Personalized Itinerary Planner and Abstract Book

AMIA 2015 Annual Symposium
November 13 - 18, 2015

To make changes to your itinerary or view the full meeting schedule, visit
https://amiaannual2015.abstractcentral.com/planner.jsp
Friday, November 13, 2015
You have nothing scheduled for this day

Saturday, November 14, 2015

<table>
<thead>
<tr>
<th>Time</th>
<th>Session or Event Info</th>
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</thead>
<tbody>
<tr>
<td>8:30 AM-4:30 PM</td>
<td>CMIO Workshop, Tutorial</td>
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<tr>
<td>8:30-4:30 PM</td>
<td>AMIA 2015 CMIO Workshop P. Fu; R. Schreiber; J. Hollberg; J. Kannry</td>
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</tbody>
</table>

Sunday, November 15, 2015

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<thead>
<tr>
<th>Time</th>
<th>Session or Event Info</th>
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<tbody>
<tr>
<td>5:30 PM-7:00 PM</td>
<td>Clinical Information Systems Working Group Meeting (sponsored by IMO), Special Event</td>
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</table>

Monday, November 16, 2015

<table>
<thead>
<tr>
<th>Time</th>
<th>Session or Event Info</th>
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<tbody>
<tr>
<td>8:30 AM-10:00 AM</td>
<td>Public Implementation Resources for Genomic Medicine</td>
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<tr>
<td>8:30 AM-10:00 AM</td>
<td>Didactic Panel - Public Implementation Resources for Genomic Medicine, Didactic Panel, Translational Bioinformatics and Biomedicine</td>
</tr>
<tr>
<td>8:30 AM-10:00 AM</td>
<td>Public Implementation Resources for Genomic Medicine J.F. Peterson; M.S. Williams; C.L. Overby; R.R. Freimuth; J.C. Denny</td>
</tr>
<tr>
<td>8:30 AM-10:00 AM</td>
<td>Podium Presentations - Inpatient Consumer Health, Podium Presentations, Consumer Informatics and PHRs</td>
</tr>
<tr>
<td>8:52-9:14 AM</td>
<td>Engaging patients in their inpatient care: Effect of patient access to their electronic health record during an acute care hospitalization&gt; J. Pell; C. Lin; M. Mancuso; S. Limon; K. Oman</td>
</tr>
<tr>
<td>9:14-9:36 AM</td>
<td>Medication Compliance in Pediatric Inpatients – What are we missing? H. Bhatia; N. Patel; C.H. Ivory; P. Stewart; K.M. Unertl; C.U. Lehmann</td>
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<td>Time</td>
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<tr>
<td>8:30 AM-10:00 AM</td>
<td>Imperial B (Hilton San Francisco Union Square)</td>
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<tr>
<td>8:30-8:52 AM</td>
<td>(Conflict)</td>
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<tr>
<td>10:30 AM-12:00 PM</td>
<td>Continental 7/8/9 (Hilton San Francisco Union Square)</td>
</tr>
<tr>
<td>10:30-10:52 AM</td>
<td>(Conflict)</td>
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<tr>
<td>10:52-11:14 AM</td>
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<td>11:14-11:36 AM</td>
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<tr>
<td>11:36-11:58 AM</td>
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<tr>
<td>10:30 AM-12:00 PM</td>
<td>Plaza A (Hilton San Francisco Union Square)</td>
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<tr>
<td>11:15-12:00 PM</td>
<td>(Conflict)</td>
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<tr>
<td>10:30 AM-2:30 PM</td>
<td>Grand Ballroom (Hilton San Francisco Union Square)</td>
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<tr>
<td>1:45 PM-3:15 PM</td>
<td>Continental 4 (Hilton San Francisco Union Square)</td>
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<tr>
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<td>(Conflict)</td>
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<tr>
