Services Task Force has published methods and tables to estimate the number of myocardial infarctions (MIs) and strokes prevented and estimated harms of using aspirin based on age categories in hypothetical cohorts of men and women. Translation of the guideline requires data and formulas to calculate risk which are not readily available to practicing clinicians. We took advantage of the opportunity to enhance the efficiency of provider and patient decision making regarding aspirin through the use of electronic health record data and computer program assistance to assess the risks and benefits.

Results: The decision support program for aspirin in HealthPartners Medical Group & Clinics was integrated with the electronic health record through a web-service called Cardiovascular (CV) Wizard. At the point of care, de-identified data including pertinent demographics, diagnosis codes, lab results, medications, and allergies are transmitted to the web service and run through a set of sophisticated algorithms to assess whether aspirin is indicated and to provide individualized treatment suggestions and safety alerts based on known allergies and intolerance, contraindications, and identification of previous bleeding risks. **Conclusions:** Using electronic decision support algorithms, it is possible to provide patients and providers with printable information to engage them in more evidence-based decisions about aspirin use for primary prevention.

Keywords: Aspirin; Decision Support; Treatment

doi:10.3121/cmr.2013.1176.ps1-50

PS1-51:

Testing a Clinical Decision Support Process to Lower Cardiovascular Risk of Patients

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Background/Aims: More than 30% of adults in the U.S. have a 10% risk or greater of having a heart attack in the next 10 years. The proportion of adults with moderate and high cardiovascular risk (CVR) accounts for nearly half of the first major cardiovascular (CV) events in the United States. Shared decision support tools may reduce CVR by facilitating and prioritizing provider-patient communication about CV risk. **Methods:** CV Wizard was developed to identify and prioritize uncontrolled CVR factors and offer treatment suggestions. It was integrated into the electronic health record through a web-service and pilot tested with 14 providers at 6 HealthPartners Medical Group (HPMG) clinics. CV Wizard was triggered during patient visits for adults age 18-75 with known CV risk factors such as diabetes, heart disease, tobacco use, hypertension, and hyperlipidemia. Staff printed the patient and provider versions of the decision making support. Providers completed a satisfaction survey 6 weeks post-implementation. **Results:** Eleven providers completed the survey. Ten said CV Wizard fit well in their workflow. All found the information on the form useful and would recommend it to others. Providers also reported that patients were receptive, all or most of the time, to using the tool. Several (n = 3) were encouraged that patients paid more attention to smoking risks. **Conclusions:** Preliminary results show that the CV Wizard is promising for engaging patients in decisions to lower CV risk and providers had high satisfaction rates. The patient tool provides an easy to comprehend visual for communicating and prioritizing CV risk reduction, particularly around smoking.

Keywords: Decision Support; Risk; Cardiovascular Disease

doi:10.3121/cmr.2013.1176.ps1-51

PS1-52:

Diagnosis of Pediatric Hypertension Depends on Clinical Practice Guideline Definitions

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Background/Aims: The National High Blood Pressure Education Program (NHBPEP) guidelines define hypertension (HT) in children and adolescents as blood pressure (BP) measures above the 95th percentile on three

consecutive clinic visits. In contrast, the Expert Panel of Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents (Expert Panel) clinical practice guidelines define HT as the average of three consecutive BP measures above the 95th percentile. Here we quantify the impact of these two different case definitions of HT on occurrence of HT in a defined population of children and adolescents.

Methods: Study subjects were a cohort of 117,329 pediatric primary care patients, drawn from three large, geographically dispersed health systems. Subjects were 3-17 years old at entry between January 1, 2007 and December 31, 2010. Subjects having an elevated initial BP were not excluded, nor were subjects having BP diagnosis codes at baseline or follow-up. We estimated the period prevalence rate of HT using NHBPEP and Expert Panel definitions, applying a rolling window to the longitudinal BP measurements to consider each successive block of three BP measures. Analyses were performed separately for children (3-11 years) and adolescents (12-17 years). Data were analyzed by Poisson regression to estimate annual rates of HT.

Results: Subjects were followed for an average of 2.1 years. HT defined by elevated BP $\geq$ 95th percentile on 3 consecutive clinic visits occurred at a rate of 0.25%/year in children, and 0.42%/year in adolescents. HT defined as the average BP $\geq$ 95th percentile from 3 successive clinic visits occurred at higher rates; 0.49%/year in children ($P \leq 0.00005$) and 0.75%/year in adolescents ($P \leq 0.00005$). For subjects with HT defined by elevated BP $\geq$ 95th percentile on 3 consecutive clinic visits, the average time between elevated measurements was 19 weeks (s.d. 25 weeks). **Conclusions:** HT rates in children and adolescents were twice as high when using an average of 3 consecutive measures (Expert Panel method) as when using 3 consecutive hypertensive levels (NHBPEP definition). The impact of these differences in HT rates on downstream risk of persistent HT and CV events later in life requires further investigation.

