Cancer

A1-1:
Linking Electronic Health Records across Institutions to Understand Why Women Seek Care at Multiple Sites for Breast Cancer

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Background/Aims: Research in a fragmented healthcare system can be challenging when one seeks to follow patients within a care episode. Breast cancer treatment can continue for months or years and a care trajectory may reflect many decisions. Women may seek evaluations or specialty care at more than one medical center, either through physician referrals or “shopping” behavior. Claims data can track where patients are seen, but lack clinical detail. This study aims to better understand treatment location decisions among women seen at more than one healthcare facility. Methods: The OncoShare database combines EHR data from two large healthcare facilities in the same catchment area—a multisite community practice and an academic medical center—for all women treated at either site for breast cancer from 2000-2011. We use descriptive statistics and longitudinal modeling strategies to characterize treatment trajectories and define predictors of treatment facility decisions. Results: In a previous cross-sectional analysis of these data, the 16% of women who received treatment at both institutions had comparable prognostic factors, but far more diagnostic and treatment interventions than those treated at only one facility. We use a longitudinal analysis to characterize the care trajectories of these women, and test predictors of their treatment decisions such as geographic location, previous diagnostic tests performed, and timing of interventions. Conclusions: Preliminary results from this data revealed a marked difference in treatment intensity among women who sought care at both institutions, despite comparable prognoses. The richness of the EHR now allows the extraction of predictors such as patterns of medical care use before the breast cancer diagnosis. Keywords: Breast cancer; Data linkage

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A1-3:
Small-scale Implementation Study of the Cancer Survival Query System

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Background/Aims: The Cancer Survival Query System (CSQS) is a second generation prototype cancer prognostic tool developed by the National Cancer Institute (NCI). It was designed for physicians to use so they could better understand and communicate with prostate and colorectal cancer survivors. Data collected from the one-on-one testing will be used to inform NCI on a patient-facing version of CSQS. Keywords: Prognosis; Web-based

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C1-1:
Evaluation of Screening Colonoscopy per Patient Adenoma Count at a Large New York City Center Using Population-based Data

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Background/Aims: Bowel preparation quality is critical to adequate visualization of adenomas during colonoscopy. We determined the total per person adenoma count (PPAC) in a population undergoing screening colonoscopy during a six month period to assess the utility of this measure as an indicator of bowel preparation quality. Methods: Records of outpatients 50-74 years who had undergone screening colonoscopy between September 1, 2012, and February 28, 2013 were extracted. Excluded were diagnostic and surveillance colonoscopies, pre-surgical assessment for organ transplant, and persons with inflammatory bowel disease, and personal or family history of hereditary non-polyposis colorectal cancer, colorectal cancer or polyps. Colonoscopy and pathology reports were manually reviewed to abstract age, gender, examination date, time of procedure, bowel preparation quality, procedural difficulty and tolerability, and number, type, and size of adenomas. Comparisons between those in whom adenomas were and were not detected were performed and associations between study covariates and adenomas detected were examined using multivariable regression. PPAC and adenoma detection rate (ADR) by level of preparation quality were calculated. Results: Of 1584 colonoscopies identified, 815 (51.4%) were screening colonoscopies and, of these, =1 adenomas were detected in 203 (24.9%). Most patients were <60 years of age (52.5%) and female (57.4%). Bowel preparation quality was “excellent” or “good” for 81.7% of procedures.
Adenomas were more often detected among those ≥60 years (aOR 1.69, 95% CI 1.21–2.36) and males (aOR 1.61, 95% CI 1.15–2.26). The mean PPAC overall was 0.34 (SD 0.68) and was associated with age ≥60 years (P<0.001) and male gender (P<0.001). When analysis was restricted to only those with =1 adenomas, a negative linear trend of PPAC was observed with PPAC highest among excellent quality preparations (1.48 [SD 1.05]), and lowest for poor preparation quality (1.00 [SD 0.00], P = 0.55). The overall ADR was 25.0% and by bowel preparation quality was 21.7% for excellent preparation, 26.6% for good, 25.5% for fair, and 13.1% for poor. Conclusions: Our findings suggest that PPAC is sensitive to changes in bowel preparation quality but is particularly sensitive when restricted to only those in whom adenomas were seen. Further exploration of PPAC as a bowel preparation quality indicator is warranted.

Keywords: Colonoscopy quality; Adenoma detection

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C1-3: Longitudinal Predictors of Initial and Repeat Colorectal Cancer Screening

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Background/Aims: Few studies have used longitudinal data to examine predictors of colorectal cancer screening (CRCS). Further, there has been little research on repeat, on-schedule CRCS. Methods: We conducted a secondary analysis of data from the Systems of Support to Increase Colorectal Cancer Screening Trial (SOS), a randomized trial to increase CRCS in adults not current with screening recommendations. The sample consisted of 1,247 participants that completed a supplemental survey at baseline. Potential predictors included sociodemographics, medical/health history, intervention group assignment, and previously validated scales of CRCS pros, cons, self-efficacy, social influence, and cancer worry. Univariable and multivariable analyses were used to identify predictors of: 1) CRCS completion during the first year of the study, and 2) repeat, on-schedule CRCS during the second year of the study among those that completed an FOBT in Year 1. We also tested for moderation effects of the intervention on baseline predictors of screening completion. Results: In multivariable analysis, prior CRCS at baseline (OR 2.67, 95% CI 2.01–3.55) and intervention group assignment (Automated: OR 2.06 95% CI 1.44–2.96; Assisted: OR 3.97, 95% CI 2.65–5.92; Navigated: OR 5.65, 95% CI 3.76–8.49) were statistically significant predictors of CRCS completion at Year 1. Family history of colorectal cancer, higher self-efficacy, and higher health rating trended towards significance. For repeat CRCS at Year 2, prior CRCS at baseline (OR 1.97, 95% CI 1.26–3.07), intervention group (Automated: OR 9.97, 95% CI 4.97–19.98; Assisted: OR 12.34, 95% CI 6.07–25.09; Navigated: OR 14.44, 95% CI 1.06–29.52) and self-efficacy (OR 1.35, 95% CI 1.03–1.77) were statistically significant predictors. The intervention moderated the effect of prior CRCS and smoking status on CRCS completion at Year 1: 79.5% with prior CRCS were screened vs. 55.2% with no prior CRCS and 70.2% of non-smokers were screened vs. 53.9% of current smokers. Conclusions: Prior screening experience was a significant determinant of CRCS in both years 1 and 2, and the intervention amplified the effect of prior screening in Year 1. The intervention also was an important determinant of screening in both years suggesting that removing major access barriers increased screening completion.

Keywords: Colorectal cancer screening; Intervention trial

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PS2-28: Members’ Suggestions for Improving FIT Kits

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Background/Aims: Our aim was to get member feedback about KPNC’s FIT kit and changes they think would improve the kit. Methods: Self-administered survey of 3 groups of White, Black, and Latino KPNC members aged 52-75 who were mailed FIT kits in 2010, 2011, and 2012: “Compliers” (CMs) – did FIT all 3 years; “Converts” (CVs) - did FIT in 2012 but not 2010-2011; “Non-Compliers” (NCs) - no FITs 2010-12. Results: Preliminary based on responses from 596 CMs, 300 CVs, and 114 NCs. All comparisons reported are statistically significant. Nearly 90% suggested at least one change to the kit. About 53% suggested including a disposable glove (40% currently use their own to get their sample) and about 40% an antibacterial wipe. About half suggested an extra sheet of paper (1/3 have some trouble catching sample on the sheet), 45% a tube with a wider opening, and 22% a longer scooping stick. Blacks and Latinos were more likely than Whites to request the glove (60% vs. 41%), the wipe (46% vs. 26%), a wider tube (49% vs. 37%), and a longer stick (25% vs. 15%), and CVs were more likely than CMs to request a glove and longer stick. NCs recommended these additions also, but mostly wanted a frank discussion with their PCP. Only about 9% were interested in a video showing how to use the FIT kit (10% of Blacks and Latinos vs. 5% of Whites). For reminders, over 80% wanted to get mailed letters, with robo-calls and secure messages preferred by 19% and text messages by about 10%.

Conclusions: Adding items to the FIT kit to address concerns about mess/ bacterial exposure and need for precision might encourage adults to start or continue using this CRC screening tool.

Keywords: Colorectal cancer screening; Race-ethnic differences

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Time to Surgery for Melanoma

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Background/Aims: Cutaneous melanoma is among the most rapidly increasing malignancies in the United States, afflicting approximately 77,000 persons and causing over 9,000 deaths annually. Over half of incident melanoma and melanoma-related deaths occurs in patients older than age 65. Barriers to accessing dermatologic care may impede timely surgical therapy for patients with melanoma, potentially resulting in psychological or physical harm. Accordingly, given the disproportionate burden of melanoma borne by the elderly and limited availability of dermatologic care, we sought to determine timeliness of surgical resection of melanoma and identify factors associated with time to surgery in the Medicare population. Methods: We conducted a population-based, retrospective cohort study of melanoma cases from years 2000 to 2009 using linked data from the Surveillance, Epidemiology, and End Results (SEER)-Medicare database. We identified cases of melanoma using ICD-O-3 and ICD-9 codes. Our primary outcome of interest was time to surgery (dichotomized at 21 days), ascertainment by dates of ICD-9 and CPT skin biopsy and surgical procedure codes from Medicare administrative claims. Multivariate logistic regression with clustering of cases by patient and fixed effects for hospital referral region was used to evaluate the impact of type of surgery (Mohs versus non-Mohs technique), patient-level factors (age, gender, race, comorbidities, marital status, income, and prior history of melanoma), and tumor-level factors (stage and anatomic location). Results: We identified 32,666 cases of melanoma (1.04 cases per patient) during our study period. The median time to surgery was 27 days (IQR 16–42). Significant predictors of surgical delay (P<0.05) included: Mohs surgery (OR 1.10), Elixhauser comorbidity index of 3 or greater (OR 1.16), unmarried status (OR 1.17), regional disease (OR 1.44), and anatomic localization to trunk (OR 0.67) and extremities (OR 0.74). Age, gender, race, income, and history of prior melanoma were not associated with time to surgery. Conclusions: Time to surgery exhibits substantial variation among the Medicare population, with longer delays associated with select patient-, provider-, and tumor-level risk factors. Future research is needed to better understand the role these factors may play as possible barriers to dermatologic surgical care and their potential impact on patient morbidity and mortality.

Keywords: Melanoma; Surgical delay
PS2-29: Factors Influencing Response to a 2012 FIT Kit Outreach Effort in Kaiser Permanente Northern California

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Background/Aims: To learn about factors that influence decision to take up FIT. Methods: Self-administered survey of 3 groups of White, Black, and Latino KPNC members aged 52-75 who were mailed FIT kits in 2010, 2011, and 2012: “Compliers” (CMs) – did FIT all 3 years; “Converts” (CVs) - did FIT in 2012 but not 2010-2011; “Non-Compliers” (NCs) - no FITs 2010-12. Results: Preliminary based on 896 respondents (596 CMs, 300 CVs, and 114 NCs). All comparisons reported are statistically significant. 89% CMs, 80% CVs, and 58% NCs: think it’s very important to their KP medical team that they get CRC screening and 91% CMs, 75% CVs, and 51% NCs themselves think it’s very important. This was despite perceived risk of polyps (64%) or CRC (71%) being low. Most frequently indicated reasons for completing FIT (CM+CV) were wanting to make sure I am OK, FIT will help me protect my health, my doctor really wanted me to, FIT more convenient than other CRC screening methods, and spouse/partner wanted me to. Guilt about being sent so many kits was a factor for 43% of CVs. Blacks and Latinos were more likely than Whites to cite pressure from their kids. Almost no one indicated urging from a minister or employer. Many (32% CMs, 50% CVs) used own glove to get their sample. Among NCs, reasons for not doing the FIT were feeling uncomfortable/disgust about the test (e.g., reaching into toilet, handling stool, messiness), concern about mailing the sample, and low CRC risk. CRC “fatalism” was much lower down in the list, with no significant difference by race. 21% of NCs said nothing would make them do the FIT and 17% had no interest in CRC screening. Of those open to CRC screening, 25% want their PCP to tell them why they need it. Conclusions: To improve participation in FIT and CRC screening, it may be helpful to involve patients; send multiple kits; have more PCP-patient discussion about CRC screening; and modify FIT kits (e.g., add gloves) to reduce anxiety about exposure to germs and mess.

Keywords: Colorectal cancer screening; Race-ethnic differences

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PS2-30: Disparities in Oral Capcitabine Use: A Chart Review of Older Patients Treated in the Community

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Background/Aims: Conventional for its oral route of administration, capcitabine is increasingly used in the older population with colorectal and other solid tumors. Since renal impairment increases with age, we designed a pilot study to assess adherence to standard dose reductions for renal insufficiency and dosing recommendations for older patients. We sought to describe patterns of capcitabine use in older patients and factors that influence dosing; specifically age and renal insufficiency. Methods: Tumor registries of 8 community-based outpatient cancer clinics were reviewed to identify patients age 65 and older treated for breast, colon, esophageal, pancreas or stomach cancers from 01/01/2001-12/31/2012. Of the 1403 patients identified, 53 received capcitabine. A retrospective electronic medical record review was conducted to collect capcitabine dose and demographic variables, vital signs, adverse events, hospitalizations, and clinical and laboratory data. Results: Of the 53 patients who received capcitabine, 21% received a dose appropriate for documented age and renal function. Most patients received doses lower than recommended and, on average, were under-dosed by 25%. Univariate analysis showed women were under-dosed more frequently than men, 85% vs. 55%. Multivariate analysis showed lower than recommended capcitabine dosing for patients with a diagnosis other than colorectal cancer -811 (95%CI -807,-154; P = 0.01) and Stage II and III disease -331 (95%CI -646,-16; P = 0.05). Conclusions: This pilot study suggests that a disparity exists in the dosing of capcitabine in older patients and both men and women received empiric doses of capcitabine below those recommended for renal insufficiency or age. This may be of particular importance in the adjuvant setting, where under-dosing may compromise outcome. Our findings highlight the need for a more thorough understanding of how chemotherapeutic agents are prescribed for older patients with cancer.

Keywords: Chemotherapy; Dosing

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PS2-33: Incidence and Treatment of Ductal Carcinoma in Situ in Kaiser Permanente, 2000-2010

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Background/Aims: Ductal carcinoma in situ (DCIS) makes up approximately 25% of all breast cancer diagnoses and is considered to be a precursor to invasive cancer. Most DCIS diagnoses will not progress to invasive cancer, but reliable prognostic and predictive markers to guide treatment have not been established. Considerable debate exists about how to best treat DCIS, and many have expressed concern that DCIS is over-diagnosed and over-treated. This study examined patterns of DCIS incidence and treatment across six regions of Kaiser Permanente (KP). Methods: Women aged ≥ 18 years of age diagnosed with DCIS between 2000 and 2010 were identified from tumor registries at each region using distributed code. Annual age-adjusted incidence rates of DCIS were estimated overall and by region and were standardized to the 2000 US population. The annual incidence of DCIS was also estimated for women aged ≥ 45 years and stratified on hormone replacement therapy status at DCIS diagnosis. Demographic characteristics and variation in first course of therapy were compared. Results: Across six KP regions, overall age-adjusted incidence was 35.2/100,000 in 2000, increased to a high of 47.2/100,000 in 2007, and then decreased to 42.6/100,000 in 2010. Age-adjusted incidence rates for women on estrogen plus progestin hormone therapy prior to diagnosis were higher than for women on estrogen only or no hormone therapy. The most common first course therapy was breast conserving surgery plus radiation (38%); however, we observed different treatment patterns across regions. These patterns will be explored further in additional analyses that will include examining variation in treatment patterns by age, year of diagnosis, and histopathologic characteristics such as hormone receptor status and tumor grade. Conclusions: Although age-adjusted incidence rates from six KP regions were consistent over time, we observed differences in treatment patterns. Differences in patient mix, tumor characteristics, patient, or physician preferences may have contributed to the variation in treatment patterns. These results may be of clinical use in determining factors associated with DCIS diagnosis and in understanding and evaluating regional treatment differences.

Keywords: Ductal carcinoma in situ; Breast cancer treatment

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PS2-34: Disparities in Head and Neck Cancer Patient Survival Relative to Race and Gender

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Background/Aims: Head and neck cancers account for approximately 3% of all cancers in the United States. The majority of these cancer types are squamous cell carcinoma (SCC), but also include salivary malignancies and others. These cancers are nearly twice as common among men as they are among women. Head and neck cancers are also diagnosed more often among people age over 50 years. Over-all disease specific survival rates are around 50%. There have been previous studies that demonstrate racial and gender
disparities in the patterns of treatment and survival, but these studies are performed in academic tertiary centers with populations comprised mainly of referral patients with limited follow up. No studies have been performed within vertically integrated health systems. Methods: The Henry Ford Health System’s Virtual Data Warehouse was queried to obtain data on head and neck cancer patients diagnosed between 1990 and 2013. Search criteria included all tumors of the upper aerodigestive tract including SCC, salivary gland malignancies and also endocrine tumors. Mortality data was obtained from SEER and Michigan State mortality data. Follow up was 20 years. Both HMO and non-HMO patients were included within the study. Statistical analysis was performed using chi-squared test. Results: 1364 thyroid cancers, 225 salivary gland cancers and 1376 aerodigestive SCC were found. Statistically significant survival differences were found with regard to race and gender in several tumor types. For thyroid malignancies, females and Non-African Americans had a statistically significant improved survival ($P = 0.0073$ and $P < 0.0001$). For salivary gland malignancies, females and African Americans had a statistically significant improved survival ($P = 0.0384$ and $P = 0.0013$). For aerodigestive SCC African Americans had a worse survival but there were no statistical differences by gender ($P < 0.0001$ and $P = 0.6984$). Conclusions: Disparities in head and neck cancer outcomes exist relative to race and gender within an integrated health system. It is unclear why African Americans with salivary malignancies have a survival advantage but worse survival in other tumor types. Further study and analysis is required to control for other factors such as socioeconomic status, education, smoking/alcohol use, comorbidities and treatment modality to answer these questions.

Keywords: Head and neck cancer; Squamous cell cancer

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PS2-35: Strategies Used by Rectal Cancer Survivors to Improve Bowel Function Other than Diet, Exercise, or Dietary Supplements

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Background/Aims: Rectal cancer (RC) surgery includes a colostomy (or ileostomy) or, more frequently, anastomosis of the rectum. Both surgery types may create long-term after-effects. We examined differences reported between survivors with ostomies (O) versus anastomoses (A) regarding bowel function and self-care. This analysis highlights patient-reported changes in daily routines that helped their bowel function, as revealed by responses to a question about post-surgical changes other than diet, exercise, or use of supplements (“such as timing of eating, number of meals, or other changes to your daily routines”) that have helped with your bowel function?”

Methods: In 2010-2011, we mailed questionnaires to 1,063 long-term rectal cancer survivors (> 5 year’s post-diagnosis) from two Kaiser Permanente (KP) Regions, Northern California (KPNC) and Northwest (KPNW), who had undergone a major intra-abdominal operation as part of their cancer treatment. Potential participants (KP members age 18 years or older with tissue-verified RC diagnoses) were identified through an electronic search of each site’s computerized tumor registry. The overall response rate was 60.5% (577 respondents/953 eligible patients). Results: Survivorship ranged from 5 to 25 years. Mean age at time of survey was 72 years for anastomoses and 74 years for ostomies ($P < 0.03$). About 56% of patients with anastomoses were male compared to 66% of ostomates ($P < 0.03$). The most frequently mentioned strategies to help bowel function for both surgery types were: smaller meals (O = 26%, A = 33%; n = 13/30), regular time of meals (O = 26%, A = 9%; n = 13/8), and not eating dinner too late (O = 8%, A = 9%; n = 4/8). Patients with anastomoses mentioned the following additional strategies: grazing or multiple small meals/snacks (10%, n = 9), and not eating before activity (4%, n = 4). The most frequent bowel symptoms helped by these strategies were: predictability (52%, n = 73), gas (34%, n = 48), constipation (31%, n = 43), diarrhea (26%, n = 37), and bloating (23%, n = 32).

Conclusions: Minimal differences were observed between ostomy/anastomosis survivors in bowel self-care strategies beyond diet, exercise, or use of supplements. Clinicians caring for RC survivors should be aware of these bowel self-management strategies both to offer as potential self-care practices and to understand whether these activities pose any risks to specific patients, given their comorbidity burdens and other health practices.

Keywords: Rectal cancer; Bowel function

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PS2-36: Incremental Medical Care Costs of Prostate Cancer for Medicare Beneficiaries

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Background/Aims: We estimated incremental monthly medical costs of prostate cancer (PC) – differences in monthly standardized costs between PC cases age ≥ 65 and age-gender-health plan matched cancer-free controls – for SEER-Medicare and HMO Medicare beneficiaries across four 12-month phases of care–Pre-diagnosis, Treatment, Survivorship, End-of-Life–to understand whether type of health care arrangement–FFS indemnity vs. HMO capitation–was associated with differences in PC costs. Methods: Cases were SEER-Medicare and HMO patients aged ≥ 65 years with PC (per tumor registry). Cancer-free controls were aged male Medicare indemnity beneficiaries and aged male HMO members who had no tumor registry evidence of any cancer prior to 2009. SEER-Medicare controls were a 5% random sample of aged Medicare beneficiaries. HMO controls were frequency matched to cancer cases on a 5:1 ratio by age group, gender, and having health plan eligibility during the year of the diagnosis from the matched prostate cancer case. We used a longitudinal case-control design to estimate incremental medical costs for PC cases starting 12 months prior to diagnosis. We extracted data for 2000-2008 from HMO standardized data warehouses and SEER-Medicare files. We applied Standardized Medicare reimbursement rates to utilization vectors and summed to total monthly medical expenses per patient in 2008 dollars. We analyzed monthly cost trajectories by phase of care and SEER-Medicare vs. HMO for Stages I-III vs. Stage IV vs. unknown Stage cases. Results: Monthly incremental PC costs in the pre-diagnosis phase were negative in the first 3 quarters and then rose rapidly in the quarter prior to diagnosis, with advanced-stage cases showing the steepest. FFS advanced-stage cases had the highest peak costs in the month of diagnosis, followed by HMO advanced stage cases. By the 12th month of the Treatment phase, monthly costs for all study groups converged at about $500 per month. In the first survivorship year, FFA and HMO advanced-stage cases had higher incremental costs than the other study groups. In the last year of life, advanced-stage cases had higher incremental costs than all other groups. Conclusions: Stage-IV Medicare FFS PC cases received the most costly treatments of all study groups. FFS incremental costs were mostly higher than HMO costs.

Keywords: Prostate cancer; Cost

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PS2-38: Cancer Research Network: Cancer Incidence, Prevalence, and Health Plan Enrollment

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Background/Aims: Nested within the HMO Research Network (HMORN), the Cancer Research Network (CRN) is a collaboration among the National Cancer Institute, 9 funded HMORN sites, 6 affiliate sites, and scientific collaborators from multiple institutions. Now in its fourth cycle, the CRN has been funded continuously since 1999. CRN’s goals are to build data infrastructure, expertise, and collaborations to promote successful cancer research involving integrated healthcare delivery systems. Understanding
Depression and Its Relationship to Perceived Financial Burden among Long-term Rectal Cancer Survivors with Ostomies and Anastomoses

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Background/Aims: Consequences of surgery for rectal cancer (permanent ostomy (PO), anastomosis (AN), or temporary ostomy (TO)) followed by anastomosis can affect survivors’ psychological and financial well-being. We investigated depression and its association with perceived financial burden resulting from their illness/treatment among long-term (>5 years post-diagnosis) survivors. Methods: A mail survey of 574 long-term rectal cancer survivors from Kaiser Permanente Northern California and Northwest was conducted in 2010-2011. The survey included questions on current depression and perceived financial burden from the City of Hope Quality of Life questionnaire. Responses were indicated on a scale where 0 = ‘none’ and 10 = ‘severe’. Scores ≥4 were classified as depressed and ≥5 as high financial burden. ANOVA was used to contrast mean scores among surgery types. Linear regression models evaluated depression and perceived financial burden scores with co-variates. Results: Mean current depression level was 2.09 (SD = 2.40), with 23% (134 of 574) classified as depressed. PO survivors (N = 182) had the highest current depression levels (M = 2.46, SD = 2.61) compared to AN (N = 326, M = 1.96, SD = 2.37) and TO (N = 66, M = 1.68, SD = 1.81) (P = 0.02). These differences in depression by surgery type were significant after adjusting for age, sex, and race (P = 0.015). Survivors reported average perceived financial burden of 1.94 (SD = 2.72), with 18% (103 of 572) perceiving high financial burdens. PO survivors perceived highest burden (M = 2.5, SD = 2.92) compared to AN (M = 1.60, SD = 2.57) and TO (M = 2.12, SD = 2.65) (P = 0.001). After confounding adjustment, level of perceived financial burden was positively associated with higher current depression levels (P <0.001). Surgery type did not modify this relationship, but it was stronger among those also reporting depression after surgery (P = 0.04). Conclusions: Current depression was frequent among these long-term survivors of rectal cancer and was highest among those with permanent ostomy. While current depression and perceived financial burden due to their illness/treatment were statistically associated, there were no differences by surgery type. Research is needed to identify factors influencing high depression and financial pressures among these rectal cancer survivors. Clinicians should be aware that long-term survivors, particularly with permanent ostomy, can have depression and financial burdens resulting from their illness or treatment. Encouraging these survivors to receive psychosocial services may improve their well-being.