<td>1:45-2:07 PM</td>
<td>(Conflict)</td>
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<td>Time</td>
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<tr>
<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>
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<tr>
<td>2:29-2:51 PM</td>
<td>Physician Participation in Meaningful Use and Rehospitalization of Medicare Fee-for-Service Enrollees</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>
</tr>
<tr>
<td>1:45 PM-3:15 PM</td>
<td>Six Important Characteristics for Patient Hand-Off Application in Inpatient Hospital Setting</td>
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<tr>
<td>2:07-2:29 PM</td>
<td>A Review and Analysis of Rounding and Handoff Document Content in Inpatient Resident Physician Teams</td>
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<tr>
<td>2:29-2:51 PM</td>
<td>Improving Care Team Communication: Early Experience at Implementing a Patient-centered Microblog</td>
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<tr>
<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</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td>Increase in Prescriber Error Rates Following Implementation of Computerized Physician Order Entry</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>
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<td>Time</td>
<td>Session or Event Info</td>
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<td>5:00 PM-6:30 PM</td>
<td><strong>Adoption of Electronic Health Records in U.S. nursing homes</strong> R.I. Bjarnadottir; C.T. Herzig; J. Travers; P.W. Stone</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td><strong>A Literature Review of Medication-Related Clinical Decision Support</strong> 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><strong>A Comparison of Clinical Decision Support Interventions from Commercial and Internally Developed Electronic Health Records</strong> B. Celik; P. Eghbali Alamdari; K. Bavuso; E. Yoshida; S.M. Maviglia; T. Wetter; R.A. Rocha; C. Lagor</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td><strong>The Master Data Element Visualization: A Consolidated View of the EHR Data at Intermountain Healthcare</strong> J. Lee; F. Sakaguchi; J. Mundt; B.B. Dodds; N. Hobbs; K. Holzhauser; S.M. Huff</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td><strong>A Taxonomic Analysis of Programming Errors in Electronic Health Records (EHRs) which Lead to Clinical Decision Support Malfunctions</strong> D.S. McEvoy; S.T. Hussain; T. Hickman; D.F. Sittig; A. Wright</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td><strong>Variation in EHR Implementations and the Impact on Safety of Test Result Follow-up</strong> D.R. Murphy; M.W. Smith; D.F. Sittig; E. Russo; H. Singh</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td><strong>Perceptions of Health Information Technology Risks by Hospital Physicians</strong> S. Palojoki; L. Lehtonen; K. Saranto</td>
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<tr>
<td>5:00 PM-6:30 PM</td>
<td><strong>The CDS Collaborative: Goals, Deliverables, and Future Directions</strong> S. Rodriguez-Loya; E. Fry; E. Sefer; P.B. Warner; C. Nanjo; J. Goodnough; D.E. Shields; E. Elliott; E. Aliverti; K. Kawamoto</td>
</tr>
<tr>
<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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<tr>
<td>5:00 PM-6:30 PM</td>
<td><strong>The EH Tracker: Using Dynamic Environmental Health Data for Improved Decision-Making of Health</strong> J.L. Burke; R.C. James; D. Lee</td>
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6:30 PM-8:00 PM, Cityscape, 46th Floor, Tower 1 (Hilton San Francisco Union Square), "Top of the World" Networking Meet-up and Tweet-up, Social Event

