Hospital Physicians</td>
<td>S. Palojoki; L. Lehtonen; K. Saranto</td>
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<td>Measuring Informatics Capacity and Capability in Public Health Agencies</td>
<td>S.R. Papagari Sangareddy; H. Tolentino; L.H. Franzke</td>
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<td>Identifying Health Consumer’s eHealth Literacy to Decrease Disparities in Accessing eHealth Information</td>
<td>H. Park; E. Lee</td>
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<td>Building custom lexicon for a large number of related concepts using templates</td>
<td>O.V. Patterson; M. Freiberg; S.L. DuVall</td>
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<td>Surveying Problem List Perceptions and Use in the Electronic Health Record</td>
<td>D. Peterson; T. Burdick; J. Cohen; I.N. Sarkar; J. Lin; D. Plante; E.S. Chen</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Simulation Framework for Longitudinal Electronic Health Records Data</td>
<td>M. Phelan; B. Goldstein</td>
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<td>5:00 PM-6:30 PM</td>
<td>Medications and Events Most Commonly Discussed in Facebook and Twitter</td>
<td>L. Anderson; H.G. Bell; G. Powell; L.A. Schifano; H.V. Le; H. Rodriguez</td>
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<td>Text Mining of Patient Demographics and Diagnoses from Psychiatric Assessments</td>
<td>E. Klosterman; R. Prasad</td>
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<td>Comparison of Knee Replacement Bundled Payment Pricing Variances Between Medicare, Medicaid, and Commercial Payers</td>
<td>T.R. Pressler; T. Gurgiolo; S. Orme; R. Kershner; J. Mathieu</td>
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<td>Blood Flow Model for Improved Decision Support</td>
<td>C. Puelz; B. Riviere; C. Rusin</td>
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<td>5:00 PM-6:30 PM</td>
<td>Fine Phenotyping in Lung Cancer Using Radiomics and Clinical Data</td>
<td>L.E. Selva; S. Pyarajan</td>
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<td>Predictors of Medical Records Violation Punishments Filed with the Texas Medical Board (TMB) Before and After the HITECH Act</td>
<td>M. Rais; C.W. Johnson; E. Kavoos</td>
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<td>Automated Citation Retrieval System for Clinical Knowledge Management</td>
<td>K. Raja; A.J. Sauer; M. Klerer; S.R. Jonnalagadda</td>
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<td>Problem list problems: A look into data integrity</td>
<td>G.H. Ramirez; H. Kim; R. El-Kareh</td>
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<td>5:00 PM-6:30 PM</td>
<td>Automating Maintenance of Care Team Relationships from Electronic Health Administrative Data to Decrease Variability of Care Coordination using the Health Information Exchange Infrastructure</td>
<td>P. RanadeKharkar; G.E. Gurr; D.K. Mann; S.N. Thornton</td>
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<td>Social Media use for Drug Repurposing: Understanding the consumer perspective</td>
<td>M. Rastegar-Mojarad; H. Liu; P. Nambisan</td>
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<td>Gaussian Processes for Interpreting Multiple Prostate Specific Antigen measurements for Prostate Cancer Prediction</td>
<td>N. Razavian; S. Blecker; D. Sontag</td>
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<td>Novel Template Identification from VA Text Integration Utility Notes</td>
<td>A.M. Redd; G. Divita; A.V. Gundlapalli; L.T. Tran; M. Samore</td>
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<td>Adapting a Mobility Monitoring Protocol for Sensor Studies with Functionally Vulnerable Older Adults</td>
<td>B. Reeder; A.A. Richard; J. Falvey; R.J. Paxton; J. Stevens-Lapsley</td>
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<td>Identifying Patterns Indicative of Copying/Pasting Behavior in Patient Generated Online Content</td>
<td>T.L. Reynolds; V. Vydiswaran; Y. Wu; Q. Mei; D.A. Hanauer; K. Zheng</td>
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<td>Visualizing High Dimensional Clinical and Tumor Genotyping Data</td>
<td>M. Rioth; J.L. Warner</td>
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<td>The CDS Collaborative: Goals, Deliverables, and Future Directions</td>
<td>S. Rodriguez-Loya; E. Fry; D. Sefer; P.B. Warner; C. Nanjo; J. Goodnough; D.E. Shields; E. Elliott; E. Aliverti; K. Kawamoto</td>
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<td>Use of Diagnosis Related Groups to Predict All-Cause Pediatric Hospital Readmission Within 30 days</td>
<td>V.M. Ruiz Herrera; A.J. Draper; Y. Ye; A.H. Urbach; R. Tsui</td>
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<td>An Exploratory Analysis of Inpatient Satisfaction and Usage Pattern of Personalized Bedside Station</td>
<td>B. Ryu; S. Kim; K. Lee; H. Hwang; S. Yoo</td>
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<td>A Multi-Dimensional Consumer-Oriented Approach to Evaluate Patient Portals</td>
<td>M. Salimi; A. Stanley; V. Nguyen; S. Myneni</td>
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<td>MAC Annotator: An interactive tool for translating medication appropriateness criteria into structured form</td>
<td>H. Salmassian; C. Friedman</td>
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<td>5:00 PM-6:30 PM</td>
<td>Predicting Acute Kidney Injury in Critically Ill Children Using Electronic Health Record Data – A Comparison of Four Statistical Learning Models</td>
<td>L.N. Sanchez-Pinto; R.G. Khemani</td>
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<td>Automating risk score calculations and care recommendations by an EMR agnostic solution and potential time saving for providers</td>
<td>M.R. Scheitel; H. Liu; J.L. Shellum; R. Hankey; S.G. Peters; R. Chaudhry</td>
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<td>Clinical Relevance of the Doctor's Dilemma Question Set</td>
<td>D.R. Schlegel; S. Kaushik; P.L. Elkin</td>
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<td>Computerized Provider Order Entry Rates and Length of Stay Are Inversely Correlated</td>
<td>R. Schreiber</td>
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<td>Evaluation of Perioperative Medication Errors and Adverse Drug Events</td>
<td>K.C. Nanji; S.D. Shaikh; A. Patel; D. Seger; D.W. Bates</td>
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<td>Increasing Size of a Health Information Exchange Allows More Accurate Measurement of Early ED Returns</td>
<td>E. Kim; G.T. Loo; T. Lowry; B.D. Shy; U. Hwang; N. Genes; C.F. Clesca; L. Richardson; J.S. Shapiro</td>
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<td>Registries in Accountable Care: Essential Data Management in New Models of Care</td>
<td>J.W. Sharp</td>
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<td>MedBus: A service-oriented architecture for enabling the research data economy</td>
<td>A. Shee; J. Estill; J.S. Brussolo</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Continuous Markov Model Approach Using Individual Patient Data to Estimate Mean Sojourn Time of Lung Cancer</td>
<td>S. Shen; S.X. Han; P. Petousis; F. Meng; W. Hsu; A.A. Bui</td>
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<td>Performance Comparison of Running Clinical Rules in Drools and Plain Java Implementation</td>
<td>J. Shi; E. Smith; T. Van Gilder</td>
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<td>An Enterprise Clinical Data Pipeline for a Cancer Center</td>
<td>E. Silgard; T. Galuhn; K. Egan; A. Rauch; P. Fearn</td>
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<td>A New, Touch-screen Sensitive Display for Management of Diuretic Therapy of Heart Failure Patients in Critical Care Setting</td>
<td>J. Sklenar; J. Parikh; J.O. Mudd</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Novel Anatomical Semantic Ontology for Identification of Anatomically Proximate CTs Using LOINC Codes</td>
<td>B.H. Slovis; T. Lowry; B. Delman; A.O. Beitia; G. Kuperman; C. DiMaggio; J.S. Shapiro</td>
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<td>A Platform for Generating and Validating Breast Risk Models from Clinical Data: Towards Patient-Centered Risk Stratified Screening</td>
<td>N.F. Smedley; N. Chau; A. Petrusre; A.A. Bui; A. Naeim; W. Hsu</td>
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<td>5:00 PM-6:30 PM</td>
<td>Prediction of Colorectal Surgical Site Infections Using Risk Factors</td>
<td>S. Sohn; M. Rastegar-Mojarad; J.M. Naessens; E.B. Habermann; D.W. Larson; H. Liu</td>
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<td>5:00 PM-6:30 PM</td>
<td>Annotating ADLs and IADLs in Veterans Affairs Clinical Documents</td>
<td>B.R. South; D. Mowery; L. Christensen; A.V. Gundlapalli; M. Tharp; M. Vali; M.E. Carter; M. Conway; S. Keyhani; W. Chapman</td>
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<td>5:00 PM-6:30 PM</td>
<td>Home-care Scheduling, Supervision and Security (HC-SSS): A status report</td>
<td>M. Botsivaly; V. Pierros; M. Marinis; A. Tzavaras; B.P. Spyropoulos</td>
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<td>5:00 PM-6:30 PM</td>
<td>Using the Consolidated Framework for Implementation Research (CFIR) to Evaluate EHR Population Health Management Tools</td>
<td>C.L. Stephan; L.L. Popejoy; D.R. Mehr; E. Rahmani; K. Wilkinson; E. Simoes</td>
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<td>5:00 PM-6:30 PM</td>
<td>Matrix Completion Methods and Imputation for EMR-Based Prediction.</td>
<td>E.J. Strandberg; M. Bayati</td>
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<td>5:00 PM-6:30 PM</td>
<td>Clinical Efficacy of Virtual Reality Rehabilitation Intervention for Patients with Low-back Pain: A Randomized Controlled Trial</td>
<td>W. Su; S. Yeh; S. Lee; H. Huang</td>
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<td>5:00 PM-6:30 PM</td>
<td>Personal Health Information Management Strategies: Experiences of Patients in the US and China</td>
<td>S. Sun; N.J. Belkin</td>
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<td>5:00 PM-6:30 PM</td>
<td>Understanding Why Providers Override Computerized Medication Alerts in the Inpatient and Outpatient Setting</td>
<td>M. Swerdloff; D. Seger; M.G. Amato; N. Maniam; O. Dalleur; J.M. Fiskio; Q.L. Her; S.P. Slight; P.E. Beeler; T. Eguale; P.C. Dykes; D.W. Bates</td>
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<td>5:00 PM-6:30 PM</td>
<td>Lost in the Fog: Information Needs in the Care of Patients with Delirium</td>
<td>T. Taft; S.D. Nelson; S. Slager; C. Weir</td>
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<td>5:00 PM-6:30 PM</td>
<td>Mapping APACHE IV &quot;Reason for Intensive Care Admission&quot; Classification to SNOWMED CT</td>
<td>C. Thongprayoon; A.K. Barwise; A.M. Harrison; B.W. Pickering; V. Herasevich</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>A SURVEY ON E-PRESCRIBING: AWARENESS, SATISFACTION, BENEFITS AND BARRIERS IN FLORIDA</strong> P. Esmaeil Zadeh; M.C. Tremblay; G.J. Deckard</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Smart Coach: A Problem-Solving Mobile App to Support Weight Loss Management</strong> B. Tulu; E. Agu; S. Lemon; J. Oleski; M. Evans; S. Pagoto</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Researcher Needs for a Patient-Centered Outcomes Research (PCOR) Data Infrastructure</strong> P. Ubri; P. Dullabh; T. Alexander; A. Rein; E. Holve; A. Schachter</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Development of a concept-based template report editor for Radiological Information System</strong> C. Valencia; A. Arbeláez; S. Velez; H. Chvatal; A.F. Zapata; L. Tamayo; A.C. Londoño; J.F. Florez-Arango</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Developing an Enhanced Electronic Referral Management System</strong> A. von Taube; P.M. Neri; D. Kiernan; I. Natanel; H.Z. Ramelson</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Exploring Healthcare Mobility in the US to Improve Quality of Care: Preliminary Results</strong> K. Wang; C. Carroll; B. Fenton; S.j. Fodeh; J. Erdos; M. Nunez-Smith; A.C. Justice; C. Brandt</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Integrating Analytics and Business Intelligence (BI) into a Health Informatics Curriculum: Pros, Cons and Opportunities</strong> V. Wangia-Anderson</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Engaging Patients &amp; Families in Contributing Patient-Reported Outcomes to a Pediatric Disease Registry for Comparative Effectiveness Research</strong> E.R. Weitzman; P.K. Salimian; K.L. Olson; K. Mandl; M. Natter</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Augmenting Psychiatric Care: A Participatory Mobile Framework</strong> K.M. Kelly; J. Rosser; K. Wells; A. Arevian</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Intelligent Home Risk Monitoring To Enable Post Acute Care Surveillance</strong> H. Moghimi; J.L. Schaffer; N. Wickramasinghe</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Using Informatics Tools to Standardize the Request, Adjudication and Monitoring of Non Formulary Agents at a VA Facility</strong> L. Winterbottom; J. McConnachie; T.M. Brenk; J. Yang; B.M. Wilcox</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Visualizing Clinical Workflow using Time and Motion Data</strong> D.T. Wu; N. Smart; S. Han; M. Majeed; J. Han; S. Li; F. Zhang; K. Zheng</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>PheWAS Network Analysis and Visualization</strong> Y. Xu; T. Edwards; L. Bastarache; R.N. Jerome; S. Zho; E. Torstenson; W. Wei; J. Shirey-Rice; E.A. Bowton; Y. Shyr; J. Pulley; J.C. Denny</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>GeoHealth Informatics: Applying Geographic Information Science (GIS) to Support Heart Failure Self-Care</strong> N. Ye; D. Johnson; R.J. Holden</td>
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<td>5:00 PM-6:30 PM</td>
<td>Annotating Recommendation Sentences in Radiology Reports</td>
<td>M. Yetisgen; P. Klassen; L. McCarthy; T. Payne; M.L. Gunn</td>
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<td>5:00 PM-6:30 PM</td>
<td>Annotation of Disease Characteristics for Cancer Liver Stage Prediction</td>
<td>W. Yim; S.W. Kwan; G. Johnson; M. Yetisgen</td>
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<td>5:00 PM-6:30 PM</td>
<td>Using TURF Framework to Improve EHR-CPOE Medication Dosing in Renal Impaired Elderly</td>
<td>R.A. Yusuf; M. Salimi; M. Zhu</td>
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<td>5:00 PM-6:30 PM</td>
<td>Lack of Unique Healthcare Identifier in Healthcare Information Exchanges: A Field Study</td>
<td>M.C. Tremblay; G.J. Deckard; P. Zhang</td>
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<td>5:00 PM-6:30 PM</td>
<td>Understanding the Use of Adverse Events Criteria in Radiation Therapy: A Literature Mining Approach</td>
<td>Y. Zhen; Y. Jiang; Q. Wu; L. Yuan; Y. Ge</td>
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<td>5:00 PM-6:30 PM</td>
<td>Automatically Screening Possible Chemoresistance Genes of Bladder Cancer Drugs</td>
<td>L. Wang; J. Zhu; Q. Zhu</td>
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<td>5:00 PM-6:30 PM</td>
<td>Choosing to Build: Optimizing the Development of a Custom Pathology Laboratory Software Solution</td>
<td>E. Madrigal; V. Brodsky</td>
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<td>5:00 PM-6:30 PM</td>
<td>Facebook and depression: How people with depression use Facebook to manage their depression</td>
<td>M. Zolnoori; P. Nambisan; T.B. Patrick</td>
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<tr>
<td>10:00 AM-2:00 PM, Room: TBD (Hilton San Francisco Union Square)</td>
<td>Poster Session I (Authors not present) Poster</td>
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<tr>
<td>8:00 PM-10:00 PM, Yosemite C (Hilton San Francisco Union Square)</td>
<td>Primary Care Informatics Working Group Meeting Business Meeting</td>
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<td>7:00 AM-8:30 AM, Union Square 5/6 (Hilton San Francisco Union Square)</td>
<td>Public Policy Committee Meeting Business Meeting</td>
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<tr>
<td>8:30 AM-10:00 AM, Room: TBD (Hilton San Francisco Union Square)</td>
<td>S12: Didactic Panel - Public Implementation Resources for Genomic Medicine, Didactic Panel, Translational Bioinformatics and Biomedicine</td>
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<td>8:30 AM-10:00 AM</td>
<td>Public Implementation Resources for Genomic Medicine</td>
<td>J.F. Peterson; M.S. Williams; C.L. Overby; R.R. Freimuth; I.J. Kullo</td>
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<tr>
<td>8:30 AM-10:00 AM, Room: TBD (Hilton San Francisco Union Square)</td>
<td>S13: Didactic Panel - Harmonization of ICD-11 and SNOMED CT - Not just Mapping! Practical and Theoretical Lessons and Benefits to Users and Implementors</td>
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<tr>
<td>8:30 AM-10:00 AM</td>
<td>Harmonization of ICD-11 and SNOMED CT – Not just mapping! Practical and Theoretical Lessons &amp; Benefits to Users and Implementors</td>
<td>A.L. Rector; J.R. Campbell; B.T. Ustun; C. Chute; H.R. Solbrig</td>
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<td>8:30-8:52 AM</td>
<td>Recognizing Disjoint Clinical Concepts in Clinical Text Using Machine Learning-based Methods</td>
<td>B. Tang; Q. Chen; X. Wang; Y. Wu; Y. Zhang; J. Wang; H. Xu</td>
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<td>8:52-9:14 AM</td>
<td>Interpretable Probabilistic Latent Variable Models for Automatic Annotation of Clinical Text</td>
<td>A. Kotov; M. Hasan; A. Carcone; M. Dong; S. Naar-King; K. Brogan Hartlieb</td>
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<tr>
<td>9:14-9:36 AM</td>
<td>Towards a Generalizable Time Expression Model for Temporal Reasoning in Clinical Notes</td>
<td>S. Velupillai; D. Mowery; S.E. Abdelrahman; L. Christensen; W. Chapman</td>
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<tr>
<td>9:36-9:58 AM</td>
<td>A Study of Concept Extraction Across Different Types of Clinical Notes</td>
<td>Y. Kim; E. Riloff; J.F. Hurdle</td>
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<td>8:30-8:52 AM</td>
<td>Utilizing Multidimensional Computer Adaptive Testing to Mitigate Burden With Patient Reported Outcomes</td>
<td>M. Bass; S.B. Morris; R. Neapolitan</td>
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<td>8:52-9:14 AM</td>
<td>A Novel Multiple Choice Question Generation Strategy: Alternative Uses for Controlled Vocabulary Thesauri in Biomedical-Sciences Education</td>
<td>M.A. Lopetegui; B.A. Lara; P. Yen; Ü.V. Çatalyürek; P. Payne</td>
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<td>9:14-9:36 AM</td>
<td>Intelligent Simulation Model To Facilitate EHR Training</td>
<td>V. Mohan; G. Scholl; J.A. Gold</td>
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<td>9:36-9:58 AM</td>
<td>Implementation and evaluation of a tele-education system for the diagnosis of ophthalmic disease by international trainees</td>
<td>J.P. Campbell; R. Swan; K. Jonas; S. Ostmo; C. Ventura; M. Martinez-Castellanos; R.G. Anzures; M.F. Chiang; R.P. Chan</td>
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<td>8:30-8:52 AM</td>
<td>Translational Meta-analytical Methods to Localize the Regulatory Patterns of Neurological Disorders in the Human Brain</td>
<td>V. Sochat; M. David; D. Wall</td>
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<td>8:52-9:14 AM</td>
<td>POETenceph - Automatic identification of clinical notes indicating encephalopathy using a realist ontology</td>
<td>K.M. Doing-Harris; C. Weir; S. Igo; J. Shi; Y. Shao; J.F. Hurdle</td>
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<td>9:14-9:36 AM</td>
<td>Computational Methods for Unraveling Temporal Brain Connectivity Data</td>
<td>B. Ray; C. Aliferis; A. Statnikov</td>
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<td>9:36-9:58 AM</td>
<td><strong>Combing Human Disease Genetics and Mouse Model Phenotypes Towards Drug Repositioning for Parkinson’s Disease</strong> Y. Chen; X. Cai; R. Xu</td>
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<td>8:30 AM-10:00 AM, Room: TBD (Hilton San Francisco Union Square), S17: Papers - Taking a Risk (and Addressing It), Papers</td>
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<td>8:30-8:52 AM</td>
<td><strong>Modelling Risk of Cardio-Respiratory Instability as a Heterogeneous Process</strong> L. Chen; A. Dubrawski; M. Hravnak; G. Clermont; M. Pinsky</td>
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<td>8:52-9:14 AM</td>
<td><strong>Diagnostic Characteristics of Patient Self-Assessment of Preoperative Cardiac Risk for Non-Cardiac Surgery - Foundations for Patient Driven Decision Support</strong> S. Manaktala; T.J. Adam</td>
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<td>9:14-9:36 AM</td>
<td><strong>Automatic Classification of Structured Product Labels for Pregnancy Risk Drug Categories, a Machine Learning Approach</strong> L.M. Rodriguez; D. Demner-Fushman</td>
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<td>9:36-9:58 AM</td>
<td><strong>Machine Learning for Treatment Assignment: Improving Individualized Risk Attribution</strong> J. Weiss; F. Kuusisto; K. Boyd; J. Liu; D. Page</td>
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<td>8:30 AM-10:00 AM, Room: TBD (Hilton San Francisco Union Square), S18: Papers/Podium Presentations - Clinical Studies, Papers/Podium Presentations</td>
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<td>8:30-8:52 AM</td>
<td><strong>A REAL TIME ELECTRONIC REGISTRY AS A KEY INTERVENTION TO REDUCE TREATMENT DISPARITIES IN EARLY STAGE, NON-SMALL CELL LUNG CANCER: PRELIMINARY RESULTS</strong> S. Cykert; P. Walker; P. Dilworth-Anderson; M. Cirino-Marcano</td>
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<td>8:52-9:14 AM</td>
<td><strong>Simulation-based Evaluation of the Generalizability Index for Study Traits</strong> Z. He; P. Chandar; P.B. Ryan; C. Weng</td>
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<td>9:14-9:36 AM</td>
<td><strong>Reproducing a Prospective Clinical Study as a Retrospective Study in MIMIC-II</strong> F.S. Kury; V. Huser; J.J. Cimino</td>
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<td>8:30 AM-10:00 AM, Room: TBD (Hilton San Francisco Union Square), S19: Podium Presentations - Inpatient Consumer Health, Podium Presentations</td>
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<td>8:30-8:52 AM</td>
<td><strong>Interim Results of a Randomized Controlled Trial on Inpatient Engagement</strong> J. Prey; B. Ryan; M. Qian; S. Restaino; S. Bakken; S.K. Feiner; R. Schnall; G. Hripcsak; J. Han; D. Vawdrey</td>
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<td>8:52-9:14 AM</td>
<td><strong>Engaging patients in their inpatient care: Effect of patient access to their electronic health record during an acute care hospitalization</strong> J. Pell; C. Lin; M. Mancuso; S. Limon; K. Oman</td>
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<td>9:14-9:36 AM</td>
<td>Medication Compliance in Pediatric Inpatients – What are we missing?</td>
<td>H. Bhatia; N. Patel; C.H. Ivory; P. Stewart; K.M. Unertl; C.U. Lehmann</td>
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<td>8:30 AM-10:00 AM</td>
<td>Room: TBD (Hilton San Francisco Union Square), S20: Podium Presentations - Are We Safer Yet?</td>
<td>Podium Presentations</td>
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<tr>
<td>8:30-8:52 AM</td>
<td>A Road Map for a National Health Information Technology Safety Center</td>
<td>D. Johnston; A. Gettinger; K. Kenyon; S. Rizk; C. Byrne; L. Dimitropoulos</td>
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<td>9:36-9:58 AM</td>
<td>Using Patient-Centered Technological Design to Improve Inpatient Fall Prevention</td>
<td>Z.P. Katsulis; W. Leung; A. Ergai; L. Schenkel; A. Rai; J. Adelman; J. Benneyan; D.W. Bates; P.C. Dykes</td>
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<td>8:30 AM-10:00 AM</td>
<td>Room: TBD (Hilton San Francisco Union Square), S21: Systems Demonstrations - Mapping Public Health</td>
<td>Systems Demonstrations</td>
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<tr>
<td>8:30-9:15 AM</td>
<td>Leveraging Health Information Exchange to Create Neighborhood Health Records for Public Health Agencies</td>
<td>B.E. Dixon; P. Gibson; K.F. Comer; J. Zou; J.L. Williams; M. Rosenman</td>
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<td>9:15-10:00 AM</td>
<td>The SDIDS System for Integrating Global Health Surveillance Data: An Example Application to Malaria Surveillance in Uganda</td>
<td>K. Zinszer; A. Okhmatovskaia; A. Shaban-Nejad; L.N. Carroll; N.F. Abermethy; D. Buckeridge</td>
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<td>8:30 AM-10:00 AM</td>
<td>Room: TBD (Hilton San Francisco Union Square), S22: Papers - Clinical Data Mining</td>
<td>Papers</td>
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<td>8:30-8:52 AM</td>
<td>Handling Temporality of Clinical Events for Drug Safety Surveillance</td>
<td>J. Zhao; A. Henriksson; M. Kvist; L. Asker; H. Boström</td>
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<td>8:52-9:14 AM</td>
<td>Casting a Wider Net: Data Driven Discovery of Proxies for Target Diagnoses</td>
<td>D. Ramlijak; A. Davey; A. Uversky; S. Roychoudhury; Z. Obradovic</td>
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<td>9:14-9:36 AM</td>
<td>Machine Learning Approaches for Detecting Diabetic Retinopathy from Clinical and Public Health Records</td>
<td>O. Ogunyemi; D. Kermah</td>
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<td>9:36-9:58 AM</td>
<td>An Associative Memory Model for Integration of Fragmented Research Data and Identification of Treatment Correlations in Breast Cancer Care A.G. Banerjee; M. Khan; J.H. Higgins; A. Giani; A. Das</td>
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<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), <strong>S23: Interactive Panel - Opportunities for Social Media within Consumer Health Informatics</strong>, Interactive Panel</td>
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<td>10:30 AM-12:00 PM</td>
<td>Opportunities for Social Media within Consumer Health Informatics R. Valdez; S. Myneni; A.L. Hartzler; L. Mamykina; N. Cobb; L. Barnes</td>
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<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), <strong>S24: Didactic Panel - Natural Language Processing for Phenotype Extraction: Challenges in Extraction and Representation</strong>, Didactic Panel</td>
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<td>10:30 AM-12:00 PM</td>
<td>Natural Language Processing for Phenotype Extraction: Challenges in Extraction and Representation H. Hochheiser; G. Savova; R. Jacobson; J.C. Denny; N.L. Washington</td>
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<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), <strong>S25: Didactic Panel - The Clinical Quality Framework Initiative to Harmonize Decision Support and Quality Measurement Standards: Defined Standards, Pilot Results, and Moving Beyond Quality Improvement</strong>, Didactic Panel</td>
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<td>10:30 AM-12:00 PM</td>
<td>The Clinical Quality Framework Initiative to Harmonize Decision Support and Quality Measurement Standards: Defined Standards, Pilot Results, and Moving Beyond Quality Improvement K. Kawamoto; M.J. Hadley; T.A. Oniki; J. Skapik</td>
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<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), <strong>S26: Papers - Temporal Data Mining</strong>, Papers</td>
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<td>10:30-10:52 AM</td>
<td>A Graph Based Methodology for Temporal Signature Identification from EHR F. Wang; C. Liu; Y. Wang; J. Hu; G. Yu</td>
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<td>10:52-11:14 AM</td>
<td>Mortality Prediction in ICUs Using A Novel Time-Slicing Cox Regression Method Y. Wang; W. Chen; K.M. Heard; M.H. Kollef; T.C. Bailey; Z. Cui; Y. He; C. Lu; Y. Chen</td>
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<td>11:14-11:36 AM</td>
<td>Data-driven Temporal Prediction of Surgical Site Infection C. Soguero-Ruiz; F. Wang; R. Jenssen; K.M. Augestad; J. Rojo-Álvarez; I. Mora-Jíménez; R. Lindsetmo; S. Skrøvseth</td>
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<td>11:36-11:58 AM</td>
<td>Exploration of Temporal ICD Coding Bias Related to Acute Diabetic Conditions M. McKillop; C. Weng; F. Polubriaginof</td>
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<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), <strong>S27: Papers - Creating New Ontologies</strong>, Papers</td>
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<td>10:30-11:00 AM</td>
<td>A Data Quality Ontology for the Secondary Use of EHR Data S.G. Johnson; S. Speedie; G. Simon; V. Kumar; B.L. Westra</td>
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<td>11:00-11:30 AM</td>
<td>Similarity-Based Recommendation of New Concepts to a Terminology P. Chandar; A. Yaman; J. Hoxha; Z. He; C. Weng</td>
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</table>
### 11:30-12:00 PM

Y. Lin; C.J. Staes; D.E. Shields; V.R. Kandula; B.M. Welch; K. Kawamoto

### 10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), **S28: Papers - Analysis of Scientific Literature, Papers**

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>10:30-10:52 AM</td>
<td>Examining the Distribution, Modularity, and Community Structure in Article Networks for Systematic Reviews</td>
<td>X. Ji; R. Machiraju; A. Ritter; P. Yen</td>
</tr>
<tr>
<td>10:52-11:14 AM</td>
<td>Classification of Clinically Useful Sentences in MEDLINE</td>
<td>M.A. Morid; S.R. Jonnalagadda; M. Fiszman; K. Raja; G. Del Fiol</td>
</tr>
<tr>
<td>11:14-11:36 AM</td>
<td>Knowledge Extraction from MEDLINE by Combining Clustering with Natural Language Processing</td>
<td>J. Miñarro-Gimenez; M. Kreuzthaler; S. Schulz</td>
</tr>
<tr>
<td>11:36-11:58 AM</td>
<td>Automatic Assignment of Non-Leaf MeSH Terms to Biomedical Articles</td>
<td>R. Kavuluru; A. Rios</td>
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</table>

### 10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), **S29: Podium Presentations - Clinical Research Informatics, Podium Presentations**

<table>
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<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>10:30-10:52 AM</td>
<td>What Are Frequent Data Requests from Researchers? A Conceptual Model of Researchers’ EHR Data Needs for Comparative Effectiveness Research</td>
<td>G.W. Hruby; P. Chandar; J. Hoxha; E.A. Mendonca; D.A. Hanauer; C. Weng</td>
</tr>
<tr>
<td>10:52-11:14 AM</td>
<td>Intra-cluster correlation estimates for design of cluster-randomized trials and multi-clinic studies that utilize electronic health record data</td>
<td>M. Marino; J. Heintzman; E. Dexter; S. Cowburn; J.P. O’Malley; S.R. Bailey; R. Gold; J.E. DeVoe</td>
</tr>
<tr>
<td>11:36-11:58 AM</td>
<td>Identifying and Understanding Data Quality Issues in a Pediatric Distributed Research Network</td>
<td>R. Khare; L. Utidjian; G. Schulte; K. Marsolo; C. Bailey</td>
</tr>
</tbody>
</table>

### 10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), **S30: Podium Presentations - NLP-enabled Information Retrieval, Podium Presentations**

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<tr>
<th>Time</th>
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<tr>
<td>10:30-10:52 AM</td>
<td>Identifying Novel Adverse Drug Events from Health Social Media Using Distant Supervision</td>
<td>X. Liu; H. Chen</td>
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<tr>
<td>10:52-11:14 AM</td>
<td>Identifying Abnormal Anatomy on Temporal Bone Computed Tomography Reports Using Readily Available Natural Language Processing Software</td>
<td>A.J. Masino; R. Grundmeier; J.W. Pennington; E.B. Crenshaw</td>
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<td>Time</td>
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<tr>
<td>11:14-11:36 AM</td>
<td>Identification of Venous Thromboembolism from Electronic Medical</td>
<td>S. Zheng; R. Dantes; J.J. Lu; S. Chernenkaya Tejedor; M. Beckman; A.</td>
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<td>Records with Information Extraction</td>
<td>Krishnaswamy; L. Richardson; F. Wang</td>
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<tr>
<td>11:36-11:58 AM</td>
<td>Improving Radiology Procedure Identification for Inferior Vena Cava</td>
<td>D.A. Mobarek; N. Bade; B. Viernes; P. Nechodom; F.R. Rickles; S.L.</td>
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<td>(IVC) Filters using EHR Text</td>
<td>DuVall</td>
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<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), S31: Podium</td>
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<td>Presentations - Public Health</td>
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<td>10:30-10:52 AM</td>
<td>Leveraging Business Rules Techniques for Data Quality Assurance in</td>
<td>D. Lyalin; W. Williams</td>
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<td>Public Health Systems</td>
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<td>11:14-11:36 AM</td>
<td>Completeness and Timeliness of Notifiable Disease Surveillance Data Submitted by Providers to Public Health Authorities</td>
<td>B.E. Dixon; P.T. Lai; U. Kirbiyik; Z. Zhang; D. Revere; R.A. Hills; P. Gibson; J.L. Williams; S. Grannis</td>
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<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), S32: Systems</td>
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<td>Demonstrations - Interoperability in the Clinical Space</td>
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<tr>
<td>10:30-11:15 AM</td>
<td>Navigating between Drug Classes and RxNorm Drugs with RxClass</td>
<td>O. Bodenreider; L. Peters; T. Nguyen</td>
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<tr>
<td>11:15-12:00 PM</td>
<td>PhEMA: Phenotype Modeling, Sharing and Execution Architecture</td>
<td>J. Pathak; J.C. Denny; W.K. Thompson; L. Rasmussen</td>
</tr>
<tr>
<td>1:45 PM-3:15 PM</td>
<td>Informatics Approaches to Supporting Emerging Accountable Health Care Delivery Methods, Didactic Panel</td>
<td>G. Kuperman; D.W. Bates; D. Kaelber; D.A. Dorr</td>
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<tr>
<td>1:45 PM-3:15 PM</td>
<td>Informatics Approaches to Supporting Emerging Accountable Health Care Delivery Models</td>
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<td>1:45 PM-3:15 PM</td>
<td>Recent Advances in Computational Drug Repositioning, Didactic Panel</td>
<td>A. Butte; N. Shah; N.P. Tatonetti; H. Xu; P. Zhang</td>
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<tr>
<td>1:45 PM-3:15 PM</td>
<td>The Public Health Informatics Workforce: Challenges, Initiatives, and the Path Forward, Didactic Panel</td>
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<td>Time</td>
<td>Session Description</td>
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<td>1:45 PM-3:15 PM</td>
<td>The Informatics Workforce for Population Health: Challenges, Initiatives and the Path Forward</td>
<td>B.E. Dixon; M. LaVenture; B. Brand; A. Davidson; S. Grannis</td>
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<td>1:45 PM-3:15 PM, Room: TBD (Hilton San Francisco Union Square), S37: Papers - Patients Want to Know, Papers</td>
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<tr>
<td>1:45-2:07 PM</td>
<td>Health Literacy, Education Levels, and Patient Portal Usage During Hospitalizations</td>
<td>S.E. Davis; C.Y. Osborn; S. Kripalani; K. Goggins; G.P. Jackson</td>
</tr>
<tr>
<td>2:29-2:51 PM</td>
<td>Making background work visible: opportunities to address patient information needs in the hospital</td>
<td>L. Kendall; S.R. Mishra; A. Pollack; B. Aaronson; W. Pratt</td>
</tr>
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<td>2:51-3:13 PM</td>
<td>Content and Usability Evaluation of Patient Oriented Drug-Drug Interaction Websites</td>
<td>T.J. Adam; J. Vang</td>
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<td>1:45 PM-3:15 PM, Room: TBD (Hilton San Francisco Union Square), S38: Papers - Ontologies, Papers</td>
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<td>1:45-2:07 PM</td>
<td>Biological Model Development as an Opportunity to Provide Content Auditing for the Foundational Model of Anatomy Ontology</td>
<td>L.L. Wang; E. Grunblatt; H. Jung; I. Kalet; M. Whipple</td>
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<td>2:07-2:29 PM</td>
<td>COBE: A Conjunctive Ontology Browser and Explorer for Visualizing SNOMED CT Fragments</td>
<td>M. Sun; W. Zhu; S. Tao; L. Cui; G. Zhang</td>
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<td>2:29-2:51 PM</td>
<td>A Method to Compare ICF and SNOMED CT for Coverage of U.S. Social Security Administration’s Disability Listing Criteria</td>
<td>S. Tu; C. Nyulas; T. Tudorache; M.A. Musen</td>
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<td>2:51-3:13 PM</td>
<td>COHeRE: Cross-Ontology Hierarchical Relation Examination for Ontology Quality Assurance</td>
<td>L. Cui</td>
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<td>1:45 PM-3:15 PM, Room: TBD (Hilton San Francisco Union Square), S39: Papers - Trials and Tribulations, Papers</td>
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<td>1:45-2:07 PM</td>
<td>Extracting Characteristics of the Study Subjects from Full-Text Articles</td>
<td>D. Demner-Fushman; J.G. Mork</td>
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<tr>
<td>2:07-2:29 PM</td>
<td>Desiderata for Major Eligibility Criteria in Breast Cancer Clinical Trials</td>
<td>M. Paulson; C. Weng</td>
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<td>2:29-2:51 PM</td>
<td>Quality Assurance of Cancer Study Common Data Elements Using A Post-Coordination Approach</td>
<td>G. Jiang; H.R. Solbrig; E. Prud’hommeaux; C. Tao; C. Weng; C. Chute</td>
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<td>2:51-3:13 PM</td>
<td>Assessing the Utility of Automatic Cancer Registry Notifications Data Extraction from Free-Text Pathology Reports</td>
<td>A. Nguyen; J. Moore; J. O'Dwyer; S. Colquists</td>
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<td>1:45 PM-3:15 PM, Room: TBD (Hilton San Francisco Union Square), S40: Papers - Imaging, Papers</td>
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<td>1:45-2:07 PM</td>
<td>Vessel Delineation in Retinal Images using Leung-Malik filters and Two Levels Hierarchical Learning</td>
<td>E. Shahrian Varnousfaderani; S. Yousefi; C. Bowd; A. Belghith; M. Goldbaum</td>
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<td>2:07-2:29 PM</td>
<td>Automated mutual exclusion rules discovery for structured observational codes in echocardiography reporting</td>
<td>T.A. Forsberg; M. Sevenster; S. Bieganski; P. Bhagat; M. Kanasseril; Y. Jia; K. Spencer</td>
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<td>2:51-3:13 PM</td>
<td>Three-dimensional Content-Based Cardiac Image Retrieval using global and local descriptors</td>
<td>L. Bergamasco; F.L. Nunes</td>
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<tr>
<td>1:45 PM-3:15 PM, Room: TBD (Hilton San Francisco Union Square), S41: Podium Presentations - Government Initiatives in Health IT, Podium Presentations</td>
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<tr>
<td>1:45-2:07 PM</td>
<td>Understanding Challenges and Opportunities in Precision Medicine and Interoperability Using Informatics Approaches</td>
<td>J. Ronquillo; C. Weng; W.T. Lester</td>
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<td>2:07-2:29 PM</td>
<td>Early Experiences with Meaningful Use and Online Portal Implementation among Providers/Staff and Patients/Caregivers in a Safety Net Healthcare System</td>
<td>C. Lyles; L. Tieu; D. Schillinger; N. Ratanawongsa; U. Sarkar</td>
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<td>2:29-2:51 PM</td>
<td>Physician Participation in Meaningful Use and Rehospitalization of Medicare Fee-for-Service Enrollees</td>
<td>M.A. Unruh; H. Jung; J.R. Vest; L. Casalino; R. Kaushal</td>
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<tr>
<td>2:51-3:13 PM</td>
<td>Are Meaningful Use Requirements Really Meaningful for Medication Use? Experiences from the Field and Future Opportunities</td>
<td>S.P. Slight; E.S. Berner; W. Galanter; S.M. Huff; B.L. Lambert; C. Lannon; C.U. Lehmann; B.J. McCourt; M. McNamara; N. Menachemi; T. Payne; S.A. Spooner; G. Schiff; T.Y. Wang; A. Akincigil; S. Crystal; S.P. Fortmann; M.L. Vandermeer; D.W. Bates</td>
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<td>1:45 PM-3:15 PM, Room: TBD (Hilton San Francisco Union Square), S42: Papers/Podium Presentations - Care Team Communication, Papers/Podium Presentations</td>
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<td>1:45-2:07 PM</td>
<td>Six Important Characteristics for Patient Hand-Off Application in Inpatient Hospital Setting</td>
<td>S.U. Ayubi; A. Pelletier</td>
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<td>2:07-2:29 PM</td>
<td>A Review and Analysis of Rounding and Handoff Document Content in Inpatient Resident Physician Teams</td>
<td>E.G. Arsoniadis; R. Khatri; J. Marquard; C. Moors; M. Kim; G.B. Melton</td>
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<td>2:29-2:51 PM</td>
<td>Improving Care Team Communication: Early Experience at Implementing a Patient-centered Microblog</td>
<td>A.K. Dalal; J.L. Schnipper; A.F. Massaro; K. McNally; P.C. Dykes; D.W. Bates</td>
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<td>1:45 PM-3:15 PM, Room: TBD (Hilton San Francisco Union Square), S43: Podium Presentations - Clinical Text Tools, Podium Presentations</td>
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<td>1:45-2:07 PM</td>
<td>Real Time Active Learning Study for Clinical Named Entity Recognition</td>
<td>Y. Chen; S. Moon; T.A. Lasko; Q. Mei; J. Wang; T. Cohen; Q. Chen; J.C. Denny; H. Xu</td>
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<tr>
<td>2:07-2:29 PM</td>
<td>Ill-formed Sentence Identification And Entity Extraction In Clinical Notes</td>
<td>A. Kumar; M.J. Cairelli; H. Alam; R. Kumar; S. Sheel</td>
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<td>2:29-2:51 PM</td>
<td>Robust Sentence Segmentation for Clinical Text</td>
<td>T.A. Miller; S. Finan; D. Dligach; G. Savova</td>
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<td>2:51-3:13 PM</td>
<td>Clinical Language Annotation, Modeling, and Processing Toolkit (CLAMP) – a user-centric NLP system</td>
<td>E. Soysal; J. Wang; M. Jiang; Y. Wu; H. Xu</td>
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<td>1:45 PM-3:15 PM, Room: TBD (Hilton San Francisco Union Square), S44: Systems Demonstratiaons - Learning Healthcare Systems Applications, Systems Demonstrations</td>
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<td>1:45-2:30 PM</td>
<td>The Scalable Collaborative Infrastructure for a Learning Health System: Facilitating Agile Comparative Effectiveness Research</td>
<td>J.G. Klann; M. Natter; D. MacFadden; S.R. Weiler; K. Mandl; S.N. Murphy</td>
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<td>2:30-3:15 PM</td>
<td>ePAD: Leveraging image data in learning healthcare systems</td>
<td>D. Rubin</td>
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<td>3:30 PM-5:00 PM, Room: TBD (Hilton San Francisco Union Square), S45: Interactive Panel - Building the Computational Workforce for Precision Medicine, Interactive Panel</td>
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<td>3:30 PM-5:00 PM</td>
<td>Building the Computational Workforce for Precision Medicine</td>
<td>J.D. Tenenbaum; J.C. Denny; D. Flannery; D.B. Fridsma; M. Williams</td>
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<td>3:30 PM-5:00 PM, Room: TBD (Hilton San Francisco Union Square), S46: Didactic Panel - Informatics Research and Innovation in a Commercial Electronic Health Record: The Experience of Three Organizations using Epic, Didactic Panel</td>
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<td>3:30 PM-5:00 PM</td>
<td>Informatics Research and Innovation in a Commercial Electronic Health Record: The Experience of Three Organizations Using Epic A. Wright; D.W. Bates; E. Kirkendall; D.A. Dorr; P. DeVault</td>
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<td>3:30 PM-5:00 PM, Room: TBD (Hilton San Francisco Union Square),</td>
<td><strong>S48: Didactic Panel - ClinicalTrials.gov: Adding Value through Informatics</strong>, Didactic Panel</td>
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<td>3:30 PM-5:00 PM</td>
<td>ClinicalTrials.gov: Adding Value through Informatics V. Huser; A. McCray; N.R. Smalheiser; A. Tasneem; C. Weng</td>
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<td>3:30 PM-5:00 PM, Room: TBD (Hilton San Francisco Union Square),</td>
<td><strong>S49: Papers - Consumer Health</strong>, Papers</td>
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<td>3:30-3:52 PM</td>
<td>Initial Readability Assessment of Clinical Trial Eligibility Criteria T. Kang; N. Elhadad; C. Weng</td>
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<td>3:52-4:14 PM</td>
<td>Determinants of Consumer eHealth Information Seeking Behavior R. Sandefer; B.L. Westra; S. Khairat; D. Pieczkiewicz; S. Speedie</td>
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<td>4:14-4:36 PM</td>
<td>Homophily of Vocabulary Usage: Beneficial Effects of Vocabulary Similarity on Online Health Communities Participation A. Park; A.L. Hartzler; J. Huh; D.W. McDonald; W. Pratt</td>
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<tr>
<td>4:36-4:58 PM</td>
<td>Collecting Family Health History using an Online Social Network: a Nationwide Survey among Potential Users B.M. Welch; N. O'Connell; S. Qanungo; C. Halbert-Hughes; J. Schiffman</td>
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<td>3:30 PM-5:00 PM, Room: TBD (Hilton San Francisco Union Square),</td>
<td><strong>S50: Papers - Data Integration</strong>, Papers</td>
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<td>3:30-3:52 PM</td>
<td>Supporting Multi-sourced Medication Information in i2b2 J.G. Klann; P.B. Pfiffner; M. Natter; E. Conner; P. Blazejewski; S.N. Murphy; K. Mandl</td>
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<tr>
<td>3:52-4:14 PM</td>
<td>OpenHealth Platform for Interactive Contextualization of Population Health Open Data J.S. Almeida; J. Hajagos; I. Crnosija; T. Kurc; M. Saltz; J. Saltz</td>
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<tr>
<td>4:14-4:36 PM</td>
<td>Towards data integration automation for the French rare disease registry M. Maaroufi; R. Choquet; P. Landais; M. Jaulent</td>
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<tr>
<td>4:36-4:58 PM</td>
<td>Employing complex polyhierarchical ontologies and promoting interoperability of i2b2 data systems J.R. Campbell; W.S. Campbell; H. Hickman; J. Pedersen; J.C. McClay</td>
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<td>3:30 PM-5:00 PM, Room: TBD (Hilton San Francisco Union Square),</td>
<td><strong>S51: Featured Presentation - High School Scholars</strong>, Featured Presentation</td>
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<td>3:30-3:52 PM</td>
<td>Protein Drug Target Prioritization for Illumination S. Mani; D. Cannon; T.I. Oprea; s. mathias; O. Ursu; c. bologa</td>
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<td>3:30-5:00 PM</td>
<td><strong>S52: Podium Presentations - Pharmacogenomics an Drug Targeting</strong>, Podium Presentations</td>
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<td>3:52-4:14 PM</td>
<td>Improvement of cytokine annotation using ontology synonym mapping</td>
<td>D. Sarantis; S.H. Kleinstein; K. Cheung</td>
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<td>4:14-4:36 PM</td>
<td>Characterizing the Frequency of Pharmacogenomic Biomarker-Guided</td>
<td>E. Devine; M. Khelifi; K. Keyloun; N. Hendrix; P. Mathias; C. Bock; P. Tarczy-Hornoch</td>
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<td>Prescribing for Drugs with Pharmacogenomic Biomarker Information in the</td>
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<td>FDA Labelling: A Pilot Study Using Data from an Electronic Health Record</td>
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<td>task and Multi-task Learning</td>
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<td>3:30 PM-5:00 PM, Room: TBD (Hilton San Francisco Union Square),</td>
<td>Podium Presentations - Large-scale Data Analytics, Podium Presentations</td>
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<td>3:30-3:52 PM</td>
<td>Population Level Clinical Analytics Using the MapReduce Framework and</td>
<td>N. Karipineni; H.S. Goldberg</td>
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<td>a Production Rule System</td>
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<td>3:52-4:14 PM</td>
<td>Making Hypertensive Medication Data Meaningful</td>
<td>R. Williams; B.C. Brown; N. Peek; I.E. Buchan</td>
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<td>4:14-4:36 PM</td>
<td>A Genome- and Phenome- Wide Study of Diverticulosis</td>
<td>Y.Y. Joo; J.A. Pacheco; L. Armstrong; W. Thompson; R.J. Carroll; J.C. Denny; P.L. Peissig; J. Linneman; J. Pathak; G.N. Nadkarni; L.J. Rasmussen-Torvik; M. Hayes; A.N. Kho</td>
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<td>4:36-4:58 PM</td>
<td>Computable Phenotypes enabled by the i2b2 Validation Platform</td>
<td>S.N. Murphy; V. Gainer; V.M. Castro; a. goodson; L.C. Phillips; S. Yu; T. Cai</td>
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<td>3:30 PM-5:00 PM, Room: TBD (Hilton San Francisco Union Square),</td>
<td>Systems Demonstrations - From Patients to Research, Systems Demonstrations</td>
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<td>3:30-4:15 PM</td>
<td>Conversational Agents for Automated Inpatient and Outpatient Health</td>
<td>T. Bickmore</td>
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<td>Counseling</td>
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<td>4:15-5:00 PM</td>
<td>OHDSI: An Open-Source Platform for Observational Data Analytics and</td>
<td>J. Duke; F. DeFalco; C. Knoll; V. Huser; R.D. Boyce; P.B. Ryan</td>
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<td></td>
<td>Collaborative Research</td>
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<td>7:00 AM-8:30 AM, Franciscan B (Hilton San Francisco Union Square),</td>
<td>Surescripts Roundtable (by invitation), Corporate</td>
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<tr>
<td>8:00 PM-10:00 PM, Franciscan B (Hilton San Francisco Union Square),</td>
<td>Visual Analytics Working Group Meeting, Business Meeting</td>
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<tr>
<td>7:00 AM-8:30 AM, Franciscan C (Hilton San Francisco Union Square),</td>
<td>Working Group Steering Committee Meetings, Business Meeting</td>
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<td>Franciscan A (Hilton San Francisco Union Square), <em>Amgen Corporate Roundtable (by invitation)</em>, Corporate</td>
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<td>5:00 PM-6:30 PM</td>
<td>Franciscan C (Hilton San Francisco Union Square), <em>AMIA 2016 Scientific Program Committee Meeting</em>, Business Meeting</td>
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<td>10:00 AM-10:30 AM</td>
<td>Room: TBD (Hilton San Francisco Union Square), <em>Coffee Break</em>, Social Event</td>
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<td>Continental 5 (Hilton San Francisco Union Square), <em>Dance Party</em>, Social Event</td>
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<td>Union Square 2 (Hilton San Francisco Union Square), <em>Dental Informatics Working Group Meeting</em>, Business Meeting</td>
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<td>Union Square 3/4 (Hilton San Francisco Union Square), <em>Education Committee Meeting</em>, Business Meeting</td>
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<td>Yosemite A/B (Hilton San Francisco Union Square), <em>Evaluation and People &amp; Organizational Issues Working Group Meeting</em>, Business Meeting</td>
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<td>Plaza A (Hilton San Francisco Union Square), <em>Nursing Informatics Working Group Meeting</em>, Business Meeting</td>
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<td>Room: TBD (Hilton San Francisco Union Square), <em>Poster Session II (Authors present)</em>, Poster</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td><em>Building of Community Health care Data Bank (EHR) using positional and temporal tracking and collecting DATA</em> M. AIHARA</td>
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<td>5:00 PM-6:30 PM</td>
<td><em>Personalized medicine beyond genetics: using personalized model-based forecasting to help type 2 diabetics understand and predict their post-meal glucose</em> D. Albers; M. Levine; B. Gluckman; G. Hripcsak; L. Mamykina</td>
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<td>5:00 PM-6:30 PM</td>
<td>Identifying Home Care Clinical Practices Most Associated with Hospital Readmissions and Non-Admitted ER Visit Rates: Secondary Data Analysis</td>
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<td>5:00 PM-6:30 PM</td>
<td>Regenstrief ePRO: A Rule-Based Platform for Capturing Targeted Patient-Reported Outcomes</td>
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<td>5:00 PM-6:30 PM</td>
<td>Feasibility and Acceptability of an Online Maternity Education Platform</td>
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<td>Analysis of Computerized Clinical Reminder Activity and Usability Issues</td>
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<td>5:00 PM-6:30 PM</td>
<td>Automating Identification of OEF/OIF Veterans Diagnosed with ALS</td>
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<td>5:00 PM-6:30 PM</td>
<td>Learning Useful Abstractions from the Web</td>
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<td>Patient-Centered Postoperative Wound Surveillance Using Smartphone Digital Photographs</td>
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<td>5:00 PM-6:30 PM</td>
<td>Standardization of Ask At Order Entry Questions: A Prudent Question is One-Half Wisdom</td>
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<td>5:00 PM-6:30 PM</td>
<td>9 Patient Treatment Errors in a 12-Month Period: Analysis of Workflows and How Electronic Health Records Interact with Workflows to Contribute to Errors</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Faceted-Search Mobile App for Matching Cancer Patients to Targeted Therapy Clinical Trials</td>
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<td>5:00 PM-6:30 PM</td>
<td>Using the Adverse Event Reporting System: Can Analysis be Streamlined by Text Processing</td>
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<td>5:00 PM-6:30 PM</td>
<td>GeneLab: NASA's Open Access, Collaborative Platform for Systems Biology and Space Medicine</td>
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<td>5:00 PM-6:30 PM</td>
<td>An Ontology-Driven Patient History Questionnaire System</td>
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<td>5:00 PM-6:30 PM</td>
<td>Integrating Electronic Health Record Competencies into Undergraduate Health Informatics Curricula: A Preliminary Qualitative Study</td>
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<td>5:00 PM-6:30 PM</td>
<td>Variable Importance in Recursive Feature Selection with Random Forests for Mortality Prediction in ICU</td>
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<td>Converting the Foundational Model of Anatomy to OWL2</td>
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<td>5:00 PM-6:30 PM</td>
<td>Developing an Ontology from HIV-associated Elements in Research</td>
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<td>5:00 PM-6:30 PM</td>
<td>Musculoskeletal Flowsheet Data Modeling for Clinical Research</td>
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<td>5:00 PM-6:30 PM</td>
<td>CDS, EHR and Pharmacogenomics to Estimate Warfarin Dosing</td>
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<td>5:00 PM-6:30 PM</td>
<td>Survey of Mayo Clinic Trainees' Knowledge, Attitudes, and Opinions Regarding Clinical Informatics</td>
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<td>5:00 PM-6:30 PM</td>
<td>Influences, Barriers, and Motivations for Healthy Behaviors Among Pediatric Cancer Patients: A Focus Group Approach</td>
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<td>5:00 PM-6:30 PM</td>
<td>Predicting The Initial Lapses After Alcohol Detoxification Using mHealth</td>
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<td>Privacy Concerns of Internet Users and Implications for Health Information Technology</td>
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<td>System Architecture of CDC I-SMILE Recommendation Engine</td>
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<td>A Cognitively-Driven, Knowledge-Based EHR User Interface Design for Outpatient Psychiatry</td>
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<td>User-Centered Design of the Clinical Dashboard for the MySafeCare Patient Safety Reporting System</td>
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<td>Detecting Mitral Valve Prolapse (MVP) From Heart Sound Recordings</td>
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<td>5:00 PM-6:30 PM</td>
<td>To Improve Sensitivity and Specificity in Early Detection of Sepsis</td>
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<td>Information System for Mobile Immersive Learning Environment for Just-in-Time Learning in Public Health</td>
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<td>Improving Vaccine-Preventable Disease Reporting through Health Information Exchange</td>
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<td>Innovative Methods for Obtaining and Managing Patient Consent for Patient Centered Outcomes Research</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Comparative Analysis of Factors for Predicting Inpatient Length of Stay for Colorectal Cancer Patients</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Six State Review of Grantees’ Experiences with the State HIE Program</td>
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<td>5:00 PM-6:30 PM</td>
<td>Platform for Engaging Everyone Responsibly (PEER) Validation Study Plan</td>
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<td>5:00 PM-6:30 PM</td>
<td>Leveraging an Open Source Data Warehousing and Analytics Tool to Promote Longitudinal Research, Improve Knowledge Transfer and Avoid Redundancy Across Research Studies</td>
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<td>5:00 PM-6:30 PM</td>
<td>Challenges for Residents in Following Instruction in Laparoscopic Surgery</td>
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<td>Grantees’ Lessons Learned in Implementing State HIE Initiatives</td>
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<td>Transforming the National Department of Veterans Affairs Data Warehouse to the OMOP Common Data Model</td>
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<td>Bridging the MedlinePlus Cloud to askMEDLINE</td>
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<td>A Gap Analysis of Competencies and Curriculum in Host-Site Projects of a Field-Based Informatics Fellowship</td>
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<td>An Examination of Standalone Personal Health Record Use by Patients with Type 2 Diabetes</td>
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<td>Therapeutic Area and Research Use Case Based Data Profiling &amp; Quality Assessment Framework</td>
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<td>Electronically Collecting Nocturnal Heart Failure Information</td>
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<td>Transition of Care from an Academic Cancer Center to Community Providers and Survivorship care: Would a Patient Care Team Portal Help?</td>
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<td>5:00 PM-6:30 PM</td>
<td>Developing Principles and Best Practices for Structured Documentation</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Tale of Two Layouts: Vignette vs. Structured Interview for Layout of an Electronic Handoff Tool</td>
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<td>5:00 PM-6:30 PM</td>
<td>Integrated Clinical Decision Support Systems: Systematic Review and Classification of Online Medical Calculators</td>
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<td>Variation Among Providers in Cost of a Knee Replacement Episode</td>
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<td>Understanding Ongoing Concerns after Implementation of Patient-Provider Messaging in the Acute Care Setting</td>
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<td>Standardized Mapping of Sensitive Data Categories</td>
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<td>Meal-Camera System to Support Nutritional Tele-Consultation for Diabetics</td>
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<td>Mapping Hospital Infections to Inform Quality Improvement Interventions</td>
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<td>Using MetaMap to Analyze Which Linguistic Concepts of an Imaging Study Indication Make it Helpful to a Radiologist</td>
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<td>Electronic Health Record Audit Logs: An Alternative Approach to Workflow Analysis</td>
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<td>RSS Feeds used by Medical Professionals, a Systematic Review and Guide</td>
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<td>5:00 PM-6:30 PM</td>
<td>Informational Content of Verbal Handoffs in Emergency Care</td>
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<td>Evaluation of a Local Terminology to SNOMED CT Crosswalk</td>
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<td>Deep Sequencing of Phage-Displayed Peptide Libraries Reveals Novel Peptide Motif that Detects Norovirus</td>
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<td>5:00 PM-6:30 PM</td>
<td>Examining the Role of Bug-tracking Systems in the Maintenance of Electronic Health Records (EHRs)</td>
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<td>5:00 PM-6:30 PM</td>
<td>Clinico-genomic Decision Support System for Precision Diagnostics and Management</td>
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*Note: The above table is a summary of presentations from a conference session.*
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<tr>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td>An Interactive System for Comprehensive Geriatric Telerehabilitation</td>
<td>I. Jeong; J. Finkelstein</td>
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<td>5:00 PM-6:30 PM</td>
<td>Representing and Validating Cancer Study Metadata Standard Using RDF Shapes Expression Language</td>
<td>H.R. Solbrig; E. Prud'hommeaux; C. Chute; G. Jiang</td>
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<td>5:00 PM-6:30 PM</td>
<td>Physician Participation in Meaningful Use and Rehospitalization of the Dually-Eligible</td>
<td>H. Jung; M.A. Unruh; J.R. Vest; L. Casalino; R. Kaushal</td>
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<td>5:00 PM-6:30 PM</td>
<td>Automatic Phone and Text Message Reminders to Increase Patient Completion of Outpatient Laboratory Testing</td>
<td>T. Dolber; D. Kaelber</td>
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<td>5:00 PM-6:30 PM</td>
<td>Characteristics of Older Adults’ Adherence of a Wearable Fall Detection Device</td>
<td>Y. Kang; S. Chaudhuri; H.J. Thompson; G. Demiris</td>
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<td>5:00 PM-6:30 PM</td>
<td>aceso (After Cancer Education and Support Operations): a clinical decision support system approach for engaging breast cancer survivors</td>
<td>A. Kapoor; P. Nambisan</td>
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<td>5:00 PM-6:30 PM</td>
<td>Design and Implementation of a Relevant Data Report Tool for Patients Presenting to the Emergency Department with Chest Pain</td>
<td>C. Katsura; F.C. Day; L. Mccullough</td>
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<td>5:00 PM-6:30 PM</td>
<td>Health Information Technology Evaluation Studies: Trends in Communities and Geography from 2004 to 2014</td>
<td>M.M. Kelley; X. Ji; P. Yen; G.M. Torelli</td>
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<td>5:00 PM-6:30 PM</td>
<td>Usability of mobile apps for radiology diagnostic decision-making</td>
<td>M. Kim; M. Aro; K. Lage; K. Ingalls; V. Sindhwani; M.K. Markey</td>
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<td>5:00 PM-6:30 PM</td>
<td>Analysis of the Great Divide Between Cardiovascular Risk and Health Scores</td>
<td>B. Kite; T. Motiwala; P. Payne</td>
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<td>5:00 PM-6:30 PM</td>
<td>Mixed-Methods Study of Risk Communication in a Patient Decision Aid</td>
<td>K.A. Klein; L. Watson; L.R. Kalaga; K.B. Eden</td>
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<td>5:00 PM-6:30 PM</td>
<td>Natural Language Processing facilitates delivery of individualized recommendations at the point of care</td>
<td>R. Komandur Elayavilli; R. Chaudhry; J. Masanz; J. Pankratz; J.L. Shellum; S.G. Peters; R. Hankey; D.J. Cronk; J.J. Boysen; K. Pavek; R. Roden; H. Liu</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Novel Visualization for Rapid Summarization of Patient History: Application to Cirrhosis</td>
<td>J.D. Koola; S.B. Ho; M.E. Matheny</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Lifecycle Management Solution to Manage Mississippi’s Data Lake and Big Data Analytics Platform</td>
<td>D.D. Krause</td>
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<td>5:00 PM-6:30 PM</td>
<td>Problem List Quality in Ambulatory Medicine</td>
<td>J. Krauss</td>
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<td>5:00 PM-6:30 PM</td>
<td>Integrated Health Information Architecture to Facilitate State-wide and National Evidence-Based Public Health Monitoring: A Case Study based in India</td>
<td>M. Kumar; R. Ramaswamy; J. Mostafa</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Combined HIS In-house Developing Model of Integrating Patient Information</td>
<td>M.J. Kuo; P. Chang; J. Chen</td>
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<td>Information Acquisition Preferences in the Intensive Care Unit</td>
<td>K.G. Kuttler; J.M. Butler; E. Hirshberg; R. Hopkins; E. Wilson; J. Orme; S. Brown</td>
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<td>5:00 PM-6:30 PM</td>
<td>Semantic and Interactive Timeline for Patient Data Visualization</td>
<td>T. Ledieu; P. Van Hille; G. Bouzillé; E. Renault; M. Cuggia</td>
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<td>5:00 PM-6:30 PM</td>
<td>Applying an instant messaging system at the hospital to support TRM</td>
<td>Y. Lee; T. Chien; H. Chen</td>
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<td>5:00 PM-6:30 PM</td>
<td>Improving Failure Mode and Effects Analysis through Electronic Health Record-Assisted Team Identification</td>
<td>G. Shier Kricke; M. Carson; Y. Lee; N. Soulakis</td>
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<td>5:00 PM-6:30 PM</td>
<td>Decision Factors Influencing the Selection of a &quot;Hand-off&quot; Model Versus a &quot;Hold-on&quot; Model for Telehealth Service Lines</td>
<td>C. LeRouge; S.J. Wood; R. Sterling; P. Forducey</td>
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<td>5:00 PM-6:30 PM</td>
<td>Developing an Electronic Survey to Capture Current State of Acute Care Patient Portals to Inform Best Practices and Future Directions</td>
<td>W. Leung; S. Collins; A.K. Dalal</td>
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<td>5:00 PM-6:30 PM</td>
<td>Design of a &quot;Synthetic&quot; Data Set for teaching and evaluating analytics methodology in Accountable Care Organizations</td>
<td>R. Ligon</td>
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<td>5:00 PM-6:30 PM</td>
<td>Health Care Providers' Perceived &amp; Actual Problems in the Use of HIT in the ED</td>
<td>M.L. Little; O. Sayan; V.L. Patel</td>
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<td>5:00 PM-6:30 PM</td>
<td>Caveats of Using Social Media Data for Medical Research: A Report from a Study on Eye-Related Symptoms in Tweets</td>
<td>Y. Liu; T. O'Brien; E. Sondhi; Q. Mei; D.A. Hanauer; K. Zheng</td>
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<td>5:00 PM-6:30 PM</td>
<td>Real-time SNOMED Post-coordination of Adverse Drug Reactions: Model Formulation for an Actionable Registry</td>
<td>M.A. Lopetegui; M. Barbe; D.R. Luna; A. Mauro</td>
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<td>5:00 PM-6:30 PM</td>
<td>Using OpenEMR in HIT Training</td>
<td>V. Lorenzi; T. McCormick; B. Miller; K. Newman; C. Smyth; F. Rahmanian; F. Morrison</td>
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<td>5:00 PM-6:30 PM</td>
<td>Variability in the Sequence of HL7 2.x Event Code Types used to Represent Encounters across a Health Information Exchange</td>
<td>T. Lowry; E. Kim; J. Johnson; J.S. Shapiro</td>
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<td>5:00 PM-6:30 PM</td>
<td>The Role of Technology Utilization in Designing Self-Management Systems</td>
<td>R.J. Lucero; R. Jaime-Lara; Y. Cortes; D. Tipiani; M. Granja; S. Bakken</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Evaluation of the accuracy of CDS for cervical cancer screening and surveillance</strong> K. MacLaughlin; R. Komandur Elayavilli; K. Wagholikar; M.R. Scheitel; H. Liu; R. Chaudhry</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Designing a drawing-based tool to manage EBRT process in an open-source oncology EMR system</strong> M. Maheshwari; S. Purkayastha</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>The Process of Using Focus Groups to Inform Development</strong> J.A. Mallow; L.A. Theeke; E.A. Theeke; B. Mallow</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Towards Personalized Nutrition</strong> C. Conti; E. Rossi; S.R. Marceglia; V. Tauro; F. Rizzi; M. Lazzaroni; C. Barlassina; L. Soldati; D. Cusi</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Qualitative Analysis of Responses to a Questionnaire via an EHR Patient Portal</strong> E.A. Marshall; S. Qanungo; J. Obeid; J.C. Oates; M.L. Habrat; R.W. Warren; L.A. Lenert</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Engaging patients using an inpatient web-based patient portal and evaluating effectiveness in a pragmatic randomized controlled trial</strong> R.M. Masterson Creber; J. Prey; B. Ryan; J. Han; S. Restaino; D. Vawdrey</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Evaluating Efficient Clinician Utilization of Electronic Health Records</strong> Y. Zhang; M. Krousel-Wood; R.V. Milani; A.B. McCoy</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Stratification of Risk for Fall Resulting in Hospital Readmission through Medication Side Effects Profiles</strong> T.H. McCoy; V.M. Castro; R.H. Perlis</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Partnering to Develop a Service-based CDS System for Public Health Reporting Specifications</strong> S. McGarvey; D. Abrams; J. Hui; L. Conn; C.J. Staes</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Born to Lose (the Call): Date of Birth Errors in Patient Identification in an Automated Adverse Drug Reaction Call System</strong> J. Medoff; A. Salazar; E.V. Klinger; J. Kwatra; M.G. Amato; P.C. Dykes; J. Haas; D. Bates; G. Schiff</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Development of a Novel Application for Home Management of Chronic Low Back Pain</strong> B. Melton; H. Kevern; J. Stones; N. Sharma</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Improving Evidence-Based Migraine Management in VA Primary Care Clinics by Utilizing Informatics Tools</strong> A. Mohammad; H. Hamid; C. Brandt</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Usability of a phenotype builder prototype and lessons learned for the design of phenotyping tools</strong> E. Montague; J. Xu; L. Rasmussen; J.C. Denny; G. Jiang; R.C. Kiefer; J.A. Pacheco; P. Speltz; W. Thompson; J. Pathak</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>The Everyday Practice of Health for Mexican Women in New Brunswick: Barriers and Opportunities</strong> M. Morales; X. Zhou</td>
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<td>5:00 PM-6:30 PM</td>
<td>Extending the Project HealthDesign Experience via On-Line Public Data Repositories A.J. Morland; P.F. Brennan</td>
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<td>5:00 PM-6:30 PM</td>
<td>An automated tool to replicate data between multiple versions of Profiles Research Networking Software's (RNS) S. Mukherjee; S. Delta</td>
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<td>5:00 PM-6:30 PM</td>
<td>HDD Access – an Open Source Terminology Server with Publicly Available Healthcare Terminology Content S.K. Nachimuthu; L. Lau</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Prefectural Medical Information Network System Developed after the Great East Japan Earthquake M. Nakayama; H. Shimizu; K. Sato; N. Nakamura</td>
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<td>5:00 PM-6:30 PM</td>
<td>Development of a Methodological Protocol for Observing Pharmacist Information Needs While Using the EHR S.D. Nelson; J. LaFleur; G. Del Fiol; S. Evans; C. Weir</td>
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<td>5:00 PM-6:30 PM</td>
<td>Role of Social Media in shaping public health messages regarding Human Papillomavirus (HPV) vaccinations L.B. Nguyen; P. Nambisan</td>
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<td>5:00 PM-6:30 PM</td>
<td>Development of Anatomical Radiology Ordersets K. O'Bryan; C.H. Andrus; F.B. Yu; P. Asaro; S.P. Hmiel</td>
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<td>5:00 PM-6:30 PM</td>
<td>Using National Database for Autism Research (NDAR) privacy-preserving record linkage protocol in the PEDSnet CDRN T.C. Ong; M.G. Kahn; D.J. Hall</td>
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<td>5:00 PM-6:30 PM</td>
<td>Evaluating Health Information Systems based on expert knowledge reference M.A. Carvalho; C.F. Ortolani; I.T. Pisa</td>
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<td>5:00 PM-6:30 PM</td>
<td>Informatics Strategies to Address Cancer Worry of Urban Dominicans A.L. Pacsi</td>
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<td>5:00 PM-6:30 PM</td>
<td>Organizing Drugs in RxNorm by Therapeutic Classes M.B. Palchuk; M. Kamerick</td>
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<td>5:00 PM-6:30 PM</td>
<td>Measuring HIE in States and Factors Associated with States’ Success in HIE S. Parashuram; S. Kim; T. Wu; P. Dullabh</td>
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<td>5:00 PM-6:30 PM</td>
<td>Efficacy of Clinical Alerts Designed to Decrease the Incidence of Contrast Induced Nephropathy M.A. Parkulo; J.E. Crook; L.J. White; C.S. Thomas; M. Rucci</td>
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<td>5:00 PM-6:30 PM</td>
<td>Finding Similar Drug Classes using RxClass T. Nguyen; L. Peters; O. Bodenreider</td>
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<td>5:00 PM-6:30 PM</td>
<td>Meta-Analysis of Ontology Applications in Healthcare k. phalakornkule; S.A. Sawesi; J.F. Jones</td>
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<td>5:00 PM-6:30 PM</td>
<td>Use of an Adaptive Agent-Based Model in Evaluating Patient Preferences in Healthcare A. Phillips; M. Sordo</td>
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<td>Data-driven identification of factors for appropriate selection of lab tests</td>
<td>G. Prakash</td>
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<td>Usability Testing of a Complex CDS Tool in the ED; Lessons Learned</td>
<td>A. Press; L. McCullagh; S. Kahn; S. Pardo; A. Schachter; T. McGinn</td>
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<td>5:00 PM-6:30 PM</td>
<td>Clustering Health Data to Discover EBP Interventions for Sepsis Prevention and Treatment for Health Disparities</td>
<td>L. Pruinelli; P. Yadav; A. Hangsleben; K. Schiroo; S. Dey; G. Simon; M.C. McCarty; V. Kumar; C.W. Delaney; M. Steinbach; B.L. Westra</td>
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<td>Data Integration Opportunities and Challenges for the ADVANCE Clinical Data Research Network</td>
<td>J. Puro</td>
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<td>5:00 PM-6:30 PM</td>
<td>To be Discontinued: CPOE Medication Orders Discontinued with Reason Being &quot;Error (Erroneous Entry)&quot;</td>
<td>A.J. Quist; T. Hickman; A. Salazar; M.G. Amato; L.A. Volk; A. Wright; D.W. Bates; G. Schiff</td>
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<td>5:00 PM-6:30 PM</td>
<td>A method to automatically create titles of clinical notes in electronic medical records</td>
<td>A. Weiss; M. Rais; R. Bhojani; D.F. Sittig</td>
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<td>5:00 PM-6:30 PM</td>
<td>Closing the Loop with an Enhanced Referral Management System</td>
<td>H.Z. Ramelson; A. von Taube; P.M. Neri</td>
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<td>5:00 PM-6:30 PM</td>
<td>Participatory Design of an Infographic to Inform Decisions about Consent for Health Information Exchange for Persons Living with HIV</td>
<td>S. Ramos; R. Schnall; P. Gordon; S. Bakken</td>
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<td>5:00 PM-6:30 PM</td>
<td>Non-Physicians E-Prescribe More than Physicians in a Pediatric Emergency Department</td>
<td>M.D. Raskas; P. Mullan; B.R. Jacobs; J.M. Chamberlain; A.S. Campling; S.J. Patel</td>
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<td>5:00 PM-6:30 PM</td>
<td>Web-based Patient-centered Toolkit: Demographics of Enrollment</td>
<td>S. Ravindran; A.K. Dalal; C. Morrison; J.M. Fiskio; J.R. Hanna; D.L. Stade; K. McNally; E. Mlaver; P.C. Dykes</td>
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<td>5:00 PM-6:30 PM</td>
<td>Identification of Variables that Predict Visit Times for Analyzing Ophthalmology Clinic Workflows</td>
<td>S. Read-Brown; M.R. Hribar; G. Aaker; L.G. Reznick; T.R. Yackel; M.F. Chiang</td>
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<td>Preserving Semantic Content of Narrative Clinical Information in the OMOP Common Data Model Format</td>
<td>G.E. Reed</td>
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<td>5:00 PM-6:30 PM</td>
<td>HomeSHARE: A Distributed Smart Homes Testbed Initiative</td>
<td>K.C. Connelly; B. Reeder; A.K. Hall; K. Caine; K.A. Siek; G. Demiris</td>
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<td>5:00 PM-6:30 PM</td>
<td>An Analytics Approach for Adverse Drug Event Discovery</td>
<td>M. REZAIE; K. Yoshigoe; U. Topaloglu</td>
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<td>5:00 PM-6:30 PM</td>
<td>Automated Prediction of Human Mobility Patterns in International Humanitarian Response</td>
<td>N. Robison; A.M. Turner</td>
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<td>5:00 PM-6:30 PM</td>
<td>Representation of Genetic Variants in Genomic Sequencing Reports</td>
<td>E.L. Rustia; C. Weng; C. Friedman</td>
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<td>5:00 PM-6:30 PM</td>
<td>Demographic Predictors for Completion of an Interactive Voice</td>
<td>A. Salazar; E.V. Klinger; J. Medoff; M.G. Amato; P.C.</td>
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<td>Response System Survey Coupled with a Real Time Transfer to a Pharmacist</td>
<td>Dykes; J. Haas; D.W. Bates; G. Schiff</td>
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<td>5:00 PM-6:30 PM</td>
<td>Changing Physician Changeover: How adopting a tool in the EMR impacts</td>
<td>J. Salisbury; E.C. Webber</td>
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<td>the perception of paper handoff tools</td>
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<td>5:00 PM-6:30 PM</td>
<td>Integrative Informatics and Predictive Modeling Support for</td>
<td>M. Saltz; J. Saltz; J. Hajagos; A. White; C.M.</td>
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<td>Population Health</td>
<td>Bolcey; J. Murry; I. Crnosija; T. Kurc; E. Bremer; J.S. Almeida</td>
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<td>5:00 PM-6:30 PM</td>
<td>Meta-Analysis: Impact of Health Information Technology on Patient</td>
<td>S.A. Sawesi; k. phalakornkule; J.F. Jones</td>
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<td>Engagement and Health Behavior Change</td>
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<td>5:00 PM-6:30 PM</td>
<td>Statistically Bolstered Opportunities Assessment in Measure Analytics</td>
<td>E. Scheufele; J. Kohler; G. Soto-Campos</td>
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<td>5:00 PM-6:30 PM</td>
<td>Use of mHealth Technology for Supporting Symptom Management in</td>
<td>R. Schnall; H. Jia; S. Olender; S. Bakken</td>
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<td>Underserved Persons Living with HIV (PLWH)</td>
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<td>5:00 PM-6:30 PM</td>
<td>Drug Allergy Interaction Alert Overrides in the Inpatient Setting</td>
<td>D. Seger; S.P. Slight; P.E. Beeler; O. Dalleur; M.G. Amato; T. Eguale;</td>
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<td>K.C. Nanji; P.C. Dykes; M. Swerdloff; J.M. Fiskio; D.W. Bates</td>
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<td>Cluster Analysis Algorithm For Cohort Comparison</td>
<td>S. Shahdadpuri; A. Sane; P. Gandhi</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Framework for Assessing Clinical Data Suitability for Observational</td>
<td>N. Shang; C. Weng; G. Hripcsak</td>
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<td>5:00 PM-6:30 PM</td>
<td>Drug Database Refinement Using Machine Learning and Text Analysis</td>
<td>R. Sharifi Sedeh; X. Zhu; Y. Jia; J. Liu; O. Farri; D. Elgort</td>
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<td>5:00 PM-6:30 PM</td>
<td>HealthAlert: A Real-Time Health Monitoring App for Apple’s HealthKit</td>
<td>B. Chaballout; R.J. Shaw</td>
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<td>5:00 PM-6:30 PM</td>
<td>Data Mining to Predict Healthcare Utilization in Managed Care Patients</td>
<td>L. Sheets; M. Phinney; S. Lander; J.C. Parker; C. Shyu</td>
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<td>5:00 PM-6:30 PM</td>
<td>Identifying Population Characteristics Tables in Full Text Articles</td>
<td>G. Sherman; C. Blake; J. Lee</td>
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<td>5:00 PM-6:30 PM</td>
<td>Implementation of a Mobile Electronic Medical Record System that</td>
<td>A. Shibuya; K. Ogawa; K. Matsumoto; M. Hashimoto; Y. Maeda; Y. Kondo</td>
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<td>5:00 PM-6:30 PM</td>
<td>Electronic Medical Records System Support of Patient Centered Medical Home Requirements for National Committee for Quality Assurance Recognition</td>
<td>E.R. Silvers; A. von Taube; C.L. Liang; L.A. Volk</td>
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<td>5:00 PM-6:30 PM</td>
<td>Alternative Information Display of Clinical Research to Support Clinical Decision Making: A Formative Evaluation.</td>
<td>S. Slager; C. Weir; H. Kim; J. Mostafa; G. Del Fiol</td>
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<td>5:00 PM-6:30 PM</td>
<td>Leveraging Genetic Findings to Identify High-Risk Chronic Kidney Disease in the Electronic Medical Record</td>
<td>C. Smail</td>
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<td>5:00 PM-6:30 PM</td>
<td>Systemic Risk Analysis for Use Cases for Safety-Related Usability of EHRs</td>
<td>M.W. Smith; D.R. Murphy; D.F. Sittig; E. Russo; H. Singh</td>
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<td>5:00 PM-6:30 PM</td>
<td>PubMed 'Early Alerts': A Pilot Study to Support Prospective Detection of Emerging Adverse Drug Events</td>
<td>A. Sorbello; a. ripple; O. Bodenreider</td>
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<td>5:00 PM-6:30 PM</td>
<td>Machine-to-Machine (M2M) Communication in Home-care</td>
<td>B.P. Spyropoulos; A. Tzavaras; M. Botsivaly</td>
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<td>5:00 PM-6:30 PM</td>
<td>Bringing Context to Data Analytics: A Hybrid Approach to Understanding Clinical Workflow</td>
<td>B. Steitz; K.M. Unertl</td>
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<td>5:00 PM-6:30 PM</td>
<td>Comparison of Patient Portal Usage between Employees and Non-Employees</td>
<td>L. Sulieman; D. Eckerle Mize; D. Fabbri; T. Rosenbloom</td>
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<td>5:00 PM-6:30 PM</td>
<td>Data-driven knowledge base evaluation: Translating an adult CDS tool for use in pediatric care</td>
<td>K.A. Sward; C.J. Newth; R.G. Khemani; J. Dean</td>
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<td>5:00 PM-6:30 PM</td>
<td>Leveraging a Clinical Data Warehouse to improve quality of data in the French DRG-based system (PMSI)</td>
<td>E. Sylvestre; C. Riou; G. Bouzillé; M. Cuggia</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Cross Strait Cooperation Design and Implementation of Mobile Nursing Information System</td>
<td>Y. Liu; P. Huang; Z. Gu; R. Wang; C. Gao; S. Tao; J. Guo; Z. Wang</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Systems-Based Framework for Informatics Workforce Development to Support Health System Transformation</td>
<td>H. Tolentino; L.H. Franzke; S.R. Papagari Sangareddy</td>
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<td>5:00 PM-6:30 PM</td>
<td>Integrating an Externally Developed Clinical Decision Support (CDS) System with an Existing Electronic Health Record (EHR) System at VA</td>
<td>S. Tu; K. Yuen; C. Oshiro; S.B. Martins; I. Valdes; G.O. Welch; P. Heidenreich; M.K. Goldstein</td>
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<td>5:00 PM-6:30 PM</td>
<td>Canary – a Graphic User Interface to a Heuristic NLP Engine</td>
<td>N.L. Sandor; S. Skentzos; A. Turchin</td>
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<td>Hospital Participation in Meaningful Use and Rehospitalization of Medicare Beneficiaries</td>
<td>M.A. Unruh; J.R. Vest; H. Jung; R. Kaushal</td>
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<td>5:00 PM-6:30 PM</td>
<td>Evaluation of a Statewide Online HIV-HCV-STD Clinical Education Program – Characterization of Healthcare Providers’ Professional Background, Self-Reported Knowledge Increase, and Intention to Change Clinical Practice</td>
<td>D. Wang; A.E. Luque; T. Doll; M. Barbosu; M. Bernhardt</td>
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<td>5:00 PM-6:30 PM</td>
<td>Building and evaluating predictive models for postoperative ileus prior to colorectal surgery</td>
<td>X. Wang; R. Caso Caso; Y. Aphinyanaphongs</td>
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<td>5:00 PM-6:30 PM</td>
<td>Pediatric venous thrombus embolus (VTE) screening tool: the design, implementation and continuous improvement of a complex clinical decision support tool</td>
<td>E.C. Webber; M. Saysana; C. Willey; A. Mahajerin</td>
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<td>Increasing Patient Enrollment in Clinical Trials Using a Web Based Recruitment Application</td>
<td>N.N. Whipple; H. Ramelson; I. Natanel</td>
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<td>5:00 PM-6:30 PM</td>
<td>A Centralized Data Collection and Management Tool in the VA: REDCap</td>
<td>E.R. Whittier; D.M. Hynes; P. Watson</td>
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<td>5:00 PM-6:30 PM</td>
<td>Routine Collection of Patient-Reported Data in Electronic Form in Clinical Settings: An Analysis of Available Technologies</td>
<td>A. Wilcox; S.D. Tew; J. Poll</td>
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<td>A BI Tool to Monitor the Intervention Efficiency of Antibiotic Therapy in Leukemia Patients</td>
<td>C. Wu</td>
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<td>Use of an Electronic Health Record as a Research Tool: Frequency of Exposure to Targeted Medical Conditions and Health Care Providers’ Clinical Proficiency</td>
<td>T. Wysocki; J. Crutchfield; M. Diaz; J. Franciosi</td>
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<td>Simplified Spectrographic Display for Bedside Electrographic Seizure Detection in the ICU</td>
<td>P. Yan; Z.M. Grinspan</td>
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<td>Intelligence in Usability Survey Research (iUSuR): an Online Usability Question Bank for Usability Survey Research</td>
<td>P. Yen; N. Esmaili</td>
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<td>Anchor time extraction for building timeline from Korean clinical narratives</td>
<td>W. Yi; S. Park; J. Choi</td>
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<td>5:00 PM-6:30 PM</td>
<td>Predicting Autonomy for Physical Activity using Data Mining Techniques</td>
<td>S. Yoon; N.M. Suero-Tejeda; S. Bakken</td>
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<td>A Preliminary Study on EHR-Associated Extra Workload Among Physicians</td>
<td>J. Zhang; K. Avery ; Y. Chen; S. Ashfaq; S.R. Rick; K. Zheng; N. Weibel; H. Hochheiser; C. Weir; K. Bell; M. Gabuzda; N. Farber; B. Pandey; A. Calvitti; L. Liu; R. Street; Z. Agha</td>
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<td>Social Media and Autism Support: Health Information Seeking in Facebook by Autism Patients and Caregivers</td>
<td>Y. Zhao; P. Nambisan</td>
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<td>A survey of automated information retrieval for genetic disorder from GeneReviews</td>
<td>Q. Zhu; p. Li</td>
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<td>Medication Adherence to Oral Hypoglycemic Agents and Hospitalization Cost in Medicaid Patients with Type 2 Diabetes</td>
<td>V. Zhu; W. Tu; M. Rosenman; J. Overhage</td>
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<td>5:00 PM-6:30 PM</td>
<td>Using a Web-based Clinical Pathway and Computerized Order Set to Improve Efficiency of Care for Asthma in a Pediatric Emergency Department</td>
<td>J. Zorc; R. Abaya; E. Delgado; R. Scarfone</td>
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10:00 AM-2:00 PM, Room: TBD (Hilton San Francisco Union Square), **Poster Session II Preview (Authors not present)**, Poster