Keywords: Cancer Research Network; Depression

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PS2-39:

Cardiovascular Disease

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Background/Aims: To analyze the incidence of major cardiovascular disease (CVD) hospitalization events and all-cause mortality among adults with diabetes with or without cardiovascular disease; and to estimate the proportion of preventable events due to uncontrolled lipids, glucose, blood pressure, and to active smoking. Methods: This was a retrospective cohort study performed within the Kaiser Permanente Northern California’s Department of Preventive Medicine using claims and laboratory data. Each patient was followed from their first recorded claim for diabetes or coronary heart disease to the earliest of death, disenrollment from the health plan, or 31 December 2011. Among 81,645 patients diagnosed with diabetes, 30,038 patients had a first hospitalization for CVD (17,440 ischemic heart disease; 12,598 stroke; 8,040 peripheral arterial disease). Patients with 18 or more CVD hospitalizations were excluded because they were less likely to be exposed to recommended preventive practices. Additionally, patients with current active smoking, active smoking at index date, and current active smoking and index date were included. Furthermore, patients with coexisting conditions known to increase risk of CVD (hypertension, diabetes, smoking, obesity, and hyperlipidemia) were excluded. The primary outcome was first hospitalization for CVD. Multivariable survival models were estimated using a Cox proportional hazards model with adjustment for age, gender, and index level of care. Results: The mean age of the study population was 69.7 years, with 18,022 men and 12,016 women. The majority of patients were white (76%), with a mean follow-up time of 3.3 years. The Kaplan-Meier curves were generated to assess the association between smoking status and incident and prevalent CVD hospitalization events and all-cause mortality. The proportion of preventable events due to uncontrolled lipids, glucose, blood pressure, and active smoking was 25%. Conclusions: The proportion of preventable events due to uncontrolled lipids, glucose, blood pressure, and active smoking was 25%. Encouraging these survivors to receive psychosocial services may improve their well-being.

Keywords: Breast cancer; Mammograms

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PS2-42:

Primary breast cancer cases diagnosed within the Marshfield Clinic system from 2002 through 2008 were identified for retrospective review. Patients diagnosed with breast cancer at another facility, male breast cancer patients, and patients residing outside of Wisconsin and its neighboring states were excluded. Patient demographics and additional data, including number of mammograms performed within five years prior to breast cancer diagnosis, breast cancer stage, insurance status, family history, and comorbidities, were abstracted. Kaplan-Meier curves were generated to assess the association between mammography screening in the five years prior to breast cancer diagnosis and overall survival with adjustment for age, insurance status, number of medical encounters, comorbidities, family history, and calendar year. Results: A total of 1,422 women with breast cancer were included in the analysis. After adjustment, women who missed any of their last five annual screening mammograms had a 2.3-fold increase in all-cause mortality compared to subjects who participated in annual screening mammography. When subjects were stratified by the number of missed screening mammograms in the five years prior to breast cancer diagnosis, a progressive decline in survival was noted resulting in an all-cause mortality hazard ratio of 1.3 (95% confidence interval 1.19 – 1.37, P <0.0001) for each additional missed mammogram. Conclusions: These results suggest that annual mammography prior to breast cancer diagnosis is predictive of increased overall survival. Importantly, a stepwise decline in overall survival was noted for each additional missed mammogram. These results are similar to findings for breast cancer-specific mortality and illustrate the importance of recommending annual screening mammography to all eligible women.

Keywords: Breast cancer; Mammograms

doi:10.3121/cmr.2014.1250.ps2-42
study using electronic health records and administrative claims. We included individuals with diabetes from a network of 11 U.S. managed care organizations (SUPREME-DM datalink) from 2005 to 2011. Uncontrolled cholesterol was defined as LDL = 100 mg/dL or HDL = 40 (M)/<50 mg/dL (F), uncontrolled glucose as Alc = 8%, and elevated blood pressure as = 140/90 mmHg. Major CVD hospitalization events were identified based on primary discharge diagnoses from inpatient encounters for myocardial infarction (MI) or acute coronary syndrome (ACS), or congestive heart failure (CHF). Mortality data were derived from State Death Records and National Death Index. Five-year incidence rates and rate ratios were estimated for uncontrolled clinical factors and smoking. Results: The study cohort included more than 800,000 patients with diabetes. Mean age was 59 years (SD = 14), 48% were female, and 46% were White. Thirty-one percent had CVD diagnoses at cohort entry. Five-year event rates (per 100 person years) were 5.1 (MI/ACS), 4.5 (stroke), 7.1 (CHF) and 24.4 for all-cause mortality in patients with CVD; rates were 1.4 (MI/ACS), 1.2 (stroke), 1.0 (CHF) and 5.2 in patients without CVD. Twenty percent of major CVD hospitalizations and 19% of deaths were attributable to uncontrolled clinical factors and smoking in patients with CVD; for individuals without CVD, 36% of major CVD hospitalizations events and 20% of deaths were similarly attributable to uncontrolled factors. Conclusions: Despite improvements in diabetes care, uncontrolled levels of clinical risk factors and smoking still account for more than 30% of CVD events in a population with diabetes. Additional attention to CVD risk factor control may importantly decrease adverse outcomes.

Keywords: Cardiovascular disease; Retrospective cohort doi:10.3121/cmr.2014.1250.ps1-40

PS2-13:
Personalized Physician Learning Intervention to Improve Hypertension Control: Randomized Trial Comparing Two Methods of Physician Profiling

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Background/Aims: To assess the impact of personalized physician learning (PPL) interventions using simulated learning cases on control of hypertension and dyslipidemias in primary care settings. Methods: One hundred thirty-two primary care physicians (PCP) with their 6307 patients with uncontrolled HT and their 20,030 patients with uncontrolled dyslipidemia were cluster randomized to one of three conditions: (a) no intervention, (b) PPL-EMR intervention in which 12 personalized learning cases were assigned to each PCP based on observed patterns of care in the electronic medical record (EMR) in the prior 1-year period, or (c) PPL-ASSESS intervention in which 12 personalized learning cases were assigned based on PCP performance on 4 standardized assessment cases. General and generalized linear mixed models were used to account for clustering and to model differences in actual patient outcomes across study arms. Results: Among those with uncontrolled HT at baseline, 49.1%, 46.6% and 47.3% (P = 0.43) achieved BP targets at follow-up, and among those with uncontrolled dyslipidemia at baseline, 37.5%, 37.3% and 38.1% (P = 0.72) achieved LDL targets at follow-up in PPL-EMR, PPL-ASSESS, and the control group, respectively. Although both SBP (P < 0.001) and lipid (P < 0.001) values significantly improved during the study period, the group x time interaction term showed no significant differential change in SBP values (P = 0.51) or lipid values (P = 0.61) across the 3 study arms. No difference in intervention effect was noted when comparing the PPL-EMR and the PPL-ASSESS interventions (P = 0.47).

Conclusions: The two personalized physician learning interventions tested in this study did not lead to improved control of hypertension or dyslipidemia in primary care clinics during a mean 14-month follow-up period. This null result may have been due in part to substantial improvement in BP and lipid control in all study site patients during the study period.

Keywords: Hypertension; Quality improvement doi:10.3121/cmr.2014.1250.ps2-13

PS2-14:
The Electronic Communications and Home Blood Pressure Monitoring Trial - Long Term Results

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Background/Aims: In the Electronic Communications and Home Blood Pressure Trial (e-BP) patients with uncontrolled blood pressure (BP) were registered to use an existing patient shared electronic health record (EHR) and secure e-mail and randomly assigned to: (1) usual care (UC); (2) home BP monitoring (BPM) and website training; or (3) this plus pharmacist team-care delivered via the web (Pharm). At the end of intervention and one year later (1 and 2 years after randomization) Pharm patients were more likely to have controlled BP. The objective here was to determine if BP control improvements persisted longer term. Methods: The primary outcomes were change in systolic and diastolic BP and percent with BP control based on BP measures from the 4.5 year study visit. Modified Poisson regression estimated adjusted RR of BP control. Adjusted spline curves were used to evaluate blood pressures in the EHR. Results: BP control was 67%, 60%, and 65% in the UC, BPM, and Pharm groups respectively (adjusted RR 0.98; 95% CI (0.85, 1.13), Pharm vs. UC) at 4.5 years. For those with more severe systolic HTN (>160 mmHg) at baseline, BP control was 52%, 46%, and 55% (adjusted RR 1.05 (0.70, 1.57), Pharm vs. UC) Analysis of BPs from the EHR showed similar results. Conclusions: Almost two thirds of patients with uncontrolled BP at baseline had controlled hypertension at 4.5 years. Group differences seen after the 1-year intervention did not persist long-term, with all groups improving. Longer-term or booster interventions may be needed.

Keywords: Aspirin; Primary prevention doi:10.3121/cmr.2014.1250.ps2-12

PS2-12:
Opportunities to Improve Aspirin Utilization for the Primary Prevention of Cardiovascular Disease in a Regional Healthcare System

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Background/Aims: Aspirin is a cornerstone of primary cardiovascular disease prevention, but little is known about aspirin use patterns in primary care populations. Aspirin pharmacoepidemiology research presents some particular challenges within the HMO Research Network because aspirin is typically obtained over-the-counter and does not routinely appear in pharmacy claims data. Aspirin use in adults without cardiovascular disease prevention. Aspirin was underutilized in this population overall, with less than half of all clinically indicated adults adherent to aspirin therapy. Statistical models found that individuals who were younger, female, not covered by health insurance, did not visit a medical provider regularly, were not obese, or did not have diabetes were least likely to use aspirin. In addition, aspirin use was less common in northeastern communities within the Marshfield Clinic service area. Conclusions: Demographic patterns of aspirin use in this study were largely consistent with previous findings, noting several aspirin use disparities in central Wisconsin adults without cardiovascular disease. Aspirin use was particularly low in those without diabetes and/or without regular physician contact. The methods outlined here on using electronic health records to conduct aspirin pharmacosurveillance can be adopted and refined by other HMO Research Network partners to optimize future cardiovascular disease (primary) prevention initiatives.

Keywords: Aspirin; Primary prevention doi:10.3121/cmr.2014.1250.ps2-12
EHR BPs can be used to track group differences after a trial ends, but with some important caveats.

**Keywords:** Hypertension; Team care  
DOI: 10.3121/cmr.2014.1250.ps2-14

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**Child Health**

**PSI-39:**

**Health Care Utilization for Children With and Without Autism Spectrum Disorders in Five Large Health Systems**

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**Background/Aims:** Approximately 1 in 88 children in the U.S. is diagnosed with Autism Spectrum Disorder (ASD). ASD is a complex disorder characterized by impairment in social skills, communication, and cognitive and behavioral functioning. Several studies have indicated that children with ASD use a different pattern of health services than typically developing children. However, most previous studies have included small samples, or only included one health system. The purpose of this analysis is to examine patterns of health service use in a large group of geographically- and racially-ethnically-diverse children with ASD enrolled in the Mental Health Research Network (MHRN) Autism Registry. **Methods:** Data from 2009 and 2010 from the virtual data warehouse (VDW) of 5 health plans was used to collect comprehensive information on patterns of health services for children with ASD and a comparison group of children without ASD. Comparisons of the patterns of service use in the two groups were conducted. Two part models of service use were used. In the first stage, logistic regression was used to examine the likelihood of any use of services. In the second stage, negative binomial regression was used to examine the level of use of services. **Results:** The study includes 8,363 children with ASD and 83,575 comparison children, making it the largest study of patterns of ASD service use to date. Preliminary results indicate that children with ASD were significantly more likely to use most types of services including sleep therapy (OR 12.2; 95% CI 10.9-13.9), mental health (OR 8.9; 95% CI 8.4-9.5), and neurology (OR 8.3; 95% CI 7.6-9.1). In contrast, they were significantly less likely to use some services including vaccinations (OR .80; 95% CI .75-.85). **Conclusions:** Children with ASD have significant physical and mental health needs related to their condition and these are reflected in increased use of services in many categories. However, in some cases children with ASD receive fewer important health care services, notably vaccinations. Better understanding of the needs of children with ASD, family beliefs and preferences, and systematic coordination of care for these children could aid in helping families to use health care services more effectively.

**Keywords:** Autism; Health services

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**PSI-20:**

**Obesity Mapping in Colorado: A Novel System for Monitoring and Tracking BMI**

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**Background/Aims:** There has been a marked increase in obesity prevalence in the US and around the world over the last twenty years. The causes of the rise in obesity involve many interrelated environmental and socioeconomic factors. Because interventions to address the obesity epidemic often occur at the community level, better surveillance data are needed to monitor obesity within communities. The only available community-level BMI data are from self-reports, provided by the Behavioral Risk Factor Surveillance System (BRFSS). **Methods:** We have piloted a system for the collection of BMI data from multiple healthcare providers in Colorado (Kaiser Permanente Colorado, Denver Health, Children’s Hospital Colorado and High Plains Community Health Center). BMI information, objectively measured during routine care and collected in Electronic Medical Records (EMR), is combined with geocoded residence address and other demographic variables. These data, combined in a manner to protect confidentiality, is then linked with built and social environment data from the Colorado Department of Public Health and Environment (CDPHE) and public data sources collected by the University of Colorado Denver (UCD). The surveillance system utilizes the HMORN Virtual Data Warehouse (VDW) data framework, including the VDW vitals and enrollment tables. **Results:** The BMI database will be available through a regional data sharing network, moving data from participating sites to a central data coordinating center (CDPHE) and to UCD for mapping and analysis. The network will enable users to both share data and perform queries within a single software environment. We intend to use the data model to track patients’ BMI over time and by county, census tract and block group geographies, and link BMI data with built and social environment data. We also intend to generate maps of BMI by census tract and block group and overlay built and social environment data to explore correlations between BMI and environmental factors. **Conclusions:** Using the underlying framework of the VDW, we have created a multi-site regional data sharing network in Colorado for tracking individual patient-level BMI data, overlaid with built and social environment information.

**Keywords:** Body mass index (BMI); Monitoring

DOI: 10.3121/cmr.2014.1250.ps2-20

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**PSI-21:**

**Using EHR Data to Quantify Within-individual Variability of Standardized Weight Measures for Youth**

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**Background/Aims:** There is increasing interest in the study of preventive and therapeutic interventions for childhood obesity. Without accounting for baseline variability in children’s weight measures, however, it is difficult to accurately explore the true impact of interventions. We wanted to identify a) what percentage of children and adolescents have large longitudinal within-individual variability in their standardized weight measures and b) groups of individuals with differential growth trajectories over time. Our hypothesis is that a substantial fraction of children have large longitudinal within-individual variability and/or a non-constant growth trajectory. **Methods:** We used a cohort of ~100,000 relatively healthy children and adolescents (2-20 years), seen in large ambulatory care organizations between 2000-2013, who had at least 3 weight measurements recorded longitudinally. The standardized weight measures we used were the weight-for-age z-score (WAZ) and the weight-for-age percentile (WAPCT). We quantified the within-individual variability by a) the slope and b) the root-mean-square-error (RMSE) of the regression of longitudinal standardized weight measures vs. age. Clusters of growth trajectories were identified using Growth Mixture Models (GMM). The number of clusters was determined by Akaike information criterion and relative cluster size. **Results:** The mean duration of longitudinal follow-up of individuals in our cohort was 4.7 yrs (median 4.2 yrs, IQR 3.9 yrs). Approximately 19% of all children and adolescents had substantial longitudinal within-individual variability (slope) ≥0.02 and/or RMSE ≥0.35. We identified two clusters within this group: 1) those with an initial relatively constant growth-trajectory (between 2-9 years) and then a slightly upward trend (between 10-20 years), 61% of the total sample and 2) those with an initial upward trend (between 2-9 years) and then downward trend (between 10-20 years) in their growth-trajectory, 39% of the total. Large within-individual variability was identified in 19.5% of children in cluster 1 and 18.7% of children in cluster 2. **Conclusions:** Relatively healthy children and adolescents have large within-individual variability in their standardized weight measures that needs to be considered in study design when weight changes are used as study endpoints. Two subgroups exhibit potentially important growth patterns that warrant investigation.

**Keywords:** Within-individual variability; Growth clusters

DOI: 10.3121/cmr.2014.1250.ps2-21
Longitudinal and survival models were then jointly estimated. Results: A total of 24,777 patients met cohort entry criteria. A random sample of 90% (22,300) was used for model development (mean age 69.3 y, 42% (9409) male, 28% (6277) with diabetes, mean baseline eGFR 51 mL/min) and contributed 119,165 person-years of follow up. 6% (1339) had a prior CVD event. During follow-up 4216 (19%) patients had a post-CKD CVD event. In fully adjusted models, each 5 mL/min/1.73m2 decrease in current eGFR was associated with a hazard ratio (HR) of 1.05 (95% CI 1.04, 1.06). For the time-dependent slope of eGFR trend, each 2 mL/min/1.73m2/year decrement was associated with a HR of 1.06 (95% CI 1.03, 1.10). Both diabetes and gender modified the eGFR slope associations, such that the associations were significantly greater among non-diabetics (HR = 1.17) and females (HR = 1.11). Conclusions: Longitudinally modeled eGFR and time-dependent eGFR slope each independently associates with CVD risk among patients with moderate and advanced CKD. The relative prognostic value of static, single time point eGFR vs. joint modeling of eGFR warrants further investigation.

Keywords: Chronic kidney disease; Joint longitudinal-survival models

doi:10.3121/cmr.2014.1250.a2-1

A2-2: Improving Diabetes Management with Mindfulness-based Stress Reduction

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Background/Aims: Managing diabetes can be challenging and stressful for many people resulting in poor diabetes control and increased mental health issues such as depression and anxiety. Methods: We conducted a pilot study of mindfulness-based stress reduction (MBSR), a combination of mindfulness meditation and gentle yoga, to look at whether it could help patients better manage their diabetes. We recruited 38 people with diabetes and 2 Hba1c values > 8 in the prior 18 months to complete a community-based MBSR course. Participants attended eight-weekly intervention sessions and participated in home-based MBSR practice. Surveys and Hba1c values were obtained at pre and post-intervention, Cohen’s-d statistic was estimated for survey outcomes. Pre-post change was evaluated using paired t-test. Results: Participants were 31- to 78-years-old (M = 57), the majority were female (68%), white (70%), employed, with some college education. Mean Hba1c pre-intervention was 9.18. Participants showed significant improvement in pre-post measures of HbA1c (change -.73%, P = .000), overall mental health (Cohen’s-d .69, P = .001), stress (Cohen’s-d -.76, P = .001), depression (Cohen’s-d -.62, P = .001), and anxiety (Cohen’s-d -.66, P = .001). There was also improvement in two measures of diabetes management: Problem Area in Diabetes Questionnaire (Cohen’s-d -.71, P = .002) and the Diabetes Empowerment Scale (Cohen’s-d -.80, P = .000). Conclusions: These results suggest that MBSR may offer a safe and effective method for helping people better manage diabetes and improve their mental health. Effect sizes were large and significant pre-post differences were found indicating that a larger clinical trial is warranted.

Keywords: Diabetes; Complementary therapies

doi:10.3121/cmr.2014.1250.a2-2

A3-2: Impact of Mild Chronic Kidney Disease Stage on Outcomes after Total Hip or Knee Arthroplasty

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1Geisinger Health System; 3Bassett Healthcare

Background/Aims: Dialysis and kidney transplantation adversely impact outcomes of total hip or knee arthroplasty (THA, TKA), but complication rates have not been reported for patients with less advanced stages of chronic kidney disease (CKD). Surgeons lack the data necessary to have informed discussions regarding anticipated outcomes of joint replacement for these patients. Methods: We retrospectively reviewed electronic health records of 779 adults with stages 1, 2, and 3 CKD not requiring dialysis or transplantation...
A2-4: Declining Rates of Major Cardiovascular Events in Adults With and Without Diabetes: 2005-2011

Jay Desai1; Gabriela Vazquez Benitez2; Emily Schroeder3; Gregory Nichols4; John Steiner5; Katherine Newton6; Ram Pathak7; Renuka Adibhatla7; Zhiyuan Xu7; Mary Becker7; Patrick O’Connor1

1HealthPartners; 2Kaiser Permanente Colorado; 3Kaiser Permanente Northwest; 4Group Health Research Institute; 5Marshfield Clinic Research Foundation

Background/Aims: A major goal of diabetes care is the prevention of major cardiovascular events (CVE). Its success can be measured by quantifying trends over time in major CVE in adults with and without diabetes. To quantify trends in occurrence of major CVE in adults with and without diabetes who received care at 11 U.S. managed care organizations from 2005 to 2011. Methods: Study subjects included 2.4 million diabetes and non-diabetes subjects, frequency matched by age and gender (10,000,000 person-years). Clinical and demographic data were extracted from EMR at each site. Major CVE events were identified based on primary discharge diagnoses from inpatient encounters for myocardial infarction/acute coronary syndrome (MI/ACS), stroke, and chronic heart failure (CHF). Age and sex-adjusted to the 2010 US census population even rates over time were computed. Generalized linear models were used to evaluate the significance of observed differences CVE trends in defined groups of subjects. Results: Mean age at cohort entry was 59 years (SD = 14), 48% female, and 46% Whites. Rates per 1000 of CVE in 2010 for diabetes subjects were (MI/ACS: 4.4, stroke 4.0, CHF 6.9); event rates were more than twice the rate of non-diabetes subjects. A 5-year decline of 32% was observed in diabetes subjects and 27% in non-diabetes subjects for MI/ACS. Similar decline was observed by gender and age groups. Conclusions: Between 2005 and 2011, rates of major cardiovascular events (CVE) declined significantly among adults with diabetes. Decline was greater in patients with diabetes, likely associated with improvements in diabetes care.

Keywords: Diabetes; Chronic disease

A2-5: Addressing Missing Data and Clinical Relapse Can Improve Composite Diabetes Quality of Care Measure

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1HealthPartners

Background/Aims: To identify strategies likely to improve composite measures of diabetes care quality. Methods: Study subjects were 14,750 adults with diabetes identified in one care delivery system in the SUPREME-DM project (HS19859) who had BP measures in both 2005 (Y1) and 2010 (Y2). We report the proportion of patients who met clinical goals (A1c <8%, LDL <100 mg/dl, BP <140/90, no tobacco use, or composite D4 goal requiring all 4 components to be at goal) in Y1 but not in Y2, based on the last available assessments in each of the two 12-month periods. Results: Among those with measures in Y1 and Y2 and at goal in Y1, the proportion not at goal in Y2 for A1c, BP, LDL, tobacco, and the D4 was 13.7%, 8.5%, 12.8%, 1.6%, and 20.7% respectively. When those missing measures in Y2 were classified as not at goal in Y2, the proportion of those in control in Y1 but not in Y2 for A1c, BP, LDL, tobacco, and the D4 was 25.7%, 8.5%, 27.1%, 24.1%, and 52.6% respectively. Among those with measures in both Y1 and Y2, the proportion of all those not at goal in year 2 who had been at goal in Y1 for A1c, BP, LDL, tobacco and the D4 was 21.1%, 45.2%, 25.9%, 14.1%, and 14.7% respectively. The proportion of those who failed to meet the D4 goal because of missing measures of one or more D4 components was 52.2% in Y1 and 54.1% in Y2. Conclusions: Strategies to improve composite diabetes measures of diabetes quality include: (a) Record measures of A1c, LDL, and tobacco use more frequently, and (b) Implement strategies to prevent clinical relapse in those at highest risk of relapse, especially for BP.

Keywords: Diabetes; Quality of care

D2-2: How Did Pharmacists Help Patients Achieve Blood Pressure Control in a Randomized Trial of Home Blood Telemonitoring Plus Pharmacist Management?

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1HealthPartners

Background/Aims: The Hyperlink trial tested a 12-month intervention combining home blood pressure (BP) telemonitoring with pharmacist care management in patients with uncontrolled hypertension. The intervention resulted in improved BP control compared to usual care at both 6 and 12 months (57% vs. 30%, P = 0.001). The mean number of medication classes increased compared to usual care (0.63 vs. 0.22, P <0.001). We use process of care data recorded by the pharmacists and BP telemonitoring data to elucidate reasons for intervention success. Methods: Hyperlink randomized 450 patients with uncontrolled BP from 16 primary care clinics, and 228 intervention group patients were enrolled from clinics. They used a home blood pressure telemonitor to transmit BP readings to a study pharmacist. Following an in-person intake visit, pharmacists consulted with patients over the phone every 2-4 weeks during the first 6 months, and at 2 month intervals thereafter. They adjusted antihypertensive therapy using a specific treatment algorithm based on BP telemonitoring data. The home BP goal was <135/85 mm Hg (<125/75 mm Hg for patients with diabetes or kidney disease.) Results: Mean BP at the research clinic enrollment visit was 148/85, and 143/85 at the pharmacist intake visit. At this visit, pharmacists changed the antihypertensive drug regimen for 10% of patients, while medication changes occurred for 33% at phone visit 1, 36% at phone visit 2, and 19% at phone visit 3. Thereafter, medication changes continued to decline. At the intake visit, pharmacists judged medication adherence to be high (>80%) in only about half of patients, but at subsequent phone visits in >90% of patients. The mean home BP recorded by the pharmacists for patients at the first phone visit was 136/80, and fell steadily to a mean of 126/74 at 3 months, with little change thereafter. Conclusions: Improved adherence and appropriate adjustments to the antihypertensive treatment regimen based on home BP telemonitoring resulted in rapid lowering of BP over a 3-month period. Our results imply that intensive intervention may only be needed for about 3 months in many patients with uncontrolled hypertension.

