PS3-52:

Heart Health in Your Pocket: Lessons Learned from the Development of a Smartphone App

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Background/Aims: As part of the Million Hearts national initiative to prevent cardiovascular disease (CVD), there are increasing calls to leverage health information technology. The Marshfield Clinic developed a Heart Health Mobile application (app) that is designed to improve awareness of CVD risk and promote risk factor control among regional smartphone users. It deploys an engaging user interface that provides a brief CVD risk assessment that takes into account self-reported behavioral, familial, and biometric risk factors, including blood pressure and lipids. Users are then directed to nearby community pharmacies, clinics, and other locations where more advanced CVD risk factor screenings can be obtained. Along with social media connections and measurement prompts, basic education materials are provided on key CVD prevention topics such as hypertension, dyslipidemia, weight management, and tobacco cessation. **Methods:** A multidisciplinary team of 24 members was created to develop the app over a 30-day timeframe. This team included a broad cross-section of clinical professionals from medicine, epidemiology, health IT, usability and graphic designers, business analytics, and marketing. An Agile programming method was used to promote adaptive planning and evolutionary development in self-organizing, cross-functional teams. **Results:** The iOS app was successfully developed, tested, and launched within the 30-day timeframe. It was submitted competitively as part of the Million Hearts Risk Check Challenge, a CVD prevention app contest sponsored by Office of the National Coordinator for Health Information Technology. The final product is shown in detail at <http://www.youtube.com/watch?v=qfESTQipjtw>. The app was developed in six different languages, and epidemiologic data on downloads, unique users, geo-segmentation, risk factor profile, and customer loyalty, among other data points, are actively collected. **Conclusions:** Health-related consumer smartphone apps can be developed rapidly and brought to scale as part of healthcare delivery systems' business and clinical strategies. They provide users with important information, education, and directions on CVD prevention and have wide-ranging potential across numerous health conditions. From an HMORN perspective, such apps also provide real-time data collection methods that can be used to identify health trends at a lower cost (and comparable quality) relative to traditional population research methods.

Keywords: Cardiovascular Disease; Prevention; Smartphone
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PS3-53:

A Multi-Site Comparison of Laparoscopic Gastric Band vs. Laparoscopic Gastric Bypass Bariatric Surgical Procedures

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Background/Aims: The two most common bariatric surgical procedures are laparoscopic gastric band (LAGB) and laparoscopic gastric bypass (RYGB). Single site comparisons suggest that RYGB may result in greater weight loss at the expense of more short-term complications, whereas LAGB may be associated with less weight loss and more long-term complications. It is unclear whether these results extend to other populations. **Methods:** This is a multi-site retrospective cohort investigation of LAGB vs. RYGB. Outcomes are: 30-day operative complications; rehospitalization at 1 and 2 years; and weight loss at 2 years. Multivariable logistic regression, Cox proportional hazards, and repeated measures will be used to assess outcomes as a function of type of surgery. **Results:** From 2005–2009, there were 1,521 LAGB and 5,963 RYGB procedures at 11 sites. Mean pre-surgical BMI was 42.6 and 44.6, and mean age was 47.0 and 45.8 for each procedure respectively.

RYGB patients were more likely to have diabetes, hypertension, gastric reflux, and sleep apnea. RYGB patients had more commercial insurance (89% vs. 72%), were less likely to be Caucasian (67% vs. 73%), and were 84% (vs. 82%) female. Results at 30-days for LAGB vs. RYGB respectively were: Failure to discharge, 0 (0%) vs. 8 (0.1%); mortality, 0 (0%) vs. 1 (0.02%); thrombotic diagnoses, 6 (0.5%) vs. 63 (1.1%); and reintervention, 10 (0.9%) vs. 30 (0.5%). Mean long-term follow-up BMI was 37.2 for LAGB and 33.3 for RYGB. All differences were statistically significant at $P = 0.05$ in bivariate models. **Conclusions:** Across multiple sites, individuals with higher BMI and morbidity burden were more likely to receive RYGB surgery. Preliminary results suggest that long-term weight loss and certain short-term complications are significantly greater for RYGB than LAGB procedures, and that LAGB procedures are more likely to have 30-day reintervention. Multivariable comparisons adjusting for pre-operative covariates and follow up time will better clarify risks and benefits of these procedures.