8:30 AM-10:00 AM, Room: TBD (Hilton San Francisco Union Square), **S56: Featured Presentation - Informatics Year in Review**, Featured Presentation

8:30 AM-10:00 AM, Room: TBD (Hilton San Francisco Union Square), **S57: Didactic Panel - The Best of Imaging Informatics Research 2015**, Didactic Panel

8:30 AM-10:00 AM, **The Best of Imaging Informatics Research 2015** C.E. Kahn; B. Erickson

8:30 AM-10:00 AM, Room: TBD (Hilton San Francisco Union Square), **S58: Didactic Panel - Looking Back and Moving Forward: A Review of Public and Global Health Informatics Literature and Events**, Didactic Panel

8:30 AM-10:00 AM, **Looking Back and Moving Forward: A Review of Public and Global Health Informatics Literature and Events** B.E. Dixon; J. Pina; J. Richards; H. Kharrazi; A.M. Turner

10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), **S59: Interactive Panel - What Could Go Wrong?: Migrating from One EHR to Another**, Interactive Panel

10:30 AM-12:00 PM, **What could go wrong?: Migrating from one EHR to another** R. Schreiber; R. Koppel; C.K. Craven; J.D. McGreevey

10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), **S61: Didactic Panel - User-centered Methods to Optimize Clinical Decision Support: Examples from Pediatrics with Applicability to All Care Settings**, Didactic Panel

10:30 AM-12:00 PM, **User-Centered Methods to Optimize Clinical Decision Support: Examples from Pediatrics with Applicability to All Care Settings** D.J. Karavite; E.D. Shelov; L. Utidjian; J. Michel; E.M. Lourie

10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), **S62: Didactic Panel - Developing Natural Language Processing Systems for Healthcare**, Didactic Panel
<table>
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<th>Time</th>
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| 10:30 AM-12:00 PM | Developing Natural Language Processing Systems for Healthcare  
G.T. Gobbel; R.M. Reeves; W. Chapman; D. Finch; J.H. Garvin |
| 10:30 AM-12:00 PM | Room: TBD (Hilton San Francisco Union Square), **S63: Papers - Workforce and Process Evaluation**, Papers |
| 10:30-10:52 AM  | Using High-Fidelity Simulation and Eye Tracking to Characterize Workflow Patterns among Hospital Physicians  
J.W. Doberne; Z. He; V. Mohan; J.A. Gold; J. Marquard; M.F. Chiang |
| 10:52-11:14 AM  | Medical Inpatient Journey Modeling and Clustering: A Bayesian Hidden Markov Model Based Approach  
Z. Huang; W. Dong; F. Wang; H. Duan |
| 11:14-11:36 AM  | Secondary Use of EHR Timestamp data: Validation and Application for Workflow Optimization  
M.R. Hribar; S. Read-Brown; L.G. Reznick; L. Lombardi; M. Parikh; T.R. Yackel; M.F. Chiang |
| 11:36-11:58 AM  | Improving guideline concordance in multidisciplinary teams: preliminary results of a cluster-randomized trial evaluating the effect of a web-based audit and feedback intervention with outreach visits  
M.v. Engen-Verheul; W. Gude; S. van der Veer; H. Kemps; M. Jaspers; N.F. de Keizer; N. Peek |
| 10:30 AM-12:00 PM | Room: TBD (Hilton San Francisco Union Square), **S64: Papers - Public Health**, Papers |
| 10:30-10:52 AM  | PHAST: A Collaborative Machine Translation and Post-editing Tool for Public Health  
K.N. Dew; A.M. Turner; I. desai; N. Martin; A.A. Laurenzi |
| 10:52-11:14 AM  | Analyses of Merging Clinical and Viral Genetic Data for Influenza Surveillance  
D.J. Magee; R. Beard; M. Scotch |
| 11:14-11:36 AM  | A Flexible Simulation Architecture for Pandemic Influenza Simulation  
H. Eriksson; T. Timpka; J. Ekberg; A. Spreco; Ö. Dahlström; M. Strömgren; E. Holm |
| 11:36-11:58 AM  | Completing Death Certificates from an EMR: Analysis of a Novel Public-Private Partnership  
J.S. Tripp; J. Duncan; L. Finch; S.M. Huff |
| 10:30 AM-12:00 PM | Room: TBD (Hilton San Francisco Union Square), **S65: Papers - Consumer Text and Ontologies**, Papers |
| 10:30-10:52 AM  | Automated Classification of Consumer Health Information Needs in Patient Portal Messages  
R.M. Cronin; D. Fabbri; J.C. Denny; G.P. Jackson |
| 10:52-11:14 AM  | Analyzing Self-Help Forums with Ontology-Based Text Mining: An Exploration in Kidney Space  
P. Burckhardt; R. Padman |
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<tr>
<td>11:14-11:36 AM</td>
<td>Automatic Extraction and Post-coordination of Spatial Relations in Consumer Language</td>
<td>K. Roberts; L.M. Rodriguez; S.E. Shooshan; D. Demner-Fushman</td>
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<td>11:36-11:58 AM</td>
<td>Representation of Functional Status Concepts from Clinical Documents and Social Media Sources by Standard Terminologies</td>
<td>A.F. Mohanty; J. Kuang; R. V. H.; C. Weir; B.E. Bray; Q.T. Zeng</td>
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<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square),</td>
<td><strong>S66: Papers - EHRs for Hospital Teams</strong>, Papers</td>
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<td>11:14-11:36 AM</td>
<td>Reading and Writing: Qualitative Analysis of Pharmacists' Use of the EHR when Preparing for Team Rounds</td>
<td>S.D. Nelson; J. LaFleur; G. Del Fiol; S. Evans; C. Weir</td>
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<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square),</td>
<td><strong>S67: Podium Presentations - Advanced Data Analytics</strong>, Podium Presentations</td>
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<td>10:30-10:52 AM</td>
<td>Assessing Variability in Breast Cancer Treatment Paths Using Frequent Sequence Mining</td>
<td>R.V. Atreya; T.A. Lasko; M.A. Levy</td>
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<td>10:52-11:14 AM</td>
<td>Process Mining of Growing Adoption of Genomic Precision Medicine Testing Using Commercial Claims and Encounters Database</td>
<td>V. Huser</td>
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<td>11:14-11:36 AM</td>
<td>Demonstrating the Advantages of Applying Data Mining Techniques on Time-Dependent Electronic Medical Records</td>
<td>U. Kartoun; V. Kumar; S. Cheng; S. Yu; K.P. Liao; E. . Karlson; A. Ananthakrishnan; Z. Xia; V. Gainer; A. Cagan; G. Savova; P.J. Chen; S.N. Murphy; S. Churchill; I.S. Kohane; P. Szolovits; T. Cai; S. Shaw</td>
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<td>11:36-11:58 AM</td>
<td>Feature Selection Based LapSVM to Classify Medical Event Reports and Enhance Patient Safety</td>
<td>S.j. Fodeh; C. Brandt; P. Miller; M. Koss; A.L. Benin</td>
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<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square),</td>
<td><strong>S68: Papers/Podium Presentations - Miscellaneous II</strong>, Papers/Podium Presentations</td>
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<td>10:30-10:52 AM</td>
<td>Translating Electronic Clinical Quality Measures to Executable, Portable, and Customizable Workflows in KNIME</td>
<td>H. Mo; J.A. Pacheco; R.C. Kiefer; L. Rasmussen; J. Pathak; J.C. Denny; W. Thompson</td>
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<td>10:52-11:14 AM</td>
<td>Model Selection For EHR Laboratory Tests Preserving Healthcare Context and Underlying Physiology</td>
<td>D. Albers; R. Pivovarov; J.M. Schmidt; N. Elhadad; G. Hripcsak</td>
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<td>11:14-11:36 AM</td>
<td>Developing the Pathologists' Monthly Assignment Schedule: A Case Study at the Division of Anatomical Pathology of The Ottawa Hospital</td>
<td>A. Montazeri; J. Patrick; W. Michalowski; D. Banerjee</td>
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<td>11:36-11:58 AM</td>
<td>A Not So Lame Outlook for Injured Farm Workers in Pork and Dairy Operations: Return-to-Work Software Application Development</td>
<td>B. Weichelt; I.A. Reyes; A. Mahnke; W. Ray; L. Verhagen; S. Halstead; M. Keifer</td>
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<td>1:45 PM-3:15 PM</td>
<td>Needs of the Digital Native: Adolescents and Access to PHRs</td>
<td>C.A. Smith; F.C. Bourgeois; P. Charney; P.F. Brennan</td>
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<td>1:45 PM-3:15 PM</td>
<td>Rapid Development and Implementation of Critical Information Systems for Ebola Treatment Centres in West Africa: Lessons for Future Events</td>
<td>J.M. Teich; H.S. Fraser; E. Perakslis; S. Oza; D. Jazayeri</td>
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<td>1:45 PM-3:15 PM</td>
<td>Health Informatics Graduate Program Accreditation: CAHIIM Process and Standards Update</td>
<td>J.J. Warren; S.B. Johnson; S.A. Boren; S. Speedie; G. Tusch</td>
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<td>1:45 PM-3:15 PM</td>
<td>The Informatics Sculptor &amp; the Clinical Annotator: Effective Annotation Strategies</td>
<td>R.M. Reeves; N.H. Gentry; E.E. Hanchrow; G.T. Gobbel; B.R. South; S.M. Bradley</td>
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<td>1:45 PM-3:15 PM</td>
<td>Featured Presentation - Student Design Challenge</td>
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<td>1:45-2:07 PM</td>
<td>Predicting Health Care Utilization After Behavioral Health Referral</td>
<td>N. Roysden; A. Wright</td>
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<td>Using Natural Language Processing and Machine Learning</td>
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<td>2:07-2:29 PM</td>
<td>Surgical Duration Estimation via Data Mining and Predictive Modeling:</td>
<td>N. Hosseini; M. Sir; C. Jankowski; K. Pasupathy</td>
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<td>A Case Study</td>
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<td>2:29-2:51 PM</td>
<td>Clinical Predictive Modeling Development and Deployment through</td>
<td>M. Khalilia; M. Choi; A. Henderson; S. Iyengar; M.L. Braunstein; J. Sun</td>
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<td>FHIR Web Services</td>
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<td>2:51-3:13 PM</td>
<td>Dynamic Estimation of the Probability of Patient Readmission to the</td>
<td>K.L. Caballero Barajas; R. Akella</td>
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<td>ICU using Electronic Medical Records</td>
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<td>1:45-2:07 PM</td>
<td>Understanding the acceptance factors of an Hospital Information</td>
<td>R. OLOGEANU; D. Morquin; H. Domingo</td>
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<td>System: evidence from a French University Hospital</td>
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<td>2:07-2:29 PM</td>
<td>Improving EHR Capabilities to Facilitate Stage 3 Meaningful Use Care</td>
<td>D. Cross; G.R. Cohen; P. Nong; A. Day; D. Vibbert; R. Naraharisetti; J. Adler-Milstein</td>
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<td>Coordination Criteria</td>
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<td>2:29-2:51 PM</td>
<td>Variability in Electronic Health Record Usage and Perceptions among</td>
<td>T.K. Redd; J.W. Doberne; D. Lattin; T.R. Yackel; C.O. Eriksson; V. Mohan; J.A. Gold; J.S. Ash; M.F. Chiang</td>
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<td>Specialty vs. Primary Care Physicians</td>
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<td>2:51-3:13 PM</td>
<td>Inferring Clinical Workflow Efficiency via Electronic Medical Record</td>
<td>Y. Chen; W. Xie; C.A. Gunter; D. Liebovitz; S. Mehrotra; H. Zhang; B. Malin</td>
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<td>Utilization</td>
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<td>Designing Asynchronous Communication Tools for Optimization of</td>
<td>J. Eschler; L.S. Liu; L. Vizer; J. McClure; P. Lozano; W. Pratt; J. Ralston</td>
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<td>Patient-Clinician Coordination</td>
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<td>2:07-2:29 PM</td>
<td>Application of a Consumer Health Information Needs Taxonomy to</td>
<td>J.A. Shenson; E. Ingram; N. Colon; G.P. Jackson</td>
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<td>Questions in Maternal-Fetal Care</td>
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<td>2:29-2:51 PM</td>
<td>Barriers and Facilitators to Patient-Provider Communication When Discussing Breast Cancer Risk to Aid in the Development of Decision Support Tools</td>
<td>H. Yi; T. Xiao; P. Thomas; A. Aguirre; C. Smalletz; J. Dimond; J. Finkelstein; K. Infante; M.S. Trivedi; R. David; J. Vargas; K. Crew; R. Kukafka</td>
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<td>2:51-3:13 PM</td>
<td>Design of a Community-Engaged Health Informatics Platform with an Architecture of Participation</td>
<td>M. Millery; W. Ramos; C. Lien; A. Aguirre; R. Kukafka</td>
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<td>1:45 PM-3:15 PM</td>
<td>Extracting Information from Clinical Texts, Papers</td>
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<td>1:45-2:07 PM</td>
<td>Finding Cervical Cancer Symptoms in Swedish Clinical Text using a Machine Learning Approach and NegEx</td>
<td>R. Weegar; M. Kvist; K. Sundström; S. Brunak; H.K. Dalianis</td>
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<td>2:07-2:29 PM</td>
<td>Automated Extraction of Substance Use Information from Clinical Texts</td>
<td>Y. Wang; E.S. Chen; S.V. Pakhomov; E.G. Arsoniadis; E.W. Carter; E. Lindemann; I.N. Sarkar; G.B. Melton</td>
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<td>2:29-2:51 PM</td>
<td>A Study of Neural Word Embeddings for Named Entity Recognition in Clinical Text</td>
<td>Y. Wu; J. Xu; M. Jiang; Y. Zhang; H. Xu</td>
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<td>2:51-3:13 PM</td>
<td>Automated Reconciliation of Radiology Reports and Discharge Summaries</td>
<td>B. Koopman; G. Zuccon; A. Wagholikar; K. Chu; J. O'Dwyer; A. Nguyen; G. Keijzers</td>
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<td>1:45 PM-3:15 PM</td>
<td>Clinical Decision Support I, Papers/Podium Presentations</td>
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<td>1:45-2:07 PM</td>
<td>Developing InSPECT: An Interactive Surveillance Portal for Evaluating Clinical Decision Support</td>
<td>A.B. McCoy; E.J. Thomas; M. Krousel-Wood; S.C. Guerrero; R.J. Applegate; D.F. Sittig</td>
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<td>2:07-2:29 PM</td>
<td>Automating Guidelines for Clinical Decision Support (CDS): A Categorization of Knowledge Engineering and Implementation Decisions</td>
<td>M.K. Goldstein; S. Tu; C. Oshiro; S.B. Martins; D.Y. Wang; A. Furman; M. Ashcraft; J. Mendoza; P. Heidenreich</td>
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<td>2:29-2:51 PM</td>
<td>Analysis of empty responses from electronic resources in infobutton managers</td>
<td>J. Long; N.C. Hulse; C. Tao</td>
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<td>2:51-3:13 PM</td>
<td>Iterative Design and Evaluation Methodology for Clinical Decision Support Systems</td>
<td>F. Yu; V. Carrasco; K.K. Mane; J. Mostafa</td>
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<td>3:30 PM-5:00 PM</td>
<td>Health Information Technology and Large-scale Adverse Events, Didactic Panel</td>
<td>F. Magrabi; D.F. Sittig; J. Scott; P. Kilbridge</td>
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<td>3:30 PM-5:00 PM</td>
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<td>Didactic Panel</td>
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<td>3:30 PM-5:00 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), S82: Didactic Panel - Data Quality in Clinical Data Research Networks (CDRNs)</td>
<td>Didactic Panel</td>
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<td>3:30 PM-5:00 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), S83: Didactic Panel - State of the Art of Clinical Narrative Report De-Identification and Its Future</td>
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<td>Room: TBD (Hilton San Francisco Union Square), S84: Papers - Clinical Decision Support II</td>
<td>Papers</td>
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<td>Expanding a First-Order Logic Mitigation Framework to Handle Multimorbid Patient Preferences</td>
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<td>3:52-4:14 PM</td>
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<td>Adaptation of a Published Risk Model to Point-of-care Clinical Decision Support Tailored to Local Workflow</td>
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<td>4:36-4:58 PM</td>
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<td>Using a Clinical Knowledge Base to Assess Comorbidity Interrelatedness Among Patients with Multiple Chronic Conditions</td>
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<td>3:30 PM-5:00 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), S85: Papers - mHealth</td>
<td>Papers</td>
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<td>3:30-3:52 PM</td>
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<td>Mining Twitter as a First Step toward Assessing the Adequacy of Gender Identification Terms on Intake Forms</td>
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<td>3:52-4:14 PM</td>
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<td>Evaluating Consumer m-Health Services for Promoting Healthy Eating: A Randomized Field Experiment</td>
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Public Perspectives of Mobile Phones’ Effects on Healthcare Quality and Medical Data Security and Privacy: A 2-Year Nationwide Survey
J.E. Richardson; J.S. Ancker

Patient Engagement in Cancer Survivorship Care through mHealth: A Consumer-centered Review of Existing Mobile Applications
Y. Geng; S. Myneni

Automated Detection of Benzodiazepine Dosage in ICU Patients through a Computational Analysis of Electrocardiographic Data
M.T. Spadafore; Z. Syed; I. Rubinfeld

Using Big Data to Evaluate the Association between Periodontal Disease and Rheumatoid Arthritis
M.A. Grasso; A.C. Comer; D. DiRenzo; Y. Yesha; N. Rishe

Development and Preliminary Evaluation of a Prototype of a Learning Electronic Medical Record System
A.J. King; G.F. Cooper; H. Hochheiser; G. Clermont; S. Visweswaran

Learning a Severity Score for Sepsis: A Novel Approach based on Clinical Comparisons
K. Dyagilev; S. Saria

JUFIT: A Configurable Rule Engine for Filtering and Generating New Multilingual UMLS Terms
J. Hellrich; S. Schulz; S. Buechel; U. Hahn

Scaling Out and Evaluation of OBSecAn, an Automated Section Annotator for Semi-Structured Clinical Documents, on a Large VA Clinical Corpus
L.T. Tran; G. Divita; A.M. Redd; M.E. Carter; M. Samore; A.V. Gundlapalli

An Ensemble Method for Spelling Correction in Consumer Health Questions
H. Kilicoglu; M. Fiszman; K. Roberts; D. Demner-Fushman

Citation Sentiment Analysis in Clinical Trial Papers
J. Xu; Y. Zhang; Y. Wu; J. Wang; x. dong; H. Xu

Human Factors of Health Information Exchange: Barriers and Facilitators to Use of the VA’s CPRS and a Regional Health Information Exchange
A.W. Kushniruk; E.M. Borycki; H. Monkman; K. Boockvar

Uncovering the Cognitive Demands of EHR Use via Task Analysis
M.S. Pfaff; O. Eris; A. Anganes; T. Crotty; J.R. Nebeker; M. Ward
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<td>4:14-4:36 PM</td>
<td>Evaluating the Effects of Cognitive Support on Interpreting ICU Patient Data</td>
<td>P.V. Killoran; S. Gantela; S. Myneni; K. Almoosa; B. Patel; T. Kannampallil; V.L. Patel; T. Cohen</td>
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<td>4:36-4:58 PM</td>
<td>Efficiency and Accuracy of Kinect and Leap Motion devices Compared to the Mouse for Intraoperative Image Manipulation</td>
<td>U.A. Uchidiuno; Y. Feng; H.M. Mentis; H. Zahiri; A. Park; I. George</td>
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<td>3:30 PM-5:00 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), S89: Podium Presentations - Self-management and Shared Decision Making</td>
<td>Podium Presentations</td>
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<td>3:30-3:52 PM</td>
<td>Qualitative Study of an Electronic Tool for Facilitating Problem-Solving and Sensemaking in Diabetes Self-Management, Mobile Diabetes Detectiv</td>
<td>L. Mamykina; E.M. Heitkemper; A.M. Smaldone; R. Kukafka; P. Davidson; E.D. Mynatt; J. Tobin; A. Cassells; C. Goodman; G. Hripcsak</td>
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<td>3:52-4:14 PM</td>
<td>Computer-Mediated Intervention to Improve Medication Literacy in Seniors with Diabetes Results in Better Patient-Reported Outcomes and Glycemic Control</td>
<td>J. Finkelstein; M. Bedra</td>
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<td>4:14-4:36 PM</td>
<td>Using a Software Program to Support Shared Decision-Making about Participation in Breast Cancer Clinical Trials</td>
<td>P. Dalrymple; L. Zach; M.L. Rogers; A. Leader; R. Myers; T. Avery; A. Quinn; A. Petrich; M. Cristofanilli; R. Schilder</td>
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<td>4:36-4:58 PM</td>
<td>An EHR-Integrated Shared Decision Making Mobile App for Prostate Cancer Screening</td>
<td>F.C. Day; M. Sarrafzadeh; S. Smith; M. Pourhomayoun; K. Sideris; A. Param; J. Ben-Hamou; D. Keeves; M.A. Pfeffer; D.S. Bell</td>
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<td>3:30-5:00 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), S90: Papers/Podium Presentations - EHR Usability and Quality</td>
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<td>3:30-3:52 PM</td>
<td>A Guideline for Assessing EHR Data Quality for Secondary Use</td>
<td>N.G. Weiskopf; C. Weng</td>
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<td>3:52-4:14 PM</td>
<td>Effects of HIE/HIT Implementation and Coordination of Care on Health Outcomes and Quality</td>
<td>O.U. Enyia Daniel; E. Mensah</td>
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<td>4:14-4:36 PM</td>
<td>Impact of Electronic Health Records on Quality of Care: Evidence on Inpatient Mortality, Readmissions, and Complications</td>
<td>T. Hernandez-Boussard; C. Curtin; D. Morrison; S. Yanamadala; K. McDonald</td>
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<td>4:36-4:58 PM</td>
<td>Usability Testing of an Ambulatory EHR Navigator</td>
<td>G. Hultman; E.G. Arsoniadis; J. Marquard; R.F. Rizvi; S. Khairat; K. Fickau; G.B. Melton</td>
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<td>Plaza A (Hilton San Francisco Union Square), State of the Association Meeting</td>
<td>Business Meeting</td>
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<td>Room: TBD (Hilton San Francisco Union Square), State of the Association Meeting</td>
<td>Special Event</td>
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<tr>
<td>12:15 PM-1:30 PM, Room: TBD (Hilton San Francisco Union Square), Closing Session and Keynote Presentation: Robert M. Wachter, MD, Special Event</td>
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<tr>
<td>10:00 AM-10:30 AM, Room: TBD (Hilton San Francisco Union Square), Coffee Break, Social Event</td>
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<td>8:30 AM-10:00 AM, Room: TBD (Hilton San Francisco Union Square), S100: Podium Presentations - Consumer Health, Podium Presentations</td>
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<td>8:30-8:52 AM</td>
<td>Will they participate? Predicting patients' response to clinical trial invitations Y. Ni; A.F. Beck; R.G. Taylor; J. Dyas; I. Solti; J. Dexheimer</td>
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<tr>
<td>8:52-9:14 AM</td>
<td>STEMPowerment: A Prototype Online Intervention to Improve Outcomes in Stem Cell Transplant Survivors J. McLaughlin; S. Peterson; M. Askins; D. Zhang</td>
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<tr>
<td>9:14-9:36 AM</td>
<td>A survey of social media for understanding patient-reported medication outcomes K. Harris; B. Ru; L. Yao</td>
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<td>9:36-9:58 AM</td>
<td>Improving Weight in Patients with Serious Mental Illness: A Randomized Controlled Trial of Computerized Weight Services with Peer Coaches A.S. Young; A.N. Cohen; R.W. Goldberg; J. Kreyenbuhl; F. Whelan</td>
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<td>8:30 AM-10:00 AM, Room: TBD (Hilton San Francisco Union Square), S101: Systems Demonstrations - EHRs of the Future, Systems Demonstrations</td>
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<td>8:30-9:15 AM</td>
<td>Electronic Health Management Platform (eHMP): The Next Phase of VA's EHR J.R. Nebeker; W.P. Nichol; S. McNamee; J. Murphy; J.L. Hellewell; R. Omizo; K. Johnson; M. McDonald; K. Kawamoto; G. Del Fiol; E. Fry; E. Hunolt; T. Cullen; S.D. Wood; J. Herout; C. Weir</td>
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<td>9:15-10:00 AM</td>
<td>Towards an Open EHR Platform: Porting a Complex Application using SMART on FHIR A. Erskine; M. Stoots; D. McCallie</td>
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<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), S102: Didactic Panel - Perioperative Clinical Decision Support: Improving Care of the Surgical Patient through Informatics, Didactic Panel</td>
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<td>10:30 AM-12:00 PM</td>
<td>Perioperative Clinical Decision Support: Improving Care of the Surgical Patient through Informatics</td>
<td>R.H. Epstein; K. Poterack; B.G. Nair; P. Guffey; B.G. Nair; B.W. Pickering</td>
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<tr>
<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), S103: Didactic Panel</td>
<td>The Value of an Open-Source Observational Research Collaboratory: Results from the OHDSI Initiative</td>
<td>J. Duke; G. Hripcsak; N. Shah; P.B. Ryan</td>
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<tr>
<td>10:30 AM-12:00 PM</td>
<td>The Implementation of Online Patient Portals in Safety Net Settings: The Realities of Meaningful Use Certification with Vulnerable Patient Populations</td>
<td>C. Lyles; U. Sarkar; N. Ratanawongsa; D.E. Oryn</td>
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<tr>
<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), S104: Didactic Panel</td>
<td>The Implementation of Online Patient Portals in Safety Net Settings: The Realities of Meaningful Use Certification with Vulnerable Patient Populations</td>
<td>C. Lyles; U. Sarkar; N. Ratanawongsa; D.E. Oryn</td>
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<td>10:30 AM-12:00 PM</td>
<td>mobile Digital Access to a Web-enhanced Network (mDAWN): Assessing the Feasibility of Mobile Health Tools for Self-Management of Type-2 Diabetes</td>
<td>K. Ho; L. Newton; A. Boothe; H. Novak Lauscher</td>
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<td>10:52-11:14 AM</td>
<td>Use of Patient Portals for Personal Health Information Management: The Older Adult Perspective</td>
<td>A.M. Turner; K. Osterhage; A.L. Hartzler; J. Joe; L. Lin; N. Kanagat; G. Demiris</td>
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<td>11:14-11:36 AM</td>
<td>Long-Term Engagement with Health-Management Technology: a Dynamic Process in Diabetes</td>
<td>P. Klasnja; L. Kendall; W. Pratt; K. Blondon</td>
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<td>11:36-11:58 AM</td>
<td>Understanding patients' health and technology attitudes for tailoring self-management interventions</td>
<td>K. O'Leary; L. Vizer; J. Eschler; J. Ralston; W. Pratt</td>
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<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), S105: Papers - Patients in Control: Self-management Tools</td>
<td>Ginkgo and Warfarin Interaction in a Large Veterans Administration Population</td>
<td>G.J. Stoddard; M. Archer; L. Shane-McWhorter; B.E. Bray; D. Redd; J. Proulx; Q.T. Zeng</td>
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<td>10:30-10:52 AM</td>
<td>Creating Shareable Clinical Decision Support Rules for a Pharmacogenomics Clinical Guideline Using Structured Knowledge Representation</td>
<td>M. Linan; D. Sottara; R.R. Freimuth</td>
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<td>11:14-11:36 AM</td>
<td>Representation of Drug Use in Biomedical Standards, Clinical Text, and Research Measures</td>
<td>E.W. Carter; I.N. Sarkar; G.B. Melton; E.S. Chen</td>
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<tr>
<td>11:36-11:58 AM</td>
<td>An Interactive User Interface for Drug Labeling to Improve Readability and Decision-Making</td>
<td>H. Abedtash; J. Duke</td>
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<tr>
<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), <strong>S107: Papers - EHR Processing</strong>, Papers</td>
<td>Reviewing 741 patients records in two hours with FASTVISU</td>
<td>J. Escudié; A. Jannot; E. Zapletal; S. Cohen; G. Malamut; A. Burgun; B. Rance</td>
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<tr>
<td>10:30-10:52 AM</td>
<td>Building Structured Personal Health Records from Photographs of Printed Medical Records</td>
<td>X. Li; G. Hu; X. Teng; G. Xie</td>
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<td>10:52-11:14 AM</td>
<td>An Assessment of Family History Information Captured in an Electronic Health Record</td>
<td>F. Polubriaginof; N.P. Tatonetti; D. Vawdrey</td>
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<tr>
<td>11:14-11:36 AM</td>
<td>Evolving Patient Compliance Trends: Integrating Clinical, Insurance, and Extrapolated Socioeconomic Data</td>
<td>J. Klobusicky; A. Aryasomayajula; N. Marko</td>
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<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), <strong>S108: Papers - Your Ontologies on Drugs</strong>, Papers</td>
<td>ttcTKB: an integrated cardiovascular toxicity knowledge base for targeted cancer drugs</td>
<td>R. Xu; Q. Wang</td>
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<td>10:52-11:14 AM</td>
<td>Approaches to Supporting the Analysis of Historical Medication Datasets with RxNorm</td>
<td>I. peters; O. Bodenreider</td>
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<td>11:36-11:58 AM</td>
<td>Smartphone Data in Rheumatoid Arthritis - What Do Rheumatologists Want?</td>
<td>P.R. Say; D. Stein; J.S. Ancker; C. Hsieh; J. Pollak; D. Estrin</td>
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<td>10:30 AM-12:00 PM, Room: TBD (Hilton San Francisco Union Square), <strong>S109: Papers - The User Perspective on Informatics Tools</strong>, Papers</td>
<td>Organizational Uses of Health Information Exchange to Change Cost and Utilization Outcomes: A Typology from a Multi-Site Qualitative Analysis</td>
<td>J.R. Vest; E.L. Abramson</td>
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<td>10:52-11:14 AM</td>
<td>Impact of Robotic Surgery on Decision Making: Perspectives of Surgical Teams</td>
<td>R. Randell; N. Alvarado; S. Honey; J. Greenhalgh; P. Gardner; A. Gill; D. Jayne; A. Kotze; A. Pearman; D. Dowding</td>
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<td>11:36-11:58 AM</td>
<td>Challenges and Insights in Using HIPAA Privacy Rule for Clinical Text Annotation</td>
<td>M. Kayaalp; A. Browne; P. Sagan; T. McGee; C.J. McDonald</td>
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<td>10:30 AM-12:00 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), S110: Podium Presentations - Supporting Decisions with NLP, Podium Presentations</td>
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<td>10:30-10:52 AM</td>
<td>Evaluating the Accuracy of Automated Notifiable Condition Detection in Free-Text Electronic Laboratory Report Results Using Contemporary Text Mining and Machine Learning Methods</td>
<td>U. Kirbiyik; P.T. Lai; B.E. Dixon; S. Grannis; S.N. Kasthuri Ratnhe</td>
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<td>10:52-11:14 AM</td>
<td>Detection of Colorectal Surgical Site Infections Using Bayesian Network and Natural Language Processing</td>
<td>S. Sohn; M. Rastegar-Mojarad; J.M. Naessens; E.B. Habermann; D.W. Larson; H. Liu</td>
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<td>11:14-11:36 AM</td>
<td>Natural Language Processing facilitates delivery of individualized recommendations at the point of care</td>
<td>R. Komandur Elayavilli; R. Chaudhry; J. Masanz; J. Pankratz; J.L. Shellum; S.G. Peters; R. Hankey; D.J. Cronk; J.J. Boysen; K. Pavek; R. Roden; H. Liu</td>
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<td>11:36-11:58 AM</td>
<td>Quantifying Tobacco Exposure Using Clinical Notes and Natural Language Processing to Enable Lung Cancer Screening</td>
<td>T. Osterman; W. Wei; J.C. Denny</td>
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<td>10:30 AM-12:00 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), S111: Podium Presentations - If We Build It, Will They Come?, Podium Presentations</td>
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<td>10:30-10:52 AM</td>
<td>Toward the Development of a Predictive Model for Patient Portal Adoption by Patients in a Federally Qualified Health Center</td>
<td>T.L. Walunas; R. Kalu; M. Sakamoto; K. Jackson; S. Rittner; T. Long; M. Sanghavi Goel</td>
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<td>10:52-11:14 AM</td>
<td>Design Principles for Clinical Decision Support for Direct Use by Patients: Addressing Symptom Self-Management in Cancer Patients</td>
<td>D.F. Lobach; J. Abrahm; D. Berry; M.S. Rabin; I. Braun; M. Nayak; M.E. Cooley</td>
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<td>11:14-11:36 AM</td>
<td>Neighborhood Internet Access and Patient Portal Use in Patients with Chronic Conditions</td>
<td>M. Reed; J. Huang</td>
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<td>11:36-11:58 AM</td>
<td>An Analysis of Patient Portal Use in the Acute Care Setting</td>
<td>E. Mlaver; A.K. Dalal; H. Reyes Nieva; F.Y. Chang; J.R. Hanna; S. Ravindran; K. McNally; D.L. Stade; C. Morrison; D.W. Bates; P.C. Dykes</td>
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<td>10:30 AM-12:00 PM</td>
<td>Room: TBD (Hilton San Francisco Union Square), S112: Papers/Podium Presentations - Discovering Associations, Papers/Podium Presentations</td>
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<td>10:30-10:52 AM</td>
<td>Polychromatic X-Ray Absorptiometry to Quantify Breast Density Volume, Ratio and their Associated Breast Cancer Risk in Full-Digital Mammography</td>
<td>L. de Sisternes; J. Rothstein; A. Jeffers; W. Sieh; D. Rubin</td>
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<td>10:52-11:14 AM</td>
<td>Mining and Visualizing Family History Associations in the Electronic Health Record: A Case Study for Pediatric Asthma E.S. Chen; G.B. Melton; R.C. Wasserman; P.T. Rosenau; D.B. Howard; I.N. Sarkar</td>
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<td>11:14-11:36 AM</td>
<td>What causes pneumonia? Kinds of Knowledge and the Case for Hybrid Representations A.L. Rector</td>
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<td>11:36-11:58 AM</td>
<td>Human Computation of Big Data in Biomedicine: Making STAR annotations for large scale functional characterization of disease D. Hadley; J. Pan; O.M. El-Sayed; J. Al-Jabban; I. Al-Jabban; T. Azad; S. Raza; M. Hadied; B. Chen; H. Paik; S. Bhattacharya; M. Sirotta; A.J. Butte</td>
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<td>8:30 AM-10:00 AM, Room: TBD (Hilton San Francisco Union Square), S91: Interactive Panel - Patient Portals: Best Practices and New Directions for Development and Investigation, Interactive Panel</td>
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<td>8:30 AM-10:00 AM</td>
<td>Patient Portals: Best Practices and New Directions for Development and Investigation P.C. Dykes; S. Collins; A.K. Dalal; R. Greysen; C. Dwyer</td>
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<td>8:30 AM-10:00 AM, Room: TBD (Hilton San Francisco Union Square), S92: Interactive Panel - (Authoring) Rules, (Distributed Query) Tools, and Drools: The Challenging New World of High Throughput Phenotyping, Interactive Panel</td>
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<td>8:30 AM-10:00 AM</td>
<td>(Authoring) Rules, (Distributed Query) Tools, and Drools: The challenging new world of high throughput phenotyping J.A. Pacheco; A.N. Kho; J. Pathak; J.C. Denny; S.N. Murphy</td>
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<td>8:30 AM-10:00 AM, Room: TBD (Hilton San Francisco Union Square), S93: Didactic Panel - Clinical Decision Support: How to Apply Standards to Deliver Knowledge-driven Interventions, Didactic Panel</td>
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<td>8:30 AM-10:00 AM</td>
<td>Clinical Decision Support: How to Apply Standards to Deliver Knowledge-Driven Interventions R.A. Jenders; G. Del Fiol; K. Kawamoto; H.R. Strasberg</td>
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<td>8:30 AM-10:00 AM, Room: TBD (Hilton San Francisco Union Square), S94: Interactive Panel - Career Opportunities for the Many Paths to Informatics, Interactive Panel</td>
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<td>8:30 AM-10:00 AM</td>
<td>Career Opportunities for the Many Paths to Informatics L.K. Wiley; T. Kelley; V. Lorenzi; V. Mohan; J.D. Tenenbaum; J.W. Doberne</td>
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<td>8:30 AM-10:00 AM, Room: TBD (Hilton San Francisco Union Square), S95: Papers - All about Handoffs, Papers</td>
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<td>8:30-8:52 AM</td>
<td>In Search of Social Translucence: An Audit Log Analysis of Handoff Documentation Views and Update S.Y. Jiang; R. Hum; D. Vawdrey; L. Mamykina</td>
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<td>8:52-9:14 AM</td>
<td>Uncertainty, Case Complexity and the Content of Verbal Handoffs at the Emergency Department J. Horsky; E.H. Suh; O. Sayan; V.L. Patel</td>
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<td>9:14-9:36 AM</td>
<td>Physician handoffs: opportunities and limitations for supportive technologies</td>
<td>K. Blondon; R. Wipfli; M.R. Nendaz; C. Lovis</td>
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<td>9:36-9:58 AM</td>
<td>Improving Continuity of Care via the Discharge Summary</td>
<td>F. Sakaguchi; L.A. Lenert</td>
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<td>8:30 AM-10:00 AM</td>
<td>S96: Papers - Human-computer Interaction, Papers</td>
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<td>8:30-8:52 AM</td>
<td>Just One More Patient: Optimizing EMR Documentation in Ambulatory Care</td>
<td>M. Pierce; T. Toscos</td>
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<td>9:14-9:36 AM</td>
<td>USER FRUSTRATION IN HIT INTERFACES: EXPLORING PAST HCI RESEARCH FOR A BETTER UNDERSTANDING OF CLINICIANS’ EXPERIENCES.</td>
<td>G. Opoku-Boateng</td>
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<td>9:36-9:58 AM</td>
<td>Model Checking for Verification of Interactive Health IT Systems</td>
<td>K.A. Butler; E. Mercer; A. Bahrami; C. Tao</td>
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<td>8:30 AM-10:00 AM</td>
<td>S97: Connectathon, Featured Presentation</td>
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<td>8:30 AM-10:00 AM</td>
<td>S98 Papers/Podium Presentations - Taken as Directed, Papers/Podium Presentations</td>
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<td>8:30-8:52 AM</td>
<td>Evaluating Term Coverage of Herbal and Dietary Supplements in Electronic Health Records</td>
<td>R. Zhang; N. Manohar; E.G. Arsoniadis; Y. Wang; T.J. Adam; S.V. Pakhomov; G.B. Melton</td>
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<td>8:52-9:14 AM</td>
<td>Nutrition Informatics Applications in Clinical Practice: a Systematic Review</td>
<td>J.C. North; K.C. Jordan; J. Metos; J.F. Hurdle</td>
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<td>9:14-9:36 AM</td>
<td>2 Years Later: Follow-up to Analysis of Electronic Medication Orders with Large Overdoses</td>
<td>J. Dexheimer; E. Kirkendall; M. Kouril; T. Minich; P. Hagedorn; C. Mahdi; S.A. Spooner</td>
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<td>9:36-9:58 AM</td>
<td>Pharmacy drug dispensing after physician discontinuation (cancel) orders</td>
<td>T. Eguale; A.D. Verma; E. Seoane-Vazquez; R. Rodriguez-Monguio; D.W. Bates; R. Tamblyn; G. Schiff</td>
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<td>8:30 AM-10:00 AM</td>
<td>S99: Papers/Podium Presentations - Clinical Notes, Papers/Podium Presentations</td>
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<td>8:30-8:52 AM</td>
<td>Collection and Documentation of Sexual Orientation and Gender Identity Demographic Data in the Electronic Health Record: The Patient Perspective</td>
<td>B.D. Lau; L. Vail; L.M. Kodadek; R. Shields; D. German; S. Peterson; A. Haider</td>
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<td>8:52-9:14 AM</td>
<td>Veterans Health Administration Experience with Data Quality Surveillance of Continuity of Care Documents: Interoperability Challenges for eHealth Exchange Participants</td>
<td>J. Lyle; O. Bouhaddou; n. botts; m. swall; e. pan; T. Cullen; m. donahue; n. hsing</td>
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<td>9:14-9:36 AM</td>
<td>An Empirical Analysis of Chaplain Charting Practices to Inform Electronic Health Record Template Redesign</td>
<td>M. Sakumoto; R. Johnson; J. Wirpsa; G. Handzo; L. Emanuel; A.N. Kho</td>
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<td>9:36-9:58 AM</td>
<td>Validating Free-text Order Entry for a Note-centric EHR</td>
<td>A. Rule; S.R. Rick; M. Chiu; P. Rios; S. Ashfaq; A. Calvitti; W.S. Chan; N. Weibel; Z. Agha</td>
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A Problem Well Stated is Half Solved: A Case-Based Tutorial About Approaching Evaluation and Technical Assistance Projects Through Informatics Problem-Solving

H. Tolentino; 1; L. H. Franzke; 1; S. R. Papagari Sangareddy; 1; C. Pepper; 2;
1. Public Health Informatics Fellowship Program, Centers for Disease Control and Prevention, Atlanta, GA, United States.
2. Texas A&M University, College Station, TX, United States.

Abstract: Problem solving is considered an important cognitive activity in everyday personal and professional life. Development of problem-solving expertise is achieved by deliberate practice designed to master critical skills with repetition, feedback, and reflection. In public health informatics (PHI), a unified problem-solving framework can increase the effectiveness by which defined problems and provided solutions are shared and communicated among diverse stakeholders in a multidisciplinary and boundary-spanning informatics practice community. Workshop participants will work in teams on real, technical assistance and informatics evaluation case studies to learn how to apply concepts, tools, and methods of a PHI problem-solving framework. This workshop is open to PHI students, educators, and practitioners who want to learn more about tools and methods used for informatics problem solving.
An introduction to Natural Language Processing methods in clinical research

O. V. Patterson; 1, 2; S. L. DuVall; 1, 2; P. R. Alba; 1, 2;
1. VA Salt Lake City Health Care System, Salt Lake City, UT, United States.
2. University of Utah, Salt Lake City, UT, United States.

Abstract: As the use of natural language processing (NLP) methods in preparing data for research continues to increase, researchers should understand the benefits and limitations of such a tool. While NLP is not a “solved” science, there are many tasks that NLP can do reliably. Extracting concepts (symptoms, diseases, medications) and values (lab values, vital signs) that are stored in the text is one example. More complex tasks, such as determining what caused an event of interest or why a patient discontinued a medication can also be addressed using the right tools. This tutorial will provide attendees with a general overview of NLP tools and methods used in health research and patient care. Participants will be introduced to NLP, the types of problems that can be addressed with NLP, and how to effectively plan and execute an NLP task using patient medical records. Synthetic clinical notes will be provided along with open-source tools that will allow participants to implement a working NLP system. The eHOST annotation application, Unstructured Information Management Architecture Asynchronous Scaleout (UIMA AS)\(^1\), the Leo NLP libraries\(^2,3\), tools developed and used in the Department of Veterans Affairs (VA) and built on existing community standards, will be introduced and used to illustrate the complete life cycle of an NLP project, from design to human annotation / chart review to NLP system creation to evaluation. The tutorial will be presented by three instructors involved in the design and development of these NLP tools who have completed more than 100 NLP tasks in the VA and other health care institutions. Attendees will experience the process of completing an NLP task and leave the tutorial with concrete examples of how NLP can be used at their institutions to benefit research studies or patient care.
Abstract: With the arrival of clinical informatics board certification for physicians, AMIA support for the applied clinical informatics communities has become more important than ever. A major part of that support is outreach to Chief Medical Information Officers (CMIOs) and those in similar roles (such as Medical Directors for Information Systems), who are charged with leading informatics change within their organizations, both large and small. AMIA is uniquely positioned to serve as the professional “home” for the CMIO community, because it can provide a combination of personal experience and anecdote with firm grounding in evidence-based biomedical informatics literature, informatics theory, foundational knowledge, and proven best practices, in a thoughtful and coherent educational setting. More than 150 individuals have attended the CMIO Workshop since its inception in 2011, more than 50 individuals participating in 2014, ranging from seasoned CMIOs of large systems to those who are just beginning their applied clinical informatics career. The goal of the 2015 CMIO Workshop is to focus on the introduction of new topics that will attract repeat attendees, while providing up-to-date content for those who are exploring or new to the field.
Practical Modeling Issues: Representing Coded and Structured Patient Data in EHR Systems
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Abstract: This tutorial describes the need for formal data models (detailed clinical models) for the EHR and how standard terminologies are used in the models. Starting with use cases encountered while developing EHR systems at Intermountain Healthcare, the instructor will discuss the basic name-value pair paradigm for flexible representation of patient data; the proper roles for standard terminologies like LOINC, SNOMED CT, First Databank, and RxNorm; approaches to handling pertinent negative findings and negation; support for precoordinated data entry while storing the data in a post coordinated database; and storage of data that belongs to another patient (baby or donor) in the patient record.
The Art and Science of Writing Items for High Stakes Exams
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Abstract: The emergence of Clinical Informatics certification created a growing need for multiple-choice test items that adhere to national standards for use in high stakes exams. The American Board of Preventive Medicine convened subject matter experts to develop items for the clinical informatics subspecialty certification exam. AMIA established an item writing activity to generate items for a clinical informatics practice exam. Newly accredited clinical informatics fellowship programs will need items to help fellows assess their mastery of the core content for clinical informatics. AMIA’s work towards Advanced Inter-professional Informatics Certification (AIIC) will create additional demand for high quality clinical informatics test items. Maintenance of certification requires that well written multiple-choice questions accompany learning content for credit to be offered. The ability to write items is a skill that will be in high demand as the discipline of clinical informatics matures. It is a skill that will also strengthen informatics education more generally.

A well-established set of rules for writing sound test items exists, yet many individuals who write test questions for use in their educational programs are unfamiliar with these guidelines. The knowledge to be tested for the discipline of clinical informatics differs from that of traditional clinical domains and therefore creates additional challenges for clinical informatics item writers. This tutorial will present guidelines for writing high quality items, offer a recommended approach for writing clinical informatics items, and provide participants with an opportunity to write items that will be shared for discussion. Drawing upon three years of experience in writing clinical informatics items, tutorial faculty will share common pitfalls that have been observed and strategies for effective item writing. After participating in this activity, the individual should be able to create items that comply with guidelines on creating one-best-answer multiple choice questions for high stakes exams and self-assessments.
Abstract: To guarantee that health IT evaluation studies, of systems and all related socio-technical aspects, are conducted in accordance with robust standards, well-trained health informatics evaluation experts are needed. In this pre-symposium workshop that is jointly organized by the AMIA Evaluation, People and Organizational Issues, and Education Working Groups, and the EFMI and IMIA Working Groups on Evaluation, we will work on recommendations for content of informatics evaluation courses. In particular, participants will first get an overview on first recommendations developed during earlier joint workshops in this series, at MIE 2014, MIE 2015, and MEDINFO 2015, and will then work in smaller groups to refine these recommendations.
Abstract: In December 2013, the Patient-Centered Outcomes Research Institute (PCORI) approved $93.5 million to support 29 clinical research data networks that have been brought together to form a new national resource known as PCORnet, the National Patient-Centered Clinical Research Network. PCORnet is a large, highly representative, national network for conducting clinical outcomes research. PCORnet is integrating data from 11 Clinical Data Research Networks (CDRNs) -- networks that originate in healthcare systems such as hospitals, health plans, or practice-based networks and securely collect "real-time," "real-world" health information during the routine course of patient care – and 18 Patient-Powered Research Networks (PPRNs) -- networks operated and governed by groups of patients and their partners who are focused on a particular condition and interested in sharing health information and participating in research. The first phase of funding was completed in September 2015 and a number of CDRNs and PPRNs are now continuing the work into Phase II. CRI-WG will recognize the immense work already done in, and further potential of, PCORnet by inviting all groups to contribute to a pre-symposium to discuss their unique contributions and successes, the common problems they have encountered and their goals in Phase II.
Natural Language Processing Working Group Pre-Symposium: Tools and Resources Demonstration and ‘Connectathon’

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5. Intermountain Healthcare, Salt Lake City, UT, United States.
7. Harvard Medical School, Boston, MA, United States.
8. Boston Children’s Hospital, Boston, MA, United States.
10. SUNY, Albany, NY, United States.
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Abstract: The application of Natural Language Processing (NLP) methods and resources to clinical and biomedical text has received increased attention over the past years, but progress has been limited by difficulties to access shared tools and resources, difficulties partly caused by clinical data confidentiality requirements. Efforts to increase sharing and interoperability of the few existing resources are needed to facilitate the progress observed in the general NLP domain. To answer this need, the AMIA NLP working group pre-symposium continues the tradition since its inception in 2012 to provide a unique platform for close interactions among students, scholars, and industry professionals who are interested in clinical NLP. The event will consist of two sections: 1) the presentation and demonstration of existing NLP tools and resources, where their authors or experts explain and show the functioning of these NLP tools or resources; and 2) a ‘connectathon’ of NLP tools, where authors will prepare their tool as a module in a standardized NLP pipeline assembled on-site to realize pre-defined typical clinical and biomedical NLP tasks.
Abstract: Biomedical imaging plays a vital role in patient care, spanning the scale from microscopic and molecular to whole body visualization, and encompassing many areas of medicine, such as radiology, pathology, dermatology, and ophthalmology. Biomedical imaging informatics is a discipline that focuses on improving patient outcomes through the effective use of images and imaging-derived information in research and clinical care. The objective of this pre-symposium is to assemble an interdisciplinary group of experts to share methods and experiences in biomedical imaging informatics with the goal of generalizing this knowledge to other imaging domains and the broader informatics community. This year’s overarching theme focuses on the opportunities and challenges of bridging phenotypic information from images with clinical and molecular characterizations of a disease to improve decision support. The event will touch upon topics such as extracting and retrieving semantic content from large imaging archives, utilizing imaging features as part of electronic health record-based phenotyping, applying machine learning to discover correlations between images and other biological scales, characterizing the significance of evolutionary features derived from images, and translating multi-scale disease models into practice. These topics synergize tightly with the broader informatics interests of the AMIA attendees and will raise their awareness of the opportunities and relevance of imaging informatics research to other biomedical informatics activities.
Abstract: Evaluation of eHealth projects is necessary to understand the impact of electronic health information systems on health outcomes. Currently there is a shortage of well-designed and implemented evaluations in the published literature. The aim of this Global Health Informatics Working Group (GHIWG) Pre-symposium is to provide participants with an opportunity to participate in the development of an eHealth Evaluation Framework and to gain knowledge and skills to critique evaluation designs, recognize potential barriers, and select suitable evaluation methodologies to ensure meaningful and generalizable results that will assist in building the needed evidence-base. Building on the activities of the eHealth evaluation tutorial, this pre-symposium workshop is divided into two sections. This GHIWG Pre-symposium first concentrates on describing a draft eHealth evaluation framework and fundamental principles of eHealth evaluation. Within this section the participant will learn about the components of eHealth evaluation, evaluation methods, and evaluation environments, and will be involved in the review of the draft framework. During the second section, the GHIWG Pre-symposium focuses on the existing evidence base on eHealth in resource poor environments and how to select suitable evaluation designs, and plan and implement evaluations. Participants will work in small groups to critique and redesign evaluation studies and are encouraged to bring a current evaluation project for the discussion. The faculty has over 50 years of combined experience of informatics and evaluation. eHealth in resource poor environments and how to select suitable evaluation designs, and plan and implement evaluations. Participants will work in small groups to critique and redesign evaluation studies and are encouraged to bring a current evaluation project for the discussion. The faculty has over 50 years of combined experience of informatics and evaluation.
Abstract: Advances in digital imaging, growth of clinical data warehouses, increased role of analytics in managing patient care, and the increasing use of genome sequencing in the clinic increasingly require the use of data mining techniques in medical informatics. Data Mining for Medical Informatics (DMMI) is a series of workshops that focus on the use of data mining techniques to address current challenges in health informatics. The main theme of the workshop this year is predictive analytics. We will focus on methods for predicting clinical outcomes under uncertainty, including risk assessment, diagnosis, prognosis and treatment effects. Predictive Analytics has received a lot of interest recently and we would like to invite researchers from both academia and industry to participate in this workshop, share their experiences, as well as discuss future research directions.
Abstract: Making is a skill-set and a toolset. It represents the convergence of accessible fabrication technologies, a robust community of user-innovators and a very fast cycle of artifacts and products developed by non-traditional actors that operate with a few degrees of freedom of the demand opportunity. They may be accountants, musicians, patients, lawyers, students, nurses, doctors, engineers and others. In the world of making, they are defined by their tangible output not their formal training.

Products and artifacts of Making in the healthcare domain hold immense promise, from creative hacks in developing nations, to empowering patients and families to engage, to contributing to the rapidly expanding Medical Internet of Things (MiOT). However, with creative expansion and empowerment come challenges of connectivity, interoperability and the threat of disconnected “one-off” solutions. Realizing progress in the MiOT will require connectivity and interoperability among a wide array of health IT applications, medical devices, consumer devices, sensors and other devices in healthcare settings and beyond. We will suggest a framework for building the MiOT using the Open ICE (Integrated Clinical Environments) standard while also addressing exchange issues for non-clinical environments such as homes and communities. This full-day tutorial will include a combination of hands-on team based “Making” and thought-provoking presentations.
Abstract: This dynamic 3-hour Public Health Informatics Workgroup-sponsored pre-symposium will both educate attendees and solicit their input on a significant and emerging public health informatics initiative: the Public Health Community Platform (PHCP). The panelists will provide attendees with an overview of the PHCP activities and challenges to date, as well as the anticipated future trajectory of the PHCP’s ongoing development. The PHCP is a Centers for Disease Control and Prevention (CDC) funded, Association of State and Territorial Health Officials (ASTHO) led initiative to provide a forum for common information exchange and development of innovative and interoperable systems. This initiative is motivated by the need for state and local public health to have the tools to fully engage in the Learning Health System by efficiently and effectively transforming data into public health action. This engagement requires efforts and investments from across the public health enterprise, including health care. The PHCP recognizes these agencies’ need for user-driven, interoperable applications to access, exchange, visualize, and analyze both internal data and data from trusted partners. The PHCP will allow developers to deploy solutions in a common environment, allowing state and local public health agencies to benefit by reducing development and maintenance costs of these shared solutions. This panel will include: the chairs from three PHCP pilot groups for Analysis and Visualization, Immunizations, and Electronic Case Reporting; a representative from the PHCP Executive Committee; and ASTHO project directors.
Primary Care and EMRs in the 21st Century – Why Haven't We Got it Right Yet and How Can We Make it Better?

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Abstract: With the progression of many intuitions into Meaningful Use, primary care providers are struggling more and more just to keep up with the documentation requirements to meet these new mandates. Often providers bemoan that they have become clerical workers and not health care providers, often spending multiple hours completing documentation requirements during an average workday. EMR vendors have made strides in providing tools for hospitalist care but the daily workflow needs of primary care providers appear to have been lost in the “sea” of complicated features and function. This is often compounded in the care of children, the elderly and patients with special healthcare needs such as technology dependence. As a result providers are frustrated and raise the question if patient care and safety is being compromised by tools that cannot meet the users needs.

This workshop will explore some of these challenges and obstacles and through the discussion compose a “wish list” for the vendor community to work on.
Developing Leadership Within AMIA: Pathways to Success

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Open Architecture for Pathways/Care Coordination
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Abstract: Current health IT has evolved over many decades as a patchwork of proprietary legacy systems for managing electronic health records (EHRs), providing decision support, facilitating workflow, finances, and quality management, among other functionality. The closed, proprietary nature of the architecture and underlying technologies in these systems has resulted in silos of data, fragmentation of the patient records, difficulty coordinating care, and difficulty evolving to address the needs of the future. In order to better support the needs of clinical pathway development and care coordination, leading health care organizations should work together with leading open technology providers to create open architecture, open interface and open source community cloud computing environment. The presence of such an environment would enable a new generation of health information technology innovation resulting in information technology tools that would be better suited to meet the needs of a health care future where delivering best practice care to patients in every setting is the norm.
Abstract:

Sociotechnical theory has become accepted in the last fifteen years for understanding and evaluating the complexity of design and implementation of health information technology (HIT) in complex health care organizations. The IOM report on information technology and patient safety argues that safety is the product of the sociotechnical system and its constituent parts. The core concept of sociotechnical theory is interdependency. Sociotechnical theory raises a number of methodological questions, since it sits uneasy with accepted research paradigms in biomedicine that focus on measurable clinical outcomes research. The panel seeks to address the value of sociotechnical theory, the underlying research methodologies and to give practical guidance on how studies involving a sociotechnical perspective can be conducted and published.
Abstract: The popularity of health self-tracking through the use of consumer health devices has primarily been confined to fitness and wellness contexts, but there has been increasing interest in leveraging this health data in clinical decision-making and care delivery. Because personal tracking devices provide a glimpse into the everyday behavior of patients, there is potentially great value in integrating this data with traditional medical data. Such integration may be particularly useful with patients experiencing chronic diseases, as their conditions require daily self-management that include activity goals, sleep monitoring, an understanding of calorie expenditure, and tracking of medication adherence. However, there are many questions that are unresolved. There is a need for clarity about how such data can be utilized in clinical encounters. There are numerous devices available to consumers and they vary greatly in features and data quality. The patient perspective has not been fully leveraged, as devices generally target a fitness market. Users of tracking devices may not be fully cognizant of issues around privacy, data sharing, and data control. Most importantly, does the use of self-tracking devices affect disease outcomes?
Abstract: The predictive modeling process is time consuming and requires clinical researchers to handle complex electronic health record (EHR) data in restricted computational environments. To address this problem, we implemented a cloud-based predictive modeling system via a hybrid setup combining a secure private server with the Amazon Web Services (AWS) Elastic MapReduce platform.