Keywords: Hypertension; Team-based care
D2-3:  Development of a Provider-level Patient Centered Medical Home Questionnaire for Measuring Implementation and Impact

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Background/Aims: The patient-centered medical home (PCMH) is widely supported as a means to coordinate care in the primary care environment, but relatively little is known about how variation in implementation of a PCMH model influences the success and sustainability. Many survey instruments developed to date for assessing PCMH are aimed at the healthcare system design as a whole or at patient experience, but not at providers who may have varying attitudes and perspectives on the role of PCMH and unique insights into practical implementation issues. Our goal was to develop questionnaires aimed at primary care physicians (PCPs) and nurse case managers (CMs) to assess variation in perception and implementation of PCMH. Methods: This study was performed within Geisinger Health System, an integrated health system with a PCMH program first introduced in 2006. We reviewed care management, medical home, chronic illness and chronic care model literature, and existing tools such as Patients Assessment of Chronic Illness Care (PACIC). Based on 60-minute interviews with system leadership about program design, we developed pilot questions and completed 90-minute interviews with 3 highly-experienced nurse CMs to map global concepts of services and systems to individual staff member functions. Two structured questionnaires were developed for CMs and PCPs focusing on team interactions, linkages to outside resources, and tasks/responsibilities. Providers were asked to rate difficulty of various functions as well as their perceived impact on patient care. Results: We administered questionnaires during 60-minute semi-structured interviews with 47 clinical staff covering 23 medical home clinics. Case managers and physicians showed strong agreement on who bears responsibility for ensuring patient access, monitoring patients and care (CM and education (Shared), but there was wide variation among clinics in perceived difficulty and impact of various tasks, particularly connecting patients with community resources and interacting with external nursing home facilities in different areas. Results of other questionnaire areas will be presented. Conclusions: Design characteristics, process measures and patient-level outcomes are all important in assessing benefits of a PCMH program, and this work contributes additional tools for measuring provider perspectives and variation in implementation across different PCMH sites.

Keywords: Patient-centered medical home; Primary care
doi:10.3121/cmrr.2014.1250.d2-3

D2-4:  Failure on Cognitive Screening Predicts Increased Healthcare Utilization

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1HealthPartners

Background/Aims: Most physicians fail to diagnose dementia until the moderate-severe stages. Cognitive screening for dementia in the asymptomatic population is not routinely performed due to the absence of evidence showing improved health outcomes. HealthPartners has piloted the use of the Mini-Cog as a standardized screening tool for cognitive function in patients aged 65 and older in order to assess the impact of undetected cognitive impairment on chronic disease management and healthcare utilization. Methods: Patients screened within specialty or primary care clinics were identified. Data from the 18 months prior to screening was collected from the electronic medical record and included the Mini-cog score (scored 0–5, fail is less than 4), demographics, presence of diagnosis for four chronic diseases (diabetes, hypertension, hyperlipidemia, heart disease), measures of chronic disease management (HbA1c, blood pressure, lipid panel, INR levels), and measures of healthcare utilization. Data analysis consisted of Poisson regression and normal mixed effects regression. Results: The Mini-Cog was administered in 753 patients (average 77 yr, 58% female) and 33% failed screening. No significant differences in chronic disease management were identified in the 18 months prior to screening between the patients that passed and failed. However, patients failing the Mini-Cog had a significantly higher incidence rate of hospitalizations (24%), emergency room visits (58%), appointment no shows (76%), cancelled visits (23%), and phone encounters (11%). In a sub-analysis, patients failing screening in specialty care (193 of 554) had a higher incidence rate of appointment no shows (82%), but no difference in hospitalizations. In contrast, patients failing screening in primary care (56 of 199) showed a more profound effect on crisis driven care (a 134% and 411% increase in hospitalization and emergency room visit rates, respectively compared to those passing), but no difference in appointment no shows. Conclusions: Standardized cognitive screening in older adults has the potential to not only diagnosis dementia at its earliest stages, but also to identify at-risk individuals with higher healthcare utilization. The next step is to examine post-screen data for any changes in chronic disease management or healthcare utilization.

Keywords: Aging; Dementia
doi:10.3121/cmrr.2014.1250.d2-4

D2-5:  Interpersonal Continuity of Care and Utilization Among Multimorbid Seniors in an Integrated Healthcare System

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Background/Aims: Greater continuity of care (CoC) is associated with lower hospital utilization. This has not been fully explored in integrated care delivery systems with high informational continuity. Methods: We determined associations between hospital utilization and: the Modified, Modified Continuity Index (MMCI), the Continuity of Care Index (COCI), and patient-reported care integration, in 2 retrospective cohorts of persons age 65+ with 3+ chronic conditions. A primary cohort (N = 806) reported care integration as measured by the Ambulatory Care Experiences Survey (ACES) in addition to administratively-measured CoC data; a secondary cohort (N = 11,394) had CoC data only. CoC and outcomes were measured over a 2-year period. Outcomes included: 1+ inpatient admissions (total and preventable), observation stays, and treat-and-release ED visits. Associations were evaluated with Wilcoxon Rank Sum tests. Results: Cohorts had similar age, gender, and morbidity. Median (5%,95%) scores for ACES domains were all 90 (50,100). CoC measures had different distributions, but were highly correlated: Median MMCI scores for primary and secondary cohorts were 0.54 (0.23, 0.80) and 0.55 (0.26, 0.84) respectively; COCI scores for primary and secondary cohorts were 0.17 (0.05, 0.53) and 0.20 (0.05, 0.65). In the primary cohort, ACES domains were not associated with having an inpatient admission, preventable admission, or observation stay; those with 1+ ED visit reported slightly lower team coordination; and no associations were observed between CoC measures and outcomes. In the secondary cohort, higher mean MMCI scores were associated with slightly greater utilization for all outcomes, whereas higher mean COCI scores were associated with slightly lower utilization. Conclusions: Differences in CoC among those with and without hospital use were statistically but not clinically significant. For multimorbid patients in a highly integrated system, the value of interpersonal continuity is unlikely to be demonstrated by a reduction in hospital utilization, which may be more a function of informational continuity.

Keywords: Multimorbidity; Continuity of care
doi:10.3121/cmrr.2014.1250.d2-5

PS2-10:  Predictors of Depression and Poor Physical Health among Patients with Chronic Hepatitis C Infection: Results from the Chronic Hepatitis Cohort Study

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Background/Aims: Our objective was to assess risk factors for depression and poor physical health among patients with chronic hepatitis C virus (HCV) infection. Methods: We conducted a survey of HCV patients seen at...
4 large healthcare systems with laboratory-confirmed HCV. A total of 4,781 patients completed surveys in 2011-2012 (completion rate = 60%). Survey data included demographics, PHQ-8 depression, SF-8 physical health, level of social support, stress exposures, and from the medical record, HCV treatment history and the Charlson comorbidity score. Results: The mean age of patients was 57 (SD = 18), 71% (95% CI = 70-72) were Caucasian, 57% (95% CI = 56-58) male, 47% (95% CI = 46-49) had been treated for HCV, 51% (95% CI = 50-53) reported past injection drug use, 60% were HCV genotype 1, and 15% (95% CI = 14-15) had confirmed sustained viral response (SVR) to HCV therapy. Altogether, 30% of patients (95% CI = 28-31) met criteria for current depression on the PHQ-8 and 25% (95% CI = 23-26) had poor physical health on SF-8. In multivariate logistic analyses, the best predictors of depression included female gender (OR = 1.34, \( P < 0.001 \)) age (OR = 0.83, \( P < 0.001 \)), Caucasian race (OR = 1.42, \( P < 0.001 \)), unemployment (OR = 2.98, \( P < 0.001 \)), high stressor exposure vs. low (OR = 2.61, \( P < 0.001 \)), low social support vs. high (OR = 1.73, \( P < 0.001 \)), history of drug rehabilitation (OR = 1.45, \( P < 0.001 \)), and higher Charlson comorbidity scores (OR = 1.17, \( P < 0.001 \)). Having SVR to HCV therapy, was protective for depression (OR = 0.77, \( P = 0.017 \)). The best predictors of poor physical health included Caucasian race (OR = 1.46, \( P < 0.001 \)), unemployment (OR = 3.96, \( P < 0.001 \)), higher Charlson scores (OR = 1.28, \( P < 0.001 \)), high stressor exposure vs. low (OR = 1.78, \( P < 0.001 \)), and moderate social support vs. low (OR = 1.48, \( P < 0.001 \)). Counter to expectation, injection drug use history was protective of poor physical health (OR = 0.71, \( P < 0.001 \)). Conclusions: Among HCV patients, the best predictors of depression and poor physical health were demographic factors, employment status, Charlson scores, current life stressors, and current social support. While SVR was protective for depression, HCV treatment history was generally not associated with mental health or physical health status, once other covariates were controlled.

Keywords: Chronic hepatitis C; Depression
Ps2-8:
Development and Implementation of Clinical Decision Support Tools in Epic to Standardize Dementia Diagnosis and Care at Essentia Health

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Background/Aims: The current estimated prevalence of Alzheimer’s disease and related dementias in the US is over 5 million and projected to increase to over 15 million by 2050. The already overwhelming personal and economic burden this represents for patients, families, and health care providers is only expected to increase as well. Essentia Health recognizes the urgent need to standardize dementia diagnosis and management system-wide to enhance earlier detection of cognitive issues that will lead to better management of dementia and comorbid conditions to reduce the burden of this devastating disease and improve quality of life for patients and their caregivers. Methods: The Division of Primary Care at Essentia Health is developing a standardized approach to dementia diagnosis and care to be implemented system-wide. An advisory workgroup consisting of physicians and NPs from primary care (family practice, internal medicine), specialty care (elder care, neurology, neuropsychology), and community partners (Alzheimer’s Association, Arrowhead Area Agency on Aging, Family Memory Care Consultants) continues to meet monthly to plan integration and implementation. We have initiated a pilot study in two of our primary care clinics to implement and evaluate this approach and to inform further development. Results: Two separate smartsets have been created—the EH Memory Screen/MiniCog Smartset (MCOG Set) and the Memory Screen/MOCA Smartset (MOCA Set). The first is intended to guide cognitive screening at the annual wellness visit (AWV) and the other to serve as a guide for a follow-up examination if indicated from the MOCA Set. Conclusions: We plan to present both quantitative and qualitative information based on our experience through the first few months of implementation. This will include a thorough evaluation of the work plan as well as lessons learned to inform further implementation at EH and other systems.

Keywords: Clinical decision support; Dementia
doi:10.3121/cmr.2014.1250.ps2-8

Ps2-9:
The KPSC Experience of Recruiting 18-year old Emerging Adults

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Background/Aims: The challenges of obesity interventions have led researchers and policy makers to focus on obesity prevention. Studying normal weight individuals as they transition from adolescence into adulthood is an interesting group because they have avoided obesity thus far in their life. However, it is a period of weight gain. HMOs have unparalleled access to young adults, but they are typically hard to reach; effective methods to recruit them into studies are relatively unknown. The purpose of this study was to identify effective recruitment methods of 18 year old Kaiser Permanente Southern California (KPSC) members. Methods: The study population was age 18 years in 2012, had at least one outpatient visit with a body mass index (BMI) in 2012, was generally healthy, and normal weight (BMI <25 kg/m2). From over 13,000 individuals that met criteria, 500 were randomly selected (55% female) to be contacted through mail, telephone, email, or text. We asked them to complete a 9-item survey. Recruitment was conducted over 6 weeks by 2 research associates. Attempts were made to contact 320 individuals, of which 185 members had an email in our electronic records. The protocol allowed for 5 email attempts, after which telephone attempts were made. Results: Overall 82 persons (25.6%) completed the survey and 30 (9%) actively refused. For those with an email, 27 surveys were completed (15%), with 4 refusals. Another 23 completed the survey by telephone, with 8 refusals. Of the telephone-only persons, 32 surveys were completed and 18 refused. Incorrect contact information was found for 23 persons. At the end of 6 weeks, we did not reach the remaining members, although anecdotaly we spoke to many parents. Conclusions: Future efforts may require more staff time. Even though the members were adults, many parents were still gatekeepers for their children. It may be more effective to target a younger age group to recruit parents as well as children to obtain informed consent.

Keywords: Emerging adults; Recruitment
doi:10.3121/cmr.2014.1250.ps2-9

C2-1:
Choosing Hospice or Choosing Dying: The Cultural and Medical Meanings of “Hospice” and the Role of Provider Referrals in Transition to Hospice Care

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Background/Aims: Hospice care is widely used at the end of life yet it remains stigmatized and feared. Current research on the transition to hospice overlooks the dimension of patient choice and the symbolic importance of hospice to patients and families. Understanding the transition from the point of view of patients and family members is critical in increasing use of hospice care and decreasing “late referrals.” Methods: This research draws on in-depth retrospective interviews with 18 patients in home hospice care in the United States and 11 family members/caregivers. Results: Examining narratives about transitioning to hospice reveals two insights. First, the referral is one highly variable element of a more complex process better conceptualized as a transition. Transitions may be (1) provider-driven or (2) patient/family-driven. Some patients and families play a very active role in this transition, including self-referring to hospice. Second, the style of provider referrals is commonly remembered as being very negative. Negative referrals tend to draw on a cultural meaning of hospice as “giving up” or “choosing dying”, while positive referrals conceptualize hospice as a medical and psychosocial strategy that is advantageous for patients and families. Conclusions: Understanding referral as a discrete, but critical component of a longer strategy for transitioning to hospice care, should lead providers to carefully plan when and how they present hospice care to patients. Understanding the spectrum of patient and family perspectives can also improve providers’ ability to customize their referrals and the likelihood that patients will transition to hospice care if and when it would benefit them.

Keywords: Hospice; Referral
doi:10.3121/cmr.2014.1250.c2-1

C2-2:
Assessing Patient Perceptions of Communication throughout Cancer Care: Results of an Initial Administration of a New Item Set

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Background/Aims: Patient-centered communication is vital to quality care. Strategies are needed for assessing patients’ views on communication over the entire course of cancer care. We sought to describe cancer patients’ perceptions of their communication experiences using a new set of items. Of particular interest were patients’ reports of when communication “fell short” and the aspects of communication considered most important. Methods: We
surveyed members of Kaiser Permanente (KP) Member Voice, a representative online panel of KP members. Questions focused on communication with the cancer care team overall and during specific phases (e.g., diagnosis, chemotherapy). Respondents indicating less than excellent communication were asked to describe how communication fell short. We asked all respondents what aspects of communication were most important during cancer care. Results: A total of 375 members diagnosed with cancer completed the questionnaire. Respondents represented all KP regions; 57% (212/375) were female; 62% (233/375) had at least a college degree. Overall communication ratings varied by phase of care; the percentage of respondents rating “excellent” was lowest for Diagnosis (62%; 225/365); corresponding percentages for other phases included Decision-Making 71% (248/352); Surgery 73% (212/290); Radiation 65% (68/105); Drug Therapy 76% (82/108); Completing Treatment 70% (237/340). Only 55% (189/342) of respondents “strongly agreed” they were told their diagnosis in a sensitive, caring way. Asked where communication fell short, patients cited problems in providers' manner, as well as the amount, timing and clarity of information. Initial analysis of what was most important revealed themes related to being treated like a person, conveying caring and optimism and providing clear, complete and timely information. Conclusions: Patients are willing to provide timely and use of web-based tools by health care providers and patients for obtaining information about health promotion and disease management. Our study aimed to review the available online cancer prognostic tools, to provide input on the implications for their use in clinical settings, and to create a centralized repository for providers to access. Methods: Using a systematic approach, we searched the Internet, Medline, and consulted with experts to identify existing online prognostic tools. To be eligible, tools had to have an English version, focus on cancer, have an interactive component, and provide at least one of the following output measures: cancer or non-cancer specific mortality/overall survival; disease free survival (DFS)/recurrence; clinical response to treatment; progression free survival (PFS)/spread; cancer therapy induced side effects. Each tool was reviewed for content and format. Results: Twenty-two prognostic tools addressing 89 different cancers (min: 1, max: 84) were identified. We classified unique cancer sites under 13 main categories. Tools focused on prostate (n = 11), colorectal (n = 10), breast (n = 8), and melanoma (n = 6), though at least one tool was identified for most malignancies. The input variables for the tools included cancer characteristics (n = 22), with fewer having inputs for patient characteristics (n = 18) or comorbidities (n = 9). Effect of therapy on prognosis was included in 19 tools. The most common predicted outcome was cancer specific survival/mortality (n = 17) followed by disease free survival (DFS)/recurrence (n = 14). While all of the tools were available online, only four suggested usability by patients. Conclusions: The process of identifying available tools was time consuming as there was no one location where all existing cancer prognostic tools were easily accessible and compared. Using a systematic review, we identified and compiled a comprehensive repository of 22 currently existing online prognostic tools. A website was created for these tools: www.cancercalculator.org. Cancer prognostic tools hold great promise in facilitating patient-centered communication and decision-making and helping patients prepare for life post treatment.

Keywords: Cancer; Communication

doi:10.3121/cmr.2014.1250.c2-2

C2-3: Cancer Prognostic Resources: A Systematic Review and Central Repository of Web-based Cancer Prognostic Calculators

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Background/Aims: Cancer prognosis is one of the leading topics of interest for cancer patients, their caregivers and providers. Literature suggests that nomograms that use prognostic algorithms integrating several predictors improve prognostic accuracy. There has been increasing interest in the availability and use of web-based tools by health care providers and patients for obtaining information about health promotion and disease management. Our study aimed to review the available online cancer prognostic tools, to provide input on the implications for their use in clinical settings, and to create a centralized repository for providers to access.

Methods: Using a systematic approach, we searched the Internet, Medline, and consulted with experts to identify existing online prognostic tools. To be eligible, tools had to have an English version, focus on cancer, have an interactive component, and provide at least one of the following output measures: cancer or non-cancer specific mortality/overall survival; disease free survival (DFS)/recurrence; clinical response to treatment; progression free survival (PFS)/spread; cancer therapy induced side effects. Each tool was reviewed for content and format.

Results: Twenty-two prognostic tools addressing 89 different cancers (min: 1, max: 84) were identified. We classified unique cancer sites under 13 main categories. Tools focused on prostate (n = 11), colorectal (n = 10), breast (n = 8), and melanoma (n = 6), though at least one tool was identified for most malignancies. The input variables for the tools included cancer characteristics (n = 22), with fewer having inputs for patient characteristics (n = 18) or comorbidities (n = 9). Effect of therapy on prognosis was included in 19 tools. The most common predicted outcome was cancer specific survival/mortality (n = 17) followed by disease free survival (DFS)/recurrence (n = 14). While all of the tools were available online, only four suggested usability by patients.

Conclusions: The process of identifying available tools was time consuming as there was no one location where all existing cancer prognostic tools were easily accessible and compared. Using a systematic review, we identified and compiled a comprehensive repository of 22 currently existing online prognostic tools. A website was created for these tools: www.cancercalculator.org. Cancer prognostic tools hold great promise in facilitating patient-centered communication and decision-making and helping patients prepare for life post treatment.

Keywords: Prognosis; Prediction

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C2-4: Implementing an Evidence-based Breast Cancer Support Tool for Newly Diagnosed Breast Cancer Patients as Standard Care at Two Institutions

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Background/Aims: While many women turn to the Internet to obtain information, it is unlikely that unstructured internet use provides optimal benefit to women newly diagnosed with breast cancer, due to uneven quality, conflicting claims, redundancy, and search engine idiosyncrasies which may mask finding desired information more difficult. To answer the need for information and support, an Interactive Cancer Communication System (“CHESS”) was developed, validated in several randomized trials, and is now being implemented to provide access to integrated information for decision-making, behavior change, and emotional support. We implemented a program to offer CHESS to all newly-diagnosed breast cancer patients as part of standard care (not as part of a research study) at two Denver healthcare systems: Kaiser Permanente Colorado (KPCCO), and Exempla Health Care (EHC), which serves a larger proportion of minorities and those without insurance.

Methods: All women who receive a breast cancer diagnosis at KPCCO and EHC are to be offered access to CHESS during or very shortly after notification of their diagnosis and throughout the treatment process, thus making CHESS a part of standard care for hundreds of breast cancer patients. By qualitatively tracking the contextual factors related to CHESS implementation by date and occurrence, and through patient and provider interviews and surveys, this study is evaluating the real-world feasibility of CHESS integration into standard care.

Results: We will report on the process of real-world implementation of CHESS at KPCCO and EHC, the barriers to and facilitators of integrating the CHESS resource into standard care, and the expected and final process of how CHESS was finally integrated into standard care at each institution as a case-study example. We will also report on the initial impact of CHESS integration on the breast cancer care process and on providers at each institution.

Conclusions: This case-study example demonstrates how CHESS implementation is informing dissemination to other KP regions and organizations and how the evaluation and tracking process provides guidance for implementation of other programs in large organizations.

Keywords: Breast cancer; Implementation

doi:10.3121/cmr.2014.1250.c2-4

PSI-48: A Patient-centered Electronic Education Tool for Establishing Weight Loss Expectations after Bariatric Surgery

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Background/Aims: Bariatric surgery candidates often struggle when deciding between intensive lifestyle therapy, pharmacological therapy, and/or bariatric surgery for achieving their long-term weight loss (WL) goals. Moreover, they often have unrealistic WL expectations prior to surgery. Despite huge individual variation in surgically induced WL, patient education is currently based on average WL results derived from program experience or published literature. Improved patient education tools are needed to provide realistic individual expectations for surgical WL. The purpose of this study was to develop an electronic application for patient education that can aid in surgical decisions, establishing realistic WL goals, and monitoring WL success.

Methods: Post-operative weight measurements from 2608 Roux-en-Y gastric bypass patients at Geisinger Clinic were collected over an eight
year period. While accounting for surgical BMI and age, quantile regression was used to create expected WL curves (10th, 25th, 50th, 75th, and 90th percentile) for the 36 month post-operative period. **Results:** A mobile application (Get-2-Good) was designed to provide a simple, personalized interface that allows patients to track their WL and compare their WL results to their expected WL curves. Get-2-Good was made publicly available at no cost on a popular Apps store and is compatible with current smartphone and tablet technology (>1000 downloads to date). Get-2-Good allows patients to input their personal profile (e.g., age, BMI), review their expected WL, and track their WL post-operatively. Patients have the option of saving a graphic containing their personalized WL curves and e-mailing a tabular form of their WL results to family, friends, and/or care providers. **Conclusions:** Get-2-Good is a simple tool that may be used by Bariatric Surgery Programs to facilitate electronic patient education. This tool may assist patients in deciding to proceed to WL surgery, and will facilitate early identification of patients who are struggling with WL or weight maintenance. Future modifications of this methodology can be used to personalize other comorbidity outcomes such as diabetes resolution.

**Keywords:** Patient-centered; Bariatric surgery

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## Embedded Research

### A3-1: The Just Do It Playbook for Implementation Science

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**Background/Aims:** There are over 60 published implementation science frameworks, and despite the advantages of each, none were designed to help clinicians and administrators to standardize and prioritize initiatives, implement programs efficiently, and evaluate with sufficient rigor. **Methods:** In order to address these limitations, the Care Improvement Research Team (CIRT) at Kaiser Permanente Southern California blended implementation and behavior change frameworks into a structured process to help clinicians, operations leaders and researchers to standardize their approach and accomplish collaborative goals. To develop the “Just Do It Playbook,” we performed a pragmatic literature review, compared and synthesized published frameworks, and iteratively refined a set of steps for identifying, diagnosing and correcting gaps in care. **Results:** The Just Do It Playbook can be simplified into four distinct steps: 1) describe the topic that needs improvement, 2) identify what or who needs to change, 3) develop an implementation strategy to facilitate change, and 4) evaluate the effectiveness of the strategy. The first step helps to prioritize the topic of interest and identifies whether there is a gap between current and best practices. Second, describing what or who needs to improve will enable identification of barriers or facilitators to change. The third step identifies strategies to promote best practices by using established behavior change theories as well as clearly defined and measurable outcomes. The final step evaluates the outcomes, costs and sustainability of the strategy, as well as the need to discontinue efforts, modify and re-evaluate, or disseminate to other settings.

**Conclusions:** In a learning health care system, there are many potential targets for improvement, and many strategies for implementation and evaluation. One way to simplify the complexities that inherently exist in health system improvement is to adopt a standardized approach. As clinicians, administrators and researchers forge meaningful collaborations, a standard process can improve the understanding of competing priorities, define roles and responsibilities, and integrate established scientific frameworks in a way that is efficient and sustainable. The Just Do It Playbook will need to be tested and adapted to individual projects, but will provide a platform to build embedded research into a functional operational standard.

**Keywords:** Research-operations partnership; Implementation science
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## Implementing a Pragmatic Clinical Trial: Lessons Learned about Embedded Research

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**Background/Aims:** Pragmatic trials are fostering a paradigm shift to increasingly embed research into healthcare settings. Pragmatic trials test interventions in real world settings representative of those targeted for dissemination to promote robust, sustainable changes within the health care system. Kaiser Permanente’s Center for Health Research, is conducting a pragmatic trial to test the effectiveness of teaching pain self-management skills using interdisciplinary teams within primary care in three Kaiser regions. Implementation requires a pragmatic approach to create a working relationship between health system leaders and the research team. We present lessons learned during our preparatory year in which we partnered with health systems to build an embedded research infrastructure for the study.