8:00 PM-10:00 PM, Union Square 15/16 (Hilton San Francisco Union Square), **Clinical Decision Support Working Group Meeting**, Special Event
<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Session Type</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30 AM-12:00 PM</td>
<td>Continental 4 (Hilton San Francisco Union Square)</td>
<td>Interactive Panel</td>
<td>What could go wrong?: Migrating from one EHR to another</td>
<td>R. Schreiber; R. Koppel; C.K. Craven; J.D. McGreevey</td>
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<tr>
<td>10:30 AM-12:00 PM</td>
<td>Continental 6 (Hilton San Francisco Union Square)</td>
<td>Didactic Panel</td>
<td>User-centered Methods to Optimize Clinical Decision Support: Examples from Pediatrics with Applicability to All Care Settings</td>
<td>D.J. Karavite; E.D. Shelov; L. Utidjian; J. Michel; E.M. Lourie</td>
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<tr>
<td>10:30 AM-12:00 PM</td>
<td>Yosemite C (Hilton San Francisco Union Square)</td>
<td>Papers</td>
<td>Automated Classification of Consumer Health Information Needs in Patient Portal Messages</td>
<td>R.M. Cronin; D. Fabbri; J.C. Denny; G.P. Jackson</td>
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<tr>
<td>10:30 AM-12:00 PM</td>
<td>Plaza B (Hilton San Francisco Union Square)</td>
<td>Podium Presentations</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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<tr>
<td>10:30 AM-12:00 PM</td>
<td>Plaza B (Hilton San Francisco Union Square)</td>
<td>Podium Presentations</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>10:30 AM-12:00 PM</td>
<td>Plaza B (Hilton San Francisco Union Square)</td>
<td>Podium Presentations</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>10:30 AM-12:00 PM</td>
<td>Plaza B (Hilton San Francisco Union Square)</td>
<td>Podium Presentations</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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<tr>
<td>Time</td>
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<td>Session Title</td>
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<td>1:45 PM-3:15 PM</td>
<td>Imperial A (Hilton San Francisco Union Square), S73: Interactive Panel</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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<tr>
<td>1:45 PM-3:15 PM</td>
<td>Continental 1/2/3 (Hilton San Francisco Union Square), S75: Papers - Prediction, Papers, Translational Bioinformatics and Biomedicine</td>
<td>Predicting Health Care Utilization After Behavioral Health Referral Using Natural Language Processing and Machine Learning</td>
<td>N. Roysden; A. Wright</td>
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<tr>
<td>1:45-2:07 PM</td>
<td>Continental 1/2/3 (Hilton San Francisco Union Square), S75: Papers - Prediction, Papers, Translational Bioinformatics and Biomedicine</td>
<td>Surgical Duration Estimation via Data Mining and Predictive Modeling: A Case Study</td>
<td>N. Hosseini; M. Sir; C. Jankowski; K. Pasupathy</td>
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<tr>
<td>2:07-2:29 PM</td>
<td>Continental 1/2/3 (Hilton San Francisco Union Square), S75: Papers - Prediction, Papers, Translational Bioinformatics and Biomedicine</td>
<td>Clinical Predictive Modeling Development and Deployment through FHIR Web Services</td>
<td>M. Khalil; M. Choi; A. Henderson; S. Iyengar; M.L. Braunstein; J. Sun</td>
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<tr>
<td>2:29-2:51 PM</td>
<td>Continental 1/2/3 (Hilton San Francisco Union Square), S75: Papers - Prediction, Papers, Translational Bioinformatics and Biomedicine</td>
<td>Dynamic Estimation of the Probability of Patient Readmission to the ICU using Electronic Medical Records</td>
<td>K.L. Caballero Barajas; R. Akella</td>
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<tr>
<td>1:45 PM-3:15 PM</td>
<td>Continental 7/8/9 (Hilton San Francisco Union Square), S76: Papers - Making EHRs Useful, Papers, Clinical Informatics</td>
<td>Understanding the acceptance factors of an Hospital Information System: evidence from a French University Hospital</td>
<td>R. OLOGEANU TADDEI; D. Morquin; H. Domingo</td>
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<tr>
<td>1:45-2:07 PM</td>
<td>Continental 7/8/9 (Hilton San Francisco Union Square), S76: Papers - Making EHRs Useful, Papers, Clinical Informatics</td>
<td>Improving EHR Capabilities to FacilitateStage 3 Meaningful Use Care Coordination Criteria</td>
<td>D. Cross; G.R. Cohen; P. Nong; A. Day; D. Vibbert; R. Naraharisetti; J. Adler-Milstein</td>
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<tr>
<td>2:07-2:29 PM</td>
<td>Continental 7/8/9 (Hilton San Francisco Union Square), S76: Papers - Making EHRs Useful, Papers, Clinical Informatics</td>
<td>Variability in Electronic Health Record Usage and Perceptions among Specialty vs. Primary Care Physicians</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>2:29-2:51 PM</td>
<td>Continental 7/8/9 (Hilton San Francisco Union Square), S76: Papers - Making EHRs Useful, Papers, Clinical Informatics</td>
<td>Inferring Clinical Workflow Efficiency via Electronic Medical Record Utilization</td>
<td>Y. Chen; W. Xie; C.A. Gunter; D. Liebovitz; S. Mehrotra; H. Zhang; B. Malin</td>
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<td>1:45 PM-3:15 PM</td>
<td>Plaza B (Hilton San Francisco Union Square), S77: Papers - Delivering a Message: Communication Tools, Papers, Clinical Workflow and Human Factors</td>
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<td>1:45-2:07 PM</td>
<td>Designing Asynchronous Communication Tools for Optimization of Patient-Clinician Coordination</td>
<td>J. Eschler; L.S. Liu; L. Vizer; J. McClure; P. Lozano; W. Pratt; J. Ralston</td>
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<td>2:07-2:29 PM</td>
<td>Application of a Consumer Health Information Needs Taxonomy to Questions in Maternal-Fetal Care</td>
<td>J.A. Shenson; E. Ingram; N. Colon; G.P. Jackson</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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<tr>
<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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**1:45 PM-3:15 PM, Yosemite A/B (Hilton San Francisco Union Square), S79: Papers/Podium Presentations - Clinical Decision Support I**