EHR data is preprocessed on a private server and the resulting de-identified event sequences are hosted on AWS. Based on user-specified modeling configurations, an on-demand web service launches a cluster of Elastic Compute 2 (EC2) instances on AWS to perform feature selection and classification algorithms in a distributed fashion. Afterwards, the secure private server aggregates results and displays them via interactive visualization.

We tested the system on a pediatric asthma readmission task on a de-identified EHR dataset of 2,967 patients. We conduct a larger scale experiment on the CMS Linkable 2008-2010 Medicare Data Entrepreneurs’ Synthetic Public Use File dataset of 2 million patients, which achieves over 25-fold speedup compared to sequential execution.
A Probabilistic Graphical Model for Individualizing Prognosis in Chronic, Complex Diseases

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Abstract: Making accurate prognoses in chronic, complex diseases is challenging due to the wide variation in expression across individuals. In many such diseases, the notion of subtypes—subpopulations that share similar symptoms and patterns of progression—have been proposed. We develop a probabilistic model that exploits the concept of subtypes to individualize prognoses of disease trajectories. These subtypes are learned automatically from data. On a new individual, our model incorporates static and time-varying markers to dynamically update predictions of subtype membership and provide individualized predictions of disease trajectory. We use our model to tackle the problem of predicting lung function trajectories in scleroderma, an autoimmune disease, and demonstrate improved predictive performance over existing approaches.
A hybrid manifold learning algorithm for the diagnosis and prognostication of Alzheimer's disease

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Abstract: The diagnosis of Alzheimer’s disease (AD) requires a variety of medical tests, which leads to huge amounts of multivariate heterogeneous data. Such data are difficult to compare, visualize, and analyze due to the heterogeneous nature of medical tests. We present a hybrid manifold learning framework, which embeds the feature vectors in a subspace preserving the underlying pairwise similarity structure, i.e. similar/dissimilar pairs. Evaluation tests are carried out using the neuroimaging and biological data from the Alzheimer's Disease Neuroimaging Initiative (ADNI) in a three-class (normal, mild cognitive impairment, and AD) classification task using support vector machine (SVM). Furthermore, we make extensive comparison with standard manifold learning algorithms, such as Principal Component Analysis (PCA), Principal Component Analysis (PCA), Multidimensional Scaling (MDS), and isometric feature mapping (Isomap). Experimental results show that our proposed algorithm yields an overall accuracy of 85.33% in the three-class task.
A Low-Cost Method for Multiple Disease Prediction

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Abstract: Recently, in response to the rising costs of healthcare services, self-insured employers have began investing in wellness programs, which often involve annual health risk assessments (HRA). A main objective of these wellness programs is to reduce the incidence of chronic illnesses, by identifying individuals at risk, and investing in interventions for risk reduction. We propose a statistical data-driven solution for accurate and low cost multiple disease prediction, using methods from multitask learning, which could be used to design an HRA. We validate our method on EHR data, and compare to a statistical benchmark.
Contrasting Association Results Between Existing PheWAS Phenotype Definition Methods and Five Validated Electronic Phenotypes

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Abstract: Phenome-Wide Association Studies (PheWAS) comprehensively investigate the association between genetic variation and a wide array of outcome traits. Electronic health record (EHR) based PheWAS uses various abstractions of International Classification of Diseases, Ninth Revision (ICD-9) codes to identify case/control status for diagnoses that are used as the phenotypic variables. However, there have not been comparisons within a PheWAS between results from high quality derived phenotypes and high-throughput but potentially inaccurate use of ICD-9 codes for case/control definition. For this study we first developed a group of high quality phenotypic algorithms for five phenotypes. Next we evaluated the association of these “gold standard” phenotypes and 4,636,178 genetic variants with minor allele frequency > 0.01 and compared the results from high-throughput associations at the 3 digit, 5 digit, and PheWAS codes for defining case/control status. We found that certain diseases contained similar patient populations across phenotyping methods but had differences in PheWAS.
LORD: a phenotype-genotype semantically integrated biomedical data tool to support rare disease diagnosis coding in health information systems

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Abstract:

Characterizing a rare disease diagnosis for a given patient is often made through expert's networks. It is a complex task that could evolve over time depending on the natural history of the disease and the evolution of the scientific knowledge. Most rare diseases have genetic causes and recent improvements of sequencing techniques contribute to the discovery of many new diseases every year. Diagnosis coding in the rare disease field requires data from multiple knowledge bases to be aggregated in order to offer the clinician a global information space from possible diagnosis to clinical signs (phenotypes) and known genetic mutations (genotype). Nowadays, the major barrier to the coding activity is the lack of consolidation of such information scattered in different thesaurus such as Orphanet, OMIM or HPO. The Linking Open data for Rare Diseases (LORD) web portal we developed stands as the first attempt to fill this gap by offering an integrated view of 8,400 rare diseases linked to more than 14,500 signs and 3,270 genes. The application provides a browsing feature to navigate through the relationships between diseases, signs and genes, and some Application Programming Interfaces to help its integration in health information systems in routine.
Semi-supervised Learning for Phenotyping Tasks
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Abstract: Supervised learning is the dominant approach to automatic electronic health records-based phenotyping, but it is expensive due to the cost of manual chart review. Semi-supervised learning takes advantage of both scarce labeled and plentiful unlabeled data. In this work, we study a family of semi-supervised learning algorithms based on Expectation Maximization (EM) in the context of several phenotyping tasks. We first experiment with the basic EM algorithm. When the modeling assumptions are violated, basic EM leads to inaccurate parameter estimation. Augmented EM attenuates this shortcoming by introducing a weighting factor that downweights the unlabeled data. Cross-validation does not always lead to the best setting of the weighting factor and other heuristic methods may be preferred. We show that accurate phenotyping models can be trained with only a few hundred labeled (and a large number of unlabeled) examples, potentially providing substantial savings in the amount of the required manual chart review.
Causal Phenotype Discovery via Deep Networks

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Abstract: The rapid growth of digital health databases has attracted many researchers interested in using modern computational methods to discover and model patterns of health and illness in a research program known as computational phenotyping. Much of the work in this area has focused on traditional statistical learning paradigms, such as classification, prediction, clustering, pattern mining. In this paper, we propose a related but different paradigm called causal phenotype discovery, which aims to discover latent representations of illness that are causally predictive. We illustrate this idea with a two-stage framework that combines the latent representation learning power of deep neural networks with state-of-the-art tools from causal inference. We apply this framework to two large ICU time series data sets and show that it can learn features that are predictively useful, that capture complex physiologic patterns associated with critical illnesses, and that are potentially more clinically meaningful than manually designed features.
DenguePredict: An Integrated Drug Repositioning Approach towards Drug Discovery for Dengue
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Abstract: Dengue is a viral disease of expanding global incidence without cures. Here we present a drug repositioning system (DenguePredict) leveraging upon a unique drug treatment database and vast amounts of disease- and drug-related data. We first constructed a large-scale genetic disease network with enriched dengue genetics data curated from biomedical literature. We applied a network-based ranking algorithm to find dengue-related diseases from the disease network. We then developed a novel algorithm to prioritize FDA-approved drugs from dengue-related diseases to treat dengue. When tested in a de-novo validation setting, DenguePredict found the only two drugs tested in clinical trials for treating dengue and ranked them highly: chloroquine ranked at top 0.96% and ivermectin at top 22.75%. We showed that drugs targeting immune systems and arachidonic acid metabolism-related apoptotic pathways might represent innovative drugs to treat dengue. In summary, DenguePredict, by combining comprehensive disease- and drug-related data and novel algorithms, may greatly facilitate drug discovery for dengue.
Abstract: Post-liver transplant patients require lifelong immunosuppressive care and monitoring. Computerized alerts can aid laboratory monitoring, but it is unknown how the distribution of alerts changes over time. We describe the changes over time of the distribution of computerized alerts for laboratory monitoring of post-liver transplant immunosuppressive care. Data were collected for post-liver transplant patients transplanted and managed at Intermountain Healthcare between 2005 and 2012. Alerts were analyzed based on year triggered, time since transplantation, hospitalization status, alert type, action taken (accepted or rejected), reason given for the action taken, and narrative comments. Alerts for overdue laboratory testing became more prevalent as time since transplantation increased. There is an increased need to support monitoring for overdue laboratory testing as the time since transplantation increases. Alerts should support providers as they monitor the evolving needs of post-transplant patients over time. We identify opportunities for improving laboratory monitoring of post-liver transplant patients.
Using Workflow Modeling to Identify Areas to Improve Genetic Test Processes in the University of Maryland Translational Pharmacogenomics Project

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Abstract: Delivering genetic test results to clinicians is a complex process. It involves many actors and multiple steps, requiring all of these to work together in order to create an optimal course of treatment for the patient. We used information gained from focus groups in order to illustrate the current process of delivering genetic test results to clinicians. We propose a business process model and notation (BPMN) representation of this process for a Translational Pharmacogenomics Project being implemented at the University of Maryland Medical Center, so that personalized medicine program implementers can identify areas to improve genetic testing processes. We found that the current process could be improved to reduce input errors, better inform and notify clinicians about the implications of certain genetic tests, and make results more easily understood. We demonstrate our use of BPMN to improve this important clinical process for CYP2C19 genetic testing in patients undergoing invasive treatment of coronary heart disease.
Identifying the Clinical Laboratory Tests from Unspecified “Other Lab Test” Data for Secondary Use

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Abstract: Clinical laboratory results are stored in electronic health records (EHRs) as structured data coded with local or standard terms. However, laboratory tests that are performed at outside laboratories are often simply labeled “outside test” or something similar, with the actual test name in a free-text result or comment field. After being aggregated into clinical data repositories, these ambiguous labels impede the retrieval of specific test results. We present a general multi-step solution that can facilitate the identification, standardization, reconciliation, and transformation of such test results. We applied our approach to data in the NIH Biomedical Translational Research Information System (BTRIS) to identify laboratory tests, map comment values to the LOINC codes that will be incorporated into our Research Entities Dictionary (RED), and develop a reference table that can be used in the EHR data extract-transform-load (ETL) process.
AMIA members' "vital signs": what the HIT implementation listserv says about goals for AMIA and for medical informatics

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Abstract: The health information technology (HIT) implementation listserv was conceived as a way to combine a substantial portion of American Medical Informatics Association (AMIA) members who belonged to four working groups (WGs): CIS, Evaluation, ELSI, and POI. Other AMIA members joined in significant numbers. It immediately became a major forum for discussing medical informatics, informatics policies, and discussion of the purpose of AMIA itself. The listserv membership approximates 25% of AMIA's members and has generated over 6,000 posts. We report on a survey of the listserv's members: what members think about the listserv; what participants want for medical informatics; how they think those goals should be achieved, and what AMIA's role should be in this process. The listserv provides vital signs about AMIA and hopes for informatics. We combine qualitative analysis of members' comments and responses about the listserv using ATLAS.ti qualitative text analysis tool and a word cloud generator.
A Multidimensional Data Warehouse for Community Health Centers

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Abstract: Community health centers (CHCs) play a pivotal role in healthcare delivery to vulnerable populations, but have not yet benefited from a data warehouse that can support improvements in clinical and financial outcomes across the practice. We have developed a multidimensional clinic data warehouse (CDW) by working with 7 CHCs across the state of Indiana and integrating their operational, financial and electronic patient records to support ongoing delivery of care. We describe in detail the rationale for the project, the data architecture employed, the content of the data warehouse, along with a description of the challenges experienced and strategies used in the development of this repository that may help other researchers, managers and leaders in health informatics. The resulting multidimensional data warehouse is highly practical and is designed to provide a foundation for wide-ranging healthcare data analytics over time and across the community health research enterprise.
Abstract: Health Center-Controlled Networks (HCCNs) aim to improve health care quality nationwide through the use of health information technology (health IT). The HCCN grant program funded 43 HCCNs, encompassing approximately 745 health centers, 3,100 clinical sites, 12,000 clinical providers, and 12 million patients served. Collectively, the HCCN grants amount to $21 million per year for three years. Health centers within an HCCN collaborate to improve operational efficiency and quality of health care.
A Framework for Person-centered, Community-wide Care Coordination

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Abstract: Healthcare is fragmented, highlighting the need for community-wide care coordination. This study focuses on needs and preferences of patients with chronic illness, family and caregivers. Analysis of twitter data and literature review by an interdisciplinary group of patients, clinicians, researchers, and informaticists resulted in identified challenges and technology solutions. A conceptual framework was developed that recognizes the dynamic relationships of individuals and family, healthcare, and community teams with points of need for coordination at the intersections.
**Abstract:** Under a collaboration agreement between the International Council of Nurses (ICN) and the International Health Terminology Standards Development Organisation (IHTSDO), this study seeks to provide equivalence from the International Classification for Nursing Practice (ICNP®) to SNOMED® CT. With a focus on nursing diagnosis/outcome concepts, this harmonization work has resulted in further enhancement of both terminologies.
Abstract: The use of data-based information to characterize care activities and costs, and to demonstrate the value of nursing, remains patchy, despite the fact that nurses are the largest group of health workers in most health systems. This study seeks to harmonise, with encouraging results, two terminologies, ICNP and ICHI, which differ in scope, structure and intended use, as a step towards ensuring that nursing is adequately represented in the future global health information infrastructure.
Abstract: Characterization of nurses’ cognitive artifacts as merely handoff tools may be a limited view of their purposes and processes leading to their construction. Nurses’ artifacts are deemed by nurses to be personal, dynamic, living objects that traverse a life cycle during each shift and evolve during the course of a career. These two processes of nurses’ cognitive artifacts point to the need for extreme flexibility in future designs of standardized handoff tools, especially electronic ones.

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Abstract: We report findings of an integrative review of clinical decision support targeting acute care bedside nurses’ decision making. Statistically significant improvement in outcomes was identified in 40% of the studies, with only 2 studies showing improved patient outcomes. Contributing reasons for these low numbers include: half of the studies were lab-based studies where patient outcome measurement is not possible, and more than half studies reported descriptive or qualitative results.
Capturing Preventive Care Services: Comparing Data Obtained from Manual Chart Review, Automated EHR Extraction, and Insurance Claims

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2. OCHIN, Inc., Portland, OR, United States.
4. Public Health & Preventive Medicine, Oregon Health & Science University, Portland, OR, United States.

Abstract: Healthcare organizations need accurate methods for evaluating and reporting the quality of patient healthcare. We compared manual chart review (‘gold standard’) to automated electronic health record (EHR) data extraction and Medicaid claims to determine the level of agreement between data sources on documentation of six preventive care services. Agreement between chart review and automated EHR data was high on all measures, suggesting that automated EHR extraction is a valid method for capturing preventive care quality.
Comparing Weight Redistribution and Distance Imputation Methods for Missing Data in Clear-text and Encrypted Record Linkage

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Abstract: Missing data in record linkage variables can negatively impact the effectiveness of privacy protected record linkage (PPRL). Weight Redistribution and Distance Imputation are novel methods developed to deal with missing data in record linkage variables. Using synthetic datasets with corrupted and missing data we showed that the performance of clear-text and encrypted probabilistic record linkage was improved and not markedly different with encrypted variables. These methods provide promising solutions to missing linkage data in PPRL.
Rethinking Document Retrieval for Scientific Literature: A Learning to Rank Approach

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Abstract: Long, document length queries are useful in tasks where the search does not rely on users inputting keywords, such as natural language search, and relevant document search. However, using documents as queries poses difficulty for search engines built and tuned for short keyword queries. We apply a learning-to-rank approach to address this problem. Using a crowd-sourced dataset, we create feature vectors between scientific articles and their citations with the goal of ranking citations by author-defined importance. Features are derived from text similarity, citation position, and age of the citation. Learning-to-rank models SVM⁰ and LambdaMART are employed to learn the relationship between the features and the ranking. We find significant improvements in NDCG over the baseline model trained on pseudo-relevance judgments. We conclude that learning-to-rank is an effective approach for the problem of query document search.
Improving Retrieval of PubMed Articles Using the TopicalMeSH Representation

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T. Cohen; 1  
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Abstract: An important practical question is whether automatically generated topics by topic modeling have any advantage over MeSH indexing alone. To address this question, we introduced the TopicalMeSH representation for biomedical literature by leveraging the correspondence between latent topics (uncovered via topic modeling) and MeSH. We evaluated TopicalMeSH as a representation for document retrieval and classification on a corpus comprising 15 drug reviews. TopicalMeSH performed better than MeSH alone in both of these tasks.
RapTAT: A Tool for Assisted Annotation and Reviewer Training via Online Machine Learning
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**Abstract:** Manually annotating clinical free text to extract the valuable information it contains is time-consuming and expensive. The task commonly relies on medically-trained human reviewers to identify concepts related to treatment and care. Although natural language processing (NLP) systems can partially automate the data extraction process and thus reduce the cost, such systems still depend on manual annotations for system training and testing. We have developed the Rapid Text Annotation Tool (RapTAT), the goal of which is to reduce the burden of free text review by assisting with both annotator training and the annotation process itself. Training of the tool relies on real-time online learning to identify the phrases and concepts of interest to the annotator, and it employs this training to pre-annotate subsequent documents, thus reducing the time required to find and annotate phrases of interest. The tool also assists with annotator training by providing visual feedback that compares and contrasts annotations of inexperienced or non-expert reviewers to those provided by a reference standard.
SEMCARE - Semantic Data Platform for Healthcare

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Abstract: SEMCARE is a joint European research project that builds a semantic data platform to identify patient cohorts based on clinical information scattered in heterogeneous clinical resources. State-of-the-art text mining technology and multilingual semantic resources are used to exploit secondary use of EHRs. In a first use case, the SEMCARE platform is applied in cardiology where it picks mentions of phenotypic information from weakly structured clinical texts in order to raise new diagnostic hypotheses. The platform is currently being tested by three clinical sites using documents in Dutch, German, and English. The results including quality measures will be available in short time and presented in the demonstration session. SEMCARE’s long-term objective is to build a flexible information extraction and semantic indexing environment that can be adapted to a broad range of languages and clinical contexts, serving a variety of secondary-use scenarios. In the demo session, we will present the SEMCARE platform analysis of anonymized clinical data, together with clinical evaluation results performed in the hospitals.
Abstract: The simple unambiguous sharing of healthcare data is insufficient to meet the needs of our delivery systems if we are to improve quality and reduce costs. Traditional standards development processes are too slow and inefficient. Moreover, the means for exchanging data has not facilitated data reuse for a broad range of purposes, including quality evaluation, decision support, clinical research, primary medical science application, public health, and comparative effectiveness. The standards needed to support these goals must rapidly evolve despite an environment constrained by the limited availability of resources, by government regulation and by a rapidly evolving knowledge base. The report of the JASON Task Force provides a clear and achievable path to that goal. Standards developers and the organizations that provide those standards are applying innovative approaches to realizing these goals.
Abstract: Over the last few decades, growing adoption of Electronic Health Record (EHR) systems has made massive clinical data available electronically. However, over 80% of clinical data are unstructured (e.g., narrative clinical documents) and are not directly assessable for computerized clinical applications. Therefore, natural language processing (NLP) technologies, which can unlock information embedded in clinical narratives, have received great attentions in the medical domain. Many NLP methods and systems have been developed in the medical domain. However, it is still challenging for new users to decide which NLP methods or tools to pick for their specific applications. In fact, there is a lack of best practices for building successful NLP applications in the medical domain.

In this 3-hour tutorial, we would like to propose some best practices in using clinical NLP to resolve real-world problems. We will start with an introduction of basic NLP concepts and available tools, and then focus on two important applications of NLP: 1) to extract phenotypic information from EHRs to support clinical research; and 2) to facilitate real-time decision support systems in clinical operations. We plan to use lectures, demonstrations and hands-on exercises to cover the basic knowledge/tools and use case studies to illustrate important trade-offs in the design and implementation of clinical NLP applications. Each of the three instructors has over 10 years of experience in clinical NLP research and application. Case studies will borrow heavily from their experience as a clinician, a researcher and an application developer to share their recommendations in building successful NLP applications in healthcare research and operations.
Abstract: This tutorial will introduce participants to the practical challenges of conducting consumer health informatics-related fieldwork in home and community settings and strategies for overcoming these challenges. As health care shifts to the home and community, patients are increasingly becoming active care participants. Consumer health informatics (CHI) tools such as personal health records, online health communities, and remote monitoring systems are being developed to support patients in this role. However, patient use of CHI tools is often suboptimal, and there is mixed evidence regarding intervention effectiveness, efficiency, and patient-centeredness. Thus, while the potential benefits of CHI tools have been demonstrated, it is clear that new design and implementation methods are required. Jimison and colleagues’ review showed that design and implementation approaches facilitating integration of CHI tools into users’ daily routines may lead to more extensive adoption of these technologies. Building on this insight, our tutorial at AMIA 2014 presented two complimentary theoretical frameworks that hold promise for achieving such daily routine integration through simultaneous attention to patient, family members, activity, and context. Application of these frameworks requires fieldwork in home and community settings. The present tutorial responds to participants’ request for further instruction related to the practical challenges and strategies associated with conducting this CHI-related fieldwork. While some of these challenges and strategies overlap with those associated with fieldwork in more controlled health care institutional settings, many are unique to patients’ home and community living environments. Application exercises in this tutorial will focus on 1) identifying challenges related to gaining access to home and community environments, conducting data collection activities in these environments, and translating the data generated into design guidance for CHI tools and 2) selecting strategies to address these challenges that balance the needs of community participants, the needs of the research/design team, and the integrity of the project.
Abstract: This tutorial will provide attendees with a practical approach to developing and deploying clinical decision support (CDS) interventions that measurably improve outcomes of interest to a health care delivery organization. The instructors initially will examine in detail the key building blocks of a CDS program, including creating and enhancing organizational structure for CDS success; identifying information systems for providing the data that drive CDS interventions; leveraging clinical workflow to optimize CDS interventions; processes and systems for measuring the outcomes of these interventions; and knowledge management to acquire and maintain the expert clinical and scientific knowledge that informs these interventions. The instructors then will show how to leverage these building blocks to address key steps in developing, implementing, managing and evaluating CDS interventions, including how to select interventions to deliver targeted improvements in health care; configuring those interventions in specific environments; putting the interventions into action; measuring the results of the CDS interventions and in turn refining the program based on the results.

Additional discussion will touch on the role of national programs relevant to CDS, including knowledge sharing; structured guidelines; meaningful use; and special considerations for CDS for small clinical practices, for hospitals and health systems and for vendors. Further, following interactive presentations by the instructors, attendees will divide into small groups and participate in a highly interactive exercise in planning and designing a CDS project to address a specific clinical target, facilitated by the instructors.

Overall, this systematic approach to CDS implementation will be presented in an interactive, case-oriented fashion, incorporating examples provided by tutorial leaders and participants’ experiences. The course content is drawn from the tutorial leaders’ popular and award-winning guidebook series on improving outcomes with clinical decision support, the last two volumes of which (in 2009 and 2012) were co-published by AMIA.
Patient Engagement and Consumer-Facing Health Information Technologies
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Abstract: Consumer-facing technologies used for self-care and condition management by patients and caregivers are promising tools for patient engagement. Innovative use of technologies such as PHRs, patient portals, smartphone applications, SMS texting, and mHealth services are enhancing communication, access to clinical records, use of medical reference information, participation in online communities, and tracking of personal health status. However, many challenges including technology silos, device incompatibility, information gaps, usability challenges, and policy conflicts limit the impact of these technologies for patient engagement.

This half-day tutorial will offer clinicians, system administrators, IT developers, policymakers, and patients (we are all patients, eventually!) insights into how enabling technologies such as patient portals, patient-generated health data, and mobile applications are used to enhance patient engagement. Instructors will present material from both research and practical perspectives, with a particular focus on identifying and addressing the challenges of patient engagement, patient portals, patient-generated health data, and the use of consumer health technologies in order to promote an active and collaborative patient role as part of the care team.

Drawing from over four decades of experience in the patient engagement space, Dr. Wald with RTI and formerly with Partners HealthCare and Cerner Corporation, and Dr. Sands with Beth Israel Deaconess Medical Center and the Society for Participatory Medicine, have substantial experience leading and researching innovations in consumer health and will examine a broad set of topics including: implementation strategies; clinician adoption; patient adoption; opportunities and limitations of patient engagement; clinician, practice, and patient workflow; and patient-gathered and contributed health observations (patient-generated health data).

In summary, this tutorial will provide an experience-based, practical introduction to consumer-facing health technologies and patient engagement, with particular attention to the clinical challenges of engaging patients through health IT.
Abstract: The R statistical programming language provides powerful tools to manipulate data and attracts many non-programmers. R offers a unique package management system and powerful data visualization packages. This tutorial will provide an introduction to the language, R installation (free software) and use of RStudio, a free integrated development environment built for R. In the first part we will cover R solutions for basic challenges facing data scientists like wrangling, cleaning and visualizing data in reproducible ways. We will focus on the most recent R packages, such as dplyr (data manipulation), ggplot2 (publication ready plots), and shiny (interactive web-based reports). In the second part, we will use several case studies (using publically available data from International Warfarin Pharmacogenomics Consortium (IWPC), Drugs@FDA, ClinicalTrials.gov and RxNorm) to demonstrate R in action on biomedical informatics datasets. We will demonstrate how the previously introduced packages for data cleaning and visualization can be applied to a dataset that combines clinical and genomic data and a range of informatics resources. All work will be demonstrated using reproducible reporting tools (e.g., RMarkdown) that combine code and analysis output in a single file (html, docx, or pdf). We will conclude with a summary of latest trends in the R language and comparison of R to other languages commonly used for data science (such as Python, Java, Julia, C or SAS), and a general Q&A section.
Introduction to Biomedical Informatics

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Abstract: Introduction to Biomedical Informatics provides a historical overview of the development of the field of biomedical informatics, beginning in the 1950s, together with an introduction to the fundamental organizing principles of the discipline. Intended for first time attendees of the Fall Symposium, this tutorial will provide a foundation for ideas presented in the meeting through didactic instruction, interactive discussion and linkage to program content. With the publication of a formal specification of core competencies by AMIA, release of by the Office of the National Coordinator of health IT curriculum material, as well as the emergence of a clinical subspecialty certification, this tutorial will provide a practical overview of essential fundamental ideas of the field of biomedical informatics for those newly introduced to the discipline, Shortliffe’s model of core methods, techniques and theories applied to application domains will be used as a framework to introduce the broad application of the principles of biomedical informatics at the present time (and within the symposium program). Selected methods and theories will be defined and presented along with representative examples of domain specific applications.
Introduction to Visual Analytics in Healthcare

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Abstract: Big data is changing our world and the way scientific breakthroughs are discovered. As healthcare organizations continue to collect most of their information in digital form, the resulting massive collections are creating many data challenges from (a) clinicians trying to analyze large amounts of unstructured, multi-modal, and longitudinal data to effectively diagnose and monitor the progression of a particular disease; to (b) patients who are confronted with the difficult task of understanding the correlations between clinical values and their own patient-generated health data; to (c) healthcare organizations who are faced with the problem of understanding the nature of disease in broad populations, and improving overall operational performance while still maintaining the quality of patient care and safety.

Visualization and visual analytics techniques have the potential to assist in many of the informatics data challenges by providing intuitive and interactive interfaces to explore, analyze, and compare large collection of structured and structured clinical data. However, to be successful, visualization-based systems must be developed to align with the unique demands of the healthcare system.

This tutorial will introduce the concepts of visual analytics in healthcare by (a) teaching some of the core concepts of data visualization, (b) introducing the basic concepts of visual analytics, (c) demonstrating case studies of how visual analytics can be used to analyze healthcare data, and (d) by providing step-by-step explanations of how to start creating advanced visualization systems and dashboards with commercial and open-source applications. The tutorial will mix instructional material with hands-on exercises.
Design, Development, and Initial Application of a Systematic, Semi-Automated Predictive Analytics Framework for Health Care

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Abstract: Predictive analytics holds great potential for improving the efficiency and effectiveness of health care. At University of Utah Health Care, a systematic framework has been iteratively developed for generating and leveraging predictive analytic algorithms based on operational clinical data. Several key processes in this framework have been automated, and high-performing models have been developed in several clinical areas including congestive heart failure readmission, appointment no-shows, and surgical complications. Clinical implementations are also ongoing.
Abstract: Concept identification is an essential task of any NLP system built for information extraction. NLP typically relies on term identification and context disambiguation. A challenge arises when a concept’s terms are ambiguous and the concept is rare, which makes manual annotation not feasible and automatic bootstrapping not efficient. We propose a method of knowledge base acquisition that requires less effort than manual review, and achieves a more accurate outcome than an automatic approach would in these cases.
Increase in Prescriber Error Rates Following Implementation of Computerized Physician Order Entry

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Abstract: In a longitudinal retrospective review of a public hospital's Quality and Risk database (MIDAS), it was found that prescriber errors increased by threefold following implementation of a commercial computerized physician order entry (CPOE) system. If reproducible, this effect has potential implications for prescriber engagement with and acceptance of CPOE, and also suggests a need for further research into best practices for clinician involvement in the development and optimization of CPOE systems.
Abstract: In radiation oncology, for some populations of patients, there is uncertainty about cure rates for a given level of radiation. Because the dose-response curve is not precisely understood, one cannot predict exactly how different prescription doses might affect outcomes. Our goal is to understand where the decision points are: When does more information change clinical practice?
Enhancing Use of the Problem List in the Inpatient Setting
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3. Emergency Medicine, Washington University, St. Louis, MO, United States. 

Abstract: Problem list management is important. We present a novel graphical interface for managing problem lists and a new search algorithm to allow usage of a robust clinical term set while not creating excessive cognitive burden for the clinician. These interventions have lead to statistically significant increases in problem list usage doubling the average number of problems in a problem list.
A Smartphone-based Gait Assessment System for the Elderly

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3. Department of Physical Therapy, Sagamihara, Japan.

Abstract: We developed a smartphone-based system that measures and analyzes the motion in walking using the built-in sensors and communication via Bluetooth Low Energy. Using the developed system, we found that the trunk of older women was significantly tilted forward, pelvis was tilted backward, and the left-right movement of the pelvis was greater than the younger women. The results suggested that we can use our system instead of the expensive optoelectronic motion capture system.
Evaluation of a Self-Triage Decision Aid System in Pregnancy-Induced Hypertension and Diabetes Mellitus: Preliminary Results of a Randomized Control Trial

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Abstract: abstract

It has been shown that access to health information can benefit patients by helping them making a more knowledgeable decision in the clinical care process. Computerized decision aids can be used to facilitate such decisions. We investigated the effect of a self-triage decision aid tool on enabling pregnant women to monitor the development of gestational hypertension and diabetes mellitus and actively participate in their health care process.
Using indirect and direct methods enhances online health community research.

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2. Group Health Research Institute, Seattle, WA, United States.
3. Information School, University of Washington, Seattle, WA, United States.

Abstract: Although online health communities offer opportunities to characterize members’ communication and needs, researchers often use only indirect methods, limiting their inquiry. We discuss how our study combined indirect text processing and direct interviews with individuals who had cancer experience. Our approach allowed us to gain rich insights for the design of online communities that may not have been gained through indirect methods alone.
Data Error Transparency in Health Information Exchange

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2. University of Utah, Salt Lake City, UT, United States.

Abstract: Health Information Exchange (HIE) systems complicate the current electronic medical record (EMR) structure and may perpetuate data errors as information is passed between healthcare providers. The longitudinal compilation of clinical data including the incorporation of inbound HIE data can form a baseline from which quality deviations can be assessed. Select types of data variability can be characterized and scored by logical processing. Alerting patients and providers to these possible errors in their EMR could potentially lead to decrease in adverse events and may improve data quality of transmitted clinical information.
Integrating Conceptual Models to Inform the Design of a Family Health Information Management System for Hispanic Dementia Caregivers

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1. Columbia University, New York, NY, United States.

Abstract: As part of the New York City Hispanic Dementia Caregiver Research Program (NHiRP), we are developing a Family Health Information Management System (FHIMS) through participatory design methods with caregivers. To create a coding framework for the analysis, we integrated concepts from Coiera’s model of the communication task-information task continuum with an adaptation of the Krikelas model of supplemental information seeking behavior resulting in five top-level concepts: Caregiver, Patient, Information Needs/Tasks, Communication Needs/Tasks, and Online Tools.
Predicting Future Anxiety and Depression Diagnoses among College Students Utilizing Electronic Health Data

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Abstract: College students responding to the Spring 2014 American College Health Association-National College Health Assessment reported feeling things were hopeless (46%), felt overwhelming anxiety (54%) and more than 80% reported feeling overwhelmed by all they had to do (86%). This critical subpopulation of Americans is facing significant levels of mental health problems, challenging colleges to provide accessible and high quality behavioral health care. However, psychiatric disorders are frequently unrecognized in primary care settings, posing physical, emotional, economic, and social burdens to patients and others. Toward the goal of earlier identification and treatment, we developed and evaluated predictive models that use electronic health record (EHR) data for predicting the diagnoses of anxiety and depression.
Visualization of Clinical Decision Support Failures

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2. Harvard Medical School, Boston, MA, United States.
3. Brigham and Women’s Hospital, Boston, MA, United States.
4. Partners HealthCare, Boston, MA, United States.

Abstract: Introduction: Evidence suggests that CDS can improve health care quality, safety, and effectiveness (1). Prior work has demonstrated multiple failures and potential harm from CDS improperly executing (2). Visualization of this complex data may help CDS implementers identify potential malfunctions of CDS rules. The visualization complements automatic methods for detecting CDS failures and identifying the key characteristics of failure.

Visualizing temporal data can be complicated by natural variations in daily rates, including holidays, periodicity (weekends and seasons) and secular trends

Methods: We extracted CDS rule firing data from the EHR used at Brigham and Women’s Hospital, and visualized the data using the ggplot2 R package. Two rules “CAD and no ASA” and “Adult Seasonal Influenza” were selected for demonstration. Firing rates were adjusted for visit volume (using notes written as a proxy).

Results: Figure 1 shows the preliminary and final versions of the date visualization in a calendar format. The visualization clearly displays two known malfunctions in the CAD/ASA alert the first from 2009 being a system-wide spike caused by a system update and the second from 2012 caused by a corruption of the drug class manager resulting in excessive execution. The third graph shows the seasonal data and changes over the years. Each year the start and magnitude of the execution has changed. There were no anomalies noted in this data. The enrichment of the circular graph focused on seasonal information.

Discussion: CDS implementation and monitoring is critical in maintaining patient safety and clinical trust. There exist multiple potential causes of failures of these systems. Clinicians have come to depend on these systems therefore identification of failures is critical. Visualization of this complex dataset is helpful to identify the pattern of failure and facilitate with correction. In future work, we plan to expand our system to optimize for variation in seasonal trends and provide linkage to a real-time dashboard for detecting anomalies before they lead to widespread patient harm.
Social Network Analysis: Data Collection Challenges and Solutions

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2. College of Nursing, University of Arizona, Tucson, AZ, United States.

Abstract: Health organization decision makers, researchers, and designers of Health Information Technology (HIT) have recognized compatibility issues between HIT and multi-professional communication processes resulting in problems integrating HIT into existing provider workflow. Solutions depend on a closer examination of how providers access information and communicate with other providers in the provision of collaborative patient care. This has led to an interest in Social Network Analysis research methods. Designing and implementing a methodologically sound Social Network Analysis data collection process in the healthcare environment has proven to be challenging for both new and experienced researchers. This poster will provide preliminary results from a systematic review of the literature that examines common challenges and solutions associated with collecting network analysis data in the health care environment.
Demographic Factors Associated with Differences between New York Inpatient Medicare Charges and Payments for (DRG 065) Stroke

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Abstract:

IRS and Medicare public datasets were analyzed to examine the gap between Medicare charges and payments. Wealthier zip codes in New York State (per 2012 tax returns) were associated with a larger gap for stroke treatment ($p = .001$) independent of urban versus rural location. The covariate-adjusted charge versus payment difference was $8,411.37 more for urban than for rural locations ($p = .005$). This gap was primarily attributable to $10,745.37 higher charges in urban locations.
Adoption of Electronic Health Records in U.S. nursing homes

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Abstract: Electronic health records (EHRs) are promising tools to improve healthcare quality, yet nursing homes (NH) lag in adoption rates compared to other settings. This cross-sectional study used survey data from a national sample of 990 NHs to explore EHR adoption. Half of participating NHs (51%) reported having implemented EHRs. Of those, 76% had implemented EHRs in 2010 or later. EHRs are still a relatively new phenomenon in NHs; more work is needed to increase adoption.
Development and implementation of a Floor Admit Reevaluation Alert (FARA) in a large academic emergency department

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Abstract: The emergency department is a fast-paced error-prone environment and the severity of a patient’s illness may go unrecognized, resulting in a severely ill patient being admitted to a normal floor bed instead of a higher acuity ICU. This type of error is associated with increased mortality and increased rate of ICU transfers from the floor. The Floor Admit Reevaluation Alert (FARA) was designed to identify these high-risk patients and alert the admitting physician.
Reducing Healthcare Costs through Medical Recommendations

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Abstract: In the US procedure and drug costs are often not visible by physicians, leading to high costs of care. Results of an experiment completed by physicians indicate that presenting alternative procedure recommendations with similar outcomes and lower costs may potentially help reduce overall healthcare costs. Interestingly, time pressure greatly affects the physicians’ use of such recommender systems.
Abstract: Emerging evidence has implicated the potential repurposing of metformin for cancer prevention and treatment. However, the physiological and biochemical impact of metformin in the body are not clearly understood and limit our ability to have intermediary phenotypes for metformin expression in cancer. In this study we utilized metabolomics biotechnology and an electronic health record-linked biobank to identify a metformin-induced expression profile and potential intermediary phenotypes for metformin function.
The Internet: A Source of Near Real Time Infectious Disease Information

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Abstract: Event-based reporting of infectious diseases is an alternative to indicator-based reporting to identify potential cases and outbreaks. Social media have contributed epidemic intelligence to population health surveillance. A search of the peer-reviewed journal literature and of the Internet yielded a set of social media and web-based tools that have been used in event-based disease surveillance reporting.
A Literature Review of Medication-Related Clinical Decision Support
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2. Newcastle upon Tyne Hospitals NHS Foundation Trust, Newcastle upon Tyne, United Kingdom.
3. Brigham and Women’s Hospital, Boston, Boston, MA, United States.
4. Harvard Medical School, Boston, MA, United States.
5. Harvard School of Public Health, Boston, MA, United States.

Abstract: Medication-related clinical decision support (CDS) delivers automated guidance and support to clinicians. We reviewed the literature of basic medication-related CDS functionalities, from 2007 to 2014, using a systematic approach and reflected upon the issues pertinent to future development. Advancements, such as improving alert specificity and application of human factors principles during the design and implementation of CDS, are important considerations to improve patient care and reduce alert fatigue.
Abstract: Enabling efficient selection of patient datasets with desired characteristics is essential to support the use of large clinical repositories for research. While clinicians hold the knowledge to formulate hypotheses based on the exploration and analysis of collected data, they are often limited by the unavailability of user-friendly tools allowing interaction with data. We developed an application enabling users to efficiently and intuitively build patient cohorts, perform basic analyses, and export these cohorts for advanced analyses.
Automated searches for personalized evidence to prevent hospital acquired infection
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Abstract: We aimed to facilitate knowledge retrieval at point of care by using automated search. We constructed a “Risk for Infection” PubMed® search filter and evaluated it using a dataset of de-identified clinical notes. The precision and inferred average precision rates of the filter were significantly higher than an unfiltered PubMed search but lower than a proprietary search engine.
A graph data model facilitates analysis of collaboration in an emergency department

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Abstract: Collaboration between providers is an integral part of day-to-day operations in a clinical environment. We mapped the workflow for care in an emergency department, identified activities performed at each step, and developed a graph data model to represent it. Using three years of encounter data, we implemented the model in a graph database. We describe several advantages over relational data models for identifying and measuring provider collaboration.
Abstract: To better understand commercial CDS offerings we classified and compared the type of CDS content provided by a commercial EHR vendor to the internally developed CDS available at Partners HealthCare System. Our results suggest that larger healthcare systems can use the commercial CDS interventions, but also need to consider efforts to customize and build additional interventions. In contrast, smaller organizations with limited resources might benefit from using the CDS provided vendors with minimal modifications.
Predicting Clinical Laboratory Turnaround Time

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Abstract: Variability in turnaround time (TAT) of clinical laboratory tests can disrupt the coordination of care for patients. Our goal was to develop a model that would deliver predicted TAT for laboratory tests at time of provider ordering. The model considered only prioritization and timestamps as specimens move through each step in the workflow. While our model was not sufficiently accurate, our framework could be generalized to other laboratory processes for predicting TAT.
Identifying High Risk of Hospitalization Among Long-Term Care Patients Using Conditional Inference Tree

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1. SEIU Healthcare NW, Renton, WA, United States.

Abstract: This study implements conditional inference tree to identify long-term care patients with high risk of hospitalization. This study aims to determine a population(s) of patients who will benefit significantly from a care team with specialized training in preventing avoidable care utilization, emphasizing the costly hospital admissions. The results indicate that additional resources are in critical demand to support patients of age younger than 3 and patients with morbid obesity and severe depression.
Appropriateness of Overrides of Age-specific Medication Alerts for Elderly Outpatients

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6. Universite catholique de Louvain (UCL), Brussels, Belgium.
7. Cliniques universitaires Saint-Luc (UCL), Brussels, Belgium.
8. MCPHS University, Boston, MA, United States.

Abstract: Inappropriate medication prescribing by physicians represents an important preventable cause of morbidity and mortality in the elderly. A well-designed geriatric decision support system can improve prescribing by recommending appropriate doses and drugs for this patient group, but prescribers do not always follow these alert recommendations. The objective of this study was to assess what override rates that could be considered reasonable in outpatient settings.
Design guidelines for effective data visualization of sensor monitoring data
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Abstract: Unobtrusive monitoring of older adults with the use of smart home sensor systems presents a unique opportunity to improve the well-being of older adults. However, no guideline exists for developing effective visualizations of sensor data to generate informative insights for older adults and their caregivers. We present a two phase research project examining data visualization needs for older adults and recommending design guidelines for effective data visualization for sensor monitoring.
Bring Your Own Device: From PDA To Smart Mobile Devices
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Abstract: The mobile nature of the healthcare profession made the concept of using a personal mobile technology attractive in the clinical setting. This poster will present results of a literature search done to describe and compare the use of electronic personal devices in the healthcare environment from the historical Personal Digital Assistant to the modern smart mobile devices. The lessons can be extrapolated which can then be applied to the next generation of mobile technologies used in the healthcare environment.
Design and Evaluation of an Infection-Risk Monitoring Application

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Abstract: NeuroTexas Institute Research Foundation (NTIRF) at St. David's Medical Center has been developing and deploying an innovative research database – ProSpect – to capture a wide range of clinical and outcomes data describing neurological and neurosurgical treatments. We have developed an “Infection Risk” app that will present patient and clinician-friendly view of infection-risk based on, patient demographics, co-morbidities, and surgical risk factors, using ProSpect as the primary data source. We plan on integrating this app to use the open-source SMART API platform in the future.
Inexpensive Radio Communications System for Wheelchair Users

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Abstract: Wheelchair-bound residents of assisted living facilities sometimes require assistance from staff even when they are isolated or away from existing call buttons. This project conducted a Proof-of-Concept trial using two-way radios to allow residents of an assisted living facility to communicate with staff members from their wheelchairs. The radios were effective and reliable on the facility campus. For certain subsets of this population they appear to be a helpful and cost-effective assistive technology.
Feasibility of Converting the Medicare Synthetic Public Use Data Into a Standardized Data Model for Clinical Research Informatics

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3. Biomedical Informatics, Columbia University, New York, NY, United States.
4. AstraZeneca, Waltham, MA, United States.
5. LTS Computing, LLC, West Chester, PA, United States.
6. Signet Accel, LLC, Powell, OH, United States.

Abstract: We evaluated the feasibility of converting the CMS Synthetic Public Use Data (SynPUF) data to the Observational Medical Outcomes Partnership (OMOP) Common Data Model version 5.0. We were able to map or use 96% of the SynPUF data. Some useful data from actual CMS limited data sets were not available in SynPUF, and there were differences in file structures. But overall, the SynPUF data was determined to be useful for clinical research informatics.
Predicting the Factors of Improvement of Health Status of Home Health Care Patients: A Holistic Data Mining Approach

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Abstract: In this study, we analyze the Electronic Health Record (EHR)s obtained from Centers for Medicare & Medicaid Services (CMS) certified Home Health care (HHC) agencies containing 270,634 patients. The main goal of the study is to find the significant factors associated with improvement of HHC patient's health status measured by multiple variables. In addition, we explore the relationships between the multiple class levels simultaneously. When applied to the large scale EHR data, the predictive model is able to discover useful knowledge and also yeild to good prediction power.
Patient Centered Medical Home (PCMH) Team Huddle Tool

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Abstract: The PCMH care model centers on a team care approach. We developed the PCMH Team Huddle Tool (PTHT) to augment the functionality of our EHR to support the delivery of actionable information in the workflow of PCMH care teams. Preliminary results over a 12 month period post implementation show higher percentage rates in 6 HEDIS quality measures in the Army's Medical Treatment Facilities (MTF) with PTHT than in MTFs without PTHT.
Abstract: Patient satisfaction has frequently been used as an indicator of health care quality, often determined through surveys. In this study we analyzed social media containing open-ended survey questions to assess patient satisfaction in clinics, hospitals, and other health care facilities in nine regions across the country to identify themes not surveyed in typical health care questionnaires. Our analysis indicated the majority of patient’s reviews comment on getting care, personal attributes of staff, and the facility.
Initial Approach to Creating an Interactive User Interface Design Tool to Enhance User-Centered Design

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2. Biomedical Informatics, Vanderbilt University, Nashville, TN, United States.

Abstract: We introduce a novel visual interface design tool to facilitate prospective feedback on health information technology features from multiple end users and collate results to enhance user-centered design. Users customize the interface by selecting and modifying data elements with a drag-and-drop web application and then see the results of their interface suggestions immediately through example patient scenarios. This versatile tool can accommodate any type of interface design from an electronic display to a printed tool.
User Adherence to a Web-Based Application for Youth with mild TBI
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3. Biostatistics and Epidemiology, Cincinnati Children's Hospital, Cincinnati, OH, United States.

Abstract: Mild traumatic brain injury (mTBI) is a common pediatric injury but treatments for associated symptoms are lacking. We piloted a web-based intervention. Participants were 11-17 years of age who presented to an emergency department with mTBI were eligible. Twenty-one participants were enrolled and 13 completed procedures. Demographic characteristics and acute symptom burden were unrelated to adherence. Further research is needed to identify strategies that will promote better adherence.
Developing a Nurse Driven Telemetry Protocol Using a Sociotechnical Model

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Abstract: Centralized cardiac monitoring using portable telemetry devices is an important, but costly approach to monitoring at risk patients. Telemetry is highly resource dependent requiring specialized staff and equipment. This safety net is often ordered inappropriately with delays in discontinuation for both adult and non-ICU patients (Bubb, 2011). This in turn creates delays in care for those who most need it.

At our medical center, the decision was made to develop a CPOE order set with criteria for telemetry placement as algorithmic support for a nurse-driven discontinuation protocol. Analysis of the people, process and technology issues using the sociotechnical model developed by Sittig, et.al. (2010) helped to identify barriers and opportunities for success. This model was selected for its interactive dimensions that lend to improved patient safety.

Variations in ordering of telemetry were opportunities for improvement. As nurse driven discontinuation protocols for telemetry and Foley catheter increase nurse autonomy and intensify decision making, exploration of the socio aspects are critical.
The Evolution of a Clinical Decision Support Request Form

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Abstract: A large hospital organization transitioned from multiple homegrown systems to one commercial enterprise-wide electronic health record (EHR). A standardized clinical decision support (CDS) request form was developed to capture elements of new and existing requests. The form’s content format was significantly revised and the function was redefined to maintain consistency. Lessons learned include organizing the required elements based on EHR functionality and workflow impact of the request form on different stages of the CDS lifecycle.
Implementing automated delivery of evidence-based medication safety information to the point of care

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2. Stony Brook University, Stony Brook, NY, United States.

Abstract: Obtaining recent evidence-based information on medication safety from MEDLINE requires comprehensive skills and time commitment. A prototype of a mobile app has been implemented to provide this customized information automatically during patient visits. The app utilizes NLM APIs and MESH indexing to retrieve the most relevant information. Evaluation of one of the prototype filters demonstrated a recall of 90% and precision of 93% in retrieval of all ADRs associated with a specific medication.
A Baseline Assessment of the Dispensary Workflow in the Birmingham Free Clinic: A Time-Motion Study of Pharmacist Tasks

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Abstract: Objective: We aim to gain a quantitative understanding of the workflow inefficiencies in the Birmingham Free Clinic dispensary. Methods: We conducted a time-motion study to analyze how much time pharmacists spend on different tasks. We divided pharmacist tasks into five main workflow categories, each of which included several subcategories. Results: This study identified the time spent preparing prescriptions as a target area for improving the efficiency of the dispensary workflow.
Determining the Factors Relevant to Patient Handoff by Role and Patient Population

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Abstract: Patient handoff is an important activity but the clinical literature provides little insight into what factors should be included in handoff. This study engaged doctors and nurses in simulated handoff exercises to understand when factors should be displayed. By having clinicians provide a simulated oral handoff and categorize factors identified in the literature as important to handoff, it determined when factors should be displayed based upon the abnormality of the factor and the user's role, specialty and patient population. Factors such as admission dates, urine output, patient condition, surgical history and precautions demonstrated significantly different inclusion rates in various subgroups. The study also found a number of factors not previously identified in the literature that are important for handoff.
Implementation of a Clinical Decision Support Tool to Improve Guideline Compliance in the Prevention of Early-Onset Group B Streptococcus Infections in Neonates

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Abstract: Introduction of guidelines for selective use of intrapartum antibiotic prophylaxis for the prevention of early-onset Group B streptococcus (GBS) infection in neonates has dramatically reduced rates of this condition in the United States. Use of a clinical decision support tool which takes advantage of information embedded into an existing electronic medical record may aid clinicians in guideline compliance and further minimize the incidence of early-onset GBS.
Contextual Computing: Tracking Healthcare Providers in the Emergency Department via Bluetooth Beacons

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Abstract: The current means for reporting the door to healthcare provider time of patients is neither accurate nor reliable. We have created a reliable method of automatically capturing this time using Bluetooth-based technology that does not hinder the Emergency Department (ED) workflow. The results show accurate measures, within seconds, of patient wait times and reliable detection of providers within key locations, without negatively impacting the ED workflow.
Evaluating Mobile Information Use in Undergraduate Nursing Programs: Moving from Access to Interpretation and Application?

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Abstract: Integration of mobile information supports in nursing curricula is assumed to promote computer and informatics competencies, however it is unclear whether this education strategy promotes evidence-based practice. Since mobile information practices are poorly understood, researchers from three Canadian nursing programs surveyed students and faculty to determine their use of, and attitudes toward, mobile information supports within classroom, laboratory and clinical settings.
Dashboard Visualizations of Emergency Department Throughput Metrics

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Abstract: We discuss the use of visualizations of throughput data to provide cognitive support for real-time comprehension and projection of the state of ED care processes. With application of statistical process control (SPC) methods toward understanding historical ED processes, we propose that SPC visualizations of real-time data can provide visual statistical cues that may more accurately capture true process performance and potentially provide early warnings of process change.
Evaluating the Effect of a Nursing Flowsheet Merge on Clinical Nursing Documentation Efficiency in a Research Hospital

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Abstract: A nursing flowsheet merge in a clinical research information system at the National Institutes of Health is being evaluated to determine whether it has improved the efficiency of documentation. A potential benefit is more frequent utilization of nursing plans of care, which theoretically results in improved care quality through improved communication. Results will be reported with data analyses for the six month period pre- and post-implementation of the nursing flowsheet merge.
Development and Validation of a Measure for EHR Related Unintended Consequences with Direct Care Registered Nurses

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Abstract: Studies of EHR related unintended consequences have been largely qualitative and few have focused on nursing. In response, we used qualitative themes to construct a quantitative measure of the phenomenon and demonstrated content validity (CVI=0.96) with nursing informatics experts (N=5). After testing with acute care R.N.’s, reliability was supported (Cronbach’s α = 0.94; ICC=0.91) and item-total correlations support the relationship of the phenomena to nurses’ perceived threats to patient safety particularly related to transitions in care (Item-total r= 0.68-0.83).
Streamlining Access to Cancer Data - An Institutional Experience
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Abstract: In this Big Data-era, the lack of large standardized databases of clinical data on all cancer patients represents a void that can be considered "criminal". City of Hope (COH) has embarked on the creation of such a Disease Registry of standardized clinical data for any cancer site, to support genotype-phenotype analyses, tissue correlations, outcomes, and quality of care research. Our approach to protocols, privacy, security information modeling, and data integration will be described.
Automating Personal Health Record Mammography Messages to Improve Mammography Screening Rates

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Abstract: Automated mammogram identification, ordering, and messaging system through standard electronic health record (EHR) and tethered personal health record (PHR) portal tools cant lead to an approximately 50% increase in screening mammograms completed over a 3 month period. EHR tethered PHRs can significantly improve screening mammogram completion rates, but still leave the majority of patients overdue for a screening mammogram without having their mammogram completed within 3 months of messaging.
iDECEIDE Smartphone App for Personalized Messages for Nutrition and Fitness Goals

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Abstract: Current smartphone applications (apps) related to health and fitness allow users to input goals and track progress but they lack personalized feedback to help detect obstacles and suggest alternatives to achieve behavioral changes for a healthier lifestyle. We propose an app, iDECEIDE, to help users to identify their ‘persona’ which enables the app to deliver tailored recommendations, provide personalized encouragement and feedback messages and determine goal completion status with the aim to help users achieve their fitness and nutrition goals.
Identifying Children with Technology Dependence through Use of Administrative Data

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5. Komansky Center for Children's Health, NewYork-Presbyterian Hospital, New York, NY, United States.

Abstract: Using electronic health information to predict health outcomes and identify high-risk patients requires mapping coded data to clinical concepts. Here, we describe preliminary work to develop and validate an operational definition of technology dependent pediatric patients based on administrative data. These children have complex medical needs and often benefit from improved care coordination. The definition will be useful to identify children for care management and to generate variables (features) for use in predictive models.
Using a Socio-Technical Framework to Understand Technology Use Among Health Care Innovation Award Community Resource Planning Awardees

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Abstract: The Centers for Medicare and Medicaid Services is supporting a number of innovations to improve community based outcomes through the Health Care Innovation Awards (HCIA). We conducted an evaluation of a subset of HCIA awardees with a focus on community resource planning to understand the impact of the innovations. A qualitative analysis was conducted using a sociotechnical framework for awardees with informatics components as part of the innovation. While the informatics components varied across awardees, studying them using a sociotechnical framework assisted in identifying themes about technology use and integration in the innovation as a whole.
Before-after implementation of the sniffer for the detection of failure to recognize and treat severe sepsis
A. M. Harrison; 1; C. Thongprayoon; 1; J. G. Park; 1; D. E. Craig; 1; C. M. Clements; 1; D. G. Goyal; 1; J. L. Elmer; 1; O. Gajic; 1; B. W. Pickering; 1; V. Herasevich; 1;
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Abstract: Sepsis is common and lethal in both the United States and around the world. Implementation of a detection and alert system for failure to recognize and treat severe sepsis (the “sepsis sniffer”) in the medical ICU setting increases compliance with the 3-hour Surviving Sepsis Campaign (SSC) bundle elements from 25% (N=98 before) to 55% (N=60 after).
Conducting health insurance surveillance with electronic health record
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3. OCHIN, Inc, Portland, OR, United States.
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Abstract: Despite new access to health insurance under the Affordable Care Act, barriers remain to obtaining and maintaining coverage. We used electronic health records (EHR) from a national network of community health centers to monitor insurance status of patients from 2012-2013 (n=279,654). 41% were uninsured at their first visit; half of these patients remained uninsured at every subsequent visit, 36% had no further visits. New insurance EHR-based surveillance tools hold promise for future health insurance outreach.
Identifying ECG Features in Congenital Heart Disease Using Variants of Dynamic Time Warping

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3. Texas Children's Hospital, Houston, TX, United States.

Abstract: Bedside monitors provide physicians with large amounts of physiological data, but interpreting the entirety of the information in real time can prove to be quite challenging. This work approaches one aspect of this big data problem by detecting features of the electrocardiogram (ECG) for developing predictive models in patients with congenital heart disease. In doing so, variants of dynamic time warping are used for comparing segments of ECG time series on a beat-by-beat basis.
Abstract: A convenient method of identifying individual snacking patterns would be helpful in dietary consultations. Here, we report an ongoing project to develop a ‘Smart Snack Box’ that records the timing of snacking behavior. The apparatus contains sufficient snacks for an individual to eat during the day, and it electronically detects and records each opening of the lid. We plan to test the system on healthy subjects.
Displaying Price Information Lowers Cost and Quantity of Medical Tests: A Systematic Review of the Impact of Price Transparency

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1. UC San Diego, San Diego, CA, United States.

Abstract: Price transparency is proposed to lower healthcare costs. To analyze its impact, we conducted a PRISMA Systematic Review of PubMed and Web of Science. Over 2000 articles were identified, 69 met additional screening criteria, and 11 met inclusion criteria as empirical studies. Price transparency lowered costs in the majority of articles (9 of 11, or 82%). In these studies, total costs decreased 3% to 37%, and number of medical tests decreased by 4.5% to 27%.
Stakeholder Perspectives on Policy Implications Post the Conclusion of the State HIE Program

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Abstract: Stakeholders suggest that federal- and state-level entities have important roles to play in the next phase of HIE following the conclusion of the State HIE Program. Continuing the expansion and maximizing the utility of electronic data exchange will require leadership and guidance through policies, data standards, and best practices. Robust and sustainable HIE requires participation, buy-in, and needs assessments from healthcare organizations, providers, and developers.
Migration of a Computerized Anticoagulation Clinic to a Commercially-Developed EHR

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Abstract: We describe the migration of a computerized anticoagulation clinic application from an internally-developed clinical information system to a commercially-developed EHR. Specific functions are noted, with the corresponding EHR tools that supported them. Initial statistics show successful implementation of the system, which was developed using only existing tools in the commercial EHR.
ArticlesAboutMe.org: Disseminating Clinical Trials Results to Patients

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Abstract: We created a service (available at ArticlesAboutMe.org) that enables clinical trial participants to register and receive an email every time an article that reports the results of the trial is published. Since January 2015, the service has been used for monitoring of over twelve trials. Existing clinical research informatics resources (ClinicalTrials.gov, PubMed) enable relatively simple implementation. Keeping participants informed about study results may provide additional motivation to enroll in a clinical study.
Examining Cancer Case Reporting Processes and Timeliness: Preliminary Results
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4. Center for Health Information and Communication, Roudebush VA Medical Center, Indianapolis, IN, United States.

Abstract: Using the Indiana State Department of Health Cancer Registry, 76,259 cancer cases were analyzed (spanning from 2001 to 2009). The result show a large variation in the mean reporting time across the years. Depending on year of diagnosis only 3.9% to 37.2% of the cases were reported within the first 6 months. The result also showed that 94.8% to 98.8% of the cases was reported within 2 years from the date of diagnosis.
Representation of Clinical Practice Guideline Data Elements Using the Health Level Seven Fast Healthcare Interoperability Resources (FHIR) Standard as a Proposed Data Formalism for the Arden Syntax

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Abstract: Context: Arden Syntax can adequately represent clinical practice guidelines (CPGs) in clinical decision support systems but lacks a standard data formalism. Objective: Assess Health Level Seven’s Fast Healthcare Interoperability Resources standard (FHIR) representation of CPG data. Method: 16 CPGs containing 806 data elements were tabulated. Result: FHIR can represent all but 2.7% of these data elements. Conclusion: FHIR adequately represents data elements in CPGs. Incorporation of FHIR in Arden Syntax would facilitate representation of CPGs.
Harmonization of Quality Data Model with HL7 FHIR to Support EHR-driven Phenotype Authoring and Execution: A Pilot Study

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Abstract:
The objective of this pilot study is to describe a crowdsourcing effort in harmonizing high-level data elements between Quality Data Model (QDM) and HL7 Fast Healthcare Interoperability Resources (FHIR) to support electronic health records (EHR)-driven phenotype authoring and execution. In total, 206 mapping pairs between the two models were identified, with a Fleiss’s kappa statistics (k=0.24) calculated for inter-rater agreement. We discuss challenging issues of the mappings.
A Case Study on the Effectiveness of an In-house Physician Rating Tool in Outpatient Clinics
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Abstract: With increased emphasis on patient-centered care, recent years have seen a surge in physician rating tools that aims to capture patient experience and provide feedbacks on clinics and physicians. A multi-method study is conducted at a private medical center to evaluate and discuss important factors when designing effective physician rating tools in healthcare institutions. Results from both quantitative and qualitative analyses are triangulated to inform our findings.
Abstract: **Objective:** Select a database engine for national master patient index for Malawi that supports multiple synchronized databases over an unstable network. **Methods:** We reviewed the capabilities of the database engines that fulfill the objective using multi-master replication. We tested the selected database using a 22 test cases and simulated dataset of 72.9 million records. **Results:** We chose CouchDB as our database solution and it passed our test cases. **Conclusions:** CouchDB can provide an infrastructure for a distributed, scalable and reliable master patient index.
Implementing an EMR-based "No Opiate" Policy In The Emergency Department

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2. Regenstrief Institute, Indianapolis, IN, United States.
3. Health Physicians, Indiana University, Indianapolis, IN, United States.

Abstract: Opiate-seeking behavior is a major problem in U.S. emergency departments (ED) and leads to recidivism and ED misuse. Our department has created an EMR-based opiate “warning flag” to help transition our frequent opiate-seeking patients away from the ED and into an outpatient chronic pain program. This intervention resulted in a significant decrease in both patient visits and testing.
Abstract: Online health communities benefit from health domain experts’ help. However, their large-scale conversations make it challenging for experts to moderate and provide clinical expertise. Automated detection of posts requiring clinical expertise can streamline this process. As a first step, we investigated classification scheme of posts based on question types using patients’ posts of an online diabetes community. The results will be used to inform annotation task for building training dataset for automated classifiers.
OpenMRS and FHIR: The Promise of a Domain Independent API for serving Healthcare Needs Across Underserved Settings

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Abstract: We sought to develop a standardized system independent API to reduce learning curves imposed by system specific EMR API’s, and to support better interoperability between healthcare applications. We developed a FHIR enabled API that could be implemented atop the Open Medical Record System (OpenMRS) EMR. We perceive that this system independent API could eventually replace the existing legacy OpenMRS API, thereby enabling developers to work with OpenMRS without any prior knowledge of its API.
An Easy-to-Use Clinical Text De-identification Tool for Clinical Scientists: NLM Scrubber

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Abstract: Health Insurance Portability and Accountability Act (HIPAA) requires that clinical documents be stripped of personally identifying information prior to their secondary use for clinical research. We have been studying clinical text de-identification for more than a decade and developing NLM Scrubber—it is a tool for every clinical scientist who conducts retrospective research using clinical reports. Although we continuously improve and add new functionalities to it, it is very simple to install and use.
Understanding the patient through visualization to improve provider-patient communication in hospitals: Know your patient to personalize your communication.

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Abstract: Patients have different personalities, values, and preferences; yet, providers have no easy way to understand these differences. This lack of knowledge of the patient could negatively influence the patient’s experience and possibly even cause harm. In our study, we aim to understand hospitalized patients’ values and preferences. With this knowledge, we can create a patient profile frame that can be used to visually highlight relevant patient values to providers.
Improving Detection of Reasons Not to Take a Medication by Leveraging Medication Prescription Status

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Abstract: When automatically assessing heart failure treatment quality measures, identifying mentions of reasons not to take heart failure treatment medications in a patient electronic health record is important. We created machine learning-based sequential taggers to extract reasons not to take heart failure medications based on lexical features. When adding the medication prescription status as feature, performance improved with 41% F₁-measure.
The Scalable Collaborative Infrastructure for a Learning Health System

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Abstract: The Scalable Collaborative Infrastructure for a Learning Health System (SCILHS) is a growing network of health centers across the United States, presently covering 8 million patients at eleven sites. SCILHS is a Clinical Data Research Network in the Patient-Centered Outcomes Research Institute's PCORnet. SCILHS enables patient-centric clinical research through: live cohort-finding queries across all sites with real-time results; incorporation of patient-reported outcomes data with clinical data; and, interoperability with the nationwide PCORnet Distributed Research Network.
Interactive Voice Response Technology: Promises and Pitfalls in Facilitating Patient-Reported Monitoring for Adverse Drug Reactions

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2. Massachusetts College of Pharmacy and Health Sciences, Boston, MA, United States.
3. Harvard Medical School, Boston, MA, United States.

Abstract: We developed a patient-reported, interactive voice response system to actively monitor the safety and effectiveness of treatment for patients taking FDA-approved medications for one of four common chronic conditions (diabetes, hypertension, insomnia, depression), with real-time support by a pharmacist. We present an analysis of our experience highlighting promises & pitfalls associated with this technology and offer strategies for other healthcare organizations that might seek to create a similar patient-reported outcome platform.
BigMouth: Development of a Scalable Infrastructure to Support Multi Institutional Data Sharing for Dentistry

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4. School of Dental Medicine, University of Pittsburgh, Pittsburgh, PA, United States.
5. School of Dentistry, University of California, San Francisco, CA, United States.

Abstract: In this research we document the challenges and lessons learned during the development of the BigMouth dental data repository. BigMouth uses the i2b2 framework and contains EHR data from six dental schools. We faced various challenges including: a) issues related to the multi-institutional nature of the project, b) data modeling and integration issues and c) infrastructure related issues. BigMouth DDR is one of a kind data repository in dentistry that could serve as an important resource for research.
Clostridium Difficile Repeat Ordering Difficult to Control without CDS

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Abstract: CDC-approved latest guidelines discourage repeat testing in patients suspected of or diagnosed with Clostridium difficile infection. However, providers were quick to order repeat testing in patients with an existing recent result. Utilizing previous laboratory result information repeat testing through Computerized Provider Order Entry was blocked; pre-post comparison reveals reduction in repeat testing by over 80%. This blocking created a learning curve for providers in addition to improving clinical care, quality, utilization and cost reduction.
Visual Exploration of Temporal Data in Electronic Medical Records

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Abstract: Detecting interesting and common patterns in patient histories provided by electronic medical records or administrative data is a challenging task. We present a visualization system that focuses on giving insights about single patients. The visual representation of events in the history of a patient is aimed at detecting patterns and helps to tell the story of the patient.
Errors with Manual Phenotype Validation: Case Study and Implications

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Abstract: Human review is generally considered the gold standard for validating computer-generated phenotypes. This work provides a cautionary case study in the context of expert chart audits conducted to validate electronic clinical quality measures for enterprise use. We found that 8.7% (176/2034) of original human review results had to be modified following initial validation. Here, we describe the most common reasons for these modifications and discuss implications for establishing a systematic electronic phenotyping validation framework.
Archetype Based Nationwide Electronic Health Record Development in Japan

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Abstract: In Japan, government policy turns into giving assurance of facilitation of the secondary use of medical information. The authors propose medical information circulation model based on ISO 13606 Archetype standard. As well as cloud service implementation design, the model provides a design of ecosystem model, which defines data collection organization and secondary use organizations separately. The implementation is under development by making renovation of conventional electronic health record system.
Integrating Usability Engineering into Undergraduate and Graduate Health Informatics Curricula

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Abstract: There is need for greater education about usability engineering in healthcare IT. At the School of Health Information Science at the University of Victoria, an approach known as rapid low-cost usability engineering has been applied in a wide range of health informatics projects and teaching contexts. The poster describes how we have integrated the approach within our curricula and how graduates of our programs have incorporated the approach into their co-op work and upon graduation.
Evaluation of Simulated Computerized Provider Order Entry Rules Toward Evidence Based Blood Utilization

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2. Pathology, University of Missouri School of Medicine, Columbia, MO, United States.

Abstract: We evaluated how additional alert override steps effect evidence based and non-evidence based transfusion ordering behaviors. Nine inpatient physicians participated in a newly created simulated ordering environment, where five providers received a typical scenario for overutilization and four providers received a scenario where a rule that only considers hemoglobin would discourage an evidence based transfusion. The new order rules prevented 100% of inappropriate orders while allowing 75% of appropriate orders to override an incorrect alert.
The Master Data Element Visualization: A Consolidated View of the EHR Data at Intermountain Healthcare

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Abstract: The master data element visualization provides navigation and interactive visualizations of the electronic health record (EHR) data at Intermountain Healthcare. The key features are 1) a sunburst tree visualization to represent classes of hierarchies, 2) data visualization for volume and distribution of the EHR data, and 3) a search function for concepts and codes. The tool was implemented internally for clinical researchers and demonstrated its usability.
Quantifying the Complexity of Discharge Planning in the Inpatient Cardiology Unit

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Abstract: Patients should play active roles in the discharge planning; however, their engagement is impeded by the complexity of discharge planning. We quantified the number of providers involved in the care using EHR to understand the complexity. We found out that patients met most discharge-related providers near the end of their hospital and half of them were new faces. Further study with larger sample is needed to understand how the complexity of care affects health outcome.
Design of a Knowledge Exchange for Community Health Workers

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Abstract: Community Health Workers (CHWs) are poised to become an increasingly important part of the healthcare landscape. Their information needs have not been studied formally and few information resources have been provided to them that either appeal to evidence or tailored to those needs. We have created such a resource based on tasks elicited from and validated by CHW focus groups. The environment (CHWresources.org) is being tested in a cluster-randomized RCT.
Drug-Disease Associations in Guidelines, Drug Labels, and Practice

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Abstract: Clinical practice guidelines (CPGs) recommend pharmacologic treatments for clinical conditions. Structured product labels (SPLs) summarize information about FDA-approved treatment indications for specific drugs. Guidelines and SPLs represent two of many potential sources of knowledge that are intended to inform evidence-based practice. In this study, we examine whether drug-disease associations identified in SPLs and in practice patterns in electronic health record data on outpatient prescriptions conform to CPG recommendations. Our results suggest that there is a mismatch between guideline-recommended pharmacologic therapies, drug product label indications, and electronic prescribing patterns.
A Deep Learning Framework for Improving Medical Information Retrieval

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Abstract: Many innovations in language modeling for information retrieval approaches can be considered to combine multiple alternative document representations, or “layers.” In this work, as an extension of our previous work, we seek to understand whether semantic representations learned from a two-step deep learning framework, including word-embedding and dependency tree recursive neural network might benefit clinical information retrieval, and how this semantically motivated layer can be combined into our existing multi-layered language modeling.
Designing iSee, the intelligent Search expansion tool

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Abstract: iSee (intelligent Search expansion) is a search recommendation function to be added to PhenDisco, a pilot web-based search engine of dbGaP. This study reports the early lessons on the design considerations of iSee that we obtained through reviewing web-based data repositories with similar functions and interviewing 3 biomedical researchers.
An analysis of PubMed4Hh App User Distribution

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Abstract: PubMed for Handhelds (PubMed4Hh) is an app for finding relevant health information from the National Library of Medicine on mobile devices. Apple’s iOS app developer tool provides daily downloads data and regional distribution data. Comparison between PubMed4Hh download distribution and the regions of PubMed citations shows a consistent match between the number of users and the number of PubMed indexed publications of a region.
Abstract: Patient-centered care includes enabling patient self-management. Improved clinical decision support (CDS) tools designed for direct use by patients are needed to empower patients to self-manage their symptoms. We used a formative process to design a prototype CDS tool for self-management of symptoms by cancer patients. CDS design principles addressed patient safety, cultural competency, care coordination, resource availability, and system function. Patient usability surveys indicated strong support for the CDS tool.
Mapping workflows in a surgical clinic to guide implementation of a patient-centered postoperative mHealth wound assessment system

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Abstract: The successful adoption of novel health information technology (HIT) is often challenging, particularly for emerging innovations. We lack guidance on methodologies for mapping workflows of mobile health (mHealth) platforms in clinical settings to assess implementation impact. Using existing general workflow assessment tools for HIT, such as flowcharting and semi-structured interviews, we propose the use of existing HIT tools for mapping clinical workflows to guide implementation of an mHealth platform in surgery care.
Designing a Plan Do Study Act Framework to Promote Proper Utilization of Early Detection Technology in the Acute Care Setting

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3. Harvard Medical School, Boston, MA, United States.