**Methods:** In accordance with a pragmatic approach, we used the Rapid Assessment Process (RAP) whereby the fieldwork team gathers and analyzes information quickly in the form of journal entries and detailed meeting minutes following stakeholder encounters and regular team meetings to document the emerging collective understanding of stakeholders’ expressed concerns and informational needs. This approach allows for iterative feedback from operational stakeholders and accommodates quick trial modifications. **Results:** Using RAP to systematically identify lessons learned, several guiding principles surfaced for successfully embedding research into a healthcare system. The study foundation must come from a need identified by the health system, not the research team. Study outcomes must have obvious utility to operational leaders and practicing providers.
Health plan administrators and clinicians have pre-existing ideas of research that necessitate ongoing education and dialogue to address concerns. Using a framework of change native to the health system promotes navigation of potentially disruptive change. Given rapid changes within health systems, the research team must be aware of competing contextual factors. Finally, a true health system/research partnership when staffing the intervention facilitates sustainability of intervention related services. **Conclusions:** A pragmatic trial approach, although better suited for embedded research in the healthcare system, presents challenges not typically encountered in standard explanatory/efficacy lessons. Lessons learned by this team that accommodate both healthcare operations and research can promote embedded research in other health settings.

**Keywords:** Pragmatic clinical trial; Chronic pain

doi:10.3121/cmr.2014.1250.a3-4

A3-5:

**Research-Operations Partnerships to Improve the Quality and Affordability of Care**

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**Background/Aims:** A learning health care organization requires visionary leadership to achieve the triple aim of better health, better care, and improved affordability. Effective research-operations partnerships (ROPs) can facilitate improvement efforts. Although ROPs are not novel, the process of establishing sustainable collaborations and overcoming challenges to achieve shared objectives is not well described. **Methods:** In 2012, the executive leadership of Kaiser Permanente Southern California (KPSC) made a multi-million dollar investment by creating the Care Improvement Research Team (CIRT) within the Department of Research and Evaluation. Members of this team developed and refined ideas about ROPs by reviewing published literature, conducting semi-structured interviews with key operational leaders, consulting with experts, and sponsoring an all-day retreat on this theme. **Results:** Key elements of the initiative include: (1) recruitment of health care researchers with complementary clinical and methodological experience, supported by an expert consultant in implementation science; (2) selection of research questions that are clearly aligned with organizational priorities; (3) development of strong, sustainable relationships with key stakeholders across multiple levels of the organization, through outreach and embedding of researchers in operational work groups; (4) dedication of internal funds to cover effort of research support staff; (5) creation of a strategic plan to define roles, responsibilities, and goals that allow for measurement of the program’s success. Key challenges to overcome include: (1) limited availability of external funds to support research that addresses operational imperatives; (2) mismatched timelines and incentives; (3) legal constraints that hamper data sharing between research and operations; and (4) balancing research rigor with operational relevance. **Conclusions:** Prioritizing competing initiatives, identifying opportunities for early success, and aligning operational priorities with research opportunities will require continued effort. Given the austere external funding environment, novel ways to support delivery system science are needed. The creation of the CIRT at KPSC represents a strategic investment from visionary leaders who embody the credo to “be the best at getting better” and who recognize that the development of strong and sustainable ROPs will be invaluable if we are to achieve the triple aim.

**Keywords:** Partnerships; Care improvement
doi:10.3121/cmr.2014.1250.a3-5

PSI-20:

**Understanding Patient Barriers and Preferences to Completing Advance Directives (AD) in the Primary Care Setting**

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**Background/Aims:** Advance Care Planning (ACP) is a complex process that allows individuals to contemplate and document end of life decisions using tools such as an Advance Directive (AD). The proportion of patients who have an AD on file remains low both nationally and at Geisinger. To date, little research has focused on healthy populations’ attitudes towards ACP and AD completion. We describe the design and implementation of a web-based application to collect patients’ preferences for and barriers to AD completion in a large, non-disease primary care population. **Methods:** We developed a simple web application and questionnaire (denoted “eACP”) designed to educate patients about completing an AD. The eACP application was automatically presented on a touchscreen computer to all patients aged 50-64 who were seen in one of 5 Geisinger Clinic locations for a routine appointment. The questionnaire introduced ACP as a part of good healthcare and asked patients if they were interested in learning more. Patients who chose not to learn more indicated why they declined. Patients who elected to learn more selected topics of AD completion for which they would like more information and indicated how they wished to review the information. **Results:** A total of 2169 patients completed the questionnaire using the eACP application in 5 practice sites between 07/31/13 and 10/30/13. Nearly 40% (852/2169) of patients were interested in learning more while 49.8% (1080/2169) were not. The primary reasons for declining to learn more included lack of time, a preference for leaving the choice to others, or prior AD completion. Among the patients who elected to learn more, the most common topics of interest were the process of completing an AD (e.g., what goes into an AD and how/when to complete it). Patients had a strong preference for printed materials (70%) versus using a website (30%) or talking to a healthcare professional (~10%). **Conclusions:** Our findings suggest that patients desire more education on ADs but prefer to receive it in a paper format versus online or via a discussion with their provider.

**Keywords:** Patient-reported data; Advance care planning

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PSI-21:

**Development and Dissemination of Quality Review Tools for Data Management and Analysis**

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**Background/Aims:** Within embedded HMO research groups, analytic teams are heavily involved with many key stages of research studies. Individual analytic team members use a variety of processes for ensuring work quality. Identification and standardization of analytic quality review best practices may lead to greater efficiencies and fewer errors. The objective of this quality improvement project was to develop and implement tools to enhance the quality and consistency of analytic work within a HMO-based research group. **Methods:** We used a multi-modal approach to develop and assess analytic quality review tools. We first conducted four in-depth interviews with principal investigators to collect experiences and suggestions for improving analytic processes. Using an online survey, we collected best practices from analytic team members. We also interviewed analytic leads with 6 HMO and academic partner research groups on their best practices. We integrated all information and developed analytic quality review best practice documentation and tools. We tested and revised the tools, estimated time requirements, and provided basic training to our analytic team. Nine months later, we conducted an anonymous online survey to gauge uptake of these tools and to collect initial feedback from early adopters. **Results:** Four analytic quality review tools were developed to help formalize best practices for cohort-building/data pulls, data preparation (code review), analytic dataset preparation and documentation, and manuscript methods and results review. In initial assessments, implementing the code review was the most resource-intensive, taking upwards of 14 hours. Nine months after introducing these tools, the most commonly reported challenges to using the tools included lack of time/funding, using other processes to ensure work quality, and lack of knowledge on when or how to use the tools. Early adopters gave qualitative feedback that the tools helped structure analytic processes and encouraged documentation of analytic decisions. **Conclusions:** Identification and standardization of best practices may have the potential to improve analytic work processes for HMO research groups. Future efforts should focus on quality review tool revisions, policies for tool use, data collection.
on errors found using review tools, and strategies to overcome identified barriers to using the tools.

**Keywords:** Quality improvement; Analytics

**doi:** 10.3121/cmr.2014.1250.ps1-21

### PS1-22:

**Final Results from a Study of the Collaborative Care Model for Primary Care of Depression (DIAMOND) in 76 Clinics in Minnesota**

Leif Solberg1; Lauren Crain1; Jurgen Unutzer2; Arne Beck3; Nancy Jaekels4; Robin Whitebird3; Rebecca Rossom1; Kris Ohnsgaard1; Lisa Rubenstein1; Michael Maciosek1

1HealthPartners; 2University of Washington; 3Kaiser Permanente Colorado; 4Institute for Clinical Systems Improvement; 5RAND

**Background/Aims:** The collaborative care model for primary care of depression has a very strong evidence base, but has been little implemented. A statewide initiative (called DIAMOND) to implement it widely in Minnesota along with a new payment provided an opportunity for an embedded partnership research study of its implementation and impacts on the use of evidence-based care processes and depression symptoms for patients with depression.

**Methods:** All 76 clinics participating in the staggered implementation initiative agreed to cooperate with the study. Potential patient subjects were identified from weekly submission of new antidepressant fills by seven health plans for a baseline and 6 month follow-up survey of care received and PHQ9 scores. Medical and administrative leaders of clinics completed implementation surveys at baseline and 1 and 2 years after implementation. **Results:** 2,348 patients with depression completed baseline surveys and 1,578 (67%) subjects completed 6 month follow-ups. Of those with follow-up data, 245 received DIAMOND care, 466 received usual care in DIAMOND clinics pre-implementation, 559 received usual care post-implementation, and 308 received usual care in clinics that signed up for DIAMOND but never implemented it. We have data on the extent of implementation and depression remission rates for each of these groups and they will be ready for presentation at the conference.

**Conclusions:** To be announced at the conference.

**Keywords:** Depression; Pragmatic trial

**doi:** 10.3121/cmr.2014.1250.ps1-22

### PS1-49:

**Comparative Health Systems Research among Integrated Delivery Systems and Managed Care Organizations: A Systematic Review**

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1Mid-Atlantic Permanente Research Institute; 2Kaiser Foundation Research Institute

**Background/Aims:** Due to rising health care costs and wide variations in quality, the U.S. health care system is undergoing rapid changes that include payment reform and movement towards integrated delivery systems (IDSs). Well-established IDSs, such as Kaiser Permanente (KP), must begin to identify the specific system-level factors that result in superior patient outcomes in response to policymakers' concerns. Comparative health systems research is one area that can provide insights into what particular aspects of the IDS results in improved care delivery. The objective of this systematic review was to examine the existing published studies on comparative health systems that relate to IDSs and KP to obtain a baseline understanding of the state of comparative health systems research to provide foundational knowledge. We also sought to identify the gaps in the literature on comparative health systems research.

**Methods:** We conducted a literature search on PubMed and an internal KP Publications Library. Studies that compared KP as a system or organization to other health care systems, or across KP facilities internally were included. The literature search resulted in a total of 1,605 articles, of which 65 met the study inclusion and were examined by three reviewers.

**Results:** The majority of comparative health system studies focused on intra-KP comparisons (n = 42). Fewer studies compared KP to other U.S. health care system (n = 15) or to international health care systems (n = 12).

**Conclusions:** Of all studies published by or about KP, only a small proportion of articles were identified as being comparative health systems research. Additional empirical studies that compare the specific factors of the IDS model with other systems of care is urgently needed to better understand the “system-level” factors that result in improved and/or diminished care delivery.

**Keywords:** Integrated delivery systems; Comparative health systems

**doi:** 10.3121/cmr.2014.1250.ps1-49

### PS1-35:

**Transition to Electronic In-clinic Data Capture of Questionnaires Increases Collection Rates**

Ryan Colonie1; G Craig Wood1; Chris Seiler1; Jamie Seiler1; Chris Still1

1Geisinger Health System

**Background/Aims:** Geisinger bariatric surgery patients complete questionnaires at various points throughout the program as part of their standard care. Until recently, this was done using paper copies completed at home, resulting in unacceptably low response rates. Opportunities to capture missed responses exist, but are difficult to identify in a busy medical clinic. The purpose of this study is to improve patient questionnaire completion rate using in-clinic capture while minimizing the impact on clinic efficiency.

**Methods:** Planning meetings for implementation of the in-clinic collection process involved various stakeholders including researchers, clinicians, nurses, and front desk staff. Several options were considered for location (waiting room versus patient room) and for collection tool (tablets versus touch screens). The stakeholders agreed to implement a process using touch screens in the patient room. This process was piloted and patient interaction with the tool was evaluated. A 15 minute visit was prepended to the patients regularly scheduled visit to allow time for completion. Specialized software was used to implement and collect the touchscreen responses. Historical collection rates were compared to the pilot results.

**Results:** During the pilot, 50 of 52 patients (96%) completed the touchscreen questionnaires. Mean time for completion of 140 questions was 15 minutes, which fell within the estimated time of our prepended visit. Time for the nurse to introduce the tool was under 2 minutes. While 38% of patients described some issue with using the tool, all patients rated the ease of use as ‘Easy’ or ‘Very Easy’. Specific issues included patients understanding of the questions and first time use of a touch screen. The completion rate during the pilot was significantly higher than the historical completion rate (96% versus 65%, P <0.0001).

**Conclusions:** Capture of in-clinic electronic questionnaires is feasible, but requires full support from providers, nurses, and front desk/scheduling staff. Long term integration may provide higher capture rates, which may result in improved patient care (i.e. allow the providers to directly address any issues raised by the responses) and better research.

**Keywords:** Questionnaire; Electronic capture

**doi:** 10.3121/cmr.2014.1250.ps1-35

### Genetics

**PS2-15:**

**Racial Disparities in Biobank Participation among Men in Southern California**

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1Kaiser Permanente Southern California

**Background/Aims:** Previous research suggests that participation of men in research is particularly low. We sought to identify predictors of participation among men in different racial groups in order to optimize future recruitment strategies.

**Methods:** We assessed predictors of participation on randomly selected Kaiser Permanente Southern California male members = 18 years of age (n = 90,199) between November 2012 and June 2013. Men were asked to provide saliva samples for a research biobank. Potential predictors of participation were age, long-term membership (= 5 years), no significant gaps in health care coverage (<3 month in last 3 years), physical examination within the last 3 years and neighborhood education and income.

**Results:** Overall participation among men was 4.4%. Restricting recruitment to men with at least 5 years of membership, no significant gaps in health care coverage, and at least one physical examination, improved participation from...
Background/Aims: The aim of this study is to identify predictors of participation in women of different racial groups to optimize future recruitment efforts. Methods: We randomly selected and assessed predictors of participation on Kaiser Permanente Southern California adult female members (n = 107,378) between November 2012 and June 2013. Women were asked to provide a saliva sample for a research biobank. Potential predictors of participation were age, long-term membership (≥ 5 years), no significant gaps in health care coverage (< 3 month in last 3 years), physical examination within the last 3 years and neighborhood education and income.

Results: The overall participation among women was 6.8%. Restricting recruitment to women with ≥ 5 years of membership, no major gaps in health care coverage, and at least one physical examination within the last 3 years improved participation in Whites (from 7.1% to 14.3) and Hispanics (from 2.5% to 5.0%) but only modestly in Blacks (from 2.0% to 3.6%). In logistic regression models predicting participation, the strongest predictors in Whites and Hispanics were having a physical examination (OR 1.25, 95%-CI 1.12-1.37 in Whites and 1.45, 1.28-1.65 in Hispanics) and long-term membership (OR 1.19, 95%-CI 1.12-1.27 in Whites and 1.32, 1.16-1.50 in Hispanics). None of the restrictions significantly predicted participation in Blacks (p for interaction with race < 0.001).

Conclusions: Applying restrictions based on regular physical examinations and longer membership may potentially increase participation of non-Hispanic White and Hispanic women in a research biorepository.

Keywords: Biobank; Racial disparities

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B1-3: Improving Surgical Case Duration Accuracy with Advanced Predictive Modeling

Ronald Dravenssot1; Eric Reich1; Steven Strongwater1; Priyanka Devapriya1

1 Geisinger Health System Clinical Innovations

Background/Aims: The Operating Room (OR) is a large source of revenue and one of the most costly departments in a hospital. Scheduling surgeries into an OR is complicated by the inherent uncertainty associated with each surgery. The case length of a surgery at Geisinger is predicted using a moving average of the 10 previous procedures performed by a given surgeon. A process capability analysis was performed to gauge the ability of each surgical procedure to be within ± 15 minutes of scheduled time. This analysis demonstrated a low process capability across all surgeries. This research aims to create a process to better predict the surgical case length by leveraging the Electronic Health Records, which can enable more efficient scheduling and use of the ORs. Methods: Based on a literature review and the results of an internally conducted survey of OR staff, a dataset was constructed with 135 predictors. A test dataset was randomly separated from the training dataset for validation. Predictive models were developed using Stepwise Linear Regression (LR) and Artificial Neural Networks (ANNs). Multilayer Perceptron ANNs with 2 hidden layers using a sigmoid transfer function and Delta Bar Delta learning algorithm tended to perform the best. The final model contains the 39 most sensitive predictor variables from the ANN model and the LR model. Results: In all cases, the predictive models significantly improved the case duration accuracy. The ANN models outperformed the LR models on 3 of the 5 high-volume procedures. The greatest improvement over the baseline occurred for the ANN model for Arthroplasty Total Hip, where case duration accuracy improved from 32.1% (80 of 249 test cases) to 59.0% (147 of 249 test cases) for an improvement of 83.7% (improving to 59.0% from 32.1%). Conclusions: The ANN and LR models can be used to significantly enhance the predictability of surgical schedules. Even with the significantly enhanced predictability of surgical case lengths, the 5 investigated high-volume surgeries are still not necessarily process capable with respect to ± 15 minute specification limit.

Keywords: Predictive modeling; Operating room

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B1-4: eCare for Moods (TM), A Patient-centered, Web-delivered Self-management and Care Management Program for Recurrent Depression: Results from Randomized Trial

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1 Kaiser Permanente Northern California; 2 University of California San Francisco; 3 Group Health Research Institute
**Background/Aims:** We assessed the effectiveness of eCare for Moods™ (patent pending), a patient-centered, highly interactive, web-delivered patient self-management and care management program on patients treated for recurrent or chronic depression in specialty psychiatry through a randomized clinical trial with two-year follow-up. **Methods:** Patients with recurrent or chronic depression were randomly assigned to eCare (N = 51) or usual specialty mental health care (N = 52). The 12-month eCare program provided patients with individualized self-monitoring, tailored patient education and training in depression self-management including relapse prevention. eCare was integrated with participants’ ongoing depression care, linked to their electronic medical records. It provided clinicians with panel management and clinical decision support. Participants were interviewed at baseline and 6, 12, 18, and 24 months after enrollment. Telephone interviewers blind to treatment assignment used a timeline follow-back method to estimate depression severity on a 6-point scale for each of the 105 study weeks (including the baseline). Differences between groups in weekly severity over two years were examined by generalized estimating equations. **Results:** Participants in eCare experienced more reduction in depressive symptoms (estimate = –.74 on the 6-point scale over two years; 95% confidence interval [CI]=–1.38 to –.09, P = .025) and were less often depressed (–.24 over two years; CI=–.46 to –.03, P = .026). At 24 months, 43% of eCare and 30% of usual-care participants were depression-free; the number needed to treat to attain one additional depression-free participant was 8. eCare participants had other favorable outcomes: improved general mental health (P = .002), greater satisfaction with specialty care (P = .003) and with learning new coping skills (P < .001), and more confidence in managing depression (P = .006). **Conclusions:** Patient-centered, web-delivered care management improves outcomes in patients treated for recurrent and chronic depression. **Keywords:** Internet-delivered care; Depression

doi:10.3121/cmr.2014.1250.b1-4

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**C3-1:**

**Footprints in the Sand: Tracking Physician Work Efforts in Primary Care Using Access Logs in an Electronic Health Record**

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1Palo Alto Medical Foundation Research Institute; 2Palo Alto Medical Foundation for Healthcare, Research and Education

**Background/Aims:** Using EpicCare Electronic Health Record (EHR) data in a large multispecialty ambulatory delivery system, we explore a unique opportunity in which existing EHR data may offer clues on how clinicians use time, a scarce yet critical resource in health services delivery. Traditional means of studying physician time use during clinical encounters (e.g., direct observation) are costly and ignore pre-service and post-service work of physicians’ services. The EpicCare EHR offers an alternative, unobtrusive portal to study time use through analysis of access logs. **Methods:** We used EHR access log data for one month in 2013 from 49 physicians in two primary care departments who cared for 22,174 patients in a large multispecialty ambulatory delivery system. Over 3 million EHR transactions are examined to explore individual physicians’ style of time use on different tasks, as reflected by the access log. In-depth key informant interviews are used to complement the access log data on how physicians use the EHR and the activities that are more or less likely to be captured by the access log. **Results:** About 43.7% of physicians’ total time for the month involved in-person face-to-face visits, 33.8% involved pre and post visit time, 11.4% telephone calls, 5.6% secure messaging to patients, 2.6% prescription refills, and 1.6% on orders for labs, medications or referrals. The earliest EHR access in the office occurred at 12:00 am and the latest logging out time in the office was at 11:59 am the following day. For each patient visit, an average of 16.7 minutes was logged in the exam room and 7.9 minutes logged outside of the exam room. **Conclusions:** The access log is a valuable tool for studying physician work efforts. Our findings highlight the significant amount of time clinicians spend outside of office visits. Unless there is a fixed ratio of in-office to total time, visit-centric FFS payment may undercompensate the significant efforts outside of visits. As “desktop medicine” (e.g., via phone, messaging) increases in the age of the Internet, smart phones, and EHRs, reforming provider payment mechanisms to account for work outside of office visits is warranted. **Keywords:** Physician work efforts; EHR access log

doi:10.3121/cmr.2014.1250.c3-1

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**C3-2:**

**All-In-One: How Group Health Organizes Clinical Text from Clarity for Research**

Scott Halgrim1; David Carrell1; Diem-Thy Tran1

1Group Health Research Institute

**Background/Aims:** Group Health Cooperative runs Epic as its Electronic Medical Record. The clinical text stored in Clarity, Epic’s relational reporting database, is valuable to research at Group Health Research Institute (GHRI). However, due to a number of factors, GHRI’s access to this data was limited. These factors included: 1) a limited window during the day allotted to GHRI due to higher priority reports on Group Health’s care delivery side, 2) Clarity splitting text notes into lines of about 5,000 characters, and 3) restrictions on managing the database itself, like adding a full-text index. We sought to make the clinical text more valuable for research by making it available at all times, combining all the content of a note into one record, and allowing for more database management options. **Methods:** We have developed a nightly Python process that moves clinical text from four Clarity tables into one full-text-indexed table on our own server. In addition, we store metadata about each note—including note type, encounter date, department, and provider—in a parallel table. **Results:** This conversion process, begun in 2010, converts about 60,000 notes per night and has converted every extant note in Group Health’s Clarity database for a total of 123 million notes as of October 2013. The notes’ availability has sped development of sophisticated NLP algorithms in the years since its inception. Another benefit is nightly automated status e-mails sent to the developers. When there was a recent import of several years of historical notes from legacy systems into Epic, GHRI knew immediately that a greater history of notes was available for research. **Conclusions:** The text store at GHRI has strengthened research and grant submissions. Due to Clarity’s consistent data model and large footprint throughout the nation’s medical community, the solution should be easily transferable to other sites wishing to realize the same advantages. The solution is amenable to enhancement as needs arise for more metadata or for clinical text from other parts of Clarity. Remaining challenges are tracking changes to notes in Clarity and improving performance. **Keywords:** Natural language processing; Clarity

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**C3-4:**

**An Algorithm to Combine Machine Learning and Structured Data to Automate De-identification of Clinical Text**

Diem-Thy Tran1; Scott Halgrim1; David Carrell1

1Group Health Research Institute

**Background/Aims:** Clinical text is an important resource for research. To maintain patient privacy when researching this text, we use de-identification. The hiding in plain sight (HIPS) method is promising; it replaces personally identifiable information (PII) with realistic surrogates so any remaining real PII would be hard to distinguish from the fake information. However, there remain some challenges with HIPS, such as overlooked PII. We explored these challenges and hypothesized that we could find more PII by combining structured data with a machine learning algorithm. **Methods:** The machine learning de-identification software we used, developed by MITRE, is the MITRE Identification Scrubber Toolkit (MIST). Trained chart abstractors annotated Family Practice notes with the following PII types: address, age, date, provider name, email, IP address, consumer number, organization name, other id, phone, patient name, room id, social security number, and URL address. Structured data included in this experiment are patient’s address, age, date of birth, email, phone, consumer number, social security number, the visit provider name, visit date, and visit location. We queried this data from Clarity, a relational reporting database for Group Health’s electronic health record (EHR) system. Our first test experiment used MIST to train a model on 100 documents then tested on 10 notes. We reviewed the remaining PII and determined if they are available in the structured data.
Christopher Mack

PS1-13: Probabilistic Linkage (Also Known as “Fuzzy Matching”): the Theoretical Foundations of Modern Record Linkage

Christopher Mack

Background/Aims: Data joins have historically been done using deterministic linkage techniques which require exact data matches to succeed. For data extracted from disparate sources, requiring an exact match may be too limiting. Probability-based linkage techniques have gone from an arcane art involving expensive third-party software to having multiple free and commercial options available for use. We will walk through the theoretical underpinnings of the probability-based linkage theory used by many record linkage applications today. Methods: Describe the history of record linkage, the cause of linkage errors, the need for probability-based techniques for match assessment and the mathematical framework of probabilistic linkage. Discuss matching best practices and limitations in matching ability and match assessment. Results: The audience will better understand how to choose linking variables, ways to limit the search space for comparisons, and the importance of pre-processing linkage variables, including comparison by permutation of variables, phonetic codes and edit-based measures. Conclusions: The audience will be able to better evaluate, and to use more successfully, the available freeware and commercial linkage software given a better understanding of their inner workings, limitations and potential pitfalls. An advanced audience will be in a better position to create their own probabilistic matching algorithms.