<table>
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<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<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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<tr>
<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>
</tr>
<tr>
<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>
</tr>
<tr>
<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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**3:30 PM-5:00 PM, Imperial A (Hilton San Francisco Union Square), S81: Didactic Panel - Collaboration and Health Information Technologies: Towards Defining and Operationalizing the Collaboration Space, Didactic Panel, Clinical Workflow and Human Factors**

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>3:30 PM-5:00 PM</td>
<td>Collaboration and Health Information Technologies: Towards Defining and Operationalizing the Collaboration Space</td>
<td>C. Kuziemsky; M. Reddy; K.A. Siek; S. Collins</td>
</tr>
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**3:30 PM-5:00 PM, Continental 4 (Hilton San Francisco Union Square), S82: Didactic Panel - Data Quality in Clinical Data Research Networks (CDRNs), Didactic Panel, Clinical Research Informatics**

<table>
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<tr>
<th>Time</th>
<th>Title</th>
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<tr>
<td>3:30 PM-5:00 PM</td>
<td>Data Quality in Clinical Data Research Networks (CDRNs)</td>
<td>A.B. McCoy; M.G. Kahn; L.R. Waitman; J.N. Doctor; R. Jain</td>
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<tr>
<td>Time</td>
<td>Session</td>
<td>Title</td>
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<tr>
<td>3:30-3:52 PM</td>
<td>(Conflict)</td>
<td>Expanding a First-Order Logic Mitigation Framework to Handle Multimorbid Patient Preferences</td>
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<tr>
<td>3:52-4:14 PM</td>
<td>(Conflict)</td>
<td>Adaptation of a Published Risk Model to Point-of-care Clinical Decision Support Tailored to Local Workflow</td>
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<tr>
<td>4:36-4:58 PM</td>
<td>(Conflict)</td>
<td>Using a Clinical Knowledge Base to Assess Comorbidity Interrelatedness Among Patients with Multiple Chronic Conditions</td>
</tr>
<tr>
<td>3:30 PM-5:00 PM</td>
<td></td>
<td>Mining Twitter as a First Step toward Assessing the Adequacy of Gender Identification Terms on Intake Forms</td>
</tr>
<tr>
<td>3:30-3:52 PM</td>
<td>(Conflict)</td>
<td>Evaluating Consumer m-Health Services for Promoting Healthy Eating: A Randomized Field Experiment</td>
</tr>
<tr>
<td>3:52-4:14 PM</td>
<td>(Conflict)</td>
<td>Public Perspectives of Mobile Phones’ Effects on Healthcare Quality and Medical Data Security and Privacy: A 2-Year Nationwide Survey</td>
</tr>
<tr>
<td>4:14-4:36 PM</td>
<td>(Conflict)</td>
<td>Patient Engagement in Cancer Survivorship Care through mHealth: A Consumer-centered Review of Existing Mobile Applications</td>
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<tr>
<td>3:30 PM-5:00 PM</td>
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<td>Automated Detection of Benzodiazepine Dosage in ICU Patients through a Computational Analysis of Electrocardiographic Data</td>
</tr>
<tr>
<td>3:30-3:52 PM</td>
<td>(Conflict)</td>
<td>Using Big Data to Evaluate the Association between Periodontal Disease and Rheumatoid Arthritis</td>
</tr>
<tr>
<td>4:14-4:36 PM (Conflict)</td>
<td>Development and Preliminary Evaluation of a Prototype of a Learning Electronic Medical Record System</td>
<td>A.J. King; G.F. Cooper; H. Hochheiser; G. Clermont; S. Visweswaran</td>
</tr>
<tr>
<td>4:36-4:58 PM (Conflict)</td>
<td>Learning a Severity Score for Sepsis: A Novel Approach based on Clinical Comparisons</td>
<td>K. Dyagilev; S. Saria</td>
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<tr>
<td>3:30 PM-5:00 PM, Plaza A (Hilton San Francisco Union Square), S87: Papers - NLP Miscellaneous Applications, Papers, NLP, Information Extraction and Retrieval</td>
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<tr>
<td>3:30-3:52 PM (Conflict)</td>
<td>JUFIT: A Configurable Rule Engine for Filtering and Generating New Multilingual UMLS Terms</td>
<td>J. Hellrich; S. Schulz; S. Buechel; U. Hahn</td>
</tr>
<tr>
<td>3:52-4:14 PM (Conflict)</td>
<td>Scaling Out and Evaluation of OBSecAn, an Automated Section Annotator for Semi-Structured Clinical Documents, on a Large VA Clinical Corpus</td>
<td>L.T. Tran; G. Divita; A.M. Redd; M.E. Carter; M. Samore; A.V. Gundlapalli</td>
</tr>
<tr>
<td>4:14-4:36 PM (Conflict)</td>
<td>An Ensemble Method for Spelling Correction in Consumer Health Questions</td>
<td>H. Kilicoglu; M. Fiszman; K. Roberts; D. Demner-Fushman</td>
</tr>
<tr>
<td>4:36-4:58 PM (Conflict)</td>
<td>Citation Sentiment Analysis in Clinical Trial Papers</td>
<td>J. Xu; Y. Zhang; Y. Wu; J. Wang; x. dong; H. Xu</td>
</tr>
<tr>
<td>3:30 PM-5:00 PM, Yosemite C (Hilton San Francisco Union Square), S88: Podium Presentations - Human Factors are Key, Podium Presentations, Clinical Workflow and Human Factors</td>
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<tr>
<td>3:30-3:52 PM (Conflict)</td>
<td>Human Factors of Health Information Exchange: Barriers and Facilitators to Use of the VA's CPRS and a Regional Health Information Exchange</td>
<td>A.W. Kushniruk; E.M. Borycki; H. Monkman; K. Boockvar</td>
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<tr>
<td>3:52-4:14 PM (Conflict)</td>
<td>Uncovering the Cognitive Demands of EHR Use via Task Analysis</td>
<td>M.S. Pfaff; O. Eris; A. Anganes; T. Crotty; J.R. Nebeker; M. Ward</td>
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<tr>
<td>4:14-4:36 PM (Conflict)</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 (Conflict)</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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<tr>
<td>3:30 PM-5:00 PM, Plaza B (Hilton San Francisco Union Square), S89: Podium Presentations - Self-management and Shared Decision Making, Podium Presentations, Consumer Informatics and PHRs</td>
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<td>3:30-3:52 PM (Conflict)</td>
<td>Qualitative Study of an Electronic Tool for Facilitating Problem-Solving and Sensemaking in Diabetes Self-Management, Mobile Diabetes Detective</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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<tr>
<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  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  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  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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Wednesday, November 18, 2015

