# TABLE OF CONTENTS

## VOLUME 1

### PODIUM ABSTRACTS

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporally Classifying Clinical Events Relative to Document Creation Time</td>
<td>Abdurahman Khalifa; Stephane Meystre</td>
<td>1</td>
</tr>
<tr>
<td>Making Patient Portals Meaningful in the Safety Net: A Case Study of Implementation at Five Community Health Centers in California</td>
<td>Sara Ackerman; Urmimala Sarkar; Lina Tieu; Dean Schillinger; Margaret Handley; Gato Gourley; Kenneth Hahn; Mekhala</td>
<td>3</td>
</tr>
<tr>
<td>DRTED: Deep learning Recommendation of Treatment from Electronic Data</td>
<td>Melissa Azcon; David Ledbetter; Long Fan Ho; Alec M. Gunny; Randall Wetzel</td>
<td>5</td>
</tr>
<tr>
<td>Using Data Assimilation to Forecast post-meal Glucose for Patients with Type 2 Diabetes</td>
<td>David Albers; Matthew Levine; Andrew Stuart; George Hripcsak; Lena Mamukina</td>
<td>7</td>
</tr>
<tr>
<td>A Terminology Framework for Nursing Documentation Redesign</td>
<td>Deborah Ariosto</td>
<td>9</td>
</tr>
<tr>
<td>Clinical Decision Support for Worker Health: A Qualitative Study of Five Primary Care Settings</td>
<td>Ji Sun Lee; Ju Hee Hwang; Taeheon Bae</td>
<td>11</td>
</tr>
<tr>
<td>Translating Hereditary and Familial Cancer Guidelines into Clinical Decision Support</td>
<td>Ayesha Aiz; Lance Pfieger; Bryce Carter; Joshua Schiffman; Brandon M. Welch</td>
<td>13</td>
</tr>
<tr>
<td>Evolution of an Integrated Patient &amp; Population Analytics Portal (IP3)</td>
<td>Neil Ballato; Hemant Patel; Jia灰尘 Starks; Final Kanabar; Monica Mardzuk-Holguin</td>
<td>15</td>
</tr>
<tr>
<td>Show Me ECHO: ENDO ECHO – Changing the Landscape of Endocrinology and Diabetes Care in Missouri</td>
<td>Mirna Becevic; Uzma Z. Khan; Omer Malik; E Rachel Matric; Suzanne A. Boren; Sarujakumar Panchal; Arpit Aggarwal</td>
<td>17</td>
</tr>
<tr>
<td>Little Impact of Highly Specific Alerts for Potassium-Increasing Drug-Drug Interactions — A Randomized Controlled Trial</td>
<td>Jörg Blaser; Patrick E. Beefer; Markus Schneemann; Emmanuel Eschmann</td>
<td>19</td>
</tr>
<tr>
<td>Linking Patients with Non-PHI Data</td>
<td>Luca Bonomi; Xiaoqian Jiang</td>
<td>21</td>
</tr>
<tr>
<td>The Effect of a Large-Scale Mobile Health Emergency Project: A Telehealth Enabled Informatics EMS Intervention</td>
<td>Tiffany Champagne-Langabeer; James R. Langabeer; Michael G. Gonzalez; Diaa Alishoare; Adria Jackson; Jennifer Mikhail</td>
<td>23</td>
</tr>
<tr>
<td>Mining and Visualizing Sequential Patterns in the Electronic Health Record: A Case Study for Asthma With and Without Mental Disorders</td>
<td>Elizabeth S. Chen; Genevieve B. Melton; Mark Howison; Erik Knoll; Ashley Lee; Indra N. Sarkar</td>
<td>25</td>
</tr>
<tr>
<td>Usability of an Automated Recommender System for Clinical Order Entry</td>
<td>Jonathan H. Chen; Mary K. Goldstein; Steven Asch; Russ B. Altman</td>
<td>27</td>
</tr>
<tr>
<td>Using Hospitalization and Suicide Mortality Data to Identify Subpopulation of High Suicide Risk via Survival Modeling</td>
<td>Kun Chen; Fei Wang; Robert Aseltine</td>
<td>29</td>
</tr>
<tr>
<td>A Framework for Visual Tracking of Risk and its Drivers in Monitoring Patients Susceptible for Cardiorespiratory Instability</td>
<td>Kun Chen; Gilles Clermont; Marilyn Hravnak; Michael R. Pinsky; Artur Dubrawski</td>
<td>31</td>
</tr>
<tr>
<td>Bulk Learning on EHR Data</td>
<td>Po-Hsiang Chiu; George Hripcsak</td>
<td>33</td>
</tr>
<tr>
<td>Patient Perspectives on Designing an Engaging Patient-Powered Research Network Patient Portal: Crohn’s and Colitis Foundation of America (CCFA) Partners</td>
<td>Arlene E. Chang; Manhan Yu; Jessica Burris; Kelly Myers; Michael D. Kappelman</td>
<td>35</td>
</tr>
<tr>
<td>A Qualitative Study of User-desired Personal Health Record Functionality: Impact of Age on Desired PHR functionality</td>
<td>Martina A. Clarke; Marilyn Storion; Thomas Windle; Ann L. Fruhligh; Tamara L. Bernard; John R. Windle</td>
<td>37</td>
</tr>
<tr>
<td>Variation in EHR Documentation Across Primary Care Providers</td>
<td>Genna R. Cohen; Charles Friedman; Andrew M. Ryan; Julia Adler-Milstein</td>
<td>39</td>
</tr>
<tr>
<td>Increased Understanding of Safety Concerns Experienced by Hospitalized Patients and their Families through Real-time Reporting in MySafeCare App</td>
<td>Sarah A. Collin; Brittany Couture; Elizabeth Lilley; Ann D. Smith; Frank Y. Chang; Esteban Gershank</td>
<td>41</td>
</tr>
<tr>
<td>Helping Patients with Breast Cancer Decide About Clinical Trials Participation</td>
<td>Prudence Dendrume; Liz Zach; Amy Leader; Laura Austin; Sarah Hegovgaty; Anna Quinn; Anet Petruch; Massimo Cristofanilli; Russell Schilder; Ronald Myers</td>
<td>43</td>
</tr>
<tr>
<td>Assessing the Potential Risk in Drug Prescriptions During Pregnancy</td>
<td>Ferdinand Dhombre; Vojtech Huser; Larizza M. Rodriguez; Olivier Bodenreder</td>
<td>45</td>
</tr>
<tr>
<td>Integrated Workflow Capture in an EHR Conversion: Standardizing on Best Practice Methods</td>
<td>Brad Doebbeling; Matthew Burton; David R. Kaufman; Karl Poterack; Mac McCallulah; Adela Grando; Tim Milis; Richard Helmers</td>
<td>47</td>
</tr>
</tbody>
</table>
Towards Phenotyping Stroke: Leveraging Electronic Health Record Data to Identify Stroke Cases in a Large-scale Epidemiological Study ................................................................. 103
Yichao Ni; Charles Moon; Kathleen Avedel; Daniel Woo; Opeolu Adeoye; Matthew Flaherty; Simona Fersioli; Jason Mackey; Felipe De Los Rios La Rosa; Sharyl Martini; Pouja Khattra; Brett Kissela
Evaluation of Whether Radiology Decision Support Embedded in the Order Entry Function of an Electronic Medical Record System Improves Appropriateness of Cross-Sectional Imaging Orders ................................................................. 105
Ted E. Palen; Susan Shetterly
Detailed Clinical Models for Nursing Action .................................................................................................................. 107
Adler Perotte; Noemie Elhadad
A Probabilistic Model for Learning Relationships Between Diagnosis Codes and Clinical Free Text ............................................. 109
Adler Perotte; Noemie Elhadad
Information Blocking: How common is it and what Polciy Strategies Can Combat It? ......................................................... 111
Eric Fiejer; Julia Adler-Milstein
Patient-provided Data Improves Race and Ethnicity Data Quality in Electronic Health Records .................................................. 113
Fernanda Polaburugamu; Hojat Salmanian; Andrea W. Shapiro; Jennifer E. Frey; George Hripcsak; Adler Perotte; Nicholas P. Tatenoetti; David Vawdrey
Validating the Occupational Data for Health Model: An Analysis of Occupational Information in Reports, Standards, Surveys, and Measures ..................................................................................... 115
Sriprisia Bajamani; Elizabeth S. Chen; Ranyah Aidekhel; Yan Wang; Genevieve B. Melton
Information Needs of Physicians, Care Coordinators, and Families to Support Care Coordination of Children with Special Health Care Needs (CSHCN) ................................................................................ 117
Pullavali Ramadha-Kharkar; Charlene Wein; Chuck Norlin; Sarah Collins; Lou Ann Scarton; Gina B. Baker; Damian A. Borbolla; Vanina Taliercio; Guillerme Del Fiol
Design and Implementation of an Ancillary Genomics System for the Return of Pharmacogenetic Results ........................................ 119
Luke Y. Rasmussen; Maureen E. Smith; Federico Almaraz; Stephen D. Persell; Laura J. Rasmussen-Torsvik; Jennifer A. Pacheco; Carl Christensen; Timothy M. Herr; Firas Weihe; Justin Starren
Technologies to Support Care Coordination for Medication Safety ......................................................................................... 121
Alissa L. Russ; Cheryl L. Luckhurst; Rachel A. Dismore; Karen J. Arthur; Amanda P. Iffachor; Peter Glassman; Michael Weiner
Mobile Apps for Vulnerable Populations Study .................................................................................................................. 123
Urmimala Sarkar; Gato Gourley; Courtney Ilyes; Lina Tieu; Cassidy Clarity; Lisa P. Neuwork; Karandeep Singh; David Bates
Templates for Ordering Specialty Care Consultations Lack Minimalism and Error Prevention: Results of a Heuristic Evaluation ................................................................. 125
April W. Savoy; Himalaya Patel; Mindy E. Flanagan; Michael Weiner; Alissa L. Russ
A Method for Enhancing the Portability of Electronic Phenotyping Algorithms: An eMERGE Pilot Study ......................................................... 127
Ning Shang; Chunhua Weng; George Hripcsak
Joint Modeling of Survival Events through Multi-task Learning Framework .................................................................................. 129
Zhaoan Sun; Xu Liu; Ping Zhang; Jianying Hu; Juan Winiwesky
Towards a Formal Account of the Dynamics of Knowledge and Context in Surgical Rooms for the Practice of Surgical Safety CheckLists .................................................................................................. 131
Xing Tan; Xiongdon An; Nicholas Pairaudeau; Jimmy Huang
Activated Working Baby Boomers Personal Health Information Management Needs and Expectations: An Exploratory Study ........................................................................................................... 133
Donghua Tao; Deborah E. Seale; Cynthia LeRouge; Jennifer E. Ohs; Helen W. Lach; Keri A. Jupka; Ricardo J. Wray
Evaluating Content Coverage of a Dental Diagnostic Terminology .......................................................................................... 135
Jason McMillian; Tapas Malakar; Shahnaz P. Thayaliskaksh; Anubha M. Dey; Kendall Fritzer
Convening Utah’s Healthcare Interests – A Statewide Care Coordination Infrastructure .......................................................... 137
Sidney N. Thornton; Shan He; Iona M. Thraen; Matt Hoffman; Darren K. Mann; Wu Xu
Expert Recommendations on Redesigning Drug Allergy Alerts in Electronic Health Record Systems ........................................... 139
Maxim Topaz; Foster R. Goss; Kimberly G. Blumenthal; Kenneth H. Lai; Diane L. Seger; Sarah P. Slight; Paige Wickner; George Robinson; Kin Wah Fung; Robert C. McCutree; Shelly Spiro; Warren W. Acker; David Bates; Li Zhou
Novel Approaches to Medication Teaching for Complex Medication Regimens .................................................................................. 141
Demetra Tsaparas; Hojat Salmanian; Samit Mohan; Jennifer E. Frey; Andrea W. Shapiro; David Vawdrey
Diagnostic Journeys of Patients Evaluated for Lyme Disease and Given Extended Antibiotic Therapy ................................................ 142
Yi-Ju Tseng; Alfred DeMaria; Donald A. Goldmann; Kenneth D. Mandl
The Role of Culture and Personality in Health Information Communication with Social Network Members ......................................................... 144
Rupa S. Valdez; Thomas M. Guterbock; Kara Fitzgibbon; Ishan C. Williams; Hannah Meneeef; Claire A. Wellbeloved-Stone
The Discriminative Power of Non-Specific Laboratory Results .............................................................................................. 146
Jacob P. VanHouten; Christopher Foneschek; Michael E. Matheny; Thomas A. Lasko
Information Extraction from Italian Medical Reports: First Steps Towards Clinical Timelines Development ................................ 148
Natalia Viani; Valentina Tibollo; Carlo Napolitano; Silvia G. Priore; Riccardo Bellazzi; Cristina Larizza; Lucia Saccu
Evaluation of SMART-on-FHIR 12b Cell using PCORNET Data Model ......................................................................................... 150
Kavishwar B. Wagholikar; Rahul Jain; Elie Oliveira; Joshua C. Mandel; Jeffrey G. Klann; Prasad Patil; Kenneth D. Mandl; Shawn N. Murphy; Susan DePork; Joo Youn Lee; Lucy L. Wang; John H. Gennari; Neil F. Abernethy
Colin G. Walsh; S T. Rosenbloom
Discovering Representational Differences Between Pathway Knowledge Bases for Pathway Resource Merging ........................................ 154
Didactic Panel: Interactive Systems in Healthcare ................................................................. 224