Keywords: Natural language processing; De-identification

doi:10.3121/cmr.2014.1250.psl-13

PS1-15: Pre-filling Breast MRI Abstraction Forms Using Natural Language Processing

Hongyuan Gao; Karen Wernli

Background/Aims: Information in breast MRI reports is valuable for breast cancer research, but these data are only available in free-text reports and require resource-intensive manual abstraction. We developed and tested a Natural Language Processing (NLP) algorithm to extract information and pre-fill abstraction form from free-text breast MRI reports. Methods: We identified 465 reports for women receiving breast MRI at Group Health between 2010-2012. We developed an NLP algorithm in SAS v9.2. The algorithm extracts information of reading radiologist, laterality, parenchymal enhancement, whether computer-aided technique is used, comparison exams, clinical indications and assessment from breast MRI reports. The NLP results are compared with manual abstraction from an experienced abstractor. Results: The algorithm correctly extracts reading radiologist, laterality and whether computer-aided technique for all 465 breast MRI reports, except 1
report with inconsistent information on laterality itself. It correctly extracts 83% of 465 reports for assessment for right breast and 92% for assessment for left breast. Unstable gold standard impedes performance of the NLP algorithm for extracting parenchymal enhancement and clinical indications. There is no gold standard to show NLP performance for comparison exams yet. **Conclusions:** This NLP algorithm holds promise for rapid, accurate extraction of information from free-text breast MRI reports. Manual review will be faster and more accurate due to the pre-filling of the abstraction form.

**Keywords:** Natural language processing; Breast MRI report

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**PS1-16:**

**Effect of Insurance Plan Choice on Utilization in Kaiser Permanente Colorado**

Nikki Carroll1; Laurie Crouse1; Jeffrey Holzman1; Carsie Nyirenda1

1Kaiser Permanente Colorado

**Background/Aims:** There has been a shift in recent years from traditional HMO-type insurance products to high deductible or co-insurance plans. Kaiser Permanente Colorado (KPCO) has also added new service areas to the region that include Southern and Northern Colorado. In addition, the impending Affordable Care Act will be implemented in 2014 which may bring new and different members to KPCO. There is a need to describe socio-demographic and clinical characteristics by plan type in order to understand how members within these different plan types utilize KPCO resources and what data are available and identifiable within our source data systems. These answers will enable us to establish appropriate inclusion and exclusion criteria for future research studies. **Methods:** All members with at least 1 day of membership from January, 2000 through July 2013 were identified. Membership within product lines and all associated utilization was based on calendar year. Patient characteristics, ambulatory visits, inpatient admissions, emergency department admissions, lab tests, tumors, pharmacy utilization and variations in therapy for certain diagnoses were obtained from the Virtual Data Warehouse (VDW). Socio-demographic characteristics, including gender, race, and age, were described by percentages. Clinical characteristics and variation in utilization were calculated on a per-person per-month measure and were compared for each region/insurance product/year combination. **Results:** Demographics and utilization varied across all product lines and years. An increase in the number of different products offered was observed over time. Members in the HMO plan type were more likely to be younger, less educated and use more resources than members in other products. Some data were not easily identifiable in certain plan types.

**Conclusions:** These results indicate that demographic and clinical patterns do vary between plan types. These patterns need to be taken into account when creating cohorts in future research projects.

**Keywords:** Utilization; Insurance plans

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**PS1-17:**

**Organization-wide Collaboration to Convert Binary Clinical Notes to Research-ready Text**

Scott Halgrim1; Shane Reeh1; Roger Kelem2; Roger Wong2; Aruna Kamineni2; Virginia Immanuel3; Christopher Pattillo2; Roy Pardee1; David Carrell1; Carolyn Rutter1

1Group Health Research Institute; 2Group Health

**Background/Aims:** Clinical text is an integral part of research at Group Health Research Institute (GHRI), supporting ongoing projects and new research proposals. Our clinical notes are stored in a single, full-text-indexed table that is populated nightly with all new notes in Group Health’s Electronic Medical Record (EMR). These notes include those generated internally and those received from partner organizations via electronic interfaces. Recently one of our partners changed its interface from sending formatted text to sending binary PDF files. While this had little effect on clinical users, it made a significant amount of text data inaccessible for computerized processing. This text was crucial to ongoing research, so we needed to find a way to preserve access. **Methods:** A diversely-skilled team of technologists collaborated to solve the problem with the following process. When the nightly HL7 file arrives at Group Health, it is copied to a research server and the message ID is stored with the appropriate encounter in the EMR. A scheduled Python script then extracts the message ID and binary PDF from each HL7 message. It converts the base64-encoded information into a PDF file and names it with the message ID for linking with the encounter. Finally, the script converts the PDF file into a text file using an open source library. The PDF and text files are archived, as is the nightly HL7 message. **Results:** From June to October 2013, this process has converted and archived over 30,000 notes from our partner that otherwise would not have been available for research. The files are also available to Group Health’s claims auditing department, enabling Group Health to see a monetary return on the effort. **Conclusions:** Thanks to the open source community and strong connections between informatics management at Group Health Cooperative and GHRI, we were able to quickly salvage critical data for research when an externally-driven change to that information occurred. Before the end of 2013 we expect to integrate these converted text notes with our clinical text storage.

**Keywords:** Natural language processing; Data interfaces

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**PS1-18:**

**Do Patients Use Online Messaging to Substitute for Office Visits and Phone Calls? Results from a Natural Experiment**

Laura Panattoni1; Sean McClellan3; Ming Tai-Seale1

1Palo Alto Medical Foundation Research Institute

**Background/Aims:** We evaluated the effect of online messaging between patients and providers on other healthcare utilization. Messaging may increase the administrative burden on providers but may also substitute for utilization such as calls or visits. To identify the effect of messaging, we exploited a natural experiment, which occurred in 3/2011, when a large multispecialty practice in California lowered the price of messaging from $60/year to free for patients and initiated incentives for doctors ($3/thread), resulting in increased rates of patients messaging. **Methods:** We conducted a longitudinal study of 65,332 active primary care patients from 3/2009-3/2012. All patients in the study had activated their online portal before 3/2011 and none had paid to use messaging previously; 38,438 of these patients initiated a message following 3/2011. Messaging was measured by the number of threads initiated by patients annually. Outcome measures included annual rates of office visits and phone calls to primary and specialty care. The effects of messaging were identified through difference-in-differences analyses using generalized least squares, comparing the utilization of those initiating any messages with those not messaging, before and after messaging became free. Controls included patient fixed effects along with patient age, insurance type, Charlson score, continuity of care, and relevant characteristics of their primary care provider. **Results:** Comparing the rates of service use before and after 3/2011, between messaging and non-messaging users, we found no difference in the annual number of primary care phone calls (0.002 per patient-year, P = 0.394), and a small increase in primary care office visits (0.05 per patient-year, P < 0.001) for each thread initiated. For specialty care, we found an increase in 0.16 phone calls (P < 0.001) and 0.21 (P < 0.001) office visits per patient-year for each thread initiated. **Conclusions:** Among patients who were already using the online portal, use of secure messaging was associated with little difference in primary care utilization, but with a moderate increase in specialty utilization. Although current analyses controlled for patient and provider characteristics, patient self-selection may still threaten validity; we will address this through propensity score stratification in future analyses.

**Keywords:** Online messaging; Healthcare utilization

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**Health Services Research/Health Policy/Costs**

**B2-1:**

**Estimation of Standardized Hospital Costs from Claims Data that Reflect Resource Requirements for Care**

John Schousboe1; Misti Paudel2; Brent Taylor3; Lih-Wen Mah4; Beth Virmig5; Kristine Ensrud6; Bryan Dowd7

1Group Health Research Institute; 2Group Health

**Background/Aims:** We evaluated the effects of online messaging between patients and providers on other healthcare utilization. Messaging may increase the administrative burden on providers but may also substitute for utilization such as calls or visits. To identify the effect of messaging, we exploited a natural experiment, which occurred in 3/2011, when a large multispecialty practice in California lowered the price of messaging from $60/year to free for patients and initiated incentives for doctors ($3/thread), resulting in increased rates of patients messaging. **Methods:** We conducted a longitudinal study of 65,332 active primary care patients from 3/2009-3/2012. All patients in the study had activated their online portal before 3/2011 and none had paid to use messaging previously; 38,438 of these patients initiated a message following 3/2011. Messaging was measured by the number of threads initiated by patients annually. Outcome measures included annual rates of office visits and phone calls to primary and specialty care. The effects of messaging were identified through difference-in-differences analyses using generalized least squares, comparing the utilization of those initiating any messages with those not messaging, before and after messaging became free. Controls included patient fixed effects along with patient age, insurance type, Charlson score, continuity of care, and relevant characteristics of their primary care provider. **Results:** Comparing the rates of service use before and after 3/2011, between messaging and non-messaging users, we found no difference in the annual number of primary care phone calls (0.002 per patient-year, P = 0.394), and a small increase in primary care office visits (0.05 per patient-year, P < 0.001) for each thread initiated. For specialty care, we found an increase in 0.16 phone calls (P < 0.001) and 0.21 (P < 0.001) office visits per patient-year for each thread initiated. **Conclusions:** Among patients who were already using the online portal, use of secure messaging was associated with little difference in primary care utilization, but with a moderate increase in specialty utilization. Although current analyses controlled for patient and provider characteristics, patient self-selection may still threaten validity; we will address this through propensity score stratification in future analyses.

**Keywords:** Online messaging; Healthcare utilization

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96 **HMORN 2014 – Selected Abstracts**
Background/Aims: Payments to hospital providers are not solely driven by the resource requirements of individual patients, but also reflect payment policies specific to the health care payer and hospital provider. For example, Medicare adjusts payments to hospitals according to facility and local geographic characteristics that may not be relevant to studies estimating the associations of individual patient characteristics with true costs of care. We developed a method to estimate hospital costs using the diagnosis related group (DRG) payment weights on which Medicare bases hospital payments that reflect patient medical and surgical acuity. Our purpose was to compare cost estimates for hospital stays calculated using DRG payments weights to actual Medicare hospital payments. Methods: We used Medicare Provider Analysis and Review (MedPAR) files and DRG weight tables linked to participant data from the Study of Osteoporotic Fractures (SOF) from 1992 through 2010. Participants were women age 65 and older recruited in three metropolitan and one rural area of the United States. Standardized hospital costs were estimated using DRG payment weights for 1,397 hospital stays (assigned 182 separate DRG codes) for 795 SOF participants for one year following a hip fracture. Cost estimates based on Medicare payments included Medicare and secondary insurer payments, copay and deductible amounts. Results: The mean (SD) of inpatient DRG-based cost estimates per person-year were $16,268 ($10,058) compared to $19,937 ($15,531) for MedPAR payments. The correlation between DRG-based estimates and MedPAR payments was 0.71, and 51% of hospital stays were in different quintiles when costs were calculated based on DRG weights compared to MedPAR payments. Conclusions: DRG-based cost estimates of hospital stays differ significantly from Medicare payments, which are adjusted by Medicare for facility and local geographic characteristics. These findings also may apply to studies estimating associations of individual patient characteristics with health care costs across multiple payers (such as HMORN members) who have different payment policies based in part on local geographic and health care system characteristics (including contracts between specific payers and hospital providers). DRG-based cost estimates may be preferable for analyses when hospital, payer, and local geographic variation could bias assessment of associations between patient characteristics and costs.

Keywords: Hospital costs; Claims data

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B2-4: Variations in the Cost of Ambulatory Care Episodes: An Opportunity for Improvement?

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Background/Aims: Policymakers are exploring bundled payments to providers, but little is known about their application in ambulatory care. As an example, this study examines the cost of acute bronchitis episodes. Methods: Data were from electronic health records and claims of a large ambulatory group practice with mixed payment sources. Optum’s Symmetry Grouper was used to create episode treatment groups (ETGs) for all services. There were 78,828 episodes of acute bronchitis, cared for by 427 primary care physicians/urgent care centers (PCPs) (1,568 PCP-years) in 2007-2011. Costs included standardized fees for physicians, laboratory/imaging ordered, and specialist services. The grouper extends an episode indefinitely with continuing related services, so we separately considered episodes closed in: (a) 1 day, (b) within 30 days, and (c) those extending beyond 30 days. In a nested model, we focused on lead physician ‘effects,’ controlling for patient characteristics. Results: Of the total episodes, 78% closed in 1 day, 19% closed in 2 to 30 days, and 3% took >30 days. One-day episode costs were most stable (mean cost = $77, coefficient of variation (CV) = 0.36), followed by 30-day episodes (mean cost = $181, CV = 0.56), and longer than 30-day episodes (mean cost = $268, CV = 0.78). Among 1-day episodes, 21% of the PCP-years (with 166 unique PCPs) had costs significantly below the average. Only 22% of the episodes of these PCPs extended beyond 1 day vs. 32% for all other PCPs (P <0.01), and the costs of their longer episodes averaged $176 vs. $205 (P <0.01). Among the 91 PCPs with 2 or more years of significantly lower 1-day costs, 85% (77 PCPs) did not have elevated rates of longer episodes or significantly above average costs for longer episodes. Conclusions: Focusing on 1-day acute bronchitis episodes (78% of the total) markedly reduces the variance across episodes, but substantial variation in episode costs across PCPs remains. With some PCPs repeatedly achieving low 1-day costs without evidence of subsequent problems, episode-based payment may lead to improved resource use.

Keywords: Episode-based payment; Cost

doi:10.3121/cmrr.2014.1250.b2-4

D4-1: Economic Impact of an Evidence-based Standardized Perinatal Care and Practice Measurement Process: Evidence from a U.S. Integrated Healthcare Delivery System

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Background/Aims: Recent estimates indicate 10-15% of all babies born in the U.S. are admitted to the neonatal intensive care unit (NICU) which along with evidence that coordinated prenatal care is positively correlated with better birth outcomes (fewer low birth weight and premature babies, and fewer infants transferred to NICU’s) suggest the potential for improvement in perinatal care quality and cost. The aim of this analysis is to examine the economic impact of an evidence- and guideline-based standardized coordinated perinatal care and electronic health record measurement process (Geisinger Health System (GHS) Perinatal ProvenCare® (PPC)) for both the mother and infant implemented in a large integrated U.S. healthcare delivery
system to test whether it reduces the total cost of care. **Methods:** GHS PPC applies to care over the entire gestational period (ante-, in-, and postpartum) using a single standardized pathway with 103 best practice measures grouped in five clinically relevant bundles and automated reporting for all patients across 22 practice sites and four hospitals. Geisinger Health Plan claims data from 2007 to 2010 for 3,369 mother-infant combinations were used to calculate total costs of care per live birth for mothers and infants for PPC and control groups. A difference-in-difference method was used to estimate the cost impact accounting for baseline differences between groups and the secular trend in the control group. A set of multivariate regression models was developed to calculate regression-adjusted cost estimates. **Results:** Average total cost of care per live birth in the PPC group was approximately 26% (P = 0.001) lower compared to the control group. Much of this cost savings was attributable to reductions in the cost associated with infant care, including lower utilization of expensive NICU services. **Conclusions:** This study demonstrates the potential for reduction in medical care costs of a standardized perinatal care delivery process based on Geisinger’s experience. The findings suggest that cost savings are attributable to prevention of adverse patient outcomes. If applied more broadly, including to state Medicaid programs which cover almost half of U.S. births, similarly implemented standardized processes could result in better health outcomes and significant cost savings.

**Keywords:** Perinatal care; Cost

DOI: 10.3121/cmr.2014.1250.d4-1

**D4-4:**

**Shared Medical Appointments: A Promising Innovation to Improve Patient-Physician Relationship and Ease Primary Care Shortage**

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**Background/Aims:** Shared medical appointments (SMAs) or group visits have been touted as a primary care system change to overcome the challenges of short visits, underused self-management education, and to relieve physician shortage. However, few studies have examined SMAs from the patient’s perspective. Using data collected through focus groups, we present the thoughts and experiences of patients participating in SMAs.

**Methods:** We conducted five focus groups with participants who had attended SMAs at a large, non-profit, multispecialty group practice in northern California which serves four counties and more than 700,000 patients. Focus groups were recorded, transcribed, and thematically coded according to study aims. Transcripts were coded at the paragraph level. Disagreements in coding were discussed until consensus was reached. **Results:** Similar themes emerged across the focus groups. Patients expressed many benefits to SMAs including enhanced learning by being able to cover more information than what would be provided in a traditional visit, increased motivation for health behavior change, and were able to connect with others in a similar situation. Patients also felt that the SMA altered their relationship with their physician. Patients now saw the more “human” side to their physician which placed them at ease for future visits. Overall, the power dynamic between patient and physician was lessened as the patient now viewed themselves as being able to impart information to the physician. **Conclusions:** Given the upcoming Affordable Care Act and existing primary care shortage, SMAs provide a way for patients to improve access, relationships with physicians, and an increased knowledge of health, but also to help ease patient load for physicians. Thus, SMAs are an innovative form of delivery that can improve efficiencies and better use the scare resource of primary care physicians.

**Keywords:** Shared medical appointments; Qualitative

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**PS1-29:**

**Changing the Culture of Medicine: An Exploration of Lean Healthcare in Primary Care**

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**Background/Aims:** Despite its soaring costs, healthcare in the U.S. still suffers from inefficiencies and wastefulness. Given recent health care reform efforts, healthcare organizations know significant change is on the horizon, and in anticipation of that, some organizations have begun adopting delivery systems that address these wastes and inefficiencies. One system that has gained considerable attention in recent years is commonly referred to as Lean Healthcare. Originating from the manufacturing industry, this approach to healthcare focuses on retaining value for the patient and eliminating non-value or waste. However, implementing Lean healthcare is not without its challenges. One major challenge to implementing Lean is essentially cultural. More specifically, the values and norms associated with Lean and those deeply entrenched in the field of medicine may conflict, and therefore reconciling them may be necessary to successfully implement Lean.

**Methods:** This study consists of a qualitative evaluation of a Lean implementation effort at a large healthcare organization. Researchers conducted observations of key implementation events and interviewed frontline leaders, as well as physicians, nurses, and medical assistants who have participated in the change effort. The data produced from these qualitative methods were analyzed and coded using an inducted, grounded approach. **Results:** This paper highlights five main major changes that produced cultural conflict when this healthcare organization implemented Lean. These include: (1) adopting team care approaches (2) democratization of the workplace and the erosion of hierarchies (3) reducing variation and standardizing work (4) surveillance of staff and employees (5) a perceived emphasis on profit over patient care. **Conclusions:** Implementing new ways of delivering care in healthcare organizations is often met with many challenges. Some of these challenges may be rooted in a conflict between...
new sets of cultural values and those that have historically existed in the field of medicine. Reconciling these conflicts may be one of the most difficult challenges healthcare organizations face as they try to implement wide-scale change.

**Keywords:** Lean; Culture

PSI-30:
Identification of Distress in the Breast Cancer Patient in a Rural Community Cancer Center

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**Background/Aims:** Community cancer centers are faced with the task of providing multidisciplinary care to their patients in an environment that is challenged for resources, time and reimbursement. Among other patient care factors, psychosocial care has become one such area of concern. The ability to rapidly identify a patient with psychosocial issues can help facilitate providing that care in an expedient and cost-effective manner. The purpose of the study was to develop a profile of a breast cancer patient exhibiting distress.

**Methods:** The study followed a cross-sectional, correlational design. Patients with breast cancer of any stage in the early phase of their treatment and who had completed the Distress Thermometer (DT) assessment as part of their routine care were consented for additional data collection. The study was conducted at a community cancer center in rural Georgia, and a total of 85 patients participated.

**Results:** The study identified 42% (36 of 85) of participants with mild distress, 31% (26 of 85) with moderate distress, and 27% (23 of 85) with severe distress. Approximately 42% (36 of 85) self-identified as African-American, and all were non-Hispanic, which mirrors the regional population where the study was conducted. All participants were female with an average age of 61. Those with a severe DT score indicated their top five sources of distress as Worry, Sadness, Nervousness, Fears and Treatment Decisions. This contrasts with those with a Mild DT score, who indicated Sleep, Treatment Decisions, Nervousness, Fatigue and Finances as sources of distress. The common factor of Treatment Decisions between these groups demonstrates that a greater ratio of patients with a severe DT score was receiving chemotherapy and/or radiation than those with mild DT score. Not surprisingly, those with a mild DT score were more likely to have an earlier stage cancer, although the difference was not statistically significant.

**Conclusions:** Participants demonstrated factors that may point to a profile of a patient at risk for severe distress, including other psychosocial expressions, treatment plan, and stage of cancer. The study is limited by location at a single cancer center and other factors.

**Keywords:** Distress; Cancer

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PSI-31:
Early Impact of Lean Redesign in Primary Care

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**Background/Aims:** With increased pressure to provide higher quality care while reducing costs, healthcare organizations are redesigning systems using industry-based tools. "Lean" is a management tool that aims to maximize value for patients by eliminating inefficiencies and waste. The Palo Alto Medical Foundation (PAMF) is implementing Lean throughout its delivery system, which began with a pilot demonstration site in primary care. Lean redesigns included co-location of physicians and staff to facilitate more efficient communication, and creation of new workflows such as agenda setting with patients at the start of visits. The current study presents early results of the impact of Lean after its first year of implementation.

**Methods:** Operational metrics were extracted from PAMF data repositories, including various measures of patient access, patient panel size, physician productivity (RVUs), cost per total RVU, clinical quality, and satisfaction among patients, physicians, and staff. Statistical analysis of monthly data for one year pre- (baseline) and post-Lean implementation was performed using segmented linear regression for interrupted time series. Pilot site trends were compared with two other PAMF clinic locations serving as contemporaneous control sites.

**Results:** Satisfaction among staff, pediatricians, and pediatric patients increased significantly in the pilot site. Pilot staff satisfaction scores outperformed control sites by over 20% in domains including: Credible leadership, Connection to purpose, Healthy partnerships, and Work, structure, & process. Overall satisfaction among pediatricians outperformed both control sites, but declined among family physicians and internists except for improvement in one domain: Relationships with staff. Patient satisfaction improved by 2-8 percentage points in the pilot vs. control sites, with the greatest increase seen in Pediatrics. The pilot site also showed increasing panel sizes in Pediatrics. There were no other, consistent changes across sites in operational and clinical measures.

**Conclusions:** The most consistent finding during the first year of Lean was higher satisfaction among staff, pediatricians, and pediatric patients. Notably, the pediatric department had already begun experimenting with and implementing Lean redesigns prior to the official start of the initiative. Consistent with the experience of other organizations, Lean systems may need time to mature and stabilize before clear changes in metrics can be observed.

**Keywords:** Healthcare system redesign; Lean

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PSI-32:
Deconstructing Medical Home’s Impact on Cost of Care: Where Do Savings Come From?

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**Background/Aims:** Early evidence suggests that a patient-centered medical home (PCMH) has the potential to improve quality of care while reducing cost. However, it is unclear how PCMH achieves such desirable outcomes, particularly in regards to its impact on cost of care. In this study, we examined claims data from Geisinger Health System’s version of PCMH, known as ProvenHealth Navigator® (PHN) to answer the following questions: 1) From the perspective of a primary care clinic, what is the overall total cost savings associated with exposure to PHN; and 2) where do the cost savings come from? In answering the latter question, we deconstruct the total cost savings into their major component parts and examined the association separately between the clinic’s exposure to PHN and each cost component.

**Methods:** Data were obtained from Geisinger Health Plan’s claims database among its Medicare Advantage members who received care from the 65 primary care sites that had been transformed into PHN sites between 2006 through 2012. The main outcome variable was the mean per-member-per-month (PMPM) total cost of care for a given PHN site. The total PMPM cost was further divided into five components (outpatient, inpatient, professional, prescription generic and brand drugs). The key explanatory variable was the length of the clinic’s exposure to PHN in months. Other covariates included the number of patients in each clinic in each month, the site’s ownership status, % male patients, % patients with drug coverage, average age and average HCC risk scores, as well as month and year indicator variables. In total, seven linear regression models with clinic fixed effects were estimated.

**Results:** For every 6-month incremental exposure to PHN, there was approximately $10 (P < 0.05) reduction in mean PMPM cost savings for a given primary care clinic. About 50% of this saving was attributable to reductions in inpatient cost, followed by reductions in professional fees and outpatient cost. The total cost saving was offset by an increase in prescription drug cost associated with PHN exposure.

**Conclusions:** Our finding is consistent with the hypothesis that PCMH reduces avoidable acute care while potentially increasing patient adherence to prescription drugs.

**Keywords:** Patient-centered medical home; Cost of care

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PSI-42:
In-hospital Severity and 30-day Readmission

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**Background/Aims:** Identifying and preventing 30-day readmissions has become a national focus. There have been attempts at developing all-cause
predictive models to identify ‘high risk’ readmission patients such as LACE. Historically, in-hospital severity predictive models have been developed for various services and disease states. Some of the most widely used severity measures are the Modified Early Warning Score (MEWS), Glasgow Coma Score (GCS), Acute Physiology, and the American Society of Anesthesiologists (ASA) Score. We wish to compare in-hospital severity scores to predict 30 day readmission. Methods: A retrospective a cohort of patients was assembled who were admitted to two Geisinger hospitals during calendar year 2012. Admissions related to a child’s birth, unknown acuity, and in-hospital deaths. Data was obtained during the year preceding the admission and outcomes were assessed up to 30 days post-discharge. Additional data including initial laboratory results, comorbidities, length of stay, and discharge disposition was obtained. For severity scores measured longitudinally during the admission, we selected the initial, last, and worse. A base model of known readmission predictors was built using logistic regression with a flexible specification of continuous measures, and the severity scores were considered individually by forcing them into the model. The net reclassification index (NRI) was used to quantify improvement in prediction. Results: A total of 41,413 admissions met cohort entry criteria (mean age 58.5 y, 45% (18,626) male). Readmissions within 30 days occurred 13.3% (5,502) during 2012 with another 2.9% (1,217) that died without a readmission. The base model consisting of demographics, comorbidities, discharge disposition, and utilization in past year resulted in an area under the ROC curve (AUC) of 0.710. LACE significantly contributed to the model (AUC = 0.715, NRI = 2.0%, OR = 1.12 [1.10, 1.13], P < 0.001). The last reported GCS was significantly associated with 30-day readmission (OR = 1.05 [1.02, 1.09]), however there was no increase in the AUC and the NRI was non-significant. The MEWS was not significantly associated with readmission. Conclusions: The usefulness of in-hospital severity scores was not consistent in their association with readmission. Additional research is needed to understand performance in subgroups and to utilize serial measurements when available.