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<th>Time</th>
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<tr>
<td>8:30 AM-10:00 AM</td>
<td>Continental 4 (Hilton San Francisco Union Square), <strong>S91: Interactive Panel - Patient Portals: Best Practices and New Directions for Development and Investigation, Interactive Panel, Consumer Informatics and PHRs</strong></td>
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<tr>
<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</td>
<td>Continental 1/2/3 (Hilton San Francisco Union Square), <strong>S95: Papers - All about Handoffs, Papers, Clinical Workflow and Human Factors</strong></td>
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<tr>
<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  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  F. Sakaguchi; L.A. Lenert</td>
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<td>8:30 AM-10:00 AM</td>
<td>Continental 7/8/9 (Hilton San Francisco Union Square), <strong>S96: Papers - Human-computer Interaction, Papers, Interactive Systems</strong></td>
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<tr>
<td>8:30-8:52 AM</td>
<td>Just One More Patient: Optimizing EMR Documentation in Ambulatory Care  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. G. Opoku-Boateng</td>
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<tr>
<td>9:36-9:58 AM</td>
<td>Model Checking for Verification of Interactive Health IT Systems K.A. Butler; E. Mercer; A. Bahrami; C. Tao</td>
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<tr>
<td>10:30 AM-12:00 PM</td>
<td><strong>S102: Didactic Panel - Perioperative Clinical Decision Support: Improving Care of the Surgical Patient through Informatics, Didactic Panel, Clinical Informatics</strong></td>
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<td>10:30 AM-12:00 PM</td>
<td><strong>S107: Papers - EHR Processing, Papers, Clinical Informatics</strong></td>
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<tr>
<td>10:30-10:52 AM</td>
<td>Reviewing 741 patients records in two hours with FASTVISU J. Escudié; A. Jannot; E. Zapletal; S. Cohen; G. Malamut; A. Burgun; B. Rance</td>
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<tr>
<td>10:52-11:14 AM</td>
<td>Building Structured Personal Health Records from Photographs of Printed Medical Records X. Li; G. Hu; X. Teng; G. Xie</td>
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<tr>
<td>11:14-11:36 AM</td>
<td>An Assessment of Family History Information Captured in an Electronic Health Record F. Polubriaginof; N.P. Tatonetti; D. Vawdrey</td>
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<td>11:36-11:58 AM</td>
<td>Evolving Patient Compliance Trends: Integrating Clinical, Insurance, and Extrapolated Socioeconomic Data J. Klobusicky; A. Aryasomayajula; N. Marko</td>
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<tr>
<td>12:15 PM-1:30 PM</td>
<td>Closing Session and Keynote Presentation: Robert M. Wachter, MD, Special Event</td>
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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.
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.
Engaging patients in their inpatient care: Effect of patient access to their electronic health record during an acute care hospitalization