Keywords: Obesity; Bariatric Surgery

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PS3-54:

Effect of Bariatric Surgery on Chronic Use of Opioid Medications

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Background/Aims: Opioids are used to manage chronic painful conditions associated with obesity. It is unknown whether weight loss attained after bariatric surgery results in a change in chronic opioid use and if so, over what timeframe. We explored the effect of bariatric surgery and associated weight loss on chronic opioid use. **Methods:** This retrospective cohort study included patients from ten Scalable Partnering Network for Comparative Effectiveness Research (SPAN) sites who had bariatric surgery between 1/1/2005 and 12/31/2009. Patients had health plan enrollment and a drug benefit during the year before and after surgery. Patients were classified based on total oral or transdermal opioid days' supply dispensed during the year prior to surgery as having no, some, or chronic use. To assess change in opioid use in the year following surgery relative to the year prior to surgery, total opioid use for each user was determined using morphine equivalents. Dispensings within 30 days post-surgery were excluded. Longitudinal mixed effects models were used to assess change in morphine equivalents dispensed before/after surgery. **Results:** The cohort included 11,719 patients. Overall, 1016 had chronic opioid use in the year before surgery and 1222 had chronic opioid use in the year after surgery. Of the chronic users pre-surgery, 760 (74.8%) remained chronic users post-surgery. Of the 10,703 with some or no opioid use pre-surgery, 462 (4.3%) became chronic users post-surgery. The most commonly dispensed opioids were hydrocodone combinations, oxycodone, and codeine combinations. Among pre-surgery chronic users, median daily morphine equivalents increased from 22.36 pre-surgery to 25.22 post-surgery (paired sign test $P < .0001$). **Conclusions:** During the year after bariatric surgery opioid use appears to increase in the overall bariatric surgery population or in those with pre-surgery chronic opioid use. Longer timeframes should also be evaluated.

Keywords: Bariatric Surgery; Opioid; Pain

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PS3-55:

Utilization of High-Technology to Collect Health Risk Assessment Information from Medicare Members: A Feasibility Study of Interactive Voice Response (IVR) and an Online Survey Tool

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Background/Aims: Kaiser Permanente (KP) has been working to develop a standardized approach to preventive care for Medicare members that includes completion of a Total Health Assessment questionnaire to provide data that the patient's health care team can use to generate a personal prevention plan as part of an Annual Wellness Visit. In order to minimize the

need for clinic staff to enter data into the EMR and to administer the questionnaire orally when the information is needed immediately, we have been evaluating administration using Interactive Voice Response (IVR) and online questionnaire administration. **Methods:** KP members were invited to participate in the IVR or the online pilot. Some IVR participants were asked to complete the Health Assessment prior to a scheduled Wellness Visit and others were invited to test the IVR system at a research facility. Those at the facility were observed and all participants were interviewed immediately after completing it. For the online pilot, members were emailed the survey link and asked to complete the Health Assessment. Once the Health Assessment was submitted, members were interviewed about their experience. **Results:** The majority (80%) of IVR participants reported that it took an acceptable amount of time to complete the Health Assessment. Two-thirds used a handheld telephone but still 75% reported it was “very easy” to respond to the survey. Nearly all could hear the questions clearly and understand the questions and response options. About 50% of members asked were willing to complete the Health Assessment online. All online participants found it easy to access and complete the Health Assessment using a link emailed to them. **Conclusions:** Both IVR and online surveys are viable options for administering a health assessment to senior members. Over half of the test respondents would prefer IVR over other modalities. Members who are comfortable with and have access to a computer in their home often prefer the online modality. Although high-tech modalities are feasible and preferable to a segment of the senior population, other modalities need to be available.

Keywords: Health Risk Assessment; Interactive Voice Response; Medicare
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Virtual Data Warehouse

A4-1:

Evaluation of the Utilization-Based Population Denominators in the HMORN Context

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Background/Aims: Defining a population denominator is a major challenge in practice-based research. Because health plan membership is unknown, population denominators must be determined by alternate methods, e.g., healthcare utilization. Such an approach may introduce bias since the resulting population may only represent a small portion of individuals who are affiliated with a healthcare organization. Moreover, healthcare utilization is often confounded by demographic and socio-economic factors, potentially compounding bias in the population estimates. **Methods:** The majority of HMORN member organizations have health plans, whose enrollment information is captured in the Virtual Data Warehouse (VDW) Enrollment file. The health plan enrollment provides a well-defined population denominator. In order to participate in multi-site research, HMORN member organizations without health plans, such as Essentia Health (EH), need to determine an enrollment proxy. The purpose of this pilot study was to evaluate a utilization-based enrollment proxy algorithm. Four HMORN sites with Epic electronic medical records (three sites with and one site without standard VDW enrollment files) participated in the study. The utilization-based algorithm was applied in two steps: 1) creating the base table from Clarity (Epic) database; and 2) creating the utilization-based enrollment proxy using predetermined selection rules. **Results:** EH implementation of the enrollment proxy for years 2002-2012 contained 390,000 “enrollment” periods for 378,000 unique patients. The EH algorithm was applied to the data from the three sites with health plans; the resulting enrollment proxy files were compared to the standard enrollment files. Patient demographic data (age, sex) and place of residence categorized by rural-urban commuting area (RUCA) codes (urban, large rural, small/isolated rural), as well as race and socio-economic measures (Census file), were used to characterize the deviations between two population denominators. **Conclusions:** The results of this study will inform HMORN researchers about the comparability of the patient populations between standard health plan enrollment and the utilization-based proxy. This study will also evaluate patient characteristics

likely to affect utilization, and therefore, accuracy of the utilization-based proxy as a population denominator. It may also be useful for further development of the algorithm.

Keywords: Virtual Data Warehouse; Enrollment Proxy;
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A4-2:

Complex VDW Queries - So Easy, a PI Can Do It

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Background/Aims: GHRI has created a SAS program that takes all of its input from a configuration file. The configuration file is nothing more than a text file, formatted to easily convey the datasets, variables, and criteria necessary for data extraction. **Methods:** There are numerous benefits of this approach: (1) complex logic can be encapsulated in a single file; (2) extensive comments in the configuration file are allowed; (3) the program is “safe” for multi-site requests; (4) after review, the program does not need to be redistributed, only the configuration file needs to be distributed and reviewed for each request, and it cannot execute without the program that supports it; (5) summary-level datasets with sophisticated criteria can be created; and (6) current summary-level efforts prevent person-level analysis. **Results:** Here is how the program works: The configuration file consists of different sections. The first section tells the program which VDW datasets are to be used. Other sections create criteria for selection and analysis. For example, here are two criteria for diabetes identification.

```
# outpatient criteria
criteria_name=outpatient /
criteria_where=enctype not in (“IP”, “ER”) and (dx
in(‘357.2’, ‘366.41’, ‘362.01’, ‘362.02’, ‘362.03’, ‘362.04’, ‘362.05’, ‘362.06’,
‘362.07’, ‘648.83’) or
substr(dx,1,3) eq ‘250’) /
criteria_keys=dx dx_date /
criteria_data=dx dx_date /
criteria_sort=a /
# lab a1c criteria
criteria_name=lab_a1c /
criteria_where=test_type eq “HGBA1C” and input(result_c, 8.) gt 6.5 /
criteria_keys=test_type result_c lab_date /
criteria_data=test_type result_c lab_date /
criteria_sort=a /
```

Conclusions: Multiple criteria blocks can be assembled to create flags for each person in a cohort. The resulting summary-level dataset can then be used to make determinations based on the absence or presence of particular flags. The criteria blocks use simple boolean expressions and concentrate the “intelligence” of the analysis in one location.

Keywords: VDW; SAS

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A4-3:

Clarity Translation of Chemotherapy Infusion Data

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Background/Aims: The aim is to educate programmers on how to pull chemotherapy infusion data from Clarity. The data are complex, and it can be take a while to learn the Clarity Data model, which can be difficult to understand. At Kaiser Permanente Northern California (KPNC), we developed a smaller model and an easy-to-understand workflow of the data. We would like to share our learnings, including how to link treatment plans, orders, dispensing, and administration together; and our knowledge of how to find completed treatment plans, days and cycles. **Methods:** To demonstrate the method for pulling data, we will show a data diagram with linkages to the different Beacon Clarity tables and a sample SQL explaining some of the filters/business logic and why the linkage must be done a certain way. **Results:** We hope users will find the information from KPNC’s experience useful, and that by the end of the presentation, users will gain a better understanding of how to pull chemotherapy infusion data from Clarity. We