Abstract: Early detection systems may improve patient safety and quality of care, but must be utilized effectively to achieve their full potential. We worked with an acute care hospital, which had adopted an early detection system, to identify potential barriers that could contribute to suboptimal system use. We designed a Plan Do Study Act framework for developing continuous quality improvement strategies that addressed these barriers and improved response times to system alerts.
Generating the MEDLINE N-Gram Set

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Abstract: The MEDLINE n-gram set is a very useful resource in Natural Language Processing (NLP) and Medical Language Processing (MLP). Currently, there is no MEDLINE n-gram set available in the public domain. Due to the large scale of data, it is a challenge to generate MEDLINE n-grams to fit into a research schedule with limited computer resources. The Lexical System Group (LSG) developed an algorithm to generate the MEDLINE n-gram set for adding multiwords into the SPECIALIST Lexicon. We believe the NLP community can benefit from access to this big data. We processed 2.6 billion single words from 22.4 million MEDLINE documents (titles and abstracts) to generate MEDLINE n-grams (n = 1 to 5) with terms appearing at least 30 times and having less than 50 characters for the 2014 release.
Bridging the Representation Gap of Medical Image and Clinical Note through Semantic Association Mining

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Abstract: Medical images and text are two of the most important forms for delivering clinical information and knowledge. Automatic integration of image knowledge and text knowledge can greatly assist clinicians in diagnosis, biologists in searching for evidence. However, the lack of a shared knowledge representation for images and text poses a significant barrier to the development of new applications that take advantage of this potential integration. This project aims to bridge the gap by systematically integrating image-text information to develop a knowledge base using natural language processing, medical image processing, and ontology-based knowledge integration methods. The image-text knowledge base can be a great help for clinical and translational research. For example, physicians can use the knowledge base to create semantic queries for searching patient with two criteria: one specified in clinical note "diagnosed with brain tumor in the past three months", and the other specified in the image "nodules larger than 5mm at the pineal gland on MRI".
A Framework for Incorporating Changes to a Reference Terminology on a Mapped Enterprise Terminology Subset

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Abstract: Enterprise vocabularies are used within EHR systems for capturing patient information at the point of care. Mapping to a reference terminology is usually required for such vocabularies for the data integration and reporting purposes. We investigated an approach for keeping the reference coding of a problem list terminology up-to-date.
Quantitative Evaluation of Dysarthria and Development of Vowel Sound Voice Training System

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2. Kitasato University School of Allied Health Sciences, Kanagawa, Japan.
3. Tokyo Healthcare University Division of Healthcare Informatics, Tokyo, Japan.

Abstract: Quantitative assessment of the dysarthria rehabilitation is not widely spread because the measuring machines are expensive and not portable. To solve this problem, we developed an application which can record the patients' voice in its rehabilitation, measure the duration and volume of the recorded voice, and calculate the formants based on frequency analysis. To evaluate the usefulness of the system, we are measuring cerebral infarction patients.
Abstract: Injuries in dairy and pork farms are common and are increasingly managed by primary care physicians. Yet, clinicians are often unfamiliar with the physical demands of farming and have little training and few resources to manage the safe return to work of injured workers. This project is developing a computer application designed for clinicians, working with patients, to guide early return to work planning for injured workers in the dairy and pork industries.
Responders and Nonresponders: Nurse Practitioner and Physical Therapist Personal Perceptions of Activity Monitors for Patient Use

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Abstract: The purpose of this mixed-methods study was to explore personal perceptions of Nurse Practitioners and Physical Therapists regarding use of activity monitors as adjuncts to patient care. Reactions from a convenience sample of 23 participants pursuing doctorate education varied. Nineteen were positive for 14 weeks, but four became “nonresponders” at three weeks, a point when support may be needed for successful use. Most participants responded that these devices would be beneficial for some patient populations.
I Can't Count: a mobile app for helping children with dyscalculia

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3. Dipartimento di Elettronica, Informazione e Bioingegneria, Politecnico di Milano, Milan, Italy.

Abstract: This work presents the experience gained with the development of an IOS App named I Can't Count. We developed it to give a direct and concrete help to those people, in our case children, who suffer from dyscalculia. We brought the diagnostic paper-based test into a digital application so as to provide a convenient and targeted, but at the same time user-friendly, tool to support the doctor during dyscalculia diagnosis and to recreate a known and easy environment for the child to help rehabilitation.
Optic disc and macula detection in fundus images by means of template matching

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2. Department of Computer Science, Institute of Research in Applied Mathematics and Systems, UNAM, Mexico, Mexico.

Abstract: Automatic computerized segmentation of optic disc (OD) and macula (MC) is an everyday need for clinical applications. Our algorithm achieves such a task by means of cross correlation of a template with the image. It performs a k-Fold cross validation loop. Each of its iterations is composed of a training and a validating stages. Results are reported on 37 fundus images obtained from a diabetic retinopathy screening program.
High Level Architecture and Evaluation of Patient Linkages for READY -
An Electronic Measurement Tool for Rheumatoid Arthritis

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Abstract: RhEumatoid Arthritis Disease activitY (READY) is an electronic measurement tool for tracking Rheumatoid Arthritis (RA) to help physicians render better clinical care. It collects data using validated instruments to score longitudinal patient reported outcomes (PROs). We here describe the high level architecture of READY tool in a multi institution environment operating on the cloud platform along with evaluation of a mechanism for generating a hashed identifier for patient linkages internally and across external system.
Clinician Evaluation of Clinical Decision Support Alert and Response Appropriateness

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Abstract: Effectively evaluating the appropriateness of clinical decision support (CDS) alerts and responses is critical to improving patient safety through health information technology. Using a REDCap data collection tool, clinicians reviewed the appropriateness of CDS alerts and responses. Of 397 alerts evaluated, 98.7% were overridden, 38.3% were appropriate, and 97.2% received appropriate responses. Further research is warranted and underway to identify predictors of inappropriate alerts, improve alert specificity, and reduce alert fatigue.
A Taxonomic Analysis of Programming Errors in Electronic Health Records (EHRs) which Lead to Clinical Decision Support Malfunctions

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Abstract: To catalog clinical decision support (CDS) types prone to failure and the programming errors leading to these failures in the EHR at Partners Healthcare, we reviewed reports from the Partners bug tracking system. We found that point of care alerts and reminders may be prone to failure. These issues were frequently caused by omission errors, trivial typos and imperfect design specifications suggesting that programming errors are important problems to consider when designing and implementing CDS.
Visualization of Laboratory, Vital, Precaution and Patient Status Data to Optimize Time on Task and Use Related Hazards

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Abstract: The visualization of patient medical data has important consequences on user related hazards and clinician efficiency. Especially in patient handoff activities where the amount of information is significant, it is important to optimize usability for these factors. This study tested the time to comprehension, use related errors, and user preference for visualizations of vital, lab, patient precaution, and patient status data. The study results indicated optimal visualizations for presenting patient, lab, and vital data over time and for presenting trend data alongside current readings. In both instances, the optimal visualizations showed statistically significant improvements in time to comprehension when compared with electronic medical record presentation. While not reaching significance, visualization of precautions and status did trend toward saving time and improving user satisfaction.
Abstract: In the era of precision medicine, accurately identifying familial conditions is crucial for providing target treatment. In this work, we studied the documentation of family history of premature cardiovascular disease and hypercholesterolemia. The agreement between patient-provided information and clinical notes on absence of family history information in patient-provided questionnaire (PPI) was higher compared to its presence.
SCILHS Data Mart Creation Plugin

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Abstract: The Scalable Collaborative Infrastructure for a Learning Health System (SCILHS, pronounced “skills”) is a network of 11 health centers across the United States that will cover over 8 million patients. SCILHS is a Clinical Data Research Network (CDRN) in the Patient-Centered Outcomes Research Institute’s PCORnet.
Assessing and Simulating Scheduling Processes in Community Health Centers
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3. Parkview Research Center, Fort Wayne, IN, United States.

Abstract: We sought to use simulation modeling to design effective scheduling processes in community health centers (CHCs) to address appointments related challenges that patients and clinics are facing. Provider characteristics, patient characteristics, number and types of appointments, and scheduling methods and horizon will be used to build the simulation model. All of this data has been collected by questionnaires, interviews, workflow observations and analysis of EMR data in CHCs.
Using Natural Language Processing to Facilitate Medical Record Abstraction in Epidemiological Studies

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Abstract: The Atherosclerosis Risk in Communities (ARIC) study conducts ongoing surveillance of hospitalized cardiovascular health events and death in 4 communities in the United States. Diagnostic criteria for heart failure (HF) have been manually abstracted from medical records since 2005, including the presence of symptoms consistent with HF decompensation (new onset or worsening shortness of breath, edema, paroxysmal nocturnal dyspnea, and orthopnea). The manual chart abstraction process has high repeatability under a stringent quality control protocol, but is time consuming and costly. Using a Python program to correct concept negations in c-TAKES (clinical Text Analysis and Knowledge Extraction Tool), we were able to develop an NLP application with high recall (sensitivity) and precision (positive predictive value) for identifying HF symptoms in free-text electronic documents. The NLP algorithm is being refined to improve its performance characteristics and to extract additional HF symptoms from free-text documents in electronic medical records. Our results suggest that use of validated NLP technology holds the potential for improving the cost-effectiveness of epidemiologic surveillance.
Implementing Customizable Asthma Action Plans into an Electronic Medical Record

S. J. Morgan; ¹; H. Z. Ramelson; ¹;

Abstract: An Asthma Action Plan is a written document that is provided to the patient in order to provide instructions on how to care for asthma symptoms at home and how to manage exacerbations. This poster describes the implementation of an electronic asthma action plan within a home-grown Electronic Medical Record and discusses some preliminary research data.
Abstract: Successful completion of randomized clinical trials is key to the progress of clinical and translational research. Trial recruitment plays a pivotal role in the success of these critical medical studies. However, despite efforts to alleviate obstacles impeding recruitment, statistics on clinical trial participation are not encouraging. The purpose of this study is to automate the process of electronic screening for trial participants to improve recruitment for all trials within a certain disease domain.
Variation in EHR Implementations and the Impact on Safety of Test Result Follow-up

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Abstract: Background: Breakdowns in EHR-based test result follow up are common and can negatively impact patient care. Increased understanding of contributory factors is needed.

Methods: A multidisciplinary team evaluated factors impacting follow-up of test results identified during task-based EHR demonstrations. Factors that impacted follow-up were compared across sites.

Results: Four EHRs were evaluated, and multiple site-specific positive and negative factors were identified.

Conclusions: Real-world EHR implementations are accompanied by several factors that positively or negatively impact the safety of test results follow-up.
Network Infrastructure for Large Scale Regional Medical Information Network

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Abstract: Since the Great East Japan Earthquake, we have been developed regional medical information network system. The private cloud and network technologies were introduced to realize its pliability and scalability. In this paper, we describe network infrastructure technologies essential for a large scale regional medical information network system.
Automated Approach to Extract Cardiovascular Phenotypes from Echocardiography Reports

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Abstract: We developed an information extraction system, EchoInfer, using natural language processing (NLP) that extracts 66 cardiac structural and functional data elements from echocardiography report. Our automated approach to the characterization of cardiovascular phenotypes from reports containing structured, semi-structured, and unstructured data has important implications for the development of research studies and has the potential to impact patient care. EchoInfer is unique because of its comprehensive coverage of phenotypes present in echocardiography reports and an overall high accuracy of over 90%.
Early Detection of Heart Failure using Data Driven Modeling Approaches on Electronic Health Records: How far can one go without Domain Knowledge?

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Abstract: This retrospective study on a 15K patient cohort investigated the feasibility of developing effective heart failure onset risk prediction models by applying data driven modeling approaches to electronic health record data. A predictive model built without using any domain knowledge about the data achieved an AUC of 0.802 (95% CI: 0.790-0.814).
Multi-Agent (Team) Microworld Environments for Healthcare

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Abstract: Much of healthcare relies on distributed clinical providers working together in complex clinical environments. However, these environments are not solely human based, but are socio-technical. To create effective technology systems, it is vital to design systems according to team needs. Yet, how can we best evaluate these team health information technology (HIT) systems? In this work, we describe the creation of a multi-agent microworld of a complex clinical environment, the Emergency Department, for the evaluation of team HITs.
The TISS Standard for electronic exchange of information in the private health insurance sector in Brazil
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Abstract: The private sector health plans in Brazil covers more than 72.2 million of beneficiaries. The information exchange among its agents is normalized by the standard Exchange of Information on Health Insurance - TISS. In 2014, this information began to be sent to the regulator of the system, the National Supplementary Health Agency, composing an important database of standardized and individualized records in the context of the future Electronic Health Record project at the national level. The TISS is compliant with ICD-10 for diagnoses and Unified Terminology for Supplementary Health (TUSS) for events and procedures.
BEST PRACTICES AND DESIGN EXPERIENCES IN HEALTH INFORMATION TECHNOLOGY (HIT) SYSTEMS: A PRIMER

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Abstract: ABSTRACT

In the healthcare sector in which almost all Health Information Technology (HIT) systems are large and complex (based on tasks, users and environments). Failure in design can result in both economical and human life losses, there is the need to: a) re-evaluate the importance of the planning phase (both feasibility analysis and requirements analysis) in system design b) take stock of recent successful and unsuccessful HIT system designs to find out how feasibility and requirements analyses (alongside other practices) play a role in design success and user experience, and c) analyze trends and come out with a possible recommendations for better HIT system design. This research is an explorative study which is based on literature review of best practices, survey of subject matter experts (HIT development/design team members) and review of recent complex HIT systems for the above-stated research needs.

Keywords: Health Information Technology (HIT), Software Development Life Cycle (SDLC) Feasibility Analysis, Requirements Analysis, User-Experience (UX), System Design.
Nurses’ Use of Electronic Health Records to Document Symptoms in Inpatient Settings: Preliminary Systematic Review Results

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Abstract: Symptom management is one of the essential functions of nurses in inpatient settings. The purpose of this study was to conduct a systematic review of use of Electronic Health Records (EHRs) to document symptom assessment and management by nurses in inpatient settings. A keyword search of Medline returned 274 results. Ten articles met inclusion criteria after independent review and reconciliation. Results from included studies indicated that interventions to systematize documentation improved documentation quality.
Privacy Preserving Sequential Pattern Mining Across Multiple Medical Sites
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2. Computer Science, California State Polytechnic University, Pomona, CA, United States.

Abstract: Sequence pattern mining methods are applicable in large number of applications and domains such as, analysis of DNA sequences, patterns in patient path, etc. When doing sequence pattern mining across multiple parties, under the regulations of HIPAA, patient’s privacy should not be revealed. We propose a new cryptography-based privacy preserving sequential pattern mining algorithm across multiple sites. It keeps each site’s data hidden from others except the mining results. Experiment results have shown its efficiency.
Perceptions of Health Information Technology Risks by Hospital Physicians

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2. University of Eastern Finland, Kuopio, Finland.
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Abstract: We conducted a study to find out physicians’ perceptions of health information technology (HIT) risks. The highest perceived risk was the unavailability of the electronic health records (EHR). The lowest perceived risk was the incorrect patient identification. The information technology risks should be characterized as a part of electronic health records implementation.
Measuring Informatics Capacity and Capability in Public Health Agencies

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Abstract: Substantial capital investments in complex information systems by public health agencies do not necessarily create the intended benefits. Planning, designing, developing, and implementing such information systems require informatics capacity within an organization. Lacking a satisfactory definition or explanation of the term, the authors (1) propose a definition and conceptualization of the terms informatics capacity and capability, and (2) introduce a measure of informatics capability as it relates to informatics capacity.
Identifying Health Consumer's eHealth Literacy to Decrease Disparities in Accessing eHealth Information

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Abstract: The purpose of this study was to assess health consumers’ eHealth literacy to improve their ability to access online health information. A total of 108 questionnaires were collected at three public libraries. We found that over 70% participants perceived that they possess eHealth literacy skill on how and where to find information, while only half of the participants perceived that they had the ability to distinguish high and low quality websites.
Building custom lexicon for a large number of related concepts using templates

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Abstract:
Term recognition is the task of detecting the boundaries of a natural language expression in text that represents an underlying concept. Accurate term recognition relies on the availability of a comprehensive knowledge base that includes a representation of all text variations for a concept that can be potentially found in text. A data-driven lexicon generation results in a lexicon that more accurately matches the target corpus than an expert-driven approach. This poster presents a method of developing a lexicon for a relatively large number of related concepts using patterns for a concept-value extraction of measurements in echocardiogram reports.
Surveying Problem List Perceptions and Use in the Electronic Health Record

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3. University of Vermont Medical Center, Burlington, VT, United States.
4. Maine Medical Center, Portland, ME, United States.
5. Brown University, Providence, RI, United States.

Abstract: The goal of this study is to gain a better understanding of problem list perceptions and use at the University of Vermont Medical Center to help inform user training and policies. Respondents were surveyed with open and closed-ended questions about definition and use of the problem list. Responses were consistent with those reported in prior studies involving clinician attitudes towards the problem list, and provide further insight for standardizing problem list use, training, and policies.
A Simulation Framework for Longitudinal Electronic Health Records Data

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Abstract: Electronic Health Records (EHRs) are an increasingly utilized clinical data source. In this poster we present our approach for simulating EHR data. Our approach simulates recorded laboratory measurements and biomarker levels over time which are related to illnesses. The model is highly customizable allowing for varying degrees of prevalence of events, severities of illnesses and interactions among biomarkers.
**Medications and Events Most Commonly Discussed in Facebook and Twitter**

L. Anderson; 1  
H. G. Bell; 5, 2  
G. Powell; 1  
L. A. Schifano; 1  
H. V. Le; 3  
H. Rodriguez; 4  

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4. Epidemico, Boston, MA, United States.  
5. ZeroChaos, Durham, NC, United States.

**Abstract:** Reported here are the most commonly discussed drug product classes and symptoms on Facebook and Twitter, which we studied as part of ongoing efforts to harness the power of social listening for pharmacovigilance. Most common product classes discussed are nervous system, respiratory system, and antiinfectives. Most common symptoms are general disorders including pain, nervous system, and psychiatric disorders. These findings may help better inform the most efficient uses of this rich data source.
Text Mining of Patient Demographics and Diagnoses from Psychiatric Assessments

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Abstract: This study utilized a rule-based text mining approach to extract and code patient demographics – age, gender, marital status, education level, and admission diagnoses -- from psychiatric assessments. A corpus of 200 psychiatric assessments was manually annotated for codes for each category and for text spans signaling them. Rules involved keyword-based patterns, augmented with structural rules. Both coding and text accuracies were satisfactory for each category, indicating that a rule-based approach is feasible for this task.
Abstract: Using an all claims payor database, the proposed poster will compare results of a standard Knee Replacement episode of care definition by primary payer. Claims can be challenging for understanding clinical care, but they are useful for seeing every provider a patient touches during an episode of care and how costs can vary. Episode analytics will provide an insight into providing clinically precise care that is financially efficacious while also tracking patient quality and safety outcomes between payor types.
Blood Flow Model for Improved Decision Support

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Abstract: Hypoplastic Left Heart Syndrome (HLHS) is a congenital heart defect requiring a sequence of three surgeries for treatment. These surgeries result in delicate physiologies that necessitate careful critical care and decision support. Our work is focused on developing a mathematical model of the full cardiovascular system, specializing the model to the HLHS physiology, and using the model to better understand this complex physiology.
Fine Phenotyping in lung Cancer Using Radiomics and Clinical Data
S. Pyarajan; 1; L. E. Selva; 1; 

Abstract: In this abstract we present a novel approach for combining radiomic data extracted from routine clinical images with unstructured and structured clinical data for fine phenotyping.
Predictors of Medical Records Violation Punishments Filed with the Texas Medical Board (TMB) Before and After the HITECH Act

M. Rais; 1; C. W. Johnson; 1; E. Kavoos; 1;
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Abstract: With widespread adoption of EHRs, changes have occurred in the way providers manage their medical records. To examine the impact of these changes on disciplinary actions around record keeping, we looked at physician violations due to inadequate medical records as filed with the Texas Medical Board between 2001 and 2014. Hierarchical binary logistic regression and correlation analyses were performed. We identified age group, birthplace, and multi-specialty to be statistically significant predictors for license revocation.
Automated Citation Retrieval System for Clinical Knowledge Management

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Abstract: Novel information retrieval methods to identify relevant citations on a clinical topic can overcome the knowledge gap between scientific publications and online clinical resources. We present a retrieval system that implements PICO framework, Vector Space Model and relevance based ranking module to support clinical knowledge management. The system achieved F-score of over 70% on preliminary analysis compared to baseline F-score of less than 5% and retrieved several new citations for new evidences.
Abstract: Maintaining accurate problem lists for patients can be important for patient care, driving clinical decision support and identifying appropriate cohorts for research. However, problem lists are often inaccurate and out of date. Issues with these lists includes duplicate items, erroneous items and items that linger despite resolution. We studied the problem list data from 32965 patients in our medical system and described which providers enter, revise or resolve problems on the problem lists as well as the number of duplicates on problems lists. Our preliminary results show 4941 (15%) patients with duplicate problem list items, which may be a considerable underestimation as we did not account for similar ICD codes in the initial analysis. We also found that only 5% of problem list items are actively resolved overall. We looked at several diagnoses which should clinically resolve quickly to compare how often these diagnoses are resolved in the EHR. For the diagnosis of UTI the average time to resolution in was 859 days 95%CI (753.16 to 964.84). Our results verify that inaccuracies in our problem lists limit their ability to support clinical care. We will build on this work to study practice style and data entry habits to identify solutions. 
**Abstract:** Primary care physicians refer one in three patients to specialty care. Yet, care coordination between primary care and specialty care lacks adequate information transfer and referral tracking. We propose an intervention that analyzes electronic health administrative data, extracts and curates relevant care team relationships and uses the health information exchange (HIE) infrastructure to automate care coordination for specialty care referrals enabling rule-based, standardized clinical data transmission.
Social Media use for Drug Repurposing: Understanding the consumer perspective

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2. Health Informatics and Administration, UW-Milwaukee, Milwaukee, WI, United States.

Abstract: When patient use social media to share their experience with medication, most of time they talk about effectiveness of medications or side effect. Sometimes they share experience of using a medication for not FDA-approved indication. In this study, we try to identify these comments and detect the new indications.
Gaussian Processes for interpreting Multiple Prostate Specific Antigen measurements for Prostate Cancer Prediction

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Abstract: Prostate Specific Antigen (PSA) is the primary measurement used for prostate cancer screening, but is limited by low specificity or sensitivity, depending on the cutoff. In this work, we present a machine learning approach based on Gaussian processes, that can better model and use repeated PSA measurements in detecting prostate cancer.
Abstract: Templates in text notes pose challenges for information extraction. We are developing a system that identifies novel templates in plain text notes included in Veterans Health Administration (VA) Text Integration Utility (TIU) notes. The system is comprised of two parts. The first clusters documents according to groups that are likely to have been derived from the same template. The second attempts to identify elements of the template from these documents.
Adapting a Mobility Monitoring Protocol for Sensor Studies with Functionally Vulnerable Older Adults

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2. Physical Therapy Program, University of Colorado School of Medicine, Aurora, CO, United States.

Abstract: Mobility is a strong predictor of hospital readmission in older adults. In-home sensors have great potential to monitor mobility. However, there have been few large-scale sensor studies with older adults and some live with multiple morbidities that limit their capacity to engage in research. The purpose of this presentation is to describe the adaptation of a mobility monitoring protocol to reduce participant burden for functionally vulnerable older adults and facilitate sensor studies with this demographic.
Identifying Patterns Indicative of Copying/Pasting Behavior in Patient Generated Online Content

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Abstract: It is expected that providing patients with ready access to their clinical information (e.g., laboratory results) will lead to numerous benefits. However, existing research indicates that patients experience challenges when using this information. Online health forums offer an opportunity to gain insights into the questions that patients may ask about clinical information. Towards this end, we reviewed posts on an online health forum, MedHelp.org, for patterns indicative of direct copying/pasting or transcribing from medical records.
Visualizing High Dimensional Clinical and Tumor Genotyping Data
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2. Hematology/Oncology, Vanderbilt University Medical Center, Nashville, TN, United States.

Abstract: Personalized cancer treatment is increasingly reliant on tumor genomic information for treatment decisions; however, depicting this genomic information in a clinical context can be problematic given the large quantity of data to display. This problem is further exacerbated by depiction of population-level clinical and genomic information for operational, quality improvement, and research purposes. Here we describe several novel examples of depicting population-level clinical and genomic information.
The CDS Collaborative: Goals, Deliverables, and Future Directions

S. Rodriguez-Loya; 1; E. Fry; 2; J. Sefer; 2; P. B. Warner; 1; C. Nanjo; 2; J. Goodnough; 2; D. E. Shields; 1; E. Elliott; 2; E. Aliverti; 2; K. Kawamoto; 1;
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Abstract: The Clinical Decision Support (CDS) Collaborative is a partnership by organizations committed to open-source, standards-based CDS to develop and share tools and resources to enable CDS at scale. The core members of this collaborative are the stewards of open-source CDS tools that are in operational use in various healthcare systems and commercial EHR systems, including the University of Utah and the Veterans Health Administration. Here, an overview of the Collaborative and its deliverables is provided.
Abstract: This study assessed the contribution of diagnosis related groups (DRGs) in predicting all-cause pediatric 30-day readmissions. We used machine-learning techniques to identify predictive DRGs, and built a Bayesian classifier from a training dataset of 64,075 inpatient visits between 2007 and 2011. The model had an area under the ROC (AUROC) curve of 0.76 (95% CI 0.75-0.77). We believe that DRGs can be used to target post-discharge interventions aimed at reducing readmission rates.
An Exploratory Analysis of Inpatient Satisfaction and Usage Pattern of Personalized Bedside Station
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Abstract: The Smart Bedside Station (SBS) is a screen that is installed on the bedside for the personal use and provides a variety of convenient services for the patients. This study aims to identify information needs, satisfaction degree and current system use status of SBS at the tertiary general university hospital. We examined inpatient response by satisfaction survey and system log data of each patient. The experimental result indicates the system importance and inpatient satisfaction.
A Multi-Dimensional Consumer-Oriented Approach to Evaluate Patient Portals

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Abstract: With the ubiquitous use of internet and increased interest in utilizing patient portals through mobile apps or web apps for managing healthy behaviors, it is necessary to evaluate the effectiveness of these resources. We propose using an integrated framework consisting of behavioral change techniques, persuasive design principles, and usability guidelines to evaluate these resources.
MAC Annotator: An interactive tool for translating medication appropriateness criteria into structured form

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Abstract: Background: Medication appropriateness criteria (MAC) are narrative guidelines for identifying and reducing inappropriate use of medications. To allow automated implementation of MAC, we developed a web-based tool to facilitate converting the MAC into computable form. Methods: “MAC Annotator” leverages NCBO Bioportal both to “pre-annotate” the MAC by automatically identifying mentions of diseases or drugs, and by normalizing the terms that the experts manually annotated. It also allows manual definitions for concepts not found in any terminology. We measured its utility in annotating 39 MAC. Results: On average, annotating each criterion took 121 seconds, of which 0.50 was spent for automated pre-annotation. Experts had high agreement in annotations. Disagreement was trivial for diseases, medications and drug classes, but was larger when modifiers were used (e.g. “uncomplicated” or “dependent”). Conclusion: MAC Annotator assisted experts in translating MAC into structured forms. It allowed experts to resolve issues with explicitness of criteria as well, preventing different interpretations.
Predicting Acute Kidney Injury in Critically Ill Children Using Electronic Health Record Data – A Comparison of Four Statistical Learning Models

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Abstract: Development or progression of acute kidney injury (AKI) is associated with increased mortality in the pediatric intensive care unit (ICU). Clinical prediction models can potentially identify high-risk patients earlier in their disease course. We developed, validated and compared four objective clinical prediction models of AKI development and progression in the first 72 hours of ICU admission using variables that are easily extractable from electronic health records and generalizable across pediatric ICUs.
Automating risk score calculations and care recommendations by an EMR agnostic solution and potential time saving for providers

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Abstract: MayoExpertAdvisor (MEA) provides patient-specific risk score calculations and care recommendations using data from electronic medical records (EMRs). We report a timing study that evaluates the baseline cognitive effort and accuracy for the calculation of risk stratifications and recommendations for chronic heart failure (CHF), atrial fibrillation, and atherosclerotic cardiovascular disease (ASCVD). The study demonstrates that MEA can save time for providers in delivering automated risk score calculations and care recommendations with a great potential to improve compliance with recommended treatments.
Clinical Relevance of the Doctor's Dilemma Question Set

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Abstract: At the annual ACP meeting, residents compete in a medicine-themed Jeopardy competition, known as Doctor's Dilemma. To build a clinical question answering system, a set of training questions which are clinically relevant is required. In this study, we show that most of the Doctor's Dilemma questions are relevant to clinical practice.
Computerized Provider Order Entry Rates and Length of Stay Are Inversely Correlated

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Abstract: Computerized provider order entry (CPOE) reduces medication errors 1. Can CPOE improve cost and efficiency outcomes such as shorter hospital length of stay?

Six prior studies 2 suggested CPOE lowered length of stay (LOS). None was performed in a community hospital with a largely unchanged vendor product, and none was able to differentiate LOS for patients who did, vs. those who did not, have electronically entered orders. Our findings indicate an inverse correlation between CPOE and LOS.
Evaluation of Perioperative Medication Errors and Adverse Drug Events
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2. Harvard Medical School, Boston, MA, United States.
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Abstract: The purpose of this study was to assess the rates of perioperative medication errors (MEs) and adverse drug events (ADEs), evaluate their root causes, and formulate preventative solutions. We observed 277 operations with 3,671 medication administrations of which 193 (5.3%, 95% CI 4.5-6.0) involved a ME and/or ADE. The rates found are higher than those previously reported. Several targeted technology- and process-based solutions exist which have the potential to decrease the incidence of perioperative MEs.
Abstract: The purpose of this study was to measure the incremental benefits of applying a specific emergency department quality measure, early ED returns, to increasing levels of health information exchange data aggregation. We found our ability to identify early ED returns increased by 66% in the smaller, pre-merger HIE (10 sites) and by 85% in the larger, post-merger HIE (31 sites) when compared with site-specific analyses.
Registries in Accountable Care: Essential Data Management in New Models of Care

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Abstract: Registries are a powerful informatics tool for research and public health. As incentives shift toward value based-care, both from commercial insurance and the Center for Medicare and Medicaid, demand for reliable, accessible data on populations is growing. The purpose of this poster is to define accountable care organizations, explain the importance of registries in managing data for ACOs and what specific requirements for ACO registries.
MedBus: A service-oriented architecture for enabling the research data economy

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Abstract: Researchers often require access to multiple data repositories to carry out their work. Although these data sources are a valuable asset to the community, researchers are often left to find these resources and navigate access to these data on an individual, point-to-point basis. In order to accelerate data discovery and access we have developed a service-oriented architecture platform, MedBus, for securely self-provisioning these resources. MedBus will ultimately enable federated access to over 300 enterprise data repositories.
A Continuous Markov Model Approach Using Individual Patient Data to Estimate Mean Sojourn Time of Lung Cancer

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Abstract: How early different screening approaches are able to detect lung cancer before symptomatic phase determines optimal screening intervals. We developed two Continuous Markov Models to estimate the average duration of lung cancer at asymptotically screening detectable phase for Low-dose Computed Tomography (LDCT) and Chest X-ray (CXR) using National Lung Screening Trial patient data. Our estimated results for CXR and LDCT are: 0.7 years (95% CI: 0.61 - 0.83) and 1.76 years (1.58 - 2).
Abstract: JBoss Drools is an open source rules engine and has been used by health care systems to process clinical rules. This study compares the performance between running the same set of clinical rules with certain complexity in Drools and by hard coding them in Java. The performance of Drools is impressive yet not as good as the plain Java implementation and may be a concern if performance is the critical factor for a successful implementation.
Abstract: We have designed a pipeline for acquiring and processing clinical data through both natural language processing and manual abstraction for the Hutch Integrated Data Repository and Archive (HIDRA), which is a collaborative effort of the Fred Hutch/University of Washington Cancer Consortium to create a database that will enable scientists and physicians to learn from new and historical patients across the consortium by having access to timely and high quality clinical data.
A New, Touch-screen Sensitive Display for Management of Diuretic Therapy of Heart Failure Patients in Critical Care Setting

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Abstract:

The user experience of providers taking care of heart failure patients can be improved by augmenting existing EMRs with touch screen displays and custom-developed applications. Putting providers in the driver's seat from the very beginning of the developmental process is essential for the overall success. Our methodology can be applied to other medical areas as well.
A Novel Anatomical Semantic Ontology for Identification of Anatomically Proximate CTs Using LOINC Codes

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5. The Department of Anesthesiology, New York Presbyterian Hospital, New York, NY, United States.

Abstract: The purpose of this study was to create a simple semantic anatomical ontology to identify anatomically similar and proximate CTs performed on individual patients across different sites in a health information exchange. Site-specific identifiers of CTs were mapped to standard LOINC terminology and assigned anatomic identifiers. 98.85% of studies were successfully labeled. This process allows identification of similar and proximate CT scans across different institutions, thereby providing structure for future HIE-based alerting systems.
A Platform for Generating and Validating Breast Risk Models from Clinical Data: Towards Patient-Centered Risk Stratified Screening

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Abstract: The wide prevalence and heterogeneity of breast cancer challenges our ability to disambiguate the value of patient and clinical factors during cancer screening. To address the need for improve risk-stratification, we have created an integrated database tied to a high-performance computing infrastructure to aggregate, process, and map structured patient information to breast cancer risk models. For a subpopulation of 1,401 patients undergoing active breast cancer screening, this platform is used to validate risk models and to explore the use of newer risk factors.
Prediction of Colorectal Surgical Site Infections Using Risk Factors

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Abstract: Surgical site infection (SSI) is the most common nosocomial infection for surgical patients and is a costly complication following major colorectal surgery (CRS). Previous studies have reported patient perioperative characteristics associated with an increased SSI risk. In this study, we employed a Bayesian network to investigate the prediction capability of SSIs using risk factors.
Annotating ADLs and IADLs in Veterans Affairs Clinical Documents

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3. San Francisco VA Medical Center, Department of Veterans Affairs, San Francisco, CA, United States.

Abstract: Descriptions of six activities of daily living (ADLs) and seven instrumental activities of daily living (IADLs) are documented in unstructured U.S. Department of Veterans Affairs (VA) healthcare data. Natural Language Processing (NLP) can be used to extract this information from clinical free-texts to predict the likelihood of nursing home admissions after inpatient admission or as measures of functional status in risk adjustment. We assess annotation guidelines for ADLs/IADLs used to build a reference standard for NLP algorithm development and report descriptive statistics describing prevalence, inter-annotator agreement, content structures, and mention prevalence for explicitly described functional impairment.
Home-care Scheduling, Supervision and Security (HC-SSS): A status report

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Abstract: It is the aim of this project to describe in brief the work in progress of a Home-care Scheduling, Supervision and Security (HC-SSS) approach, designed to support the continuity of health-care and the secure information management, for patients discharged from Hospital to Home-care.
Using the Consolidated Framework for Implementation Research (CFIR) to Evaluate EHR Population Health Management Tools

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Abstract: How electronic health record (EHR) innovation is implemented in clinical practice is influenced by the contextual environment. The Consolidated Framework for Implementation Research (CFIR) provides a systematic comprehensive approach to analyzing and interpreting the qualitative data from an implementation process evaluation. The CFIR provides a useful framework for understanding intervention implementation and opportunities for improving implementation processes. In this case study, issues of engagement, leadership, and feedback were identified as particularly important.
Matrix Completion Methods and Imputation for EMR-Based Prediction.

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Abstract: Missing data in electronic medical records is common and often missing not at random. We compared a novel multiple imputation method and a novel feature selection low rank method to matrix completion and mean imputation. We assessed performance on simulated data and on real EMR data. The novel low rank method resulted in good classification performance and faster computation time. The choice of any sophisticated imputation resulted in better predictive performance than mean imputation.
Abstract: Low back pain (LBP) is a common health problem globally. However, current entertaining virtual reality-based LBP rehabilitation systems do not offer the capacity for patients to incorporate learning patterns into daily activities to reduce recurrence of LBP. Therefore, we recruited forty patients and performed clinical assessments to investigate the efficacy of the system proposed. Experimental results demonstrate that patients’ uses of VR system are associated with better treatment outcomes in terms of physical and mental functions.
Abstract: How patients manage their health information can have different effects on their own care. In this study, we explore patients’ existing information management strategies to have a glimpse into what have worked for patients and what may be incorporated into the design of supporting technologies. Interviews and photo-documentation with 60 diabetes patients in the US and China are carried out to extract patient expertise from rich data.
Understanding Why Providers Override Computerized Medication Alerts in the Inpatient and Outpatient Setting

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5. Cliniques Universitaires Saint-Luc, Brussels, Belgium.
6. School of Medicines, Pharmacy and Health, Durham University, Durham, United Kingdom.
7. Harvard Medical School, Boston, MA, United States.
8. McGill University, Montreal, QC, Canada.

Abstract: Computerized decision support (CDS) alerts are often overridden in the inpatient and outpatient setting. We evaluated both inpatient and outpatient providers focusing on their behavior and practice when overriding these alerts. While providers in the inpatient and outpatient setting were grateful for alerts and felt they contribute to patient safety, inpatient clinicians felt that CDS alerts could be more effective and efficient since they saw their patients more frequently and were likely to experience alert fatigue.
Lost in the Fog: Information Needs in the Care of Patients with Delirium

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Abstract: Understanding physician’s decision-making processes in addressing diagnostic dilemmas is crucial to designing effective decision support. To help fill this gap, critical incident interviews were conducted with physicians reporting diagnosing a patient with delirium. Preliminary analysis has uncovered themes showing causes of uncertainty in delirium workup and strategies physicians use to discover hidden or missing data. The need to include functional/mental status information for healthy patients in the EMR and for better search mechanisms was identified.
Mapping APACHE IV "Reason for Intensive Care Admission" Classification to SNOWMED CT

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Abstract: The lack of structured and formal definition for concepts in APACHE IV classification is a rate-limiting factor for data sharing, aggregation, and classification. However, SNOMED CT contains large amounts of information that is not pertinent for most clinical conditions in the ICU. Mapping APACHE IV classification to SNOMED CT Concept Codes can be done in 98% of cases. This mapping result is useful to identify relevant patient subsets using SNOMED CT as a first step in developing the ICU-specific interface terminology.
A SURVEY ON E-PRESCRIBING: AWARENESS, SATISFACTION, BENEFITS AND BARRIERS IN FLORIDA

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Abstract: Electronic prescribing (e-prescribing) allows prescribers to securely send electronic prescriptions directly to pharmacies using specific software [1]. Large national health policy initiatives are promoting the adoption and meaningful use of certified Electronic Health records (EHRs) with electronic prescribing (e-prescribing) capability in order to improve the safety, quality, and efficiency of healthcare delivery. A growing concern among pharmacists is the patient safety implications of new kinds of medication errors and information omissions caused might be introduced by e-prescribing [2]. Currently, pharmacists expect to receive more prescriptions electronically. Thus, they need to be aware of the unintended consequences of e-prescribing. To better understand e-prescribing systems and the potential changes in workflow of pharmacies, it is important to understand what errors are introduced by e-prescribing that did not occur with manual forms of prescribing. This study provides analysis and insight into the awareness of Florida pharmacists and pharmacy personnel of e-prescribing systems, their likelihood of using e-prescribing in their practices, their overall satisfaction with e-prescribing systems, their preference for prescribing, the principal benefits and barriers, and the main errors encountered by pharmacies in Florida. This study is important because building awareness of e-prescribing functionalities, benefits and errors can help pharmacies better take advantage this service. Although e-prescribing can reduce errors related to illegible handwriting the technology itself can cause new types of e-prescription errors. These errors decrease the workflow efficiency because pharmacy personnel have to stop their work and call the prescriber to detect and resolve the errors. Pharmacists and prescribers need to be trained on the function, software interface, and integration of e-prescribing systems into their practice in order to better use of e-prescribing service. Moreover, lack of standardized e-prescribing software is considered as one of the main obstacles affecting the implementation of e-prescribing. Collaborative interaction and communication between prescribers and pharmacies by implementing a standardized e-prescribing system is a possible solution.
Abstract: We developed Smart Coach, a mobile app that implements problem solving strategies, to help patients during their weight loss journey by identify solutions to their weight loss problems. We identified a large set of problems and solutions based on 30 weight-loss problem solving session. During the usability study, we observed an average SUS score of 79.7 indicating that the users were overall satisfied with the features and the content of the app.
Researcher Needs for a Patient-Centered Outcomes Research (PCOR) Data Infrastructure

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Abstract: The Affordable Care Act provides funding to enable patient centered outcomes research (PCOR) data infrastructure. Researchers' agree on the need to address data quality issues, facilitate access to federal and private data assets, enable collection and integration of patient-provided data, and promote sustainability of infrastructure through standards and policies. These findings highlight potential research and investment opportunities to improve processes for data capture, storage, and use of health data from healthcare operations to research.
Abstract: The use of standardized templates provided by the RSNA for improving radiology-reporting practices combined with multiplies ontologies from different medical resources such as Radlex, SNOMED-CT, LOINC, HL7 and CIE-10 in a single application give to radiologist a powerful tool to create structured templates for any specility, modality and anatomy. The best practices of reporting could provide complete reports, homogenized findings and useful tools for data mining.
Developing an Enhanced Electronic Referral Management System

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Abstract: To increase patient safety and prevent liability issues, this innovative program has created an enhanced referral management module in an ambulatory EHR. This module will enable practices to meet requirements for best practice steps for referral management. The module includes enhanced workflow features that will help practices create and track referrals.
Exploring Healthcare Mobility in the US to Improve Quality of Care: Preliminary Results
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2. Yale University School of Medicine, New Haven, CT, United States.

Abstract: Mobile populations, who are often minority and low-income populations, are at risk for poor healthcare outcomes. These populations may experience poor healthcare coordination leading to either delays in or unnecessary care as health systems are not designed for mobility. There are no agreed upon definitions for mobility for healthcare use, and thereby no standard measures and estimates of this type of mobility, or ‘healthcare mobility’. We used Veterans Health Administration national integrated health record systems with clinical data from over 100 facilities to explore healthcare mobility and to identify patterns in healthcare mobility.
Integrating Analytics and Business Intelligence (BI) into a Health Informatics Curriculum: Pros, Cons and Opportunities
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Abstract: Healthcare is drowning in data as a result of the rapid adoption of electronic health records (EHRs), and health informatics professionals with strong data analytics and BI skills are needed. A survey was administered to gather data about attitudes towards a curriculum that integrates analytics into a Health Informatics curriculum. The results showed positive attitude towards the approach and overwhelming support to maintain the integration and focus on specific areas of analytics.
Engaging Patients & Families in Contributing Patient-Reported Outcomes to a Pediatric Disease Registry for Comparative Effectiveness Research

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3. Division of Developmental Medicine, Boston Children's Hospital, Boston, MA, United States.

Abstract: We evaluated a novel patient-facing informatics approach for engaging patients and parents in contributing patient-reported outcomes (PROs) into a national pediatric rheumatic disease registry to support comparative effectiveness research. Across four sites, families highlighted medication side effects and safety as their chief concerns, and more than one quarter reported medication related problems. Initial analyses provide early support for a participatory model of engaging a cohort in providing health information to answer their own prioritized questions.
Augmenting Psychiatric Care: A Participatory Mobile Framework

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Abstract: Community-partnered participatory techniques improve patient engagement, reduce disparities and improve clinical outcomes. The Chorus Participatory Mobile Framework enables implementation of these participatory techniques in mobile intervention development. Using this framework, we partnered with patients and providers to develop patient-tailored mobile interventions to augment outpatient psychiatric care.
Intelligent Home Risk Monitoring To Enable Post Acute Care Surveillance

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Abstract: This study is designed to explore the benefits, barriers and critical components needed to design and develop an intelligent home risk monitoring solution in the specific context of Hip and Knee Arthroplasty in senior citizens. The proffered solution is anticipated to assist reducing the number of unplanned readmissions, improving post-operative quality through continuous monitoring of risk factors at home, reducing rehabilitation costs by expanding home care and thereby reducing the burden on rehabilitation care facilities.
Using Informatics Tools to Standardize the Request, Adjudication and Monitoring of Non Formulary Agents at a VA Facility

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Abstract: The Veterans Health Administration (VHA) lacks a standardized approach to request, adjudicate, and monitor patients on non-formulary (NF) medications. These medications require monitoring to ensure patient safety. Manual reviews are labor intensive, variably conducted, and miss safety concerns. This work, supported by an Innovation Grant, examines the impact of clinical informatics tools to leverage efficient monitoring capabilities. The new processes will be piloted locally and reported for consideration for broader deployment.
Visualizing Clinical Workflow using Time and Motion Data

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Abstract: Understanding clinical workflow is crucial to improving quality, safety, and efficiency of patient care delivery. A common source of data for studying clinical workflow is through time and motion studies, which however generate multi-dimensional datasets that are very difficult to analyze. To address this challenge, we used three visualization techniques to visualize time and motion data to allow for easy identification of important workflow patterns. These visualizations help us better analyze physical movements, relationships between locations and activities, and the magnitude of change in workflow.
PheWAS Network Analysis and Visualization

Y. Xu; T. Edwards; L. Bastarache; R. N. Jerome; S. Zho; E. Torstenson; W. Wei; J. Shirey-Rice; E. A. Bowton; Y. Shyr; J. Pulley; J. C. Denny;
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Abstract: Understanding the genetic determinants of complex diseases is essential in personalized genomic medicine. In this work, we will demonstrate an exploratory data analysis framework, integrating networks and statistical modeling techniques, to build a set of graphic representation and analysis strategies depicting complex associations between genetic architecture and disease risks. We will illustrate with a case study of our approach applied on a dataset from Vanderbilt EMR-linked biobank with 30,000 subjects and 1500 disease codes.
GeoHealth Informatics: Applying Geographic Information Science (GIS) to Support Heart Failure Self-Care

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Abstract: This study addresses how geographic information science and systems (GIS) can facilitate heart failure self-care. Self-care barriers such as inadequate transportation, distance from healthy food sources or pharmacies, and terrain issues can be addressed with GIS tools offer patients on-demand transportation options, sensor-based connections with their clinical team, or maps of healthy alternatives. Opportunities are discussed in parallel with challenges such as device cost, tool usability, and privacy.
Annotating Recommendation Sentences in Radiology Reports
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4. Information Technology Services, University of Washington, Seattle, WA, United States.
5. Radiology, University of Washington, Seattle, WA, United States.

Abstract: Communication of follow-up recommendations when abnormalities are identified on imaging studies is prone to error. The absence of an automated system to identify and track radiology recommendations is an important barrier to ensuring timely follow-up of patients especially with non-acute incidental findings on imaging studies. We are in the process of building a natural language processing system to identify clinically important follow-up recommendations in free-text radiology reports so that the reports can be flagged and separate workflow processes can be initiated to improve the consistency and quality of care delivery. To accomplish this, we are creating a multi-institutional radiology report corpus annotated for clinically important recommendation information.
Annotation of Disease Characteristics for Cancer Liver Stage Prediction

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Abstract: Liver cancer is one of the leading cancer-related causes of death worldwide that occurs across different lifestyle and genetic environments. To facilitate evidence-based research in liver cancer, we (a) define a set of domain-related characteristics to annotate, (b) construct a workflow to support annotations at several levels, and (c) evaluate the consistency of our annotation scheme through a double annotation experiment.
Using TURF Framework to Improve EHR-CPOE Medication Dosing in Renal Impaired Elderly

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Abstract: The incidence of renal impairment is increasing rapidly in older adults. Drug dosing errors are common in these patients, which might result in an Adverse Drug Event, such as toxicity. Electronic Health Record-Computerized Provider Order Entries (EHR-CPOEs) can potentially help but EHR-CPOEs with poor user interface may result in technology-induced errors. This project evaluated an existing EHR-CPOE module regarding prescribing for older adults with renal impairment and proposed a redesign to address the identified issues.
Lack of Unique Healthcare Identifier in Healthcare Information Exchanges: A Field Study
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1. FIU, Miami, FL, United States.

Abstract: The lack of a Unique Healthcare Identifier (UHID) for patient records presents a challenge for the exchange of personal health information across diverse organizations and forces dependence upon matching algorithms or linking methodologies to successfully exchange patient data. This study proposes a two-stage approach to examine successful matching of patient records based on deterministic linkage of patient identifiers and the impact of the performance on HIE development and utilization.
Understanding the Use of Adverse Events Criteria in Radiation Therapy: A Literature Mining Approach

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Abstract: This project investigates the usage trends of three most commonly used adverse events criteria (or normal tissue toxicity scoring system) in radiation therapy (RT) by automated analysis of published articles using text mining methods. To validate the proposed mining method, the results are compared with those obtained by a manual analysis conducted by domain experts using three years of RT-related clinical articles.
Automatically Screening Possible Chemoresistance Genes of Bladder Cancer Drugs
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Abstract: Bladder cancer is highly refractory to the drug therapy due to chemoresistance, which prevents effective chemotherapy [1]. At present the mechanistic understanding of cancer chemoresistance remains elusive [1]. This study aims to predict chemoresistance genes of bladder cancer drugs including Adriamycin, Cisplatin, and Paclitaxel, from a large scale of literature data, SemMedDB. The findings produced from this study would consequently provide novel hypotheses to further investigate bladder cancer chemoresistance mechanisms by biologists and/or oncologists.
Choosing to Build: Optimizing the Development of a Custom Pathology Laboratory Software Solution

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Abstract: Background: Commercially available software seldom meets all the requirements of laboratory medicine. Customizations by vendors can result in additional costs and compromises, while using software as-is may lead to inefficient workflows and impact patient safety. At NYP/Weill Cornell we chose to create a responsive, web-based, multi-user application for submitting and tracking scan orders to a new whole-slide scanning service. We analyzed the amount of time and effort to design, build, and test a working solution, focusing on how prioritization of issues documented during development impact the time to completion in days (TC).

Design: Bitbucket was used as the distributed revision control system and issue tracker. Source code statistics for the project, built on Microsoft Windows 2012 with PHP, were generated using GitStatX. Developer productivity was measured using lines of code (LOC) written per-day by our software engineer, who holds a Master of Biomedical and Computer Engineering. A physician-informaticist (PI) responsible for conceptual design, functional specifications, and program testing was surveyed regarding his time commitment.

Results: The development team comprised 1.2 FTEs; the PI dedicated 0.2 of his time, spending 60% of it on software testing. The project took 451 days and contains 1999 files with 379,620 LOC (averaging 670/week). In total, 377 issues were documented, of which 325 were resolved, and 49 remained outstanding at launch; 204 (54%) were classified as bug, 163 (43%) as enhancement, 3 (1%) as proposal, and 7 (2%) as task. The top two priority flags assigned to bugs and enhancements were “blocker” and “critical”. The average TC for all issues was 29 days (13 for bugs, and 52 for enhancements) with a median of 9, and SD of 59.2. “Blocker” was used 24 times: 19 (79%) for bugs with a TC of 3.4, and 5 (21%) for enhancements with a TC of 6.6. “Critical” was used 221 times: 139 (62.9%) for bugs with a TC of 12, and 78 (35.3%) for enhancements with a TC of 39.2.

Conclusion: Although testing and issue documentation required a generous amount of time, prioritization positively impacted the rate at which development milestones were achieved. Issues marked with the highest priority of “blocker” were resolved 3 to 6 times faster than those flagged as “critical”. Additionally, daily LOC logs established a baseline expectation of activity. The use of issue tracking and version control systems provides an effective way of monitoring development in order to efficiently build software solutions.
Facebook and depression: How people with depression use Facebook to manage their depression.

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Abstract: The purpose of this study is to analyze posts in Facebook depression groups, to classify them into pragmatic, empathic, and social categories. In addition, nature of comments left for post and their relationships with post are analyzed. Preliminary result of this research shows that people with depression in Facebook depression groups are more likely to experience empathic or sociability aspects than pragmatic aspect.
Abstract: Genomic Medicine programs have proliferated as the evidence for implementing compelling pharmacogenomics use cases or targeted therapy accumulates. However, current electronic health records (EHRs) are under-developed for manipulating genomic data or communicating results to patients and providers. Three NIH-funded networks – Electronic Medical Records and Genomics (eMERGE), Pharmacogenomics Research Network (PGRN), and Implementing GeNomics In PracTicE (IGNITE) -- are creating health information technology (HIT) resources to help fill these gaps. Members of these consortia, which span academic medical centers and integrated health systems, are working to create educational tools, patient engagement technologies, clinical decision support resources, and common data models to exchange structured genomic results and guidelines. During this panel, speakers will review 1-2 resources that are available publically, and discuss how to leverage these resources to implement a new precision medicine or translational program. A panelist will describe methods and resources to encode genomic data and knowledge so that is can be shared between EHR environments. Secondly, a repository for storing and indexing genomic clinical decision support artifacts will be presented as well as efforts to use Infobuttons to provide just-in-time genomic medicine education. Finally, a panelist will present engagement technologies which can assist with communicating genomic results directly to patients.
Harmonization of ICD-11 and SNOMED CT – Not just mapping!

Practical and Theoretical Lessons & Benefits to Users and Implementers

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Abstract: ICD and SNOMED CT were designed for different purposes – ICD for statistical reporting and epidemiological studies; SNOMED CT for documenting clinical care. They conform to different semantics – ICD is a closed mono-hierarchy in which sibling entities must be mutually exclusive and jointly exhaustive. SNOMED is an open polyhierarchy based on description logic. ICD has a strong requirement to focus on identifying diagnosis and underlying cause of death; SNOMED has an equally strong requirement to reflect the evolution of clinical understanding. ICD’s usage has clearly outgrown its historical structure. Updates occur at long intervals, and migration between versions is costly. To meet these problems and harmonize with SNOMED, ICD-11 uses a radically new three-component architecture: A “Common Ontology” that will correspond to an agreed subset of SNOMED, a “Foundation Component” structured around this ontology, and “Linearizations” that correspond to the existing classification, plus algorithms that link these component. The result is expected to simplify generating maps between SNOMED and ICD and to provide a stable platform for the evolution of ICD. The development has required clarifying the semantics of both ICD and SNOMED and has important implications for anyone working with either or attempting to harmonize other systems with them.
Recognizing Disjoint Clinical Concepts in Clinical Text Using Machine Learning-based Methods

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Abstract: Clinical concept recognition (CCR) is a fundamental task in clinical natural language processing (NLP) field. Almost all current machine learning-based CCR systems can only recognize clinical concepts of consecutive words (called consecutive clinical concepts, CCCs), but can do nothing about clinical concepts of disjoint words (called disjoint clinical concepts, DCCs), which widely exist in clinical text. In this paper, we proposed two novel types of representations for disjoint clinical concepts, and applied two state-of-the-art machine learning methods to recognizing consecutive and disjoint concepts. Experiments conducted on the 2013 ShARe/CLEF challenge corpus showed that our best system achieved a “strict” F-measure of 0.803 for CCCs, a “strict” F-measure of 0.477 for DCCs, and a “strict” F-measure of 0.783 for all clinical concepts, significantly higher than the baseline systems by 4.2% and 4.1% respectively.
Interpretable Probabilistic Latent Variable Models for Automatic Annotation of Clinical Text

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Abstract: We propose Latent Class Allocation (LCA) and Discriminative Labeled Latent Dirichlet Allocation (DL-LDA), two novel interpretable probabilistic latent variable models for automatic annotation of clinical text. Both models separate the terms that are highly characteristic of textual fragments annotated with a given set of labels from other non-discriminative terms, but rely on generative processes with different structure of latent variables. LCA directly learns class-specific multinomials, while DL-LDA breaks them down into topics (clusters of semantically related words). Extensive experimental evaluation indicates that the proposed models outperform Naïve Bayes, a standard probabilistic classifier, and Labeled LDA, a state-of-the-art topic model for labeled corpora, on the task of automatic annotation of transcripts of motivational interviews, while the output of the proposed models can be easily interpreted by clinical practitioners.
Towards a Generalizable Time Expression Model for Temporal Reasoning in Clinical Notes

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Abstract: Accurate temporal identification and normalization is imperative for many biomedical and clinical tasks such as generating timelines and identifying phenotypes. A major natural language processing challenge is developing and evaluating a generalizable temporal modeling approach that performs well across corpora and institutions. Our long-term goal is to create such a model. We initiate our work on reaching this goal by focusing on temporal expression (TIMEX3) identification. We present a systematic approach to 1) generalize existing solutions for automated TIMEX3 span detection, and 2) assess similarities and differences by various instantiations of TIMEX3 models applied on separate clinical corpora. When evaluated on the 2012 i2b2 and the 2015 Clinical TempEval challenge corpora, our conclusion is that our approach is successful – we achieve competitive results for automated classification, and we identify similarities and differences in TIMEX3 modeling that will be informative in the development of a simplified, general temporal model.
A Study of Concept Extraction Across Different Types of Clinical Notes

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Abstract: Our research investigates methods for creating effective concept extractors for specialty clinical notes. First, we present three new “specialty area” datasets consisting of Cardiology, Neurology, and Orthopedics clinical notes manually annotated with medical concepts. We analyze the medical concepts in each dataset and compare with the widely used i2b2 2010 corpus. Second, we create several types of concept extraction models and examine the effects of training supervised learners with specialty area data versus i2b2 data. We find substantial differences in performance across the datasets, and obtain the best results for all three specialty areas by training with both i2b2 and specialty data. Third, we explore strategies to improve concept extraction on specialty notes with ensemble methods. We compare two types of ensemble methods (Voting/Stacking) and a domain adaptation model, and show that a Stacked ensemble of classifiers trained with i2b2 and specialty data yields the best performance.
Utilizing Multidimensional Computer Adaptive Testing to Mitigate Burden With Patient Reported Outcomes

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Abstract: Utilization of patient-reported outcome measures (PROs) had been limited by the lack of psychometrically sound measures scored in real-time. The Patient Reported Outcomes Measurement Information System (PROMIS) initiative developed a broad array of high-quality PRO measures. Towards reducing the number of items administered in measuring PROs, PROMIS employs Item Response Theory (IRT) and Computer Adaptive Testing (CAT). By only administering questions targeted to the subject's trait level, CAT has cut testing times in half. The IRT/CAT implementation in PROMIS is unidimensional in that there is a separate set of questions administered for each measured trait. However, there are often correlations among traits. Multidimensional IRT (MIRT) and multidimensional CAT (MCAT) provide items concerning several correlated traits, and should ameliorate patient burden. We developed an MIRT model using existing PROMIS item banks for depression and anxiety, developed MCAT software, and compared the efficiency of the MCAT approach to the unidimensional approach.
A Novel Multiple Choice Question Generation Strategy:
Alternative Uses for Controlled Vocabulary Thesauri in Biomedical-Sciences Education
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Abstract: Multiple choice questions play an important role in training and evaluating biomedical science students. However, the resource intensive nature of question generation limits their open availability, reducing their contribution to evaluation purposes mainly. Although applied-knowledge questions require a complex formulation process, the creation of concrete-knowledge questions (i.e., definitions, associations) could be assisted by the use of informatics methods. We envisioned a novel and simple algorithm that exploits validated knowledge repositories and generates concrete-knowledge questions by leveraging concepts’ relationships. In this manuscript we present the development and validation of a prototype which successfully produced meaningful concrete-knowledge questions, opening new applications for existing knowledge repositories, potentially benefiting students of all biomedical sciences disciplines.
Intelligent Simulation Model To Facilitate EHR Training

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Abstract: Despite the rapid growth of EHR use, there are currently no standardized protocols for EHR training. A simulation EHR environment may offer significant advantages with respect to EHR training, but optimizing the training paradigm requires careful consideration of the simulation model itself, and how it is to be deployed during training. In this paper, we propose Six Principles that are EHR-agnostic and provide the framework for the development of an intelligent simulation model that can optimize EHR training by replicating real-world clinical conditions and appropriate cognitive loads.
**Abstract:** Tele-education systems are increasingly being utilized in medical education worldwide. Due to limited human resources in healthcare in low and middle-income countries, developing online systems that are accessible to medical trainees in underserved areas potentially represents a highly efficient and effective method of improving the quantity and quality of the health care workforce. We developed, implemented, and evaluated an interactive web-based tele-education system (based on internationally accepted, image-based guidelines) for the diagnosis of retinopathy of prematurity among ophthalmologists-in-training in Brazil, Mexico, and the Philippines. We demonstrate that participation in this tele-education program improved diagnostic accuracy and reliability, and was preferred to standard pedagogical methods. This system may be employed not only in training, but also in international certification programs, and the process may be generalizable to other image-based specialties, such as dermatology and radiology.
Translational Meta-analytical Methods to Localize the Regulatory Patterns of Neurological Disorders in the Human Brain

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Abstract: The task of mapping neurological disorders in the human brain must be informed by multiple measurements of an individual’s phenotype - neuroimaging, genomics, and behavior. We developed a novel meta-analytical approach to integrate disparate resources and generated transcriptional maps of neurological disorders in the human brain, yielding a purely computational procedure to pinpoint the brain location of transcribed genes likely to be involved in either onset or maintenance of the neurological condition.
POETenceph - Automatic identification of clinical notes indicating encephalopathy using a realist ontology

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Abstract:

Identifying inpatients with encephalopathy is important. The disorder is prevalent, often missed, and puts patients at risk. We describe POETenceph, natural language processing pipeline, which ranks clinical notes on the extent to which they indicate the patient had encephalopathy. We use a realist ontology of the entities and relationships indicative of encephalopathy in clinical notes. POETenceph includes a passage rank algorithm, which takes identified disorders; matches them to the ontology; calculates the diffuseness, centrality, and length of the matched entry; adds the scores; and returns the ranked documents. We evaluate it against a corpus of clinical documents annotated for evidence of delirium. Higher POETenceph are associated with increasing numbers of reviewer annotations. Detailed examination found that 65% of the bottom scoring documents contained little or no evidence and 70% of the top contained good evidence. POETenceph can effectively rank clinical documents for their evidence of encephalopathy as characterized by delirium.
Abstract: Brain science is a frontier research area with great promise for understanding, preventing, and treating multiple diseases affecting millions of patients. Its key task of reconstructing neuronal brain connectivity poses unique Big Data Analysis challenges distinct from those in clinical or “-omics” domains. Our goal is to understand the strengths and limitations of reconstruction algorithms, measure performance and its determinants, and ultimately enhance performance and applicability. We devised a set of experiments in a well-controlled setting using an established gold-standard based on calcium fluorescence time series recordings of thousands of neurons sampled from a previously validated neuronal model of complex time-varying causal neuronal connections. Following empirical testing of several state-of-the-art reconstruction algorithms, and using the best-performing algorithms, we constructed features of a classifier and predicted the presence or absence of connections using meta-learning. This approach combines information-theoretic, feature construction, and pattern recognition meta-learning methods to considerably improve the Area under ROC curve performance. Our data are very promising toward the feasibility of reliably reconstructing complex neuronal connectivity.
Combing Human Disease Genetics and Mouse Model Phenotypes Towards Drug Repositioning for Parkinson's Disease

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Abstract: Parkinson's disease (PD) is a severe neurodegenerative disorder without effective treatments. Here, we present a novel drug repositioning approach to predict new drugs for PD leveraging both disease genetics and large amounts of mouse model phenotypes. First, we identified PD-specific mouse phenotypes using well-studied human disease genes. Then we searched all FDA-approved drugs for candidates that share similar mouse phenotype profiles with PD. We demonstrated the validity of our approach using drugs that have been approved for PD: 10 approved PD drugs were ranked within top 10% among 1197 candidates. In predicting novel PD drugs, our approach achieved a mean average precision of 0.24, which is significantly higher (p<e-11) than 0.16 for a state-of-art drug discovery approach based on mouse phenotype data. Comparison of gene expression profiles between PD and top-ranked drug candidates indicates that quetiapine has the potential to treat PD.
Modelling Risk of Cardio-Respiratory Instability as a Heterogeneous Process
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Abstract: Cardio-respiratory instability (CRI) occurs frequently in acutely ill. If not identified and treated early, it leads to significant morbidity and mortality. Current practice primarily relies on vigilance of the clinical personnel for early recognition of CRI. Given limited monitoring resources available in critical care environment, it can be suboptimal. Thus, an “Early Warning Scoring” mechanism is desirable to alert medical team when a patient is approaching instability. It is widely recognized that critically ill may show subtle changes prior to the onset of CRI, but it is not well known how their risk evolves before the onset. Using large amounts of physiological data routinely gathered from continuous noninvasive monitoring of Step-Down Unit patients, we demonstrate a data-driven approach that: (1) Characterizes patient’s individual CRI risk process; (2) Identifies groups of patients that progress along similar risk evolution trajectories; (3) Utilizes grouping information to help forecast the emergence of CRI.
Diagnostic Characteristics of Patient Self-Assessment of Preoperative Cardiac Risk for Non-Cardiac Surgery - Foundations for Patient Driven Decision Support

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Abstract: Patient self-assessment can potentially mitigate time pressures during the preoperative window by adding important triage data to better identify at-risk patients. However, to effectively harness such patient-driven capacity, it is important to establish its validity and reliability. We tested the reliability and validity of a patient self-report survey instrument and its concordance with gold standard clinician assessment for pre-operative cardiovascular risk evaluation. A total 314 surveys and their corresponding clinician evaluations were used for calculating patient and provider reported RCRI scores, risk perceptions, reliability and validity analyses. We concluded that patient self-reported RCRI risk factors (Ischemic heart disease, congestive heart failure, cerebrovascular accident, diabetes requiring insulin, and renal insufficiency) have good and statistically significant overall accuracy, high specificity and negative predictive values compared to gold standard clinician evaluation.
**Automatic Classification of Structured Product Labels for Pregnancy Risk Drug Categories, a Machine Learning Approach**

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**Abstract:** With regular expressions and manual review, 18,342 FDA-approved drug product labels were processed to determine if the five standard pregnancy drug risk categories were mentioned in the label. After excluding 81 drugs with multiple-risk categories, 83% of the labels had a risk category within the text and 17% labels did not. We trained a Sequential Minimal Optimization algorithm on the labels containing pregnancy risk information segmented into standard document sections. For the evaluation of the classifier on the testing set, we used the Micromedex drug risk categories. The precautions section had the best performance for assigning drug risk categories, achieving Accuracy 0.79, Precision 0.66, Recall 0.64 and F1 measure 0.65. Missing pregnancy risk categories could be suggested using machine learning algorithms trained on the existing publicly available pregnancy risk information.
Abstract: Clinical studies model the \textit{average} treatment effect (ATE), but apply this population-level effect to future individuals. Due to recent developments of machine learning algorithms with useful statistical guarantees, we argue instead for modeling the \textit{individualized} treatment effect (ITE), which has better applicability to new patients. We compare ATE-estimation using randomized and observational analysis methods against ITE-estimation using machine learning, and describe how the ITE theoretically generalizes to new population distributions, whereas the ATE may not.

On a synthetic data set of statin use and myocardial infarction (MI), we show that a learned ITE model improves true ITE estimation and outperforms the ATE. We additionally argue that ITE models should be learned with a consistent, non-parametric algorithm from unweighted examples and show experiments in favor of our argument using our synthetic data model and a real data set of D-penicillamine use for primary biliary cirrhosis.
A REAL TIME ELECTRONIC REGISTRY AS A KEY INTERVENTION TO REDUCE TREATMENT DISPARITIES IN EARLY STAGE, NON-SMALL CELL LUNG CANCER: PRELIMINARY RESULTS

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Abstract: African-Americans (AA) with lung cancer experience a higher annual death rate compared to Whites (W) with AA men particularly affected (78.5 vs 65.7 deaths per 100,000 population). Despite this risk, AA patients with curable early stage lung cancer lag behind surgical rates for W patients. We describe preliminary results from an intervention triggered by a real time electronic registry that demonstrates better treatment results for all early stage patients and a reduction in treatment disparities.
Simulation-based Evaluation of the Generalizability Index for Study Traits
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Abstract: The Generalizability Index for Study Traits (GIST) has been proposed recently for assessing the population representativeness of a set of related clinical trials using eligibility features (e.g., age or BMI), one each time. However, GIST has not yet been evaluated. To bridge this knowledge gap, this paper reports a simulation-based validation study for GIST. Using the National Health and Nutrition Examination Survey (NHANES) data, we demonstrated the effectiveness of GIST at quantifying the population representativeness of a set of related trials that differ in disease domains, study phases, sponsor types, and study designs, respectively. We also showed that among seven example medical conditions, the GIST of age increases from Phase I trials to Phase III trials in the seven disease domains and is the lowest in asthma trials. We concluded that GIST correlates with simulation-based generalizability results and is a valid metric for quantifying population representativeness of related clinical trials.
Reproducing a Prospective Clinical Study as a Retrospective Study in MIMIC-II

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Abstract: In this paper we sought to reproduce, as a computational retrospective study in an EMR database (MIMIC-II), a recent large prospective clinical study: the 2013 publication, by the Japanese Association for Acute Medicine (JAAM), about disseminated intravascular coagulation, in journal Critical Care (PMID: 23787004). We designed in SQL and Java a set of electronic phenotypes that reproduced the study’s data sampling, and used R to perform the same statistical inference procedures. All source code we produced is available online at https://github.com/fabkury/paamia2015. Our program identified 2,257 eligible patients in MIMIC-II, and the results remarkably agreed with the prospective study. A minority of the needed data elements was not found in MIMIC-II, and statistically significant inferences were possible in the majority of the cases.
Using PopMedNet to Support a Multi-Site Research Network: Lessons from PCORnet
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Abstract: The PopMedNet™ informatics platform supports large-scale distributed health data research networks (DRN). The PCORnet implementation was the largest and most complex of any of the PopMedNet-based networks. PopMedNet was rapidly deployed and tested across over 70 PCORnet sites with a wide range of local expertise and computing environments.
Interim Results of a Randomized Controlled Trial on Inpatient Engagement

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Abstract: The impact of patient engagement has been likened to that of a “blockbuster drug.” While patient engagement has been a focal point in the outpatient setting, little work on this topic has been conducted within the hospital. This podium presentation will report interim results of a randomized controlled trial (RCT) that evaluates the impact of a tablet-based patient portal tool in the hospital setting.
Engaging patients in their inpatient care: Effect of patient access to their electronic health record during an acute care hospitalization

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Abstract: Better transparency of the medical record has the potential to improve patient centered care. We gave inpatients real-time access to components of their electronic health record and evaluated the opinions of the patients and their caregivers. Caregivers were worried that giving inpatients real-time access to their electronic health record would increase workload, but this was not realized. Patients were not worried or confused about seeing their results, and patients felt empowered with this transparency.
Medication Compliance in Pediatric Inpatients – What are we missing?
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Abstract: There is evidence of a medication compliance gap for adult patients in some medical centers. However, medication compliance for pediatric inpatients has not been studied. We analyzed medication orders for pediatric inpatients at a major academic institution where the corresponding administration data was missing or indicated non-administration. The overall compliance rate was greater than 97%. This study indicated that the condition of medication process is robust.
Discharge Instructions: What Do Patients Remember?

