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 20110. Uncontrolled cholesterol was defined as LDL = 100 mg/dL or HDL = 40 (M)/<50 mg/dL (F), uncontrolled glucose as A1c = 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 using Poisson regression in multivariable models for individuals with and without diagnoses of CVD. Average attributable fractions 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 four 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

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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. This study leveraged electronic health records from the Marshfield Clinic to identify demographic, clinical, and geographic predictors of aspirin use in adults without cardiovascular disease. **Methods:** A cross-sectional study was used with years 2010-2012 data from 45-79 year old adults in the Marshfield Epidemiologic Study Area. Individuals who reported regular use (daily or every other day) of aspirin-containing medications during their most recent ambulatory encounter, or had an aspirin contraindication, were considered adherent to aspirin therapy. **Results:** Per national guideline, there were 6,950 adults in the target population who were clinically indicated for aspirin therapy for primary cardiovascular disease prevention. Aspirin was underutilized in this population overall, with less than half of all clinically indicated adults adherent to aspirin therapy. Statistically adjusted 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

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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 ($P < .001$) and lipid ($P < .001$) 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

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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.

EHR BPs can be used to track group differences after a trial ends, but with some important caveats.

Keywords: Hypertension; Team care

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Child Health

PS1-39:

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 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 speech 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 most effectively.

Keywords: Autism; Health services

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PS2-20:

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

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PS2-21:

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 ($|\text{slope}| \geq 0.02$ and/or $\text{RMSE} \geq 0.35$). 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

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