Lena Mamykina; Madhu Reddy; Katie A. Siek; Gabriela Marcs; Leslie Liu

Building a Research Ecosystem Upon the Early Success of ResearchKit .................................................. 227

Kenneth D. Mandl; Richard A. Bloomfield; Deborah Estrin; Stephen Friend; Pascal B. Pflügger

Secure Record Linkage for Precision Medicine and Patient Centered Outcomes Research .......................... 230

Daniella Meeker; Abel N. Kho; Toan C. Ong; Xiaoqian Jiang; Jason N. Doctor

Calibration of Predictive Models for Clinical Decision Making: Personalizing Prevention, Treatment, and Disease Progression ........................................................................................................ 233

Catherine Staas; Shu McGarvey; Shun He; Ryan Arnold; Laura Conn

Electronic Case Reporting: 360° Perspective by Public Health, Informatics, and Healthcare Stakeholders 236

Marc Tobias; Robert W. Grundmeier; Joshua C. Mandel; Aaron Weinstein; Janet Campbell

Engaging Older Adults in the Design, Implementation and Evaluation of Health IT ..................................... 241

Lucila Ohno-Machado; George Hripcsak; Michael E. Matheny; Yuan Wu; Xiaoqian Jiang

Building Software Platforms that Integrate with the EHR: Implementations, Frameworks, and Industry Experiences ............................................................................................................................................. 244

Anne M. Turner; George Demiris; Amanda Lazar; Blaine Reeder

Transforming Clinical Documentation: Nursing and Big Data Working Group 10’s Recommendations and Action Plan .................................................................................................................................................. 247

Charlotte A. Weaver; Judith Effken; Kelly Cochran; Rebecca Freeman; Ann O’Brien

Informatics to Transform Med Wreck to Medication Reconciliation .......................................................... 249

Nathan Botts; Eric C. Pan; Lois Olinger; Margaret Donahue; Nelson Hsing

Business Analysis Component of Public Health Informatics: The Missing Link ....................................... 250

John P. Borsi; James D. Stone; William J. O’Carroll; Jeffrey M. Bratman; Bill Brand

INTERACTIVE PANEL

Mental Health/Substance Use Disorder Care, Privacy, and HIT—Can We Make it All Work? ............................. 253

David W. Bates; Alice B. Buech; Mariella Gordon-Nguyen; Paul Tang

New Pathways Into Biomedical Informatics: Educational Outreach Programs for High School Students ........ 256

David Boone; John Finney; Kim M. Uersti; Indra N. Sarkar

Patient Generated Data: The Missing Link in Patient Centered Care? .......................................................... 259

Noémie Elhadad; Lena Mamykina; XinXi Zhu; Eileen Koski

Women in Informatics Leadership Forum ..................................................................................................... 262

Rebecca Jacobson; Suzanne Bakken; Wendy Chapman; Valerie Florunce; Jessica D. Tenenbaum

Global e-Health: The Latin American Perspectives ......................................................................................... 264

Heimur H. Marin; David Novillo-Ortiz; Alexandre F. Barbosa; Fernan Gonzalez-Bernad de Quirós

A Forum on Qualitative Research in Biomedical Informatics: Controversies, Challenges, and Opportunities 267

Laurie L. Novak; Bapa Valdez; Tiffany Voinot; Jan Talmon; Nancy M. Lorenzi

Population Health Informatics: Connecting Consumers to Care ...................................................................... 270

Harm J. Scherpbier; Vincent A. Emanuele; Jane Sarasohn-Kahn; Mark Scrimshire

How Informatics Are Being Applied in Industry: Challenge and Opportunity ............................................. 272

Xia Wang; Zhaohui J. Cai; Jorge A. Caballero; Matvey B. Parchuk; Shabram Ebdollahi; Elizabeth S. Chapman

Personalized and Precision Medicine at Scale ................................................................................................. 275

Ken Yule; Lewis J. Frey; Nephi Walton; Daniel Z. Sands

PAPERS

Expanding Access to High-Quality Plain-language Patient Education Information Through Context-Specific Hyperlinks ........................................................................................................................................ 277

Jessica S. Ancer; Elizabeth Mauer; Diane Hauser; Neil Calman

Studying Readiness for Clinical Decision Support for Worker Health Using the Rapid Assessment Process and Mixed Methods Interviews ........................................................................................................ 285

Joan S. Ash; Dian A. Chase; Jane Warren; Elizabeth V. Murphy; Stacey Marovich

Automatic Generation of Conditional Diagnostic Guidelines ........................................................................... 295

Tyler Baldwin; Yufan Guo; Tanveer Syeda-Mahmood

Using Monte Carlo/Gaussian Based Small Area Estimates to Predict Where Medicaid Patients Reside ............... 305

Jiaxue Ji; Xuejin Wen; Satyender Goel; Jing Zhou; Abel N. Kho; Lina Fu

Recognizing Question Entailment for Medical Question Answering ............................................................. 310

Asma Ben Abacha; Dina Demner-Fushman

Hypothesis-Free Search for Connections Between Birth Month and Disease Prevalence in Large, Geographically Varied Cohorts .................................................................................................................. 319

John P. Borsi

Improved Veteran Access to Care through the Veteran Health Information Exchange (VHIE) Retail Immunization Coordination Project ........................................................................................................ 326

Nathan Botts; Eric C. Pan; Lois Olinger; Margaret Donahue; Nelson Hsing

Automated Detection of Privacy Sensitive Conditions in C-CDAs: Security Labeling Services at the Department of Veterans Affairs ............................................................................................................. 332

Omar Bouhaddou; Mike Davis; Margaret Donahue; Anthony Malta; Stephanie Griffin; Jennifer Teal; Jonathan R. Nebecker
Safe “Cloudification” of Large Images Through Picker APIs .......................................................... 342

An Extended SNOMED CT Concept Model for Observations in Molecular Genomics .......................... 352

Analyzing SNOMED CT’s Historical Data: Pitfalls and Possibilities .............................................. 361

Interpretable Deep Models for ICU Outcome Prediction ................................................................. 371

Designing a Clinical Data Warehouse Architecture to Support Quality Improvement Initiatives .... 381

Integrative Spatial Data Analytics for Public Health Studies of New York State .................................. 391

Classification Models for Pulmonary Function using Motion Analysis from Phone Sensors .......... 401

Usability Testing of a Web-Based Decision Aid for Breast Cancer Risk Assessment Among Multi-Ethnic Women ............................................................. 411

Prioritization and Refinement of Clinical Data Elements within EHR Systems ................................ 421

Forecasting the Spread of Mosquito-Borne Disease using Publicly Accessible Data: A Case Study in Chikungunya ................................................................. 431

ODaCC1: Ontology-guided Data Curation for Multisite Clinical Research Data Integration in the NINDS Center for Stroke Research .............................................. 441

Nine Principles of Semantic Harmonization .................................................................................. 451

A K-Reversible Approach to Model Clinical Trajectories ............................................................... 460

Hierarchical Bayesian Logistic Regression to forecast metabolic control in type 2 DM patients .... 470

Design and Evaluation of a Medication Adherence Application with Communication for Seniors in Independent Living Communities ......................................................... 480

Investigating Delays in Updates to Infusion Pump Drug Limit Libraries ....................................... 490

Evaluation of a Digital Companion for Older Adults with Mild Cognitive Impairment .................... 496

Using Best Practices to Extract, Organize, and Reuse Embedded Decision Support Content Knowledge Rules from Mature Clinical Systems .................................................. 504

Characterizing Physicians Practice Phenotype from Unstructured Electronic Health Records .......... 514

Understanding Patient Satisfaction with Received Healthcare Services: A Natural Language Processing Approach ................................................................. 524

Dynamic Multicore Processing for Pandemic Influenza Simulation ............................................... 534

Integrating the Patient Portal Into the Health Management Work Ecosystem: User Acceptance of a Novel Prototype ................................................................. 541

Modeling the Temporal Evolution of Postoperative Complications ............................................. 551

Towards Comprehensive Clinical Abbreviation Disambiguation Using Machine-Labeled Training Data .................................................................................................................. 560

Leveraging Lexical Matching and Ontological Alignment to Map SNOMED CT Surgical Procedures to ICD-10-PCS ................................................................................................. 570

Integrating Process Mining and Cognitive Analysis to Study EHR Workflow ................................ 580

Understanding the Knowledge Gap Experienced by U.S. Safety Net Patients in Teleretinal Screening ................................................................................................................. 590

Foraging for Information in the EHR: The Search for Adherence Related Information by Mental Health Clinicians .......................................................................................... 600

"Scared to go to the Hospital": Inpatient Experiences with Undesirable Events ............................ 609

Topological-Pattern-Based Recommendation of UMLS Concepts for National Cancer Institute Thesaurus ..................................................................................................................... 618

Zhe He ; Tan Chen ; Sherri de Coronado ; Katrina Fiskarski ; James Geller

Zhe He ; Tan Chen ; Sherri de Coronado ; Katrina Fiskarski ; James Geller
VOLUME 2

Adolescent and Caregiver use of a Tethered Personal Health Record System .......................................................... 628
Matthew K. Hong ; Lauren Wilcox ; Clayton Feistel ; Karen Wastileksi-Masker ; Thomas Olson ; Stephen Simoneaux

Cognitive Errors in Reconciling Complex Medication Lists ......................................................................................... 638
Jan Horsky ; Harley Ramelson

Clinic Workflow Simulations Using Secondary EHR Data ............................................................................................... 647
Michelle R. Hribar ; David Biermann ; Sarah Read-Brown ; Leah G. Reznick ; Lorinna Lombardi ; Manxi Parikh ; Winston Chamberlain ; Thomas R. Yackel ; Michael F. Chiang

Visualization of Order Set Creation and Usage Patterns in Early Implementation Phases of an Electronic Health Record .......................................................................................................................... 657
Nathan C. Hulse ; Jaecoon Lee ; Tim Botgeason

Discordant Patient Pain Level Reporting Between Questionnaires and Physician Encounters of the Same Day .......... 667
David A. Juckett ; Fred N. Davis ; Mark Gostine ; Eric P. Kasten ; Philip L. Reed ; Joseph Gardiner ; Rebecca Risko

People, Process and Technology: Strategies for Assuring Sustainable Implementation of EMRs at Public-Sector Health Facilities in Kenya........................................................................................................ 677
Samuel G. Kang’a ; Veronica Muhehe ; Nitsa Lhu ; Diana Too ; Nancy Puttkammer

Analysis of Healthcare Cost and Utilization in the First Two Years of the Medicare Shared Savings Program Using Big Data from the CMS Enclave ................................................................................. 724
Fabrizio S. P. Kury ; Seo H. Baik ; Clement J. McDonald

A Connectivity Framework for Social Information Systems Design in Healthcare ........................................................ 734
Craig E. Kaziemsky ; Pavel Andreescu ; Morad Benyoussef ; Tracey O’Sullivan ; Syam Jamaly

A Compartmental Model for Zika Virus with Dynamic Human and Vector Populations ......................................... 743
Eva K. Lee ; Yifan Liu ; Ferdinand H. Pitz

Profiling Fast Healthcare Interoperability Resources (FHIR) of Family Health History based on the Clinical Element Models .................................................................................................................................................. 753
Jaecoon Lee ; Nathan C. Hulse ; Grant M. Wood ; Thomas A. Oniki ; Stanley M. Huff

