Health Centers Care for a Sicker Population With Fewer Clinic Visits and Fewer Hospitalizations

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Background: The Health Center (HC) program is a vital primary care safety net program supported by the Health Resources and Services Administration and cares for ~20.5 million people. Understanding how HCs influence utilization and quality of care for the primary care safety net is critical for the program’s sustainability. Previous studies have been limited in how they identify HC patients and may not sufficiently address selection issues leading patients to be cared for at HC vs. other sites of care. We used unique geocoding data to more accurately identify HC patients and propensity score methods to address selection issues in order to compare utilization and preventive care receipt between HC patients and comparable outpatients.

Methods: Pooling five, 2-year panels of Medical Expenditure Panel Survey data (2004-2008), we studied adults, ≥18 years, living ≤20 miles of a HC, with ≥1 outpatient visit in the first panel year. We identified HC patients if ≥50% of their outpatient care was at HCs (n=1024). Using second panel year data, we compared utilization (office visits, hospitalizations and emergency room (ER) visits) and 10 preventive measures (routine visits, diet/exercise advice, influenza vaccination, dental care and hypertension, cholesterol, cervical/breast/colon cancer screening) between HC and other patients (non-HC, n=32,796). We modeled the overall population and non-dual Medicaid (HC, n=181; non-HC, n=1839), and uninsured (HC, n=349; non-HC, n=3622) subpopulations. Due to small sample sizes, hospitalizations could not be modeled for the Medicaid subpopulation and only 4 preventive measures could be modeled for the Medicaid and uninsured subpopulations. We calculated propensity scores to adjust for 38 characteristics (e.g., sociodemographics, insurance type, comorbidity, quality of life, disability). Analyses accounted for the complex survey design by including survey weights, which were multiplied by inverse probability treatment weights from propensity scores. We modeled utilization using negative binomial regression and preventive care receipt using logistic regression.

Results: HC and non-HC patients differed in 37 out of 38 included characteristics. HC patients were less educated, poorer, more often minority, and had more diseases, more disability, and worse quality of life. Compared to non-HC patients, HC patients had lower rates of office visits (incidence rate ratio (IRR), 0.58, p<.001) and hospitalizations (IRR, 0.28, p<.001), but no difference was detected in ER visits. HC patients received more (2 out of 10 measures) or no different (7 out of 10 measures) preventive care. Among Medicaid patients, HC and non-HC patients had no difference in office visits, but HC patients had higher rates of ER visits (IRR, 1.60, p=.01). There was no difference in preventive care between Medicaid HC and non-HC patients for all measures. Uninsured HC patients had lower rates of office visits (IRR, 0.65, p=.01), but no difference in hospitalizations or ER visits was detected. Uninsured HC patients had more preventive care compared to non-HC patients for 3 out of 4 measures.

Conclusions: Health Centers care for a socially and medically disadvantaged population; however, HC patients have fewer clinic visits and hospitalizations and receive similar or more preventive care compared to other patients. Further study is needed to understand how Health Centers are able to provide high levels of preventive care with fewer clinic visits and fewer hospitalizations.
Repatriation to primary care: Do PCPs and specialists agree?

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**Background:** ‘Repatriation’ – the return of care management from a specialist to the primary care provider (PCP), accompanied by specialist recommendations – could help optimize the use of specialty care resources. A better understanding of two areas is needed: 1) identification of patients followed by a specialist for a clinical problem that could reasonably be managed by a PCP, and 2) an understanding of barriers to repatriation. Here we report survey results from specialists and PCPs regarding patients under their mutual care; in a companion abstract we report qualitative findings from interviews with PCPs.

**Methods:** Specialists (total n=59) in 5 medicine subspecialty practices (Cardiology, Endocrinology, Gastroenterology, Pulmonary, and Rheumatology) at a single institution completed a 4-item, self-administered survey following each patient visit (n=104-173 surveys per specialty), which asked, “Could this diagnosis be managed exclusively by the PCP?” Response options were “yes”, “perhaps,” and “no”. PCPs (both internal (n=90) and external (n=262) to the academic medical center) were then identified, and received a similar survey for each patient captured by a specialist survey. Since PCPs were reflecting on their own comfort level with exclusive management, we did not include a "perhaps" response, but rather ‘yes’ and ‘unlikely’. Proportions are presented with 95% confidence intervals (95% CI); statistical significance in the difference between specialists and PCPs on the question of repatriation was assessed with McNemar’s chi-square test.

**Results:** Specialists completed surveys for 754 (68%) of the 1082 eligible patient visits during the survey period. PCPs were identified for 705 (94%) of these patients (n=316 internal, and 389 external). PCPs completed 383 surveys (response rate = 80% for internal and 37% for external PCPs). 342 patients had PCP and specialist surveys with no missing data, and served as the final study sample. PCPs identified 46% of patients appropriate for repatriation, compared with specialists who identified 24% (p<0.001). Among patients whom PCPs deemed appropriate for repatriation (n=158), 35% (95% CI: 28, 42) of specialists answered "yes," 27% (95% CI: 20, 34) answered "perhaps," and 38% (95% CI: 30, 45) answered "no." Among patients whom specialists deemed appropriate for repatriation (n=82), 67% (95% CI: 57, 77) of PCPs answered "yes" and 33% (95% CI: 23, 43) answered "unlikely." Overall, 16% (95% CI: 13%, 19%) of patients had concordant PCPs and specialists, answering “yes” to repatriation. For trends by diagnosis, we limited the analysis to those diagnoses shared by at least 8 patients. The diagnoses with >50% agreement that repatriation was appropriate were hypertension (6/8 PCP-specialist pairs agree), coronary artery disease (11/21), non-malignant thyroid disease (6/12), and COPD (9/18). Diagnoses with >50% agreement that repatriation was not appropriate were inflammatory bowel disease (11/13), thyroid cancer (11/13), and rheumatoid arthritis (25/32).

