PS2-11:

Impact of a Health Information Technology (HIT) Based Intervention to Improve Adherence to Cardiovascular Disease Medications: Early Results from the PATIENT Trial

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Background/Aims: Adherence to certain effective and widely prescribed cardiovascular (CVD) medications is poor. The purpose of this analysis is to demonstrate the effective implementation of a cost-effective and easily disseminable population-level HIT adherence intervention. **Methods:** PATIENT is a pragmatic trial designed to improve adherence to antihypertensives and statins in high-risk patients in three Kaiser Permanente (KP) regions. The 1-year intervention (Dec. 2011-2012) enrolled 21,752 adults, aged 40-80, with diabetes or CVD and at least 1 dispensing of a target medication in the past year (based on pharmacy dispensing data). Participants were randomized to one of 3 arms: usual care (UC), automated telephone reminders (IVR), or an enhanced IVR arm (IVR+) that added mailed educational materials, reminder mailings and live outreach calls to IVR calls. **Results:** Through the first 10 months of intervention we attempted 42,010 automated reminder calls (˜ 2.9 per intervention participant). Of these, 56% (23,596) of calls successfully reached the target participant and an additional 29% (12,271) resulted in messages left. These figures were higher for calls made to those nearly due for a refill (65% and 26% of 20,182) than for calls made to those overdue (48% and 32% of 21,828). Of calls where we reached the participant, 30% resulted in a transfer to the regional pharmacy automated refill line and an additional 2.5% resulted in transfers to a live pharmacist. Among the 7,258 IVR+ patients, 3,748 medication reminder letters were mailed, 2,146 live reminder calls were made, and we have sent 36,823 educational mailings (˜4.9 per participant). Key implementation challenges that emerged related to 1) complexities in coding the intervention call flag algorithm from the EMR and 2) customization of the intervention to fit regional work-flow and support program sustainability. Close partnering with pharmacy staff was crucial in overcoming early hurdles. Outcome data (not yet available) will be presented at the meeting. **Conclusions:** We successfully implemented a large, multi-modal, HIT, medication adherence intervention at 3 KP regions. A high proportion of members were reached and actively participated in the intervention. Key challenges/solutions are detailed in a manual of operations to facilitate the implementation of similar interventions in other settings.

Keywords: Medication Adherence; Comparative Effectiveness Research; Automated Phone Calls

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PS2-12:

The Usability of the SPAN Distributed Research Network Menu-Driven Interface

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Background/Aims: Distributed research networks (DRNs) represent a mechanism by which electronic health care data can be securely shared and analyzed across multiple sites. DRNs may feature a menu-driven interface that allows researchers to query structured data sets that reside behind each participating site's firewall. These queries return aggregated data tables that contain simple frequencies, such as the number of patients by age, gender, diagnosis, treatment or procedure. It is hypothesized that researchers would use a menu-driven interface to conduct preparatory-to-research queries for power analyses that require data from multiple sites. The objective of this study was to evaluate the usability of a menu-driven interface developed for the Scalable Partnering Network for Comparative Effectiveness Research (SPAN). **Methods:** To evaluate the functionality of the SPAN menu-driven interface, we conducted twelve 90-minute usability testing sessions with researchers from 4 SPAN sites. In each testing session, the user was asked to perform sample queries prepared by the research team. As the user performed a sample query, a moderator asked questions about the functionality of the interface. At the end of each testing session, user satisfaction was also measured with the System Usability Scale (SUS), a widely used survey tool for quantifying subjective assessments of usability. The usability testing sessions were audiotaped and analyzed using standard qualitative coding techniques. **Results:** In general, users thought the interface would be a useful and efficient tool for conducting multi-site preparatory-to-research queries. Users also found the layout of the interface to be logical, easy to navigate and visually pleasing. Some investigators claimed they would use the tool themselves, while others would go through an analyst. Some users expressed concern that the interface was a "black box," where they did not have enough information about the nuances of the underlying data. There were several requests to increase the interface's functionality, such as incorporating denominator data to calculate rates. The mean SUS score was 77.7, which indicates an above average level. **Conclusions:** The SPAN menu-driven interface performed well in testing and appears to be a useful tool for multi-site research. Future enhancements are being considered.

Keywords: Distributed Research Network; Menu-Driven Query Tool; Preparatory to Research

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PS2-21:

Extracting Signs and Symptoms from Colonoscopy Reports Using NLP

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Background/Aims: The overarching goal of the Studying Colorectal Cancer: Effectiveness of Screening Strategies (SuCCESS) project at Group Health (GH) is to develop evidence to inform personalized colorectal cancer (CRC) screening recommendations. Specifically, we aim to study the comparative effectiveness of screening as practiced, evaluate the potential for personalizing screening and surveillance recommendations, and model the long-term comparative effectiveness of screening in a cohort of GH members enrolled between 1993 and 2015. To accomplish these goals, we used Natural Language Processing (NLP) to collect detailed information from colonoscopy reports in GH's electronic medical record (EMR). Specifically, we extended an existing NLP system to identify whether signs or symptoms related to CRC were reported at the time of colonoscopy. **Methods:** To prepare the NLP system to process all colonoscopy reports available in the EMR during the study period, we used a development set of 248 documents. The reports were randomly selected from colonoscopies performed in 2011 for which there was a corresponding pathology report on the same day. Trained medical record reviewers created the development set gold standard. The NLP system, developed in GATE (an open source text processing architecture), was an extension of a system created by Harkema et al. that used MetaMap as a resource to process all documents before sending the appropriate reports through a set of colonoscopy extraction rules. Colonoscopy results were consolidated by a post-processing and evaluation tool written in Python by the authors. **Results:** The system performed admirably on CRC signs and symptoms. Aggregate sensitivity and specificity were 0.885 and 0.980, respectively, and positive predictive value (PPV), or precision, was 0.826, resulting in an F-score of 0.855. **Conclusions:** In order to execute the SuCCESS project's ambitious research aims we need high-quality data from tens of thousands of colonoscopy procedures. This information is not captured in a structured way in GH's EMR, and manual abstraction of this information is not feasible, but our results show that NLP can reliably extract detailed information from the text reports. Future work includes improving the system's precision, extracting patient and family history, and extracting results from the associated pathology reports.

Keywords: Colorectal Cancer; Natural Language Processing; Information Extraction

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