Toward Medical Documentation That Enhances Situational Awareness and Learning ...................................................... 763
Leslie A. Lenert

Predictive Analytics to Support Real-Time Management in Pathology Facilities .......................................................... 772
Lysanne Lessard ; Wojtek Michalowski ; Wei Chen Li ; Fawaz Halwani ; Daniel Amyot ; Dipokkar Banerjee

Comparing Lagged Linear Correlation, Lagged Regression, Granger Causality, and Vector Autoregression for Uncovering Associations in EHR Data ......................................................................................... 779
Matthew E. Levine ; David Albers ; George Hripcsak

A Topic-modeling Based Framework for Drug-Drug Interaction Classification from Biomedical Text .................................................. 789
Dingcheng Li ; Stéphane Lévy ; Majid Rastegar-Mojarrad ; Yanshan Wang ; Xiaodi Li ; Viggo Chudlady ; Terry Thernou ; Hongfang Liu

Integrated Machine Learning Approaches for Predicting Ischemic Stroke and Thrombembolism in Atrial Fibrillation ............................................................................................................................................. 799
Xiang Li ; Haijinfeng Liu ; Xin Du ; Ping Zhang ; Gang Hu ; Guotong Xie ; Shijing Guo ; Meixiu Lin ; Xiaoping Xie

Data-Driven Prediction of Beneficial Drug Combinations in Spontaneous Reporting Systems ........................................... 808
Ying Li ; Ping Zhang ; Zhanjun Tan ; Junying Hu

CMedTEX: A Rule-based Temporal Expression Extraction and Normalization System for Chinese Clinical Notes ............................................................................................................................... 818
Zengjia Liu ; Buzhou Tang ; Qingcai Chen ; Huaodi Li ; Junzhao Bu ; Jingzhi Jiang ; Qiwen Deng ; Suixiong Zhu

Interpretable Topic Features for Post-ICU Mortality Prediction .......................................................................................... 827
Yen-Fu Luo ; Anna Rumshisky

A First Step Towards a Clinical Decision Support System for Post-Traumatic Stress Disorders ........................................... 837
Sist Ma ; Isaac Galatzer-Levy ; Xaya Wang ; David Fenyo ; Arich Shalev

Reusable Filtering Functions for Application in ICU Data: A Case Study .............................................................................. 844
Vincent Major ; Monique S. Tanna ; Simon Jones ; Yindalum Apinyaapoulos

A Platform for Exploration Into Chaining of Web Services for Clinical Data Transformation and Reasoning ...................... 854
José Alberto Maldonado ; Marco Marcos ; Jesualdo T. Fernández Breis ; Estebal Parcerro ; Diego Boscá ; Maria del Carmen Legaz-García ; Begoña Martínez-Salvador ; Montserrat Bobles

Assessing Metadata Quality of a Federally Sponsored Health Data Repository ........................................................................ 864
David T. Marx ; James Beattie ; Vitaly Herasevich ; Lael C. Gatewood ; Rui Zhang

A Data-Driven Approach for Better Assignment of Clinical and Surgical Capacity in an Elective Surgical Practice ........ 874
Gabriela Martínez ; Brian J. Bernard ; David W. Larson ; Kalyan Pasupathy ; Mustafa Y. Sir
Predicting Negative Events: Using Post-Discharge Data to Detect High-Risk Patients ................................................................. 1169
Lisa Salisian ; Daniel Fahri ; Fei Wang ; Junying Hu ; Bradley Malin
Adapting Nielsen’s Design Heuristics to Dual Processing for Clinical Decision Support ................................................................. 1179
Teresa Taft ; Catherine Staas ; Stacey Slager ; Charlene Weir
Automating Guidelines for Clinical Decision Support: Knowledge Engineering and Implementation ....................................................... 1189
Geoffrey J. Tso ; Samson Tu ; Connie Oshiro ; Susana B. Martins ; Michael Ashcroft ; Kaeli Yuen ; Dan Y. Wang ; Amy Robinson ;
Paul Heidenreich ; Mary K. Goldstein
Automating Performance Measures and Clinical Practice Guidelines: Differences and Complementarities ............................................. 1199
Samson W. Tu ; Susana B. Martins ; Connie Oshiro ; Kaeli Yuen ; Dan Y. Wang ; Amy Robinson ; Michael Ashcroft ; Paul
Heidenreich ; Mary K. Goldstein
Investigating Longitudinal Tobacco Use Information from Social History and Clinical Notes in the Electronic Health Record ........................................ 1209
Yan Wang ; Elizabeth S. Chen ; Serguei F. Pakhomov ; Elizabeth Lindemann ; Genevieve B. Melton
Mental Status Documentation: Information Quality and Data Processes ...................................................................................... 1219
Charlene Weir ; Bryan Gibson ; Teresa Taft ; Stacey Slager ; Lacey Lewis ; Nancy Staggers
A Mixed Methods Task Analysis of the Implementation and Validation of EHR-Based Clinical Quality Measures .................................. 1229
Nicole G. Weiskopf ; Faiza Khan ; David A. Dorr ; Deborah V. Woodcock ; Joaquin E. Cigarroa ; Aaron M. Cohen
Differentiating Sense Through Semantic Interaction Data ........................................................................................................... 1238
T. Elizabeth Workman ; Charlene Weir ; Thomas Rindflesch
Learning Clinical Workflows to Identify Subgroups of Heart Failure Patients .................................................................................. 1248
Chao Tan ; You Chen ; Bo Li ; David Liebovitz ; Bradley Malin
Breach Risk Magnitude: A Quantitative Measure of Database Security .......................................................................................... 1258
William A. Yasnoff
Understanding and Visualizing Multitasking and Task Switching Activities: A Time Motion Study to Capture Nursing Workflow ........................................ 1264
Po-Yin Yen ; Marjorie M. Kelley ; Marcello A. Lupetoggi ; Amber L. Rosudo ; Elaina M. Migliore ; Esther M. Chippis ; Jacalyn
Buck
Moderating the Influence of Current Intention to Improve Suicide Risk Prediction ........................................................................ 1274
Navid A. Zahar ; Christopher Buckingham
Semantic Role Labeling of Clinical Text: Comparing Syntactic Parsers and Features ........................................................................ 1283
Yaoyan Zhang ; Min Jiang ; Jinggi Wang ; Hua Xu
A Decade of Experience in Creating and Maintaining Data Elements for Structured Clinical Documentation in EHRs .................... 1293
Li Zhou ; Sarah Collins ; Stephen J. Morgan ; Neelam Zafar ; Emily J. Gesner ; Martin Fehrenbuck ; Roberto A. Rocha
Sharing Patient-Generated Data in Clinical Practices: An Interview Study .................................................................................... 1303
Haining Zhu ; Joanna Colgan ; Madhu Reddy ; Eun Kyoung Choe

POSTERS
Clinical Decision Support to Detect High Risk Patients with QTe Prolongation ............................................................................... 1313
Christopher A. Aakre ; Martin Iss ; Gyorgy Simon ; Bob Tarrell ; Michael J. Ackerman ; Pedro J. Caraballo
Comparison of Drug-Drug Interaction Alert Acceptance Rates ........................................................................................................ 1314
Skye Aaron ; Dustin S. McEvoy ; Adam Wright
Mining EMR Data to Hypothesize Causal Associations for Depressive Disorders ........................................................................ 1315
Orhan Abar ; Ramakanth Kavuluru
Integrating Medical-Dental Care for Patients with Diabetes: A Pilot Implementation of Clinical Decision Support Alerts .......................... 1316
Amit Acharya ; Kelsey M. Schwei ; Dixie Schroeder ; Jordan Ashton ; Srinivas Challa ; Cynthia A. Sorenson ; Louay Daniel ; Eric
Penniman ; John O’Brien
A National Survey Assessing How Many Records Providers Are Allowed to Open at Once in Electronic Health Records in Hospitals and Ambulatory Sites ................................................................................................. 1317
Jason Adelman ; Matthew Berger ; Anita Rai ; William Galanter ; Gordon Schiff ; David Vawdrey ; Robert A. Green ; Hojjat
Salmavat ; Ross Koppel ; William Southern
Into the Void: Prescriber Use of a “Comments” Field in an Electronic Health Record System ................................................................. 1318
Angela Ai ; Mary G. Amato ; Diane L. Seger ; Julie M. Fiskio ; Adam Wright
The Super Annotator: A Method of Semi-Automated Rare Event Identification for Large Clinical Data Sets ............................................. 1319
Patrick B. Alba ; Olga V. Patterson ; Benjamin Vierne ; Daniel W. Denhutler ; Nicole Bailey ; Andrew Wilson ; Aaron W.
Kamasu ; Scott L. DaVall
Approaches for Using Temporal and Other Filters for Next Generation Phenotype Discovery .............................................................. 1320
David Alberts ; Adler Perotte ; George Hripcsak
Heteroscedastic Omics Data Analysis: Distance-Based Multivariate Approach .............................................................................. 1321
Alexander V. Alekseyenko
Creating Electronic Clinical Decision Support Tools for Management of Obese GERD Patients in an Outpatient Setting ................................. 1322
Olga Alexeeva ; Reni Yudianti ; Raj Keshvani
Investigating How Health IT Solutions Responded to Information Needs for Fall-Risk Management: A Case Study ................................. 1323
Dari Alhuwaili ; Gunen Koru
Heuristic Evaluation of a Novel Inpatient Portal .............................................................................................................................. 1324
Sana Ali ; Baria Hafeez ; Lisette Roman ; Jessica S. Ancker
A Toolkit that Standardizes Data Retrieval across Multiple Perioperative Data Sources ................................................................. 1325
Frank Aline ; Maxim Terekhov ; Teus H. Kappen ; Karen McCarty ; Honjuan Blazer ; Stephen Bader ; Jesse M. Ehrenfeld ;
Jonathan P. Wanderer

Identifying Discrepancies in Diabetes and Diabetic Foot Ulcer ICD-9 Codes Via Administrative Data in a Veteran
Latricia L. Allen ; Eni Njoh ; Gail Powell-Cope ; Tatjana Bulat ; Dezon Finch ................................................................. 1326

Towards Automated Selection of Patient-Specific Education Materials in Ambulatory Care Settings ......................................................... 1327
Fatemah M. Aloudah ; Samas Wajisnasik

Complexity Reduction and Visualization of RDF Knowledge Networks for Precision Medicine ......................................................... 1328
Zainab Al-Tate ; Nattapon Thanintron ; Iker Eroy ; Richard Hamner ; Dong Xu ; Trupti Joshi ; Dmitry Shin

Designing an Evaluation Methods Course in Health Informatics ............................................................................. 1329
Jessica S. Ancker ; Stephen B. Johnson

Configurable Permissioning to Address Diverse Data Collection Needs ............................................................................. 1330
Beth Anderson ; Henry Agnew ; Frank Farach ; Leon Rozembli ; Charles Terrell

Log File Analysis of User Engagement with Maternity Information Access Point ............................................................................. 1331
Adriana Arcia ; Eva R. Warner

Nursing Documentation Redesign: A Collaborative Approach ............................................................................. 1332
Deborah Ariosto

Technological Barriers to Situational Awareness in Laboratory Testing ............................................................................. 1333
Argus Athanas ; Molly Kantor ; Meghan Sebasky ; Robert El-Kareh

Standardization of FDA Adverse Event Reporting System to the OHDSI Common Data Model ......................................................... 1334
Amelia A. Avritt ; Adler Perose

Lessons Learned from Adopting RTLS-Based Asset Tracking System in a Tertiary Hospital ............................................................................. 1335
Hyunyoung Baek ; Seok Kim ; Eunja Jung ; Rongmin Baek ; Hee Hwang ; Seoyoung Yoo

End-user Customization of Electronic Medical Record System Provides Measurable Improvements in
Documentation Compliance ............................................................................. 1336
Anindita Bagchi ; Jayne Mitchell ; Jiri Sklenar ; James O. Mudd

On the Predictive Potential of Graph Patterns for Biomedical Relation Extraction ............................................................................. 1337
Gokhan Balaf ; Sergey Wallace ; Ramakanth Kavuluru

Establishing Value of Health Information Exchange Content ............................................................................. 1338
Gina B. Baker ; Sidney N. Thornton

Mobile Interactive Case Simulation Tools to Assist Healthcare Providers in Clinical Decisions ............................................................................. 1339
Monica Barbusa ; Margaret Demment ; Scott McIntosh ; Tamala David ; Jose Perez-Ramos ; Terry Doll ; Beatrice Aladin ; Cheryl
Smith ; Timothy Dye

