HF-related chart reviews and for possible early detection of HF. In addition, the integrated NLP components and our validation methodology can be adapted for application beyond HF.

Keywords: Natural Language Processing; Early Detection; Health Informatics

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CB4-03:

An Eye on the Future: A Review of Data Virtualization Techniques to Improve Research Analytics

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Background/Aims: Integrating data across systems can be a daunting process. The traditional method of moving data to a common location, mapping fields with different formats and meanings, and performing data cleaning activities to ensure valid and reliable integration across systems can be both expensive and extremely time consuming. As the scope of needed research data increases, the traditional methodology may not be sustainable. Data Virtualization provides an alternative to traditional methods that may reduce the effort required to integrate data across disparate systems. **Objective:** Our goal was to survey new methods in data integration, cloud computing, enterprise data management and virtual data management for opportunities to increase the efficiency of producing VDW and similar data sets. **Methods:** Kaiser Permanente Information Technology (KPIT), in collaboration with the Mid-Atlantic Permanente Research Institute (MAPRI) reviewed methodologies in the burgeoning field of Data Virtualization. We identified potential strengths and weaknesses of new approaches to data integration. For each method, we evaluated its potential application for producing effective research data sets. **Results:** Data Virtualization provides opportunities to reduce the amount of data movement required to integrate data sources on different platforms in order to produce research data sets. Additionally, Data Virtualization also includes methods for managing “fuzzy” matching used to match fields known to have poor reliability such as names, addresses and social security numbers. These methods could improve the efficiency of integrating state and federal data such as patient race, death, and tumors with internal electronic health record data. **Discussion:** The emerging field of Data Virtualization has considerable potential for increasing the efficiency of producing research data sets. An important next step will be to develop a proof of concept project that will help us understand to benefits and drawbacks of these techniques.

Keywords: Data Virtualization; Technology; Health Informatics

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CC1-01:

A Simulated Diabetes Learning Intervention Improves Provider Knowledge and Confidence in Managing Diabetes

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Background/Aims: Provider performance on diabetes measures is variable, and is at least partially due to differences in provider knowledge and confidence in managing patients with diabetes and multiple co-morbidities. **Objective:** To evaluate whether a simulated learning program can improve provider knowledge and self-confidence in diabetes management. **Methods:** 19 primary care residency programs and 341 consented residents were randomized to (a) intervention (177 residents) or (b) control (164 residents) conditions. Intervention subjects were assigned 18 learning cases using SimCare Diabetes, a web-based immersive simulation program that challenges providers to achieve blood sugar, blood pressure, and lipid goals in 6 months of simulated time, as well as to address other issues such as severe obesity and insulin resistance, hypoglycemia, depression, obstructive sleep apnea, and non-adherence. Between simulated encounters with a patient, providers receive personalized feedback on progress to goals and

treatment actions taken or omitted. 92 intervention and 128 control subjects completed a post-intervention follow-up online survey with 10 multiple choice knowledge and 5 self-confidence assessment questions using a 5-point Likert scale (1=not at all confident, 5=very confident). Mean (95% CI) knowledge test and self-confidence measures, adjusting for residency program clustering, were compared by group. **Results:** On knowledge testing, 46% of the intervention group answered more than half the answers correctly compared to 16% of the control group. The mean knowledge score (95% CI) was 5.31 (4.87-5.75) for intervention and 4.1 (3.69-4.50) for control subjects ($p<.001$). Self-confidence measures were higher for intervention compared to control subjects for: use of all available drug classes to manage diabetes (3.64 vs. 3.09, $p<.001$), insulin use (4.12 vs. 3.36, $p<.001$), interpretation of blood sugars (4.21 vs. 3.58, $p<.001$), setting individualized treatment goals (4.06 vs. 3.42, $p<.001$), and overall confidence in managing diabetes (3.97 vs. 3.28, $p<.001$). **Discussion:** An immersive online simulated diabetes learning program was effective at improving knowledge and self-confidence for diabetes management in primary care residents. Support and partnerships to maintain and spread the technology are desirable.

Keywords: Simulated Training; Evaluation; Health Informatics

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CC1-02:

Technological Resources and Personnel Costs Required to Implement an Automated Alert System for Primary Care Physicians When Patients Transition from Hospitals to Home

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Background/Aims: With the adoption of electronic medical records (EMR) by medical group practices, there are opportunities to improve the quality of care for patients who are discharged from hospitals and intermediate care facilities. While transitions within vertically-integrated healthcare systems are amenable to EMR-based transition interventions, there is little guidance for medical groups without integrated hospital-EMR access who wish to automate the flow of patient information during critical transitions in care. Our aim was to describe the technological resources, expertise and time needed to develop and implement an automated system providing critical information and alerts to primary care physicians when their patients transition from hospitals or skilled nursing facilities to home. **Methods:** Within a large medical group practice with an EMR, we developed and implemented an automated alert system that provides notification of discharges, reminders of the need for follow-up visits, new drugs added during the in-patient stay, warnings about drug-drug interactions, and recommendations for dosing changes and laboratory monitoring of high risk drugs. We tracked components of the information system required to accomplish this as well as the time spent by team members. We used US national averages of relevant hourly wages to estimate personnel costs. **Results:** Critical components of the information system are notifications of hospital discharges through an admission, discharge and transfer registration (ADT) interface, linkage to the group practice scheduling system, timely access to information on pharmacy dispensing and lab tests, and an interface engine to direct messages to specific physicians and staff. Total personnel cost was \$76,314. Nearly half (47%) was for 614 hours by physicians who developed content, provided overall project management, and reviewed alerts during a test period to ensure that only “actionable” alerts would be sent. **Discussion:** Implementing a system to provide a flow of critical information about patient transitions requires strong internal informatics expertise, cooperation between facilities and ambulatory providers, development of a number of electronic linkages, and extensive commitment of physician time.

Keywords: Costs; Automated Alert System; Health Informatics

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