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Abstract: Patients are often overwhelmed with information on discharge from the hospital. It is crucial for patients to be able to remember the content of their discharge instructions to support them post-hospitalization. Discharge instructions were analyzed to determine the content of instructions that patients remember and do not remember. Content analysis was conducted on three levels. First was information by section of the discharge instructions. Second was by individual instruction. Third was by immediacy of the discharge instructions. It is evident that patients don’t remember a majority of their discharge instructions. Understanding how patients process discharge instruction information can inform informatics interventions that can improve patient recall and adherence to discharge instructions.
A Road Map for a National Health Information Technology Safety Center

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Abstract: Prior work by federal advisory committees and agencies identified the potential value of a national health IT safety center. We describe the process for developing a road map for such a center – including its vision, objectives, core functions and operating model. Whether or not a center is funded, this road map identifies potential high value functions and activities requiring multi-stakeholder engagement in order to maximize the potential for health IT to make care safer.
Rising Drug Allergy Alert Overrides in a Computerized Provider Order Entry System: a Decade of Experience

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Abstract: In this observational, cross-sectional study of 611,192 drug allergy interaction alerts in two large hospitals in Boston (MA, USA), we found a trend of increasing alert overrides over the past decade, which is concerning. There is an urgent need to focus efforts on providing a more accurate and relevant drug allergy interaction alerts for providers to decrease alert overrides and improve alert fatigue.
Analysis and Classification of Patient Safety Reports in Computerized Prescriber Order Entry (CPOE) Systems and Refinement of a New Taxonomy for Classification of CPOE-Related Medication Errors

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Abstract: Although CPOE systems have been widely adopted by many healthcare systems in recent years, more analyses of errors across multiple systems are needed. The aim of this study was to classify and analyze errors related to CPOE based on a review of error reports with ongoing development and refinement of a taxonomy classification system for CPOE-related errors.
Using Patient-Centered Technological Design to Improve Inpatient Fall Prevention

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Abstract: Inpatient falls are a serious patient safety issue. Previous research suggests engaging patients in fall risk assessment can reduce falls during hospitalization. We aim to develop an iPad application to facilitate communication of fall risks between patients and nurses at the bedside. Surveys conducted at two hospitals serving different patient populations helped us understand how demographic factors affect patients' openness to use technology. This will aid in patient-centered iterative technological design to improve fall prevention.
Leveraging Health Information Exchange to Create Neighborhood Health Records for Public Health Agencies

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Abstract: Assessment is a core function of public health. Traditional methods leverage surveys, vital records, and paper-based disease reporting. Increased adoption of electronic health records and health information exchange present an opportunity to enhance health assessment activities by enabling access to up-to-date data on disease burden and outcomes, with sufficient geographic density to allow small area analyses. Furthermore, when combined with community-level data relevant to social determinants, HIE has the capacity to create a neighborhood health profile that measures and tracks health risks and disparities at a community level. In this demonstration, we will present how we've leveraged routinely collected and geospatially-enhanced EHR data available from a regional health information exchange to create neighborhood health profiles for a county health department. The discussion will highlight neighborhood level indicators developed for the project, data visualizations, and issues of representativeness or bias in the data.
The SDIDS System for Integrating Global Health Surveillance Data: An Example Application to Malaria Surveillance in
Uganda
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Abstract: Data that could be used for global disease surveillance are divided across diseases, countries, and
organizations. The integration of this data requires substantial effort and malaria surveillance is an example of how
data fragmentation can hinder evidence-based decision-making. In order to achieve allocative efficiency in malaria
control programming, access to timely and accurate malaria surveillance data across a variety sources is necessary.
The Scalable Data Integration for Disease Surveillance (SDIDS) is a software application designed to enable the
integration and analysis of data across multiple scales to support global health decision-making. We present a
prototype of SDIDS to demonstrate how it can be used to integrate malaria surveillance data collected by multiple
organizations in Uganda. SDIDS is a web-based platform that automates the integration of heterogeneous data from
multiple sources, and supports visualization, analysis, and sharing of these data. Specifically, it contains semantic
integration of disparate data sources, automatic computations of health indicators, and an open interface for
requesting standardized data and analysis.
Abstract: Using longitudinal data in electronic health records (EHRs) for post-marketing adverse drug event (ADE) detection allows for monitoring patients throughout their medical history. Machine learning methods have been shown to be efficient and effective in screening health records and detecting ADEs. How best to exploit historical data, as encoded by clinical events in EHRs is, however, not very well understood. In this study, three strategies for handling temporality of clinical events are proposed and evaluated using an EHR database from Stockholm, Sweden. The random forest learning algorithm is applied to predict fourteen ADEs using clinical events collected from different lengths of patient history. The results show that, in general, including longer patient history leads to improved predictive performance, and that assigning weights to events according to time distance from the ADE yields the biggest improvement.
Casting a Wider Net: Data Driven Discovery of Proxies for Target Diagnoses

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Abstract: Background: The Hospital Readmissions Reduction Program (HRRP) introduced in October 2012 as part of the Affordable Care Act (ACA), ties hospital reimbursement rates to adjusted 30-day readmissions and mortality performance for a small set of target diagnoses. There is growing concern and emerging evidence that use of a small set of target diagnoses to establish reimbursement rates can lead to unstable results that are susceptible to manipulation (gaming) by hospitals.

Methods: We propose a novel approach to identifying co-occurring diagnoses and procedures that can themselves serve as a proxy indicator of the target diagnosis. The proposed approach constructs a Markov Blanket that allows a high level of performance, in terms of predictive accuracy and scalability, along with interpretability of obtained results. In order to scale to a large number of co-occurring diagnoses (features) and hospital discharge records (samples), our approach begins with Google's PageRank algorithm and exploits the stability of obtained results to rank the contribution of each diagnosis/procedure in terms of presence in a Markov Blanket for outcome prediction.

Results: Presence of target diagnoses acute myocardial infarction (AMI), congestive heart failure (CHF), pneumonia (PN), and Sepsis in hospital discharge records for Medicare and Medicaid patients in California and New York state hospitals (2009-2011), were predicted using models trained on a subset of California state hospitals (2003-2008). Using repeated holdout evaluation, we used ~30,000,000 hospital discharge records and analyzed the stability of the proposed approach. Model performance was measured using the Area Under the ROC Curve (AUC) metric, and importance and contribution of single features to the final result. The results varied from AUC=0.68 (with SE<1e-4) for PN on cross validation datasets to AUC=0.94, with (SE<1e-7) for Sepsis on California hospitals (2009 – 2011), while the stability of features was consistently better with more training data for each target diagnosis. Prediction accuracy for considered target diagnoses approaches or exceeds accuracy estimates for discharge record data.

Conclusions: This paper presents a novel approach to identifying a small subset of relevant diagnoses and procedures that approximate the Markov Blanket for target diagnoses. Accuracy and interpretability of results demonstrate the potential of our approach.
Machine Learning Approaches for Detecting Diabetic Retinopathy from Clinical and Public Health Records
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Abstract: Introduction: Annual eye examinations are recommended for diabetic patients in order to detect diabetic retinopathy and other eye conditions that arise from diabetes. Medically underserved urban communities in the US have annual screening rates that are much lower than the national average and could benefit from informatics approaches to identify unscreened patients most at risk of developing retinopathy.

Methods: Using clinical data from urban safety net clinics as well as public health data from the CDC’s National Health and Nutrition Examination Survey, we examined different machine learning approaches for predicting retinopathy from clinical or public health data. All datasets utilized exhibited a class imbalance.

Results: Classifiers learned on the clinical data were modestly predictive of retinopathy with the best model having an AUC of 0.72, sensitivity of 69.2% and specificity of 55.9%. Classifiers learned on public health data were not predictive of retinopathy.

Discussion: Successful approaches to detecting latent retinopathy using machine learning could help safety net and other clinics identify unscreened patients who are most at risk of developing retinopathy and the use of ensemble classifiers on clinical data shows promise for this purpose.
Abstract: A major challenge in advancing scientific discoveries using data-driven clinical research is the fragmentation of relevant data among multiple information systems. This fragmentation requires significant data-engineering work before correlations can be found among data attributes in multiple systems. In this paper, we focus on integrating information on breast cancer care, and present a novel computational approach to identify correlations between administered drugs captured in an electronic medical records and biological factors obtained from a tumor registry through rapid data aggregation and analysis. We use an associative memory (AM) model to encode all existing associations among the data attributes from both systems in a high-dimensional vector space. The AM model stores highly associated data items in neighboring memory locations to enable efficient querying operations. The results of applying AM to a set of integrated data on tumor markers and drug administrations discovered anomalies between clinical recommendations and derived associations.
Abstract: Social media, including blogs, wikis, discussion forums, and social networking tools, has become an increasingly significant space for health-related interactions among patients and others engaged in their care (e.g., family, friends, peers, and health professionals). This panel will address critical questions surrounding current and future opportunities for social media within consumer health informatics. Panelists will discuss their experiences analyzing health-related interactions on social media and the resulting implications for consumer health informatics design and research: Dr. Hartzler will discuss ethical considerations; Dr. Myneni will discuss use of existing theories and methods for data analysis; Dr. Valdez will discuss novel recruitment and data collection methods; Dr. Mamykina will discuss design guidance drawn from observational learning; Dr. Cobb will discuss methods of outcome measurement and inherent challenges. The session will then serve as a forum for panel and audience engagement with opportunities at the social media and consumer health informatics intersection, including: innovative research designs, strategies for safeguarding user privacy, novel methods, and the role for health professionals and other stakeholder groups in social media interactions. This panel is timely given that the rapid growth of social media for personal health management has enabled new and evolving forms of patient engagement and stakeholder collaboration.
Abstract: Previous work has demonstrated the benefits of using Natural Language Processing (NLP) techniques for extracting diagnoses from clinical texts and assigning patients to categories for cohort identification and GWAS studies using electronic health record (EHR) data. However, there is a growing awareness that understanding cancers and other complex or rare diseases will require richer phenotypic models that describe the development, progression, and location of specific signs and symptoms. Computing over these “deep phenotypes” will require NLP methods that can interpret individual documents, summarization approaches that can combine information from multiple notes and document types (e.g., radiology, pathology, and clinical notes) to build a longitudinal patient, and structured data models that will facilitate the integration between NLP and existing discrete data and comparison of these phenotypic models. This panel will discuss challenges inherent in developing both data models and the NLP tools. Strategies involving the use of NLP pipelines (cTAKES), clinical data models (FHIR), and phenotype data exchange formats will be discussed. Attendees at this panel will gain an understanding of the NLP challenges in extracting deep phenotype information, strategies for representing phenotype data, and emerging systems and tools that are applying these techniques to challenging translational problems.
The Clinical Quality Framework Initiative to Harmonize Decision Support and Quality Measurement Standards: Defined Standards, Pilot Results, and Moving Beyond Quality Improvement

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Abstract: The Clinical Quality Framework (CQF) is a public-private partnership sponsored by the Office of the National Coordinator for Health IT (ONC) and the Centers for Medicare & Medicaid Services (CMS) to create a harmonized set of standards for clinical decision support (CDS) and electronic clinical quality measurement (eCQM). At AMIA 2014, experts presented preliminary results from the first year of this multi-year initiative. In this panel, CQF leaders will describe the standards developed, including the HL7 Clinical Quality Language standard for logical expression, the HL7 FHIR Quality Profiles for data exchange, the HL7 Quality Improvement and Clinical Knowledge model for logical inferencing, and several implementation guides leveraging these foundational standards. The panelists will then present findings from pilot deployments of the standards in various clinical domains ranging from cardiology to radiology, preventive care, infectious diseases, and oncology. The panelists will also describe partnerships with relevant initiatives beyond the quality domain, including the ONC Data Access Framework initiative, the Health Services Platform Consortium (HSPC), and the Clinical Information Modeling Initiative (CIMI).
A Graph Based Methodology for Temporal Signature Identification from EHR

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Abstract: Data driven technology is believed to be a promising technique for transforming the current status of healthcare. Electronic Health Records (EHR) is one of the main carriers for conducting the data driven healthcare research, where the goal is to derive insights from healthcare data and utilize such insights to improve the quality of care delivery. Due to the progression nature of human disease, one important aspect for analyzing healthcare data is temporality, which suggests the temporal relationships among different healthcare events and how their values evolve over time. Sequential pattern mining is a popular tool to extract time-invariant patterns from discrete sequences and has been applied in analyzing EHR before. However, due to the complexity of EHR, those approaches usually suffers from the pattern explosion problem, which means that a huge number of patterns will be detected with improper setting of the support threshold. To address this challenge, in this paper, we develop a novel representation, namely the temporal graph, for event sequences like EHR, wherein the nodes are medical events and the edges indicate the temporal relationships among those events in patient EHRs. Based on the temporal graph representation, we further develop an approach for temporal signature identification to identify the most significant and interpretable graph bases as temporal signatures, and the expressing coefficients can be treated as the embeddings of the patients in such temporal signature space. Our temporal signature identification framework is also flexible to incorporate semi-supervised/supervised information. We validate our framework on two real-world tasks. One is predicting the onset risk of heart failure. The other is predicting the risk of heart failure related hospitalization for patients with COPD pre-condition. Our results show that the prediction performance in both tasks can be improved by the proposed approaches.
Mortality Prediction in ICUs Using A Novel Time-Slicing Cox Regression Method
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Abstract: Over the last few decades, machine learning and data mining have been increasingly used for clinical 
prediction in ICUs. However, there is still a huge gap in making full use of the time-series data generated from ICUs. 
Aiming at filling this gap, we propose a novel approach entitled Time Slicing Cox regression (TS-Cox), which extends 
the classical Cox regression into a classification method on multi-dimensional time-series. Unlike traditional classifiers 
such as logistic regression and support vector machines, our model not only incorporates the discriminative features 
derived from the time-series, but also naturally exploits the temporal orders of these features based on a Cox-like 
function. Empirical evaluation on MIMIC-II database demonstrates the efficacy of the TS-Cox model. Our TS-Cox 
model outperforms all other baseline models by a good margin in terms of AUC_PR, sensitivity and PPV, which 
indicates that TS-Cox may be a promising tool for mortality prediction in ICUs.
Abstract: Introduction:
Analysis of data from the Electronic Health Record (EHR) data presents unique challenges, in particular relating to inconsistent temporal resolution of input variables. A considerable amount of patient information is available in the EHR — including blood tests that are performed routinely during inpatient follow-up. These data are useful for the design of advanced machine learning-based methods for early detection.

Methods:
Using a matched cohort of patients undergoing gastrointestinal surgery, we built a prediction model for postoperative surgical site infections (SSIs) using Gaussian process (GP) regression, time warping and imputation methods to manage the sparsity of the data source, and support vector machines for classification.

Results:
We find that using GP and time warping improves prediction over simpler imputation models.

Discussion:
SSI is a relatively common complication, and tools to identify patients at risk at an early stage would be of great clinical importance.
Exploration of Temporal ICD Coding Bias Related to Acute Diabetic Conditions

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Abstract: Electronic Health Records (EHRs) hold great promise for secondary data reuse but have been reported to contain severe biases. The temporal characteristics of coding biases remain unclear. This study used a survival analysis approach to reveal temporal bias trends for coding acute diabetic conditions among 268 diabetes patients. For glucose-controlled ketoacidosis patients we found it took an average of 7.5 months for the incorrect code to be removed, while for glucose-controlled hypoglycemic patients it took an average of 9 months. We also examined blood glucose lab values and performed a case review to confirm the validity of our findings. We discuss the implications of our findings and propose future work.
A Data Quality Ontology for the Secondary Use of EHR Data

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Abstract: The secondary use of EHR data for research is expected to improve health outcomes for patients, but the benefits will only be realized if the data in the EHR is of sufficient quality to support these uses. A data quality (DQ) ontology was developed to rigorously define concepts and enable automated computation of data quality measures. The healthcare data quality literature was mined for the important terms used to describe data quality concepts and harmonized into an ontology. Four high-level data quality dimensions (“correctness”, “consistency”, “completeness” and “currency”) categorize 19 lower level measures. The ontology serves as an unambiguous vocabulary, which defines concepts more precisely than natural language; it provides a mechanism to automatically compute data quality measures; and is reusable across domains and use cases. A detailed example is presented to demonstrate its utility. The DQ ontology can make data validation more common and reproducible.
Abstract: Terminologies can suffer from poor concept coverage due to delays in addition of new concepts. This study tests a similarity-based approach to recommending concepts from a text corpus to a terminology. Our approach involves extraction of candidate concepts from a given text corpus, which are represented using a set of features. The model learns the important features to characterize a concept and recommends new concepts to a terminology. Further, we propose a cost-effective evaluation methodology to estimate the effectiveness of terminology enrichment methods. To test our methodology, we use the clinical trial eligibility criteria free-text as an example text corpus to recommend concepts for SNOMED CT. We computed precision at various rank intervals to measure the performance of the methods. Results indicate that our automated algorithm is an effective method for concept recommendation.

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Abstract: When coupled with a common information model, a common terminology for clinical decision support (CDS) and electronic clinical quality measurement (eCQM) could greatly facilitate the distributed development and sharing of CDS and eCQM knowledge resources. To enable such scalable knowledge authoring and sharing, we systematically developed an extensible and standards-based terminology for CDS and eCQM in the context of the HL7 Virtual Medical Record (vMR) information model. The development of this terminology entailed three steps: (1) systematic, physician-curated concept identification from sources such as the Health Information Technology Standards Panel (HITSP) and the SNOMED-CT CORE problem list; (2) concept de-duplication leveraging the Unified Medical Language System (UMLS) MetaMap and Metathesaurus; and (3) systematic concept naming using standard terminologies and heuristic algorithms. This process generated 3,046 concepts spanning 68 domains. Evaluation against representative CDS and eCQM resources revealed approximately 50-70% concept coverage, indicating the need for continued expansion of the terminology.
Examining the Distribution, Modularity, and Community Structure in Article Networks for Systematic Reviews

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Abstract: Systematic reviews (SRs) provide high quality evidence for clinical practice, but the article screening process is time and labor intensive. As SRs aim to identify relevant articles with a specific scope, we propose that a pre-defined article relationship, using similarity metrics, could accelerate this process. In this study, we established the article relationship using MEDLINE element similarities and visualized the article network with the Force Atlas layout. We also analyzed the article networks with graph diameter, closeness centrality, and module classes. The results revealed the distribution of articles and found that included articles tended to aggregate together in some module classes, providing further evidence of the existence of strong relationships among included articles. This approach can be utilized to facilitate the articles selection process through early identification of these dominant module classes. We are optimistic that the use of article network visualization can help better SR work prioritization.
Abstract: Objective: In a previous study, we investigated a sentence classification model that uses semantic features to extract clinically useful sentences from UpToDate, a synthesized clinical evidence resource. In the present study, we assess the generalizability of the sentence classifier to Medline abstracts.

Methods: We applied the classification model to an independent gold standard of high quality clinical studies from Medline. Then, the classifier trained on UpToDate sentences was optimized by re-retraining the classifier with Medline abstracts and adding a sentence location feature.

Results: The previous classifier yielded an F-measure of 58% on Medline versus 67% on UpToDate. Re-training the classifier on Medline improved F-measure to 68%; and to 76% (p<0.01) after adding the sentence location feature.

Conclusions: The classifier’s model and input features generalized to Medline abstracts, but the classifier needed to be retrained on Medline to achieve equivalent performance. Sentence location provided additional contribution to the overall classification performance.
Knowledge Extraction from MEDLINE by Combining Clustering with Natural Language Processing

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Abstract: The identification of relevant predicates between co-occurring concepts in scientific literature databases like MEDLINE is crucial for using these sources for knowledge extraction, in order to obtain meaningful biomedical predications as subject-predicate-object triples. We consider the manually assigned MeSH indexing terms (main headings and subheadings) in MEDLINE records as a rich resource for extracting a broad range of domain knowledge. In this paper, we explore the combination of a clustering method for co-occurring concepts based on their related MeSH subheadings in MEDLINE with the use of SemRep, a natural language processing engine, which extracts predications from free text documents. As a result, we generated sets of clusters of co-occurring concepts and identified the most significant predicates for each cluster. The association of such predicates with the co-occurrences of the resulting clusters produces the list of predications, which were checked for relevance.
Automatic Assignment of Non-Leaf MeSH Terms to Biomedical Articles

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Abstract: Assigning labels from a hierarchical vocabulary is a well known special case of multi-label classification, often modeled to maximize micro F1-score. However, building accurate binary classifiers for poorly performing labels in the hierarchy can improve both micro and macro F1-scores. In this paper, we propose and evaluate classification strategies involving descendant node instances to build better binary classifiers for non-leaf labels with the use-case of assigning Medical Subject Headings (MeSH) to biomedical articles. Librarians at the National Library of Medicine tag each biomedical article to be indexed by their PubMed information system with terms from the MeSH terminology, a biomedical conceptual hierarchy with over 27,000 terms. Human indexers look at each article's full text to assign a set of most suitable MeSH terms for indexing it. Several recent automated attempts focused on using the article title and abstract text to identify MeSH terms for the corresponding article. Despite these attempts, it is observed that assigning MeSH terms corresponding to certain non-leaf nodes of the MeSH hierarchy is particularly challenging. Non-leaf nodes are very important as they constitute one third of the total number of MeSH terms. Here, we demonstrate the effectiveness of exploiting training examples of descendant terms of non-leaf nodes in improving the performance of conventional classifiers for the corresponding non-leaf MeSH terms. Specifically, we focus on reducing the false positives (FPs) caused due to descendant instances in traditional classifiers. Our methods are able to achieve a relative improvement of 7.5% in macro-F1 score while also increasing the micro-F1 score by 1.6% for a set of 500 non-leaf terms in the MeSH hierarchy. These results strongly indicate the critical role of incorporating hierarchical information in MeSH term prediction. To our knowledge, our effort is the first to demonstrate the role of hierarchical information in improving binary classifiers for non-leaf MeSH terms.
Abstract: Understanding the conceptual organization of abstract medical concepts used by medical researchers may serve as a guideline for both medical researchers and informaticians in their respective duties. We conducted a validation, enrichment, and generalization of a conceptual model utilizing three datasets: Clinical Trial Inclusion/Exclusion criteria, EHR data request logs, and EHR SQL queries. The proposed model represents a conceptual organization commensurate with how medical researchers organize medical concepts for researcher.
Intra-cluster correlation estimates for design of cluster-randomized trials and multi-clinic studies that utilize electronic health record data

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Abstract: Electronic health record (EHR) data can be used for cluster-randomized trials and multi-clinic observational studies. To account for the relatedness of subjects within clusters, methods are needed to calculate the intra-cluster correlation (ICC). With EHR data from 31 Oregon primary care clinics, we used generalized linear mixed-effects models to demonstrate a method for how to use EHR data to construct ICC estimates and effective sample sizes for healthcare outcomes commonly used in primary care research.
PCORnet Implementation of PopMedNet Data Characterization Tool

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Abstract: The National Patient-Centered Clinical Research Network (PCORnet) distributed research network (DRN) leverages the PopMedNet™ (PMN) platform to facilitate network operations. Data characterization metrics that are rapidly accessible will be valuable to the developing PCORnet DRN. The ability of PCORnet to leverage the PMN Data Characterization tool, existing PMN functionality, demonstrates the extensibility and cross-network functionality of the PMN platform. Standardization of PCORnet data characterization output allows for this cross-network sharing of PMN functionality.
Identifying and Understanding Data Quality Issues in a Pediatric Distributed Research Network

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Abstract: A prerequisite for building a clinical data research network is that the quality of the aggregated data be well-understood. As part of a newly-formed EHR-based pediatric research network, a set of systematic data quality checks were implemented and executed on the data. This study contributes by providing a detailed account of the types and sources of encountered issues, and a longitudinal distribution of issues across the partner sites in the network.
Identifying Novel Adverse Drug Events from Health Social Media Using Distant Supervision

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Abstract: Adverse drug events (ADEs) are a significant healthcare problem worldwide. Prior studies have shown that health social media can be used to generate medical hypotheses and identify adverse drug events. In this study, we develop an information extraction framework to identify novel ADEs using distant supervision which leverages existing knowledge of adverse drug events and requires no labeled text. Our proposed framework achieves promising performance in identifying adverse drug events without expensive human annotation.
Identifying Abnormal Anatomy on Temporal Bone Computed Tomography Reports Using Readily Available Natural Language Processing Software

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Abstract: Significant amounts of medical information remains locked in free text and is only accessible using natural language processing (NLP). We used python-based NLP tools to classify radiology reports as describing either normal or abnormal ear anatomy. A neural network and Naive Bayes model performed well (F1 score 0.96 and 0.95 respectively). We conclude that researchers may be able to use basic NLP approaches readily available in open source toolkits to extract information in selected domains.
Identification of Venous Thromboembolism from Electronic Medical Records with Information Extraction

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Abstract: Venous thromboembolism (VTE), including deep vein thrombosis (DVT) and pulmonary embolism (PE), is associated with significant morbidity and mortality. We present IDEAL-X, a novel open source information extraction system, and evaluate its accuracy for identifying VTE diagnosis directly from radiology reports in electronic medical records. The result shows IDEAL-X is capable of correctly identifying VTE from the free text of radiology reports with very high sensitivity and specificity.
Improving Radiology Procedure Identification for Inferior Vena Cava (IVC) Filters using EHR Text

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Abstract: Insertion of inferior vena cava filters is an anticoagulation alternative in patients with venous thromboembolism. Insertions have increased without corresponding increase in retrieval despite FDA communications to remove filters as soon as possible to decrease complications. This retrospective database study uses VA integrated national coded datasets with 8,314 IVC filter placements and only 980 retrievals. Placements and retrievals may be occurring without CPT and/or ICD9 coding. We propose an alerting system to identify retained filters.
Leveraging Business Rules Techniques for Data Quality Assurance in Public Health Systems

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Abstract: This presentation discusses a case study of implementing business rules for validating quality of data coming to immunization information systems that operate within U.S. state immunization programs. Independent evaluation findings indicate that application of developed best practice recommendations in state and local health departments resulted in improved data quality, reduced staff time, and increased efficiencies across immunization programs.
Abstract: Sexually transmitted disease (STD) programs at state and local health departments have complex information needs for surveillance and program support. Several recent events have led health departments to plan to transition to new information systems. Selecting and implementing new systems is a major undertaking that can benefit from the experiences of others. We interviewed STD Program administrators of seven jurisdictions that had already made the transition to identify lessons learned.
Abstract: Modern surveillance practice is evolving. Traditional manual processes for gathering data are being replaced with automated, electronic capture from a number of sources. As part of a research project to electronically enhance provider-based reporting of notifiable disease, we describe the existing completeness and timeliness of information reported to local health departments using a combination of electronic, fax and paper-based methods. Electronic lab-based methods are more complete, raising questions about the role of paper-based provider reports.
Developing a Collaborative Evaluation Framework for Utah’s APCD

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4. Utah Department of Health, Salt Lake City, UT, United States.

Abstract: We developed an evaluation framework based on a collaborative evaluation model for a large-scale, federally-funded information system improvement project with the Utah Department of Health. In this presentation, we describe the development of the framework and its elements, all of which form an essential foundation to the success of the deliverables with regard to the objectives of Utah’s All Payer Claims Database (APCD).
Navigating between Drug Classes and RxNorm Drugs with RxClass

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Abstract: RxClass is a web-based, interactive browser and companion API to explore the relationships between RxNorm drugs and drug classes from several sources including ATC, MeSH and NDF-RT. Like RxNav, RxClass is publicly available at: http://rxnav.nlm.nih.gov /
PhEMA: Phenotype Modeling, Sharing and Execution Architecture
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Abstract: The phenotype modeling, sharing and execution architecture (PhEMA) platform provides a comprehensive solution for standards-based phenotype algorithm authoring, integration with the Phenotype KnowledgeBase website (PheKB, http://phekb.org) for community-wide sharing, and execution on standardized and normalized EHR data using advanced workflow management via the open-source Konstanz Information Miner (KNIME, http://knime.org). In this system demonstration, we will highlight the key features of the platform and provide hands-on experience in authoring, sharing and executing phenotype algorithms using de-identified, standardized electronic health record (EHR) data. The platform is available at: http://projectphema.org.
Informatics Approaches to Supporting Emerging Accountable Health Care Delivery Models

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5. Harvard University, Boston, MA, United States.
6. The MetroHealth System, Cleveland, OH, United States.
7. Case Western Reserve University, Cleveland, OH, United States.
8. Oregon Health and Science University, Portland, OR, United States.

Abstract: Medicare, Medicaid and commercial payers are creating incentives for efficient care delivery models and the health care market place is responding rapidly. The new incentives require health care delivery organizations – often for the first time – to include efficiency of care delivery as a key strategic goal. These dynamics are changing the way provider organizations are delivering care. New information infrastructures -- including analytics, work flow support for new care roles (e.g., care coordinators), information systems support for team-based work flows, information-enabled interactions with new business partners, and improved interactions directly with patients -- are emerging to manage patients in the new environment. The learning objective for this panel is for attendees to develop a better understanding of how leading organizations are addressing changes in health care payment models and the informatics-enabled approaches they are taking to support workflow changes, team-based care and the need for data-driven organizational and health care management.
Recent Advances in Computational Drug Repositioning

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3. Stanford University, Stanford, CA, United States.
5. The University of Texas Health Science Center at Houston, Houston, TX, United States.

Abstract: Computational drug repositioning is a promising and efficient tool for discovering new uses from existing drugs and holds the great potential for precision medicine in the age of big data. The explosive growth of large-scale genomic and phenotypic data, as well data of small molecular compounds with granted regulatory approval, is enabling new developments for computational repositioning. To achieve the shortest path towards new drug indications, advanced data processing and analysis strategies are critical for making sense of these heterogeneous molecular measurements. Despite the progress simulated by big data analytics, there is clearly room for technical improvement with regard to computational drug repositioning methods. Furthermore, to materialize the true potential and impact of these methods, much work is needed to show that they can be successfully adopted into practical applications. In this panel, participants will summarize the recent advances in computational drug repositioning and identify challenges and opportunities. Panel participants will synthesize their perspectives on these key issues and likely future developments in this area, explore a diverse set of topics, and engage in thoughtful discussion with the audience.
Abstract: Informatics professionals make significant contributions to detecting, monitoring and improving population health. Although informatics professionals exist in local, state and federal public health agencies, we know little about them or their needs. Yet there exist several disparate education and training programs in public or population health informatics (PHI) that seek to prepare the public health workforce for designing, implementing, and using PHI systems. This panel presents diverse views on the PHI workforce and its needs from local, state, federal and international levels. Current data on the characteristics and information needs of the PHI workforce will be presented. Then panelists will discuss the various initiatives and programs that seek to educate or train the PHI workforce. The panel will raise questions and discuss opportunities about how to better organize information about training opportunities and the role that AMIA should play in supporting the existing and future PHI workforce.
Health Literacy, Education Levels, and Patient Portal Usage During Hospitalizations
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Abstract: Patient portal adoption has rapidly increased, and portal usage has been associated with patients’ sociodemographics, health literacy, and education. Research on patient portals has primarily focused on the outpatient setting. We explored whether health literacy and education were associated with portal usage in an inpatient population. Among 60,159 admissions in 2012-2013, 23.3% of patients reported limited health literacy; 50.4% reported some post-secondary education; 34.4% were registered for the portal; and 23.4% of registered patients used the portal during hospitalization. Probability of registration and inpatient portal use increased with educational attainment. Health literacy was associated with registration but not inpatient use. Among admissions with inpatient use, educational attainment was associated with viewing health record data, and health literacy was associated use of appointment and health education tools. The inpatient setting may provide an opportunity to overcome barriers to patient portal adoption and reduce disparities in use of health information technologies.
Strategies for Managing Mobile Devices for Use by Hospitalized Inpatients

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Abstract: Despite the potential advantages, implementation of mobile devices and ongoing management pose challenges in the hospital environment. Our team implemented the PROSPECT (Promoting Respect and Ongoing Safety through Patient-centeredness, Engagement, Communication and Technology) project at Brigham and Women's Hospital. The goal of PROSPECT is to transform the hospital environment by providing a suite of e-tools to facilitate teamwork among nurses, physicians, and patients and to engage patients and care partners in their plan of care. In this paper, we describe the device-related decisions and challenges faced including device and accessory selection, integration, information and device security, infection control, user access, and ongoing operation and maintenance. We relate the strategies that we used for managing mobile devices and lessons learned based on our experiences.
Abstract: Despite growing use of patient-facing technologies such as patient portals to address information needs for outpatients, we understand little about how patients manage information and use information technologies in an inpatient context. Based on hospital observations and responses to an online questionnaire from previously hospitalized patients and caregivers, we describe information workspace that patients have available to them in the hospital and the information items that patients and caregivers rate as important and difficult to access or manage while hospitalized. We found that patients and caregivers desired information—such as the plan of care and the schedule of activities—that is difficult to access as needed in a hospital setting. Within this study, we describe the various tools and approaches that patients and caregivers use to help monitor their care as well as illuminate gaps in information needs not typically captured by traditional patient portals.
Content and Usability Evaluation of Patient Oriented Drug-Drug Interaction Websites

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Abstract: Drug-Drug Interactions (DDI) are an important source of preventable adverse drug events and a common reason for hospitalization among patients on multiple drug therapy regimens. DDI information systems are important patient safety tools with the capacity to identify and warn health professionals of clinically significant DDI risk. While substantial research has been completed on DDI information systems in professional settings such as community, hospital, and independent pharmacies; there has been limited research on DDI systems offered through online websites directly for use by ambulatory patients. The focus of this project is to test patient oriented website capacity to correctly identify drug interactions among well established and clinically significant medication combinations and convey clinical risk data to patients. The patient education capability was assessed by evaluating website Information Capacity, Patient Usability and Readability. The study results indicate that the majority of websites identified which met the inclusion and exclusion criteria operated similarly, but vary in risk severity assessment and are not optimally patient oriented to effectively deliver risk information. The limited quality of information and complex medical term content complicate DDI risk data conveyance and the sites may not provide optimal information delivery to allow medication consumers to understand and manage their medication regimens.
Biological Model Development as an Opportunity to Provide Content Auditing for the Foundational Model of Anatomy Ontology

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Abstract: Constructing a biological model using an established ontology provides a unique opportunity to perform content auditing on the ontology. We built a Markov chain model to study tumor metastasis in the regional lymphatics of patients with head and neck squamous cell carcinoma (HNSCC). The model attempts to determine regions with high likelihood for metastasis, which guides surgeons and radiation oncologists in selecting the boundaries of treatment. To achieve consistent anatomical relationships, the nodes in our model are populated using lymphatic objects extracted from the Foundational Model of Anatomy (FMA) ontology.

During this process, we discovered several types of inconsistencies in the lymphatic representations within the FMA. We were able to use this model building opportunity to audit the entities and connections in this region of interest (ROI). We found five classes of errors that are computationally detectable and resolvable, one class of errors that is computationally detectable but unresolvable, requiring the assistance of a content expert, and also errors of content, which cannot be detected through computational means. Mathematical descriptions of detectable errors along with expert review were used to discover inconsistencies and suggest concepts for addition and removal. Out of 106 organ and organ parts in the ROI, 8 unique entities were affected, leading to the suggestion of 30 concepts for addition and 4 for removal. Out of 27 lymphatic chain instances, 23 were found to have errors, with a total of 32 concepts suggested for addition and 15 concepts for removal. These content corrections are necessary for the accurate functioning of the FMA and provide benefits for future research and educational uses.
Abstract: Ontology search interfaces can benefit from the latest information retrieval advances. This paper introduces a Conjunctive Ontology Browser and Explorer (COBE) for searching and exploring SNOMED CT concepts and visualizing SNOMED CT fragments. COBE combines navigational exploration (NE) with direct lookup (DL) as two complementary modes for finding specific SNOMED CT concepts. The NE mode allows a user to interactively and incrementally narrow down (hence conjunctive) the search space by adding word-stems used in concept labels, one at a time. Such word-stems serve as attribute constraints, or "attributes" in Formal Concept Analysis, which allows the user to navigate to specific SNOMED CT concept clusters. The DL mode represents the common search mechanism by using a collection of key words, as well as concept identifiers. With respect to the DL mode, evaluation against manually created reference standard showed that COBE attains an example-based precision of 0.958, recall of 0.917, and F1 measure of 0.875. With respect to the NE mode, COBE leverages 28,371 concepts in non-lattice pairs to construct the stem cloud. With merely 9.37% of the total SNOMED CT stem cloud, our exploration navigation mode covers 98.97% of the entire concept collection.
A Method to Compare ICF and SNOMED CT for Coverage of U.S. Social Security Administration’s Disability Listing Criteria

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Abstract: We developed a method to evaluate the extent to which the International Classification of Function, Disability, and Health (ICF) and SNOMED CT cover concepts used in the disability listing criteria of the U.S. Social Security Administration’s “Blue Book.” First we decomposed the criteria into their constituent concepts and relationships. We defined different types of mappings and manually mapped the recognized concepts and relationships to either ICF or SNOMED CT. We defined various metrics for measuring the coverage of each terminology, taking into account the effects of inexact matches and frequency of occurrence. We validated our method by mapping the terms in the disability criteria of Adult Listings, Chapter 12 (Mental Disorders). SNOMED CT dominates ICF in almost all the metrics that we have computed. The method is applicable for determining any terminology’s coverage of eligibility criteria.
Abstract: Biomedical ontologies play a vital role in healthcare information management, data integration, and decision support. Ontology quality assurance (OQA) is an indispensable part of the ontology engineering cycle. Most existing OQA methods are based on the knowledge provided within the targeted ontology. This paper proposes a novel cross-ontology analysis method, Cross-Ontology Hierarchical Relation Examination (COHeRE), to detect inconsistencies and possible errors in hierarchical relations across multiple ontologies. COHeRE leverages the Unified Medical Language System (UMLS) knowledge source and the MapReduce cloud computing technique for systematic, large-scale ontology quality assurance work. COHeRE consists of three main steps with the UMLS concepts and relations as the input. First, the relations claimed in source vocabularies are filtered and aggregated for each pair of concepts. Second, inconsistent relations are detected if a concept pair is related by different types of relations in different source vocabularies. Finally, the uncovered inconsistent relations are voted according to their number of occurrences across different source vocabularies. The voting result together with the inconsistent relations serve as the output of COHeRE for possible ontological change. The highest votes provide initial suggestion on how such inconsistencies might be fixed. In UMLS, 138,987 concept pairs were found to have inconsistent relationships across multiple source vocabularies. 40 inconsistent concept pairs involving hierarchical relationships were randomly selected and manually reviewed by a human expert. 95.8% of the inconsistent relations involved in these concept pairs indeed exist in their source vocabularies rather than being introduced by mistake in the UMLS integration process. 73.7% of the concept pairs with suggested relationship were agreed by the human expert. The effectiveness of COHeRE indicates that UMLS provides a promising environment to enhance qualities of biomedical ontologies by performing cross-ontology examination.
Abstract: Characteristics of the subjects of biomedical research are important in determining if a publication describing the research is relevant to a search. To facilitate finding relevant publications, MEDLINE citations provide Medical Subject Headings that describe the subjects’ characteristics, such as their species, gender, and age. We seek to improve the recommendation of these headings by the Medical Text Indexer (MTI) that supports manual indexing of MEDLINE. To that end, we explore the potential of the full text of the publications. Using simple recall-oriented rule-based methods we determined that adding sentences extracted from the methods sections and captions to the abstracts prior to MTI processing significantly improved recall and $F_1$ score with only a slight drop in precision. Improvements were also achieved in directly assigning several headings extracted from the full text. These results indicate the need for further development of automated methods capable of leveraging the full text for indexing.
Desiderata for Major Eligibility Criteria in Breast Cancer Clinical Trials
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Abstract: Use of major eligibility criteria is a popular but unstudied folk practice for improving patient screening efficiency for clinical studies. This mixed-methods research study derived the desiderata for major eligibility criteria in breast cancer clinical trials. We randomly selected thirty interventional breast cancer clinical trials conducted at The New York-Presbyterian Hospital on the Columbia University Medical Center campus to create training (N=20) and testing (N=10) datasets. We utilized the Think-aloud protocol to gauge how clinical researchers identify and use major eligibility criteria to prescreen patients for clinical trials during an audio-recorded interview. A focus group session was held to understand the current prescreening process and investigate how it could be optimized to maximize recruitment rates. Using the grounded theory method, we annotated transcriptions to discover user rationale and desiderata behind major eligibility criteria in breast cancer clinical trials, which were evaluated in a follow-up survey.
Abstract: The objectives of the present study are to prototype and evaluate a quality assurance (QA) tool for the study of cancer common data elements (CDEs) using a post-coordination approach. The study starts by integrating the NCI caDSR CDEs and The Cancer Genome Atlas (TCGA) data dictionaries in a single Resource Description Framework (RDF) data store. We designed a compositional expression pattern based on the Data Element Concept model structure informed by ISO/IEC 11179, and developed a transformation tool that converts the pattern-based compositional expressions into the Web Ontology Language (OWL) syntax. Invoking reasoning and explanation services, we tested the system utilizing the CDEs extracted from two TCGA clinical cancer study domains. The system could automatically identify duplicate CDEs, and detect CDE modeling errors. In conclusion, compositional expressions not only enable reuse of existing ontology codes to define new domain concepts, but also provide an automated mechanism for QA of terminological annotations for CDEs.
Assessing the Utility of Automatic Cancer Registry Notifications Data Extraction from Free-Text Pathology Reports
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Abstract: Cancer Registries record cancer data by reading and interpreting pathology cancer specimen reports. For some Registries this can be a manual process, which is labour and time intensive and subject to errors. A system for automatic extraction of cancer data from HL7 electronic free-text pathology reports has been proposed to improve the workflow efficiency of the Cancer Registry. The system is currently processing an incoming trickle feed of HL7 electronic pathology reports from across the state of Queensland in Australia to produce an electronic cancer notification. Natural language processing and symbolic reasoning using SNOMED CT were adopted in the system; Queensland Cancer Registry business rules were also incorporated. A set of 220 unseen pathology reports selected from patients with a range of cancers was used to evaluate the performance of the system. The system achieved overall recall of 0.78, precision of 0.83 and F-measure of 0.80 over seven categories, namely, basis of diagnosis (3 classes), primary site (66 classes), laterality (5 classes), histological type (94 classes), histological grade (7 classes), metastasis site (19 classes) and metastatic status (2 classes). These results are encouraging given the large cross-section of cancers. The system allows for the provision of clinical coding support as well as indicative statistics on the current state of cancer, which is not otherwise available.
Vessel Delineation in Retinal Images using Leung-Malik filters and Two Levels Hierarchical Learning

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Abstract: Blood vessel segmentation is important for the analysis of ocular fundus images for diseases affecting vessel caliber, occlusion, leakage, inflammation, and proliferation. We introduce a novel supervised method to evaluate performance of Leung-Malik filters in delineating vessels. First, feature vectors are extracted for every pixel with respect to the response of Leung-Malik filters on green channel retinal images in different orientations and scales. A two level hierarchical learning framework is proposed to segment vessels in retinal images with confounding disease abnormalities. In the first level, three expert classifiers are trained to delineate 1) vessels, 2) background, and 3) retinal pathologies including abnormal pathologies such as lesions and anatomical structures such as optic disc. In the second level, a new classifier is trained to detect vessels and non-vessel pixels based on results of the expert classifiers. Qualitative evaluation shows the effectiveness of the proposed expert classifiers in modeling retinal pathologies. Quantitative results on two standard datasets STARE (AUC = 0.971, Acc=0.927) and DRIVE (AUC = 0.955, Acc =0.903) are comparable with other state-of-the-art vessel segmentation methods.
Abstract: Structured reporting in medicine has been argued to support and enhance machine-assisted processing and communication of pertinent information. Retrospective studies showed that structured echocardiography reports, constructed through point-and-click selection of finding codes (FCs), contain pairwise contradictory FCs (e.g., “No tricuspid regurgitation” and “Severe regurgitation”) downgrading report quality and reliability thereof. In a prospective study, contradictions were detected automatically using an extensive rule set that encodes mutual exclusion patterns between FCs. Rules creation is a labor and knowledge-intensive task that could benefit from automation. We propose a machine-learning approach to discover mutual exclusion rules in a corpus of 101,211 structured echocardiography reports through semantic and statistical analysis. Ground truth is derived from the extensive prospectively evaluated rule set. On the unseen test set, F-measure (0.439) and above-chance level AUC (0.885) show that our approach can potentially support the manual rules creation process. Our methods discovered previously unknown rules per expert review.
Automated Grading of Gliomas using Deep Learning in Digital Pathology Images: A modular approach with ensemble of convolutional neural networks

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Abstract: Brain glioma is the most common primary malignant brain tumors in adults with different pathologic subtypes: Lower Grade Glioma (LGG) Grade II, Lower Grade Glioma (LGG) Grade III, and Glioblastoma Multiforme (GBM) Grade IV. The survival and treatment options are highly dependent of this glioma grade. We propose a deep learning-based, modular classification pipeline for automated grading of gliomas using digital pathology images. Whole tissue digitized images of pathology slides obtained from The Cancer Genome Atlas (TCGA) were used to train our deep learning modules. Our modular pipeline provides diagnostic quality statistics, such as precision, sensitivity and specificity, of the individual deep learning modules, and (1) facilitates training given the limited data in this domain, (2) enables exploration of different deep learning structures for each module, (3) leads to developing less complex modules that are simpler to analyze, and (4) provides flexibility, permitting use of single modules within the framework or use of other modeling or machine learning applications, such as probabilistic graphical models or support vector machines. Our modular approach helps us meet the requirements of minimum accuracy levels that are demanded by the context of different decision points within a multi-class classification scheme. Convolutional Neural Networks are trained for each module for each sub-task with more than 90% classification accuracies on validation data set, and achieved classification accuracy of 96% for the task of GBM vs LGG classification, 71% for further identifying the grade of LGG into Grade II or Grade III on independent data set coming from new patients from the multi-institutional repository.
Three-dimensional Content-Based Cardiac Image Retrieval using global and local descriptors

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Abstract: The increase in volume of medical images generated and stored has created difficulties in accurate image retrieval. An alternative is generate three-dimensional (3D) models from such medical images and use them in the search. Some of the main cardiac illnesses, such as Congestive Heart Failure (CHF), have deformation in the heart's shape as one of the main symptoms, which can be faster identified in a 3D object than in 2D slices. This article presents techniques developed to retrieve 3D cardiac models using global and local descriptors within a content-based image retrieval system. These techniques were applied in pre-classified 3D models with and without the CHF disease and they were evaluated by using Precision vs. Recall metric. We observed that local descriptors achieved better results than global descriptor, reaching 85% of accuracy. The results confirmed the potential of using 3D models retrieval in the medical context to aid in the diagnosis.
Abstract: Precision medicine has the potential to leverage health IT in ways that could dramatically improve public and population health, bringing practical genetic information exchange into sharp focus. The purpose of this study was to 1) build an informatics pipeline capable of integrating diverse datasets describing genetic test information, and 2) gain insight into the current state of precision medicine as it relates to data standardization and exchange.
Abstract: In 2015, we in the medical informatics community will continue to spend a significant amount of time discussing patient engagement with online portals as a part of Meaningful Use certification. For safety net systems serving vulnerable populations, there are a number of unique challenges in this process. We present qualitative research exploring early experiences from both providers/staff and patients/caregivers, which call attention to critical issues of language, literacy, and caregiver/proxy access.
Physician Participation in Meaningful Use and Rehospitalization of Medicare Fee-for-Service Enrollees
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Abstract: Nearly 20% of hospitalized Medicare fee-for-service enrollees are readmitted within 30 days. Outpatient physicians’ use of interoperable electronic health records may reduce readmission rates. We compared the odds of rehospitalization before and after Meaningful Use for patients of physicians who participated in the program with patients of matched control physicians. Relative to the control group, physician participation in Meaningful Use was associated with 7.5% lower odds of rehospitalization (Odds Ratio: 0.925, 95% confidence interval: 0.860-0.996).
Are Meaningful Use Requirements Really Meaningful for Medication Use? Experiences from the Field and Future Opportunities

Abstract: The Agency for Healthcare Research and Quality (AHRQ)-sponsored Centers for Education and Research in Therapeutics (CERTs) critically examined the impact of MU policy relating to the use of medications. Stakeholders initially met in June 2014 to discuss the specific issues and developed recommendations to help inform future HIT policy. The consensus was that the MU objectives should acknowledge the diversity of healthcare systems and consider in particular EHR functionalities critical for the accurate prescribing of medications in children.
Six Important Characteristics for Patient Hand-Off Application in Inpatient Hospital Setting

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Abstract: We present six important and required requirements for patient hand-off application in an inpatient setting using bring-your-own-device (BYOD). The requirements are learning lessons from developing and piloting a hand-off application at Boston Children’s Hospital.
Abstract: There has yet to emerge a standard for physician EHR-based rounding and handoff documents. We reviewed the published literature to determine the content in such documents. We then compared this to current content in these documents at our institution, and surveyed resident physicians for content needs to enact patient care. Our results differed somewhat from published studies. Further work in standards development is required for optimal communication and use of these documents in patient care.
Improving Care Team Communication: Early Experience at Implementing a Patient-centered Microblog

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Abstract: We designed and implemented a patient-centered microblog to facilitate seamless asynchronous messaging in the acute care setting. We monitored messaging activity and conducted focus groups/interviews with users and clinical leadership. Total messaging activity steadily increased but varied by unit. We derived major themes regarding system functionality, actual clinical use, notification and alert fatigue, barriers to use, and desired enhancements. Overall, the perception of the system's value with regard to care team communication was very favorable.
Computer-Supported Feedback Message Tailoring for Healthcare Providers in Malawi: Proof-of-Concept

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Abstract: Although performance feedback has the potential to help clinicians improve the quality and safety of care, healthcare organizations generally lack knowledge about how this guidance is best provided. In low-resource settings, tools for theory-informed feedback tailoring may enhance limited clinical supervision resources. Our objectives were to establish proof-of-concept for computer-supported feedback message tailoring in Malawi, Africa. We conducted this research in five stages: clinical performance measurement, modeling the influence of feedback on antiretroviral therapy (ART) performance, creating a rule-based message tailoring process, generating tailored messages for recipients, and finally analysis of performance and message tailoring data. We retrospectively generated tailored messages for 7,448 monthly performance reports from 11 ART clinics. We found that tailored feedback could be routinely generated for four guideline-based performance indicators, with 35% of reports having messages prioritized to optimize the effect of feedback. This research establishes proof-of-concept for a novel approach to improving the use of clinical performance feedback in low-resource settings and suggests possible directions for prospective evaluations comparing alternative designs of feedback messages.
Abstract: Active learning (AL) has been demonstrated to help achieve high-quality supervised classification models with reduced annotation cost in simulated studies, where annotation cost for each sample was identical. In this study, we evaluated the real-time performance of AL in a clinical named entity recognition (NER) task in a user study based on a newly developed AL enabled annotation system for NER, called Active LEARNER.
Ill-formed Sentence Identification And Entity Extraction In Clinical Notes
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Abstract: In this study we develop a text processing and reporting tool that processes clinical notes and identifies ill-formed constructions and extracts medical named entities. The medical named entity extraction score improves when the ill-formed constructions are identified and eliminated from the test dataset. We take cues from social media analytic studies and employ supervised machine learning algorithms and several rule based engines.
Robust Sentence Segmentation for Clinical Text

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Abstract: Sentence segmentation is often the first step in a natural language processing pipeline, and may be considered "solved." However, clinical text varies greatly and performance degrades when off-the-shelf systems are applied to new domains. We describe new methods for sentence segmentation that can be applied to corpora with varying formatting. We find that character-based features, word shape features, and newline position features can improve performance over existing systems.
Clinical Language Annotation, Modeling, and Processing Toolkit (CLAMP) – a user-centric NLP system

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Abstract: Clinical Language Annotation, Modelling and Processing Toolkit (CLAMP) is an open source language processing toolkit for medical narratives. It features a user friendly Eclipse based graphical user interface (GUI) which was built on top of a UIMA compatible high performance natural language processing framework. This framework provides machine learning and rule-based components to be used to construct pipelines for medical texts both with the GUI and, also as a NLP framework to build advanced applications.
Abstract: The Scalable Collaborative Infrastructure for a Learning Health System (SCILHS, pronounced “skills”) is a growing network of health centers across the United States. SCILHS is a Clinical Data Research Network (CDRN) in the Patient-Centered Outcomes Research Institute’s PCORnet, a national effort to instantiate a ‘network of networks’ that supports large-scale comparative effectiveness research. SCILHS uses Informatics for Integrating Biology and the Bedside (i2b2) as its technical backbone and has adopted the PCORnet Common Data Model (CDM) as its foundation for interoperable data exchange. We developed an i2b2 ontology that represents the CDM, and we developed extensive documentation and spreadsheets to assist the mapping process. We made this ontology publically available, and portions of it are used by several other CDRNs. SCILHS uses the Shared Health Research Information Network (SHRINE) platform for distributed querying. SCILHS sites have developed mutual trust relationships, which enable the SCILHS SHRINE hub to perform live queries across all sites and return aggregate counts in real-time. This prep-to-research functionality enables SCILHS to rapidly identify patient cohorts with specific conditions who meet eligibility criteria for observational research or clinical trials. SCILHS is a successful demonstration of an approach for live, distributed queries across diverse environments with disparate data.
Abstract: As biomedical informatics efforts are undertaken to build the learning health system, there is a need to include the information provided by medical imaging in these efforts, since imaging provides detailed information about the disease phenotype for diagnosis and its response to treatment. However, at present, radiology images are not leveraged in many healthcare applications (other than viewing the raw images) because the disease phenotype information they contain is unstructured and not directly machine-accessible. We developed the electronic Physician Annotation Device (ePAD), a freely-available Web-based platform for capturing and storing the phenotypic information contained in radiological images (quantitative and semantic image features) in an explicit, standardized, and machine-accessible format that is interoperable with medical standards such as DICOM and HL7. The ePAD platform is extensible, permitting the community to extend its capabilities with respect to extracting and computing image features, as well as enabling developers to build applications that leverage the information in images in combination with other clinical data. ePAD is being used to at several institutions internationally as well as in national resources such as The Cancer Genome Atlas (TCGA) project of the NIH to enable a coordinated national collection of minable radiological image data.
Building the Computational Workforce for Precision Medicine

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5. Geisinger, Danville, PA, United States.

Abstract: Biomedical research and practice have never been more interdisciplinary than they are today, and yet interdisciplinary training in biomedicine remains the exception and not the rule. AMIA has a number of initiatives, from working groups to the annual Summit on Translational Bioinformatics, which emphasize the importance of the “bio” end of the biomedical informatics spectrum. However, there is significant opportunity for collaboration with other organizations with complementary expertise. AMIA has significant capabilities in informatics to support precision medicine. The American College of Medical Genetics and Genomics has significant expertise in medical genetics and genomics to improve human health. This panel brings together thought leaders from these two organizations to discuss the challenges in training tomorrow’s workforce for precision medicine, and the possibilities for interprofessional educational opportunities.
Informatics Research and Innovation in a Commercial Electronic Health Record: The Experience of Three Organizations Using Epic

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Abstract: Historically, many of the key innovations in informatics came from organizations with self-developed clinical information systems. Having a self-developed system gives organizations considerable flexibility to tailor and extend their software and explore new and potentially innovative approaches. However, maintaining a self-developed system is expensive, poses risks to generalizability and makes scaling challenging. Recognizing these issues, most academic medical centers have moved, or are in the process of moving, to commercial electronic health records (EHRs).

In this panel, we present the experience of three organizations which are actively implementing innovative approaches to improve care: Partners HealthCare, Cincinnati Children's Hospital Medical Center and Oregon Health and Science University. All three organizations, at one time, had pioneering self-developed systems but switched to Epic, one of the most popular EHRs used worldwide.

The presenters will detail their organizations’ experience innovating on the Epic platform through the lens of several case studies, introduce the range of technical approaches for developing and integrating innovative tools in Epic, discuss Epic’s approaches to working with innovators and cover issues in organization governance of innovation activities.

Though the focus of the panel is the experience with Epic, the lessons learned apply to all commercial EHRs.
**ClinicalTrials.gov: Adding Value through Informatics**

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**Abstract:** ClinicalTrials.gov is a repository of registered clinical trials maintained by NLM containing detailed descriptions of trial sponsorship, design, and results (when available). ClinicalTrials.gov plays an increasingly important, pivotal role in evidence-based medicine, and serves a diverse audience ranging from clinical researchers, who are designing and conducting new trials and recruiting patients; systematic reviewers, who are summarizing the best available evidence regarding safety and efficacy; bio-entrepreneurs, who are looking for drug repurposing or new therapeutic opportunities; and patients, who may be looking for a suitable clinical trial that might accept them. This panel will present an overview of ClinicalTrials.gov and discuss several ongoing lines of informatics research that are adding value -- for example, using text mining to improve the computability of eligibility criteria, design attributes and outcome results and connect these with patient EHR data; linking a registered trial with the publications arising from that trial; and performing aggregate analyses across trials to extract reusable design knowledge, understand design patterns and trends, and uncover systematic biases. The panelists will also discuss challenges and opportunities for further evolution of ClinicalTrials.gov, particularly in light of emerging trends such as patient-centered clinical trials, or the use of unpublished trial data in meta-analyses.
Abstract: Various search engines are available to clinical trial seekers. However, it remains unknown how comprehensible clinical trial eligibility criteria used for recruitment are to a lay audience. This study initially investigated this problem. Readability of eligibility criteria was assessed according to (i) shallow and lexical characteristics through the use of an established, generic readability metric; (ii) syntactic characteristics through natural language processing techniques; and (iii) health terminological characteristics through an automated comparison to technical and lay health texts. We further stratified clinical trials according to various study characteristics (e.g., source country or study type) to understand potential factors influencing readability. Mainly caused by frequent use of technical jargons, a college reading level was found to be necessary to understand eligibility criteria text, a level much higher than the average literacy level of the general American population. The use of technical jargons should be minimized to simplify eligibility criteria text.
Determinants of Consumer eHealth Information Seeking Behavior

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Abstract: Patients are increasingly using the Internet and other technologies to engage in their own healthcare, but little research has focused on the determinants of consumer eHealth behaviors related to Internet use. This study uses data from 115,089 respondents to four years of the National Health Interview Series to identify the associations between one consumer eHealth behavior (information seeking) and demographics, health measures, and Personal Health Information Management (PHIM) (messaging, scheduling, refills, and chat). Individuals who use PHIM are 7.5 times more likely to search the internet for health related information. Just as health has social determinants, the results of this study indicate there are potential social determinants of consumer eHealth behaviors including personal demographics, health status, and healthcare access.
Homophily of Vocabulary Usage: Beneficial Effects of Vocabulary Similarity on Online Health Communities

Participation

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5. Information School, University of Washington, Seattle, WA, United States.

Abstract: Online health communities provide popular platforms for individuals to exchange psychosocial support and form ties. Although regular active participation (i.e., posting to interact with other members) in online health communities can provide important benefits, sustained active participation remains challenging for these communities. Leveraging previous literature on homophily (i.e., “love of those who are like themselves”), we examined the relationship between vocabulary similarity (i.e., homophily of word usage) of thread posts and members’ future interaction in online health communities. We quantitatively measured vocabulary similarity by calculating, in a vector space model, cosine similarity between the original post and the first reply in 20,499 threads. Our findings across five online health communities suggest that vocabulary similarity is a significant predictor of members’ future interaction in online health communities. These findings carry practical implications for facilitating and sustaining online community participation through beneficial effects of homophily in the vocabulary of essential peer support.
Collecting Family Health History using an Online Social Network: a Nationwide Survey among Potential Users

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Abstract: Family health history (FHx) is one of the most important risk factors for disease. Unfortunately, collection and use of FHx is under-utilized in the clinical setting. Efforts to improve collection of FHx have had minimal impact. A novel approach to collect FHx using social networking capabilities is being explored. We conducted a nationwide survey of 5,258 respondents to 1- assess the interest in using an online social network for FHx, 2- identify if such a tool would have clinical utility, and 3- identify notable trends and potential concerns. We found survey respondents to be very supportive of the proposed approach and interesting trends related to age, education, and race were identified. Results from this survey will be used to guide future research and development of a proposed FHx social network application.
Supporting Multi-sourced Medication Information in i2b2
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Abstract: Postmarketing drug surveillance is critical to assessing adverse events associated with medications, because prelaunch clinical trials frequently miss negative drug effects. The Informatics for Integrating Biology and the Bedside platform (i2b2) has been used effectively for this. However, previous work suffers from incomplete medical data present in electronic health record (EHR) systems. Here, we develop a system to integrate non-traditional data sources with EHR data: pharmacy dispensing information and patient-reported data. We implement and validate a toolset to gather medication data from a Pharmacy Benefit Manager network, import it into an i2b2 EHR repository using a standard data format, merge it with the EHR data, and present it to for annotation with results returned to i2b2. This toolkit is enabling studies on medication list data quality, adherence, and adverse event detection.
OpenHealth Platform for Interactive Contextualization of Population Health Open Data

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Abstract: The financial incentives for data science applications leading to improved health outcomes, such as DSRIP (bit.ly/dsrip), are well-aligned with the broad adoption of Open Data by State and Federal agencies. This creates entirely novel opportunities for analytical applications that make exclusive use of the pervasive Web Computing platform. The framework described here explores this new avenue to contextualize Health data in a manner that relies exclusively on the native JavaScript interpreter and data processing resources of the ubiquitous Web Browser. The OpenHealth platform is made publicly available, and is publicly hosted with version control and open source, at https://github.com/mathbiol/openHealth. The different data/analytics workflow architectures explored are accompanied with live applications ranging from DSRIP, such as Hospital Inpatient Prevention Quality Indicators at http://bit.ly/pqiSuffolk, to The Cancer Genome Atlas (TCGA) as illustrated by http://bit.ly/tcgascopeGBM.
Towards data integration automation for the French rare disease registry

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Abstract: Building a medical registry upon an existing infrastructure and rooted practices is not an easy task. It is the case for the BNDMR project, the French rare disease registry, that aims to collect administrative and medical data of rare disease patients seen in different hospitals. To avoid duplicating data entry for health professionals, the project plans to deploy connectors with the existing systems to automatically retrieve data. Given the data heterogeneity and the large number of source systems, the automation of connectors creation is required. In this context, we propose a methodology that optimizes the use of existing alignment approaches in the data integration processes. The generated mappings are formalized in exploitable mapping expressions. Following this methodology, a process has been experimented on specific data types of a source system: Boolean and predefined lists. As a result, effectiveness of the used alignment approach has been enhanced and more good mappings have been detected. Nonetheless, further improvements could be done to deal with the semantic issue and process other data types.
Employing complex polyhierarchical ontologies and promoting interoperability of i2b2 data systems

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Abstract: i2b2 is in widespread use for managing research data warehouses. It employs reference ontologies as a record index and supports searching for aggregate cases using a pattern match operator on ASCII strings representing the node traversal from root to concept (PATHs). This creates complexities in dissemination and deployment for large polyhierarchical ontologies such as SNOMED CT. We hypothesized that an alternative approach employing transitive closure tables (TC) could lead to more accurate, efficient and interoperable search tools for i2b2. We evaluated search speed, accuracy and interoperability of queries employing each approach. We found both TC-based and PATH-based queries to produce accurate results. However, we observed that TC-based queries involving concepts included in large numbers of paths ran substantially faster than PATH-based queries for the same concept. Oracle query plan resource estimates differed by one to three orders of magnitude for these queries. We conclude that a simplification of dissemination tools for SNOMED CT and revision in the metadata build for i2b2 can effectively employ SNOMED CT with increased efficiency and comparable accuracy. Use of transitive closure tables in metadata can promote network query interoperability.
Protein Drug Target Prioritization for Illumination

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Abstract: Developing informatics methods for protein drug target prioritization to facilitate further illumination of these targets by knockout experiments on model organisms to study their phenotypic effects will advance discovery of novel drug targets for common and rare diseases. In this study we propose an informatics approach based on machine learning for prioritizing targets from the class of proteins labeled Tdark because not much is known about them based on our current state of knowledge.
Improvement of cytokine annotation using ontology synonym mapping
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Abstract: It remains a challenge to discover and integrate biomedical data sets because they are annotated using different terminologies. Single ontologies appear to have limited coverage of term synonyms and thus can fail to recognize connections between data sets. This research proposes Synonym Ontology Mapping (SOMA), an approach that integrates multiple ontologies to increase synonym coverage. The approach has been tested and validated in the context of annotating cytokines in the immunology literature.
Characterizing the Frequency of Pharmacogenomic Biomarker-Guided Prescribing for Drugs with Pharmacogenomic Biomarker information in the FDA Labelling: A Pilot Study Using Data from an Electronic Health Record

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Abstract: In this study, we retrieve clinical data from the EHR of the University of Washington Medical Center (01-2010 to 03-2014) to estimate and characterize pharmacogenomic (PGx) biomarker use, assess the association between characteristics of PGx-med pairs and the use of PGx tests, and estimate the temporal association between medication prescribing and PGx testing. Our study will inform the field of PGx biomarker use by providing an estimate of the frequency of use in real-world clinical practice.
Towards Computational Drug Repositioning: A Comparative Study of Single-task and Multi-task Learning

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Abstract: Drug repositioning (also referred to as drug repurposing), the process of finding new uses of existing drugs, has been gaining popularity in recent years. In this study, we propose a multi-task learning framework to generate drug repositioning hypotheses. Experimental results show that our approach outperforms single-task learning strategy significantly. Moreover, learned disease relatedness by our approach could provide additional insights for further investigation of repositioning candidates.
Population Level Clinical Analytics Using the MapReduce Framework and a Production Rule System

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Abstract: In repurposing a highly scalable web-service-based decision support service for population level analytics, we have found it inefficient to use real-time clinical services for large volume data. We used Hadoop, an open-source distributed computing framework, to extract our logic from a production rule system and execute analytics in a scalable, high performance environment. We compared performance of several parallel processing implementations, which could be scaled for large, pre-existing patient data repositories.
Making Hypertensive Medication Data Meaningful

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Abstract: We demonstrate an algorithm for constructing meaningful prescription events from primary care electronic health records. These events detail the initiation, termination and alteration of antihypertensive therapy, and are useful for further analysis in several areas: monitoring patient adherence to medication; care pathway analysis including process mining; advanced phenotype construction; audit and feedback; and for measuring quality indicator performance.
Abstract: The exploding growth of available genetic data coupled with longitudinal electronic health records (EHRs) enables the phenome-wide association studies (PheWAS) to discover new phenotype associations for genetic variants. By performing PheWASs on the diverticulosis patients of the eMERGE cohort, we demonstrate its feasibility as a novel tool for exploration of novel genotype-phenotype associations. Our findings reinforce the utility of PheWAS as a tool for not only replicating genotype-phenotype associations but also in providing a comprehensive catalog of human diseases associated with published variants.
Computable Phenotypes enabled by the i2b2 Validation Platform

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Abstract: Validation of raw EHR data accuracy often reveals poor sensitivity and positive predictive values. However, raw data consisting of codes and narrative text can be molded in most cases into accurate values. The technique for performing this transformation can be complex and requires a rigorous approach. We wrapped a set of data transformation tools into the i2b2 Phenotype Validation Platform. Using the platform, eight computed phenotypes were created and validated in a systematic fashion.
Conversational Agents for Automated Inpatient and Outpatient Health Counseling
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Abstract: Conversational agents are computer-animated characters that can simulate one-on-one, face-to-face counseling with a health provider. These agents have now been used to provide automated health education and health behavior change counseling in a wide range of medical domains. In the inpatient setting they have been used to counsel on options for surgical anesthesia, post hospital-discharge self-care, and to provide continual hospital bedside education, sleep promotion, and patient activation. Conversational agents have also been integrated with sensor systems so that they can provide context-sensitive counseling and explain events occurring in the hospital room to patients, as well as provide a mediated communication channel between patients and their providers. In the outpatient setting they have been used to collect family health histories, screen for and counsel on substance abuse, and to provide medication, exercise, diet, breastfeeding, and preconception care promotion. This medium has been shown to be particularly effective for patients with low health literacy, and has been linguistically and culturally tailored for several populations, including Latino and Chinese. Several of these systems will be demonstrated, and the development methodology and underlying technology described, including 3D animation systems, dialogue engines, and behavioral ontologies for driving automated health behavior change counseling. Evidence from trials comparing conversational agents to more conventional methods and technologies will be presented.
Abstract: Observational Health Data Sciences and Informatics (OHDSI, pronounced ‘Odyssey’) is an international consortium focused on large-scale analysis of observational data. OHDSI has developed an open-source platform for data analytics, visualization, and collaborative research based on a widely used common data model (CDM). In this demonstration, we will present the OHDSI suite of software including tools for loading data into the CDM, assessing data quality, defining and characterizing clinical cohorts, and conducting observational research. We will also present an API for retrieving adverse drug event evidence from a wide range of sources.
Abstract: The data concerning community health, such as, medical health records, health check-up, cancer screening, nurse care services have been separately stored in each their own database. The difficulty of sharing information between these regions, was in the compatibility of data. The aim of this study was to develop the Community Health Databank (EHR) for providing an efficient community health care.
Personalized medicine beyond genetics: using personalized model-based forecasting to help type 2 diabetics understand and predict their post-meal glucose

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Abstract: A computational foundation for personalized application-based DM2 interventions such as mobile applications that DM2 patients use for making meal choices and for managing and observing their overall health is presented. The model-based forecasting (MBF) methodology that takes glucose and nutrition as input variables and personalizes (trains) a mechanistic model that generates immediate, post-meal glucose forecast is introduced and evaluated. The success of the MBF methodology provides a foundation for a highly personalized intervention.
Identifying Home Care Clinical Practices Most Associated with Hospital Readmissions and Non-Admitted ER Visit Rates: Secondary Data Analysis

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Abstract: A secondary data analysis study to identify the home health care practices and processes most associated with higher utilization outcome rates, including the (i) hospital readmission rates and (ii) non-admitted ER visit rates. Checking for fall risk and proving timely care were most associated with the utilization outcomes.
Regenstrief ePRO: A Rule-Based Platform for Capturing Targeted Patient-Reported Outcomes

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Abstract: The past decade has seen increases in utilization of patient-reported outcomes for treatment and patient safety efforts. Regenstrief Institute has developed a platform to deliver questions based on patient-specific characteristics. The platform combines LOINC-coded measures and customized questions. It includes a rules engine and database for tracking question delivery and completion. The front-end client is built on OpenMRS and delivers questions to mobile devices. Answers are converted to HL7 and routed to a data warehouse.
Feasibility and Acceptability of an Online Maternity Education Platform

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Abstract: This study explores the feasibility and acceptability of an online maternity information platform among Medicaid-enrolled women. Focus groups and a field-testing period will be used to explore Internet access barriers/facilitators, preferred information formats, messaging patterns, and user experience. Findings will be used to identify opportunities for facilitating Internet access within a prenatal care context and to configure a health literate informational resource that engages and meets the self-management needs of the target population.
Analysis of Computerized Clinical Reminder Activity and Usability Issues

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8. University of Michigan, Ann Arbor, MI, United States.
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10. Baylor College of Medicine, Houston, TX, United States.
11. Houston VA Center for Innovations, Quality, Effectiveness and Safety, Houston, TX, United States.