Constructing Diagnostic CT Exam Lists for Sites across an HIE ............................................................................. 1340
Anton O. Beita ; Tina Lowry ; Daniel J. Vreeman ; Bradley Delman ; Benjamin H. Slovis ; George T. Loo ; Frederick L. Thum ;
Jason S. Shapiro

Categorizing Clinical Data to Make it Easier for Patients to Indicate Their Data Sharing Preferences ............................................................................. 1341
Elizabeth Bell ; Diana Guajarro ; Hyoemei Kim ; Alexander Richardson ; Jina Huh ; Shuang Wang ; Lucia Ohno-Machado

NASA’s GeneLab: Phase I Results and Plans ............................................................................. 1342
Daniel C. Berrios ; Jon Welch ; Homer Fogle ; Michael Skalmore ; Ouma Marcu

Toward Honoring the Values of Patients With Multiple Chronic Conditions: Insights from a Field Study ............................................................................. 1343
Andrew B. L. Berry ; Catherine Lim ; Tad Hersch ; Andrea L. Hartzler ; Ed Wagner ; Evette Ludman ; James Balston

Transmission of ELR Messages To Improve Public Health Reporting ............................................................................. 1344
Samar Binkheder ; Brian E. Dixon ; Shaun Grannis

Comparison of Approaches for Heart Failure Case Identification from EHR Data ............................................................................. 1345
Saul Blecker ; Stuart Katz ; Leora Horwitz ; Gilad Kuperman ; Hannah Park ; David Songt

Characterizing the Semantic Composition of the UMLS Metathesaurus Over Time ............................................................................. 1346
Oliver Bodenreider ; Lee Peters

Identifying Missing Finding Site Relations in SNOMED CT ............................................................................. 1347
Jonathan P. Bone ; Werner Ceusters

Pre and Post Knowledge Self-Assessment: Analysis of Students in an Introduction to Health Informatics Course ............................................................................. 1348
Suzanne A. Boren ; Iris Zachary

Evaluation of Safety Heuristics Applied to a Mobile Medication Reconciliation Application ............................................................................. 1349
Elizabeth M. Borycki ; Andre W. Kushniruk

Opioid-Related Side Effects and Adverse Reactions: Mining of Patient Secure Messages ............................................................................. 1350
Lisa Bouyade ; Robert D. Kerns ; William Becker ; Thomas K. Houston ; Stephen L. Luther ; Stephanie L. Shimada ; Balaji
Padmanabhan

Home 3D: Virtualized Home Environments in the EHR ............................................................................. 1351
Markus Broecker ; Patricia F. Brennan

A Systematic Review of The Types And Causes Of Prescribing Errors Generated From Using Computerized
Provider Order Entry Systems in Primary and Secondary Care ............................................................................. 1352
Clare L. Brown ; Helen L. Mulcahey ; Katherine L. Triffitt ; Dean F. Sittig ; Joan S. Ash ; Katie Reygade ; Andrew K. Husband ;
David Bates ; Sarah P. Slight

An Outcome-weighted Network Model for Quantifying and Measuring Collaboration in a Hospital Cardiology
Unit ............................................................................. 1353
Matthew B. Carson ; Denise Scholten ; Connor Fraitley ; Stephanie Gravener ; Emilie Powell ; Amy Y. Wang ; Gayle Kriloe ;
Faraz S. Ahmad ; Raje K. Mutaharasan ; Nicholas Soulakis

Extending Informatics Education to Home Care ............................................................................. 1354
Gail R. Casper ; Paula A. Jarzemsky ; Jennifer D. Athonas ; Patricia F. Brennan
Modeling Information Behaviour over Time: A Colorectal Cancer Screening Case Study .......................................................... 1355
Caitlin Champion ; Gonzalo G. Alvarez ; Evan Affleck ; Craig Karski

Knowledge Management of Drug Indications –Complexities and Challenges .................................................................................. 1356
Christine M. Cheng ; Jeff Babp

Technology Usage and Preferences During Pregnancy .......................................................................................................................... 1357
Sai Chennupati ; Marian Dorst ; Shiloh H. Anders ; Gretchen P. Jackson

Informatics Tools to Support Family Caregivers’ Pain Management in End-of-life Care: Current Evidence and Opportunities .............................................................................................................................................................................. 1358
Nai-Ching Chi ; George Demiris

Card Sorting of Symptom Self-Management Strategies to Inform the Development of a mHealth App in Underserved Persons Living with HIV .................................................................................................................................................................................. 1359
Hwayoung Cho ; Lena M. Milian ; Rebecca Schmall

Why Patients in Online Communities Report Not Taking SSRIs .............................................................................................................. 1360
Jason H.D. Cho ; Marina Shah ; Roxana Girju

A Single-Item Scale Stress for mHealth Interventions .............................................................................................................................. 1361
Adam C. Dziorny ; Sherry L. Pagoto ; Edwin D. Braunstein ; Bengisu Tulun

Crowdsourced Evaluation of Medical Texts Simplified by Medical Trainees ......................................................................................... 1362
Yong Choi ; Anne M. Turner ; Katrina Kirchoff

The Design of a Patient-Centered Personal Health Record with Patients as Co-Designers ........................................................................ 1363
Arlene Chang ; Hauwei Chen ; Grace Shin ; Ketan Mane ; Hye-Chung Kum

Assessment of the Heterogeneity of Outcome Measurements for IT Interventions in Health Care ................................................................ 1364
Tiago K. Colchico ; Julio Facelli ; Guilherme Del Fiol ; Debra Scannmon ; Watson A. Bowers ; Scott P. Narus

A Qualitative Analysis of Electronic Clinical Quality Measures Development and Data Validation ................................................................................................. 1365
Nicholas V. Colin ; Colin A. Chohan ; Bhavya Sanchdeva ; David A. Dorf

Usage of Electronic Online Care Process Models for Learning at the Point of Care ..................................................................................... 1366
David A. Cook ; Laurie J. Pencille ; Kristi J. Sorensen ; Deborah J. Rhodes

An Automatic Data Mining Approach Using Linked Data Technologies ............................................................................................................ 1367
Brett F. Crop ; John B. Coles ; Karen Meexs

Developing Analytics for Wheelchair Sensors to Improve User Health ........................................................................................................ 1368
Dorothy W. Curtis ; Hui Song

Integrating Electronic Death Registration with Electronic Health Records Systems: Results of Trial Use of the VRDR Profile .................................................................................................................................................................................. 1369
Vira Danuk ; Glenna Gobar ; Michelle Williamson ; Mike Hogarth

Analysis of Heparin and Aspirin Administration on Acute Ischemic Stroke from International Stroke Trial (IST) ........................................... 1370
Yifang Dong ; Sahitha Gajjala ; Craig W. Johnson

Assessing Healthcare Workforce Training Needs for Health Information Technology-Enabled Healthcare Transformation .................................................................................................................................................................................. 1371
Rusen Davood ; Mary M. Virgo ; Andrew Flattard ; Angie Lee ; Bruce Forman ; Lucy Appert ; Jennifer Ringler ; Gilad Kuperman ; Victoria Tisse ; Rita Kukafka

Automatic Extraction of Maximum and Recommended Drug Dosage Information from DailyMed Database .................................................. 1372
Lalindra De Silva ; Olga V. Patterson ; Scott L. DuVall

Effects of Meaningful Use of EHRs on ED Clinical Workflow .................................................................................................................. 1373
Courtney Denton ; Gloria Nino ; Jason S. Shapiro ; Thomas G. Kannampallil ; Vimala L. Patil

Methods to Measure and Improve the Quality of Large Scale Health Data: An Application in Public Health Surveillance .................................................................................................................................................................................. 1374
Brian E. Dixon ; Jon Duke ; Shawn Grannis

Proposal of Automatic Patient Authored Text Analysis to Measure Patient Engagement ............................................................................ 1375
Gabriel N. Ribeiro ; Márcia Ito

GWAS Finder: Search Engine for GWAS Datasets in Biomedical Literature ................................................................................................. 1376
Xiao Dong ; Yaqun Zhang ; Hua Xu

Utilizing a State-level, Integrated, Discharge Database to Monitor the Trend in Potentially Preventable Hospitizations for Congestive Heart Failure .................................................................................................................................................................................. 1377
Riddhi P. Doshi ; Gregory J. Matthews ; Garth Graham ; Robert Aseltine

Improving Quality of Care for Heart Failure Patients in a Home Care Setting: What Feedback Information Do Nurses Need? .................................................................................................................................................................................. 1378
Dawn W Dowding ; Nicola Onorato ; Jacqueline Merril ; David Russell

Preliminary Evaluation of a Multi-Component Intervention Prior to Discharge to Reduce Pediatric 30-Day Readmissions .................................................................................................................................................................................. 1379
Amir J. Draper ; Andrew H. Urban ; Roger Day ; Fereedeh Palmer ; Srinivasan Suresh ; Rich Tsui

Evaluation of Clinical Score Usefulness to Guide Development of Automated Score Calculation for Hospitalized Patients .................................................................................................................................................................................. 1380
Mikhail A. Dziadzko ; Christopher Aukre ; Vitaly Herasevich

Analyzing Electronic Health Record Interactions to Capture Resident Work Hours ......................................................................................... 1381
Adam C. Dziorny ; Evan Orenstein ; Robert B. Lindell ; Nicole Hames ; Bimal Desai

An Analysis of Readmission Events Over Time in Patients with Type 2 Diabetes ................................................................................................. 1382
Amie J. Draper ; Andrew H. Urban ; Roger Day ; Fereedeh Palmer ; Srinivasan Suresh ; Rich Tsui

A Maximum Entropy Model of Follow-up: Using Cancer Registry and Insurance Data to Identify Encounters for Breast Cancer Surveillance .................................................................................................................................................. 1383
Kathryn S. Egans ; Gary Lyman ; Karma Kreizenbeck ; Catherine Fedorenko ; April Affle ; Heather Noble ; Tracy Kusnir-Wong ; Ada Moherdian ; F. M. Stewart ; Benjamin Greer ; Scott D. Ramsey
A Scalable Dataset Indexing Infrastructure for the bioCADDIE Data Discovery System ................................................................. 1413
David M. Erickson ; Jie Long ; Vitaly Herasevich ; Mikhail A. Dziadzko ; Christopher Aakre

Potential for Post-Discharge Care Coordination ................................................................. 1415
Joon-Young Lee ; Chung-Hoon Kim ; Seung-Yeob Kim ; Myeong-Gu Ahn

Exploratory Analysis of Marketing Vs. Non-Marketing Tweets on E-Cigarettes .................. 1416
Sujeet Datta ; varieties of; Aroma Chatterjee ; Parth Agrawal ; Pratik Crowder ; Swapnil Kundu ; Divya Agarwal ; Varsha Aggarwal

HIE Expansion Improves Identification of Frequent Hospital Visitors ................................. 1417
Xiao Han ; Tina Lowry ; George T. Loo ; Elaine Rabin ; Zachary M. Grissom ; Lisa M. Kern ; Gilad Kuperman ; Jason S. Shapiro

Overcoming Interoperability Challenges of Community-Based Health Interventions .... 1418
Saira N. Haque ; Shelly Ebron ; Westleigh Quattrone ; Robert Bailey ; Barry H. Blumenfeld

Visual Optimization of a Provider Dashboard for Patient Reported Outcomes in Surgical Spine Patients ................................................. 1419
Mary Beth Hasselquist ; Elizabeth Austin ; Brett Fey ; Liz Kellogg ; Cynthia LeRoulje ; Andrea L. Hurtzel ; David Flum ; Danielle C. Lavalle

Business Process Modeling: Capturing the Workflow of Medicine ........................................ 1420
Peter J. Haug ; Herman Post ; Joseph Bledsoe

Roadmap for Integrating an EMG Machine with the EMR ................................................................. 1421
David Haustein ; Brenton C. Bohlg

Design Considerations for Patient Portals: Needs and Preferences from Elderly Adopters .......... 1422
Yuqi He

Assessing the Impact of Mobile-based Intervention on Health Literacy among Pregnant Women in Urban India ........................................ 1423
Aparna Hegde ; Riddhi Doshi

Efficacy and Types of Health Information Technology Used in Diabetes Education for Medically Underserved Adults: A Systematic Review and Meta-analysis ........................................ 1424
Elizabeth M. Heitkemper ; Lena Mamykina ; Jasmine Travers ; Arlene M. Snaldone