J. Pell; 1; C. Lin; 1; M. Mancuso; 1; S. Limon; 1; K. Oman; 1;
1. University of Colorado Hospital, University of Colorado Hospital, Aurora, CO, United States.

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?
H. Bhatia; 1 N. Patel; 2 C. H. Ivory; 3 P. Stewart; 4 K. M. Unertl; 1 C. U. Lehmann; 2
1. Biomedical Informatics, Vanderbilt University, Nashville, TN, United States.
2. Pediatrics, Vanderbilt University, Nashville, TN, United States.
3. Vanderbilt School of Nursing, Nashville, TN, United States.
4. Informatics Clinical Systems, Vanderbilt University, Nashville, TN, United States.

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?
B. D. Hill; 1, Q. T. Zeng; 1;
1. Biomedical Informatics, University of Utah, Salt Lake City, UT, United States.

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

D. Johnston; 1 A. Gettine; 2 K. Kenyon; 3 S. Rizk; 1 C. Byrne; 4 L. Dimitropoulos; 1

1. Center for the Advancement of Health IT, RTI International, Waltham, MA, United States.
2. Office of Clinical Quality and Safety, Office of the National Coordinator for Health Information Technology, Washington, DC, United States.
3. Office of Policy, Office of the National Coordinator for Health Information Technology, Washington, DC, United States.
4. RTI International, Waltham, MA, United States.

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.
What Are Frequent Data Requests from Researchers? A Conceptual Model of Researchers’ EHR Data Needs for Comparative Effectiveness Research

G. W. Hruby; 1; P. Chandar; 1; J. Hoxha; 1; E. A. Mendonca; 2, 3; D. A. Hanauer; 4, 5; C. Weng; 1;
1. Department of Biomedical Informatics, Columbia University, New York, NY, United States.
2. Department of Pediatrics, University of Wisconsin, Madison, WI, United States.
3. Department of Biostatistics and Medical Informatics, University of Wisconsin, Madison, WI, United States.
4. Department of Pediatrics, University of Michigan, Ann Arbor, MI, United States.
5. School of Information, University of Michigan, Ann Arbor, MI, United States.

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

M. Marino; 1; J. Heintzman; 1; E. Dexter; 1; S. Cowburn; 2; J. P. O’Malley; 1; S. R. Bailey; 1; R. Gold; 2; J. E. DeVoe; 1, 2

1. Family Medicine, Oregon Health and Science University, Portland, OR, United States.
2. OCHIN Inc., Portland, OR, United States.

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

J. L. Sturtevant; 1; J. Malenfant; 1; M. Davies; 1; J. Rodrigues; 1; L. G. Qualls; 2; L. H. Curtis; 2; J. Brown; 1;
1. Department of Population Medicine, Harvard Pilgrim Health Care Institute, Boston, MA, United States.
2. Duke Clinical Research Institute, Durham, NC, United States.

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

L. Utidjian;¹, R. Khare;¹, G. Schulte;³, K. Marsolo;², C. Bailey;¹;
1. CHOP, Philadelphia, PA, United States.
2. CCHMC, Cincinatti, OH, United States.
3. Children's Hospital Colorado, Aurora, CO, United States.