Abstract: We performed sequential task analysis and user research to capture detail of physician user experience around Clinical Computerized Reminders and clinical documentation at the VA San Diego Healthcare system. Our work aims to assess the true burden of CCRs within EMR systems. Our research disclosed latent user interface design challenges within CPRS based on EMR activity patterns captured during real clinical encounters through manually coded computer activity and sequential task analysis.
Automating Identification of OEF/OIF Veterans Diagnosed with ALS

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3. Yale School of Medicine, Yale University, New Haven, CT, United States.

Abstract: Amyotrophic lateral sclerosis (ALS) is a progressive, fatal neurodegenerative disease. Persian Gulf deployment has been shown to be associated with increased risk of ALS. Electronic health record data from a cohort of OEF/OIF veterans was used with a previously published algorithm to attempt to identify patients with an ALS diagnosis and evaluate the rate of false-positive diagnosis. Subsequent chart review showed that the algorithm performed reasonably well in excluding patients who do not have ALS.
Learning Useful Abstractions from the Web
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Abstract: The successful application of machine learning to high-dimensional EMR data typically turns on the construction of an appropriate feature vector. We propose the use of unsupervised dimensionality reduction techniques to leverage expert knowledge freely available in unstructured form from the Web to engineer low-dimensional representations of the data. We evaluate our method in the context of building models for three clinical classification tasks.
Patient-Centered Postoperative Wound Surveillance Using Smartphone Digital Photographs

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2. Department of Surgery, University of Wisconsin-Madison, Madison, WI, United States.

Abstract: Surgical site infection (SSI) is the most common nosocomial infection in surgical patients and accounts for 38% of post-operative complications. SSI results in physical and emotional stress for a significant number of patients and their families and can lead to readmission, reoperation, limb loss, or death. We designed and tested a patient-centered, outpatient wound surveillance program using smartphone digital photography to promote early recognition of SSI following discharge.
Standardization of Ask At Order Entry Questions: A Prudent Question is One-Half Wisdom

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2. LabCorp, Burlington, NC, United States.
3. Vernetzt, LLC, Sausalito, CA, United States.

Abstract: The collection of supportive data from patients and ancillary departments is required to determine etiology of disease or to define appropriate action on laboratory result values. Examples of collected data includes metrics for 24 hour urine chemistries and public health surveillance on pediatric lead testing. A variety of industry subject matter experts and professional organizations collaborating on federal initiatives have compiled a master list of ask at order entry questions and incorporated LOINC terms.
Abstract: Large sociotechnical enterprises such as healthcare are complex systems of individuals and organizations who depend upon equally complex technological systems. These systems require continual functional adaptations from individuals in real time despite finite time and resources. This is a study of workflows and CPOE, and how the interactions of the two lead to or mitigate wrong order entry. The study employs the Functional Resonance Analysis Method, an outgrowth of Resilience Engineering, specifically designed for large sociotechnical systems.
A Faceted-Search Mobile App for Matching Cancer Patients to Targeted Therapy Clinical Trials

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2. Department of Surgery, University of California, San Francisco, San Francisco, CA, United States.

Abstract: We have developed a new mobile app (CTMatch) that uses a faceted search design to find cancer clinical trials. The user is prompted with facets - demographics, cancer stage and biomarker status – specific to the indication. Faceted search has been demonstrated to improve complex searching, especially with dynamic taxonomies. CTMatch offers a convenient tool for facilitating patient-provider discussions of trials at the point of care. CTMatch will be evaluated with usability testing.
Using the Adverse Event Reporting System: Can Analysis be Streamlined by Text Processing?

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2. Center for Medical Informatics, Yale University School of Medicine, New Haven, CT, United States.

Abstract: Background: Existing, widely used, software systems for reporting adverse events are limited in how they handle the unstructured text entered by frontline staff. This limitation means that use of this potentially rich information depends on extensive manual sorting and collation of electronic data, which is resource-intensive and prone to variable results. Aim: The aim of this study was to develop an electronic approach to processing the text in medical event reports that is reliable enough so that it can be used to improve patient-safety in a less manually resource-intense fashion. Methods: We categorized 9405 event reports from February 2012-January 2014, using 3 different approaches: (1) manual review by experienced clinicians (“gold standard”), (2) key-word query, (3) semi-supervised machine learning: FS-LapSVM - a hybrid method that combines F-score feature selection with Laplacian support vector machine. The 2 computerized approaches were compared to the “gold standard” and to the “usual approach” (categorization by the frontline personnel in the software tool). Results: Both key-word query and machine learning perform better than the “usual approach.” Conclusions: Electronic approaches to streamlining the use of free-text entered into an adverse event report system are feasible and can be extremely valuable in categorizing and sorting this important data for use in improving patient-safety. In addition, the common taxonomy used by this widespread software vendor does not readily support accessing all aspects of the information that is needed to improve clinical care; alternate, automatable query-methods offer important flexibility to the users of this data hoping to improve patient-safety.
Abstract: NASA is investing in GeneLab (http://genelab.nasa.gov/), a multi-year effort to maximize utilization of the limited resources to conduct biological and medical research in space, principally aboard the International Space Station (ISS). High-throughput genomic, transcriptomic, proteomic or other “omics” analyses from experiments conducted on the ISS will be stored in the GeneLab Data Systems (GLDS), an “open-science” information system that will also include a biocomputation platform with collaborative science capabilities, to enable the discovery and validation of molecular networks.
An Ontology-Driven Patient History Questionnaire System

J. P. Bona; 1
1. University at Buffalo, Buffalo, NY, United States.

Abstract: We report on an ontology-driven system for collecting, recording, and managing patient history data that is currently under development. The underlying ontology represents not only the things that a patient history is about, but also elements of the history-taking process, including the questionnaire and its contents.
Abstract: Integration of electronic health record (EHR) competency development throughout an undergraduate health informatics (HI) program is essential for students’ to understand how: (a) the EHR can be used by clinicians, (b) to procure an EHR for specific user interface requirements and workflows, (c) to customize a system for a local (i.e. health care system and clinical/organizational practice) setting, and (d) to design, develop and build an EHR.
Abstract: In this paper we study the problem of predicting mortality in ICU. Since the number of collected observations is large, feature selection techniques are well suited to find the best subset for prediction problems. We consider a recursive feature selection procedure based on Random Forests. We propose a modification of the variable importance step by combining both model-dependent variable importance obtained from Random Forests and model-independent importance obtained by AUC analysis. The proposed modification of variable importance is robust against Random Forests sensitivity to variable correlation. The obtained mortality prediction performance is promising as it reached 80% AUC using only 30 selected features from the initial set of 124 features.
Converting the Foundational Model of Anatomy to OWL2

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Abstract: In this poster we describe the conversion of the Foundational Model of Anatomy (FMA) and the Ontology of Craniofacial Development and Malformation (OCDM) from the Protégé Frames knowledge representation language to OWL2 (hereafter referred to as OWL). We describe the conversion goals and methodology. Equally importantly, we note what we did not try and accomplish. This conversion is a first step towards tool compatibility, ontology interoperability, and understanding the gains and compromises of such a translation.
Developing an Ontology from HIV-associated Elements in Research

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2. NY State Psychiatric Institute & Columbia University, HIV Center for Clinical and Behavioral Studies, New York, NY, United States.
3. New York-Presbyterian Hospital Value Institute, New York, NY, United States.
4. School of Nursing, Columbia University, New York, NY, United States.

Abstract: Data harmonization is fundamental to integration, and domain-specific semantic harmonization tools are ideal for managing both the diversity of variables and quickly evolving nature of the HIV research domain. The objective of this research is to developing an ontology from HIV-associated elements in research. Thus, our aim is to leverage empirical methods and existing knowledge bases to develop and evaluate an ontology to formally represent common data elements (CDEs) in HIV research.
Abstract: The purpose of the study was to create an ontology representing musculoskeletal concepts using data extracted from a clinical data repository. The ontology connects flowsheet measures to higher-level EHR data concepts to support quality improvement work and research. The structured data derived represents a robust interdisciplinary research and quality improvement opportunity through examination of a large quantity of detailed assessments and interventions that reflect concepts such as mobility, gait, muscle tone, and level of independence.
CDS, EHR and Pharmacogenomics to Estimate Warfarin Dosing

P. J. Caraballo; 1; J. A. Sutton; 2; P. Rao; 2; K. Wix; 2; W. T. Nicholson; 2; C. Schultz; 2; C. R. Rohrer Vitek; 2; R. Bleimeyer; 2; L. Hines; 2; D. Blair; 2; M. A. Parkulo; 2;
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Abstract: The use of clinical decision support has been proposed to incorporate pharmacogenomics test results (CYP2C9 and VKORC1) in the calculation of the initial dose of warfarin. We developed and implemented a calculator/alert integrated in the workflow using structured data and available functionality on two commercial electronic health records. A limited number of patients benefit from the calculator due to the low use of preemptive pharmacogenomics testing and the lack of support on current clinical guidelines.
Survey of Mayo Clinic Trainees' Knowledge, Attitudes, and Opinions Regarding Clinical Informatics.

T. Carvajal Carvajal; 1 K. Poterack; 1
1. Mayo Clinic, Phoenix, AZ, United States.

Abstract: Mayo Clinic residents and fellows were surveyed regarding their knowledge and beliefs about Clinical Informatics (CI). 181 responded (14% response rate). 24% were aware of the availability of CI subspecialty training, similar to a previous survey of medical students. 71% were able to identify the correct definition of CI, and 70% were able to correctly identify CI scope of practice. There were 63% correct responses to knowledge questions based on a CI curriculum. While there was some familiarity with CI, its scope of practice and core content, the lack of awareness of training opportunities implies further education is needed.
Influences, Barriers, and Motivations for Healthy Behaviors Among Pediatric Cancer Patients: A Focus Group Approach

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2. Pediatric Oncology, Columbia University, New York, NY, United States.

Abstract:
Interventions designed to address the challenges of adolescents with chronic diseases are needed. We conducted a focus group to understand health behaviors and barriers experienced by pediatric cancer patients. The prominent themes identified were: multi-level determinants of health behaviors; initiation and maintenance of health habits; inspirations for health; and the importance of trust in evaluating information resources. These results suggest several design implications including social media components, tailoring interventions, and validating information provided to users.
**Predicting The Initial Lapses After Alcohol Detoxification Using mHealth**

*M. Chih; 1*

1. Clinical Sciences, University of Kentucky, Lexington, KY, United States.

**Abstract:** This is a predictive modeling study of alcohol addiction patients’ initial lapses after leaving residential care and using a smartphone app for ongoing support. Two logistic regression-based models, the Full Model containing all predictors and the Simplified Model with only two significant predictors, were developed. The Simplified Model showed better predictability of the initial lapses at the first lapse episode. However, the Full Model showed better predictability of the initial lapses in later lapse episodes.
Privacy Concerns of Internet Users and Implications for Health Information Technology

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1. School of Nursing, Columbia University, New York, NY, United States.

Abstract: Privacy is an important issue for enabling the use of health information technology. This analysis explored privacy concerns of Internet users. We analyzed survey data collected by the Pew Research Center. Most participants were worried about privacy when using the Internet and reported that it was impossible to be completely anonymous. These findings are of particular relevance to persons who use the Internet for meeting health information needs and highlight the importance of addressing privacy and security protections.
System Architecture of CDC I-SMILE Recommendation Engine

E. Choi; 1; J. J. Dcruz; 2; S. Lin; 1; A. B. Singh; 1; H. Su; 1; K. Ryder; 2; S. R. Papagari Sangareddy; 2; H. Tolentino; 2; J. Sun; 1;

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2. Centers for Disease Control and Prevention, Atlanta, GA, United States.

Abstract: The Centers for Disease Control and Prevention (CDC) hosts numerous applied training programs that are focused on improving population health. Because of the rapidly changing health policy and practice landscape, access to relevant learning content in a timely manner is a substantial challenge for persons using these programs. The informatics workforce development team (IWDT) has envisioned an innovative, adaptive learning system called information system for mobile immersive learning environment (I-SMILE) to address this challenge. This poster describes system architecture of a core component of the I-SMILE recommendation engine.
A Cognitively-Driven, Knowledge-Based EHR User Interface Design for Outpatient Psychiatry

C. Cott, 1

1. Biomedical Informatics, Arizona State University, Chandler, AZ, United States.

Abstract: The purpose of this study is to show that a doctor-patient encounter user interface (UI) explicitly designed to support clinicians’ knowledge structure and cognitive tasks, will result in greater usability than traditional EHR UIs. Using the methods of cognitive task analysis (CTA) of patient encounters in the context of outpatient psychiatry, a psychiatric knowledge model and its related subtasks were identified. Based on these findings, a prototype web-based UI was designed and built. The new interface was evaluated by having psychiatrists watch simulated-patient videos while creating a patient encounter record using both the prototype and the traditional UIs. Preliminary results show that users found the prototype more user friendly, with higher situation awareness and efficiency and lower mental effort. Clinical accuracy was unchanged.
Abstract: MySafeCare is a web-based/mobile enabled application that provides patients and families a quick, electronic, real-time way to report and communicate their safety concerns to appropriate clinical staff. A user-centered design approach was taken to develop the v1 clinical dashboard, which entailed conducting interviews with nurse/medical directors. Through collaboration between our technical team and interviewing team we targeted features that are important to the users while also technically feasible.
Detecting Mitral Valve Prolapse (MVP) From Heart Sound Recordings

D. W. Curtis; 1 Y. Li; 1; 1. CSAIL, MIT, Cambridge, MA, United States.

Abstract: We apply machine learning techniques to detect Mitral Valve Prolapse (MVP) from phonocardiogram (PCG) and EKG recordings. After segmenting each recording into beats, we use Gaussian mixture model to assign beats to disease/normal clusters per presence of murmurs. Features extracted from beat level clustering are used to classify each patient with support vector machine (SVM). We achieve precision rate of 94.7% and recall rate of 88.9%. This automatic heart sound analysis is valuable for screening.
To Improve Sensitivity and Specificity in Early Detection of Sepsis

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Abstract: The U.S. National Center for Health Statistics of the Centers for Disease Control and Prevention (CDC) has issued estimates derived from claims data that sepsis cases have increased in the U.S. from 621,000 in the year 2000 to 1,141,000 in 2008. With increased use of electronic health records (EHR), a significant amount of secondary EHR data is collected. This data can be used to develop and implement an Early Warning Scoring system (EWS) to identify septic patients earlier and help improve in hospital mortality of septic patients. Since early detection of sepsis in adults is challenging, this thesis explores and proposes opportunities to improve the accuracy of the early warning scoring systems and alerts used to detect sepsis. This study approach is to identify new vital sign thresholds in SIRS criteria for different age groups that can help improve the efficiency of the current sepsis alert at UC Davis Health System (UCDHS). Evaluating these new scoring systems shows improved sensitivity and specificity in early detection of sepsis in adults.
Information System for Mobile Immersive Learning Environment for Just-in-Time Learning in Public Health

J. J. Dcruz; 3; K. Ryder; 1; E. Choi; 2; S. Lin; 2; A. B. Singh; 2; H. Su; 2; S. R. Papagari Sangareddy; 3; H. Tolentino; 3; J. Sun; 2;

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2. Georgia Institute of Technology, Atlanta, GA, United States.
3. Division of Scientific Education and Professional Development, Centers for Disease Control and Prevention, Atlanta, GA, United States.

Abstract: I-SMILE (information system for mobile immersive learning environment) is an interactive, immersive, and context aware social learning environment that is based on mobile and cloud platforms. It delivers learner-centered, just-in-time learning for the public health workforce as they solve problems in a challenging and a rapidly evolving environment. From the perspective of public health workforce development, we present a business case, functional requirements, prototype, and lessons from a formative evaluation study.
Improving Vaccine-Preventable Disease Reporting through Health Information Exchange

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1. Epidemiology, Indiana University Fairbanks School of Public Health, Indianapolis, IN, United States.
2. Center for Biomedical Informatics, Regenstrief Institute, Indianapolis, IN, United States.
3. Center for Health Information and Communication, HSR&D Service, Veterans Health Administration, U.S. Department of Veterans Affairs, Indianapolis, IN, United States.
4. Epidemiology, Marion County Public Health Department, Indianapolis, IN, United States.
5. Family Medicine, Indiana University School of Medicine, Indianapolis, IN, United States.

Abstract: Although clinical providers are obligated to report Vaccine-Preventable Disease (VPD) cases to public health authorities, provider reporting is frequently incomplete, error-prone, and delayed. We seek to explore whether an intervention, aimed at providers and delivered electronically through a health information exchange (HIE), can improve VPD reporting rates as well as how such an intervention can be implemented in an integrated infrastructure involving heterogeneous electronic health record (EHR) systems. Baseline data suggest there is a significant need for informatics solutions to the challenge of provider reporting.
Innovative Methods for Obtaining and Managing Patient Consent for Patient Centered Outcomes Research

K. Donaldson;1 P. Dullabh;1 M. Goldstein;3 J. H. Thorpe;3 K. Li;2 D. Bowers;3
1. Health Sciences, NORC at the University of Chicago, Bethesda, MD, United States.
2. Health Care, NORC at the University of Chicago, Bethesda, MD, United States.

Abstract: Current methods for researchers to obtain patient consent for the authorized use of their data can be inefficient and resource intensive. For this study we conducted a scan of new approaches for obtaining and maintaining patient consent for the authorized use of individually identifiable data for research. This study is part of a larger initiative to inform the development of data capacity for patient-centered outcomes research (PCOR).
A Comparative Analysis of Factors for Predicting Inpatient Length of Stay for Colorectal Cancer Patients

P. Dua; 1 A. Reddy; 2 P. Chowriappa; 2

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2. Computer Science, Louisiana Tech University, Ruston, LA, United States.

Abstract: Predicting the Length Of Stay (LOS) of patients is an effective tool for health care providers to provide patients with better services and to manage the hospital resources effectively. It also helps the hospital management to plan for preventive interventions for patients with intense conditions. We have analyzed the colon cancer data available from the State-wide Planning and Research Cooperative System (SPARCS) dataset from the New York state for the duration 2009-2012. We used survival analysis to determine the significant features that influence the length of stay, using discharge from hospital as the time to event. We discovered that Age Group, Type of Admission, Total Charges, Discharge Day of the Week, Emergency Department Indicator, Source of payment are the important factors that influence the LOS.
A Six State Review of Grantees’ Experiences with the State HIE Program

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1. Health Sciences, NORC at the University of Chicago, Bethesda, MD, United States.

Abstract: The State Health Information Exchange (HIE) Program aimed to expand the secure movement of electronic health information. In depth case studies in six states revealed grantees pursued diverse strategies for enabling exchange to meet local stakeholders’ needs. Grantees made progress garnering stakeholder trust and participation, expanding HIE service options, and addressing persistent HIE barriers. Notable lessons learned include building exchange capabilities incrementally, selling the HIE concept to big players, and resolving incompatibilities with HIE vendors.
Platform for Engaging Everyone Responsibly (PEER) Validation Study Plan

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2. Clinical Informatics, Duke Clinical Research Institute, Durham, NC, United States.

Abstract: Genetic Alliance has developed the Platform for Engaging Everyone Responsibly (PEER) tool as a means for collecting patient data. However, this tool requires validation before it can be used in regulatory decision-making. We used the UFuRT analysis methodology and the PCORI methodology standards to identify PEER system user types, general functional requirements and candidate evaluation methods. This work provided an integrated approach to the development of a general evaluation plan.
Leveraging an Open Source Data Warehousing and Analytics Tool to Promote Longitudinal Research, Improve Knowledge Transfer and Avoid Redundancy Across Research Studies

K. Feghali; 1 D. Nutman; 2 A. Rosenthal; 2 T. Britten; 1 J. Croghan; 2 U. Sheikh; 1 D. Hardison; 1
1. Deloitte Consulting LLP, McLean, VA, United States.
2. National Institute of Allergies and Infectious Diseases, Rockville, MD, United States.

Abstract: A customized open-source platform designed to streamline research efforts for the NIAID / Laboratory of Parasitic Diseases (LPD) integrates data from multiple disparate data sources collected since 1974. Standardized data are organized around research subjects enabling scientists to perform retrospective analyses and plan prospective research studies. A customized individual patient profile provides a holistic and longitudinal view of research participants. Overall researchers experienced increased efficiency, accuracy, and cost-effectiveness of patient data management and analysis.
Challenges for Residents in Following Instruction in Laparoscopic Surgery
Y. Feng; H. Zahiri; H. M. Mentis;
1. Information Systems, University of Maryland, Baltimore County, Baltimore, MD, United States.
2. Anne Arundel Medical Center, Annapolis, MD, United States.

Abstract: Operating room-based training plays an important role in accumulating experiences in laparoscopic surgeries. Efficient trainings depend on residents' understanding of the instructions given by senior surgeons. However, residents' difficulties in understanding instructions are often overlooked by training system design. In this study, we focus on the challenges residents have in following instructions during the surgery. Our findings can be used to make recommendations for the design of effective surgical training system and surgical support system.
Grantees’ Lessons Learned in Implementing State HIE Initiatives

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2. Health Care, NORC at the University of Chicago, Bethesda, MD, United States.

Abstract: The State HIE Program provided states and territories funding to invest in HIE solutions. We analyzed grantee final reports to identify key drivers, challenges, and strategies grantees employed to overcome obstacles. The program catalyzed progress toward enabling HIE services, however there are still gaps to achieve interoperable intra-state, inter-state, and national exchange. These findings could help policy makers design future programs, service offerings, and policies to advance HIE.
Transforming the National Department of Veterans Affairs Data Warehouse to the OMOP Common Data Model

F. FitzHenry; 1, 2; J. Brannen; 1; J. Denton; 1, 2; J. R. Nebeker; 3; S. L. Duvall; 3; F. F. Minter; 1, 2; J. Scehnet; 3; B. Sauer; 3; L. Ohno-Machado; 4; M. E. Matheny; 1, 2;

1. GRECC, Department of Veterans Affairs Tennessee Valley Healthcare System, Nashville, TN, United States.
2. Department of Biomedical Informatics, Vanderbilt University, Nashville, TN, United States.
3. VA Informatics and Computing Infrastructure (VINCI), Salt Lake City, UT, United States.
4. Department Bioinformatics UCSD, San Diego, CA, United States.

Abstract: This poster describes the conversion of the national Veteran's Affairs (VA) healthcare network's corporate data warehouse to a common data models suitable for distributed observation research: the Observational Medical Outcomes Partnership (OMOP). There are approximately 16,927 thousand unique patients in the dataset. VA's OMOP data will be available for initiatives of VA researcher groups and research initiatives of PCORnet.
Bridging the MedlinePlus Cloud to askMEDLINE

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1. National Library of Medicine, Bethesda, MD, United States.

Abstract: We developed a Web interface to show the top searched terms from MedlinePlus Cloud and direct the top searched terms to askMEDLINE’s query database. The bridge from MedlinePlus, a patient and family health information resource to askMEDLINE provides recent evidence from PubMed for patients and health care professionals.
A Gap Analysis of Competencies and Curriculum in Host-Site Projects of a Field-Based Informatics Fellowship
L. H. Franzke; 1; S. R. Papagari Sangareddy; 1; R. Bess; 1; H. Tolentino; 1; B. Baccaro; 1;
1. Public Health Informatics Fellowship Program, Centers for Disease Control and Prevention, Atlanta, GA, United States.

Abstract: A program overview of an Applied Public Health Informatics Fellowship program that provides a 1-year training at state, tribal, local and territorial health departments. A gap analysis is performed to map and analyze the curriculum and competencies to the host assignment projects. The results will guide how to improve the curriculum and competencies to better serve the informatics needs for health departments.
An Examination of Standalone Personal Health Record Use by Patients with Type 2 Diabetes

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2. School of Pharmacy and Health Professions, Creighton University, Omaha, NE, United States.
3. College of Nursing, Creighton University, Omaha, NE, United States.

Abstract: This study combined a randomized controlled trial with qualitative interviews to examine the impact of standalone personal health record (PHR) use on clinical and social cognitive outcomes of type 2 diabetes. After 3-6 months, while no statistically significant change in hemoglobin A1c was observed, diabetes knowledge improved in the PHR group. Interviews revealed that while PHR users found value in self-management of their health, PHR use was limited and did not facilitate patient-provider information sharing.
Abstract: We have developed a framework for data profiling and quality assessment for real-world evidence that performs an overall data quality assessment, therapeutic area, and research objective based evaluation. The profiler leverages definitions and rules from a content library which can be updated as understanding of data quality evolves, and the findings presented in a highly intuitive user interface to simplify data due diligence and quality assessment process.
Electronically Collecting Nocturnal Heart Failure Information

C. L. Gardner; 1, H. B. Burke; 2;

1. Graduate School of Nursing, Uniformed Services University of the Health Sciences, Bethesda, MD, United States.
2. School of Medicine, Uniformed Services University of the Health Sciences, Bethesda, MD, United States.

Abstract: We provided patients with physiologic devices to measure their medical status at home. We hypothesized that patients would be able to use these devices overnight. We found patients used a scale less than expected and the activity monitor more than expected. We also found that the importance the patients give to the information determines, in part, how willing they are to collect it.
Transition of Care from an Academic Cancer Center to Community Providers and Survivorship care: Would a Patient Care Team Portal Help?

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P. E. Whalen; 1
M. Oktapodas; 1

1. Clinical Data Network, Roswell Park Cancer Institute, Buffalo, NY, United States.

Abstract: In the transition of care from an academic cancer center to community providers, cancer patients’ continuity and quality of care are susceptible to poor communication, care coordination, and the relationship between providers. This research hopes to better future interactions between patients, academic, and community providers through a patient care team portal to facilitate the sharing of information and knowledge in such a way that the transition of care and survivorship care processes are improved.
Abstract: Consistent data capture is a challenge that has been experienced in healthcare organizations throughout the country. Structured documentation forms are a method of documentation being utilized within EHR systems. A preliminary set of principles and best practices for structured data capture was defined using an iterative process. A sample of documentation forms was compared against these principles. Results showed that only two of the seven defined principles had 100% compliance.
A Tale of Two Layouts: Vignette vs. Structured Interview for Layout of an Electronic Handoff Tool

N. C. Gonzalez; 2; W. B. Webb; 1; R. A. McKelvy; 3; K. L. Fleming; 1; R. L. Shapiro; 1, 4;

4. Cardiology, Washington University in St. Louis School of Medicine, St. Louis, MO, United States.

Abstract: Patient handoff is an important activity but little work has been done to determine the ideal user experience (UX) for a handoff. This study engaged doctors and nurses in simulated handoff exercises to understand the best UX to support users in different roles (physician vs. nurse) and care settings (ICU vs. Medical vs. Surgical; Adult vs. Pediatric). Notable differences occurred in the UX format (1 vs. 2 vs. 3 columns) and in how handoff specific factors are thought about and organized. This study suggests that customized layouts for users based on their role and patient population is warranted and presents the ideal layout for the various user groups.
Integrated Clinical Decision Support Systems: Systematic Review and Classification of Online Medical Calculators

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1. Informatics Institute, University of Missouri - Columbia, Columbia, MO, United States.
2. Computer Science, University of Missouri - Columbia, Columbia, MO, United States.
3. School of Medicine, University of Missouri - Columbia, Columbia, MO, United States.

Abstract: Documenting in EMR’s can be burdensome, yet the data collected can form the basis for new advances in clinical decision support systems such as medical calculators. To date, clinicians have not benefited fully from medical calculators due to the non-integrated nature of medical calculator services. In this poster presentation, attendees will learn about a systematic approach underway to understand how calculators are used and the best way to integrate them into EMR’s for maximum effect.
Variation Among Providers in Cost of a Knee Replacement Episode

T. Gurgiolo; 1; T. R. Pressler; 1; S. Orme; 1; R. Kershner; 2; J. Mathieu; 2;
1. Aver Informatics, Columbus, OH, United States.
2. Center for Improving Value in Healthcare, Denver, CO, United States.

Abstract: Using an all claims payor database, the proposed poster will compare results of a standard Knee Replacement episode of care definition by primary payer. Claims can be challenging for understanding clinical care, but they are useful for seeing every provider a patient touches during an episode of care and how costs can vary. Episode analytics will provide an insight into providing clinically precise care that is financially efficacious while also tracking patient quality and safety outcomes.
Abstract: A web-based communication tool could be an effective supplement to direct patient-physician interaction in the acute care setting. We conducted a focus group to compare the main concerns physicians identified regarding patient-provider messaging with actual messaging data. The main concerns identified by providers were not supported by patient usage data; however, ongoing concerns still linger amongst providers. Managing ongoing provider concerns could lead to an uptake in provider usage, which may favorably impact patient utilization in the acute care environment.
Standardized Mapping of Sensitive Data Categories

T. Harman;¹, R. Howe;¹;

Abstract: Health information exchange and data security go hand and hand, but privacy concerns related to protecting sensitive health information requires flagging data elements within the electronic health record before transmission. The use of standard terminologies to encode sensitive health information enables automated flagging of such data to prevent unauthorized distribution.
Meal-Camera System to Support Nutritional Tele-Consultation for Diabetics

M. Hashimoto;¹; U. Nakamura;¹; M. Akiyama;²; T. Takebayashi;³; M. Oshima,⁴; T. Kumegawa;⁴; H. Imachi;⁴; K. Murao;⁴;

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Abstract: We propose a communication tool for connecting diabetic outpatients and hospital’s medical staff such as dietitians and doctors. This system supports nutritional tele-consultation based on meal images taken by patient’s smartphone. Patients easily send images of their meals with applications installed in smartphones. Dietitians use computers and guide the patients remotely based on the images. Clinical study with 20 patients show that patients' weight and HbA1c improved in the most cases.
Mapping Hospital Infections to Inform Quality Improvement Interventions
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Abstract: Hospital acquired infections (HAIs) are the target of federal initiatives to improve quality of care. HAI surveillance is often performed manually, and reported using tables and charts. We assessed the feasibility of automating an HAI identification algorithm, and displaying the results on a hospital map to provide geospatial context.
Using MetaMap to Analyze Which Linguistic Concepts of an Imaging Study Indication Make it Helpful to a Radiologist

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Abstract: For reading radiologists, order indications improve interpretation. We used UMLS MetaMap to analyze which linguistic concepts in order indications are most helpful to radiologists. We analyzed indications from 200 abomen/pelvis CTs, and found that the following concepts were most associated with higher indication quality: “Modifying concepts” (p=0.01), “Findings” (p <0.0001), “Disease/Syndromes” (p=0.01), and “Ideas or Concepts” (p = 0.01). This knowledge could be used to help improve providers’ indication quality.
Electronic Health Record Audit Logs: An Alternative Approach to Workflow Analysis
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Abstract: Successful implementation of technology in clinical settings depends on the ability to assess and adapt to clinical workflows. We describe a method of utilizing an electronic health record audit file to measure primary care workflow. Our data replicate the previous findings that used survey and direct observation to measure primary care workflow. This new approach may be a low cost and efficient way to measure the impact of new technology in clinical practice.
Abstract: Introduction: Really simple syndication is an effective tool for clinicians to obtain timely access to evidence to guide clinical practice. Methods: In a systematic review, we examined the use of RSS by medical professionals. Results: Of 1610 articles, we included 130 articles, and found applications within medicine, nursing and health librarian education. Conclusion: Medical professionals use RSS in different ways. We have summarized the guidance to help clinicians set up RSS feeds.
Informational Content of Verbal Handoffs in Emergency Care

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Abstract: Care transitions are known sources of medical error. We have observed physicians discussing 150 patient cases during eleven handoffs at a large urban ED. We found that physicians handing off care at the end of shifts vary the amount of informational detail in verbal presentations according to the level of certainty about their diagnosis and apparent fit to illness script. Electronic support tools for handoffs should allow for flexibility based on clinical complexity and uncertainty.
Evaluation of a Local Terminology to SNOMED CT Crosswalk

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Abstract: An evaluation of the crosswalk created between SNOMED CT and a local terminology was done to determine if mapping was accurate for data translation. Findings indicated that a lot of local terms could be crosswalked however many relationship types were not consistent in meaning and usage. Existing informatics principles should be considered and documented when establishing a new crosswalk or map to ensure that it is meaningful, useful and reproducible.
Deep Sequencing of Phage-Displayed Peptide Libraries Reveals Novel Peptide Motif that Detects Norovirus
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Abstract: Noroviruses are the leading cause of non-bacterial gastroenteritis around the globe. While infections spread rapidly, existing diagnostics lack feasibility for point-of-care detection. We screened a library containing a billion randomized phage-displayed peptides and identified peptides encoding this motif through sequence analysis that effectively binds noroviruses. Improved diagnostics utilizing this motif can inform treatment decisions and prevention, and the methods used here can be applied to identify novel detection reagents for any protein of interest.
Examining the Role of Bug-tracking Systems in the Maintenance of Electronic Health Records (EHRs)

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Abstract: Bug-tracking systems support the design, development, and testing of software systems in teams. We analyzed the use of Partners Healthcare’s Team Coordination System to determine its effectiveness in identifying and resolving bugs in the electronic health record system at Brigham and Women’s Hospital, a Partners’ hospital. We found that TCS was instrumental in helping to efficiently fix bugs in the EHR, but that it could be improved by increasing usability for physician end-users.
Clinico-genomic Decision Support System for Precision Diagnostics and Management

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Abstract: Chronic diseases are known to be co-morbid. While clinical factors that cause these diseases may also contribute to co-morbidity, there may exist certain other factors, such as genetics, that can also increase the risk. This project aims to use a novel analytics based approach for assessing clinical and genetic factors of patients simultaneously. By evaluating the clinico-genomic factors for multiple patients, novel insights can be gained for the patients who may have overlaps with peers in the disease groups and with non-peers from distinct disease groups.
An Interactive System for Comprehensive Geriatric Telerehabilitation

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Abstract: An interactive prototype of home-based geriatric telerehabilitation system was built. The system utilizes individualized plans of fitness-related activities that were designed for a specified purpose using the biking system and the resistance chair. The system successfully integrated exercise principles and real-time monitoring techniques aimed at increasing patient adherence, achieving personalized goals and supporting patient safety.
Representing and Validating Cancer Study Metadata Standard Using RDF Shapes Expression Language

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Abstract: The RDF Data Shapes Working Group is developing a W3C Recommendation for the Shapes Constraint Language (SHACL), which formally describes structural constraints on instances in Resource Description Framework (RDF) graphs. The objective of this study is to create a publicly available SHACL-based schema that defines a common way to represent the subset of the ISO/IEC 11179 Metadata Repository data element model in RDF.
Physician Participation in Meaningful Use and Rehospitalization of the Dually-Eligible

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Abstract: Dual-eligibles have higher rates of rehospitalization compared to the broader Medicare population. Outpatient physicians’ use of interoperable electronic health records may reduce readmission rates. We compared the odds of rehospitalization pre/post Meaningful Use for dual-eligibles attributed to physicians who participated in the program with dual-eligibles attributed to matched control physicians. Relative to the control group, physician participation in Meaningful Use was associated with 6% lower odds of rehospitalization (Odds Ratio: 0.94, 95% confidence interval: 0.90-0.98).
Automatic Phone and Text Message Reminders to Increase Patient Completion of Outpatient Laboratory Testing

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Abstract: Laboratory evaluation is a significant part of patient care. In many healthcare systems, labs are not collected at the point of care, but rather are ordered in clinic with patient instructions to go to a different location to collect the lab. Therefore, many ordered labs may not be collected. We implemented an automated phone and text message reminder system that increased lab collection over 250%. Phone messages were more effective than text messages.
Characteristics of Older Adults’ Adherence of a Wearable Fall Detection Device

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Abstract: One strategy to detect falls related to aging is the use of informatics tools, such as sensor devices. This is a secondary analysis of a study that explored the use of a fall detection device that has a Global Positioning System (GPS) function. Based on the results, ability of older adults to perform activities of daily living may assist in identifying those who adhere in use of a fall detection device with a GPS function.
aceso (After Cancer Education and Support Operations): a clinical decision support system approach for engaging breast cancer survivors

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Abstract: aceso is an interactive tool, supporting breast cancer survivors as they transition from hospital to home. It collects observations and symptoms from the patient, monitors and analyses them in combination with their breast cancer related medical history, detects significant patterns, and issues appropriate alerts, notifying them preemptively of any possible treatment-related side effects. The alert system is based on a set of pre-compiled rules that state the condition, action and context for issuing each alert.
Design and Implementation of a Relevant Data Report Tool for Patients Presenting to the Emergency Department with Chest Pain

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Abstract: Few clinical decision support tools exist to extract in real-time the pertinent portions of a patient’s voluminous medical record. A patient who presents with chest pain (for example) may or may not have relevant information documented in multiple disparate locations within an EHR. We will create a summary tool that automatically gathers and displays data in tabular, conclusion, and full-report formats. We intend to apply this model to other chief complaints and hospital departments.
Health Information Technology Evaluation Studies:
Trends in Communities and Geography from 2004 to 2014
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Abstract: Health information technology evaluation studies are increasing. We investigated trends in research groups, journals, geographic distribution and number of articles published (2004-2014). Five publications appeared most frequently accounting for one-third of articles published. Twice as many articles were published after 2009 than before.
Usability of mobile apps for radiology diagnostic decision-making

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Abstract: We evaluated the usability of eight iOS mobile apps currently available in radiology to support training in diagnostic decision-making. Lab-based usability tests using video analyses with the triangular method approach were conducted to determine usability issues. The methods include video analysis, system usability scale (SUS), and a debriefing session with participants. Six staff radiology physicians completed a typical set of tasks, using think-aloud strategy. Thirty-five unique usability issues were identified and 18 improvements were suggested.
Analysis of the Great Divide Between Cardiovascular Risk and Health Scores

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Abstract: Underlying many cardiovascular intervention efforts are assessments based on CV risk and health scores. Both offer opportunities to address CVD burdens, but there exists a divide between results of these scores. We present existing CV risk and health scores for a sample population to increase our understanding of the current environment. This process reveals existing barriers to usability of clinical research and public health informatics tools allowing for the design of appropriate next steps.
Mixed-Methods Study of Risk Communication in a Patient Decision Aid

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Abstract: Communicating risk to patients within a patient decision aid requires careful designed and testing. This mixed-methods study recorded the impressions and reactions of rural patients to an iPad app that helps women decide at what age to begin having routine screening mammograms. Our results indicated that the app’s numerical risk graphics were well received and informative; themes are discussed. Estimates of mammograms’ positive predictive value were also better after using the decision aid than before.
Natural Language Processing facilitates delivery of individualized recommendations at the point of care

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Abstract: Clinicians struggle to provide consistent care for many conditions despite the availability of standard guidelines. This problem is intensified when clinicians attempt to provide personalized care, primarily due to time required to search for patient specific data in the medical records and to integrate knowledge regarding the clinical conditions. With a multi-group collaboration effort at Mayo Clinic, we have developed a new web based EMR agnostic care recommendation solution called MayoExpertAdvisor (MEA) that integrates information from both the structured resources and unstructured clinical notes and reports. Natural Language Processing (NLP) has been utilized to extract clinical information from clinical text relevant to three conditions: hyperlipidemia, atrial fibrillation, and heart failure. We demonstrate that NLP plays a critical role in facilitating the delivery of individualized recommendations of those conditions at the point of care.
A Novel Visualization for Rapid Summarization of Patient History: Application to Cirrhosis

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4. Gastroenterology, UCSD, San Diego, CA, United States.
5. Gastroenterology, Dept of Veterans Affairs, San Diego, CA, United States.

Abstract: Patient phenotype identification serves as an essential step for clinical trial recruitment, outcome prediction, survival analysis, and other retrospective and prospective research studies. We sought to develop a visualization to succinctly summarize a patient’s clinical history relevant to advanced liver disease progression to support rapid clinical interpretation. We piloted the visualization using the D3 JavaScript engine. We were able succinctly display complex clinical information and allow users to quickly identify disease state changes for patients with cirrhosis.
A Lifecycle Management Solution to Manage Mississippi’s Data Lake and Big Data Analytics Platform

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Abstract: We are building a big data repository and informatics platform for the State of Mississippi from which to address our many population health challenges. The most immediate challenge we faced was how to manage the deluge of data being contributed from a variety of sources. In order to manage the lifecycle of massive amounts of data, we developed a lifecycle management application (LCM), which we then expanded to also manage spatial data and custom applications.
Problem List Quality in Ambulatory Medicine

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Abstract: The level of evidence required to place a diagnosis in the problem list is often ambiguous, and The Joint Commission and Meaningful Use have conflicting definitions of the problem list. A chart review was conducted to evaluate how the problem list was being used after installation of Epic Ambulatory. 86 charts were reviewed, and 1-30 diagnoses were included on the problem lists, with 95% of the providers reviewing the problem list. However, 73% of the lists contained duplicate diagnoses, 60% of the lists contained signs and symptoms, and 60% of the patients had active diagnoses that were not on the problem list. The lack of a harmonized definition of a problem list and the difficulty of determining which diagnosis are significant enough to be included on the problem list contribute to low problem list quality.
Abstract: Public funding for implementing health programs and policies in India is significant and demands close monitoring and ongoing program evaluations. Unfortunately, the health information system landscape is highly fragmented and the new national health policy envisions to create an Integrated Health Information Architecture (IHIA) to address the problem. This research study develops the underlying rationale, describe key stakeholders, and proposes a state level IHIA to meet the needs of program administrators at different levels.
A Combined HIS In-house Developing Model of Integrating Patient Information

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Abstract: It has been challenging to integrate patient information in hospitals with various and complex information systems to care or serve patients. We utilized our in-house HIS developing capability and a team approach, in which the nursing informatics expertise played a very important role, to successfully design an integrated patient information system on a mobile platform in less than a year. Compared to the buying-out strategy, our making-in model has provided us a very cost-effective and efficient opportunity to develop new systems to respond to the rapidly changing healthcare environment.
Information Acquisition Preferences in the Intensive Care Unit

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Abstract: Patients and families frequently suffer Post Traumatic Stress Disorder (PTSD) after an Intensive Care Unit stay. Tailored information transfer and personalized support may decrease risk of PTSD. In surveys of community dwelling adults, significant relationships between use of computer tablets and a preference for more autonomous shared decision making ($\beta=-0.113, p=0.038$), and use of Internet for health information ($\beta=0.301, p=0.015$) were associated with the desire to use a tablet computer for communication.
Semantic and Interactive Timeline for Patient Data Visualization

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Abstract: In this work, we introduce new advanced features into a timeline framework for patient data visualization, using interactive GUI, semantic data aggregation and time navigation functionalities. Domain and visualization ontologies were developed and combined with a set of rules to dynamically filter the patient dataset and generate adapted views according the physician specialty into the timeline. Our prototype is used by both physicians and data scientists to better analyze health care events in several dimensions.
Applying an instant messaging system at the hospital to support TRM

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Abstract: Effective communication among the healthcare team is needed to facilitate team resource management (TRM). We aimed to develop an instant messaging system, Link to Team (L2T), embedded in the original hospital information system to improve the communication and coordination among all members of the healthcare team. Based on the idea of patient-centered and workflow-driven, we used the rapid application development model (RAD) to develop an easy-to-use and user satisfied instant message system.
Improving Failure Mode and Effects Analysis through Electronic Health Record-Assisted Team Identification
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Abstract: This study compared a hand-drawn process map of activities and providers performing them within an emergency department compared to the same data derived from an electronic health record to determine whether EHR documentation could be leveraged to develop a comprehensive list of providers for a Failure Mode and Effects Analysis team. The study concluded that EHRs might be useful for supplementing current FMEA team assembly practices by identifying engaged providers overlooked by typical process mapping.
Decision Factors Influencing the Selection of a "Hand-off" Model Versus a "Hold-on" Model for Telehealth Service Lines

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Abstract: The need for robust and effective telehealth programs (often composed of multiple service lines) has never been greater, leaving healthcare organizations clamoring to develop delivery systems that result in effective workflow and desired outcomes. Examined are two distinct management approaches to telehealth service lines - “hand-off” versus “hold-on” models. Results specify factors underlying model selection and the role of telehealth departments in facilitating effective workflows to support successful implementation and sustainable operations.
Developing an Electronic Survey to Capture Current State of Acute Care Patient Portals to Inform Best Practices and Future Directions

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Abstract: To date, patient portal research has been in the ambulatory settings. There are limited data on the use of patient portals in acute care settings. Using an iterative process, we developed an electronic survey that aims to capture critical data on the current state of acute care patient portals at four academic medical centers in order to identify new directions for development and investigation. We describe the survey development process and the resulting survey.
Design of a “Synthetic” Data Set for teaching and evaluating analytics methodology in Accountable Care Organizations

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Abstract: Accountable Care Organizations (ACOs) represent a relatively evolving model of reimbursement for healthcare delivery. The various ACO models include financial incentives for delivering quality healthcare at a reduced cost. These organizations present a unique challenge by requiring analytics of clinical, financial and outcomes data from participating organizations. This paper presents one organizations development of a “synthetic” ACO for the purposes of simulating the challenges of analyzing data similar to that found in an ACO environment.
Health Care Providers’ Perceived & Actual Problems in the Use of HIT in the ED
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Abstract: Emergency Departments (EDs) are complex environments due to the interdependent, episodic, collaborative, non-linear, and decision dense nature of the patient care. To gain a true perspective of provider perceptions and the reality of the ED workflow environment, recorded semi-structured interviews, ethnographic observations, recordings of patient handoff information, and digital sound pressure level (SPL) data were collected. The preliminary analysis indicates a mismatch between healthcare providers’ focus and perceptions of the seriousness of electronic health record (EHR) navigational difficulties, while ignoring the actual impact of task interruption and excessive noise levels on cognitive functioning. A discrepancy between providers’ perceptions and reality, suggests there may be a risk when health information technology (HIT) system changes are performed on interview data alone. Our findings suggest ethnographic observations in addition to interviews may be necessary to obtain a complete picture of an ED workflow environment prior to implementing any HIT system alterations.
Caveats of Using Social Media Data for Medical Research: A Report from a Study on Eye-Related Symptoms in Tweets

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Abstract: Numerous prior studies have demonstrated that social media can be a valuable source of information for purposes such as early detection of disease epidemics and clinical and public health research. Nevertheless, researchers have also cautioned about the use of social media data because such data are inherently noisy. We applied MetaMap to a random sample of twitter messages to identify potential mentions of eye-related sign/symptom concepts. We then conducted a manual review of the results extracted by MetaMap to assess their medical relevance. The objective was to identify non-medically relevant tweets that may be ‘mislabeled’ by MetaMap, and common reasons for this mislabeling. We demonstrate that MetaMap, performed very poorly in extracting medical concepts from tweets. Of the tweets identified by MetaMap as containing medical relevant concepts, 70% were deemed by the two coders as non-medically relevant. Extreme caution shall be therefore used when applying NLP tools to extract medically relevant content from social media for disease surveillance or for research.
Real-time SNOMED Post-coordination of Adverse Drug Reactions: Model Formulation for an Actionable Registry

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Abstract: Updated and accurate allergies records are key for a safe patient care. We present a model to manage the registry of adverse drug reactions and allergies in our home-grown EHR, aimed at maintaining updated allergic status for our patients, and doing it on a manner that produces actionable data we could leverage, all while being minimally disruptive in the usual clinical workflow. Preliminary results are presented.
Using OpenEMR in HIT Training

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Abstract: OpenEMR has provided an effective sandbox for Health IT trainees at Columbia University. Its usage has reinforced many of the concepts taught in our program, and our students have been able to make a positive contribution to the OpenEMR community. We will outline how we have used OpenEMR and describe the intended benefits as well as some unanticipated benefits discovered while using an open source, ONC-certified electronic health record for training.
Variability in the Sequence of HL7 2.x Event Code Types used to Represent Encounters Across a Health Information Exchange

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Abstract: The purpose of the study was to analyze variations in use of HL7 2.x event code types for acute care sites within a health information exchange based on 3 types of patient encounters: 1) treat and release emergency department (ED) visit, 2) ED visit leading to an inpatient admission, and 3) other types of encounters. 3,363 HL7 messages were analyzed, resulting in 32 patterns of HL7 event code type sequences.
The Role of Technology Utilization in Designing Self-Management Systems
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Abstract: We report preliminary findings associated with the development of an electronic family-health information management system (eFHIMS). A directed content analysis of family caregiver focus groups was conducted to identify the extent to which Hispanic caregivers apply and perform self-management skills and tasks, respectively, as a basis for generating participatory design activities. Technology use was mentioned more than any other skill by caregivers to address and/or accomplish self-management tasks.
Evaluation of the accuracy of CDS for cervical cancer screening and surveillance

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5. Primary Care Internal Medicine, Mayo Clinic, Rochester, MN, United States.

Abstract: Complexity in cervical cancer screening and management guidelines and the lack of personalized care recommendation systems poses a significant challenge to offer appropriate individualized care recommendations in cervical cancer screening and surveillance care process models. At Mayo Clinic, we have developed a clinical decision support system (CDSS) to automate standard guidelines based on information available in electronic medical records (EMRs) for cervical cancer screening and surveillance at the point of care. However, revision of these guidelines has posed a significant challenge to the development of the CDSS. In this work, we studied accuracy of the CDS system after updating it to implement the latest revision of the guidelines. Micro-level error analysis has allowed us to better understand difficult decision scenarios for cervical cancer screening and surveillance at the point of care.
Abstract: We initially developed and implemented an EMR system for oncology in a large teaching hospital. As part of the implementation, we first defined and added the concepts for oncology in the terminology dictionary, which is the basic building block of most OpenMRS systems by modelling the concepts. We then designed different forms primarily for each part of the body and/or system where cancer occurs and for the radiation therapies such as EBRT and Brachy mostly using HTML form entry modules. The other modules were used for integrating anatomical drawings with the clinical text data on forms to design a user interface for EMR. Although the EMR system proved beneficial in the initial pilot run, recording more than 150 patients data within months however there were challenges faced due to UI design and usability concerns of EMR which limited the further use of this EMR system.
The Process of Using Focus Groups to Inform Development
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2. Information Technology Consultant, Sovern Run, LLC, Albright, WV, United States.

Abstract: We completed focus groups in an academic, outpatient, and community setting. The approach was developed using Krueger’s Focus groups: A practical guide for applied research. Focus groups were attended by 29 healthcare team members including 7 males and 22 females, age range 23 to 62. The participants included: Medical Assistants, Registered Nurses, front desk staff, Physicians, Nurse Practitioners, Physician’s Assistants, Pharmacists, Social Workers, Administrators, and Board Members.
Abstract: The emerging field of Nutrigenomics, which investigates how genetic polymorphisms influence response to diet, poses the need for an integrated solution to collect, monitor and analyse large sets of data. We developed an integrated platform, called Dietary Monitoring Solution, enabling the collection of phenotypic, genetic and lifestyle information, linked to a mHealth application and we used it to systematically collect data from patients and citizens, in the context of a large epidemiological study.
Abstract: Obtaining and updating patient preferences for participation in research can be cumbersome for both patients and clinical investigators. A patient portal to the electronic health record (EHR) provides a suitable venue for patients to indicate and manage their preferences. However the process may be confusing at times to patients. As a result unplanned questions and concerns may arise. We report on the qualitative analysis of patient responses thus far.
Engaging patients using an inpatient web-based patient portal and evaluating effectiveness in a pragmatic randomized controlled trial

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2. Department of Biomedical Informatics, Columbia University, New York, NY, United States.
3. Value Institute, NewYork-Presbyterian Hospital, New York, NY, United States.
4. Cardiology, NewYork-Presbyterian Hospital, New York, NY, United States.

Abstract: This poster describes the study design for an innovative, pragmatic randomized controlled trial to evaluate the impact of a personalized, web-based patient portal, Inpatient myNYP. The federally funded trial is being conducted with cardiology patients at NewYork-Presbyterian Hospital/Columbia University Medical Center. The purpose of the intervention is to improve engagement and satisfaction in hospital patients.
Evaluating Efficient Clinician Utilization of Electronic Health Records
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3. Tulane University, New Orleans, LA, United States.

Abstract: We analyzed the utilization of selected electronic health record (EHR) features and tested the clinician-level characteristics associated with the utilization. Data directly from the EHR show variability in EHR utilization. The EHR was efficiently used for patient information review and timely message review but seldom for order sets. Clinician characteristics such as care setting, practice type, and age are associated with utilization of these features.
Stratification of Risk for Fall Resulting in Hospital Readmission through Medication Side Effects Profiles

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2. Partners Research Computing, Partners Healthcare, Boston, MA, United States.

Abstract: Fall related injury is a major source of morbidity and mortality. Stratification of fall risk is an important step towards targeted intervention. Epidemiological data suggest that dizziness, syncope, hypotension, and confusion contribute to a patient’s fall risk. Off-target effects of medications with these adverse effects may themselves impart detectable fall risk. Testing this hypothesis in a statewide database, we find that inclusion of medication side effects enhances predictions of hospital readmission due to falls.
Partnering to Develop a Service-based CDS System for Public Health Reporting Specifications

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1. Northrop Grumman, Atlanta, GA, United States.
2. University of Utah, Utah, UT, United States.
3. Rollins School of Public Health, Emory University, Atlanta, GA, United States.
5. CSELS, Centers for Disease Control and Prevention, Atlanta, GA, United States.

Abstract: The Reportable Condition Knowledge Management System (RCKMS) project is focused on developing an infrastructure to present reporting criteria in a human-readable and electronic format to support automated reporting to public health. Currently, healthcare personnel struggle to find jurisdiction-specific reporting specifications, and to keep abreast of changes. The RCKMS project partners public health practitioners, with a multi-jurisdictional healthcare provider, and a Clinical Decision Support consultant to collaboratively develop a service-based CDS for public health reporting specifications; a critical component of automated case reporting.
Abstract: Date-of-birth verification is a viable way for Interactive Voice Response Systems to identify patients. However, it can lead to technical complexities for the user. This analysis examines the errors that occurred during patient date-of-birth verification for an adverse drug reaction screening. The majority of errors in verification were caused by inconsistent patient responses that did not meet the format required by the data input system.
Development of a Novel Application for Home Management of Chronic Low Back Pain

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2. University of Kansas Medical Center, Kansas City, KS, United States.

Abstract: The objective of this project is to develop and test an iPad application for home-based therapy of chronic low back pain. Up to twenty patients will utilize the application instead of in-person physical therapy for six weeks. The application educates patients on pain physiology, fear avoidance, exercises, and pain management options. Patients will complete the Computer System Usability Questionnaire to assess usability, as well as questionnaires to evaluate changes in fear avoidance and pain control.
Improving Evidence-Based Migraine Management in VA Primary Care Clinics by Utilizing Informatics Tools

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2. VA Connecticut HCS, West Haven, CT, United States.
3. Neurology, VA Connecticut HCS, West Haven, CT, United States.

Abstract: Migraine headaches are a common cause of impairment and lost employment productivity; people with migraines miss on average four days of work a year and cost the U.S. an estimated $13 billion a year. Veterans are particularly vulnerable to developing migraines because of their relatively high rate of traumatic brain injury. Having an immediate access to the evidence-based guidelines as a tool will greatly assist in educating our clinicians to effectively manage migraine.
Usability of a phenotype builder prototype and lessons learned for the design of phenotyping tools

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2. Vanderbilt University, Nashville, TN, United States.
4. NorthShore University HealthSystem, Evanston, IL, United States.

Abstract: The use of electronic health records (EHRs) for the development of phenotype algorithms offers much potential, but is hindered in part by the lack of portable, standardized phenotype definitions. One solution is the creation of novel informatics tools to facilitate algorithm development. Here we develop design guidelines from potential end users of phenotyping software using qualitative methods. Results are presented as themes to inform the design of future software systems.
The Everyday Practice of Health for Mexican Women in New Brunswick: Barriers and Opportunities

M. Morales; X. Zhou;

1. School of Communication & Information, Rutgers University, Brooklyn, NY, United States.

Abstract: This poster presents initial findings of an exploratory qualitative study that investigates the healthcare practices of Mexican immigrant women, with particular attention paid to folk or traditional health behavior of this community. Findings from focus group interviews reveal that the pervasiveness of several institutional and systemic barriers challenges the way this community practices health. We hope that a better understanding of community health practices might improve communication between the immigrant community and the healthcare system.
Extending the Project HealthDesign Experience via On-Line Public Data Repositories

A. J. Morland; 1 ; P. F. Brennan; 1;
1. Industrial and Systems Engineering, University of Wisconsin-Madison, Madison, WI, United States.

Abstract: In Project HealthDesign five teams designed PHR apps that supported self-tracking of patient generated data. These teams generated thousands of data points representing time-stamped encounters used by patients to, for example, record mood or document meals. We deposited sets of self-tracking data generated from each project in ICSPR, a public data repository, to make those data available for free as a test bed for use by future PHR app designers.
An automated tool to replicate data between multiple versions of Profiles Research Networking Software's (RNS)

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1. Center for Biomedical Informatics, Charles R. Drew University of Medicine And Science, Los Angeles, CA, United States.

Abstract: At Charles R. Drew University of Medicine and Science (CDU), we adopted different versions of Profiles RNS to use locally and to feed their data to other research consortia. In order to synchronize information between different instances of Profiles RNS which are architecturally different, we created an automated tool to implement replication of data involving complex cross-referencing, number of inner and outer joins and Node table lookup across different versions of Profiles RNS databases.
HDD Access – an Open Source Terminology Server with Publicly Available Healthcare Terminology Content

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Abstract: HDD Access is a publicly available terminology server published since 2012 by 3M with support from the Department of Defense (DoD) and the Department of Veterans Affairs (VA). HDD Access supports easy implementation, maintenance and use of both standard and local terminologies. It includes standard terminologies such as RxNorm, ICD-9-CM, ICD-10-CM, ICD-10-PCS and others. It also allows users to add their own terminology content. We will demonstrate the HDD Access terminology server, its terminology content, browsing, searching and authoring tools, web services API, and the lessons learned in creating a publicly available open source product. We will demonstrate how standard terminologies can be implemented easily, how users can create local extensions to support their own terminologies, and how applications can use terminologies through a web-services API based on HL7 Common Terminology Services.
Abstract: A medical network system, the Miyagi Medical and Welfare Information Network (MMWIN), has been in development since 2013. MMWIN allows the backup of medical information of hospitals, clinics, pharmacies, and care facilities. By the end of February 2015, more than 1.6 million registered patients and more than 42 million pieces of backed up data were recorded on it. Increasing patient registration and maintaining a balance between income and cost are critical to maintaining this project.
Abstract: Obtaining unbiased results when studying clinician information needs is challenging. We developed a method for observing pharmacists and better understanding their information needs in the hospital setting using an eye-tracking camera and contextual inquiry. The method was well received by the pharmacists and we will discuss some of the pros and cons of using such a method.
Role of Social Media in shaping public health messages regarding Human Papillomavirus (HPV) vaccinations

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1. Health Informatics and Administration, University of Wisconsin-Milwaukee, Milwaukee, WI, United States.

Abstract: Human Papillomavirus (HPV) is the main cause of cervical cancer. Cervical cancer is a preventable disease, when found early, through proper detection of health screenings and also through HPV vaccinations. The study objective is to determine how social media play a role in shaping public health messages especially in the case of HPV vaccinations.
Development of Anatomical Radiology Ordersets
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2. St. Louis Children's Hospital, St. Louis, MO, United States.
3. Emergency Department, Washington University, St. Louis, MO, United States.

Abstract: The ordering of radiology studies can be error prone. Locally this was seen due to terminology issues. Clinically oriented ordersets for MRI, CT, and ultrasound studies were developed that organized studies anatomically and by contrast requirements. These ordersets served to improve order accuracy and taught trainees standardized terminology for studies that they were able to reapply.
Abstract: A National Pediatric Learning Health System (PEDSnet) is performing data enrichment by integrating its current clinical-based dataset with external data from various data partners. Because the datasets are distributed among different institutions, a privacy-preserving and efficient record linkage protocol is needed for data integration. This study proposes a workflow to adopt a privacy-preserving record linkage protocol developed by the National Database for Autism Research (NDAR) project to support PEDSnet data enrichment objectives.
Evaluating Health Information Systems based on expert knowledge reference
C. F. Ortolani; 1; M. A. Carvalho; 1; I. T. Pisa; 1;
1. Health Informatics, Unifesp, Sao Paulo, Sao Paulo, Brazil.

Abstract: This paper describes a web tool used for Health Information System (HIS) assessment through identification of security feature presence. The tool implements an evaluation model based on terms extracted from several standards commonly used to support HIS construction. This text corpus was lapidate by Certified Information Systems Security Professional (CISSP) experts via Argument-Delphi and Focus-Group at previous work. Three different uses (tool input types) allow distinct user profiles, from technically inexperienced or administrative focused personnel only able to identify system’s certification declaration to an auditor capable of selecting system behavior or perform feature reconnaissance directly.
Informatics Strategies to Address Cancer Worry of Urban Dominicans

A. L. Pacsi; 1
1. Nursing, Columbia University, Yonkers, NY, United States.

Abstract: As part of the Washington Heights/Inwood Informatics Infrastructure for Comparative Effectiveness Research (WICER) project, we conducted a survey that identified cancer as a worrisome health concern of urban Dominicans residing in Washington Heights/Inwood in New York City. Those who were married, younger, less depressed, and those who had received a cancer diagnosis previously were more likely to be worried about cancer. Survey data serve as a foundation to develop targeted informatics strategies to address cancer worry.
Organizing Drugs in RxNorm by Therapeutic Classes
M. B. Palchuk; 1, 2; M. Kamerick; 1;
2. Harvard Medical School, Boston, MA, United States.

Abstract: The therapeutic classification of drugs is used ubiquitously. In the public domain, NDF-RT's “Drug Products by VA Class” provides the ability to organize medications mapped to RxNorm. We used it to group RxNorm ingredients by therapeutic class. The result, while useful for analysis, is missing 13% of the valid RxNorm ingredients.
Abstract: For the State HIE Program evaluation, we developed a composite measure of state HIE progress. Results suggest program factors became more important over the course of the program in their association with HIE performance. Smaller states, states with lesser competition among hospitals, and higher pre-HITECH office based-EHR adoption were likely to be in the highest HIE quartile. States with opt in consent models were likely to be in the lower HIE quartiles.
Efficacy of Clinical Alerts Designed to Decrease the Incidence of Contrast Induced Nephropathy

M. A. Parkulo; 1  J. E. Crook; 1  L. J. White; 1  C. S. Thomas; 1  M. Rucci; 1

1. Mayo Clinic, Jacksonville, FL, United States.

Abstract: Contrast Induced Nephropathy (CIN) is a common and potentially preventable iatrogenic complication. Clinical Decision Support has been promoted as a tool to assist providers in preventing this complication especially in high risk patients. We implemented Clinical Decision Support rules at Mayo Clinic in Florida in 2010 to assist providers in identifying high risk patients and suggest alternative imaging or prophylactic measures to reduce the risk of CIN. We retrospectively compared the rate of creatinine testing prior to contrast administration, rate of contrast use in high risk patients and rate of CIN in patients who we had appropriate data prior to and following implementation of the rules. Identification of high risk patients as evidenced by measuring of creatinine within 30 days of contrast use increased significantly, but there was no reduction in contrast use in high risk patients or decline in the incidence of CIN in those patients we could assess.
Finding Similar Drug Classes using RxClass

L. Peters;¹; T. Nguyen;¹; O. Bodenreider;¹;

1. National Library of Medicine, Bethesda, MD, United States.

Abstract: RxClass, a web-based browser for drug classes, supports navigation between RxNorm drugs and drug classes from several sources (ATC, MeSH, DailyMed and NDF-RT), and allows users to explore similar classes.
Meta-Analysis of Ontology Applications in Healthcare

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Abstract: This poster presents the meta-analysis of ontology applications within the last 15 years to evaluate the patterns of implementations and outcomes. We discovered that the focus of ontology implementations were merely at a specific-domain level. Upper ontology was absent in most of the applications even when their purposes was reuse and sharing. The majority of ontology implementations remain at strict research level and their long-term implementation plans were missing.
Use of an Adaptive Agent-Based Model in Evaluating Patient Preferences in Healthcare

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3. Harvard Medical School, Boston, MA, United States.
4. Clinical Informatics, Partners eCare, Partners Healthcare, Boston, MA, United States.

Abstract: Current healthcare reform policies emphasize the need to cultivate empowered patients that will make informed and intelligent decisions about their care. The complexity of the healthcare system requires new methods to model patient behaviors and preferences. Through the development of a pilot computer based adaptive agent model, we will potentially demonstrate the emergent behavior of patients in healthcare through the interaction of individual patient and other system agent preferences.
Data-driven identification of factors for appropriate selection of lab tests

G. Prakash;¹
1. Independent Scholar, Mumbai, Maharashtra, India.

Abstract: The topic discussed in this paper is the systemic identification of lab tests that measure the same analyte from a data set, and the analysis and identification of heuristics that would guide the appropriate selection of lab tests.
Usability Testing of a Complex CDS Tool in the ED; Lessons Learned

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2. Department of Emergency Medicine, Hofstra North Shore-LIJ School of Medicine, Manhasset, NY, United States.

Abstract: Clinical decision support (CDS) tools for PE (Pulmonary Embolism) diagnosis have been designed and implemented over the past several years with limited success. We sought to design and test a CDS tool that would be implemented into the Emergency Department Electronic Medical Record (EMR). This paper highlights the usability testing conducted when designing the CDS tool.
Clustering Health Data to Discover EBP Interventions for Sepsis Prevention and Treatment for Health Disparities

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4. Hennepin County Medical Center, Minneapolis, MN, United States.

Abstract

Sepsis or septicemia has doubled from 2000 through 2008, and hospitalizations have increased by 70% for this diagnosis. Use of evidence-based practice (EBP) guidelines, such as the Surviving Sepsis Campaign, could lead to earlier diagnosis, and consequently, earlier treatment of sepsis. However, these guidelines have not been widely incorporated in clinical practice. The overall goal of this study is to analyze patterns of EBP guidelines use and changes in health status over time, particularly for patients with health disparities. Descriptive results comparing actual care to the EBP guidelines for the population as a whole and for those with health disparities and other variables from the clustering analysis will be reported. Mining techniques applied to this cohort provide a better understanding of predictor factors between different septic populations that have different health outcomes.
Data Integration Opportunities and Challenges for the ADVANCE Clinical Data Research Network

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1. Research, OCHIN, Inc., Portland, OR, United States.

Abstract: The increased data collection and integration supported by the ADVANCE Clinical Data Research Network will facilitate rich, impactful PCOR. Collecting and integrating multiple sources of data (ambulatory, hospital, claims, patient reported outcomes, and community data) raises many challenges. Some challenges are surmountable while others require workarounds or even changes of scope. Details of these challenges will be discussed.
Abstract: To characterize medication errors in computerized prescriber order entry (CPOE) systems, prescribers at Brigham and Women’s Hospital who discontinued a medication indicating “error (erroneous entry)” were queried for details. Prescriber responses showed most erroneous discontinuations were from “wrong patient” and “wrong medication” errors. We found prescribers have varying definitions of “error (erroneous entry),” suggesting that CPOE discontinuation categories should be more clearly designed and explained, and CPOE error data be systematically monitored to prevent errors.
A method to automatically create titles of clinical notes in electronic medical records

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Abstract: A clinical note title provides a glimpse to the issues dealt with on the day of the visit; it can allow providers to quickly identify significant finding. Without opening the entire note to understand its contents, a title can help providers decide which notes to open and where to focus their attention. When such titles were absent, we sought to develop methods to automatically create clinical note titles utilizing clinical & billing system data.
Abstract: An enhanced electronic referral management system (ERMS) was developed in an ambulatory EHR to meet a series of best practice steps for referral management. The objectives of this study were to assess PCP and staff satisfaction with the ERMS and to assess improvements in process and workflow by conducting surveys pre and post implementation of the module.
Participatory Design of an Infographic to Inform Decisions about Consent for Health Information Exchange for Persons Living with HIV
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2. Medical Center, Columbia University, New York, NY, United States.
3. Biomedical Informatics, Columbia University, New York, NY, United States.

Abstract: In New York State, written, informed consent is mandated for patient ‘opt-in’ to electronically share medical data with their healthcare providers[1]. The purpose of this study is to use a participatory design [2, 3] approach to develop an infographic that clearly articulates Health Information Exchange (HIE) implications and its distinction from the Health Insurance Portability and Accountability Act (HIPAA) for HIV clinic patients.
Non-Physicians E-Prescribe More than Physicians in a Pediatric Emergency Department

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1. Emergency Medicine, Children's National Medical Center, Washington, DC, United States.
2. Bear Institute, Children's National Medical Center, Washington, DC, United States.

Abstract: Electronic prescribing increases fill rates, improves outcomes, decreases errors, and reduces cost. Adoption rates of e-prescribing by non-physician providers compared to physicians are not known. A retrospective analysis of 45,752 prescriptions from 128 providers at 2 pediatric emergency departments demonstrated that non-physician providers e-prescribe more frequently than physicians (41% and 31%, respectively, OR 1.5, 95% CI 1.46-1.61). Daytime shift, Tuesday, satellite emergency department, and senior attending status were also associated with higher rates of e-prescribing.
Abstract: A newly implemented web-based communication tool has shown promise in transforming the patient-provider dynamic within the acute care environment. This patient portal was developed to be accessible to a wide range of patients, including those who have limited familiarity and varied experience with accessing personal health information via a patient-centered toolkit on an iPad. We identified patients who enrolled and declined to enroll in this study and determined whether certain demographics correlated with patient enrollment.
Identification of Variables that Predict Visit Times for Analyzing Ophthalmology Clinic Workflows

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2. Medical Informatics & Clinical Epidemiology, Oregon Health & Science University, Portland, OR, United States.

Abstract: Efficient workflow in ophthalmology is critical for patient care, satisfaction, and efficiency. Scheduling strategies can potentially improve clinic efficiency if they can accurately predict time variability in exams. Secondary use of EHR timestamps and observed clinical data can help understand workflow by predicting exam-time and wait-time, and may be used to increase office scheduling efficiency. In addition to traditional patient demographics, provider perception may be a useful indicator of total exam and total visit times.
Preserving Semantic Content of Narrative Clinical Information in the OMOP Common Data Model Format

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1. Biomedical Informatics, Columbia University, New York, NY, United States.

Abstract:
To date, little research has been performed on how to preserve the semantic content of relevant clinical information that is contained in narrative clinical notes, while representing the information in the format of a common data model, such as the Observational Health Outcomes Partnership common data model (OMOP CDM).
HomeSHARE: A Distributed Smart Homes Testbed Initiative

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2. Clemson University, Clemson, SC, United States.
3. Indiana University, Bloomington, IN, United States.

Abstract: Smart homes research to support aging in place is mainly characterized by small-scale feasibility studies that fail to translate to real-world use. To overcome this barrier, there is a need for a distributed smart homes testbed that enables deployment of standardized technologies across research environments and conduct of large-scale community-based field studies. HomeSHARE is a multi-site collaboration that seeks to develop such a platform with input from informatics, gerontology, and computer science research communities.
An Analytics Approach for Adverse Drug Event Discovery

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2. Computer Science, University of Arkansas at Little Rock, Little rock, AR, United States.