TransformDB: A Data Management System for Multimodal Imaging Data ...................... 1425
Karl G. Helmer ; Qi Wang ; Graham Warner

Evaluation of Clinical Score Calculator Programmability within the Electronic Health Record 1426
Judy Herasevich ; Mikhail A. Dziadzko ; Christopher Asb

Inconsistency and Variation in Concordance of Social History Documentation between Nursing and Provider .............................................................................. 1427
Jamie S. Hirsch ; Kevin Bock ; John Chetico ; Petros Karumanlakis ; Deborah Mensch ; Michael Oppenheim

Peter Hoonakker ; Shimeng Du ; Ann S. Hundt ; Jason Stamm ; Brian W. Patterson ; Pascale Carayon

Ranking PubMed Hits by Projection on an Axis of Words Having Varied Relevance to Search Intention ......................................................... 1429
Teruyoshi Hitoshi ; Takuro Tamura

Workflow-guided Development of a Clinical Decision Support Tool for Patients with Advanced Liver Disease ......................................................... 1430
Samuel B. Ho ; Julie Ducum ; Anne Miller ; Jennifer H. Garvin ; Jejo D. Koola ; Russ Beebe ; Jason M. Slagle ; Dave M. Westerman ; Carrie Reale ; Matthew B. Weinger ; Erik Groessl ; Michael E. Matheny

Development of an Electronic Triger Tool for Identifying Inpatient Diagnostic Error ......................................................... 1431
Katherine A. Homann ; Robert El-Kareh

Perceived Effectiveness of Clinical Decision Support to Improve VTE Prophylaxis: A Comparison of Physicians, Pharmacists and Nurses ......................................................... 1432
Peter Hoonakker ; Shimeng Du ; Ann S. Hundt ; Jason Stamm ; Brian W. Patterson ; Pascale Carayon

Implementing Semantics-Based Cross-domain Collaboration Recommendation in Biomedicine with a Graph Database .............................................................................. 1433
Piotr Hristovski ; Andrej Kastin ; Thomas Rindfleisch

Machine Learning Methods for the Early Identification of Diabetes ........................................ 1434
Kang Liu ; Xiaojian Jiang

A Mockup Interface for Searching Similar Patients Using Temporal Patterns ......................... 1435
Henry Huang ; Xiaojian Jiang

Evaluating Patients’ Perceptions of Infobuttons ........................................................................ 1436
Nathan C. Hulse ; Jie Long

Triggers for VTE Prophylaxis: Sociotechnical System Considerations ................................. 1437
Ann S. Hundt ; Peter Hoonakker ; Jason Stamm ; Vaibhav Agrawal ; Brian W. F. Posnett ; M. Sumi ; David Flum ; Danielle C. Lavalle

Predicting Ordered Diagnostic Tests from Patient Triage Data ........................................... 1438
Hairley Hunter-Zinzic ; Stephen Gaechde

Evaluating Differences Between MIMIC II and III Critical Care Databases ......................... 1439
Matinas I. Hurriado ; Jette Henderson ; Joydeep Ghosh

Exploring the Use of ClinicalTrials.gov Trial Results Data for Pharmacovigilance ............... 1440
Vojtech Hauer ; Olivier Bodenreider

Secondary Data Analysis on Ventilator-associated Pneumonia and Pressure Ulcer with Regards to Head of Bed Elevations .............................................................................. 1441
Sookyung Hwan ; Cheryl Newton ; Susan Moffatt-Bruce
Assessing the Feasibility of Developing an Inpatient Telehealth Referral System for Veterans with Poorly Controlled Diabetes

Information and Communication Needs of Hispanic Dementia Caregivers Informing Design of a Family Health Information Management System

Understanding Delays In Abnormal Test Result Follow-Up Using Electronic Health Records In Outpatient Primary Care Settings

Informing the Requirements for IT-Based Fall Risk Management Solutions in Home Health Care

Big-Data Method to Advance Public Health Informatics: Smarter Public Health Prevention System (SPHPS)

Does Health Status Affect Patient Preferences for Sharing Clinical Data for Research?

Using Familiar Concepts to Elicit Technology Design Insights

Utility of the Fast Healthcare Interoperability Resources (FHIR) Standard for Representation of Non-Query Data Mappings in the Arden Syntax

An NLP Extension to the Quality Data Model for EHR-Driven Phenotype Algorithm Authoring and Execution

An Evaluation of Activity Trackers for Monitoring Parkinson’s Disease Patient Outcomes

Assessment of Radiation Oncology Clinician Information Needs in Radiotherapy Treatment Planning

Socioeconomic and Clinical Correlates of Computer Use in Cancer Patients

Self-management Apps for Breast Cancer Survivors: Applying Clinical Terminology Standards for Personal Decision Support

Health Care Utilization by Active Duty Service Members Following a Mild Traumatic Brain Injury

Data Mapping in Development and Implementation of Clinical Data Management Technology for Clinical Research

Design, Implementation, and Maintenance of Relevant ASAP Data Report Tools for Patients Presenting to the Emergency Department

Grammar Frequency and Simplification: When Intuition Fails

Simplifying PheWAS Analysis: An R Package and Teaching Module

The Impact of a Portal for Parents of Hospitalized Children on Healthcare Team Workflow

Patient Accessible Electronic Health Records Portal

Secondary Use of Health Information Exchange: Bivariate Analysis of Return Visits After Emergency Care

Developing a Mobile Application to Improve Diabetic Patients’ Self-Care Behaviors: A Functionality Analysis

Data Topography of a Large Multi-Site Research Network

Incorporating Televisions into Older Adults’ Health Routines: A Case Study

Magnomath: Mobile Application for Identifying Dyscalculia Symptoms Related to Magnocellular Reasoning

Selecting Health Insurance Coverage: Can Complexity and Context Be Used to Manipulate Choices?

An Electronic Health Record Phenotyping Algorithm for Identifying Patients with Hepatorenal Syndrome

Developing an NLP Pipeline for Thyroid Ultrasound Reporting

Analysis and Redesign of Alerts and Reminders in a Commercial Electronic Health Record System to Reduce Alert Fatigue
Towards the Creation of a Novel Career-based Health Informatics (HI) Curriculum Assessment Instrument: A Research Capability Framework

Participants’ View on Picture Taking in a Behavior Change Intervention

Integrating Usability Engineering into System Testing and Implementation: A Multi-Phased Approach to Ensure System Usability and Safety

Development and Validation of an Electronic Health Record (EHR)-Based Risk Stratification Rule for Inpatient Delirium

Integration of a Healthcare Data Dictionary Front-end Tool with Data Visualization: Architectural Features and Early Implementation in the Laboratory Domain

Clinical Decision Support for High Risk Medications in the Elderly at the Point of Prescribing

Designing Avatars to Assist with Self-Management for Overweight and Obese Adolescents

Reviewing Asthma-related Grey Literature and Personal Opinions on Twitter using LDA and CTM Clustering

Drug-drug Interaction Detection with A Topic-modeling Based Framework Augmented with Distant-Supervision

Ontology-Based Analysis of Adverse Drug Reactions Associated with Anti-infection Drugs in China

Three-Dimension (3D) Blood Vessel Reconstruction and Spatial Analytics with Whole-Slide Histological Images

Web Delivery of Team Based Learning Components

A Comparison of ESpell and GSpell Spell-Checker Tools

Implementing Precision Predictive Analytics for Unplanned 30-Day Readmissions for Real-Time Use at the Point of Care

Integration of Genomic, Specimen, and Cancer Registry Data in an i2b2 Data Analytics Platform for Oncology Research

Multiword Frequency Analysis Based on the MEDLINE N-gram Set

How Strong is the Evidence for the Effectiveness of Dementia Family Caregiver Information and Communication Technology Interventions?

A Research Capability Framework

Using Results of Statistical Text Mining in Big Data Analysis

Use of SNOMED CT Relationships for Optimizing Automatically Extracted Problem List Entities from Clinical Narratives

Reducing Clinician “EHR Screen Time” and Increasing Patient “Face Time”

In Patient Usability Testing Results of a Patient-Centered Postoperative Wound Surveillance Smart Phone App

Utilizing Digital Photographs

Proactive Patient Management Worksheets: An Opportunity to Support Clinical Care While Addressing Increasingly Complex Reporting Requirements

Incorporation of Case Setup Complexities into the Analysis of Operating Room Turnover Times

Identifying Treatment Refusal Through Natural Language Processing

Comparison of Electronic Health Record Data Sources to a Gold Standard Patient Data Set in Correctly Identifying Chronic Conditions

Shelby J. Martin ; Nicole G. Weiskopf ; David A. Dorr

Joel J. Martin ; Nathaniel S. Ring ; Andrea A. Kelley ; Jon Duke

Julie Maitland ; Natalia Largaespada Beer ; John Rutter ; Jeff Beairisto ; Iain Macneil ; Colin Kilburn ; Ian Smith

Sina Madani ; Jerry Henderson

J Edward Maddela ; Khaled Hassan ; Omar Iqbal

Andrea N. Malmke ; Rebecca Gunther ; Sara Fernandez Taylor ; Kate L. Baker ; Jason T. Wiseman ; Craig Kent

Julie Mastland ; Natalia Largaespada Beer ; John Rutter ; Jeff Beairisto ; Iain Macneil ; Colin Kilburn ; Ian Smith

John D. Manning ; Manmeet Singh ; Pavithra I. Issanayake ; Elizabeth Day ; Richard Banchs

Joel J. Martin ; Nathaniel S. Ring ; Andrea A. Kelley ; Jon Duke

Shelby J. Martin ; Nicole G. Weiskopf ; David A. Dorr
Review of Existing Mobile Apps to Support Symptom Management for Adults with Heart Failure Using the Mobile Application Rating Scale .......................................................... 1499

Patrick C. Mathias ; Noah Hoffman

Ensuring Data Integrity from Anesthesia Information Management Systems: An Approach by the Multicenter Perioperative Outcomes Group .................................................................................................. 1500

Implementing Computerized Provider Order Entry Increased Rates of Duplicate Laboratory Testing in Inpatient and Outpatient Settings

Patrick C. Mathias ; Noah Hoffman

MedicineMaps: A Tool for Mapping and Linking Evidence from Experimental and Clinical Trial Literature .......................................................... 1502

Nicholas J. Maltas ; Wei-Ting Chen ; Alcino J. Silva ; William Hsu

Bibliometric Analysis Can Identify Sources of Anomalies in Document Retrieval relating to MeSH Structure and Indexing Patterns

Katherine W. McCain

Extending The PCORnet Common Data Model To Encompass Emergency Department Clinical Research.......................................................... 1504

James C. McClay ; Brett J. Gardner

An Analysis of the Utility of Coded Override Reasons for Drug-Drug Interaction Alerts at Eleven Sites .......................................................... 1505

Dustin S. McEvoy ; Dean F. Sittig ; Adam Wright

RexDB & GSM Provide Iterative Cohort Selection for GWAS: A Case Study of Gains through Interoperability of Two Open-Source Technologies........................................................................... 1506

Owen McGettrick ; Ezekiel Maier ; Natasha Sevcovic ; Leon Rozenblit ; Paul Hodor

Nanomedicine Entity Extraction .................................................................................................. 1507

Gabrielle N. Jones ; Marley Hudson ; Tanin Ezadi ; Ivan Jimenez ; Nastassja Lewinski

Homeless Patients Driving Innovation: Establishing a Community Innovation Panel to Create Patient-Facing Technology in a Large Urban Health Clinic ................................................................................... 1508

D Keith McInnes ; Salem Johnston ; Robert Ihas

Qualitative Assessment of Women’s Attitudes Towards a Tracking App for Phenytoin Endometriosis.................................................................................. 1509

Mollie M. McKillop ; Tamer Seckin ; Noemie Elhadad

Qualitative Analysis of Proxy Utilization of Patient Portal for Older Adult Patients .......................................................................................... 1510

Brittany L. Melton ; Crystal Burkhardt

A Framework for Robust Information Extraction from Free Text Documents .......................................................................................... 1511

Frank Meng ; Craig Moritoka ; James Sayre

Automated Dynamic Problem and Allergy Lists for Efficient Electronic Health Record Management.......................................................... 1512

Stéphane M. Meystre ; Jianyin Shao ; Greg M. Jones

Influenza Vaccine Cancel-Reordering Reveals a Potential Limitation of Immunization Decision Support during Intermittent Vaccine Shortages .......................................................................................... 1513