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.
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

G. Kuperman; 1, 2; D. W. Bates; 3, 4, 5; D. Kaelber; 6, 7; D. A. Dorr; 8

1. Information Services, New York Presbyterian, New York City, NY, United States.
2. Biomedical Informatics, Columbia University, New York, NY, United States.
3. Brigham and Women's Hospital, Boston, MA, United States.
4. Partners HealthCare System, Boston, MA, United States.
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.
Understanding Challenges and Opportunities in Precision Medicine and Interoperability Using Informatics Approaches

J. Ronquillo; 1, 5; C. Weng; 4; W. T. Lester; 2, 3;
1. Office of the National Coordinator for Health Information Technology, Washington, DC, United States.
2. Laboratory of Computer Science, Massachusetts General Hospital, Boston, MA, United States.
3. Harvard Medical School, Boston, MA, United States.
4. Department of Biomedical Informatics, Columbia University, New York, NY, United States.
5. Grinformatics, Haymarket, VA, United States.

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.
Early Experiences with Meaningful Use and Online Portal Implementation among Providers/Staff and Patients/Caregivers in a Safety Net Healthcare System

C. Lyles; L. Tieu; D. Schillinger; N. Ratanawongsa; U. Sarkar;

1. Medicine, University of California, San Francisco, San Francisco, CA, United States.

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

M. A. Unruh; H. Jung; J. R. Vest; L. Casalino; R. Kaushal;

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

S. P. Slight; 1, 2; E. S. Berner; 4; W. Galanter; 3; S. M. Huff; 5, 6; B. L. Lambert; 7; C. Lannon; 8; C. U. Lehmann; 9; B. J. McCourt; 10; M. McNamara; 11; N. Menachemi; 12; T. Payne; 13; S. A. Spooner; 14; G. Schiff; 2, 15; T. Y. Wang; 16; A. Akincigil; 17; S. Crystal; 18; S. P. Fortmann; 19; M. L. Vandermeer; 19; D. W. Bates; 2, 15, 20;

1. School of Medicine, Pharmacy and Health, Durham University, Durham, United Kingdom.
2. Brigham and Women's Hospital, Boston, MA, United States.
3. University of Illinois, Chicago, IL, United States.
4. University of Alabama at Birmingham, Birmingham, AL, United States.
5. University of Utah, Salt Lake City, UT, United States.
6. Intermountain Healthcare, Salt Lake City, UT, United States.
7. Northwestern University, Chicago, IL, United States.
8. Cincinnati Children's Hospital Medical Center, Cincinnati, OH, United States.
9. Vanderbilt University, Nashville, TN, United States.
10. Duke University, Durham, NC, United States.
11. Northwest Permanente, Portland, OR, United States.
12. Indiana University, Indianapolis, IN, United States.
14. University of Cincinnati College of Medicine, Cincinnati, OH, United States.
15. Harvard Medical School, Boston, MA, United States.
16. Duke University, Durham, NC, United States.
17. The State University of New Jersey, New Brunswick, NJ, United States.
18. Rutgers University, New Brunswick, NJ, United States.
20. Harvard School of Public Health, Boston, MA, United States.

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

S. U. Ayubi; 1; A. Pelletier; 1;

1. Innovation Acceleration Program, Boston Children's Hospital, Boston, MA, United States.

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.
A Review and Analysis of Rounding and Handoff Document Content in Inpatient Resident Physician Teams

E. G. Arsoniadis; 1, 5; R. Khatri; 1; J. Marquard; 2; C. Moors; 3; M. Kim; 3, 4; G. B. Melton; 1, 5;

1. Surgery, University of Minnesota, Minneapolis, MN, United States.
2. College of Engineering, University of Massachusetts, Amherst, MA, United States.
3. Medical School, University of Minnesota, Minneapolis, MN, United States.
4. Medicine, University of Minnesota, Minneapolis, MN, United States.
5. Institute for Health Informatics, University of Minnesota, Minneapolis, MN, United States.