Keywords: Hypertension; Pediatric; Blood Pressure

doi:10.3121/cmr.2013.1176.ps1-52

Chronic Conditions

B2-2:

Impact of Automated Alerts to Primary Care Providers and Staff When Patients are Discharged from the Hospital: A Randomized Trial

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Background/Aims: Inadequate continuity of care puts patients at high risk during transitions from the inpatient to ambulatory setting. Several approaches for improving patient transitions from hospitals to home have been developed, but most require substantial commitments of personnel time. With the adoption of electronic medical records by medical group practices, there may be opportunities to improve the quality of care for patients discharged from hospitals. **Methods:** We conducted a randomized controlled trial of an HIT-based transitional care intervention in a particularly vulnerable patient population, patients aged 65 and older discharged from hospital to home. In addition to notifying providers about the patient's recent transition, the system provided information about new drugs added during the inpatient stay, warnings about drug-drug interactions, recommendations of dose changes and laboratory monitoring of high-risk medications, and reminded the primary care provider's support staff to schedule a post-hospitalization office visit. Randomization occurred at the time of hospital discharge during a one-year intervention period beginning in August 2010. Alerts were automatically delivered to the provider and staff in-basket within the Epic electronic medical record. The primary outcomes were: 1) having an outpatient office visit with the primary care provider within 30 days following discharge, and 2) having a rehospitalization within 30 days following discharge. **Results:** The study included 3667 discharges of which 1877 discharges were randomly assigned to the intervention arm. Forty-nine percent of discharges in the intervention arm were followed by office visits with the primary care provider within 30 days, compared to 51% in the comparison arm (RR 0.96, 95% CI 0.90, 1.03). Eighteen percent of discharges in the intervention arm were followed by a rehospitalization

within 30 days compared to 20% in the comparison arm (RR 0.92, 95% CI 0.80, 1.05). **Conclusions:** The intervention was not effective in increasing the proportion of discharges followed by timely office visits to primary care providers or reducing the proportion with rehospitalization.

Keywords: Hospital Discharges; Re-Hospitalization; Office Visits
doi:10.3121/cmr.2013.1176.b2-2

B2-3:

Predicting the Risk of End-Stage Renal Disease in Patients with Stage 3 Chronic Kidney Disease: A Pragmatic Risk Score

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Background/Aims: Chronic kidney disease (CKD) is common, but only progresses to end-stage renal disease (ESRD) in a minority of patients. Developing a tool for early identification of patients likely to progress to ESRD would enable clinicians and medical systems to target resources to patients likely to benefit from interventions. **Methods:** We conducted a cohort study by linking data among 38,483 patients with stage 3 CKD. We measured patient characteristics during the year before patients became eligible because of their poor kidney function. The patient characteristics were known from previous studies to predict ESRD. We followed patients for up to one year. Seven routinely measured patient characteristics accurately predicted the risk of ESRD. By combining those characteristics with numeric weights for their importance, the risk score identified the subgroup (top decile or tenth) of patients at the highest risk. **Results:** We observed 461 patients who developed ESRD, a one-year risk of 1.6 per 100 patients. We judged the risk score's effectiveness by dividing the cohort into ten equal groups or deciles, which included approximately 3,849 patients. Patients at or above the 90th percentile of predicted risk (top decile) were 60 times more likely to suffer a deep infection when compared with patients below the 10th percentile (bottom decile): 11.0 per 100 patients (top decile) versus 0.2 per 100 (bottom decile). The c-statistic was 0.89. **Conclusions:** This pragmatic risk score appears to be the first of its kind for predicting ESRD in patients with stage 3 CKD. Previous risk scores in the KPNW population and other populations have predicted ESRD in both earlier and later stages of CKD and may not be sufficiently accurate for KPNW's intended application. Our risk score can predict a patient's absolute risk (e.g., 11 per 100 patients). The risk score can also reveal where a patient's absolute risk ranks as a percentile. The same seven characteristics are more useful to decision-makers when the hazard ratios (numeric weights) can be combined in a risk score to predict the absolute risk.