Jeremy Michel ; Levon Utidjan ; Jerritt Thayer ; Robert W. Grandmeier

Expert Interpretations of Prostate Cancer Quality-of-Life Survey Results .......................................................................................... 1514

Sean P. Mikes ; Andrea L. Hartzler ; Ted A. Sklarus ; John L. Gory

The Importance of Well-Defined Mapping Heuristics for Mapping Quality .......................................................................................... 1515

Holly Miller ; Catherine Hoang ; Nathan Stocks ; Timothy Williams ; Mary Ferramanosca ; Paloma L. Hawry

Discovering Community Resources to Support Emerging Models of Care .......................................................... 1516

Mari Mallory ; Rita Kukafka

Applying Machine Learning Methods to Predict Activities of Daily Living for Cancer Patients .......................................................................................... 1517

Laura Men ; Talha Ot ; Sava Yukannovic ; Hedyeh Mohabbi ; Katherine Irvin ; Iliretka Krausisiqi ; Janusz Wojniasak

Visualizing the Effects of Cancers on Relationships between Comorbidities and Activities of Daily Living .......................................................................................... 1518

Hua Min ; Talha Ot ; Sava Yukannovic ; Hedyeh Mohabbi ; Katherine Irvin ; Iliretka Krausisiqi ; Janusz Wojniasak

Development of a Diagnostic Assistant for Multiple Sclerosis Using Natural Language Processing of the Electronic Medical Record .......................................................... 1519

Lindsey R. Mitrani ; Gabriel G. Lu ; Dominick J. Faligieri ; Herbert Chase

Predictive Modeling for Appointment No-show in Community Health Centers .......................................................................................... 1520

Islam Mohamed ; Ayten Turkcan ; Tommy Tocsoi ; Huanmei Wu ; Bradley N. Dobbelding

Semantic Relatedness and Similarity between Biomedical Concepts .......................................................................................... 1521

Sungmoon Moon ; Trevor Cohen ; Hua Xu

Resolving Hierarchical Ambiguity in Indexing Recommendations .......................................................................................... 1522

James G. Mork ; Dina Demner-Fushman

Apache Spark for the Analysis of High Frequency Neurointensive Care Unit Data: Preliminary Comparison of Scala vs. R.......................................................... 1523

Laura Moss ; Martin Shaw ; Ian Piper ; Christopher Hetherorne ; John Kinsella


Danielle L. Mowry ; Kristina M. Doing-Harris ; Wendy Chapman ; Chrissy Daniels ; Mike Conway

Characterizing the Fever Effect in Autism Spectrum Disorder .......................................................................................... 1525

Efrat Muller ; Alal Eran ; Denis Aghel ; Issac Kohane ; Etan Bachmat

Validation of an Automated Process for the Comparison of Nutrition Care with Evidence-Based Nutrition Practice Guidelines (EBNPG) .......................................................................................... 1526

William J. Murphy ; Martin M. Yadrick ; Ruya K. Hand

Electronic Health Record Interventions Improve Patient Centered Medical Home Documentation for Primary Care Practices Seeking National Committee for Quality Assurance Recognition .......................................................................................... 1527

Sara R. G. Myers ; Elizabeth R. Silvers ; Catherine L. Liang ; Lynn A. Volk ; Colleen Blanchette ; Amy Feeney
Support Mobile Maternal Health Applications in Developing Countries

All Alerts are not Created Equal: A Study of Differences in User Perceptions of Drug-drug and Drug-allergy Interaction Alerts

Medication Self-Reconciliation Through Automated Telephony

Assessing Patterns of Medication Use across VA and Non-VA Healthcare Systems

Supporting and Engaging Women Veterans Through Social Media: Informational Vs. Emotional Support for Health Issues

One Year Usability Results for an Electronic Respiratory Therapy Tool for the Intensive Care Unit

Clinical Decision Support Substantially Improved Appropriate Screening for Vitamin D Deficiency

Exploring the Patient Perspective on Access, Interpretation, and Use of Test Results from Patient Portals

Design of Point-of-Care Lupus Nephritis Outcome Risk Score to Improve Adherence to Guidelines for Treatment

Carelig: Early Reactions to a Mobile Care Management and Handoff Tool

Application of Ontobedia on Cell Line Ontology Development

Informatics in the International Medical School Curriculum: A Pilot Survey

Pediatric Inpatient Medication Reconciliation using EMR in a Community Hospital

Using Tablet Computer Journals to Capture Patients' Chronic Disease Management in Daily-living Settings

Visualizing Clinical Event Sequences to Support EHR Data Retrieval

Sociotechnical Interventions to Optimize Research-Focused EHR Data Retrieval Requests

Text Processing of Clinical Research Protocols and Informed Consents to Facilitate Tracking of Research Procedures

Annotating Patient Smoking Status from Electronic Dental Record Histories

Implementing a Course in Computational Thinking During Residency Using R

Cues for PE Diagnosis in the Emergency Department: A Sociotechnical Systems Approach for Clinical Decision Support

NDC Properties in RxNorm

Use of Freetext Clinical Reports for Prediction of 30-Day Psychiatric Readmissions

Systemic Identification of Analytes Tracked As Outcomes in RPM Clinical Trials

Usability of a Provider-Facing Breast Cancer Prevention Toolbox

A Platform for Rapid Data Sharing and Visualization to Contribute Towards Future Epidemic Preparedness

Within Communities in Sierra Leone

S2CR2UM: A Solution to the In Silico Relevance, Reliability & Reproducibility Conundrum

Topic Visualization of Online Cancer Discussion Forums

Mobile Maternal Health Applications in Developing Countries
Serious Digital Game for Heart Failure Self-management by Older Adults: a Pilot Study ......................................................... 1559

Parsing Complex Microbiology Data for Secondary Use ........................................................................................................ 1560

Rural Health Informatics: Using EHR Data for Systems Based Improvements in the Emergency Department .......................... 1561

Gilbert H. Ramirez ; James P. Killeen

Patient Identity Matching for Health Information Exchange between Poison Control Centers and Emergency Departments ....................... 1562

Pallavi Ranade-Kharar ; Darren K. Mann ; Heather Bennett ; Barbara I. Crouch ; Guillerme Del Fiol ; Sidney N. Thornton ; Mollee R. Cummins

Detecting Anomalies in Alert Firing in Clinical Decision Support (CDS) Systems Using Anomaly/Outlier Detection Techniques ............................................ 1563

Soami Ray ; Adam Wright ; Dustin S. McEvoy ; Jan Marie Andersen

Utilization of Cost Effective Tools for Queries on Healthcare System Stress.................................................................................. 1564

Taylor Read ; Elizabeth White ; Neelima Karpininen ; Maxim Ignatov ; Mahesh Shannagam ; Beatriz H. Rocha ; J Perren Cobb ; Saviero M. Mavuglia ; Roberto A. Rocha ; Sarah Collins

Improving Pain Assessment in Medical Intensive Care Unit Through Natural Language Processing .......................................................... 1565

Douglas Reid ; Qing T. Zeng ; Cynthia Brandt ; Kathleen Akgin

Event Coreference in Support of Temporal Reasoning in Mental Health Notes .................................................................................. 1566

Ruth M. Reeves ; Marcus Verhagen ; Cynthia Brandt ; Wendy Chapman ; Michael E. Matheny ; Steven H. Brown ; Brian Marx ; Theodore Speroff

Pediatric Inpatient Burden and Comorbidities of Bullous Pemphigoid in the United States ........................................................................ 1567

Ziyou Ren ; Jonathan I. Silverberg

Development of Mobile Application System to Detect Pathological Smartphone Use and Smartphone Addiction ......................... 1568

Mi Jung Bho ; In Hye Yook ; Heon Baek ; Mun Joo Choi ; Seo Joon Lee ; Dai-Jin Kim ; In Young Choi

PubMed ‘Early Alerts’: Towards Better Precision of Literature Searching for Pharmacovigilance Information based on an Assessment of Relevance Feedback .................................................................................................................. 1569

Anna Ripple ; Alfred Sorbello ; Shahrahul Haider ; Olivier Bodenreider

Use of a Market Segmentation Method to Validate User Types of SHUTI, An Internet-Delivered Intervention for Insomnia ........................................................................... 1570

L Ritterband ; Vanessa Sturz ; Philip Chow ; Holly Lord ; Frances Thordikne ; Wendy Cohn

Improving Inclusion of Comparison Studies in Radiology Interpretations ...................................................................................... 1571

Catherine C. Roberts ; Shirley Loprinzi ; Elaine Comstock

Developing Standards for Usability in Electronic Health Records: Challenges and Opportunities .................................................... 1572

Mitra A. Roxca ; Rebecca Meehan ; Constance M. Johnson ; John Ritte ; Gary Dickinson ; Randace M. Kelly ; Lauralee Barrett ; Ethan Budreau

Are Boston Healthcare Center Websites Linguistically Accessible? ................................................................................................. 1573

Jorge A. Rodriguez ; Sanja Percac-Lima

Towards Automatic Discovery of Genes Related to Human Placenta .............................................................................................. 1574

Larizza M. Rodriguez ; Stephanie M. Morrison ; Kathleen Greenberg ; Dina Denner-Fushman

Family History by Other Names: A Preliminary Comparison of Structured and Free-Text Sources in the Electronic Health Record .............................................................................................................. 1575

Paul T. Rosenau ; Diantha B. Howard ; Genevieve B. Melton ; Elizabeth S. Chen

Patient Record Linkage Between Two Academic Health Centers ........................................................................................................... 1576

Mindy K. Ross ; Douglas S. Bell

Confidence in Methodologies to Accurately Predict Risk Stratification in Primary Care Practices .................................................. 1577

Rachel L. Ross ; Bhavya Sachdeva ; Jesse H. Wagner ; Lindsey Watson ; Jennifer D. Hall ; David Cameron ; Deborah J. Cohen ; David A. Dorre

Redesigning Chart Rounds in Radiation Oncology .................................................................................................................. 1578

Adam Rude ; Erin Gillespie ; Nadir Weibel ; Todd Pawlicki

Leveraging the Electronic HealthRecord to Investigate Medication Safety Incidents ............................................................................... 1579

Alissa L. Russ ; Laura G. Miliotello ; Peter Glassman ; Karen J. Arthur ; Alan J. Zillich ; Michael Weiner

The Impact of Nurses’ Graph Literacy and Numeracy on Comprehension of Visualized Feedback Information .................................................. 1580

David Russell ; Nicole Onorato ; Yoland Barron ; Jacqueline Merril ; Dawn Dowding

MyHealthKeeper: A Pilot Study for Personal Health Record Based Healthcare Management ......................................................... 1581

Boram Ryu ; Sosyong Yoo ; Eunyoung Yeo ; Sookyoung Ji ; Yu jung Kim ; Jeongik Lee ; Jeong-won Kim

Using Patient Photos to Reduce Wrong-Patient Order Entry: Providers’ Perspective ............................................................................ 1582

Hojjat Salmasian ; Jason Adelman ; Robert A. Green ; David Vasilyev

A Comparative Model of Participatory User Centered Design Methods (pUCD) for Adolescent Health Technologies ......................................................... 1583

Srivara Sangasumerwaran ; Cynthia LeRouge ; Anne M. Turner ; Torree Malasanos

Use of a Web-based Survey to Identify Symptom Frequency and Intensity Reporting of Persons Living with HIV with HANA Conditions .................................................................................................................. 1584

Rebecca Schnall ; Sabina Hirshfield ; Karolynn Siegel ; Lena M. Milian ; Heidi Castillo ; Hwayoung Cho

Usability Evaluation of an Evidence-based Dental Patient Case Simulator .......................................................................................... 1585

Kelsey M. Schweiz ; Kate L. Thomas ; Vijayakumar Thirumalai ; Chris Enstad ; Kim Johnson ; Andrew Schmidt ; Olga Godlevsky ; Neil Johnson ; William Rush ; Amit Acharya

An Evaluation of ‘Definite’ Anaphylaxis Drug Allergy Alert Overrides in Both Inpatient and Outpatient Settings .................................................. 1586

Diane L. Seger ; Sarah P. Sligl ; Elizabeth R. Silvers ; Mary Amato ; Julie M. Fiskio ; Adrian Wong ; Patrick E. Beeleer ; David Bates
RuSH: a Rule-based Segmentation Tool Using Hashing for Extremely Accurate Sentence Segmentation of Clinical Text