Abstract: Healthcare organizations generate massive quantities of data which are often convolved with valuable hidden insights. These data are very useful in postmarketing surveillance programs and data mining techniques are employed to discover new adverse drug events (ADEs), but the computational complexity of the traditional data analytics platforms makes the need to migrate to a scalable analytics platform. In this work, we used Spark and MLlib as an alternative scalable solution for discovering signals and advert drug interactions in FDA Adverse Event Reporting System (FAERS) dataset. The goal in experiments was predicting the possibility of certain interactions given a prescribed set of drugs using Spark platform and MLlib library.
Automated Prediction of Human Mobility Patterns in International Humanitarian Response

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2. Department of Health Services, University of Washington, Seattle, WA, United States.

Abstract: Population dynamics in the immediate aftermath of a humanitarian emergency, are incredibly complex, but have the utmost importance to emergency managers attempting to bring order to the chaos. To this end, we present Cascade an analytics system designed to ingest mobile call records, determine the geographic distribution of individuals within the affected areas, predict future movement patterns, and present the findings in a user-friendly way that can facilitate decision making on aid distribution and allocation.
Representation of Genetic Variants in Genomic Sequencing Reports

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2. Division of Pediatric Hematology/Oncology/Stem Cell Transplant, Columbia University Medical Center, New York, NY, United States.

Abstract: As cost decreases and utility increases, more and more information from genomic testing is finding its way into the electronic health record. There are currently no standards in reporting abnormal genetic variants in genomic sequencing reports which leads to inconsistent reporting between institutions. After reviewing 100 genomic sequencing reports performed at our institution, we developed a representation of the common elements used when reporting genetic variants.
Demographic Predictors for Completion of an Interactive Voice Response System Survey Coupled with a Real Time Transfer to a Pharmacist

A. Salazar; 1 E. V. Klinger; 1 J. Medoff; 1 M. G. Amato; 1 P. C. Dykes; 1 J. Haas; 1 D. W. Bates; 1 G. Schiff; 1

1. Brigham and Women's hospital, Boston, MA, United States.

Abstract: In a previous study we demonstrated that an automated call-based pharmacovigilance system that integrates patient data from Electronic Health Records (EHRs) with an Interactive Voice Response System (IVRS) permitted primary care providers to identify drug related symptoms experienced by their patients and thereby recognize adverse events that can lead to important changes in medication use. The purpose of this analysis is to study the demographic characteristics that predict a successful real time transfer to a pharmacist using an active pharmacovigilance system that incorporates data from the EHR into an IVRS.
Changing Physician Changeover:

How adopting a tool in the EMR impacts the perception of paper handoff tools

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2. Indiana University School of Medicine, Indianapolis, IN, United States.

Abstract: Physician handoff tools and electronic medical records (EMRs) may improve changeover; however, paper handoff tools generated from EMRs are also utilized and the effectiveness of paper tool design is not widely studied. The objective was to detail the impact of the EMR implementation of a consistent, standardized handoff tool on resident changeover. Analysis of paper changeover tools after implementing the EMR change shows a decrease the amount of information added and corrected, suggesting improved accuracy.
Integrative Informatics and Predictive Modeling Support for Population Health

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Abstract:
This project targets development of proactive population health informatics methods in a geographically distributed medically and culturally heterogeneous population. This requires data integration from disparate sources including electronic health records, NYS Statewide Planning and Research Cooperative System (SPARCS) data, public health data, mobile and home sensors. Data integration pipelines, data quality control pipelines, data dictionary and data products are being created using various tools, including a novel open source, streaming JavaScript based OpenHealth platform (https://github.com/mathbiol/openHealth).
Meta-Analysis: Impact of Health Information Technology on Patient Engagement and Health Behavior Change
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Abstract: This poster presents a meta-analysis of the impact of information technologies (IT) on patient engagement and behavior change. The primary goals of this review were to analyze the different types of IT used to change patient behavior and their characteristics, the association between IT used in conjunction with behavioral theory and its impact on behavior change, and the association between how behavioral changes are measured and the impact of IT.
Statistically Bolstered Opportunities Assessment in Measure Analytics
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1. ConvergeHEALTH by Deloitte, Newton, MA, United States.
2. Harvard Medical School, Boston, MA, United States.

Abstract: We describe the use of the binomial test of proportions as a means to calculate the impact of patient level attributes on a quality or performance metric’s population with a measure of statistical significance. Hospital administrators can use the output of this methodology as a statistically bolstered opportunities assessment and gain insight into potential detrimental or protective attributes of a metric’s populations for investigation.
Use of mHealth Technology for Supporting Symptom Management in Underserved Persons Living with HIV (PLWH)

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2. Biostatistics, Columbia University, New York, NY, United States.
3. College of Physicians and Surgeons, Columbia University, New York, NY, United States.
4. Biomedical Informatics, Columbia University, New York, NY, United States.

Abstract: The ability to self-manage adverse symptoms of HIV has been shown to improve patient-centered outcome in persons living with the disease. Mobile Health (mHealth) offers an ideal platform for the implementation and dissemination of evidence-based strategies for HIV symptom management. In our proposed work, we will develop a mHealth tool to provide real-time access to important symptom management strategies to improve patient-centered outcomes.
Drug Allergy Interaction Alert Overrides in the Inpatient Setting

D. Seger; 1, 2; S. P. Slight; 2, 3; P. E. Beeler; 2, 9; O. Dalleur; 2, 4, 6; M. G. Amato; 2, 5; T. Eguale; 2, 5, 7; K. C. Nanji; 8; P. C. Dykes; 2, 9; M. Swerdloff; 1; J. M. Fiskio; 2; D. W. Bates; 2, 9;

2. Brigham and Women's Hospital, Boston, MA, United States.
3. School of Medicines, Pharmacy and Health, Durham University, Durham, United Kingdom.
4. Louvain Drug Research Institute, Universite catholique de Louvain (UCL), Louvain-la-Neuve, Belgium.
5. MCPHS University, Boston, MA, United States.
6. Cliniques universitaires Saint-Luc (UCL), Brussels, Belgium.
7. McGill University, Montreal, QC, Canada.
8. Massachusetts General Hospital, Boston, MA, United States.
9. Harvard Medical School, Boston, MA, United States.

Abstract: Drug allergy interaction (DAI) alerts are often overridden in the outpatient setting. We evaluated the rate of DAI overrides in the inpatient setting and why providers chose to override these alerts. The override rate of DAI alerts in inpatients was found to be very high (83.9%). The total number of alerts fired for true allergic reactions (immune-mediated) was only 38,224 (29%) of which 31,191 (81.6%) were overridden.
Abstract: Clinical research on real-world dataset involves a large multitude of clinical data parameters including demographics, diagnosis, surgeries, procedures, prescriptions, laboratory variables as well as side-effects and adverse events. We have developed an advanced visualization to perform a cluster analysis to study relationships between these various data parameters, to create virtually all possible sub-cohort combinations and identify the ones that have significant difference in outcomes.
A Framework for Assessing Clinical Data Suitability for Observational Study

N. Shang; 1; C. Weng; 1; G. Hripcsak; 1;

1. Department of Biomedical Informatics, Columbia University, New York, NY, United States.

Abstract: Finding an appropriate clinical database for observational studies is challenging. In this work, we develop a Suitability framework (policy and administration, relevancy, descriptive metadata and provenance documentation, usable, quality) to analyze suitability of clinical databases for research reuse. Aspects important to both data custodians and data consumers are targeted. Our framework will be evaluated with user surveys in an iterative process that reflects experts’ opinion on the matter.
Abstract: One of the main challenges in utilizing Healthcare databases is the existing non-uniformity across the databases. We implemented an NLP- and machine learning-based approach to standardizing and mapping drug names to corresponding HICL codes. We applied a Naïve Bayes method to the intensive care unit (ICU) medication database of Philips eRI database, which is pre-processed and cleaned with a natural language processing (NLP) pipeline. Following our evaluation on a sample data set, we have achieved 99.7% of accuracy in predicting correct, uniform drug name entries.
HealthAlert: A Real-Time Health Monitoring App for Apple's HealthKit

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2. School of Nursing, Duke University, Durham, NC, United States.

Abstract: A team of computer scientists and clinicians at Duke University developed a mobile-based health monitoring solution, "HealthAlert," that provides real-time health status notifications to a patient, their social network, and selected clinicians. Using certified health-measuring devices, a patient can input his or her health data into Apple’s Health app in order for HealthAlert to analyze the data and send relevant notifications as a text or voice message.
Data Mining to Predict Healthcare Utilization in Managed Care Patients
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2. School of Medicine, University of Missouri, Columbia, MO, United States.
3. Computer Science Department, University of Missouri, Columbia, MO, United States.
4. Electrical and Computer Engineering Department, University of Missouri, Columbia, MO, United States.

Abstract: Objective. To improve patient care by mining electronic health record (EHR) data for healthcare utilization predictors. Materials and Methods. Patients with the highest charges during one year were compared to an equal number of patients with low charges. Clinical attributes were associated using a Frequent-Pattern Growth algorithm, then validated by multiple regression. Results. Of 19,012 EHR data elements, 16 predicted charges over $75,000 (p<0.20). Conclusion. EHR mining reveals multiple predictors of high healthcare utilization.
Identifying Population Characteristics Tables in Full Text Articles
G. Sherman; 1; C. Blake; 1; J. Lee; 1;
1. University of Illinois at Urbana-Champaign, Champaign, IL, United States.

Abstract: Authors frequently use tables to provide population characteristics of patients who participate in a study. Automated indexing methods tend to focus on the narrative in an article, rather than tables, even though this data can help physicians determine whether a study is relevant to their current clinical encounters. We provide an automated method to identify tables that contain population characteristics, which can be extracted in a later step.
Implementation of a Mobile Electronic Medical Record System that Uses a Problem-oriented Contiguous Timeline View

A. Shibuya; 1; K. Ogawa; 2; K. Matsumoto; 2; M. Hashimoto; 2; Y. Maeda; 1; Y. Kondo; 1;
1. Nihon University School of Medicine, Tokyo, Japan.
2. KDDI R&D Labs, Saitama, Japan.

Abstract: A mobile electronic medical record (mEMR) system was designed that uses a Problem-oriented Contiguous Timeline View (PCTLV), which presents an overview of patient information (e.g., prescription drugs, laboratory results) along a time-axis on a single screen. Clinicians can view medical history (e.g., insulin doses, glucose levels) that relates to disease management while easily changing time-scales (day, month, year) with one click. The mEMR that uses a PCTLV may have a significant impact on clinicians’ decision-making.
Electronic Medical Records System Support of Patient Centered Medical Home Requirements for National Committee for Quality Assurance Recognition

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Abstract: Identification and subsequent addition of elements to a “home-grown” ambulatory electronic health record (EHR) system can yield useful resources for primary care providers in Patient Centered Medical Homes (PCMH) in the areas of care planning, patient self care support, and new medication management. Opportunities for the EHR to support PCMH goals were identified with new system functionalities added to help practices bridge gaps in documentation needed to achieve National Committee for Quality Assurance (NCQA) Recognition.
Abstract: We studied maximizing information display of clinical trials by comparing PubMed to two alternate versions of a more condensed display (text and table). Twelve physicians completed a survey evaluating three different displays summarizing clinical trials for three vignettes. Participants rated the tabular form more highly (5.9) than the text summary (5.6) and PubMed (4.0) on a 1-7 scale. These results suggest that standardized information display can reduce cognitive task load and time scanning clinical trials.
Leveraging Genetic Findings to Identify High-Risk Chronic Kidney Disease in the Electronic Medical Record

C. Smail; 1
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Abstract: Black Americans with chronic kidney disease (CKD) progress faster than Whites to end-stage renal disease. A variant in the apolipoprotein L, 1 (ApoL1) gene is associated with faster-progressing CKD, explaining most of the observed difference. The variant leads to CKD sub-types with distinct, shared phenotypes that are sometimes recognized by clinicians, who tend to assign diagnoses of hypertensive nephropathy. Using these insights, the objective was to identify patients with ApoL1-like CKD using only clinical data.
Systemic Risk Analysis for Use Cases for Safety-Related Usability of EHRs

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2. University of Texas Health Science Center, Houston, TX, United States.

Abstract: Because EHR safety and usability are affected by multiple socio-technical dimensions in the complex world of healthcare, it is difficult to identify the user cases that will be most helpful in detecting important safety-related usability problems. We used a systemic risk analysis method (FRAM: Functional Resonance Analysis Method) to identify which aspects of the abnormal test result follow-up process have the most impact to safety. These were used to identify safety-critical use cases.
Abstract: The FDA traditionally monitors the safety of marketed drugs by analyzing reports submitted by manufacturers and consumers to the FDA Adverse Event Reporting System (FAERS). In order to enhance prospective detection of emerging adverse drug events (ADE), we investigated leveraging existing PubMed “MyNCBI” functionalities and searching resources to survey the biomedical literature for the latest published safety information in the use case of the new oral hepatitis C drugs.
Machine-to-Machine (M2M) Communication in Home-care

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1. Biomedical Engineering Department, Technological Education Institute (TEI) of Athens, Athens, Greece, Athens, Attica, Greece.

Abstract: The purpose of this work-in-progress paper is to present the status of our attempts to utilize "hybrid" Machine-to-Machine (M2M) Communication, in Home-Healthcare. M2M communication and the Internet of Things (IOT) are growing quickly and we consider that they will be soon adopted in Home-Healthcare and Point-of-Care testing systems, because of their advantages, concerning interoperability and automation of the said systems.
Bringing Context to Data Analytics: A Hybrid Approach to Understanding Clinical Workflow

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2. Biomedical Informatics, Vanderbilt University School of Medicine, Nashville, TN, United States.

Abstract: Understanding workflow complexities is integral to achieving maximum effectiveness within clinical environments. Additionally, the coordination of patient care across multiple care providers has surfaced as an efficiency issue. Understanding workflow can help accommodate differences in user needs, which can improve HIT use and adoption. We offer an iterative, mixed methods, approach of workflow modeling to further the analysis and understanding of clinical workflow.
Comparison of Patient Portal Usage between Employees and Non-Employees

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3. Computer Science, Vanderbilt University, Nashville, TN, United States.

Abstract: Vanderbilt University Medical Center (VUMC) employees are encouraged to view their own electronic health record (EHR). We hypothesized that employees would demonstrate lower use of the patient portal because of their access to the EHR. Employees demonstrated higher use of secure messaging functionalities but frequency and types of other functions used did not vary between groups. Analysis of how employees view their own EHR may guide the development of new functionalities in the patient portal.
Data-driven knowledge base evaluation: Translating an adult CDS tool for use in pediatric care

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3. Pediatrics, University of Utah, Salt Lake City, UT, United States.

Abstract: Knowledge base maintenance is complex and labor intensive but necessary to keep CDS aligned with best evidence and to improve acceptance. We adapted a ventilator management CDS, designed for adult ICUs, for pediatric ICU use. Clinical data combined with data visualization and analytic techniques helped focus knowledge engineering efforts.
Leveraging a Clinical Data Warehouse to improve quality of data in the French DRG-based system (PMSI)

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2. University of Rennes, Rennes, France.

Abstract: The aim of this study is to develop a methodology to improve coding using drug prescription data from the hospital’s clinical data warehouse. A retrospective analysis was performed, using drug prescription data from patients hospitalized in otorhinolaryngology between October and December 2014. On the 122 hospital stays with at least one drug prescription, 92 (75.4%) had at least one missing diagnosis and information on the missing diagnoses was found for 41 hospital stays (44.6%).
A Cross Strait Cooperation Design and Implementation of Mobile Nursing Information System
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1. Jiangsu Province Hospital, Nanjing, Jiangsu, China.
2. MiWell, Taipei, Taiwan.

Abstract: In this study, we developed two-interface nursing information system with web portal and native mobile application. Our goal is to provide the best practice information technology to support point-of-care. The project is separated into two phases. The 1st phase was to integrate barcode identification into medication administration, blood transfusion, and blood sampling procedures. It’s implemented module by module since Aug 2014. We plan to kick off the 2nd phase after phase 1 goes live completely.
A Systems-Based Framework for Informatics Workforce Development to Support Health System Transformation
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Abstract: The United States lags behind certain high-income countries in health outcome versus spending per capita. Intersectoral collaborations are needed among participants in the health system to achieve a collective effect in improving health outcomes among both persons and populations. A competent, informatics-savvy, and boundary-spanning workforce is essential to health system transformation to improve population health. To deliver this intended outcome, the authors developed a systems-based framework to strategically intervene at experiential learning ecosystem leverage points.
Integrating an Externally Developed Clinical Decision Support (CDS) System with an Existing Electronic Health Record (EHR) System at VA

S. Tu; 1, 2; K. Yuen; 2; C. Oshiro; 2; S. B. Martins; 2; I. Valdes; 3; G. O. Welch; 3; P. Heidenreich; 2, 1; M. K. Goldstein; 2, 1;

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2. VA Palo Alto Health Care System, Palo Alto, CA, United States.
3. Astronaut Contracting LLC, Houston, TX, United States.

Abstract: We developed an architecture to integrate externally developed clinical decision support systems into Department of Veteran Affair’s existing CPRS electronic health record system. In a prototype implementation, we demonstrated how ATHENA-CDS can be invoked from within CPRS and how a VA clinician can interact with ATHENA-CDS’s patient-specific advisories within VA’s existing reminder system workflow. These externally generated ‘dynamic reminders’ make use of the CPRS capability to include clickable buttons to take actions within CPRS. This work highlights the desirability for an EHR system to facilitate integration with externally developed CDS services by providing controlled access to patient data and by having mechanisms for interpreting and displaying such computed CDS.
Canary – a Graphic User Interface to a Heuristic NLP Engine  
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3. Boston University, Boston, MA, United States.  

Abstract: Many available NLP packages are either costly or require programming skills, limiting their adoption by clinical researchers. We have developed Canary - a GUI to an NLP engine that implements both context-free and context-dependent grammar, that allows its use by non-technical researchers. Canary allows the user to enter/ edit all of the language model components and apply the language model to a dataset to generate output. Canary executable and code are available upon request.
Abstract: Nearly 20% of hospitalized Medicare beneficiaries are readmitted within 30 days. Hospitals' use of electronic health records (EHRs) may reduce readmission rates. Over 90% of non-federal hospitals now possess Meaningful Use certified EHRs. We compared the odds of rehospitalization before and after Meaningful Use for Medicare discharges from Florida hospitals. Compared to the control group, hospital participation in Meaningful Use was associated with 3% lower odds of rehospitalization (Odds Ratio: 0.970, 95% Confidence Interval: 0.949-0.997).
Evaluation of a Statewide Online HIV-HCV-STD Clinical Education Program – Characterization of Healthcare Providers' Professional Background, Self-Reported Knowledge Increase, and Intention to Change Clinical Practice

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1. University of Rochester Medical Center, Rochester, NY, United States.

Abstract: An initial assessment of the New York State HIV-HCV-STD Clinical Education Initiative online training program has shown very positive evaluations by clinicians and their intention to use the learned knowledge and to change clinical practice. While certain responses may depend on specific courses, years of practice, and services provided, clinicians from the rural areas and with small patient caseload are the groups most benefited from participating in online training.
Building and evaluating predictive models for postoperative ileus prior to colorectal surgery

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2. NYU School of Medicine, NYU Langone Medical Center, New York, NY, United States.

Abstract: Postoperative ileus (POI) is an abnormal pattern of gastrointestinal motility, frequently occurring after abdominal surgery. The goal of this study was to create a predictive model for POI using variables immediately after the preoperative assessment. From a multicenter prospective database, 37 preoperative and surgery-related predictors were used for model building. The LR model was the highest performing classifier with statistically significant discrimination. Model building can be utilized to create a predictive model for POI.
Pediatric venous thrombus embolus (VTE) screening tool: the design, implementation and continuous improvement of a complex clinical decision support tool

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2. Regenstrief Institute, Center for Biomedical Informatics, Indianapolis, IN, United States.
3. Indiana University Health, Indianapolis, IN, United States.
4. Children Hospital of Orange County, Orange, CA, United States.

Abstract: Pediatric venous thrombus emboli (VTE) is increasing in hospitalized children. The project objective was to implement an integrated electronic medical record (EMR) to increase screening, document VTE risk, and provide patient specific clinical decision support (CDS). Since implementation, screening rates have increased to approximately 68% of eligible patients and there have been no VTE in the screened population. The EMR tool has also gone through two improvement cycles to address the usability and quality of data captured, respectively.
Increasing Patient Enrollment in Clinical Trials Using a Web Based Recruitment Application

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2. Harvard Medical School, Boston, MA, United States.
3. Brigham and Women's Hospital, Boston, MA, United States.

Abstract: One of the main challenges for clinical researchers is the ability to recruit an adequate number of participants. We will describe the components of a patient-centered, web based application accessible from the Partners HealthCare patient portal that will enable patients to review current clinical trials associated with health areas relevant to them and initiate the process to enroll in a trial.
A Centralized Data Collection and Management Tool in the VA: REDCap

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1. Department of Veterans Affairs, Hines, IL, United States.

Abstract: REDCap, a web-based data collection and management software is being utilized in over 1000 institutions including the Department of Veterans Affairs (VA). Recognizing the need for a centrally available tool REDCap was implemented. This poster highlights ways that VA researchers and program offices are utilizing REDCap to meet data collection and storage needs.
Routine Collection of Patient-Reported Data in Electronic Form in Clinical Settings: An Analysis of Available Technologies

A. Wilcox; 1; S. D. Tew; 1; J. Poll; 1;
1. Intermountain Healthcare, Murray, UT, United States.

Abstract: Patient-reported data in electronic form is increasingly important for use in healthcare. We analyzed two technologies (scanned forms and tablet computers) for their ability to support patient-reported data collection. We rated each technology on 13 characteristics among 4 functional categories. We concluded that tablets were better than scanned forms for collecting patient-reported data in electronic form. The differences were primarily due to advantages in functionality, while institutional cost, security, and patient preference were balanced.
A BI Tool to Monitor the Intervention Efficiency of Antibiotic Therapy in Leukemia Patients

C. Wu; 1

1. Pharmacy Medication Management and Analytics, The University of Texas MD Anderson Cancer Center, Houston, TX, United States.

Abstract: A BI tool with Hyperion Reporting Studio was developed to monitor the efficiency of the intervention process for the MDACC antimicrobial stewardship team on daptomycin, linezolid, vancomycin usage in leukemia patients. Daily defined dose (DDD) per 1000 patient days, days of therapy (DOT) per 1000 patient days, Cost per 1000 patient days, mean duration per 1000 patient days, and patient length of stay (LOS) were the measurement indexes. The SPC control chart of the each index was generated to measure the efficiency of the intervention on the antibiotics.
Use of an Electronic Health Record as a Research Tool: Frequency of Exposure to Targeted Medical Conditions and Health Care Providers’ Clinical Proficiency

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Abstract: INTRODUCTION: Pediatric care often requires complex decision making and judgments that may deteriorate over time if those skills are not used. Frequency of exposure to specific clinical problems is an important influence on maintenance or decay of health care providers’ (HCP) clinical proficiency in managing those problems. The electronic health record (EHR) could be used to index frequency of exposure and to select clinical problems for research to analyze 1.) Whether health care providers’ clinical proficiency in managing a health condition decays with time since the prior exposure to that condition; and 2.) Which characteristics of the work, worker and workplace affect the magnitude of skill decay. This study explored utility of the EHR in identifying and forecasting specific clinical skills in care for targeted medical conditions that may yield the most beneficial effects on quality and safety of care.

METHODS: This research occurred at Nemours Children’s Health System in the Delaware Valley and Florida. The data were obtained at the HCP level in a completely de-identified, aggregated manner from Nemours EHR Data Warehouse for 2013. The criteria for selecting clinical problems targeted for study were: high frequency of care encounters; varied types of HCPs; adequacy of EHR; variable frequency of exposure to that problem within HCPs; presence of evidence-based practice guidelines; variability in HCPs’ performance; controversy among experts about optimal care; and interest among clinical divisions to facilitate this research. Based on those criteria, the research team selected (from 100 initial candidates) nine clinical problems for further study: obesity, influenza vaccination, gastroesophageal reflux disease (GERD), concussion, supracondylar fracture, idiopathic scoliosis, headache, encopresis-constipation and type 1 diabetes mellitus. Nemours HCPs that have special expertise with each condition served as subject matter experts (SMEs) for task analysis interviews, often supplemented with published practice guidelines, designed to define optimal clinical management of each problem and to specify EHR data elements that could quantify quality of care. The team developed a Δ-t statistic, time since the HCP’s prior clinical encounter with the targeted clinical problem, as an index of frequency of exposure. The team also collected certain worker (e.g. HCP demographics, time since prior board certification, EHR proficiency) and workplace (e.g. on-call schedule, clinic appointment density) variables from sources other than the EHR itself.

RESULTS: The nine clinical problems were evaluated across the Nemours healthcare system, using aggregated data from 2013. Encounter frequency ranged from 1566 cases of encopresis-constipation to 220,774 encounters for influenza vaccination. Mean Δ-t ranged from 1.72 days, for obesity, to 30.79 days for influenza vaccination. Encopresis-constipation, with a relatively low number of cases appeared with the next highest value with a mean Δ-t of 23.25 days. Maximum Δ-t ranged from 285, for obesity to 497 for headaches. Obesity, influenza vaccination and GERD exhibited a maximum Δ-t of < 1 year, but the rest indicated greater than 400 days. Except for influenza vaccination, the distribution of Δ-t for each clinical condition fit a Gamma distribution (P < 0.001), indicating that the appearance of patients for each of these conditions follows a Poisson distribution. The distribution for influenza vaccination differed due to seasonality of administration, but still generally fit the distribution. Number of different clinicians seeing these conditions averaged 250, with Type 1 diabetes having the smallest number of different professionals, at 114.

DISCUSSION: This project demonstrates the utility of the EHR as a research tool in studies of quality and safety of care and frequency of exposure of health care providers to specific health care problems. Use of the EHR to
characterize frequency of exposure of HCPs to specific health care problems will allow health care organizations to be better prepared to identify intervention loci that can lead to improved quality and safety of care in a cost efficient manner. Subsequent steps in our research include building a multivariate model to enable prediction of clinical skill decay/maintenance and to test interventions focused on preventing decay of clinical knowledge and skills.
Simplified Spectrographic Display for Bedside Electrographic Seizure Detection in the ICU
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Abstract: In the ICU, seizures are often detectable only on the electroencephalogram (EEG). A delay in treatment leads to high mortality. Current ICU workflow in seizure detection is complex and may delay treatment. A simplified seizure visualization display for the bedside ICU physician will reduce this delay. This project combines a median power spectrogram (MPS) and hemispheric asymmetry spectrogram (HAS) as a simplified display to visualize seizures. Preliminarily, a non-subspecialist using this display detected more seizures compared to subspecialized neurophysiologists using typical color density spectral display. This suggests that the MPS+HAS display is both simple and effective in seizure detection.
Intelligence in Usability Survey Research (iUSuR): an Online Usability Question Bank for Usability Survey Research

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2. Computer Science & Engineering, The Ohio State University, Columbus, OH, United States.
3. Industrial Engineering, The Ohio State University, Columbus, OH, United States.

Abstract: Because of low cost and easy administration, usability survey research is commonly used in the evaluation of health information technology (HIT), particularly for general user satisfaction or technology acceptance. However, support and resources for usability survey research are limited. We created an online usability question bank to help researchers search and select appropriate instruments for their HIT usability survey research.
Anchor time extraction for building timeline from Korean clinical narratives

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2. Interdisciplinary program in Bioengineering, Graduate School, Seoul National University, Seoul, Korea (the Republic of).

Abstract: This work is on extracting salient times, which can present clinical events on a timeline from Korean clinical narratives. Given a thousand of clinical narratives from Seoul National University Hospital, conditional random field is applied to use contextual structures for the purpose of avoiding false positive errors in the task. We show the model with our tokenization method is more effective to noisy text sets.
Predicting Autonomy for Physical Activity using Data Mining Techniques
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Abstract: We applied data mining techniques to a community-based behavioral dataset to develop prediction models for gaining insights for a social media-based intervention for an urban underserved population. Environmental and modifiable personal factors influenced both positive intrinsic motivation ‘willing to make time for physical activity’ and negative intrinsic motivation ‘hard to make time for physical activity’. Data mining methods were useful to build physical activity prediction models prior to designing self-management interventions.
A Preliminary Study on EHR-Associated Extra Workload Among Physicians

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9. Baylor College of Medicine, Houston, TX, United States.
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Abstract: The electronic health record systems (EHR) can potentially increase workload for physicians. Our study aims to understand the sources and impact of the added work due to the introduction of EHRs. We discovered poor usability, system-enabled new tasks, changed work responsibilities and administrative tasks as the main sources of extra work for physicians. This study provides new insights for understanding EHR-associated workload to inform the redesign of technology and work practices to alleviate added work for physicians in time limited clinical visits.
Social Media and Autism Support: Health Information Seeking in Facebook by Autism Patients and Caregivers

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Abstract: Given the fast permeation of social media into the health domain, this study centers on the investigation of what types of information users usually share and seek within the online autism support group on Facebook. One of the largest Facebook autism group was selected, and 17389 group posts and comments were collected. The results showed us that Facebook group has been used as an efficient platform for autism patients and their relatives where they actively interacted and showed the strong enthusiasm to each other. The topics discussed by group members reflected users’ concerns about autism. Through the coding analysis, this study did a first level classification of topics discussed in this group and our findings show that autism is chronic disease users were more concerned about dealing with it in their day-to-day life than the medical aspects of it.
A survey of automated information retrieval for genetic disorder from GeneReviews

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Abstract: A genetic disorder is an illness caused by one or more abnormalities in the genome, especially a condition that is present from birth (congenital). Most genetic disorders are quite rare and affect one person in every several thousands or millions. That is to say not too much information about the genetic disorder is available for supporting relevant research. In another hand, GeneReviews is expert-authored, peer-reviewed disease descriptions (“chapters”) presented in a standardized format and focused on clinically relevant and medically actionable information on the diagnosis, management, and genetic counseling of patients and families with specific inherited conditions. GeneReviews in free text can be browsed and searched via NCBI website, however, no structured electronic version available to be integrated into the clinical decision support systems, especially for the Genetic Testing Ontology (GTO) developed in our previous work \(^1\)\(^2\). In this study, we conducted a survey by applying two widely-used biomedical annotation tools, National Center for Biomedical Ontology (NCBO) annotator and Unified Medical Language System (UMLS) MetaMap to annotate data extracted from 10 GeneReviews chapters. From this preliminary work, we identified gaps between a large volume of genetic information and insufficient capability of processing such information by using current Natural Language Processing (NLP) tools, and propose the extension of these tools to be able to annotate relevant genetic information.
Medication Adherence to Oral Hypoglycemic Agents and Hospitalization Cost in Medicaid Patients with Type 2 Diabetes

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Abstract:
We analyzed the correlation between medication adherence to oral hypoglycemic agents (OHA) and the cost of hospitalization related to type 2 diabetes (DM2) using data from the Indiana Network for Patient Care. Among 8,889 eligible patients, 8,288 were OHA non-adherent patients and 601 were OHA adherent patients. After adjusting for confounders, adherence to OHA was associated with lower hospital cost (β = -416, p<0.0001) and higher OHA medication expenses (β = 256, p<0.0001).
Using a Web-based Clinical Pathway and Computerized Order Set to Improve Efficiency of Care for Asthma in a Pediatric Emergency Department

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Abstract: A multi-disciplinary group revised a web-based asthma pathway and EHR-based order set using clinical decision support principles to follow recommendations to increase use of metered dose inhalers with spacers (MDIs) and reduce use of continuous nebulized albuterol (CA) for acute treatment in the Emergency Department (ED). After implementation, use of CA in mild-moderate asthma patients fell from 40% to 13% immediately and was sustained, with an accompanying reduction in ED length of stay.
The Best of Imaging Informatics Research 2015

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Abstract: Over the past decade, there have been rapid advances in imaging informatics research. As the storage and display of multidimensional image data has become commonplace and “off the shelf”, imaging informatics has focused increasingly on information not found in pixels and voxels. For example, new ontologies are now available to capture information in the imaging report. New structured data capture technologies and natural language processing capabilities provide discrete data that can be analyzed in concert with other data from the electronic medical record. Likewise, novel quantitative image analysis techniques give us new methods to diagnose clinical conditions and discern their time course. Machine learning methods applied both to images and imaging reports have accelerated our ability to extract meaningful clinical information from images. Several more practical advances, such as standardized work flow and analytic tools have modernized the practice of radiology and other clinical imaging specialties. Advances in imaging informatics research will be reviewed in this session.
Looking Back and Moving Forward: A Review of Public and Global Health Informatics Literature and Events

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Abstract: Over the past decade, the disciplines of public health and global health informatics have rapidly expanded and continue to evolve within the field of biomedical informatics. Increased attention and activity by the U.S. Centers for Disease Control and Prevention as well as many health ministries, the World Health Organization, and non-governmental organizations are generating new knowledge and lessons regarding the development, implementation, and use of information systems in health care delivery around the globe. Thus, a growing body of literature now contains important insights and lessons from international informatics activities, stimulating the need to synthesize the knowledge for the field. In this panel, a review of recent literature in the areas of public health and global health informatics will be presented. Key articles revealing trends, methods, and lessons will be summarized to bring attendees up-to-date on the use of informatics to improve population health as well as care in low resource settings.
What could go wrong?: Migrating from one EHR to another
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Abstract: Many healthcare institutions face a second crisis in electronic health record system (EHR) implementation: migrating from one mature commercial or home-grown EHR to another. A considerable portion of the healthcare market is now converting to a second or third EHR system. AMIA members, ostensibly, have examined in great detail the challenges of initial EHR selection, implementation, adoption, and the shift away from paper records. Research is missing or sparse to guide informaticists and information technology specialists on the challenges and support for subsequent implementations.

This panel seeks to accomplish the following:
Recognize that one important implementation issue is one of migrating from one mature EHR to another;
Explore the advantages of such shifts;
Discuss extant evidence-based literature on system migration, or “re-implementation”;
Identify the conversion risks and costs;
Distinguish often unforeseen consequences;
Guide others in this common endeavor.

Panelists will explore what is known via anecdotal sources, listserv discussions, personal experience, and the relatively few published studies related to this topic. We shall solicit information from fellow AMIA members and present new information. Panelists will declare their positions on these topics, followed by questions proffered to each other in an attempt to stimulate audience participation in the open discussion period.
Abstract: Unintended consequences of health information technology (HIT) and clinical decision support (CDS) are frequently a result of poor design. Usability problems in electronic health records (EHR) have gained national attention. The need to increase effectiveness and reduce harm is vital and urgent. User-centered methodologies provide an array of methods to design systems around the requirements of the users and are critical to developing HIT that is safe and effective. In a series of vignettes, the panelists will describe applications of user-centered methods during the design of CDS projects in a multispecialty pediatric healthcare system. The panelists will review common user-centered design methods, suggest how to choose methodologies, and discuss both the benefits and challenges of following a user-centered approach in busy clinical settings. Panelists will describe examples of unintended consequences of CDS interventions and user-centered methods to prevent them. The panel moderator is a formally-trained in user-centered methods and All panelists are pediatric informaticists with experience in the design and implementation of HIT/CDS interventions.
Developing Natural Language Processing Systems for Healthcare

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Abstract: Natural language processing (NLP) systems can help uncover medical knowledge buried within clinical free text. Despite multiple demonstrations of the clinical utility of NLP, its use for biomedical research and patient care remains limited. A detailed overview of the steps involved and potential challenges associated with creating an NLP system could help potential users of such systems; they could use this knowledge to assess feasibility and identify the types of expertise required for system development and implementation. This panel will delineate four key tasks commonly required when developing a clinical NLP system: 1) document selection; 2) annotation; 3) NLP software development; and 4) clinical implementation. Presenters will explain the role of each task in NLP system development, define the subtasks required, describe approaches for estimating the effort and time requirements, and delineate approaches and tools for assisting with task completion. Attendees will acquire an understanding of the common requirements for NLP system development, an appreciation of potential tools to help with the process, and be better able to assess whether and how to approach using NLP in their own biomedical centers.
Using High-Fidelity Simulation and Eye Tracking to Characterize Workflow Patterns among Hospital Physicians

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Abstract: Modern EHR systems are complex, and end-user behavior and training are highly variable. The need for clinicians to access key clinical data is a critical patient safety issue. This study used a mixed methods approach employing a high-fidelity EHR simulation environment, eye and screen tracking, surveys, and semi-structured interviews to characterize typical EHR usage by hospital physicians (hospitalists) as they encounter a new patient. The main findings are: 1) There were strong similarities across the groups in the information types the physicians looked at most frequently, 2) While there was no overall difference in case duration between the groups, we observed two distinct workflow types between the groups with respect to gathering information in the EHR and creating a note, and 3) A majority of the case time was devoted to note composition in both groups. This has implications for EHR interface design and raises further questions about what individual user workflows exist in the EHR.
Medical Inpatient Journey Modeling and Clustering: A Bayesian Hidden Markov Model Based Approach
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Abstract: Medical inpatient journeys, described as sequences of treatment events performed on patients in their hospitalization, provide a comprehensive source for healthcare process analysis and health service management. Modeling and clustering medical inpatient journeys is useful to healthcare organizations for a number of reasons including inpatient journey reorganization in a more convenient way for understanding and browsing, etc. Unlike traditional event sequences, medical inpatient trajectories are more challenging as they are typically loosely-structured, i.e., treatment events might occur arbitrarily within a specific clinical epoch of an inpatient journey, such that one has to incorporate these informal inpatient journeys in the clustering process. In this study, we present a probabilistic model-based approach to model and cluster medical inpatient journeys. Specifically, we exploit a Bayesian Hidden Markov Model based approach to transform medical inpatient journeys into a probabilistic space, which can be seen as a richer representation of inpatient journeys to be clustered. Then, using hierarchical clustering on the matrix of similarities, inpatient journeys can be clustered into different categories w.r.t. their clinical and temporal characteristics. We evaluated the proposed approach on a real clinical data set pertaining to the unstable angina treatment process. The experimental results reveal that our method can identify and model latent treatment topics underlying in personalized inpatient journeys, and yield impressive clustering quality.
Secondary Use of EHR Timestamp data: Validation and Application for Workflow Optimization

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Abstract: Patient flows within outpatient clinics are complex; patients see multiple providers in multiple rooms and have multiple procedures during a single encounter. Consequently, patient wait times can accumulate affecting patient satisfaction and future care. Being able to represent the time and variability of patient exams can greatly improve scheduling strategies through the use of simulation. We investigate the accuracy of EHR timestamps for representing each provider’s interaction length during the overall encounter; we present our model and the challenges for using EHR data to determine provider interaction lengths. This study has the following key findings: 1) secondary use of EHR timestamp data is generally accurate for measuring patient interaction length, 2) timestamp data are less reflective of patient interaction length when EHR use does not coincide with actual clinical workflow, and 3) these data may be used for novel activities such as developing simulation models for alternative clinical scheduling and workflow strategies.
Improving guideline concordance in multidisciplinary teams: preliminary results of a cluster-randomized trial evaluating the effect of a web-based audit and feedback intervention with outreach visits

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Abstract: Despite their widespread use, audit and feedback (A&F) interventions show variable effectiveness on improving professional performance. Based on known facilitators of successful A&F interventions, we developed a web-based A&F intervention with indicator-based performance feedback, benchmark information, action planning and outreach visits. The goal of the intervention was to engage with multidisciplinary teams to overcome barriers to guideline concordance and to improve overall team performance in the field of cardiac rehabilitation (CR). To assess its effectiveness we conducted a cluster-randomized trial in 18 CR clinics (14,847 patients) already working with computerized decision support (CDS). Our preliminary results showed no increase in concordance with guideline recommendations regarding prescription of CR therapies. Future analyses will investigate whether our intervention did improve team performance on other quality indicators.
PHAST: A Collaborative Machine Translation and Post-editing Tool for Public Health

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Abstract: This paper describes a novel collaborative machine translation (MT) plus post-editing system called PHAST (Public Health Automatic System for Translation, phastsystem.org), tailored for use in producing multilingual education materials for public health. Its collaborative features highlight a new approach in public health informatics: sharing limited bilingual translation resources via a groupware system. We report here on the design methods and requirements used to develop PHAST and on its evaluation with potential public health users. Our results indicate such a system could be a feasible means of increasing the production of multilingual public health materials by reducing the barriers of time and cost. PHAST’s design can serve as a model for other communities interested in assuring the accuracy of MT through shared language expertise.
Analyses of Merging Clinical and Viral Genetic Data for Influenza Surveillance

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Abstract: The annual influenza vaccine is one of the most common public health interventions and is universally recommended for all individuals older than six months. Vaccine composition depends on viruses circulating over the past flu season and are estimated to be the most prevalent and representative strains in the current season. Here, we use clinical data outfitted with viral genetics to characterize confirmed influenza cases from the past two flu seasons and genetically compare them to the strains that they were vaccinated against that year. We show that case similarities to vaccine strains differ by geographic region and that the vaccines appear to have different levels of effectiveness by region. This study demonstrates the value of merging viral genetics with clinical data. Further research is needed to formally evaluate whether this improves biosurveillance efforts and enhances efficacy of influenza vaccines.
A Flexible Simulation Architecture for Pandemic Influenza Simulation

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Abstract: Simulation is an important resource for studying the dynamics of pandemic influenza and predicting the potential impact of interventions. However, there are several challenges for the design of such simulator architectures. Specifically, it is difficult to develop simulators that combine flexibility with run-time performance. This tradeoff is problematic in the pandemic-response setting because it makes it challenging to extend and adapt simulators for ongoing situations where rapid results are indispensable.

Simulation architectures based on aspect-oriented programming can model specific concerns of the simulator and can allow developers to rapidly extend the simulator in new ways without sacrificing run-time performance. It is possible to use such aspects in conjunction with separate simulation models, which define community, disease, and intervention properties. The implication of this research for pandemic response is that aspects can add a novel layer of flexibility to simulation environments, which enables modelers to extend the simulator run-time component to new requirements that go beyond the original modeling framework.
Completing Death Certificates from an EMR: Analysis of a Novel Public-Private Partnership

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Abstract: With the objective of increasing electronic death registration, Intermountain Healthcare and the Utah Office of Vital Records and Statistics have developed a system enabling death certification from within Intermountain’s electronic medical record (EMR), consisting of an EMR module and an HL7 interface. Comparison of post-intervention death certification at Intermountain Healthcare against a baseline study found a slight increase in the percentage of deaths certified electronically (73% pre vs. 77% post). Analysis of deaths certified using the EMR-module found that they were completed significantly sooner than those certified on paper or using the state’s web-based electronic death registration system (EDRS) (Mean time: Paper = 114.72 hours, EDRS = 81.84 hours, EMR = 43.92 hours; p < 0.0001). EMR-certified deaths also contained significantly more causes of deaths than either alternative method (Mean number of causes: Paper = 3.9 causes, EDRS = 4.0 causes, EMR = 5.5 causes; p < 0.0001).
Automated Classification of Consumer Health Information Needs in Patient Portal Messages

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Abstract: Patients have diverse health information needs, and secure messaging through patient portals is an emerging means by which such needs are expressed and met. As patient portal adoption increases, growing volumes of secure messages may burden healthcare providers. Automated classification could expedite portal message triage and answering. We created four automated classifiers based on word content and natural language processing techniques to identify health information needs in 1000 patient-generated portal messages. Logistic regression and random forest classifiers detected single information needs well, with area under the curves of 0.804-0.914. A logistic regression classifier accurately found the set of needs within a message, with a Jaccard index of 0.859 (95% Confidence Interval: (0.847, 0.871)). Automated classification of consumer health information needs expressed in patient portal messages is feasible and may allow direct linking to relevant resources or creation of institutional resources for commonly expressed needs.
Analyzing Self-Help Forums with Ontology-Based Text Mining: An Exploration in Kidney Space

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Abstract: The Internet has emerged as a popular source for health-related information. More than eighty percent of American Internet users have searched for health topics online. Millions of patients use self-help online forums to exchange information and support. In parallel, the increasing prevalence of chronic diseases has become a financial burden for the healthcare system demanding new, cost-effective interventions. To provide such interventions, it is necessary to understand patients’ preferences of treatment options and to gain insights into their experiences as patients. We introduce a text-processing algorithm based on semantic ontologies to allow for finer-grained analyses of online forums compared to standard methods. We have applied our method in an analysis of two major Chronic Kidney Disease (CKD) forums. Our results suggest that the analysis of forums may provide valuable insights on daily issues patients face, their choice of different treatment options and interactions between patients, their relatives and clinicians.
Automatic Extraction and Post-coordination of Spatial Relations in Consumer Language
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Abstract: To incorporate ontological concepts in natural language processing (NLP) it is often necessary to combine simple concepts into complex concepts (post-coordination). This is especially true in consumer language, where a more limited vocabulary forces consumers to utilize highly productive language that is almost impossible to pre-coordinate in an ontology. Our work focuses on recognizing an important case for post-coordination in natural language: spatial relations between disorders and anatomical structures. Consumers typically utilize such spatial relations when describing symptoms. We describe an annotated corpus of 2,000 sentences with 1,300 spatial relations, and a second corpus of 500 of these relations manually normalized to UMLS concepts. We use machine learning techniques to recognize these relations, obtaining good performance. Further, we experiment with methods to normalize the relations to an existing ontology. This two-step process is analogous to the combination of concept recognition and normalization, and achieves comparable results.
Representation of Functional Status Concepts from Clinical Documents and Social Media Sources by Standard Terminologies

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Abstract: Patient-reported functional status is widely recognized as an important patient-centered outcome that adds value to medical care, research, and quality improvement. Functional status outcomes are, however, not routinely or uniformly collected in the medical record, except in certain small patient populations (e.g. geriatrics, nursing home residents). To utilize patient reported functional status for clinical research and practice, we manually collected 2,763 terms from clinical records and social media sites and modeled them on the widely used Short Form-36 Health Survey. We then examined the coverage of the Unified Medical Language System (UMLS) for these functional status terms through automated mapping. Most terms (85.9%) did not have exact matches in the UMLS. Partial matches were prevalent, however, they typically did not capture the terms’ exact semantics. Our study suggests that there is a need to extend existing standard terminologies to incorporate functional status terms used by patients and clinicians.

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Abstract: In recent years, Decision Support Systems (DSSs) have been developed and used to achieve “meaningful use”. One approach to developing DSSs is to translate clinical guidelines into a computer-interpretable format. However, there is no specific guideline modeling approach to translate nursing guidelines to computer-interpretable guidelines. This results in limited use of DSSs in nursing. Unified modeling language (UML) is a software writing language known to accurately represent the end-users’ perspective, due to its expressive characteristics. Furthermore, standard terminology enabled DSSs have been shown to smoothly integrate into existing health information systems. In order to facilitate development of nursing DSSs, the UML was used to represent a guideline for medication management for older adults encode with the International Classification for Nursing Practice (ICNP®). The UML was found to be a useful and sufficient tool to model a nursing guideline for a DSS.
Abstract: Computerized wearable devices such as smart watches will become valuable nursing tools. This paper describes a smart-watch system developed in close collaboration with a team of nurses working in a Swedish ICU. The smart-watch system provides real-time vital-sign monitoring, threshold alarms, and to-do reminders. Additionally, a Kanban board, visualized on a multitouch screen provides an overview of completed and upcoming tasks. We describe an approach to implement automated checklist systems with smart watches and discuss aspects of importance when implementing such memory and attention support. The paper is finalized with an in-development formative evaluation of the system.
Abstract: In the collaborative hospital environment, pharmacists are important members of the healthcare team, yet compared to physicians and nurses, little is known about pharmacists' information needs or how they interact with the electronic health record (EHR). We directly observed seven clinical inpatient pharmacists as they interacted with the EHR preparing for clinical rounds using an eye-tracking camera and contextual inquiry. Pharmacists spent 50% of their time reading information from the EHR, such as notes and medication lists, and 27% of their time copying EHR data onto paper, such as patient history and laboratory results. In an environment where minutes count, the results of this study can help inform the development of CDS tools and/or EHR designs to facilitate the information needs of the pharmacists in providing care for their patients.
Abstract: The standard of safe medication practice requires strict observance of the five rights of medication administration: the right patient, drug, time, dose, and route. Despite adherence to these guidelines, medication errors remain a public health concern that has generated health policies and hospital processes that leverage automation and computerization to reduce these errors. Bar code, RFID, biometrics and pharmacy automation technologies have been demonstrated in literature to decrease the incidence of medication errors by minimizing human factors involved in the process. Although evidence suggests the effectiveness of these technologies, adoption rates and trends vary across hospital systems. The objective of study is to examine the state and adoption trends of automatic identification and data capture (AIDC) methods and pharmacy automation technologies in U.S. hospitals. A retrospective descriptive analysis of survey data from the HIMSS Analytics® Database was done, demonstrating an optimistic growth in the adoption of these patient safety solutions.
Assessing Variability in Breast Cancer Treatment Paths Using Frequent Sequence Mining

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Abstract: Analyzing breast cancer treatment paths is critical for measuring clinical quality. A major component of monitoring quality in breast cancer care is representing variability in treatment paths. We generated treatment event paths from cancer registry data and assessed the distribution of sequences. We used frequent sequence mining to generate treatment event patterns that helped to represent the variability in the treatment event paths.
Process Mining of Growing Adoption of Genomic Precision Medicine Testing Using Commercial Claims and Encounters Database

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Abstract: A new set of molecular pathology (MoPath) codes in Current Procedural Terminology, that covers many genomic precision medicine tests, went into effect in 2013. We analyzed 324 thousand genetic testing instances of 146 thousand patients in MarketScan Commercial Claims and Encounters dataset showing an increasing adoption of genomic testing and analyzing cost and testing context trends. This work is part of a larger effort to characterize a genomic patient in claims and EHR databases.
Demonstrating the Advantages of Applying Data Mining Techniques on Time-Dependent Electronic Medical Records

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Abstract: Summary: We demonstrate several advantages of applying data mining techniques on time-dependent Electronic Medical Records (EMR), specifically: 1) combining structured and unstructured variables improves the accuracy of a type-2 diabetes (T2D) classification algorithm, 2) conducting a quantitative survey of multiple comorbidities is important in T2D especially cardiovascular complications with hazard ratios, 3) analyzing time dependent variables can clarify time dependent contributions to variety of comorbidities, and specifically of the “obesity paradox”, and 4) demonstrating that an unbiased examination of physician treatment patterns reveals changes over time consistent with clinical trials.

Background: Cohorts assembled from EMR present a potentially powerful resource to study T2D and cardiovascular complications at population scale. Recent reports have demonstrated the utility of EMR analysis to discover genotype-phenotype correlations, sub-categories of disease, and adverse drug events.

Methods: We developed a classification algorithm to identify T2D patients based on characteristics including clinical notes, diagnosis and procedure codes, medications, and laboratory tests. We analyzed an EMR database at MGH and BWH considering patients who received care between 1990 - 2013. We applied logistic regression with the adaptive LASSO using different combinations of variables such as structured variables only, unstructured variables only, and combination of all variables. To determine the level of association between clinical and demographic variables with mortality we developed baseline and lagged-time varying Cox regression models that included an adjustment to ethnicity and time varying covariates. To assess how therapeutic choices change over time, we calculated sparse covariance matrices for heart failure related concepts extracted from clinical notes.

Results: Our classification algorithm identified 65,099 T2D patients with a specificity of 97% and PPV of 96% based on "gold standard" physician chart review. 56,691 patients (87.1%) had two and 38,449 patients (59.1%) had four or more chronic conditions, demonstrating the complexity of the cohort. Cox regression models indicated statistically significant HRs > 1 for CHF, CAD, and CVD, and HRs < 1 for PCI and CABG. Increasing BMI was associated with lower mortality as compared to the reference BMI (<25 kg/m^2>). Further stratifying the results into 1, 3 and 5 years analysis, this “obesity paradox” is strikingly obvious at short-term follow-up of 1 year, suggesting that patients with low BMI were suffering from chronic medical conditions (e.g., malignancy or inflammatory conditions) increasing their 1 year mortality. However, at 3 and 5 years follow-up, we do see increase in mortality with increasing BMI levels likely related to increase in the burden of cardiovascular events.
<b>Discussion: </b>We implemented classification, prediction, and natural language processing techniques in multiple scenarios to create and to analyze a highly complex and large cohort. This cohort recapitulates many findings from traditionally ascertained cohorts while enabling additional analyses (e.g., utilizing physician notes or richer temporal data), illustrating its utility for a variety of discovery efforts.
Feature Selection Based LapSVM to Classify Medical Event Reports and Enhance Patient Safety

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Abstract: Timely reporting and analysis of adverse events and medical errors is critical to driving forward programs in patient safety. We propose feature based Laplacian support vector machine (FS-LapSVM) to identify two major error events: patient mismatches errors and patient weight errors.
Abstract: There is currently no widely available mechanism for translating Quality Data Model specifications of electronic clinical quality measures into executable workflows. As part of the Phenotype Execution Modeling Architecture project, we address this gap through the creation of a translator from QDM-based specifications to executable workflows that can be used with an open-source data analytics platform. These workflows are easily shared across sites, and they allow for customization to account for heterogeneous local EHR data.
Model Selection For EHR Laboratory Tests Preserving Healthcare Context and Underlying Physiology

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Abstract: A methodology for how to best represent electronic health record laboratory tests numerically via model selection is presented. In different clinical contexts, different models of data may be appropriate, and it is shown that the cause is not so much a change in physiology, but a change in the way health is measured in the different contexts. That is, the health care process causes different but measurable biases in the data.
Abstract: In the Division of Anatomical Pathology of a teaching hospital at the beginning of each month, clinical managers assign expected daily pathology requests to the pathologists on duty. Since the number of these requests is usually large and a division employs a number of pathologists with different sub-specialties, the size of the problem is significant and finding a feasible assignment schedule manually is time-consuming. Moreover, every time there is a need to change, a new assignment schedule needs to be developed taking into account all the pre-defined constraints including pathologists’ availability, sub-specialty mix, teaching/research releases, etc. In this paper we describe an analytics optimization model embedded in a decision support tool that helps the clinical managers of the division determine the optimal monthly assignment schedule. The decision support tool has been validated using data from the Division of Anatomical Pathology at The Ottawa Hospital in Ottawa, Ontario, Canada.
A Not So Lame Outlook for Injured Farm Workers in Pork and Dairy Operations: Return-to-Work Software Application Development

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Abstract: Serious, restrictive, non-fatal injuries are commonplace in large animal agriculture including in pork and dairy production. Primary care clinicians often have few resources to facilitate workers' return to work. This project will develop a return to work software program to produce applicable light duty job assemblies (LDJA). One of the significant challenges is the integration of Physical and Occupational Therapists’ unstructured narrative data collection methods into structured data.
Needs of the Digital Native: Adolescents and Access to PHRs

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Abstract: PHRs present particular challenges in pediatrics and the pediatric PHR is a particularly timely, while controversial, issue in medical informatics. This is true because minor patients present “unique health privacy and confidentiality standards,” different users within a family unit have different rights to access different information, and there are “extensive variations” in PHR implementation and access across the United States. This panel considers the challenges, benefits and risks of access to PHRs by adolescent patients. In order to address the needs of this population, we have to support access policies that handle age-specific changes in PHR ownership, as well as encourage EHR functionality that allows appropriate identification and classification of confidential information. We also offer two examples of how these challenges play out in context of adolescents' lived experiences. How is care coordinated for adolescents with chronic health conditions when PHRs are not available? Can PHRs play a role in assisting adolescents and young adults living with chronic illness to develop self-advocacy and self-awareness?
Rapid Development and Implementation of Critical Information Systems for Ebola Treatment Centres in West Africa:

Lessons for Future Events

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Abstract: In response to the large West African Ebola outbreak beginning in 2014, Ebola Treatment Centres (ETCs) were established to provide efficient care for suspected and confirmed Ebola patients while minimizing risk of cross infection to staff and other patients. Critical clinical information entry and review tasks such as assessments, ordering, and administration of drugs and fluids must be performed rapidly in highly challenging conditions because workers wear personal protective equipment (PPE) which reduces dexterity, vision and comfort. Additionally, it is vital to have information tools to conduct important functions, such as contact tracing to limit the spread of new cases and trials of new diagnostic/therapeutic approaches.

In this panel, members of two teams providing rapid development and implementation at different centres describe the unique situational needs and challenges, software and hardware considerations and solutions, user engagement throughout testing and rollout, and approaches to advanced functionality such as analytics and clinical decision support. The audience will be better able to plan future implementations in challenging environments; to include information management in advance planning for future crises; and should be able to leverage available technologies and strategies for effective design and deployment of crisis information systems.
Abstract: Academic program accreditation in higher education is both a process and a status involving a review of a program against formal Standards to determine educational quality, how well students and society are served, and if successful the award of accreditation. The Commission on Accreditation for Health Informatics and Information Management Education (CAHIIM) has offered accreditation at the masters’ degree level in Health Informatics since 2010. AMIA officially joined CAHIIM as a Member organization in January 1, 2015. A revision in the governance structure created a Health Informatics Accreditation Council with the responsibility of establishing and maintaining accreditation Standards, policies and procedures. This Panel will present the Council’s work to date and address questions about how CAHIIM accreditation is conducted, the value of accreditation to the health informatics field, the status of goals for 2015-2016, how the process is conducted, and the types of CAHIIM volunteer opportunities. Participants will have the opportunity to ask questions and provide input on the Council’s initiatives from their varied perspectives.
The Informatics Sculptor & the Clinical Annotator: Effective Annotation Strategies

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Abstract: Annotation of free text is an operation requiring human labor, complex cognition and topic-specific knowledge, requiring multiple skills sets in order to be effectively performed. This panel organized around the shared perspective that cross-education of research team members in the disciplines involved is a necessary and desirable function of informatics research. Curating clinical data thru analytic processes including annotation depends on multiple levels of data transform, each requiring expertise from the participating roles involved in the project. This panel discussion includes the following roles: 1) annotator, 2) data quality organizer, 3) NLP developer, 4) clinical expert study designer. Panel members representing one of the roles in integrating annotation data into the research project will discuss tasks and responsibilities of their own role within the process, converging on how their own professional perspective impacts and is impacted by the other roles in the project. The barriers to operationalizing annotation goals will be significantly lowered for attendees of this panel session. Those with an interest in initiating an NLP system for their research or in obtaining quality annotation for other purposes will gain an understanding of ways to best make use of each team member's particular expertise to obtain quality annotations.
Predicting Health Care Utilization After Behavioral Health Referral Using Natural Language Processing and Machine Learning

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Abstract: Mental health problems are an independent predictor of increased healthcare utilization. We created random forest classifiers for predicting two outcomes following a patient's first behavioral health encounter: decreased utilization by any amount (AUROC 0.74) and ultra-high absolute utilization (AUROC 0.88). These models may be used for clinical decision support by referring providers, to automatically detect patients who may benefit from referral, for cost management, or for risk/protection factor analysis.
Surgical Duration Estimation via Data Mining and Predictive Modeling: A Case Study

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Abstract: Operating rooms (ORs) are one of the most expensive and profitable resources within a hospital system. OR managers strive to utilize these resources in the best possible manner. Traditionally, surgery durations are estimated using a moving average adjusted by the scheduler (adjusted system prediction or ASP). Other methods based on distributions, regression and data mining have also been proposed. To overcome difficulties with numerous procedure types and lack of sufficient sample size, and avoid distributional assumptions, the main objective is to develop a hybrid method of duration prediction and demonstrate using a case study.
Clinical Predictive Modeling Development and Deployment through FHIR Web Services

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Abstract:
Clinical predictive modeling involves two challenging tasks: model development and model deployment. In this paper we demonstrate a software architecture for developing and deploying clinical predictive models using web services via the Health Level 7 (HL7) Fast Healthcare Interoperability Resources (FHIR) standard. The services enable model development using electronic health records (EHRs) stored in OMOP CDM databases and model deployment for scoring individual patients through FHIR resources. The MIMIC2 ICU dataset and a synthetic outpatient dataset were transformed into OMOP CDM databases for predictive model development. The resulting predictive models are deployed as FHIR resources, which receive requests of patient information, perform prediction against the deployed predictive model and respond with prediction scores. To assess the practicality of this approach we evaluated the response and prediction time of the FHIR modeling web services. We found the system to be reasonably fast with one second total response time per patient prediction.
Dynamic Estimation of the Probability of Patient Readmission to the ICU using Electronic Medical Records

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Abstract: In this paper, we propose a framework to dynamically estimate the probability that a patient is readmitted after he/she is discharged from the ICU. We model this probability as a latent state that evolves over time using Dynamical Linear Models (DLM). We use as input a combination of numerical and text features obtained from the patient Electronic Medical Records (EMRs). We process the text from the EMRs to capture different diseases, symptoms and treatments by means of noun phrases and ontologies. We capture the global context of each text entry by means of Statistical Topic Models. We fill out the missing values using a Expectation Maximization based method (EM). Experimental results show that our method clearly outperforms other methods in the literature terms of AUC, sensitivity and specificity. In addition, we show that the combination of different features (numerical and text) increases the prediction performance of the proposed approach.
Understanding the acceptance factors of an Hospital Information System: evidence from a French University Hospital

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Abstract: The goal of this study was to examine the perceived usefulness, the perceived ease of use and the perceived behavioral control of a Hospital Information System (HIS) for the care staff. We administrated a questionnaire composed of open-end and closed questions, based on the main concepts of Technology Acceptance Model. As results, the perceived usefulness, ease of use and behavioral control (self-efficacy and organizational support) are correlated with medical occupations. As an example, we found that a half of the medical secretaries consider the HIS is ease of use, at the opposite to the anesthesiologists, surgeons and physicians. Medical secretaries reported also the highest rate of PBC and a high rate of PU. Pharmacists reported the highest rate of PU but a low rate of PBC, which is similar to the rate of the surgeons and physicians. Content analysis of open questions highlights factors influencing these constructs: ergonomics, errors in the documenting process, insufficient compatibility with the medical department or the occupational group. Consequently, we suggest that the gap between the perceptions of the different occupational groups may be explained by the use of different modules and by interdependency of the care staff.
Improving EHR Capabilities to Facilitate Stage 3 Meaningful Use Care Coordination Criteria

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Abstract: Primary care practices have been limited in their ability to leverage electronic health records (EHRs) and health information exchange (HIE) to improve care coordination, but will soon be incentivized to do so under proposed Stage 3 meaningful use criteria. We use mixed methods to understand how primary care practices manage, share and reconcile electronic patient information across care settings, and identify innovations in EHR design to support enhanced care coordination. Opportunities identified by practices focused on availability and usability of features that facilitate (1) generation of customized summary of care records, (2) team-based care approaches, and (3) management of the increased volume of electronic information generated and exchanged during care transitions. More broadly, vendors and policymakers need to continue to work together to improve interoperability as the key to effective care coordination. If these EHR innovations were widespread, the value of meeting the proposed Stage 3 care coordination criteria would be substantially enhanced.
Variability in Electronic Health Record Usage and Perceptions among Specialty vs. Primary Care Physicians

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Abstract:
Despite federal incentives for adoption of electronic health records (EHRs), surveys have shown that EHR use is less common among specialty physicians than generalists. Concerns have been raised that current-generation EHR systems are inadequate to meet the unique information gathering needs of specialists. This study sought to identify whether information gathering needs and EHR usage patterns are different between specialists and generalists, and if so, to characterize their precise nature. We found that specialists and generalists have significantly different perceptions of which elements of the EHR are most important and how well these systems are suited to displaying clinical information. Resolution of these disparities could have implications for clinical productivity and efficiency, patient and physician satisfaction, and the ability of clinical practices to achieve Meaningful Use incentives.
Inferring Clinical Workflow Efficiency via Electronic Medical Record Utilization

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Abstract: Complexity in clinical workflows can lead to inefficiency in making diagnoses, ineffectiveness of treatment plans and uninformed management of healthcare organizations (HCOs). Traditional strategies to manage workflow complexity are based on measuring the gaps between workflows defined by HCO administrators and the actual processes followed by staff in the clinic. However, existing methods tend to neglect the influences of EMR systems on the utilization of workflows, which could be leveraged to optimize workflows facilitated through the EMR. In this paper, we introduce a framework to infer clinical workflows through the utilization of an EMR and show how such workflows roughly partition into four types according to their efficiency. Our framework infers workflows at several levels of granularity through data mining technologies. We study four months of EMR event logs from a large medical center, including 16,569 inpatient stays, and illustrate that over approximately 95% of workflows are efficient and that 80% of patients are on such workflows. At the same time, we show that the remaining 5% of workflows may be inefficient due to a variety of factors, such as complex patients.
Designing Asynchronous Communication Tools for Optimization of Patient-Clinician Coordination

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Abstract: Asynchronous communication outside the clinical setting has both enriched and complicated patient-clinician interactions. Many patients can now interact with a patient portal 24 hours a day, asking questions of their clinicians via secure message, checking lab results, ordering medication refills, or making appointments. However, the mode of communication (asynchronous) and the nature of the interaction (lacking tone or body language) strip valuable information from each side of patient-clinician asynchronous communication. Using interviews with 34 individuals who actively manage a chronic illness of their own, or for a child or partner, we elicited narratives about patients’ experiences and expectations for using asynchronous communication to address medical issues with their clinicians. Based on these perspectives, we present opportunities for designing asynchronous communication tools to better facilitate understanding of and coordination around care activities between patients and clinicians.
Abstract: Pregnancy is a time when expectant mothers may have numerous questions about their unborn children, especially when congenital anomalies are diagnosed prenatally. We sought to characterize information needs of pregnant women seen in the Vanderbilt Children’s Hospital Fetal Center. Participants recorded questions from diagnosis through delivery. Questions were categorized by two researchers using a hierarchical taxonomy describing consumer health information needs. Consensus category assignments were made, and inter-rater reliability was measured with Cohen’s Kappa. Sixteen participants reported 398 questions in 39 subcategories, of which the most common topics were prognosis (53 questions; 13.3%) and indications for intervention (31 questions; 7.8%). Inter-rater reliability of assignments showed moderate ($\kappa=0.57$) to substantial ($\kappa=0.75$) agreement for subcategories and primary categories, respectively. Pregnant women with prenatal diagnoses have diverse unmet information needs; a taxonomy of consumer health information needs may improve the ability to meet such needs through content and system design.
Barriers and Facilitators to Patient-Provider Communication When Discussing Breast Cancer Risk to Aid in the Development of Decision Support Tools

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Abstract: The purpose of this study was to identify barriers and facilitators to patient-provider communication when discussing breast cancer risk to aid in the development of decision support tools. Four patient focus groups (N=34) and eight provider focus groups (N=10) took place in Northern Manhattan. A qualitative analysis was conducted using Atlas.ti software. The coding yielded 62.3%-94.5% agreement. The results showed that 1) barriers are time constraints, lack of knowledge, low health literacy, and language barriers, and 2) facilitators are information needs, desire for personalization, and autonomy when communicating risk in patient-provider encounters. These results will inform the development of a patient-centered decision aid (RealRisks) and a provider-facing breast cancer risk navigation (BNAV) tool, which are designed to facilitate patient-provider risk communication and shared decision-making about breast cancer prevention strategies, such as chemoprevention.
Design of a Community-Engaged Health Informatics Platform with an Architecture of Participation

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Abstract: Community-engaged health informatics (CEHI) applies information technology and participatory approaches to improve the health of communities. Our objective was to translate the concept of CEHI into a usable and replicable informatics platform that will facilitate community-engaged practice and research. The setting is a diverse urban neighborhood in New York City. The methods included community asset mapping, stakeholder interviews, logic modeling, analysis of affordances in open-source tools, elicitation of use cases and requirements, and a survey of early adopters. Based on synthesis of data collected, GetHealthyHeights.org (GHH) was developed using open-source LAMP stack and Drupal content management software. Drupal’s organic groups module was used for novel participatory functionality, along with detailed user roles and permissions. Future work includes evaluation of GHH and its impact on agency and service networks. We plan to expand GHH with additional functionality to further support CEHI by combining informatics solutions with community engagement to improve health.
Finding Cervical Cancer Symptoms in Swedish Clinical Text using a Machine Learning Approach and NegEx

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Abstract: Detection of early symptoms in cervical cancer is crucial for early treatment and survival. To find symptoms of cervical cancer in clinical text, Named Entity Recognition is needed. In this paper the Clinical Entity Finder, a machine-learning tool trained on annotated clinical text from a Swedish internal medicine emergency unit, is evaluated on cervical cancer records. The Clinical Entity Finder identifies entities of the types body part, finding and disorder and is extended with negation detection using the rule-based tool NegEx, to distinguish between negated and non-negated entities. To measure the performance of the tools on this new domain, two physicians annotated a set of clinical notes from the health records of cervical cancer patients. The inter-annotator agreement for finding, disorder and body part obtained an average F-score of 0.677 and the Clinical Entity Finder extended with NegEx had an average F-score of 0.667.
Automated Extraction of Substance Use Information from Clinical Texts

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Abstract: Within clinical discourse, social history (SH) includes important information about substance use (alcohol, drug, and nicotine use) as key risk factors for disease, disability, and mortality. In this study, we developed and evaluated a natural language processing (NLP) system for automated detection of substance use statements and extraction of substance use attributes (e.g., temporal and status) based on Stanford Typed Dependencies. The developed NLP system leveraged linguistic resources and domain knowledge from a multi-site social history study, Propbank and the MiPACQ corpus. The system attained F-scores of 89.8, 84.6 and 89.4 respectively for alcohol, drug, and nicotine use statement detection, as well as average F-scores of 82.1, 90.3, 80.8, 88.7, 96.6, and 74.5 respectively for extraction of attributes. Our results suggest that NLP systems can achieve good performance when augmented with linguistic resources and domain knowledge when applied to a wide breadth of substance use free text clinical notes.
A Study of Neural Word Embeddings for Named Entity Recognition in Clinical Text
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Abstract: Clinical Named Entity Recognition (NER) is a critical task for extracting important patient information from clinical text to support clinical and translational research. This study explored the neural word embeddings derived from a large unlabeled clinical corpus for clinical NER. We systematically compared two neural word embedding algorithms and three different strategies for deriving distributed word representations. Two neural word embeddings were derived from the unlabeled Multiparameter Intelligent Monitoring in Intensive Care (MIMIC) II corpus (403,871 notes). The results from both 2010 i2b2 and 2014 Semantic Evaluation (SemEval) data showed that the binarized word embedding features outperformed other strategies for deriving distributed word representations. The binarized embedding features improved the F1-score of the Conditional Random Fields based clinical NER system by 2.3% on i2b2 data and 2.4% on SemEval data. The combined feature from the binarized embeddings and the Brown clusters improved the F1-score of the clinical NER system by 2.9% on i2b2 data and 2.7% on SemEval data. Our study also showed that the distributed word embedding features derived from a large unlabeled corpus can be better than the widely used Brown clusters. Further analysis found that the neural word embeddings captured a wide range of semantic relations, which could be discretized into distributed word representations to benefit the clinical NER system. The low-cost distributed feature representation can be adapted to any other clinical natural language processing research.
Automated Reconciliation of Radiology Reports and Discharge Summaries

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Abstract: We study machine learning techniques to automatically identify limb abnormalities (including fractures, dislocation and foreign bodies) from radiology reports. For patients presenting to the Emergency Room (ER) with suspected limb abnormalities (e.g., fractures) there is often a multi-day delay before the radiology report is available to ER staff, by which time the patient may have been discharged home with the possibility of undiagnosed fractures. ER staff, currently, have to manually review and reconcile radiology reports with the ER discharge diagnosis; this is a laborious and error-prone manual process. Using radiology reports from three different hospitals, we show that extracting detailed features from the reports to train Support Vector Machines can effectively automate the identification of limb fractures, dislocations and foreign bodies. These can be automatically reconciled with a patient's discharge diagnosis from the ER to identify a number of cases where limb abnormalities went undiagnosed.
Abstract: We developed InSPECT (Interactive Surveillance Portal for Evaluating Clinical Decision Support), an electronic health record-independent, interactive web-based dashboard that facilitates the review of clinical decision support alerts and responses. Further research is warranted and underway to assess the dashboard for usability and ability to improve alert appropriateness and resulting patient safety.
Automating Guidelines for Clinical Decision Support (CDS): A Categorization of Knowledge Engineering and Implementation Decisions

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Abstract: ATHENA-CDS has encoded complex clinical practice guideline recommendations for 5 common chronic conditions, for integration into an existing clinical Dashboard. This study seeks to validate and extend the 13 steps Shiffman et. al. identified for translating knowledge contained in guideline text into computable format and to integrate into clinic workflow. We categorized 119 decisions made at project meetings. We apply the 13 steps and identify new categories required for a system handling multiple conditions and integrating with existing health information technology tools.
Analysis of empty responses from electronic resources in infobutton managers

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Abstract: Infobuttons provide context-aware educational materials to both providers and patients and are becoming an important element in modern electronic health records (EHR) and patient health records (PHR). However, the content from different electronic resources (e-resource) as responses from infobutton manager has not been fully analyzed and evaluated. In this paper, we propose a method for automatically analyzing responses from infobutton manager. A tool is implemented to retrieve and analyze responses from infobutton manager. To test the tool, we extracted and sampled common and uncommon concepts from EHR usage data in Intermountain Healthcare’s enterprise data warehouse. From the output of the tool, we evaluate infobutton performance by multiple categories, including against the most and least common used concepts, grouped by different modules in patient portal, by different e-resources, and by type of access (standardized Health Level Seven (HL7) vs not). Based on the results of our evaluation, we provide suggestions for further enhancements of infobuttons to the current implementation, including suggesting accessing priorities of e-resources and encouraging the use of the HL7 standard.
Iterative Design and Evaluation Methodology for Clinical Decision Support Systems

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Abstract: MindsEye, a visual-based interactive clinical decision support (CDS) tool was designed and completed two-phase usability testing. Simultaneously, an iterative methodology for evaluating the usability of CDS user interfaces (UI) was developed and refined after Phase I of the project. Adopting revised methodology, we conducted Phase II evaluation on the refined UI with an expanded pool of subjects and new tasks. This study presented and compared the methodologies and evaluation results of both phases. Overall, this iterative UI design and evaluation methodology proved to be useful and produced superior user performance and results.
Health information technology and large-scale adverse events

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Abstract: There is an urgent need to address large-scale adverse events associated with health information technology (HIT) because the opportunity for harm to numerous patients is intensified with rapid implementation of systems worldwide. This panel will review current evidence about large-scale events including their impact on care delivery and consequences for patients. It will then use a case study of a high profile failure to discuss lessons for safe implementation and operation of present day HIT systems. The panel will then turn its attention to processes for detection and management of HIT events. And finally it will examine strategies for prevention and mitigation of large-scale events. The panel will aim to improve understanding about large-scale events and to transfer learnings about evidence-based best practice methods to improve preparedness, detection, response and recovery from HIT events, and to identify gaps and areas for further work.
The image contains a document page with textual content. The content is formatted as follows:

**Collaboration and Health Information Technologies: Towards Defining and Operationalizing the Collaboration Space**

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**Abstract:** Despite calls for increased collaborative care delivery it is still a challenge to operationalize collaboration, and more specifically, to design and evaluate HIT to support collaboration. Reasons for that include a lack of integrated studies on different aspects of collaboration and a lack of research with an explicit focus on collaboration. However, studying collaboration can be challenging given the range of processes, providers and settings where collaboration takes place. To advance research on collaboration and HIT we need ways to bound studies of collaboration according to the different type of collaborations and the overall collaboration space where they exist. This panel will provide insight on how to define and operationalize the collaboration space. We will discuss the structure of the collaboration space and how it provides bounding for studies of collaboration as well as discuss clinical collaboration and patient centered participatory medicine as two specific contexts of collaboration spaces.
Abstract: National initiatives are increasingly leveraging the vast amounts of data availed by health information technology. PCORnet, the National Patient-Centered Clinical Research Network is one such example, and it aims to improve the ability to perform comparative effectiveness research by integrating data from clinical data research networks (CDRNs) and patient-powered research networks (PPRNs). One key component to the success of these networks will be ensuring the quality of the electronic health record and patient reported outcome data over time and across organizations. Clinical research informaticians have indicated challenges to data quality stemming from data integration, data capture, data exchange, and data standardization. Discussion items include the importance of data quality, a framework and plan for assessing data quality, the effects of health information system infrastructure on data quality, and data quality considerations for patient reported outcomes. Shared learnings from PCORnet stakeholders committed to the network’s excellence should help inform the national dialogue.
Abstract: While automatic de-identification systems exist, release of de-identified data usually requires significant multi-round expensive effort for validation. To overcome this barrier, we need a consensus on the parameters of successful automatic de-identification. Although we can establish such parameters relative to error rates of human annotators, it is ultimately a policy question whose answer needs to be vetted by the public. When personal identifiers are substituted with surrogates or pseudonyms, it could be very difficult to spot the residual identifiers missed by the de-identifier, but in absolute terms, it is difficult to ensure that de-identified clinical text contains no references that might indirectly identify the patient; hence, de-identified clinical text is usually shared through a data use agreement. When such an agreement is in place, dates and some address parts can be left identified in a limited data set. If we reframe the de-identification problem by focusing on the pertinent identifiers, we may smooth the path to data sharing.