Keywords: Risk Scores; Chronic Kidney Disease; ESRD
doi:10.3121/cmr.2013.1176.b2-3

B2-4:

A Vertebral Fracture Assessment (VFA) Performance Algorithm Improves Appropriate Utilization Among Those Referred for Bone Density Tests (DXA)

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Background/Aims: Densitometric lateral spine imaging (vertebral fracture assessment, or VFA) identifies prevalent vertebral fracture and improves fracture risk estimation, but is under-utilized in clinical practice. We created an algorithm to be used by bone density (DXA) technologists to identify those with moderate or higher pre-test probability of prevalent vertebral fracture who should have VFA at the time of a DXA test. Our objectives were to: a) assess changes of VFA utilization after implementation of the algorithm at a large rural multispecialty community health care organization and an academic health center; and b) assess the association of VFA results with prescription of fracture prevention medication. **Methods:** We devised a physician DXA order option that VFA also be performed for those patients whose worst T-score (spine, femoral neck, or total hip) is between -1.5 and -2.5 PLUS age 65 years or more OR height loss 1.5 inches or more OR current glucocorticoid use. The proportion for those with an indication for

VFA who had one done before and after introduction of the performance algorithm was compared with chi2 statistic. Manual medical record review was done to assess results of VFA, and logistic regression was used to estimate the multivariable-adjusted association of VFA results (positive for vertebral fracture vs. negative) with subsequent physician prescribing of fracture prevention therapy. **Results:** After introduction of the DXA/VFA order option, 36% (331 of 969) and 87% (438 of 452) of those with a VFA indication at the two institutions had VFA performed (P-value <0.001 compared to before introduction). Those with a VFA positive for prevalent vertebral fracture had an odds ratio of 3.2 (95% C.I. 2.1 - 3.1) of starting fracture prevention medication compared to those with a VFA negative for vertebral fracture, adjusted for age, sex, prior clinical fracture, and current glucocorticoid use. **Conclusions:** DXA technologists can successfully use an algorithm to identify those for whom VFA is indicated, provided the appropriate conditional order for VFA is part of the DXA order. Documentation of prevalent vertebral fracture appropriately increases utilization of fracture prevention therapy in a substantial subset of those who do not otherwise have an indication for therapy.

Keywords: Vertebral Fracture Assessment; Fracture Risk
doi:10.3121/cmr.2013.1176.b2-4

B2-5:

Spectrum of Obesity and Extreme Obesity in a Diverse Population of Children and Adolescents

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Background/Aims: The aim of the study was to examine the prevalence of obesity and extreme obesity in school-aged children using three classifications based on body mass index (BMI): BMI percentile, percentage above the 95th percentile and Z score, and the association of BMI stratification with elevated blood pressure. **Methods:** This was a retrospective study of 117,618 children aged 6-17 years receiving well-child care in Kaiser Permanente Northern California between July 2007 and December 2010. Blood pressure, BMI and other data were extracted from electronic records. **Results:** The prevalence of BMI >95th percentile ranged from 14.5% (4,395 of 30,235) in whites and 14.3% (2,287 of 16,033) in Asians to 22.3% (1,809 of 8,124) in blacks and 25.8% (5,734 of 22,187) in Hispanics. For boys, the highest prevalence was in Hispanics (29.2%, 3,346 of 11,452), followed by blacks (21.0%, 879 of 4,193); for girls, the highest prevalence was in blacks (23.7%, 930 of 3,931) and then Hispanics (22.2%, 2,388 of 10,735). For extreme obesity, a threshold of BMI ≥120% of the 95th BMI percentile identified the largest proportion of children (5.6%, 6,532 of 117,618) compared to BMI ≥99th percentile (3.8%, 4,488 of 117,618) and BMI Z score ≥3.0 (0.1%, 83 of 117,618). Stratification of BMI by percentage above the 95th percentile demonstrated a graded relationship between obesity severity and risk of elevated blood pressure. **Conclusions:** The prevalence of obesity and extreme obesity in children varied by age, gender and race/ethnicity, with the highest prevalence among Hispanics followed by black children. Compared to BMI thresholds based on the 99th BMI percentile or BMI Z score of 3, classification by BMI ≥120% of the 95th BMI percentile identified a greater percentage of severely obese children in whom additional health risk-stratification was achieved by further categorizing based on percentage above the 95th BMI percentile. This classification approach may be useful for obesity management in clinical practice, public health surveillance, and research.

Keywords: Obesity; Children; Classification
doi:10.3121/cmr.2013.1176.b2-5