Disease Connections at RGD

Mary Shimoyama; Stanley Landerlenderkind; Jeff De Pons; Marek Tatuj; Victoria Petri; G. Thomas Hayman; Shur-Jen Wang; Rajni Nigam; Jennifer R. Smith; Jyothi Thota; Omid Ghiassvand; Melinda Dwinnell

Comprehensive Evaluation of Univariate and Multivariate Distributions for Machine Learning With Microbiome Data

Comparing Clinical Decision Support of a Homegrown Versus a Vendor Electronic Health Record System

Elizabeth R. Silvers; Diane L. Seger; Adrian Wong; Mary G. Amato; Sarah P. Slight; Patrick E. Beeler; Julie M. Fiskio; David Bates

Practical Use of Common Data Elements in a Metadata-driven Clinical Trial Management System

Murali Sircun; Mark McDonald; Tammy Yokum; Janice Lee

Developing an Electronic Health Record-Based Cohort of Patients with Inflammatory Bowel Diseases for Observational Patient-Centered Outcomes Research

Sidharth Singh; Paulina Paul; Chun-Nan Hsu; Lucila Ohno-Machado

Pilot Evaluation of a Mobile Application to Reduce Congestive Heart Failure Readmission: The HealthPal Project

Minal A. Singhee; Rema Padman; Sriiram Iyengar; Daniel Gartner; Robert Monte; Ashley Ketterer; Brianna Scott; Angelo Batecchi

Tracking Risk of Acute Mental Status Change in VA Hospitals

Sancy L. Slager; Bryan Gibson; Teresa Tafj; Nancy Suggers; Lacey Lewis; Charlene Weir

A Literature Review of The Approaches Used to Train Qualified Prescribers to Use Computerized Provider Order Entry Systems

Sarah P. Slight; Katie Reygade; Ann Sloc; Jamie J. Coleman; Sarah K. Pontefract; David Bates; Andrew K. Husband; Neil Watson; Clare L. Brown

Needs Assessment: A Subscription-based Laboratory Notification System

Paulina Sokolow; Katrina Radhakrishnan; Edgar Chu

eMeasure Certification: Validating Logic for Electronic Clinical Quality Measure (eCQM) Reporting

Anne Marie Smith; Ben Hamlin

Human Factors Analysis of Look-Alike/Sound-Alike Medication Errors

Katriona H. Smith; Aaron Z. Hettinger; Allan Fong; Maryann Amishahi; Grace Tran; Erica Savage

Categorization of Patient Health Goals Elicited During Home Care Admission

Paulina Sokolow; Katrina Radhakrishnan; Edgar Chu

Health Reform in Minnesota: An Analysis of Complementary Initiatives Implementing Electronic Health Record Technology and Care Coordination

Karen L. Soderberg; Srirajy Rajaman; Douglas R. Whosley; Martin LaVenture

Asthma Ascertaining NLP System Portability Across Institutions

Sunghwan Sohn; Yanzhan Wang; Chung-II Wi; Elizabeth A. Krusemark; Euijung Ryu; Mir H. Ali; Young J. Juhn; Hongfang Liu

Automated Extraction of Disease Activity Component Measures From Electronic Medical Records Using Natural Language Processing

Brett R. South; Shibhiti Mecotra; Jianwei Leng; Sophia Liu; Brian Sauer; Grant Cannon

Contrasting Autism Subgroup Genotypes Using Frequent Pattern Mining

Matt Spencer; Chi-Ren Shyu

Smartphones’-OS Apps and Medical Disciplines serving Mobile-Health

Basilix Spyropoulou; Maria Bania; Irini Maht; Stavros Theofanis Milios; Georgios Tziokas; Kostas Proestos; Iliana Gerasou; Manolis Kapersanos

Analyzing Similarities in Handoff Communication Content Between Residents and Nurses

Vignesh Sinivasan; Thomas Kannamappill; Trevor Cohen; Joanna Abraham

Most Common Allergen Terms in the Departments of Defense and Veterans Affairs: Developing a Baseline Set of Allergen Terms for the C-CDA Using RxNorm "Ingredient" Level Abstraction

Karl J. Stiller; David Parker; Brett Marquard; Adam Chiosa; Michael Lincoln; Archie Bockhorst; Albert Bonnema; Steven Kator; Norman Stone

Is More eHealth System Use Better for Cancer Patients and Family Caregivers? A Literature Review

Wu-Chen Su; Ming-Yuan Chih


Katherine A. Svard; Alex A. Bui; Jone-Luis Ambite; Michael Dellarco

Never-Ending Medical Learning

Douglas A. Talbert; William Eberle; John Hurdle

Fibit™ Fitness Tracking Ease of Use and Utility: Preliminary Findings for Potential Use in Clinical Care

David P. Taylor; Nathan C. Huie; Chaitanyak M. Myman; Bhuu Iyer; Matthew Eberth; Jason Gagner; Peter J. Hang

Relieving Operational Burdens of Participants in Inter-organizational Care Coordination

Sidney N. Thornton; Shan He; Iona M. Thraen; Deepshi Rajeev

Development of Test Topics for Cohort Identification

Tamar Timmons; Stephen Wu; William R. Hersh

Real-Time Patient Satisfaction Surveys via an Emergency Department Portal

Marc Tobias; Julie Westover; Joseph Zorc

Operationalizing Best Practice for First Follow-up Visit after Discharge from a Well-Baby Nursery

Michael Tote; Catherine J. Staes; Julie Shakti
Development of a Case Definition for Emergency Department Visits Attributable to Life-Threatening Aortic Dissections ................................................................. 1615

Logical Rules for the Automated Ordering of Isolation Precautions .......................................................................................................................... 1616

Intravenous Immunoglobulin Stewardship Using an Electronic Tool ...................................................................................................................... 1617

Feature Engineering Alternatives for Natural Language Phenotype Classifiers ........................................................................................................ 1618

Implementation Strategies to Address Information-related Barriers for Community Pharmacies Participating in a Statewide Pharmacy Care Management Network .............................................................. 1619

Understanding Technology Requirements to Support Chronic Disease Care: The Longitudinal Care Plan Cycle .......................................................... 1620

Complications ................................................................................................................................................................................................ 1621

E-prescriptions and Problem Lists: Looking for Indications Using the Open-Source MEDI Medication-Indication Modifying a Case Report Form to Collect Anonymous and Consistent Data Getting to the Right ICD-10 Code: A Multifaceted Approach ...................................................................................................................................................... 1622


Planning a Learning Health System Evaluation: The Multiple Sclerosis Partners Advancing Technology and Health Solutions (MS PATHS) Initiative ..................................................................................................................................................................................... 1624

Cajun Codefest 4.0 on SMART-on-FHIR apps for Diabetes ........................................................................................................................................... 1625

Auditing Tree-like Organ Systems in the Fma Using Network Motifs.................................................................................................................................................. 1626

Medication Recommendation for Chronic Diseases with Comorbidities Using Electronic Medical Records ..................................................................... 1627

Discovering Associations between Problem List and Practice Setting ........................................................................................................................ 1628

Personal Health Record Self-Scheduling by Patients Decreases No-Show Rates and Operational Efficiency in Primary Care and Specialty Follow-Up Visits ........................................................................................................................................................................ 1629

Export Data from i2b2 Using the New Download Data Web Client Plugin .............................................................................................................................................. 1630

Finding Evaluation Frameworks for Complex Health IT Implementations ........................................................................................................................................ 1631

Finding Evaluation Frameworks for Complex Health IT Implementations .................................................................................................................. 1632

Using Semantic Groupings to Support Clinical Trial Medical Condition Search: A Case Study on Diabetic Complications ..................................................................................................................................................................................... 1633

A Study of Active Learning for Document Selection in Clinical Named Entity Recognition ........................................................................................................................................................................ 1634

Using the Hierarchical Structure of the Medical Subject Headings (MeSH) for Automatic MeSH Term Assignment ........................................................................................................................................... 1635

Use of an Interface Terminology for Evaluating Terminology Coverage for a Clinical Decision Support System ........................................................................................................................................................................ 1636

ItRunsInMyFamily Social Network for Family Health History: Project Update ........................................................................................................................................................................ 1637

Improving the Workflow of Curbside Consultation by Using Unstructured Clinical Notes - a Natural Language and Machine Learning-based Approach ........................................................................................................................................................................ 1638

Patient Preferences for Visualizing Possible Outcomes of Breast Reconstruction ........................................................................................................................................................................ 1639

Getting to the Right ICD-10 Code: A Multifaceted Approach .................................................................................................................................................................................. 1640

Modifying a Case Report Form to Collect Anonymous and Consistent Data ........................................................................................................................................................................ 1641

Towards A Better Cancer Care Through The Use Of A Chemotherapy Ordering Information System: Transferrable Lessons Learnt ........................................................................................................................................................................ 1642

E-prescriptions and Problem Lists: Looking for Indications Using the Open-Source MEDI Medication-Indication Matching Resource ........................................................................................................................................... 1643
Effect of Alcohol Prohibition on Drug-related Mortality .......................................................... 1644
James A. Woodward ; Ray H. Hylock ; Qiang Wu ; Xiaoming Zeng

Restoring Line Breaks in Epic-Derived Clinical Notes ................................................................. 1645
Stephen T. Wu ; Allison Stiler ; Meikun Wang ; Tamara Timmons ; Steven Bedrick

What Can Neural Networks Learn from Unlabeled Clinical Narratives? ..................................... 1646
Yonghui Wu ; Jun Xu ; Yaoyun Zhang ; Hua Xu

Diabetes Self-Management Applications: Focus Group Findings from Elderly Diabetic Patients ...... 1647
Qing Ye ; Suzanne A. Boren ; Uzma Z. Khan ; Min Kim

A Review of Mobile Phone-based Interventions and Applications for Medication Adherence ...... 1648
Po-Yin Yen ; Jessica Garvey Smith ; Michelle P. Zhou ; Megan Chamberlain ; Niaoman Ji ; Albert M. Lai

Vision-Based Hand Hygiene Monitoring in Hospitals ................................................................. 1649
Serena Yeung ; Alexandre Alahi ; Albert Haque ; Boya Peng ; Zelun Luo ; Amit Singh ; Terry Platchek ; Arnold Milstein ; Fei-Fei Li

Annotation of Tumor Reference Resolution and Tumor Characteristics for Cancer Liver Stage Prediction ................................................................. 1650
Wen-wen Lin ; Tyler Deman ; Sharon W. Kwan ; Melita Yettoen

Visualization of Topics from Twitter and Focus Groups as the Foundation for Insights about Dementia Caregiving ................................................................. 1651
Sunmoo Yoon ; Nurka M. Suero-Tejeda ; Blake Hunter ; Suzanne Bakken

Using Topic Models to Analyze Concepts for New MeSH Terms .................................................. 1652
Zhiguang Yu ; Todd R. Johnson

A Pilot Evaluation of the NIH Common Data Elements for Standardizing the Data Collected in Clinical Research Studies ..................................................................................................... 1653
Marianne Zachariah ; Amanda L. Doe ; Jennifer Imao ; Omotola Ogunyemi ; Liz Y. Chen ; Spencer SootHor ; Kevin Dawson ; Robert A. Jenders ; Douglas S. Bell

Reading Leadership: Improving Participation in an Introduction to Health Informatics Course ...... 1654
Iris Zachary ; Suzanne A. Boren

Answering Patients’ Questions Using Expert-Vetted Online Resources: A Case Study of Diabetes ..................................................................................................... 1655
Yuqun Zeng ; Liwei Wang ; Yanshan Wang ; Dongcheng Li ; Hongfang Li

Data-Driven System for Perioperative Acuity Prediction ............................................................... 1656
Linda Zhang ; Daniel Fabbrini ; Jonathan P. Wanderer

An Integration of Cooperative Learning into Undergraduate Medical Informatics Class with Service Learning Components ..................................................................................... 1657
Jiangyuan Zhou ; Duowei Wang

Extracting Laboratory Eligibility Criteria Data Elements from IRB Protocols Using Natural Language Processing .................................................................................. 1658
Vivienne J. Zhu ; Elizabeth A. Marshall ; Randall Alexander ; Sherly R. Yesudhas ; Leslie A. Lenert

Evaluating Acceptability and Efficacy of Antidepressant Medications using Patients Comments in Social Media ................................................................. 1659
Maryam Zolnoro ; Timothy B. Patrick ; Mike Conway ; Anthony Faiola ; Jake Luo

STUDENT DESIGN CHALLENGE

Personalized Heart Disease Risk Manager: A Tool for Patients and Clinicians to Manage Cardiovascular Risk ................................................................. 1660
Raja A. Cholan ; Jennifer A. Pacheco ; Gene Ren ; Laura Hickerson