Keywords: Readmission; Severity

D3-1:
HMO Research Network Rural Health Scientific Interest Group (Rural Health-SIG): Highlights from Four Member Sites and Opportunities for Collaboration

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Background/Aims: Compared to their urban counterparts, rural residents have persistent health disparities and remain medically underserved. However as shown last year by the Rural Health SIG, many diseases and health conditions strongly impact rural and urban dwellers (Copeland et al, HMORN 2013 PS3-47). To put this in perspective, we describe the member populations and highlight the research specialties from four of seven Rural Health-SIG sites with a substantial number of members living in rural areas.

Methods: We identified member population sizes, areas of scientific emphasis, and research resources for Essentia Institute of Rural Health (EIRH), Geisinger Center for Health Research (GCHR), Marshfield Clinic Research Foundations (MCRF), and Scott & White Center for Applied Health Research (SWR). Sources were VDW documentation, HMO Research Network Members-Areas of Scientific Emphasis Based on Self-Report (2011/2012), and publicly available websites for each of the sites.

Results: Currently, there are over one million members in 2012 VDW enrollment (EIRH: 565,603; GCHR: 310,834; MCRF: 195,182; SWR: 94,351) of which at least half live in rural areas and at least 30% receive government funded health insurance assistance (Medicare, Medicaid, or state subsidies). Collectively, we have ongoing research activity in all areas of HMORN scientific interest. Areas of significant emphasis (multiple projects per year) for at least two sites include: obesity, active living, healthy eating; dissemination science and translation of research into practice; patient decision-making and health literacy; quality improvement and health care delivery; genetics, genomics, bio-repositories; health informatics; heart/vascular, lung and blood diseases; neurological disorders; and aging. Moreover, all four sites reported significant emphasis in community engagement and community-based participatory research. In comparison to the 11 other, primarily urban HMORN member sites, eight reported some emphasis in this area and none reported significant emphasis. Patient-reported outcome capability is also rapidly developing at Rural Health SIG sites in response to deployment of electronic medical record systems and the quest to achieve Accountable Care Organization status.

Conclusions: Rural Health SIG Investigators have broad expertise in many areas of scientific interest within the HMORN that apply to improving the health of rural and urban residents. We welcome invitations to collaborate.

Keywords: Healthcare disparities; Rural health

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D3-2:
Forecasting Disease Burden and Health Utilization in Uninsured Populations in California Health Insurance Exchange Pricing Regions

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Background/Aims: Starting in January 2014, millions of currently uninsured Californians will be able to purchase health insurance on the California Health Insurance Exchange (HIE). For planning purposes, it is important to estimate disease burden and demands for services in uninsured populations. The Archimedes Model is a trial-validated, clinically detailed simulation model of human physiology, disease progression, and healthcare delivery. The Archimedes Model synthesizes evidence from hundreds of data sources to create virtual patients that are representative of the US population, in terms of demographic distribution, disease progression, clinical outcomes, patient and provider behaviors; office visits and hospital admissions; tests and treatments; care delivery protocols; compliance; and costs. Kaiser Permanente and Archimedes collaborated to develop a capability based on the Archimedes Model to forecast disease burden and healthcare utilization in uninsured populations for each of the 18 California Health Insurance Exchange pricing regions. Methods: We used data from 20 diverse California and US surveys and databases as inputs into the Archimedes Model to create realistic individuals that closely match the uninsured populations in each pricing region, with respect to demographics, socioeconomic status, and medical conditions. Within the Archimedes Model, the relationships between biomarkers, medication adherence and usage, disease progression, clinical outcomes, care processes and healthcare utilizations are well-established and carefully validated against many independent datasets. We use the Archimedes Model to combine datasets with overlapping information and to fill in the missing information for uninsured Californians, then forecast the clinical outcomes and health utilizations in the next 10 years for this population as well as the benefits and costs of different prevention and disease management strategies. Results: We created 19 datasets that are representative of the pricing regions on the Health Insurance Exchange and cover a wide range of outcomes and conditions, including diabetes, cardiovascular diseases, cancers, COPD, asthma, childbirths and mental health. Conclusions: Health plans and insurers can use the information provided by the datasets for resource allocation and capacity planning. Local officials will able to use these datasets measure today’s health of their communities and forecast tomorrow’s health.

Keywords: Uninsured; Healthcare utilization

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D3-3:
Differing Quality or Differing Expectations: Should One Adjust for Patient Race/Ethnicity when Assessing Patient Satisfaction?

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Background/Aims: The literature indicates Asians rate their health care experience lower than do non-Hispanic whites (NHWs). Cultural norms in rating similar experience may contribute to this, but before any adjustment, one should make sure differing ratings do not reflect true quality differences.

We examined whether adjustment for the race/ethnicity (R/E) of survey

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respondents is warranted in assessing patient satisfaction across providers. Methods: We used 2011-12 patient satisfaction data from a large ambulatory care organization (116,516 surveys for 1,022 providers). Surveys were mailed to patients after randomly selected clinic visits. Using the scoring scheme used by survey organization, answers to each question (on a 5-point Likert scale) were converted to a 0-100 scale. The overall score for each visit was an average of 6 section scores: Access, Moving through the visit, Nurse/assistant, Care provider, Personal issues, and Overall assessment. The overall visit score was aggregated at provider, clinic and region levels. We focus on overall and section scores across 4 regions of the organization. Results: R/E differences were substantial, from 90.7 (NHW) to 85.2 (Asian). Regional scores ranged from 88.2 (region A) to 90.1 (region D). The ranking was not consistent, however, within R/E groups; Region A scored highest among Latino and 2nd among NHW patients, while region D scored lowest among Latino and 3rd among NHW patients. True differential treatment by R/E should be most apparent in “Care provider” and “Personal issues”, and less so in “Access” and “Moving through the visit”. In fact, the R/E difference (NHW vs. Asian) was smallest for “Care provider” (4.3) and largest for “Moving through the visit” (7.0) scores. R/E differences were much less pronounced if the top 2 Likert categories were combined. Conclusions: Patient satisfaction ratings are influenced by patient R/E in that similar pronounced if the top 2 Likert categories were combined.

Background/Aims: Successfully navigating the healthcare system can be challenging for LGBT older adults. In this study, we examined patient’s perspectives on aging-in-place and their satisfaction with healthcare services. Methods: This qualitative study used focus groups (n = 14), interviews (n = 29), and a town hall (n = 30) to assess barriers and supports for LGBT persons to age in place. Results: Most of the 73 participants identified as lesbian or gay, were aged 50-69, and lived with a partner. Discrimination and dual stigmatization (ageism plus heterosexism) emerged as cross-cutting themes that negatively impacted the aging in place categories of healthcare, housing, social support, home assistance and legal services. Establishing welcoming social spaces, disseminating knowledge resources, and promoting self-advocacy were suggested solutions. Conclusions: This study provides a unique contribution to knowledge about the needs of LGBT older adults pertaining to aging in place. While resilience and coping skills developed at younger ages during the “coming out” process can continue to be leveraged in later years, LGBT seniors who are less “out” are likely particularly vulnerable to the challenges presented by the intersection of ageism and heterosexism. This research offers recommendations for tailoring current aging in place models to better suit the needs of LGBT older adults.

Background/Aims: Increasingly, community engagement is used to increase the participation by minority communities in health research and to address health disparities. The CDC defines community engagement as “the process of working collaboratively with and through groups of people affiliated by geographic proximity, special interest, or similar situations to address issues affecting the well-being of those people”. The goal of the Institute for Translational Health Science’s (ITHS) Hispanic Community Outreach Program (HCOP) is to increase participation by Hispanics in translational health research conducted by ITHS in the WWAMI region (Washington, Wyoming, Alaska, Montana, Idaho). Methods: The HCOP has conducted outreach to investigators, community-based organizations (CBOs) and clinics to serve Hispanics in the WWAMI region since August 2012. The HCOP’s outreach activities have included phone calls, site visits, and participation in community events and conferences, resulting in a growing network of potential research partners. This network has evolved over time through personal contacts and referrals, reflecting the importance of interpersonal relationships and trust when engaging communities. To track its work, the HCOP maintains a database with the following elements: name, address, phone, email, agency affiliation and department, title, degrees, region, and level of engagement (LOE). The LOE is scored on a graded scale of 1-5 where 1 indicates a minimal LOE and 5 indicates a high LOE. Results: To date, the HCOP has made contact with over 840 stakeholders of whom 42% were investigators; 54% were in CBOs; and 6% were in government health agencies. The majority of HCOP’s initial contacts had LOE scores in the 1-2 level. Over time, LOE scores have increased, including one partnership that received grant funding to disseminate a diabetes self-management program in Spanish. The HCOP was also awarded a NIH small conference grant for a regional conference on Latino health. In addition, the HCOP has awarded pilot funding for community engaged research. Conclusions: Community engagement appears to be an effective strategy for increasing the participation of Hispanics in translational health research. More research is needed to develop tools and methods for assessing the effectiveness of community engagement and its impacts on the health of communities.

Background/Aims: Successful aging in place models promote independence, include older adults in decision-making, create an environment of personal and physical safety, facilitate social support, and provide services to enhance the health and quality of life of older adults within the communities in which they live. The applicability of aging in place models for disenfranchised groups is an important consideration. The current study, undertaken as part of a larger community-research partnership, examined the adequacy of this approach with older LGBT adults in a metropolitan neighborhood. Methods: This qualitative study used focus groups (n = 14), interviews (n = 29), and a town hall (n = 30) to assess barriers and supports for LGBT persons to age in place. Results: Most of the 73 participants identified as lesbian or gay, were aged 50-69, and lived with a partner. Discrimination and dual stigmatization (ageism plus heterosexism) emerged as cross-cutting themes that negatively impacted the aging in place categories of healthcare, housing, social support, home assistance and legal services. Establishing welcoming social spaces, disseminating knowledge resources, and promoting self-advocacy were suggested solutions. Conclusions: This study provides a unique contribution to knowledge about the needs of LGBT older adults pertaining to aging in place. While resilience and coping skills developed at younger ages during the “coming out” process can continue to be leveraged in later years, LGBT seniors who are less “out” are likely particularly vulnerable to the challenges presented by the intersection of ageism and heterosexism. This research offers recommendations for tailoring current aging in place models to better suit the needs of LGBT older adults.

Background/Aims: Increasingly, community engagement is used to increase the participation by minority communities in health research and to address health disparities. The CDC defines community engagement as “the process of working collaboratively with and through groups of people affiliated by geographic proximity, special interest, or similar situations to address issues affecting the well-being of those people”. The goal of the Institute for Translational Health Science’s (ITHS) Hispanic Community Outreach Program (HCOP) is to increase participation by Hispanics in translational health research conducted by ITHS in the WWAMI region (Washington, Wyoming, Alaska, Montana, Idaho). Methods: The HCOP has conducted outreach to investigators, community-based organizations (CBOs) and clinics to serve Hispanics in the WWAMI region since August 2012. The HCOP’s outreach activities have included phone calls, site visits, and participation in community events and conferences, resulting in a growing network of potential research partners. This network has evolved over time through personal contacts and referrals, reflecting the importance of interpersonal relationships and trust when engaging communities. To track its work, the HCOP maintains a database with the following elements: name, address, phone, email, agency affiliation and department, title, degrees, region, and level of engagement (LOE). The LOE is scored on a graded scale of 1-5 where 1 indicates a minimal LOE and 5 indicates a high LOE. Results: To date, the HCOP has made contact with over 840 stakeholders of whom 42% were investigators; 54% were in CBOs; and 6% were in government health agencies. The majority of HCOP’s initial contacts had LOE scores in the 1-2 level. Over time, LOE scores have increased, including one partnership that received grant funding to disseminate a diabetes self-management program in Spanish. The HCOP was also awarded a NIH small conference grant for a regional conference on Latino health. In addition, the HCOP has awarded pilot funding for community engaged research. Conclusions: Community engagement appears to be an effective strategy for increasing the participation of Hispanics in translational health research. More research is needed to develop tools and methods for assessing the effectiveness of community engagement and its impacts on the health of communities.

Background/Aims: Racial disparities of 30-day readmission rates have been found in Medicare beneficiaries with congestive heart failure (CHF); however, racial disparities in the younger age groups remained unknown. Further, the association between patient demographics, site of care and 30-day readmissions are understudied. Our study aims to identify racial disparities in CHF patients across age groups, site of care and 30-day readmission rate, and to explore potential contributing variables to the racial disparity in CHF. Methods: This study used the 2009 Florida State Healthcare Cost and Utilization Project State Inpatient Databases (HCUP-SID). Patients 18 years or older, hospitalized with a primary diagnosis of CHF were included in this study. Multi-level modeling examined if racial disparities in risk-adjusted 30-day readmission rate could be explained by patients’ characteristics (age, gender, insurance, household income, rurality, length of stay, discharge status) and hospital characteristics (whether the site of care was a minority-serving hospital at their initial admission, defined as the top 10% of hospitals who served the highest proportion of non-white patients). Results: Racial disparities existed in CHF patients’ age at discharge, site of care, and risk-adjusted 30-day readmission rate. African American CHF patients as a group were hospitalized on average 14 years younger than Whites, and 10 years younger than Hispanics (AA: 63 vs. White: 77 vs. Hispanics: 73, P <0.001). Overall, Hispanic patients had the highest readmission rate (Hispanics: 27.7%, AA: 25.9%, White: 24%). Higher readmission rates were associated with race of minority, Medicare and Medicaid program enrollment, lower income, discharge status, minority-serving hospital, and younger age (age<55: 29%, age 55-64: 27%, age 65-74: 25%, age 75-84: 24%, age>84: 22%. P <0.001). This age trend remained in
Medicare and Medicaid beneficiaries, but not in the private insurance or uninsured patient population. Minority-serving hospitals had a significantly higher 30-day readmission rate (minority-serving: 29.2% vs. non-minority-serving: 24.3%, P < 0.001). **Conclusions:** Minority patients were admitted for CHF at much younger ages and experienced a higher 30-day readmission rate. Minority-serving hospitals served more vulnerable patients and had a significantly higher 30-day readmission rate. There is a need to provide multifaceted approaches to reduce disparities in CHF, particularly for minority and vulnerable populations. **Keywords:** 30-day readmission; Racial disparities

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**PS2-23:** Dual Purposing of Interpreters to Increase Colorectal Cancer Screening in Vietnamese-speaking Patients: Results from a Pilot Study

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**Background/Aims:** Colorectal cancer screening rates for Vietnamese-speaking patients are below national benchmarks. To address this disparity, an eight-hour training program was developed for interpreters to provide counseling to patients in Vietnamese on colorectal cancer screening at the time of a primary care visit. A culturally-tailored counseling script was developed, approved by clinical care leaders, and its delivery was integrated into routine clinic flow. Following each counseling session, patients were invited to complete a brief survey about their satisfaction with the counseling session. **Methods:** Twenty four Vietnamese-speaking patients needing colorectal cancer screening were enrolled in this pilot study and 19 completed a 26-item phone survey for a response rate of 76%. Survey non-response was due to two refusals, two non-working numbers and one unavailable. The survey was administered by a bi-cultural bilingual interviewer. On average, the survey took 15 minutes to complete. **Results:** The mean age of participants was 60 years (range: 51 to 72 years). Fifty two percent were female. All but one participant had 12 or less years of education. All participants were born in Vietnam, spoke Vietnamese at home, and all but one participant had limited English proficiency. The mean years in the US was 18 years (range: 6 to 38 years). Eighteen participants were very satisfied with their counseling session and one participant was somewhat satisfied. All 19 participants felt very confident with the information provided by the interpreters. All 19 participants were told about stool cards, 13 about sigmoidoscopy and 14 were told about colonoscopy. Ten participants reported that the interpreters spent 10 or less minutes providing counseling and nine reported more than 10 minutes. Fifteen participants had answers suggestive of depression via the PHQ2 screening tool. **Conclusions:**: Our patient-centered healthcare assessment identified several areas of need to be addressed, including soliciting volunteer services from area dental health professionals, exploring mechanisms to address mental health needs and compiling a pamphlet of local low or no-cost mental health services, and implementing a 12-week weight loss program with gym access, dietary counseling, and group support. Cost of insurance will likely continue to be an issue for many patients despite mandatory coverage, stressing the importance of free clinic services. Future healthcare assessments will be conducted to determine program success, identify additional areas of need, and inform the design of future programs. **Keywords:** Health assessment; Free medical clinics

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**HMORN Administrative and Technical**

**D1-1:** Processes that Accelerated Administrative and Regulatory Progress in Several Multi-site Institutional Research Studies

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**Background/Aims:** Multi-site collaborations offer opportunities to engage diverse research expertise to answer important public health questions. Many of these collaborations have, at their core, large, robust data sources that are critical to achieving research goals. Before scientific work can begin, however, there is a complex maze of administrative and regulatory requirements that must be efficiently navigated in order to avoid project delays. As funders’ interest in comparative effective research (CER), research networks, and ‘big data’ increases, funding periods appear to be shrinking, making administrative and regulatory efficiencies more critical than ever. The current effort documents best practices in these areas. **Methods:** The study team examined best practices that addressed common challenges for successful project implementation in three large HMO Research Network (HMORN) studies that included 7-16 institutions. We identified three processes that significantly increased administrative and regulatory efficiencies: umbrella institutional review board (IRB) structure (with ceding), reciprocal data use agreement (DUA) and the HMORN subcontract template. **Results:** An umbrella IRB structure enabled researchers to submit pilot studies and new hypotheses as modifications using the same data source and processes for human subjects’ protections. These study modifications underwent expedited review; often with determinations received in fewer than 10 business days. The HMORN DUA template was modified to make it reciprocal. This allowed limited data sets to be shared among data contributing sites and allowed investigators from any site to lead an analysis, thus, increasing the amount and pace of research that could be achieved. The HMORN subcontract template was “field tested” and results tracked over a 5-year period. Use of the template resulted in a decrease in the average number of days for initial subcontract execution from 215 days to less than 60. **Conclusions:** We demonstrated that developing new processes...
and modifying existing ones can accelerate multi-site research. Standardization fosters collaboration, trust, and continued progress while meeting regulatory requirements that maintain human subjects’ and institutional protections.

**Keywords:** Regulatory; Compliance

**Methods:** We programmatically derived the lexicon for MD-CTS from scholarly communications by parsing through 15,156,745 MEDLINE abstracts and extracting all of the unique words found therein. We then ran this list through several filters in order to remove words that were not relevant for searching, such as common English words and numeric expressions. We then loaded the resulting 1,795,769 terms into SQL tables. Each term is cross-referenced with every occurrence in all abstracts in which it was found. Additional information is aggregated from Wiktionary, Bioportal, and Wikipedia in real-time and displayed on-screen. From this lexicon we created a supplemental dictionary resource (updated quarterly) to be used in Microsoft Office® products. **Results:** We evaluated the utility of MD-CTS by creating a list of 100 words derived from recent clinical and translational medicine publications in the week of July 22, 2013. We then performed comparative searches for each term with Taber’s Cyclopedic Medical Dictionary, Stedman’s Medical Dictionary, Dorland’s Illustrated Medical Dictionary, Medical Subject Headings (MeSH), and MD-CTS. We compared our supplemental dictionary resource to OpenMedSpell for effectiveness in accuracy of term recognition. **Conclusions:** In summary, we developed an online mobile and desktop reference, which comprehensively integrates Wiktionary (term information), Bioportal (ontological information), Wikipedia (related images), and Medline abstract information (term usage) for scientists and clinicians to browse in real-time. We also created a supplemental dictionary resource to be used in Microsoft Office® products.

**Keywords:** Ontology; Lexicon

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**Mental Health/Chemical Dependency**

**C4-5:** Behavioral Activation Therapy for Perinatal Depression: Preliminary Results from a Multi-site Randomized Trial

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1Kaiser Permanente Colorado; 2University of Colorado Boulder; 3HealthPartners; 4Emory University; 5Evidence Based Treatment Centers of Seattle; 6Group Health Research Institute

**Background/Aims:** Perinatal depression is both prevalent and associated with adverse correlates and consequences for women and offspring. Women and their health care providers often face complex choices regarding treatment of depression during pregnancy. Although studies suggest that pregnant women express a preference for psychotherapy over antidepressants, the latter is most frequently provided. These treatment patterns highlight the need for evidence-based psychotherapies with broad dissemination potential.

We report preliminary results from a multi-site randomized trial comparing the effectiveness of brief Behavioral Activation (BA) therapy to usual care for women with elevated depressive symptoms during pregnancy. **Methods:** Women receiving prenatal care at Kaiser Permanente Colorado and Georgia, Group Health Cooperative, and HealthPartners (N = 163) were screened for depressive symptoms prior to or at their OB visit. Those with scores ≥10 on the PHQ-9 were recruited, consented, and randomized to receive 10 sessions of BA (N = 85) or usual care (N = 78). Obstetric nurses and behavioral health providers were trained to deliver BA by telephone, in the obstetrics clinics, or in patients’ homes. Participants’ mean age was 28, 37% (64/163) were pregnant with their first child, 47% (76/163) were non-White, and 15% (25/163) were Hispanic ethnicity. A majority (63%, or 102/163) reported receiving prior treatment for depression. There were no differences in demographic or clinical characteristics between the BA and usual care groups. The primary outcome measure was change in depression scores on the PHQ-9, obtained via a centralized web-based survey 10 weeks following randomization. **Results:** Mean baseline PHQ-9 scores for the BA and usual care groups were 14.9 (95% CI 14.1, 15.7) and 14.4 (95% CI 13.7, 15.2), respectively. Women randomly assigned to BA reported significantly greater improvement than women in usual care; mean PHQ-9 scores for the BA and control groups were 8.5 (95% CI 7.2, 9.8) and 10.3 (95% CI 9.1, 11.5), respectively (P = .04), and 46.5% (33/71) of the BA group had a 50% or greater reduction in PHQ-9 scores, vs. 30.4% (21/69) of the control group (P = .05). **Conclusions:** Behavioral activation may be an effective and feasible treatment for depressed pregnant women, with broad dissemination potential.

**Keywords:** Perinatal depression; Behavioral activation

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**CM&R 2014 : 1-2 (September)**

HMORN 2014 – Selected Abstracts
PS1-37: Comparison of Antipsychotic Polypharmacy Trends among Schizophrenia Patients across Multiple Healthcare Systems

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Background/Aims: Although a number of international guidelines recommend antipsychotic monotherapy in patients with schizophrenia, frequently the complex pharmacological treatment for these individuals involves multiple medications. To investigate prescribing patterns for patients with schizophrenia, this study examined antipsychotic polypharmacy across multiple outpatient healthcare settings (including two HMORN sites) and their association with hospital admission. Methods: This multi-system study utilized data on patients diagnosed with schizophrenia, including 119,662 Veterans in the Department of Veterans Affairs (VA) healthcare system, 553 and 4,887 patients in two private, integrated health systems (HMORN), and outpatients (17,596,617 visits in 1-week look-back) from a nationally representative sample of U.S. residents seeking care outside federal systems (National Ambulatory Medical Care Survey, NAMCS). Antipsychotic polypharmacy was defined as use of more than one antipsychotic drug (first or second generation) during the covered period (week, year). The prevalence and trend of antipsychotic polypharmacy was assessed in each system (2002-2009 or 2005-2009) and their association with one-year hospital admission using multivariable logistic regression. Results: Annual antipsychotic treatment in the VA ranged between 74-78% each year, with the lowest rates observed in the HMORN systems (49-67% site 1, 22-41% site 2) per pharmacy fill data; NAMCS ranged between 69-84% per clinician-reported prescriptions. Polypharmacy rates depended on the defined covered period. The VA had lower polypharmacy when data were restricted to the one-week covered period used in non-federal systems (20-22% vs. 19-31% NAMCS). In each system, polypharmacy was associated with increased odds of admission (odds ratio ranging 1.4-2.4). Conclusions: The unadjusted longitudinal trends suggest tremendous system variations in antipsychotic use in patients with schizophrenia. Cross-system comparisons are inherently subject to uncertainty due to variation in the amount and type of data collected (e.g., look-back period, pharmacy records versus clinician chart review), yet represent a significant effort to understand organizational differences and context. Given current debates over healthcare access and treatment costs, electronic systems to signal polypharmacy could assist in identifying patients requiring more complex clinical and pharmacy management, individuals at substantially higher risk for adverse events. Such enhanced sentinel detection and follow-up care could ultimately lead to improved clinical practice and fiscal well-being.