Installing and running a clinical de-identification system may require substantial expertise, which small institutions and clinical scientists may lack. Although we would like to develop capable systems with sophisticated functionalities, we also should strive for simplicity for routine de-identification tasks.
Expanding a First-Order Logic Mitigation Framework to Handle Multimorbid Patient Preferences

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Abstract: The increasing prevalence of multimorbidity is a challenge for physicians who have to manage a constantly growing number of patients with simultaneous diseases. Adding to this challenge is the need to incorporate patient preferences as key components of the care process, thanks in part to the emergence of personalized and participatory medicine. In our previous work we proposed a framework employing first order logic to represent clinical practice guidelines (CPGs) and to mitigate possible adverse interactions when concurrently applying multiple CPGs to a multimorbid patient. In this paper, we describe extensions to our methodological framework that (1) broaden our definition of revision operators to support required and desired types of revisions defined in secondary knowledge sources, and (2) expand the mitigation algorithm to apply revisions based on their type. We illustrate the capabilities of the expanded framework using a clinical case study of a multimorbid patient with stable cardiac artery disease who suffers a sudden onset of deep vein thrombosis.
Adaptation of a Published Risk Model to Point-of-care Clinical Decision Support Tailored to Local Workflow

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Abstract: Electronic clinical decision support can bring newly published knowledge to the point of care. However, local organizational buy-in, support for team workflows, IT system ease of use and other sociotechnical factors are needed to promote adoption. We successfully implemented a multi-variate cardiac risk stratification model from another institution into ours. We recreated the model and integrated it into our workflow, accessing it from our EHR with patient-specific data and facilitating clinical documentation if the user accepts the model results. Our clinical leaders championed the change and led educational dissemination efforts. We describe the ad-hoc social and technical collaboration needed to build and deploy the tool. The tool complements a clinical initiative within a community of practice, and is correlated with appropriate use of nuclear imaging.
Challenges and Solutions in Optimizing Execution Performance of a Clinical Decision Support-Based Quality Measurement (CDS-QM) Framework

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Abstract: Given the close relationship between clinical decision support (CDS) and quality measurement (QM), it has been proposed that a standards-based CDS Web service could be leveraged to enable QM. Benefits of such a CDS-QM framework include semantic consistency and implementation efficiency. However, earlier research has identified execution performance as a critical barrier when CDS-QM is applied to large populations. Here, we describe challenges encountered and solutions devised to optimize CDS-QM execution performance. Through these optimizations, the CDS-QM execution time was optimized approximately three orders of magnitude, such that approximately 370,000 patient records can now be evaluated for 22 quality measure groups in less than 5 hours (approximately 2 milliseconds per measure group per patient). Several key optimization methods were identified, with the most impact achieved through population-based retrieval of relevant data, multi-step data staging, and parallel processing. These optimizations have enabled CDS-QM to be operationally deployed at an enterprise level.
Using a Clinical Knowledge Base to Assess Comorbidity Interrelatedness Among Patients with Multiple Chronic Conditions

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Abstract: Decision support tools increasingly integrate clinical knowledge such as medication indications and contraindications with electronic health record (EHR) data to support clinical care and patient safety. The availability of this encoded information and patient data provides an opportunity to develop measures of clinical decision complexity that may be of value for quality improvement and research efforts. We investigated the feasibility of using encoded clinical knowledge and EHR data to develop a measure of comorbidity interrelatedness (the degree to which patients’ co-occurring conditions interact to generate clinical complexity). Using a common clinical scenario—decisions about blood pressure medications in patients with hypertension—we quantified comorbidity interrelatedness by calculating the number of indications and contraindications to blood pressure medications that are generated by patients’ comorbidities (e.g., diabetes, gout, depression). We examined properties of comorbidity interrelatedness using data from a decision support system for hypertension in the Veterans Affairs Health Care System.
Abstract: The Institute of Medicine (IOM) recommends that health care providers collect data on gender identity. If these data are to be useful, they should utilize terms that characterize gender identity in a manner that is 1) sensitive to transgender and gender non-binary individuals (trans* people) and 2) semantically structured to render associated data meaningful to the health care professionals. We developed a set of tools and approaches for analyzing Twitter data as a basis for generating hypotheses on language used to identify gender and discuss gender related issues across regions and population groups. We offer sample hypotheses regarding regional variations in the usage of certain terms such as ‘genderqueer’, ‘genderfluid’, and ‘neutrois’ and their usefulness as terms on intake forms. While these hypotheses cannot be directly validated with Twitter data alone, our data and tools help to formulate testable hypotheses and design future studies regarding the adequacy of gender identification terms on intake forms.
Evaluating Consumer m-Health Services for Promoting Healthy Eating: A Randomized Field Experiment
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Abstract: Mobile apps have great potential to deliver promising interventions to engage consumers and change their health-related behaviors, such as healthy eating. Currently, the interventions for promoting healthy eating are either too onerous to keep consumers engaged or too restrictive to keep consumers connected with healthcare professionals. In addition, while social media allows individuals to receive information from many sources, it is unclear how peer support interacts with professional support in the context of such interventions. This study proposes and evaluates three mobile-enabled interventions to address these challenges. We examine their effects on user engagement and food choices via a 4-month randomized field experiment. Mixed models provide strong evidence of the positive effect of image-based dietitian support and negative effects of peer support, and moderate evidence of the positive effects of mobile-based visual diary, highlighting the value of mobile apps for delivering advanced interventions to engage users and facilitate behavior change.
Public Perspectives of Mobile Phones' Effects on Healthcare Quality and Medical Data Security and Privacy: A 2-Year Nationwide Survey

J. E. Richardson; 1, J. S. Ancker; 1;

Abstract: Given growing interest in mobile phones for health management (mHealth), we surveyed consumer perceptions of mHealth in security, privacy, and healthcare quality using national random-digit-dial telephone surveys in 2013 and 2014. In 2013, 48% thought that using a mobile phone to communicate data with a physician’s electronic health record (EHR) would improve the quality of health care. By 2014, the proportion rose to 57% (p < .001). There were no similar changes in privacy concerns yet nearly two-thirds expressed privacy concerns. In 2013 alone, respondents were more likely to express privacy concerns about medical data on mobile phones than they were to endorse similar concerns with EHRs or health information exchange (HIE). Consumers increasingly believe that mHealth improves healthcare quality, but security and privacy concerns need to be addressed for quality improvement to be fully realized.
Patient Engagement in Cancer Survivorship Care through mHealth: A Consumer-centered Review of Existing Mobile Applications

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Abstract: With improvements in early detection and treatment, the number of cancer survivors has been on the rise. Studies suggest that cancer survivors do not often receive proper follow-up care despite existing guidelines. Patient engagement is key to healthy survivorship, and mHealth provides a viable platform to empower survivors with just-in-time personalized support. However, our understanding of existing mHealth solutions in cancer survivorship is limited. In this paper, we use Patient Engagement Framework to investigate existing apps to bridge this knowledge gap. App features are mapped to the framework components to determine the level of engagement facilitated. Ability to record treatment summaries has been found in five out of seven apps examined. While collaborative care and social engagement are found minimally, the majority of features (95%) are limited to information and way finding, e-tools, and interactive forms. Limitations of the existing apps and possible improvements to the framework are discussed.
Automated Detection of Benzodiazepine Dosage in ICU Patients through a Computational Analysis of 
Electrocardiographic Data

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Abstract: To enable automated maintenance of patient sedation in an intensive care unit (ICU) setting, more robust, quantitative metrics of sedation depth must be developed. In this study, we demonstrated the feasibility of a fully computational system that leverages low-quality electrocardiography (ECG) from a single lead to detect the presence of benzodiazepine sedatives in a subject’s system. Starting with features commonly examined manually by cardiologists searching for evidence of poisonings, we generalized the extraction of these features to a fully automated process. We tested the predictive power of these features using nine subjects from an intensive care clinical database. Features were found to be significantly indicative of a binary relationship between dose and ECG morphology, but we were unable to find evidence of a predictable continuous relationship. Fitting this binary relationship to a classifier, we achieved a sensitivity of 89% and a specificity of 95%.
Using Big Data to Evaluate the Association between Periodontal Disease and Rheumatoid Arthritis

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Abstract: An association between periodontal disease and rheumatoid arthritis is believed to exist. Most investigations into a possible relationship have been case-control studies with relatively low sample sizes. The advent of very large clinical repositories has created new opportunities for data-driven research. We conducted a retrospective cohort study to measure the association between periodontal disease and rheumatoid arthritis in a population of 25 million patients. We demonstrated that subjects with periodontal disease were roughly 1.4 times more likely to have rheumatoid arthritis. These results compare favorably with those of previous studies on smaller cohorts. Additional work is needed to identify the mechanisms behind this association and to determine if aggressive treatment of periodontal disease can alter the course of rheumatoid arthritis.
Abstract: Electronic medical records (EMRs) are capturing increasing amounts of data per patient. For clinicians to efficiently and accurately understand a patient's clinical state, better ways are needed to determine when and how to display EMR data. We built a prototype system that records how physicians view EMR data, which we used to train models that predict which EMR data will be relevant in a given patient. We call this approach a Learning EMR (LEMR). A physician used the prototype to review 59 intensive care unit (ICU) patient cases. We used the data-access patterns from these cases to train logistic regression models that, when evaluated, had AUROC values as high as 0.92 and that averaged 0.73, supporting that the approach is promising. A preliminary usability study identified advantages of the system and a few concerns about implementation. Overall, 3 of 4 ICU physicians were enthusiastic about features of the prototype.
Learning a Severity Score for Sepsis: A Novel Approach based on Clinical Comparisons
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Abstract: Sepsis is one of the leading causes of death in the United States. Early administration of treatment has been shown to decrease sepsis-related mortality and morbidity. Existing scoring systems such as the Acute Physiology and Chronic Health Evaluation (APACHE II) and Sequential Organ Failure Assessment scores (SOFA) achieve poor sensitivity in distinguishing between the different stages of sepsis. Recently, we proposed the Disease Severity Score Learning (DSSL) framework that automatically derives a severity score from data based on clinical comparisons -- pairs of disease states ordered by their severity. In this paper, we test the feasibility of using DSSL to develop a sepsis severity score. We show that the learned score significantly outperforms APACHE-II and SOFA in distinguishing between the different stages of sepsis. Additionally, the learned score is sensitive to changes in severity leading up to septic shock and post treatment administration.
JUFIT: A Configurable Rule Engine for Filtering and Generating New Multilingual UMLS Terms

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Abstract: We here describe JUFIT, an easily adjustable rule engine which allows to filter non-natural terms (i.e., ones usually not occurring in running citation texts) from the UMLS metathesaurus and even adds new terms to the UMLS (by rewriting non-natural terms). Unlike previous attempts (with MetaMap or Casper), JUFIT serves multilingual purposes in that it runs for English, Spanish, French, German and Dutch documents, as well – the most prominent European languages in terms of UMLS coverage. We evaluated JUFIT under a variety of experimental conditions and found evidence that it increases annotation quality for English, and most likely also for German and Spanish.
Scaling Out and Evaluation of OBSeCAn, an Automated Section Annotator for Semi-Structured Clinical Documents, on a Large VA Clinical Corpus

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Abstract: “Identifying and labeling” (annotating) sections improves the effectiveness of extracting information stored in the free text of clinical documents. OBSeCAn, an automated ontology-based section annotator, was developed to identify and label sections of semi-structured clinical documents from the Department of Veterans Affairs (VA). In the first step, the algorithm reads and parses the document to obtain and store information regarding sections into a structure that supports the hierarchy of sections. The second stage detects and makes correction to errors in the parsed structure. The third stage produces the section annotation output using the final parsed tree. In this study, we present the OBSeCAn method and its scale to a million document corpus and evaluate its performance in identifying family history sections. We identify high yield sections for this use case from note titles such as primary care and demonstrate a median rate of 99% in correctly identifying a family history section.
An Ensemble Method for Spelling Correction in Consumer Health Questions

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Abstract: Orthographic and grammatical errors are a common feature of informal texts written by lay people. Health-related questions asked by consumers are a case in point. Automatic interpretation of consumer health questions is hampered by such errors. In this paper, we propose a method that combines techniques based on edit distance and frequency counts with a contextual similarity-based method for detecting and correcting orthographic errors, including misspellings, word breaks, and punctuation errors. We evaluate our method on a set of spell-corrected questions extracted from the NLM collection of consumer health questions. Our method achieves a F1 score of 0.61, compared to an informed baseline of 0.29, achieved using ESpell, a spelling correction system developed for biomedical queries. Our results show that orthographic similarity is most relevant in spelling error correction in consumer health questions and that frequency and contextual information are complementary to orthographic features.
Citation Sentiment Analysis in Clinical Trial Papers

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Abstract: In scientific writing, positive credits and negative criticisms can often be seen in the text mentioning the cited papers, providing useful information about whether a study can be reproduced or not. In this study, we focus on citation sentiment analysis, which aims to determine the sentiment polarity that the citation context carries towards the cited paper. A citation sentiment corpus was annotated first on clinical trial papers. The effectiveness of n-gram and sentiment lexicon features, and problem-specified structure features for citation sentiment analysis were then examined using the annotated corpus. The combined features from the word n-grams, the sentiment lexicons and the structure information achieved the highest Micro F-score of 0.860 and Macro-F score of 0.719, indicating that it is feasible to use machine learning methods for citation sentiment analysis in biomedical publications. A comprehensive comparison between citation sentiment analysis of clinical trial papers and other general domains were conducted, which additionally highlights the unique challenges within this domain.
Human Factors of Health Information Exchange: Barriers and Facilitators to Use of the VA’s CPRS and a Regional Health Information Exchange

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Abstract: The issue of how to integrate information across different health information systems is becoming critical as the level of data interoperability increases. In this podium presentation we examine providers’ use of the VA’s Computerized Patient Record System (CPRS) and a Regional Health Information Exchange (RHIO) from a human factors perspective. The approach was able to identify system and provider factors that impede and facilitate adoption of the information exchange tool for routine use.
Abstract: Using an electronic health record (EHR) system places many cognitive demands upon the user. This study presents the results of ten cognitive task analysis interviews with a variety of clinicians, including the challenges EHR users face and the cues and strategies they employ to overcome those challenges. Several themes emerged from the interviews, such as support for an accurate situation model of the patient, common ground, and planning and action.
Evaluating the Effects of Cognitive Support on Interpreting ICU Patient Data

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4. University of Illinois at Chicago, Chicago, IL, United States.

Abstract: We investigated the impact of SIRSi, a Cognitive Support System for enhanced interpretation of Systemic Inflammatory Response (SIRS) criteria. Our data compares the performance of SIRSi’s concept oriented interface with a more traditional data-source oriented interface while viewing ICU patient data using a “think-aloud” protocol. Our results demonstrated linear, top-down viewing order for both interfaces, but found significantly greater attention to SIRS criteria data and more complete clinical assessment when using the concept oriented interface.
Efficiency and Accuracy of Kinect and Leap Motion devices Compared to the Mouse for Intraoperative Image Manipulation

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Abstract: With this study we compared the efficiency and accuracy of a standard mouse, the Microsoft Kinect, and the Leap Motion device for the sterile manipulation of images in the operating room. Our study shows that for many image manipulation tasks, there is no significant difference between the mouse, the Kinect, or the Leap Motion device. However, a few select tasks did lend themselves to be either more efficient or more accurate with a mouse.
Qualitative Study of an Electronic Tool for Facilitating Problem-Solving and Sensemaking in Diabetes Self-Management, Mobile Diabetes Detective

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4. Georgia Institute of Technology, Atlanta, GA, United States.

Abstract: Problem-solving skills are essential to successful diabetes self-management, result in better diabetes self-care behaviors, and lead to improvements in clinical outcomes. In this presentation, we will introduce Mobile Diabetes Detective (MoDD) – a novel electronic tool for engaging individuals with diabetes in problem-solving using data collected with self-monitoring. We will report the results of the qualitative study of user attitudes, preferences, and experiences with MoDD that emerged during their participation in a randomized controlled trial.
Computer-Mediated Intervention to Improve Medication Literacy in Seniors with Diabetes Results in Better Patient-Reported Outcomes and Glycemic Control

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Abstract: The purpose of this study was to compare interactive continuous patient education (iCOPE) to a brochure in a randomized controlled trial. Older adults taking oral diabetes medications were randomly assigned to receive the same diabetes medications curriculum via iCOPE or printed brochure combined with periodic reminders. At 3 months significant improvement in medication knowledge, self-efficacy and glycemic control was found in the intervention group whereas changes in the control group remained not significant.
Using a Software Program to Support Shared Decision-Making about Participation in Breast Cancer Clinical Trials

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2. Medical Oncology, Thomas Jefferson University, Philadelphia, PA, United States.
3. College of Computing & Informatics, Drexel University, Philadelphia, PA, United States.

Abstract: This study describes use of a decision counseling process and tool employing a version of an Analytic Hierarchical Processing algorithm to help breast cancer patients make decisions in consultation with their physician about participating in a clinical trial. The process captures the patient's current attitudes and beliefs at the point of care and results in a categorical assessment of preference scores for participation in a clinical trial that can be used in shared decision making.
An EHR-Integrated Shared Decision Making Mobile App for Prostate Cancer Screening
F. C. Day; 1, 2; M. Sarrafzadeh; 3; S. Smith; 1; M. Pourhomayoun; 3; K. Sideris; 3; A. Param; 3; J. Ben-Hamou; 1; D. Keeves; 1; M. A. Pfeffer; 1; D. S. Bell; 1;
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2. GLAVA, Los Angeles, CA, United States.
3. University of California, Los Angeles, Los Angeles, CA, United States.

Abstract: Engaging patients in SDM is important to optimize patient-centered outcomes, provide high quality care, and help control health care costs. We have established a multidisciplinary team to implement an initial mobile app/EHR integration (based on a trial vetted SDM web app) that includes a back end machine learning analytics algorithm. An mHealth initiative for secure bidirectional data exchange with an EHR is feasible and may increase patient engagement and improve patient-centered outcomes.
Abstract: The reuse of electronic health record (EHR) data promises to increase the efficiency and generalizability of clinical research. EHR data, however, are known to be of poor and variable quality, which may decrease the validity of research findings. Researchers and informaticians require tools that allow them to select, perform, and report appropriate data quality assessments. We describe the formulation, development, and intended use of 3x3 DQA (Data Quality Assessment), a novel dynamic guideline for EHR data quality assessment.
Effects of HIE/HIT Implementation and Coordination of Care on Health Outcomes and Quality

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Abstract: This study analyzes the effects of HIE/HIT on patient outcomes and quality of care metrics. Using the AHA IT Database, HIMSS IT data and CMS Inpatient, Outpatient and Skilled Nursing Facility data spanning years 2006-2012, the authors conduct a hierarchical cluster analysis of measures of HIE/HIT, measuring HIE/HIT penetration, and the associated outcome and quality metrics associated with health care institutions. Institutions with the highest penetration of HIE/HIT saw improved health outcomes and quality.
Impact of Electronic Health Records on Quality of Care: Evidence on Inpatient Mortality, Readmissions, and Complications

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Abstract: It has been suggested that health information technology, particularly electronic health records (EHR), will improve quality and efficiency of healthcare organizations and many hospitals have implemented these systems. However, little evidence exists on the association between EHR adoption and improved quality of care across a broad range of medical and surgical conditions. We hypothesized that hospitals with fully-implemented EHR-systems [Full-EHR] would have lower levels of inpatient mortality, 30-day all cause readmissions, and complications (measured by Patient Safety Indicators [PSIs]), compared to hospitals with no or partially implemented EHR-systems [No-EHR and Partial-EHR, respectively]. We found medical and surgical patients sought care at hospitals reporting No-EHR (10.1%), Partial-EHR (56.5%) and Full-EHR. (33.4%). Patients at hospitals with a Full-EHR had the lowest rates of inpatient mortality, readmissions, and PSIs followed by patients at hospitals with a Partial-EHR and then patients at hospitals with No-EHR. (p<.05); surgical patients demonstrated between a 9-15% decrease and medical patients had between a 5-12% decrease in rates. However, the difference-in-differences analysis found EHR implementation had a minimal effect both in medical and surgical patients on inpatient mortality readmission, and complications. As federal incentives encourage EHR adoption and hospitals strive for meaningful use, it will be important to understand the benefits received from EHRs. Under the healthcare reform, all parties focus on the quality of care received and EHRs might play a smaller role than expected. Our results suggest that EHR-associated improved quality, safety, and efficacy might vary by type of care and meaningful use targets should reflect such variations.
Usability Testing of an Ambulatory EHR Navigator
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Abstract: In response to clinician problems and challenges with a new EHR, an ambulatory navigator was redesigned. This study explored whether redesigning the navigator with clinician input addressed some of these challenges. Participants were asked to complete tasks using each navigator while thinking aloud. The version of the navigator had no effect on perceived workload and time on task was longer with the redesigned version of the navigator. This study highlights challenges in improving EHR interfaces.
Will they participate? Predicting patients’ response to clinical trial invitations

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Abstract: Challenges with patient recruitment for clinical trials are recognized as a major barrier to the timely and efficacious conduct of translational research. This study focuses on understanding factors impacting patients’ enthusiasm for contributing to a trial, including acuity of their clinical problems, demographics and socioeconomic status, and trial characteristics. Our objective is to develop a machine-learning model to predict a patient’s response (if the patient agrees or declines) before he/she is approached for a clinical trial.
STEMPOWERMENT: A Prototype Online Intervention to Improve Outcomes in Stem Cell Transplant Survivors

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Abstract: Hematopoietic stem cell transplantation (SCT) survivors encounter numerous physical and psychosocial barriers to adherence with medication regimens and maintenance of adequate hydration and physical activity levels; low adherence can result in serious consequences such as organ damage and/or chronic, severe graft vs. host disease. We evaluated a prototype online interactive intervention utilizing game mechanics to promote post-SCT self-management behaviors among AYA survivors; namely, medication adherence, hydration, and physical activity.
A survey of social media for understanding patient-reported medication outcomes
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Abstract: Harnessing social media as a new data source for monitoring medication outcomes in the post-marketing stage has not been systematically examined. In this project, we extracted user posts for 11 disease-drug pairs from four social media sites and investigated the availability and quality of consumer-reported information regarding effectiveness, side effects, adherence, and cost. We believe reliable text-mining methods are essential to fully unlocking the abundant and meaningful information in social media for medication outcome.
Improving Weight in Patients with Serious Mental Illness: A Randomized Controlled Trial of Computerized Weight Services with Peer Coaches
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Abstract: In-person weight management interventions improve outcomes of people with serious mental illness. However, these require extensive time from patients and clinicians, and are rarely provided in usual care. We studied whether barriers could be addressed using computerized provision of diet and exercise education, and decision support, combined with motivation from peer coaches. The intervention was compared to in-person services and usual care, and found to be well accepted and resulted in improved weight.
Abstract: VA is in the second year of its EHR modernization program called VistA Evolution. The Enterprise Health Management Platform (eHMP) is next generation EHR system. eHMP incrementally delivers new capabilities necessary for new models of healthcare that we desire to implement, while it preserves the business processes that we desire to keep. Technically, eHMP builds upon VistA, our current MUMPS system, with a data aggregation layer, service layer using modern open-source components, and a modular user interface that allows addition of compliant applications from outside VA. New data elements will be natively stored using national standards. Many new services use standard implementations and interfaces such as OpenCDS and Business Process Management Notation. This demonstration will highlight the ability of this system to collect and operate on data from 130 different VistA EHRs, DoD, and community partners participating in Connect or Direct data exchanges. It will also highlight the new user experience that is heavily informed by social and cognitive psychology.
Towards an Open EHR Platform: Porting a Complex Application using SMART on FHIR

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Abstract: Abstract

The Rheumatology App is a sophisticated, web-based application for managing a rheumatology ambulatory encounter, developed by Geisinger Health System. The Rheumatology App synthesizes information from several sources, including the EHR and presenting disease-specific data in a graphical summary view. It assists in the formatting of a progress note for the visit, incorporating relevant data from all sources. The Rheumatology App was initially developed to run on a major commercial EHR (Epic). Subsequently, it was adapted to take advantage of the SHARP grant funded SMART platform and emerging HL-7 FHIR resources, given that these draft standards are publicly available, non-proprietary and facilitate the exchange of clinical data in an EHR-agnostic manner. The data set used for these RESTful APIs were derived from the Meaningful Use Common Dataset, as promoted by the Argonaut Project and the Office of the National Coordinator (e.g. LOINC, RxNORM, SNOMED-CT). The process of converting the Rheumatology App from an embedded state within one commercially available EHR into a “SMART on FHIR” state into another EHR was shorter than expected, measured in weeks, not months or years. Converting the full functionality required at least eleven (11) FHIR resource types, some of which were both read and write access to the EHR. This is one of the more complex implementations using SMART on FHIR to appear in the literature to date. We will demonstrate the Rheumatology App executing as a “SMART app” in the context a commercial EHR. We will discuss the process, the learning from the conversion exercise and deploying the Rheumatology App as SMART on FHIR functionality embedded directly and unobtrusively within the framework and workflow of the various EHRs, from the perspective of both the health system application developers, and the EHR vendor.

Purpose of the System

The Rheumatology App presents clinical information in a format that supports the cognitive process of a clinician treating rheumatic disease. All Geisinger Rheumatologist use this Rheumatology App to manage their patients. The workflow includes touchscreen questionnaires for the patient, designed to collect information about symptoms of their new or chronic rheumatologic condition. The patient generated data is rendered into views that, when assembled with data imported from the EHR and data from clinician input, facilitate shared decision making and visualization of the next best actions to perform for the patient. Following the Learning Health System principles, as a by-product care administered, this data entry and integration supports the development of a rheumatic database for research and decision support. In addition, increases in clinician efficiency and productivity were measured using the Rheumatology App. The SMART on FHIR implementation of the Rheumatology App demonstrates the feasibility of delivering complex and specialized clinical functionality using a standards-based open platform approach.

Deployment Status

In its native implementation, the Rheumatology App has been used in production for several years, and seen widespread adoption among eligible clinicians. The SMART-on-FHIR implementation is currently running as a proof-of-concept, with deployment planned for Fall 2015.
Abstract: The perioperative period is a complex environment that can benefit significantly from the implementation of clinical decision support (CDS), given the large volume and velocity of data, the presence of many distractions, and increasing documentation requirements. Panel participants will describe projects they have successfully implemented that relate to four separate domains of perioperative CDS. Implementation of post hoc provider-specific feedback through the use of dashboards will be discussed in the context of improving the quality of patient care. Guidance of provider activities at the point of patient care in the operating room through integration of data from physiologic monitors, anesthesia machines, and the electronic health record and delivery of timely advice will be presented. A CDS system to facilitate compliance with the new SCIP 4 protocol related to control of blood glucose following cardiac surgery will be described. Translation of published research regarding Bayesian statistical predictions for time remaining during surgical cases to a real time whiteboard to facilitate operating room management CDS will be shown. Panelists will discuss issues related to implementing CDS in the context of modern electronic health systems in which access to necessary data in near real-time has proven to be challenging.
The Value of an Open-Source Observational Research Collaboratory: Results from the OHDSI Initiative

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Abstract: The Observational Health Data Sciences and Informatics collaborative (OHDSI, pronounced ‘Odyssey’) was formed in 2013 with the goal of creating reliable scientific evidence through large-scale analysis of observational health data from around the world. To advance this goal, OHDSI has had to grow rapidly its scientific, technical, and community infrastructure. OHDSI has now grown to over 120 participants from 10 countries. Across the collaborative, there are over 50 databases covering hundreds of millions of patient lives. OHDSI has conducted multiple international network-based observational research studies using this infrastructure. In this panel, we present initial results and lessons learned from the OHDSI initiative.
The Implementation of Online Patient Portals in Safety Net Settings: The Realities of Meaningful Use Certification with Vulnerable Patient Populations

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Abstract: This panel will provide insights and early data about the experiences of safety net healthcare settings implementing online patient portals in order to meet Meaningful Use Stage 2 certification deadline during 2015. While the vast majority of US healthcare systems are in the midst of implementing patient access to online patient portal websites to allow patients to view their medical information online and communicate electronically with providers in between office visits, healthcare systems serving predominantly low-income and uninsured/publicly insured face unique challenges with patient as well as provider/staff engagement. In particular, these systems have developed strategies for engaging patients with limited health literacy and/or basic computer/Internet skills, such as dedicated portal training programs. They also have recognized the need for parallel processes for provider/staff engagement.
mobile Digital Access to a Web-enhanced Network (mDAWN): Assessing the Feasibility of Mobile Health Tools for Self-Management of Type-2 Diabetes

K. Ho; 1; L. Newton; 1; A. Boothe; 1; H. Novak Lauscher; 1

Abstract: The mobile Digital Access to a Web-enhanced Network (mDAWN) program was implemented as an online, mobile self-management system to support patients with type-2 diabetes and their informal caregivers. Patients used wireless physiological sensors, received text messages, and had access to a secure web platform with health resources and semi-facilitated discussion forum. Outcomes were evaluated using (1) pre and post self-reported health behavior measures, (2) physiological outcomes, (3) program cost, and (4) in-depth participant interviews. The group had significantly decreased health distress, HbA1c levels, and systolic blood pressure. Participants largely saw the mDAWN as providing good value for the costs involved and found the program to be empowering in gaining control over their diabetes. mHealth programs have the potential to improve clinical outcomes through cost effective patient-led care for chronic illness. Further evaluation needs to examine integration of similar mhealth programs into the patient-physician relationship.
Use of Patient Portals for Personal Health Information Management: The Older Adult Perspective
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Abstract: The personal health information management (PHIM) practices and needs of older adults are poorly understood. We describe initial results from the UW SOARING project (Studying Older Adults & Researching Information Needs and Goals), a participatory design investigation of PHIM in older adults (60 years and older). We conducted in-depth interviews with older adults (n=74) living in a variety of residential settings about their management of personal health information. A surprising 20% of participants report using patient portals and another 16% reported prior use or anticipated use of portals in the future. Participants cite ease of access to health information and direct communication with providers as valuable portal features. Barriers to the use of patient portals include a general lack of computer proficiency, high internet costs and security concerns. Design features based on consideration of needs and practices of older adults will facilitate appeal and maximize usability; both are elements critical to adoption of tools such as patient portals that can support older adults and PHIM.
Abstract: Diabetes management is a complex, dynamic process that is largely incumbent on patient choices and behavior. We explore how health-management needs—and the needs for technological support—change over time for individuals with diabetes. Through interviews and a focus group, we found that after initial diagnosis, individuals face acute information needs and chiefly turn to mobile applications and Internet resources to help understand the diabetes-specific factors that affect their health. Over time their focus shifts from highly regimented routines to more flexible ones that enable them to maintain a quality of life. Our results suggest that long-term engagement with health technology does not necessarily require continuous, sustained use: routine disease management could lead to a decrease in use, until a new event occurs. Our findings point to a need for tools that help patients with diabetes to effectively manage their health as their bodies, treatment and circumstances change over time.
Understanding patients' health and technology attitudes for tailoring self-management interventions

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Abstract: Healthcare providers are moving towards tailoring self-management interventions to include the communication technologies patients use in daily life. Accurate understanding of patients' attitudes towards both technology and involvement in managing chronic conditions will be critical for informing effective self-management strategies. The tailoring of these interventions, however, could be undermined by providers' implicit biases based on patient age, race, and education level that have been shown to negatively affect care. To inform the design and tailoring of self-management interventions, we elicited attitudes toward technology use and participation in care of 40 participants in a maximum variation sample. The analysis revealed three participant clusters—"Proactive Techies," "Indie Self-Managers," and "Remind Me! Non-Techies"—that represent varying attitudes toward health behaviors and technologies that were independent of race, education level, and age. Our approach provides insight into how people prioritize important values related to health participation and technology.
Abstract: Ginkgo biloba is a widely used herbal product that could potentially have a severe interaction with warfarin, which is the most frequently prescribed anticoagulant agent in North America. Literature, however, provides conflicting evidence on the presence and severity of the interaction. In this study, we developed text processing methods to extract the ginkgo usage and combined it with prescription data on warfarin from a very clinical data repository. Our statistical analysis suggests that taking concurrently with warfarin, ginkgo does significantly increase patients’ risk of a bleeding adverse event (hazard ratio = 1.38, 95%CI: 1.20 to 1.58, p<.001). This study also is the first attempt of using a large medical record database to confirm a suspected herb-drug interaction. 


Abstract: Pharmacogenomics (PGx) guidelines contain drug-gene relationships, therapeutic and clinical recommendations from which clinical decision support (CDS) rules can be extracted, rendered and then delivered through clinical decision support systems (CDSS) to provide clinicians with just-in-time information at the point of care. Several tools exist that can be used to generate CDS rules that are based on computer interpretable guidelines (CIG), but none have been previously applied to the PGx domain. We utilized the Unified Modeling Language (UML), the Health Level 7 virtual medical record (HL7 vMR) model, and standard terminologies to represent the semantics and decision logic derived from a PGx guideline, which were then mapped to the Health eDecisions (HeD) schema. The modeling and extraction processes developed here demonstrate how structured knowledge representations can be used to support the creation of shareable CDS rules from PGx guidelines.
Abstract: Drug misuse is a prominent cause of morbidity and mortality in the United States. Recent focus on behavioral and social domains in the electronic health record (EHR) has highlighted the need for comprehensive examination of social history information, such as drug use. In this study, representation of drug use was examined in three types of sources: (1) standards from HL7 and openEHR, (2) clinical text from publicly accessible clinical notes and a local EHR, and (3) research measures from the PhenX Toolkit and CDE Browser. In total, 27 elements were identified across the examined sources, revealing a diverse set of values that were found to be associated with drug use type, frequency, method, time frame, and amount. The findings of this study provide insight into the representation of drug use information that may contribute to efforts for standardizing collection and use of these data to support clinical care and research.
An Interactive User Interface for Drug Labeling to Improve Readability and Decision-Making

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Abstract: FDA-approved prescribing information (also known as product labeling or labels) contain critical safety information for health care professionals. Drug labels have often been criticized, however, for being overly complex, difficult to read, and rife with overwarning, leading to high cognitive load. In this project, we aimed to improve the usability of drug labels by increasing the ‘signal-to-noise ratio’ and providing meaningful information to care providers based on patient-specific comorbidities and concomitant medications. In the current paper, we describe the design process and resulting web application, known as myDrugLabel. Using the Structured Product Label documents as a base, we describe the process of label personalization, readability improvements, and integration of diverse evidence sources, including the medical literature from PubMed, pharmacovigilance reports from FDA adverse event reporting system (FAERS), and social media signals directly into the label.
Reviewing 741 patients records in two hours with FASTVISU
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Abstract: The secondary use of electronic health records opens up new perspectives. They provide researchers with structured data and unstructured data, including free text reports. Many applications been developed to leverage knowledge from free-text reports, but manual review of documents is still a complex process.

We developed FASTVISU a web-based application to assist clinicians in reviewing documents. We used FastVisu to review a set of 6340 documents from 741 patients suffering from the celiac disease.

A first automated selection pruned the original set to 847 documents from 276 patients’ records. The records were reviewed by two trained physicians to identify the presence of 15 auto-immune diseases. It took respectively two hours and two hours and a half to evaluate the entire corpus. Inter-annotator agreement was high (Cohen’s kappa at 0.89).

FastVisu is a user-friendly modular solution to validate entities extracted by NLP methods from free-text documents stored in clinical data warehouses.
Building Structured Personal Health Records from Photographs of Printed Medical Records

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Abstract: Personal health records (PHRs) provide patient-centric healthcare by making health records accessible to patients. In China, it is very difficult for individuals to access electronic health records. Instead, individuals can easily obtain the printed copies of their own medical records, such as prescriptions and lab test reports, from hospitals. In this paper, we propose a practical approach to extract structured data from printed medical records photographed by mobile phones. An optical character recognition (OCR) pipeline is performed to recognize text in a document photo, which addresses the problems of low image quality and content complexity by image pre-processing and multiple OCR engine synthesis. A series of annotation algorithms that support flexible layouts are then used to identify the document type, entities of interest, and entity correlations, from which a structured PHR document is built. The proposed approach was applied to real world medical records to demonstrate the effectiveness and applicability.
An Assessment of Family History Information Captured in an Electronic Health Record
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Abstract: Family history is considered a core element of clinical care. In this study we assessed the quality of family history data captured in an established commercial electronic health record (EHR) at a large academic medical center. Because the EHR had no centralized location to store family history information, it was collected as part of clinical notes in structured or free-text format. We analyzed differences between 10,000 free-text and 9,121 structured family history observations. Each observation was classified according to disease presence/absence and family member affected (e.g., father, mother, etc.). The structured notes did not collect a complete family history as defined by standards endorsed by the U.S. Agency for Healthcare Research and Quality; the free-text notes contained more information than the structured notes, but still not enough to be considered “complete.” Several barriers remain for collecting complete, useful family history data in electronic health records.
Evolving Patient Compliance Trends: Integrating Clinical, Insurance, and Extrapolated Socioeconomic Data

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Abstract: Efforts toward improving patient compliance in medication focus on either identifying trends in patient features or studying changes through an intervention. Our study seeks to provide an important link between these two approaches through defining trends of evolving compliance. In addition to using clinical covariates provided through insurance claims and health records, we also extracted census based data to provide socioeconomic covariates such as income and population density. Through creating quadrants based on periods of medicine intake, we derive several novel definitions of compliance. These definitions revealed additional compliance trends through considering refill histories later in a patient’s length of therapy. These results suggested that the link between patient features and compliance includes a temporal component, and should be considered in policymaking when identifying compliant subgroups.
Characterization of the Context of Drug Concepts in Research Protocols: An Empiric Study to Guide Ontology Development

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Abstract: We examined a large body of research study documents (protocols) to identify mentions of drug concepts and established base concepts and roles needed to characterize the semantics of these instances. We found these concepts in three general situations: background knowledge about the drug, study procedures involving the drug, and other roles of the drug in the study. We identified 18 more specific contexts (e.g., adverse event information, administration and dosing of the drug, and interactions between the study drug and other drugs). The ontology was validated against a test set of protocol documents from NIH and ClinicalTrial.gov. The goal is to support the automated extraction of drug information from protocol documents to support functions such as study retrieval, determination of subject eligibility, generation of order sets, and creation of logic for decision support alerts and reminders. Further work is needed to formally extend existing ontologies of clinical research.
Abstract: Targeted cancer drugs are often associated with unexpectedly high cardiovascular (CV) adverse events. Systematic approaches to studying CV events associated with targeted anticancer drugs have high potential for elucidating the complex pathways underlying targeted anti-cancer drugs. In this study, we built tcTKB, a comprehensive CV toxicity knowledge base for targeted cancer drugs, by extracting drug-CV pairs from five large-scale and complementary data sources. The data sources include FDA drug labels (44,979 labels), the FDA Adverse Event Reporting System (FAERS) (4,285,097 records), the Canada Vigilance Adverse Reaction Online Database (CVAROD) (1,107,752 records), published biomedical literature (21,354,075 records), and published full-text articles from the Journal of Oncology (JCO) (13,855 articles). tcTKB contains 14,351 drug-CV pairs for 45 targeted anticancer drugs and 1,842 CV events. We demonstrate that CV events positively correlate with drug target genes and drug metabolism genes, demonstrating that tcTKB in combination with other data resources, could facilitate our understanding of targeted anticancer drugs and their associated CV toxicities.
Approaches to Supporting the Analysis of Historical Medication Datasets with RxNorm

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Abstract: Objective: To investigate approaches to supporting the analysis of historical medication datasets with RxNorm. Methods: We created two sets of National Drug Codes (NDCs). One is based on historical NDCs harvested from versions of RxNorm from 2007 to present. The other comprises all sources of NDCs in the current release of RxNorm, including proprietary sources. We evaluated these two resources against four sets of NDCs obtained from various sources. Results: In two historical medication datasets, 14-19% of the NDCs were obsolete, but 91-96% of these obsolete NDCs could be recovered and mapped to active drug concepts. Conclusion: Adding historical data significantly increases NDC mapping to active RxNorm drugs. A service for mapping historical NDC datasets leveraging RxNorm was added to the RxNorm API and is available at https://rxnav.nlm.nih.gov/.

Chemical Ingredients
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Abstract: The National Drug File – Reference Terminology (NDF-RT) is a large and complex drug terminology. NDF-RT provides important information about clinical drugs, e.g., their chemical ingredients, mechanisms of action, dosage form and physiological effects. Within NDF-RT such information is represented using tens of thousands of roles. It is difficult to comprehend large, complex terminologies like NDF-RT. In previous studies, we introduced abstraction networks to summarize the content and structure of terminologies. In this paper, we introduce the Ingredient Abstraction Network to summarize NDF-RT’s Chemical Ingredients and their associated drugs. Additionally, we introduce the Aggregate Ingredient Abstraction Network, for controlling the granularity of summarization provided by the Ingredient Abstraction Network. The Ingredient Abstraction Network is used to support the discovery of new candidate drug-drug interactions (DDIs) not appearing in First Databank, Inc.’s DDI knowledgebase.
Abstract: Objective: To create a relevant and clinically informative visualization of passively collected patient mobility data from smartphones of rheumatoid arthritis (RA) patients for rheumatologists.

Methods: (1) Pilot analysis of smartphone mobility data in RA; (2) Assessment of rheumatologists’ needs for patient data through semi-structured interviews; and (3) Evaluation of the visual format of the RA data using scenario-based usability methods.

Results: We created a color-scale mobility index superimposed on a calendar to summarize the passive mobility measures from the smartphone that the rheumatologists confirmed would be clinically relevant.

Conclusion: This assessment of clinician data needs and preferences demonstrates the potential value of passively collected smartphone data to resolve an important data question in RA. Efforts such as these are necessary to ensure that any smartphone data that patients share with their doctors will not exacerbate clinician information overload, but actually facilitate clinical decisions.
Organizational Uses of Health Information Exchange to Change Cost and Utilization Outcomes: A Typology from a Multi-Site Qualitative Analysis

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Abstract: Health information exchange (HIE) systems facilitate access to patient information for a variety of health care organizations, end users, and clinical and organizational goals. While a complex intervention, organizations’ usage of HIE is often conceptualized and measured narrowly. We sought to provide greater specificity to the concept of HIE as an intervention by formulating a typology of organizational HIE usage. We interviewed representatives of a regional health information organization and health care organizations actively using HIE information to change patient utilization and costs. The resultant typology includes three dimensions: user role, usage initiation, and patient set. This approach to categorizing how health care organizations are actually applying HIE information to clinical and business tasks provides greater clarity about HIE as an intervention and helps elucidate the conceptual linkage between HIE and organizational and patient outcomes.
Impact of Robotic Surgery on Decision Making: Perspectives of Surgical Teams

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Abstract: There has been rapid growth in the purchase of surgical robots in both North America and Europe in recent years. Whilst this technology promises many benefits for patients, the introduction of such a complex interactive system into healthcare practice often results in unintended consequences that are difficult to predict. Decision making by surgeons during an operation is affected by variables including tactile perception, visual perception, motor skill, and instrument complexity, all of which are changed by robotic surgery, yet the impact of robotic surgery on decision making has not been previously studied. Drawing on the approach of realist evaluation, we conducted a multi-site interview study across nine hospitals, interviewing 44 operating room personnel with experience of robotic surgery to gather their perspectives on how robotic surgery impacts surgeon decision making. The findings reveal both potential benefits and challenges of robotic surgery for decision making.
Abstract: The Privacy Rule of Health Insurance Portability and Accountability Act (HIPAA) requires that clinical documents be stripped of personally identifying information before they can be released to researchers and others. We have been manually annotating clinical text since 2008 in order to test and evaluate an algorithmic clinical text de-identification tool, NLM Scrubber, which we have been developing in parallel. Although HIPAA provides some guidance about what must be de-identified, translating those guidelines into practice is not as straightforward, especially when one deals with free text. As a result we have changed our manual annotation labels and methods six times. This paper explains why we have made those annotation choices, which have been evolved throughout seven years of practice on this field. The aim of this paper is to start a community discussion towards developing standards for clinical text annotation with the end goal of studying and comparing clinical text de-identification systems more accurately.
Evaluating the Accuracy of Automated Notifiable Condition Detection in Free-Text Electronic Laboratory Report

Results Using Contemporary Text Mining and Machine Learning Methods

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Abstract: The increasing volume of electronic laboratory reports (ELR) render manual adjudication of these reports infeasible. Using open-source software Weka we implemented text mining techniques and a random forest decision model to identify ELR’s positive for Salmonella from within real-world HL7 laboratory messages. The model exhibited an ROC of 0.984. Our results suggest that automated identification of notifiable results from within electronic laboratory using open source text data mining software reports is both feasible and accurate.
Detection of Colorectal Surgical Site Infections Using Bayesian Network and Natural Language Processing
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Abstract: Surgical site infection (SSI) is the most common nosocomial infection for surgical patients and is a costly complication following major colorectal surgery (CRS). Previous studies have reported patient perioperative characteristics associated with an increased SSI risk using NSQIP data. In this study, we analyzed SSI risk factors for CRS and further applied a machine learning technique to detect SSIs using not only risk factors but also keywords extracted from clinical notes through natural language processing.
Natural Language Processing facilitates delivery of individualized recommendations at the point of care

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Abstract:
Clinicians struggle to provide consistent care for many conditions despite the availability of standard guidelines. This problem is intensified when clinicians attempt to provide personalized care, primarily due to time required to search for patient specific data in the medical records and to integrate knowledge regarding the clinical conditions. With a multi-group collaboration effort at Mayo Clinic, we have developed a new web based EMR agnostic care recommendation solution called MayoExpertAdvisor (MEA) that integrates information from both the structured resources and unstructured clinical notes and reports. Natural Language Processing (NLP) has been utilized to extract clinical information from clinical text relevant to three conditions: hyperlipidemia, atrial fibrillation, and heart failure. We demonstrate that NLP plays a critical role in facilitating the delivery of individualized recommendations of those conditions at the point of care.
**Quantifying Tobacco Exposure Using Clinical Notes and Natural Language Processing to Enable Lung Cancer Screening**

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**Abstract:** Lung cancer screening is recommended in individuals age 55-80 with 30 or more pack-years (PY) of smoking history. We created an algorithm using natural language processing to quantify PY from social history text. The algorithm was validated against physician-calculated PY from 984 health records. The correlation between physician-calculated and predicted PY was 0.78. We were able to predict 14 of 19 individuals that qualify for lung cancer screening (p-value 0.03).
Toward the Development of a Predictive Model for Patient Portal Adoption by Patients in a Federally Qualified Health Center

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Abstract: **Patient portals provide online access to health records. We surveyed patients in a community health center to better understand perceived ease of use and perceived usefulness of portals. Participants were interested in similar portal features. Patients with higher levels of education had more apprehension about ease of use. Achieving Meaningful Use of EHR and preventing disparities in portal uptake requires attention to the ease of use of these systems, especially among those with more education.**
**Design Principles for Clinical Decision Support for Direct Use by Patients: Addressing Symptom Self-Management in Cancer Patients**

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**Abstract:** Direct use of clinical decision support (CDS) by patients for symptom management has not been studied extensively. We conducted a formative mixed methods study involving focus groups, semi-structured interviews, and usability surveys with 24 cancer patients/caregivers and 13 oncology clinicians to identify patient barriers and clinician concerns to using CDS for symptom self-management. The design principles resulting from this study provide insight into how CDS systems can be developed to support patient self-management directly.
Neighborhood Internet Access and Patient Portal Use in Patients with Chronic Conditions
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Abstract: We studied the association between level of internet access, a potential underlying cause for observed differences in patient portal use, and use of the portal among patients with chronic conditions in a large integrated health system. We found that patients who lived in neighborhoods with lower levels of residential internet access were less likely to use the portal, even after adjusting for demographic and socio-economic characteristics.
An Analysis of Patient Portal Use in the Acute Care Setting

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Abstract: Considerable gaps in knowledge remain regarding patient portal implementation in acute care settings. Use of a patient portal has been recorded by time-stamped clicks. Analysis was performed to investigate patterns of use over varied length of hospitalization. We found high rates of access for those who used the portal after enrollment, and observed that clinical information was increasingly accessed over longer hospitalizations. Such insights provide foundational guidance for institutions developing similar programs.
Polychromatic X-Ray Absorptiometry to Quantify Breast Density Volume, Ratio and their Associated Breast Cancer Risk in Full-Digital Mammography

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Abstract: We present a novel, fully automated method to provide an estimate of dense volume and dense-to-adipose tissue ratio directly on full-digital mammograms. We evaluated its ability to predict breast cancer risk and compared it to the Cumulus approach. Measurements from both approaches were positively associated with breast cancer risk, with slightly stronger associations observed for our method. Our method could constitute a valid automated alternative to stratify women in the population according to cancer risk.
Mining and Visualizing Family History Associations in the Electronic Health Record: A Case Study for Pediatric Asthma

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Abstract: Asthma is the most common chronic childhood disease and has seen increasing prevalence worldwide. While there is existing evidence of familial and other risk factors for pediatric asthma, there is a need for further studies to explore and understand interactions among these risk factors. The goal of this study was to develop an approach for mining, visualizing, and evaluating association rules representing pairwise interactions among potential familial risk factors based on information documented as part of a patient's family history in the electronic health record. As a case study, 10,260 structured family history entries for a cohort of 1,531 pediatric asthma patients were extracted and analyzed to generate family history associations at different levels of granularity. The preliminary results highlight the potential of this approach for validating known knowledge and suggesting opportunities for further investigation that may contribute to improving prediction of asthma risk in children.
Abstract: Many of the difficulties and controversies that plague clinical knowledge representation, EHR standards and terminologies arise from lack of clarity about fundamental distinctions and interrelationships among different sorts of knowledge – terminology/ontologies, generalizations, specifics, data schemas, data, and natural language – and among the representations appropriate to each. Recent experiences in both standards and commercial system development demonstrate that no one representation is sufficient. They suggest a clear partitioning of types of knowledge and point to the need for hybrid systems that combine different representations for different types of knowledge.
Abstract: There are over 126 billion functional genomics data points from more than 1.6 million digital samples in public functional genomics experiments amassed over the last 15 years. The NCBI’s Gene Expression Omnibus (GEO; http://ncbi.nlm.nih.gov/geo) archives this data that must cover a great many biological disease phenotypes as it has directly contributed to at least 32,000 distinct PubMed biomedical publications. Indeed, this highest-quality, NIH-funded functional genomics Big Data can be translated into large-scale drug and biomarker discovery as our lab and others have repeatedly shown. However, individual samples remain poorly described by unstructured free text that represents complex bio-ontologies that are shared by samples across independent experiments. Thus far, strictly computational approaches to annotate GEO en-masse such as text mining have largely failed to recapitulate biological annotations with any measured reliability. Therefore, to address this growing Big Data Problem and to scale the precise annotation and useful interpretation of open digital samples, we previously built the Search Tag Analyze Resource (STAR; stargeo.org) to allow anyone to describe GEO sample phenotypes uniformly across different studies and to characterize gene expression signatures for disease. Here, we design and implement a validation system based on STAR annotations to reward concordance among expert inter-raters and converge on precision annotations at scale. Furthermore, we use meta-analytics across many thousands of samples with shared phenotypes to estimate a molecular nosology, or classification of disease, for over 20 different autoimmune, infectious, or neoplastic clinical conditions. Our innovative approach uses emerging Internet technologies such as crowd-sourcing and social networks to translate open Big Data in biomedicine into structured knowledge that can be used at scale for massive drug and biomarker discovery.
Abstract: The meaningful use legislation requirements for patient engagement have led to a greater use of personal health records or patient portals in outpatient settings. However, there are limited examples in the literature that describe strategies and e-health tools to provide patients with access to their health information in hospital or inpatient settings. This interactive panel will explore the findings from a recent study that identified inpatient portal best practices across four “early adopter” healthcare organizations in the United States. Session participants will be involved in refining and identifying new directions for the development and investigation of patient portals.
(Authoring) Rules, (Distributed Query) Tools, and Drools: The challenging new world of high throughput phenotyping

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Abstract: Deriving phenotypes from electronic health records (EHRs) is in progress within several national networks, including the electronic Medical Records and Genomics (eMERGE) network 1,2, the Pharmacogenomics Research Network (PGRN) 3, the SHARPn (Strategic Health IT Advanced Research Projects) 4, and PCORnet 5, to name only a few, and those phenotype definitions are also now being shared across those networks. Two main obstacles make it more difficult to share those EHR derived phenotypes across sites, and especially networks: 1) the absence of clear, unambiguous phenotype algorithm definitions represented in a standardized, if not executable, format that can easily be shared, and 2) the use of different standard data representations, and varying data models. This panel will discuss the varying array of methodologies, informatics tools, and data standards and data models for sharing and executing EHR derived phenotypes. The panel will also discuss efforts to harmonize data models and phenotyping informatics tools across the multiple parallel national efforts mentioned here.
Clinical Decision Support: How to Apply Standards to Deliver Knowledge-Driven Interventions

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Abstract: Clinical decision support (CDS) is receiving increasing attention as a way to help improve clinical practice and health behaviors. The use of health information technology (HIT) standards for encoding data, representing knowledge and delivering knowledge-based interventions can help facilitate implementation of CDS. However, many standards from numerous standards development organizations (SDOs) exist that are variously incorporated into vendor software, and consensus on the use of these standards is lacking. Moreover, newly proposed standards elaborated in the past year in CDS and related areas such as clinical quality measurement have increased the complexity of this domain. The recent emergence of the Health Level Seven Fast Healthcare Interoperability Resources (FHIR) standard for patient data representation is particularly pertinent.

Accordingly, the panel members, who are clinicians and co-chairs of the Health Level Seven International (HL7) CDS Work Group, will address two learning objectives. First, attendees will learn key details of extant and proposed HIT standards that are applicable to CDS which they may need to use in their work. Second, the attendees will recognize how these standards have been applied in actual implementations that are used to provide CDS that can be used to improve the quality of clinical care and outcomes.
Career Opportunities for the Many Paths to Informatics

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Abstract: Informatics is a diverse field with an even more diverse workforce. A demand for informatics professionals continues to increase, the number and types of informatics training opportunities also increase. From traditional informatics training programs to cross-training in informatics and informatics certification programs, there are a number of ways into an informatics career. Following our successful tradition, the AMIA Student Working Group proposes a “career panel” to offer perspectives and advice for students on career opportunities and professional development. This year, the panelists include a board certified physician informatician, an informatics PhD working in academia, a cross-trained PhD-level informatician entrepreneur and a certified informatics professional with industry and academic experience. They will share their career and educational experiences and discuss upcoming trends in informatics careers. This panel will help future and current informatics students and early-career professionals to better prepare for and develop their careers.
In Search of Social Translucence: An Audit Log Analysis of Handoff Documentation Views and Update

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Abstract: Communication and information sharing are critical parts of teamwork in the hospital; however, achieving open and fluid communication can be challenging. Finding specific patient information within documentation can be difficult. Recent studies on handoff documentation tools show that resident handoff notes are increasingly used as an alternative information source by non-physician clinicians. Previous findings also show that residents have become aware of this unintended use. This study investigated the alignment of resident note updating patterns and team note viewing patterns based on usage log data of handoff notes. Qualitative interviews with clinicians were used to triangulate findings based on the log analysis. The study found that notes that were frequently updated were viewed significantly more frequently than notes updated less often ($p < 2.2 \times 10^{-16}$). Almost 44% of all notes had aligned frequency of views and updates. The considerable percentage (56%) of mismatched note utilization suggests an opportunity for improvement.
Uncertainty, Case Complexity and the Content of Verbal Handoffs at the Emergency Department

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Abstract: Handoffs are known to increase the risk of medical error and adverse events. Few electronic tools can support this process effectively, however. Our objective was to describe the relationship between clinical complexity, diagnostic uncertainty, fit with illness script and the content of case presentations by physicians. We observed the handoff of care for 150 patients during eleven shift changes at a large urban emergency department (ED). Results indicate that as uncertainty about diagnosis and perceived illness script increased, more descriptive detail was conveyed to the incoming physicians. Physicians were concerned primarily with creating a shared mental model of a patient’s clinical state and with describing the expected path to disposition rather than simply passing on data and findings. Electronic tools for ED handoffs should allow adjustment of structure and content to capture complexity and uncertainty appropriately without requiring extra effort for more routine cases that better fit to more standard narratives.
Abstract: Shift-to-shift handoffs refer to the process of transferring role and responsibility for providing care from one person to another, thus insuring continuity of care. Through focus groups of residents and supervising physicians, we studied how physicians select patient cases to discuss during handoffs. We also compared the selection across level of experience. Understanding the patient selection criteria can give us insight into how to improve handoffs, in particular using supportive technologies that are integrated into the clinical information system. Studying the actual handoff process and note-taking also generated suggestions for handoff improvement.
Improving Continuity of Care via the Discharge Summary

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Abstract: Discharge summaries (DCS) frequently fail to improve the continuity of care. A chart review of 188 DCS was performed to identify specific components that could be improved through health information technology. Medication reconciliations were analyzed for completeness and for medical reasoning. Documentation of pending results and follow-up details were analyzed. Patient preferences, patient goals, and the handover tone were noted. Patients were discharged on an average of 9.8 medications, only 3% of medication reconciliations were complete and medical reasoning was frequently absent. There were 358 pending results in 188 hospital discharges though only 14% were mentioned in the DCS. Documentation of clear, timely follow-up was present for less than 50% of patients. Patient preferences, patient goals, and lessons learned were rarely included. A handover tone was in only 17% of the DCS. Evaluating the DCS as a clinical handover is novel but information for safe handovers is frequently missing.
Abstract: The adoption of electronic medical records (EMRs) in primary care settings is on the rise in the United States and many are feeling the stress. The introduction of the EMR or transition to a new EMR is known to create workflow challenges for primary care providers and their office staff, as was the case in our health system. This study evolved out of an attempt to alleviate stress by defining the best practice or most optimal way to document office visits, allowing providers to see just one more patient each day. We leveraged a change management model that encourages looking for what is working vs. throwing resources at problem areas. By doing so we identified several distinguishing behaviors among providers who were doing exceptionally well with the EMR. We deployed an intervention aimed at enhancing the identified behaviors in a group of providers and it resulted marked improvement in efficiency.
Supporting Clinical Cognition: A Human-Centered Approach to a Novel ICU Information Visualization Dashboard

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Abstract: Advances in intensive care unit bedside displays/interfaces and electronic medical record (EMR) technology have not adequately addressed the topic of visual clarity of patient data/information to further reduce cognitive load during clinical decision-making. We responded to these challenges with a human-centered approach to designing and testing a decision-support tool: MIVA 2.0 (Medical Information Visualization Assistant, v.2). Envisioned as an EMR visualization dashboard to support rapid analysis of real-time clinical data-trends, our primary goal originated from a clinical requirement to reduce cognitive overload. In the study, a convenient sample of 12 participants were recruited, in which quantitative/qualitative measures were used to compare MIVA 2.0 with ICU paper medical-charts, using time-on-task, post-test questionnaires, and interviews. Findings demonstrate a significant difference in speed and accuracy with the use of MIVA 2.0. Qualitative outcomes concurred, with participants acknowledging the potential impact of MIVA 2.0 for reducing cognitive load and enabling more accurate and quicker decision-making.
Abstract: ABSTRACT:

User frustration research has been one way of looking into clinicians’ experience with health information technology use and interaction. In order to understand how clinician frustration with Health Information Technology (HIT) use occurs, there is the need to explore Human-Computer Interaction (HCI) literature that addresses both frustration and HIT use. In the past three decades, HCI frustration research has increased and expanded. Researchers have done a lot of work to understand emotions, end-user frustration and affect. This paper uses a historical literature review approach to review the origins of emotion and frustration research and explore the research question; Does HCI research on frustration provide insights on clinicians’ frustration with HIT interfaces? From the literature review HCI research on emotion and frustration provides additional insights that can indeed help explain user frustration in HIT. Different approaches and HCI perspectives also help frame HIT user frustration research as well as inform HIT system design. The paper concludes with a suggested directions on how future design and research may take.
Model Checking for Verification of Interactive Health IT Systems

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Abstract: Rigorous methods for design and verification of health IT systems have lagged far behind their proliferation. The inherent technical complexity of healthcare, combined with the added complexity of health information technology makes their resulting behavior unpredictable and introduces serious risk. We propose to mitigate this risk by formalizing the relationship between HIT and the conceptual work that increasingly typifies modern care. We introduce new techniques for modeling clinical workflows and the conceptual work products within them that allow established, powerful modeling checking technology to be applied to interactive health IT systems. The new capability can evaluate the workflows of a new HIT system performed by clinicians and computers to improve safety and reliability. We illustrate the method on a patient contact system to demonstrate this approach to model checking is effective for HIT interactive systems and that much of it can be automated.
Evaluating Term Coverage of Herbal and Dietary Supplements in Electronic Health Records

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Abstract: Herbal and dietary supplement consumption has rapidly expanded in recent years. Due to pharmacological and metabolic characteristics of some supplements, they can interact with prescription medications, potentially leading to clinically important and potentially preventable adverse reactions. Electronic health record (EHR) system provides a valuable source from which drug-supplement interactions can be mined and assessed for their clinical effects. A fundamental prerequisite is a functional understanding of supplement documentation in EHR and associated supplement coverage in major online databases. To address this, clinical notes and corresponding medication lists from an integrated healthcare system were extracted and compared with online databases. Overall, about 40% of listed medications are supplements, most of which are included in medication lists as nutritional or miscellaneous products. Gaps were found between supplement and standard medication terminologies, creating documentation difficulties in fully achieving robust supplement documentation in EHR systems. In addition, in the clinical notes we identified supplements which were not mentioned in the medication lists.
Nutrition Informatics Applications in Clinical Practice: a Systematic Review

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Abstract: Nutrition care and metabolic control contribute to clinical patient outcomes. Biomedical informatics applications represent a way to potentially improve quality and efficiency of nutrition management. We performed a systematic literature review to identify clinical decision support and computerized provider order entry systems used to manage nutrition care. Online research databases were searched using a specific set of keywords. Additionally, bibliographies were referenced for supplemental citations. Four independent reviewers selected sixteen studies out of 364 for review. These papers described adult and neonatal nutrition support applications, blood glucose management applications, and other nutrition applications. Overall, results indicated that computerized interventions could contribute to improved patient outcomes and provider performance. Specifically, computer systems in the clinical setting improved nutrient delivery, rates of malnutrition, weight loss, blood glucose values, clinician efficiency, and error rates. In conclusion, further investigation of informatics applications on nutritional and performance outcomes utilizing rigorous study designs is recommended.
Abstract: A major challenge in pediatric medicine is management of weight-based dosing. We present a 2 year follow-up to a manuscript addressing large overdose alerts and user response in our pediatric institution. We have seen an overall decrease in the number of alerts shown to users with increased modification and customized rules. Our evidence suggests as burden decreases, response to alerts increases.
Abstract: Physicians discontinue or cancel previously prescribed drugs due to considerations of safety, effectiveness and cost. However, it is unclear what effect these discontinuation orders have on pharmacy dispensing. Integrated electronic health records (EHR) allow us to monitor discontinuation orders, discontinuation reasons, and actual dispensation data. Using data from an EHR, we assessed the frequency of pharmacy drug dispensation after physicians discontinue orders, and evaluated how the discontinuation reasons affected pharmacy dispensation.
Collection and Documentation of Sexual Orientation and Gender Identity Demographic Data in the Electronic Health Record: The Patient Perspective

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Abstract: We assessed patient perspectives regarding collection and documentation of sexual orientation (SO) and gender identity (GI) demographic data in the electronic health record (EHR). Patients are more willing to report their SO and GI when all patients are routinely asked using standardized tools, and allow these data to be stored in EHRs if security and privacy concerns are addressed, and protections and training are in place to ensure appropriate information use and attention by providers.
Veterans Health Administration Experience with Data Quality Surveillance of Continuity of Care Documents:
Interoperability Challenges for eHealth Exchange Participants
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Abstract: As part of ongoing data quality efforts authors monitored health information retrieved through the United States Department of Veterans Affairs’ (VA) Virtual Lifetime Electronic Record (VLER) Health operation. Health data exchanged through the eHealth Exchange (managed by Healtheway, Inc.) between VA and external care providers was evaluated in order to test methods of data quality surveillance and to identify key quality concerns. Testing evaluated transition of care data from 20 VLER Health partners. Findings indicated operational monitoring discovers issues not addressed during onboarding testing, that many issues result from specification ambiguity, and that many issues require human review. We make recommendations to address these issues, specifically to embed automated testing tools within information exchange transactions and to continuously monitor and improve data quality, which will facilitate adoption and use.
An Empirical Analysis of Chaplain Charting Practices to Inform Electronic Health Record Template Redesign

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Abstract: With multiple care providers documenting in the electronic health record (EHR), it is important that these distinct disciplines chart in a way that facilitates intra- and inter-disciplinary communication. The healthcare chaplaincy is integral to understanding spiritual and religious beliefs as part of a comprehensive patient assessment, and to address related matters such as providing emotional support or initiating goals of care discussions. This study describes the current state of healthcare chaplaincy EHR documentation and identifies important areas for improvement.
Validating Free-text Order Entry for a Note-centric EHR

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Abstract: Electronic Health Records (EHRs) have increased the utility and portability of health information by storing it in structured formats. However, EHRs separate this structured data from the rich, free-text descriptions of clinical notes. The ultimate objective of our research is to develop an interactive progress note that unifies entry, access, and retrieval of structured and unstructured health information. In this study we present the design and subsequent testing with eight clinicians of a core element of this envisioned note: free-text order entry. Clinicians saw this new order-entry paradigm as a way to save time and preserve data quality by reducing double-documentation. However, they wanted the prototype to recognize more diverse types of shorthand and apply default values to fields that remain fairly constant across orders, such as number of refills and pickup location. Future work will test more complex orders, such as cascading orders, with a broader range of clinicians.