CareMax: A Patient-Centric Cancer Treatment Decision and Calendar Tool .................................. 1665
Jared Erwin ; William Kearns ; Wayne H. Liang ; Carolyn Pauize

The SEA: A Self-Experimentation Approach and Learning Health System for Precision Medicine .................................................................................................. 1671
Aly M. Khalifa ; Rosalie Waller ; Jingrui Wen ; Thomas Reese

Breast Cancer Personal Trajectory Tool .......................................................................................... 1677
Anjana Ramnath ; Tim A. Green ; Diana Rickard ; Lincoln Sheets

PreMed: A Collaborative Environment for Precision Medicine Research and Practice ................. 1683
Jianlin Shi ; Lance Pfieger

Leveraging High Patient Information Density: Chronic Disease Monitoring with the Precision Patient Ledger ................................................................................. 1693
Kristen Stevens ; Vincent Caruso ; Geoffrey Schau ; Matthew Sandling

Obesity Tracker Application: Mobile Health for Obesity in Children ......................................... 1698
Nattapon Thantintorn ; Pongkamon Krasanabud ; Pericles S. Giannaris

SocialVue: Making Social Determinants of Health Visible in the EHR ........................................ 1703
Dana Womack ; Steven R. Chamberlin ; Ian T. Stavros

STUDENT PAPER

Content and Quality of Free-Text Occupation Documentation in the Electronic Health Record ........ 1708
Ranyah Aldekhyyel ; Elizabeth S. Chen ; Sripriya Rajamani ; Yan Wang ; Genevieve B. Melton

SMASH: A Data-driven Informatics Method to Assist Experts in Characterizing Semantic Heterogeneity Among Data Elements ................................................................. 1717
Rebecca A. Marmor ; Elizabeth Epstein ; Meera Reghunathan ; Mitchell Boldin

Affirming Proposed Variable Relationship Patterns in a Conceptual Nursing Model by Converting Qualitative Data to Causal Loop Diagrams ......................................................... 1727
Jennifer A. Browne
Multi-Trajecotry Models of Chronic Kidney Disease Progression .................................................................................................................. 1737
PREMIX: PRIVacy-preserving EstiMation of Individual admiXture ........................................................................................................... 1747
Drug/Side-effect Relationships
PREMIX: PRIVacy-preserving EstiMation of Individual admiXture

Data Driven Approach to Burden of Treatment Measurement: A Study of Patients with Breast Cancer ........................................................................................................ 1756

Alex C. Cheng ; Mia A. Levy

An Empirical Study for Impacts of Measurement Errors on EHR based Association Studies ........................................................................................................................................................................ 1764

Rui Doan ; Ming Cao ; Tonghui Wu ; Jing Huang ; Joshua C. Denny ; Hua Xu ; Yong Chen

Supporting Common Ground Development in the Operation Room Through Information Display Systems ........................................................................................................... 1774

Yuanyuan Feng ; Helena M. Mentois

Exploring Dynamic Risk Prediction for Dialysis Patients ................................................................................................................................. 1784

Travis R. Goodwin ; Sandra M. Harabagiu

Multi-modal Patient Cohort Identification From EEG Report and Signal Data ................................................................................................................................. 1794

Assessing Patient and Caregiver Needs and Challenges in Information and Symptom Management: a Study of Primary Brain Tumors ................................................................................................................................................................. 1804

Ze He ; Jenna Marquard ; Elizabeth Hemmeman

Model-Guided Design and Development of an Electronic Health Record Training Program ................................................................................................................................. 1814

Accelerating Chart Review Using Automated Methods on Electronic Health Record Data for Postoperative Complications ................................................................................................................................. 1822

Ensembles of NLP Tools for Data Element Extraction from Clinical Notes ................................................................................................................................. 1880

Parental Perceptions, Experiences, and Desires of Music Therapy ................................................................................................................................. 1870

Karrue Karahalios

Development of a Novel Markov Chain Model for the Prediction of Head and Neck Squamous Cell Carcinoma ................................................................................................................................................................. 1832

Dissemination

Hyunggu Jung ; Anthony Law ; Eli Grunblatt ; Lucy L. Wang ; Aaron S. Kusano ; Jose Mejino ; Mark Whipple

A Novel Schema to Enhance Data Quality of Patient Safety Event Reports ................................................................................................................................. 1840

Hong Kang ; Yang Gong

Public Health Data for Individual Patient Care: Mapping Poison Control Center Data to the C-CDA Consultation

Note

Improving Prediction for Depression Via Elastic Net Regression - Results from Korea National Health Insurance Services Data ................................................................................................................................................................. 1850

Parental Perceptions, Experiences, and Desires of Music Therapy

Ensembles of NLP Tools for Data Element Extraction from Clinical Notes

Parental Perceptions, Experiences, and Desires of Music Therapy

Literature-Based Discovery of Confounding in Observational Clinical Data

Adoption of Secure Messaging in a Patient Portal Across Pediatric Specialties


Healthcare Data Analytics for Parkinson’s Disease Patients: A Study of Hospital Cost and Utilization in the United States

Medication Harmony: A Framework to Save Time, Improve Accuracy and Increase Patient Activation

Use of a Patient Portal During Hospital Admissions to Surgical Services

Characterization of Temporal Semantic Shifts of Peer-to-peer Communication in a Health-related Online Community: Implications for Data-driven Health Promotion

A Social Network Analysis of Cancer Provider Collaboration

Baby Steps Text: Feasibility Study of an SMS-Based Tool for Tracking Children’s Developmental Progress

Evaluating a Novel Summary Visualization for Clinical Trial Reports: A Usability Study

Maurine Tong ; William Hsu ; Ricky K. Taira
Nurse Informaticians Report Low Satisfaction and Multi-level Concerns with Electronic Health Records: Results from an International Survey ........................................................................................................................................2016
Maxim Trupaz ; Charlene Ronquillo ; Laura-Martina Pellenom ; Martha K. Badger ; Samira Ali ; Adrienne Lewis ; Mattias Georgsson ; Eunjoo Jeon ; Jude Tuyabon ; Chi-Hsing Kuo ; Tasneem Islam ; Janine A. Sommer ; HyunSung Jang ; Gabrielle Jacklin Elter ; Dari Alhewaid ; Ying-Li Lee

Why Aren’t They Happy? An Analysis of End User-satisfaction with Clinical Information Systems ........................................................................................................................................2026
Prasad Umesh ; Catherine J. Staes ; Howard Weeks ; Heidi Kramer ; Damian A. Borbolla ; Stacey Stiger ; Teresa Tiuf ; Vaidalami Chakraburmi ; Charlene Weir

Learning Effective Treatment Pathways for Type-2 Diabetes from a Clinical Data Warehouse ........................................................................................................................................2036
Rohit Vashisht ; Ken Jung ; Nigam Shah

Clinical Word Sense Disambiguation with Interactive Search and Classification ........................................................................2062
Yue Wang ; Kai Zheng ; Hua Xu ; Qiaoqiu Mei

Representing Residence, Living Situation, and Living Conditions: An Evaluation of Terminologies, Standards, Guidelines, and Measures/Surveys ......................................................................................2072
Tamaras J. Winden ; Elizabeth S. Chen ; Genevieve B. Melton

Evaluating Terminologies to Enable Imaging-Related Decision Rule Sharing ..................................................................................2082
Zibao Yan ; Bonilida Lacson ; Vlad Faltecen ; Ivan Jp ; Ali S. Baja ; David Osterbar ; Ram ; Khurani

Factors Contributing to Dropping-out in an Online Health Community: Static and Longitudinal Analyses ........................................................................2090
Shaoqian Zhang ; Noemie Elhadad

DCDS: A Real-time Data Capture and Personalized Decision Support System for Heart Failure Patients in Skilled Nursing Facilities ..................................................................................................2100
Wei Zhu ; Lingyun Luo ; Tarun Jain ; Rebecca S. Boxer ; Licong Cui ; Guo-Qiang Zhang

SYSTEMS DEMONSTRATION

Improving Veterans Access to Care through Telehealth and Local Fire Departments ........................................................................2110
Hamed Abbaspourzadeh ; Umair Iqbal ; J Edward Maddela ; Manolo Moneda ; Shashik Rehman

CareSign Live Upgrading from Outdated Paper Handoffs to Real-Time, Interdisciplinary Handoffs ........................................................................2111
Subha Atri ; Jacqueline M. Soegaard Ballester ; Juliana Olsen ; Geoffrey Bass ; Damien Ler ; Glenn Fala ; Rich Urbani ; William Hanson

Assessment Center API: A Software Component Model for the Integration of Patient Reported Outcomes (PRO) into Clinical Care ........................................................................................................2112
Michael Bass ; Rob J. Taylor ; Justin Starren ; Joshua T. Spuhl ; Jimmy Johnson ; Jason Guattery

Integrating a Dialogue System into a Virtual Patient Consultation ..........................................................................................2113
Leandros Campilos-Abro ; Dhohou Bouamor ; Eric Bilinski ; Anne-Laure Ligeon ; Sophie Rosset ; Pierre Zweigenbaum

ExploreLayout: Comprehending Patient Subgroups in Large Networks ..........................................................................................2114
Bryant Dang ; Joseph Mathew ; Tianlong Chen ; Suresh K. Bhavnani

Automated Evaluation and Training for Interprofessional Education using Virtual Patients and Providers ........................................................................2115
Debashis Datta ; Valentina Brahm ; John Owen ; Casey White ; Laura Barnes

Tireias: Knowledge Engineering and Large-Scale Machine Learning for Interpretable Drug-Drug Interaction Prediction ..........................................................................................................................2116
Michael E. Matheny ; Dax M. Westerman ; Laura Pearlman ; Josh Gieringer ; Xiaqian Jiang ; Claudia Carac ; Tara K. Knight ; Shuang Wang ; Amy Perkins ; Lucila Ohno-Machado ; Bill Clarke ; Daniele Meeker

DOT, An Interactive Reporting Dashboard for Visualization of Order Set Development and Utilization Patterns Across an Enterprise ..................................................................................................2117
Nathan C. Hulse ; Jackieh Ong ; Tim Borgeson

Demonstration of GuideVueMobile Clinical Guideline Technology ........................................................................................................2118
M Sribam Iyer ; Joe F. Flores-Arango ; Jack Smith

SMART on FHIR Platform for Interoperable Healthcare Applications ........................................................................................................2119
Joshua Mendel ; Daniel Gottlieb ; Daniel S. Fristech ; Kenneth D. Mundy

Michael E. Matheny ; Dax M. Westerman ; Laura Pearlman ; Josh Gieringer ; Xiaqian Jiang ; Claudia Carac ; Tara K. Knight ; Shuang Wang ; Amy Perkins ; Lucila Ohno-Machado ; Bill Clarke ; Daniele Meeker

Beyond SMART: Remote Decision Support with CDK Hooks ........................................................................................................2121
David McClellan, Jr. ; Scott P. Narus ; Kevin Sleekton ; Perry Grinn Marshall

CEDAR: Better Data Sharing Through the Authoring of Better Metadada ........................................................................................................2122
Mark A. Musen ; Martin J. O’Connor ; Marcos Martinez-Romero ; Attila Levente Egyedi ; Debra Willrett ; John Graybeal

VA’s New Electronic Health Management Platform (eHMP): Novel Features for Activity Management and Notifications ..............................................................................................................................2123
Jonathan R. Nebecker ; Shane McNamee ; David Douglas ; James L. Hellewell ; Kristian Johnson ; Jessica Murphy ; Ron Moody ; Charlene Weir

iCONCUR: informed CONsent for Clinical data and biosample Use for Research ..................................................................................2124
Lucila Ohno-Machado ; Hyoeneui Kim ; Elizabeth Bell ; Xiaqian Jiang ; Dexter Friedman ; Claudia Carac

The MobiGuide Distributed & Personalized Patient Guidance System ........................................................................................................2125
Mor Peleg ; Yuval Shahar ; Silvana Quaglioni
The Consent, Contact and Community Framework for Patient Reported Outcomes: Connecting ResearchKit to the Health System with FHIR

Bridging the Gap Between Public Health and Clinical Provider: The PHRASE Interoperable Platform for Improving Decision Support

LHC-Forms and Related Widgets for Capturing and Tuning Health Data

Development of DataMed, a Data Discovery Index Prototype by bioCADDIE: Laying the Groundwork for Biomedical Data Discovery

Author Index