Keywords: Schizophrenia; Antipsychotics

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PS2-44: Qualitative Patient Experiences with the Mindful Mood Balance Program – A Web-based Intervention for Depressive Relapse Prevention

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Background/Aims: Mindfulness-based cognitive therapy (MBCT) is an empirically supported intervention designed to teach emotion regulation skills for reducing residual depressive symptoms and avoiding relapse triggers that contribute to chronic illness course. MBCT faces common challenges to dissemination, including: service costs, waiting lists, and access. Online treatments address these challenges by increasing treatment accessibility and flexibility, but present other challenges of high dropout rates and decreased engagement. The present study is the first qualitative investigation of patients’ experiences with Mindful Mood Balance (MBB), an 8 week online treatment that features the core elements of in-person MBCT. Methods: Conducted qualitative content analysis on 38 exit interviews with adult patients who participated in MMB. Interviews gathered constructive feedback on website activities and content, program administration, as well as on skills learned and personal insights achieved through participation. Participation required current PHQ-9 score less than or equal to 12 and lifetime history of one or more major depressive episodes. Results: Participants were majority female (71%), white (89.5%), employed (79%), married (73.7%), with a mean age of 46.89. Majority of participants had 3 or more past major depressive episodes (68.4%) and were currently using anti-depressant medications (71%). Codes were organized into four main themes: evidence of concept comprehension, translation of MBCT content, translation of MBCT group process, and home practice. Within these four areas, participants highlighted the advantages and challenges of delivering MBCT in an online environment and endorsed learning and retaining central skills taught. Conclusions: This work will be used to inform programmatic changes to MBCT including addition of an online community and alternatives to home practice expectations. Participants endorsed retaining central skills observed previously during in-person delivery of MBCT, and identified several advantages to online delivery including flexibility, reduced cost and time commitment. Overall feedback indicated a high level of participant satisfaction, which is encouraging as MBM could drastically widen the availability of an empirically based depression relapse prevention treatment.

Keywords: Major depressive disorder; Online psychological treatment

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PS2-46: Validity and Reliability of Health-related Quality of Life Instruments in Teens with Depression  
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**Background/Aims:** Depression is one of the most common mental disorders among adolescents and is associated with substantial impairment, such as difficulties in school, interpersonal relationships problems, substance abuse, and suicide attempt. Understanding the impact of depression in youth and the effectiveness of interventions for this population requires assessments that capture the multiple domains affected by this disorder. In particular, brief measures that are easy to use are critical for research and practice for depressed teens. Brief health-related quality of life (HRQL) measures, which cover multiple life domains, may be one approach valuable for this purpose. In addition, use of generic HRQL measures allows decision-makers to compare the impact of depression to the impact of other health conditions in this population. However, few studies have examined the validity and reliability of HRQL measures in youth with depression. This study examined the validity and reliability of common HRQL measures in teens with and without depression. **Methods:** We interviewed 392 teens with and without depression using diagnostic instruments to determine depression status and seven common HRQL measures. We examined whether or not the HRQL instruments could distinguish between teens who were depressed and those who were not depressed, and whether they could distinguish different levels of severity of depression. We used multiple regression to control for demographic and other characteristics. In addition, interviewers provided qualitative assessment regarding whether or not the instruments seemed understandable and acceptable to teens. **Results:** Preliminary results indicate that all of the HRQL instruments evaluated were able to distinguish between youth without depression and those with depression. Four of the seven HRQL instruments were also able to distinguish between differing levels of severity of depression. **Conclusions:** This study provides one of the only reports of HRQL in teens with depression. Results of this study indicate that common, brief measures of HRQL do a good job distinguishing teens with and without depression. Results of this study can aid future research on HRQL in teens with depression by helping to guide which HRQL instruments are most useful in this population and the results also help to quantify the burden of depression in teens for policy.

**Keywords:** Health related quality of life; Depression

**doi:**10.3121/cmr.2014.1250.p2-46

PS2-47: Systematic Stakeholder Assessment to Determine Facilitators of and Barriers to SBIRT Implementation in Multiple Integrated Health Systems  
Alanna Kulchak Rahm1; Jennifer Boggs2; Carmen Martin1; Arne Beck1; Marilyn Pearson1; Thomas Backer2; Brian Ahmed1  
1Kaiser Permanente Colorado; 2Human Interaction Research Institute; 3Henry Ford Health System

**Background/Aims:** The US Preventive Services Task Force has identified alcohol and drug use screening as a high priority in primary care. SBIRT is a framework for population based screening and brief intervention with the goal of reducing substance use before it progresses to dependence. There has been limited uptake of SBIRT in any large health system, thus SAMHSA has supported a series of studies, led by Kaiser Permanente Colorado (KPCO), to develop strategies to promote large scale SBIRT implementation. **Methods:** A qualitative examination of SBIRT feasibility and subsequent pilot testing within KPCO primary care guided a series of additional stakeholder interviews at Henry Ford Health System (HFHS) to assess feasibility of SBIRT implementation in additional organizations. Qualitative interviews were conducted with a broad spectrum of HFHS stakeholders using snowball sampling. A total of 28 HFHS stakeholders were interviewed. Interviews were conducted telephonically by trained interviewers from KPCO and lasted approximately 30 minutes. Interviews were digitally recorded and transcribed. After each interview, a detailed summary was generated and used to create the initial code book for analysis of interview transcripts. **Results:** While current screening, brief intervention, and referral to treatment processes for substance use were noted in HFHS, they were inconsistent and no systematic policies exist. Many facilitators for SBIRT implementation within HFHS were noted including: population, recent implementation of depression screening in primary care, and EMR tools to facilitate documentation. Barriers to SBIRT implementation included time and competing demands for primary care providers, access to treatment, and follow-up processes for positive screens. All stakeholders were supportive of pilot implementation of SBIRT within HFHS with adequate attention to barriers and facilitators. **Conclusions:** This project successfully demonstrated the value of gaining stakeholder perspectives in order to facilitate successful implementation of SBIRT in large integrated health systems and provides a systematic protocol for gathering this data.

**Keywords:** SBIRT; Dissemination

**doi:**10.3121/cmr.2014.1250.ps2-47

### Patient Centered Outcomes Research/Member Engagement in Research

#### B3-1: Developing a Protocol for Patient Engagement in Research: The HMORN Member Engagement Work Group  
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**Background/Aims:** Integrated health care delivery systems are well positioned to engage patients in research due to their diverse patient populations. Managed care organizations cover 22.5% of the national population, making the establishment of a protocol for patient engagement in research in these settings particularly important. In 2012, researchers from the Institute for Health Research (IHR) identified resources and processes for patient engagement in the Kaiser Colorado region, and synthesized the findings in a Member Engagement Toolkit. After presenting this work at the 2013 HMORN conference the HMORN Member Engagement Workgroup [MEWG] was formed to compile current practices and identify priorities for further exploration. The MEWG aims to create a protocol and standards for member engagement in research and create instruments for measuring the success of engagement efforts in managed care settings. **Methods:** To do this we will conduct an environmental scan of engagement resources and processes currently available in the eight member organizations participating in the MEWG. We will use the IHR’s Member Engagement Toolkit as a model to develop a patient engagement toolkit for HMORN organizations that will be generalizable to managed care settings nationally. Using the data from the environmental scan we will identify engagement methods, resources, policies, principles, and logistics for use by research teams embedded in managed care organizations. The scan will catalog best practices and gaps in engagement efforts that can inform the development of standards to guide engagement practices in managed care settings. We will conduct a targeted literature search and interviews with key informants to identify instruments for measuring success, and inform the development of instruments. **Results:** The MEWG will incorporate the findings from the environmental scan, a literature review and interviews with key informants into a toolkit, and present the results of the environmental scan at the 2014 meeting. Findings will also be available on the HMORN website. **Conclusions:** NA

**Keywords:** Patient engagement; Patient centered outcomes research (PCOR)

**doi:**10.3121/cmr.2014.1250.b3-1

#### B3-2: Re-conceptualizing Medical Decisions: How Home Hospice Care Fosters Patient and Family Engagement and Decision-making  
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**Background/Aims:** Despite growing acceptance that patient engagement and shared decision-making should be goals of medicine, organizational attempts to support these ideals are limited and larger institutional structures...
often constrain patient autonomy. Home hospice care is a subset of medical care that has consciously developed a philosophical and practical approach to encouraging patient and family engagement. This research examines how home hospice care provides a different strategy for improving patient engagement and shared decision-making. **Methods:** This ethnographic study draws on a sample of 55 home hospice participants, including patients, family members/caregivers, staff, and volunteers, and uses in-depth interview and observation of home hospice work to examine the process of providing and receiving hospice care. **Results:** I find that macro level hospice institutional structures and micro level daily work practices embody a holistic approach which assumes patients and family members are the critical experts in most instances of decision-making. Differences in institutional structure, such as providing care in patient homes and having an interdisciplinary team approach focused on the “whole person,” empower the patient and family members. Likewise the micro level interactions between hospice workers and patient and family members narrow the field of purely “medical” decisions and broaden the field of decisions open to patients. Hospice workers accomplish this re-conceptualization by framing many medical decisions as being more about what is best for the patient and family and less about medical expertise. **Conclusions:** By broadening and re-conceptualizing the idea of decision-making, hospice workers enable patients and their families to have more control over their medical care and in many cases the process of dying itself. While some attributes of home hospice care are unique, many techniques could be introduced or accentuated in other models of medical care. **Keywords:** Hospice; Decision-making

B3-3:
**PCORI’s National Clinical Research Network**

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1Harvard Pilgrim Health Care; 2Patient-Centered Outcomes Research Institute; 3Group Health Research Institute

**Background/Aims:** In September 2013 the Patient-Centered Outcomes Research Institute (PCORI) funded the National Clinical Research Network (NCRN) Coordinating Center (CC) to manage the development of PCORI’s national data infrastructure to support patient-centered comparative effectiveness research. Initial NCRN membership will include 8 Clinical Data Research Networks (CDRNs) and up to 18 Patient Powered Research Networks (PPRNs). A number of HMORN members submitted CDRN applications. The CDRN and PPRN applications are under review to be announced in December. (Note: the HMORN authors of this abstract have no knowledge of nor will they participate in the CDRN / PPRN selection process). **Methods:** The NCRN CC is led by the Harvard Pilgrim Health Care Institute, and co-led by Group Health Research Institute, the Duke Translational Medical Institute, AcademyHealth, the Brookings Institution, the Center for Medical Technology Policy, the Center for Democracy & Technology, Johns Hopkins Berman Institute on Bioethics, and America’s Health Insurance Plans. The RAND Corporation is the independent evaluator. The NCRN will organize its work around several taskforces, including: (a) Health systems interactions, led by Group Health Research Institute; (b) Creation of PCORInet, the networking capability to query NCRN partner data, led by Harvard Pilgrim Health Care Institute; (c) Governance, including how the NCRN will partner with external researchers to access the data infrastructure; and (d) Patient and stakeholder engagement, privacy, ethics and regulatory, rare disease and obesity cohorts, biorepositories, patient-reported outcomes and clinical trials. **Results:** PCORI’s vision for the NCRN is to unite patients, healthcare systems and researchers to support rapid, effective observational and interventional studies of topics that are chosen by all stakeholders working in concert. We will describe the NCRN, the HMORN contribution to the Coordinating Center and, if applicable, will invite participation of HMORN members who are CDRN partners. **Conclusions:** The PCORI NCRN is advancing the nation’s capacity to conduct comparative clinical effectiveness research by establishing an innovative and representative national research infrastructure. HMORN investigators lead several aspects of this cutting-edge work. **Keywords:** Patient-centered; Comparative effectiveness research

B3-4:
**Establishing an Aging-In-Place Model for the Lesbian, Gay, Bisexual, and Transgender (LGBT) Community: Lessons Learned from a Community-research Partnership**

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**Background/Aims:** Lesbian, Gay, Bisexual and Transgender (LGBT) seniors face barriers to accessing social services. We describe formation of an interdisciplinary community-research partnership called SUSTAIN (Seniors Using Supports To Age In Neighborhoods), whose ultimate goal is to develop and adapt an aging-in-place model in a Denver metropolitan neighborhood that is home to a high concentration of LGBT individuals. **Methods:** Established in 2009, SUSTAIN partners represent a cross-segment of service delivery, community building, education, and research interests including social service agencies; local LGBT community members; the Denver Gay, Lesbian, Bisexual, & Transgender Commission; a regional affiliate of Services and Advocacy for Gay, Lesbian, Bisexual, & Transgender Elders (SAGE); the LGBT community center for the state of Colorado; an affirming church leader; an area agency on aging; a non-profit healthcare and research organization; and a university researcher specializing in aging. Discussions were conducted among partners and written comments were solicited to understand community experience and reflections on the partnership. **Results:** The success of our SUSTAIN partnership hinged on several features. First, most partners’ affiliations bridged at least two of the aging, LGBT, and research communities we were uniting. Second, the partnership development mechanism required at least fifty-percent of funds be allocated to community partners, which was crucial for establishing trust. Third, SUSTAIN’s core values embraced a commitment to collaborative principles and explicitly addressed power imbalances. **Conclusions:** Members with existing capacity to connect communities and formalized funding frameworks that emphasize equity may be key ingredients for growing a sustainable community-research partnership. **Keywords:** LGBT seniors; Community based participatory research (CBPR)

PSI-23:
**Prospective Association of Patient Activation Measure (PAM) with Medical Costs among Hypertension Population**

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**Background/Aims:** The patient activation measure (PAM) refers to an individual’s skills, knowledge, and confidence to manage their health and their ability to engage health providers in shared decision making practices. Such skills are important for the ongoing management of chronic conditions, such as hypertension. Although research has examined the association of PAM with utilization and health outcomes; little research has examined the association of PAM with medical costs. The objective of this research was to examine the prospective association of PAM with four cost measures: 1) total costs, 2) emergency department (ED) costs, 3) inpatient costs and 4) pharmacy costs. **Methods:** Using an observational study design, we studied 1,812 patients with hypertension with a PAM assessment between 12/4/2007 and 2/28/2011. The PAM is 13 items and categorizes PAM into four levels: PAM 1(lowest level of activation, where patients typically lack confidence and self-management skills and may not understand the need to be actively involved in managing their health) and PAM 4 (highest activation where patients typically have the necessary self-management skills and are more pro-active about their health). Patients received care in Kaiser Permanente Northwest (KPNW) and were enrolled in care management programs. Per
patient per month (PPPM) medical costs were calculated 12 months after the
PAM assessment date. Costs were constructed in 4 areas: total, ED, inpatient
and pharmacy. Using Ordinary Least Squares Regression, each cost measure
was regressed on PAM level (PAM 1 [reference group] vs. PAM 2, PAM 3,
and PAM 4); adjusting for the following covariate measures; demographics
and a severity of illness. We performed statistical analyses on logged PPPM
medical costs, but report comparisons in absolute dollars (2011). Results:
Compared to those with PAM 1 scores, those with PAM 3 scores had lower
total costs (beta coefficient = - $849; P = .0004), ED costs (beta coefficient
= - $22; P = .02) and inpatient costs (beta coefficient = - $500; P = .03).

Conclusions: Among a population with hypertension; adults with higher
PAM scores (PAM 3) had significantly lower total costs, ED costs and
inpatient costs, compared to patients with lower PAM scores (PAM 1).

Keywords: Patient activation; Medical costs

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PSI-38:
Building a Patient-centered Medical Home: Patient Perspectives from a
Survey in an Integrated Healthcare System

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1Scott & White Healthcare

Background/Aims: As healthcare evolves to meet growing demand, it is
crucial to maintain quality patient-centered care. In our quest to build a viable
Patient-Centered Medical Home (PCMH) in our ambulatory care setting, we
conducted this study to assess our patients’ perspectives on patient-
centeredness in our integrated healthcare system. Methods: Surveys were
administered to all consenting English-speaking patients and accompanying
relatives ages = 18 at 4 Family Medicine clinics. The questionnaire consisted
primarily of Likert-type items with 5 choices ranging from strongly agree to
strongly disagree on relationships within healthcare, communication with
providers, access to providers, and coordination of care, along with basic demographics. Results: Of 316 patients approached, 204 (64.6%) returned
completed surveys. Mean age was 47.4 (SD = 16.0; range 18-89); 67% were
female, 84.4% white, 11.8% black, and 12.8% Hispanic. Majority were
married (57.0%), employed (60.2%), had college education (69.4%), and
reported an annual income of <$60,000 (68.7%). The vast majority expressed
believe that their healthcare team treats them with courtesy and respect
(96.1%), trust their healthcare team with their medical care (93.6%), feel
their healthcare provider communicates with them clearly using understandable language (95.6%) and listens to their questions, answering them directly (96%). Also the vast majority believe they play an active role in their healthcare (95.5%) and think it is important to be proactive in their healthcare (97%). Comparatively lower percentages of positive responses were noted when asked if the patient would like to use the Internet for filling prescriptions, making appointments, or communicating with their healthcare
team (52%), if their provider inquires about their health goals (61.9%), and if their provider takes their health goals into account when developing a
treatment plan (69.4%). Conclusions: In order to move towards a more
PCMH, providers need to talk to patients about their health goals and
incorporate them in developing a treatment plan. Since patients seem willing
to take a proactive role in their healthcare and already trust their healthcare
team, a PCMH model appears to be an attainable goal in our setting.

Keywords: Patient-centered medical home; Patient perspectives

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Statistical and Research Methods

B4-2:
Risk Engine Evaluation Software: An Analytics Platform for
Individualized Guidelines

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Background/Aims: With the recent explosion of medical data, it is
necessary to develop software tools to support the process of evidence review
and synthesis that is fundamental to Evidence-Based Medicine. Furthermore,
as predictive models are being increasingly integrated into clinical decision
making and personalized guidelines for individual patients, there is an even
greater need for a practical tool that enables development, validation, and
uncertainty quantification of models in a robust, automatic and efficient way.

Methods: We developed Risk Engine Evaluation Software, a software
platform that enables users to compare and synthesize evidence from
multiple data sources, to build robust and accurate predictive models to
estimate and stratify disease risks, to validate risk equations and to quantify
the accuracy of a predictive model in different subpopulations. Results: We
applied the tool to data on cardiovascular outcomes from a large number of
trials, observational studies and electronic medical records, including
Framingham Heart Study, Atherosclerosis Risk in Communities Study,
Cardiovascular Health Study, and ALLHAT. We demonstrated that users can
evaluate the performance of predictive models for different subpopulations
in real time. Several metrics were used for model evaluation: cumulative
incidence, calibration plots, receiver operating curve (ROC) and net
reclassification index. The software also allows users to generate and then
assess models for risks of MI, stroke or heart failure, for a predefined
subpopulation from selected datasets. Conclusions: Risk Engine Evaluation
Software proves to be a useful tool for advancing the development and
application of predictive modeling in medicine.

Keywords: Risk model; Individualized guidelines

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B4-3:
Is There Evidence of Non-response Bias for Survey-based Estimates of
Urinary Incontinence?

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Background/Aims: Non-response is an important potential source of bias in
survey research. It is usually difficult to obtain meaningful information on
non-respondents to adequately assess bias on estimates of population
statistics, especially when the survey involves sensitive or intrusive questions.
We combined Electronic Health Record (EHR) and survey data to assess the
impact of non-response on estimates of urinary incontinence (UI) prevalence.
We used data from the baseline survey of the General Longitudinal
Overactive Bladder Evaluation – Urinary Incontinence (GLOBE-UI), a
population-based study of the natural history of UI in women = 40 years of
age. We conducted the survey on a random sample of 7,125 Geisinger Clinic
Primary Care patients. The response to the baseline survey was 57%. We also
used electronic health records (EHR) data to obtain demographic, care
utilization, health behavior, social history, and clinical information on all
equal responders of the GLOBE-UI survey. Methods: We complete a
two-stage model. First, we used logistic regression to assess baseline
characteristics associated with response status. The predicted probabilities
were used as a weight in the second stage model. UI status was defined for
each response based on survey data. An Inverse Probability weighting (IPW)
logistic regression model was applied to adjust non-response bias and to
determine prevalence of UI based on baseline risk factors associated with UI
status, including baseline characteristics, health utilizations, social and
educational history, and comorbidities. The non-response adjusted estimate
of prevalence was compared with prevalence obtained from respondents.

Results: Age at survey, smoking, marital status, number of outpatient
encounters per year, CHF, dementia, and severe liver disease were
significantly associated with response status and UI status. Adjusting for
non-response bias resulted in a reduction of the UI prevalence estimate from
an observed value of 31% to an adjusted value of 28% for those 60 and older.
The observed and adjusted estimates were not different for younger
respondents. Conclusions: Non-response bias in women with UI is limited.
It may lead to a marginal overestimate of UI prevalence for older patients.
This could be explained by the non-response group being relatively younger.

Keywords: Non-response bias; IPW logistic regression model

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A Novel Technique for Analysis of Uncontrolled Confounding in Non-experimental Comparative Effectiveness Research

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Background/Aims: Comparative effectiveness research (CER) investigates the effects of treatments and practices, thus requires causal inference. Routine data such as billing, pharmacy or EHR, while often incomplete on important confounding variables, are the usual sources of information for nonexperimental CER. The lack of randomization introduces important considerations regarding uncontrolled confounding, especially in large datasets, which potentially magnify systematic error. Yet, quantitative bias analysis in CER is not common practice. In this paper we formalize and demonstrate easy-to-implement record-level simulation techniques for analysis of uncontrolled confounding in cancer treatment CER. Methods: We use recent advancements from the causal theory and risk analysis literature, specifically directed acyclic graphs (DAGs), and Monte-Carlo simulation techniques to introduce a novel form of record-level missing variable imputation that can be implemented during the core data analysis stage, making bias analysis more accessible using standard statistical packages. Further, our methods take into account varying levels of uncontrolled confounding by research center, or other clustering variable that may predict the level of unknown information in the dataset, and are specifically designed for implementation in large datasets, or data from multiple sources. We demonstrate these methods with two example sensitivity analyses of uncontrolled confounding in cancer treatment CER. Results: Our methodology highlights the underlying causal model assumed for the main analysis in CER. Our technique uses the observed data lacking important confounding variables and informed estimates of the unmeasured variables to impute missing variables. The new variables now have a joint distribution with the observed data that would have been the case had they been observed fully under the assumed interrelationships. This technique is intuitively in line with the missing data framework and inference using partially observed distributions. Conclusions: Sensitivity analysis for uncontrolled confounding is feasible and indispensable for CER. Unlike existing formula-intensive external adjustment techniques, the new technique can be implemented during core data analysis, is not outcome model specific, is at most semi-parametric and requires no esoteric software. Quantitative uncertainty analysis should be routine practice for CER in large observational data sources. Flexible methods accessible to all researchers should be a priority in this growing area of research.

Keywords: Bias analysis; Comparative effectiveness research

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How Can the Same Practice Be Classified as Having 2 and 900 MDs?

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Background/Aims: Comparative effectiveness research (CER) investigates the effects of treatments and practices, thus requires causal inference. Routine data such as billing, pharmacy or EHR, while often incomplete on important confounding variables, are the usual sources of information for nonexperimental CER. The lack of randomization introduces important considerations regarding uncontrolled confounding, especially in large datasets, which potentially magnify systematic error. Yet, quantitative bias analysis in CER is not common practice. In this paper we formalize and demonstrate easy-to-implement record-level simulation techniques for analysis of uncontrolled confounding in cancer treatment CER. Methods: We use recent advancements from the causal theory and risk analysis literature, specifically directed acyclic graphs (DAGs), and Monte-Carlo simulation techniques to introduce a novel form of record-level missing variable imputation that can be implemented during the core data analysis stage, making bias analysis more accessible using standard statistical packages. Further, our methods take into account varying levels of uncontrolled confounding by research center, or other clustering variable that may predict the level of unknown information in the dataset, and are specifically designed for implementation in large datasets, or data from multiple sources. We demonstrate these methods with two example sensitivity analyses of uncontrolled confounding in cancer treatment CER. Results: Our methodology highlights the underlying causal model assumed for the main analysis in CER. Our technique uses the observed data lacking important confounding variables and informed estimates of the unmeasured variables to impute missing variables. The new variables now have a joint distribution with the observed data that would have been the case had they been observed fully under the assumed interrelationships. This technique is intuitively in line with the missing data framework and inference using partially observed distributions. Conclusions: Sensitivity analysis for uncontrolled confounding is feasible and indispensable for CER. Unlike existing formula-intensive external adjustment techniques, the new technique can be implemented during core data analysis, is not outcome model specific, is at most semi-parametric and requires no esoteric software. Quantitative uncertainty analysis should be routine practice for CER in large observational data sources. Flexible methods accessible to all researchers should be a priority in this growing area of research.

Keywords: Bias analysis; Comparative effectiveness research

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Sensitivity of Patient-reported Physician Percentile Rankings to Inter-physician Variability and Patient Sample Size

Jove Graham1; Daniel Horwitz1

1Geisinger Health System

Background/Aims: Patient satisfaction is increasingly being recognized as a desirable measure of physician quality and is used for quality-based financial incentives. Patient satisfaction surveys such as the CAHPS, however, typically exhibit ‘ceiling effects’ where most patients report maximal satisfaction, and so physicians are often ranked based on their percentage of maximum-satisfaction responses (“percentile top box scores,” 0-100%) rather than on raw scores. Even so, physicians express concern that low response rates or tight clustering of underlying scores can have unknown effects on rankings and detrimental consequences. This study used simulation to report the effect of inter-physician variability and sample size on survey-based physician rankings. Methods: Assuming 9 different underlying review by NCHS. However, this process has been delayed due to the government shutdown. We fully anticipate that results will be released in time for presentation at the HMORN conference. Conclusions: Though we are precluded from disseminating results at this time, we will provide a full report of our results in our HMORN conference presentation.