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

A. K. Dalal; 1, 2; J. L. Schnipper; 1, 2; A. F. Massaro; 3, 2; K. McNally; 1; P. C. Dykes; 1, 2; D. W. Bates; 1, 2,

1. Division of General Medicine, Brigham and Women's Hospital, Boston, MA, United States.
2. Harvard Medical School, Boston, MA, United States.
3. Medicine, Brigham and Women's Hospital, Boston, MA, United States.

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.
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.
Informatics Research and Innovation in a Commercial Electronic Health Record: The Experience of Three Organizations Using Epic

A. Wright; 1, 2; D. W. Bates; 1, 2; E. Kirkendall; 3, 4; D. A. Dorr; 5; P. DeVault; 6;
1. General Medicine, Brigham and Women's Hospital, Boston, MA, United States.
2. Harvard Medical School, Boston, MA, United States.
3. Cincinnati Children's Hospital Medical Center, Cincinnati, OH, United States.
4. University of Cincinnati, Cincinnati, OH, United States.
5. Oregon Health and Science University, Portland, OR, United States.

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.
Increase in Prescriber Error Rates Following Implementation of Computerized Physician Order Entry

G. B. Alexander; 1, 2; G. M. Ramos; 1;
1. Psychiatry, Maricopa Integrated Health System, Mesa, AZ, United States.
2. Psychiatry, University of Arizona College of Medicine-Phoenix, Phoenix, AZ, United States.

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.
Enhancing Use of the Problem List in the Inpatient Setting

C. H. Andrus; K. O'Bryan; P. Asaro; S. P. Hmiel; F. B. Yu;
1. Pediatrics, Washington University, St Louis, MO, United States.
2. St. Louis Children’s Hospital, St. Louis, MO, United States.
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.
Adoption of Electronic Health Records in U.S. nursing homes
R. I. Bjarnadottir; 1, C. T. Herzig; 1, 2, J. Travers; 1, P. W. Stone; 1,
1. School of Nursing, Columbia University, New York, NY, United States.
2. Epidemiology, Columbia University Mailman School of Public Health, New York, NY, United States.

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.
A Literature Review of Medication-Related Clinical Decision Support
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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.
A Comparison of Clinical Decision Support Interventions from Commercial and Internally Developed Electronic Health Records

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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.
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.
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.
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.
Perceptions of Health Information Technology Risks by Hospital Physicians

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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.
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.
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.
The EH Tracker: Using Dynamic Environmental Health Data for Improved Decision-Making of Health
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Abstract: Although climate change and environmental health information have been widely dispersed to the public through various channels of communication, from environmental advocate groups to mass media productions, little is known by the public about how the impact of dynamic environmental health hazard data affects their individual health. Existing environmental health applications consist of predominantly pollen allergy and weather forecasts based systems, only provide the public with a limited set of environmental health information, lack recommendations for ways to reduce the public’s exposure to predominant pollen allergens, and do not include any data on air pollution levels. In our solution, we aim to provide individuals with user-specific environmental health hazard data using a web-based and mobile application called the Environmental Health (EH) Tracker. The EH Tracker design incorporates actionable recommendations that reduce exposure to pollutants and pollen allergens, and integrates features such as electronic health record integration and healthcare provider communication channels. Our design includes machine learning algorithms to provide the users with environmental hazard feedback summaries, recommendations for reducing exposure, and healthcare provider notifications triggered by user experiences. Thus, we believe that the EH tracker will aid in reducing individuals’ exposure to environmental health hazards and reduce their chances of having an allergic reaction and/or worsen their existing health condition such as chronic and non-communicable diseases.
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.
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.
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<sup>2</sup>). 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.
Discussion: 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: 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 an 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 stare staff.
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.
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.
Application of a Consumer Health Information Needs Taxonomy to Questions in Maternal-Fetal Care

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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 (κ=0.57) to substantial (κ=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.
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.
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 Shifman 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 less 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.
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.
Data Quality in Clinical Data Research Networks (CDRNs)

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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.
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

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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.
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%.
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 $F_1$ 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.
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.
Uncovering the Cognitive Demands of EHR Use via Task Analysis

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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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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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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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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

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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.
Patient Portals: Best Practices and New Directions for Development and Investigation
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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.
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.
Physician handoffs: opportunities and limitations for supportive technologies

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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.
USER FRUSTRATION IN HIT INTERFACES: EXPLORING PAST HCI RESEARCH FOR A BETTER UNDERSTANDING OF CLINICIANS' EXPERIENCES.

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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.
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.
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.