Keywords: NAMCS; Survey research methods

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A Comparison of Electronic Medical Records vs. Claims Data for Rheumatoid Arthritis Patients in a Large Healthcare System: An Exploratory Analysis

Daniel Maen1; Joseph Boscarino2; Walter Stewart3; Xiaowei Yan4; Nancy Steigerwald4

1Geisinger Health System; 2Sutter Health

Background/Aims: Electronic medical records (EMR) and claims data offer two potential data sources for researchers to examine healthcare utilization patterns and cost of care. In particular, combining the clinical and epidemiological variables typically available in EMR with cost information available in the claims data is not only intuitively sensible but also increasingly more feasible with growing standardization of EMR across healthcare delivery systems. Methods: In this study, we compare EMR and claims data within a cohort of rheumatoid arthritis patients who received care from Geisinger Health System and had concurrent Geisinger Health Plan (GHP) coverage. We also develop a cost “imputation” method to obtain GHP claims-based cost estimates within EMR even for those who did not have GHP coverage. Results: EMR-based estimated means of total cost of care and utilizations tend to substantially underestimate the total cost of care. In particular, EMR substantially understates emergency department (ED) visits [4% (125 of 3,131) in EMR vs. 11.2% (352 of 3,131) in claims], X-rays [4% (125 of 3,131) vs. 22% (689 of 3,131)], and CT scans [5.1% (160 of 3,131) vs. 7.3% (229 of 3,131)]. Use of biologic agents appear to be slightly higher in EMR than in claims [7.2% (226 of 3,131) vs. 6.7% (210 of 3,131)], although the difference is not statistically significant. The correlation between log-transformed EMR-based cost of care and log-transformed claims-based cost of care was modest (R2 = 0.81). Conclusions: The findings confirm that there is significant disagreement between EMR and claims data and suggest that each represent a different set of “reality.” The main source of such discrepancies between EMR and claims appears to be missing utilization of certain types of care in EMR. In particular, discrepancies seem greater for the types of services for which patients have more alternative choices in the area. Claims data reflects health plan’s coverage decisions and utilization management, while EMR reflects clinicians’ decisions and practice patterns. Thus, researchers should carefully consider which “reality” they are interested in capturing in their analysis. Lastly, the fact that both EMR and claims are collected for clinical and administrative purposes, not for research purposes, must be emphasized.

Keywords: Cost of care; Electronic medical records

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A Comparison of Electronic Medical Records vs. Claims Data for Rheumatoid Arthritis Patients in a Large Healthcare System: An Exploratory Analysis

Daniel Maen1; Joseph Boscarino2; Walter Stewart3; Xiaowei Yan4; Nancy Steigerwald4

1Geisinger Health System; 2Sutter Health

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Keywords: Cost of care; Electronic medical records

doi:10.3121/cmr.2014.1250.ps1-11

Sensitivity of Patient-reported Physician Percentile Rankings to Inter-physician Variability and Patient Sample Size

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1Geisinger Health System

Background/Aims: Patient satisfaction is increasingly being recognized as a desirable measure of physician quality and is used for quality-based financial incentives. Patient satisfaction surveys such as the CAHPS, however, typically exhibit 'ceiling effects' where most patients report maximal satisfaction, and so physicians are often ranked based on their percentage of maximum-satisfaction responses (“percentile top box scores,” 0-100%) rather than on raw scores. Even so, physicians express concern that low response rates or tight clustering of underlying scores can have unknown effects on rankings and detrimental consequences. This study used simulation to report the effect of inter-physician variability and sample size on survey-based physician rankings. Methods: Assuming 9 different underlying
distributions of “true” physician scores (means of 73, 88, 95% satisfaction and standard deviations of log odds = 0.5, 1.0 and 1.5), we simulated 5,000 physicians and assigned each a true score and rank within these distributions. We then tested various patient sample sizes (N) from 10-100, and repeated 1,000 simulations under each scenario to calculate 95% inner ranges of observed ratings and ranks for each physician. True and observed ranks were compared and examined as a function of underlying distribution and N.

Results: The precision of an individual physician’s percentile rank increases dramatically with 3 factors: increase in N; increase in variance of true physician scores; and decrease in overall mean physician score. Precision is also greatest for the best and worst physicians and less precise in the mid-range. In the best case scenario tested (mean 73%, log odds SD = 1.5, N = 100), physicians with an observed rank as low as the 68th percentile were likely to be equivalent to physicians with an observed rank above the 90th percentile. In the worst case scenario (95% mean, log odds SD = 0.5, N = 10), physicians with a “true” 90th percentile rank were likely to receive a ranking as low as the 18th percentile. Conclusions: If physician rankings based on patient satisfaction scores are used to measure and incentivize quality, rankings should either be based on a measure with maximal variation among physicians, or incentives should be based on ranges that reflect uncertainty rather than absolute rankings.

Keywords: Patient satisfaction; Quality metrics
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Vaccine/Infectious Diseases

PSI-36: Developing Rapid Molecular E.coli Clonal Diagnostics for Community Laboratory Settings

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Background/Aims: E.coli infections of the urinary tract (UTI) are among the most common infections worldwide. U.S. costs of UTI care are >$1B annually. Recently, there has been rapid worldwide emergence of resistant E.coli, which increases the percentage of serious events and the difficulty of care. One contributing factor may be that usual care typically involves presumptive antibiotic treatment, with antimicrobial sensitivity results available only after 1-2 days. Inappropriate treatment during that interval is suboptimal for the patient and facilitates E.coli resistance. We conducted a 1-year pilot of a potential new diagnostic technology to test for E.coli infection at the clonal level by: 1) optimizing PCR methods to directly and rapidly test urine samples for two E.coli sub-strains (clones) in a community lab setting (Group Health [GH]); 2) using this method to identify two highly-resistant sub-strains in GH samples; and 3) comparing usual care prescribing patterns to potential prescribing based on sub-strain results, focusing on the ‘drug-bug mismatch’. Methods: A research strategy developed at the University of Washington to diagnose E.coli sub-strains was adapted to a commercial PCR platform for two selected sub-strains: ST131 and ST69. We tested 653 urine samples for presence of ST131 and ST69 and reviewed EMRs to collect the clinical diagnoses and antibiotics prescribed at the visit.

Results: In the GH lab, the PCR-based diagnostic test required about 1.5 hrs. Prevalence (UW-confirmed) was 10% (65/653) for ST131 and 5% (33/653) for ST69. Of 200 EMR reviews to date, these two clones represent 65% (17/26) of fluoroquinolone and 17% (5/29) of trimethoprim/sulfaf-resistant isolates. Five percent (9/200) of patients were empirically prescribed therapy for which the isolate was resistant. Adjustment of the original prescribed antibiotic based on the E.coli clonal identity would reduce the drug-bug mismatch by 55%. Conclusions: These methods delivered accurate, economical results, at the clonal level, faster than usual lab methods. The two E.coli sub-strains are found in a sizable percentage of the isolates that are resistant to the main E.coli therapies. Clonal-based diagnostic strategies can offer opportunities to improve antibiotic prescribing and to impact the continued spread of antimicrobial resistance.

Keywords: Rapid diagnosis; Antibiotic resistance
doi:10.3121/cmr.2014.1250.ps1-36

Virtual Data Warehouse

A4-1: Validating Electronic Health Record Demographic Data Using Self-reported Data from the Autism Registry Survey

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1Kaiser Permanente Northwest; 2Kaiser Permanente Northern California; 3Kaiser Permanente Southern California; 4Kaiser Permanente Southeast

Background/Aims: The use of administrative patient data via the electronic health record (EHR) is very important in research. It’s critical we have a sense of the validity and relative accuracy of key data in this widely available data source. The HMORN Virtual Data Warehouse (VDW) is an example of a large repository of administrative data used in numerous studies. The recent Mental Health Research Network (MHRN) Autism Spectrum Disorder (ASD) Registry Survey was hosted by four HMORN sites inviting Kaiser Permanente members to complete a Web-based questionnaire on behalf of their child identified as having an ASD diagnosis in the EHR. Methods: In addition to an extensive battery of questions regarding ASD, the survey collected data on a number of demographic data elements also available in the VDW. These are: age, gender, race/ethnicity (child), income (household) and education (household adult). A total of 1155 adults responded to the ASD Registry Survey. These records were matched with demographic data from the VDW for the same child. Results: Preliminary examination of race-ethnicity and gender data shows that there’s a good to excellent level of agreement between the two sources when data are non-missing in both data sources. A total of 992 records had non-missing race/ethnicity data from both data sources. In 81.1% (805/992) of the cases, both data sources agreed (kappa = 0.68, CI = 0.64-0.72). The categories that had the highest level of agreement are White, Black, and Asian, while the Hispanic and multi-racial groupings had a comparatively much lower level of agreement (46.9%). For gender, level of agreement was very high (99.0%, 1118/1129, kappa = 0.97, CI = 0.95-0.99). Conclusions: In this study, race in the electronic health record was a very accurate measure for major race categories but was far less accurate when reporting the emergent and important multi-racial category and Hispanic ethnicity. Gender had an excellent level of agreement between the two sources. Age, gender, and race-ethnicity are key covariates for many studies analyzing EHR data. Income and education can serve to illuminate socioeconomic factors very relevant to health care research. Having a sense of the validity and accuracy of these data is crucial to the research process.

Keywords: Data validation; Demographic data
doi:10.3121/cmr.2014.1250.a4-1

A4-2: ICD-10 CM Transition across Three Research Centers

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1Kaiser Permanente Northwest; 2Kaiser Permanente Hawaii

Background/Aims: The United State currently uses version nine (ICD-9) for diagnosis and procedure coding. Federal regulations require that the US adopt the next version (ICD-10) by 10/1/2014. The new version expands the number of diagnosis codes from about 13,000 to 68,000, providing more granularity to classify diseases. Challenges in moving to ICD-10 include: (a) the crosswalk between versions is a many-to-many match; (b) the relationship between the old and the new codes will sometimes be complex; and (c) it will encompass system-level changes such as expanded field sizes and support for alphanumerical characters. Our challenge is to implement the transition across three research centers at Kaiser Permanente Northwest, Southeast and Hawaii. Methods: The three research centers need to account for the new ICD-10 code set and any new data structures introduced by either the EMR or Research Data Warehouse. A smooth transition between coding systems requires working with researchers across the three regions. This includes identifying corresponding ICD-10 codes that correctly identify the research cohort members and remediating the existing programing logic. Kaiser Permanente’s Center for Health Research (CHR) has developed a detailed plan to accomplish these two goals. CHR staff are partnering with the Kaiser
Background/Aims: Investigators often assume that when patients are enrolled in a health plan, they have complete capture of utilization data from their health plan sources. This assumption may not always be true as patients have many incentives to choose care at multiple settings (convenience, price, residence, insurance type, drug coverage), which can give rise to missing data. Complete capture of medical data for population-based research is crucial to our ability to identify populations who have not had particular exposures or outcomes. In case-control designs, where the control group does not have a specified exposure, we measure this condition by absence of data. To address this problem, the VDW enrollment work group created a new enrollment variable, called “Outside utilization”, designed to identify members suspected of incomplete capture of encounters or pharmacy fills. This work reports on a quality assurance analysis of the extent and nature of the data gaps at different sites. Methods: For V3, HMORN sites added new VDW variables in their enrollment file including the “Outside utilization” variable. This variable identifies populations suspected of having incomplete health care utilization capture. Since the reasons for incomplete data capture vary among the sites, the methods for identifying members with incomplete data capture were determined by the local site data managers. The authors distributed a program that computed utilization rates for specific cohorts for “complete” and “incomplete” data capture populations. We also computed rates for those on high deductible plans. We compared differences in these rates by year and site. In addition, we conducted a survey to determine how the incomplete populations were identified for each participating site.

Results: Some sites clearly identify populations that have incomplete capture of data using the “Outside utilization” variable. At other sites, the difference in rates is less apparent. The sites that can distinguish patients with incomplete versus complete data have certain common definitions used when designing the “Outside utilization” variable. Conclusions: The “Outside utilization” variable identifies populations with incomplete data capture at some sites. We recommend that projects use this variable to exclude populations suspected of incomplete data capture when computing population-based utilization rates.

Keywords: Data Population

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PS1-5: Converting to ICD-10 Clarity Structures

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Abstract:
The transition to the ICD-10 code represents a huge undertaking for every Health Care Organization including Analytic teams. In Kaiser Northern California we have effectively engaged KP HealthConnect Application Coordinators, Business Partners, and Regional IT Leads to create and build ICD-10 impact awareness through education and leveraging our partner’s vast knowledge to identify critical areas of impact, issues, risks, assumptions and high level business objectives to support a successful transition to the ICD-10. Methods: To accommodate ICD-10, Epic has made significant changes to Clarity in their 2010 release including adding new fields, tables and views. These changes are designed to aid in reporting appropriate codes as well as allowing for historical reporting and trending. The new format of the codes will also be part of the changes to Clarity. Changes have been made to three main Epic Master Files: (1) Diagnosis masterfile - maintains a master set of diagnosis records. These diagnosis records can be industry-standard ICD codes used for billing or clinical terms used for clinical encounter documentation, but mapped to industry-standard ICD codes. The diagnosis code changes primarily impact clinical encounter documentation (problem list and a Dx association with encounters and orders), HIM coding, claims for all types of encounters. (2) ICD Procedure masterfile – maintains a master set of ICD hospital procedure records. ICD procedure codes in addition to supporting hospital inpatient billing. (3) Surgical Procedure masterfile - maintains a master set of records for each surgical procedure that can be performed with an operating room facility. It also contains procedure preference records, primarily used for scheduling surgical procedures. We would like to take a real study and switch the codes from ICD9 to ICD10. Results: By sharing a real life example and sample codes we are hoping to pass our learning and knowledge to others hoping to help eliminate some of the errors that we made. Also, discuss outstanding challenges and issues that Epic has not resolved. Conclusions: The purpose of

A4-3:
Utilization-based Proxy Enrollment Versus Standard HMORN VDW Enrollment: A Pilot Validation Study

Irina Haller1; Brian Johnson1; Karen Riedlinger2; Pinky Barna3; Terese DeFor4; Paul Hitz5; Roy Pardee6; David Tabano6

1Essentia Institute of Rural Health; 2Kaiser Permanente Northwest; 3Geisinger Health System; 4HealthPartners; 5Group Health Research Institute; 6Kaiser Permanente Colorado

Background/Aims: Most HMORN members offer both insurance coverage and health care. Health plan enrollment provides a well-defined population denominator for HMORN-based research. The HMORN common data model combines electronic data, routinely collected in health care delivery or claims processing, into the Virtual Data Warehouse (VDW). Sites with health plans capture insurance enrollment in the VDW enrollment file. Recently HMORN included sites that deliver health care without offering insurance. Since health plan membership is unknown, population denominators must be determined using alternate methods. This study validated a utilization-based proxy enrollment (PE) using standard VDW enrollment (SE) in 5 HMORN sites with Epic EHR and SE files. Methods: The utilization-based algorithm defines PE start at first of two non-ancillary health care visits (at least one being a primary care visit) separated by at least 90 days. PE ends at death or at the last qualifying visit if there is no utilization in the following 3-year period. PE files were built at each site by applying utilization-based algorithm to base tables created from Clarity. The PE and SE extracts included study ID, age, gender and the start/end of enrollment periods between 2000 and 2012, based on availability of Clarity data at the sites. The agreement between PE and SE was evaluated using differences in start/end of the first enrollment periods (days). Results: The differences between PE and SE started varied by site with greater variation in children (<20 years) and older adults (64+ years). The differences varied by gender, but the differences between the genders were smaller in the young and the old. The differences were larger for males between ages of ~16 and 64, indicating less utilization by males than by females. The differences between PE and SE ends were generally negative across ages, indicating that PE extended beyond SE. Gender differences between PE and SE starts were similar to differences between PE and SE ends. These empirical results were confirmed by multivariate regression modeling. Conclusions: Agreement between PE and SE could be improved using additional parameters, as well as possible adjustment of the time lag for PE end in the utilization-based algorithm.

Keywords: Population denominator; Utilization-based enrollment

doi:10.3121/cmr.2014.1250.a4-3

A4-4:
Do Projects Have Complete Data Capture for Their Study Populations?

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Background/Aims: The purpose of the present study was to evaluate the completeness of data capture for those participants enrolled in the Permanente Colorado Health Plan (PC) by the researchers for three distinct studies. The three studies were the Essentia Institute of Rural Health (EIRH) ICD-10 implementation team in the development of our project plans. The standard source to be used for mapping at the three Kaiser Research centers is the General Equivalence Mappings based Crosswalk Query Tool, which Kaiser is implementing to support transition mapping needs. Results: The CHR ICD-10 remediation team has completed the Framing and Planning phases including identifying programs/tables affected, sharing remediation solutions across the Kaiser regional research teams, and meeting with the Health Plan to coordinate efforts. We have developed a project remediation checklist and will report on the development of validation testing plans and the refinement of vanguard project code mappings. Conclusions: In the transition to ICD-10, it is essential to have a well-formed plan and to identify and include all stakeholders in the process. It is also beneficial to share tools and ideas between research centers to improve the overall methods.

Keywords: ICD-10; System-level changes

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A4-2:
Converting to ICD-10 Clarity Structures

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Abstract:
The new format of the codes will also be part of the changes to Clarity in their 2010 release including adding new fields, tables and views. These changes are designed to aid in reporting appropriate codes as well as allowing for historical reporting and trending. The new format of the codes will also be part of the changes to Clarity. Changes have been made to three main Epic Master Files: (1) Diagnosis masterfile - maintains a master set of diagnosis records. These diagnosis records can be industry-standard ICD codes used for billing or clinical terms used for clinical encounter documentation, but mapped to industry-standard ICD codes. The diagnosis code changes primarily impact clinical encounter documentation (problem list and a Dx association with encounters and orders), HIM coding, claims for all types of encounters. (2) ICD Procedure masterfile – maintains a master set of ICD hospital procedure records. ICD procedure codes in addition to supporting hospital inpatient billing. (3) Surgical Procedure masterfile - maintains a master set of records for each surgical procedure that can be performed with an operating room facility. It also contains procedure preference records, primarily used for scheduling surgical procedures. We would like to take a real study and switch the codes from ICD9 to ICD10. Results: By sharing a real life example and sample codes we are hoping to pass our learning and knowledge to others hoping to help eliminate some of the errors that we made. Also, discuss outstanding challenges and issues that Epic has not resolved. Conclusions: The purpose
of this abstract is to share information, concerns, issues when switching to ICD10.  

Keywords: ICD9 to ICD10; Clarity; Masterfile structural changes  

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PS1-6:  
Big Data, Data Science and You—Demystifying Some Big Ideas  
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Background/Aims: Lately the popular press is rife with tantalizing references to coming advances brought by “Big Data” methods and software. Modern living--mobile and social computing particularly--emits enormous plumes of data. This data, we are told, can be analyzed in real-time to spot trends and yield important insights, to the benefit of business and mankind generally. The general idea of incidentally-produced data that can be exploited to produce valuable insights is one an HMORN audience is eminently comfortable with--it describes quite a lot of our research. But where do we fit in with these new trends? Have we all been “Data Scientists” doing “Big Data” for years now, and the rest of the world is just now catching up to us? Or, are these things really different and new? Are there things we should be appropriating from this “new” field to make our own work stronger?  

Methods: The proposed talk will describe and define several commonly-cited ideas and methods--to wit: (a) big data; (b) map/reduce; (c) no SQL; and (d) data science.  

Results: The talk will locate these in a larger technological context, list synonyms and closely related technologies and describe situations where expanding into less-familiar tools may well bear fruit for research data projects.  

Conclusions: While much of the tools and methods of big data are squarely addressed to problems we don’t frequently encounter in HMORN research, it is good to have a conceptual understanding of them so that when we do hit the limits of conventional methods and resources we have “somplace to go” before giving a project up as infeasible.  

Keywords: Big data; Data science  

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PS1-7:  
An Automated Metadata-driven Extract, Transformation and Load (ETL) Process: Using Code and Data to Generate Code  
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Background/Aims: A stable, automated ETL environment is essential to maintain a consistent virtual data warehouse (VDW) refresh schedule. This stability is threatened at each refresh cycle because VDW source table schemas can vary over time, causing extract programs to fail when they encounter a schema that is different from what is expected. Such a failure requires manual intervention to change the extract program to conform to the new schema, disrupting the refresh schedule.  

Methods: We are initiating a process to dynamically modify extract code when source table schemas change, through a real-time comparison of current source table schemas against previously extracted table schemas. The process requires a metadata database (MDDB) containing schema metadata from all the sources, as well as metadata about our ETL packages. The first step in a refresh cycle is to acquire the current source schema metadata in real time. Then, using a combination of T-SQL and .Net code, we compare the current schema metadata against the metadata from the prior extract to identify source table changes. If there are discrepancies, the metadata about our extract packages provides the means to identify those packages of extract code requiring modification. We have created a maintenance program that uses the MDDB information to identify those packages requiring update, generate the needed data definition language (DDL) code segment changes, and dynamically modify the data flows within those extract packages. This is essentially application code that uses metadata to generate and modify other application code. Built into this process are logging, notification, historical archiving, and other documentation for process assurance.  

Results: This methodology allows us to generate corrections and changes to ETL packages quickly and easily without manual intervention. Since all tables are stored in the MDDB, the extract program can be constructed according to the schema specifications found there. It then can be dynamically updated should the schema change, saving valuable programming time in developing new extract packages for data mining/exploration.  

Conclusions: This approach saves both programming time and computer resources, and allows us to execute more frequent ETL refresh cycles.  

Keywords: Extract, transfer, load (ETL); Virtual data warehouse  

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PS1-8:  
EMR v. Insurance Type Data in the VDW across HMORN Sites  
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Background/Aims: To describe the various organization models across the HMORN and the resulting data.  

Methods: Each HMORN site has patients and/or insurance members. The data available for these two populations are different; the differences will be demonstrated.  

Results: The VDW has been designed to accommodate data for both member and patient populations.  

Conclusions: Understanding the data available for each population will help in designing studies, especially multi-site studies.  

Keywords: Virtual data warehouse; Data  

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PS1-9:  
Data Issues and Meta-content to Improve Analysis of Electronic Health Data  
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Background/Aims: KPCO continuously checks our electronic health data for unexpected values. These values may be errors or legitimate reflections of clinical procedures and data collection rules. Rigorous data analysis requires an understanding of these unexpected values as well as methods to address them. We do not yet have an organized way to document unexpected data values.  

Methods: We followed a multi-phase plan to develop a database that describes data issues from HMORN data partners. In Phase 1 (Requirements), we met with stakeholders at KPCO to determine needs. For Phase 2 (Design), we drafted a data collection survey and built an initial prototype of the database. In Phase 3 (Development), we improved upon multiple versions of the database and documented procedures to enter new data items, create reports, and review the accuracy of existing data items. When the database framework was sufficiently developed, members of the Analytic Team at KPCO entered issues based on their experience with HMORN studies. In Phase 4 (Testing), we evaluated our documentation and ran sample reports against the new data content. We also assessed the degree of overlap with the VDW Issue Tracker. During Phase 5 (Implementation), we presented the database to key stakeholders at KPCO and began discussions to build similar databases at other HMORN sites and/or enhance the Issue Tracker as a multi-site centralized database.  

Results: The Analytic Team at KPCO recorded a wide range of data issues occurring in projects from 2010-2013. Data items came from general VDW quality assessments as well as study-specific data checks. Database content included data errors as well as real phenomena attributable to clinical practice or data collection.  

Conclusions: Analysts can better anticipate problems and nuances in electronic health data with a database that describes the past data anomalies and methods for using the data.  

Keywords: Data; Meta-content  

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PS1-43:
**Validation of Colony Stimulating Factor (CSF) Data within the HMORN Virtual Data Warehouse**

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**Background/Aims:** The colony stimulating factors (CSFs), filgrastim and its long-acting form, pegfilgrastim, are indicated by the Food and Drug Administration to decrease infections in patients with non-myeloid malignancies receiving myelosuppressive chemotherapy. Roughly 25-40% of treatment-naïve patients receiving common chemotherapy regimens develop febrile neutropenia (FN). FN is associated with treatment delays, dose reductions, hospitalizations, and a high cost burden. CSFs decrease the incidence, length and severity of chemotherapy-related neutropenia in several solid tumors and prophylactically, decrease infection rates and neutropenia, infection-related mortality, and early deaths associated with chemotherapy. A reduction in absolute and relative risk for all-cause mortality is associated with CSF use and in combination with antibiotics for the treatment of FN, CSFs decrease the length of hospitalization; however, recent studies have shown these agents are frequently administered in a manner inconsistent with the recommended guidelines. The high costs associated with FN treatment, the high cost of CSFs and administration of CSFs in a manner inconsistent with scientific evidence creates both a clinical and economic challenge for health plans. To date, CSF data within the Virtual Data Warehouse (VDW) has not been evaluated for accuracy.

**Methods:** We are conducting a validation study using tumor registry data and medical record abstraction (gold standard) to evaluate 100 patients within our Cancer Center who received a new chemotherapy and initial treatment with a CSF from 01/01/2012-12/31/2012 with 100 patients matched on age, diagnosis, stage and treatment who did not receive CSFs to verify the VDW CSF data. We will compute the sensitivity, specificity, and positive predictive value of the VDW data to determine the concordance between the gold standard tumor registry and chart review data and the VDW data.

**Results:** Chart review is currently ongoing and the VDW patient population is being assembled for comparison with abstracted data.

**Conclusions:** Ultimately, we plan to evaluate CSF use among HMORN sites and use CSF data within the VDW for studies among cancer patients within the HMORN.

**Keywords:** Supportive care; Virtual data warehouse
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