**Conclusions:** For patients with continuing care in specialty practices, and an established PCP, PCPs and specialists agreed that return of care management to the PCP is reasonable for a significant proportion. This presents an opportunity to provide less costly, streamlined care for such patients. Conversely, we found a high degree of discordance overall. Several diagnoses emerged as potential targets for empiric interventions to facilitate repatriation where appropriate.
The Use of Individualized Dashboards and Pay-for-Performance to Improve Venous Thromboembolism Prophylaxis Compliance by Hospitalists

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Background: Venous thromboembolism (VTE) accounts for over 100,000 deaths per year and costs the healthcare system approximately $15,000 per event. Methods to increase appropriate prophylaxis have included computerized physician order entry (CPOE) with decision support, dashboards, and pay-for-performance (P4P) programs. In this study, we sequentially examined CPOE-based decision support alone, group and individualized feedback using a dashboard plus decision support, and a P4P program in conjunction with dashboards and decision support to improve VTE prophylaxis.

Methods: CPOE with decision support for appropriate VTE prophylaxis based on American College of Chest Physicians (ACCP) guidelines was incorporated into the admission order-sets for all adults admitted to our tertiary care academic medical center in 2008. Appropriate prophylaxis was audited through the CPOE system 24 hours from admission. To further improve VTE prophylaxis, a web-based dashboard specific to the hospitalist group was launched in January 2011, providing both hospitalist group and individualized hospitalist compliance rates. Benchmarks were determined using this dashboard. After 6 months of feedback only, a P4P program was initiated with hospital funding. No payment was made to individual hospitalists with ACCP-compliant VTE prophylaxis rates of <80%. Graduated payouts were made for compliance rates of 80-100% to a maximum of $0.50 per work RVU. Using time series analysis, the percent compliance for the hospitalist group was compared during all three periods: CPOE alone, CPOE with dashboard, and CPOE with dashboard tied to P4P. The analysis was restricted to the non-teaching unit of the hospital where individual housestaff practice would be unlikely to confound the results. A sensitivity analysis explored the potential impact from physician turnover.

Results: We examined 4119 inpatient admissions by 38 hospitalists from 2008-2012. The 5 most frequent primary diagnoses were heart failure, acute kidney failure, syncope, pneumonia, and chest pain. Patients had a median age of 57 years [IQR: 44, 69], APR-DRG severity of illness score of 2 [IQR: 2, 3] and length of stay of 3 days [IQR: 2, 6]. VTE prophylaxis group compliance rates were 84% (95% CI: 83, 85), 90% (95%: 88, 93), and 94% (95%: 93, 96) for CPOE alone, CPOE with dashboard, and CPOE with dashboard tied to P4P respectively. Compliance significantly improved with both the use of the dashboard (p<0.001) and the addition of the P4P program (p=0.01). Annual individual physician VTE P4P payments ranged from $80 to $1429 (mean $654; SD ±364). The total annual cost of the P4P program of $12,422 was distributed to 19 providers. Sensitivity analysis accounting for physician turnover did not significantly impact the comparisons.

Conclusions: Although CPOE with decision support assists with appropriate VTE prophylaxis, direct feedback using dashboards significantly improved compliance. This effect was further augmented by incorporating an individual physician pay-for-performance program. The total P4P payments for an entire year were less than the cost of a single VTE event, suggesting an actual cost-savings. Real-time dashboards and physician-level incentives
Barriers and Facilitators of Contraceptive Counseling by General Internal Medicine Faculty and Internal Medicine Residents

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Background: Almost half of US pregnancies are unplanned, resulting in many unintended births and over a million induced abortions each year. Contraceptive counseling (CC) is an effective tool to increase patients’ use of contraception and thus decrease the rates of unplanned pregnancies and abortions. Internists are increasingly caring for reproductive age women and contraceptive counseling is a core competency of preventative care in this population, particularly when teratogenic medications are prescribed (e.g., HMG-coA reductase inhibitors and angiotensin-converting enzyme inhibitors). This study’s objectives were: 1) evaluate the frequency of contraceptive counseling provided to reproductive age women during a prevention-focused visit by internal medicine faculty and resident providers, 2) identify factors affecting the frequency of CC.

Methods: University of Colorado internal medicine residents and affiliated outpatient internist faculty working in seven separate metropolitan practice settings were invited to complete a 20 question online survey on demographics and CC-related factors. We asked providers to report the frequency of CC during an “annual physical” for women 15-45 years of age on a 4-point Likert scale with verbal anchors: “rarely ≤ 20%”, “sometimes 21-49%”, “often 50-79%”, “routinely ≥ 80%”. We also assessed possible facilitators of CC (e.g., high self-efficacy, women’s health educational exposures, provider gender) and possible CC barriers (e.g., low frequency of sexual history, low perceived importance).

Results: Our survey response rate was 61% and responders were demographically similar to nonresponders. Although greater than 95% of residents and faculty respondents agreed that CC is important, only 33% of faculty and 19% of residents reported that they provide CC routinely (≥80% of the time) to reproductive age women during a prevention-focused visit. Providing CC routinely was strongly associated with taking a sexual history ≥ 50% of the time (OR = 11.6 (3.3 to 39.9)), high self-efficacy to provide CC (OR = 6.5 (1.5 to 29.0)), and female provider gender (OR = 4.3 (1.9 to 9.8)), all reported as unadjusted odds ratio (95% CI). Over 80% of residents and over 60% of faculty reported they would provide CC more often if they had more knowledge of contraceptive methods. However, educational exposures such as women’s health electives during residency were not significantly associated with perceived adequate knowledge regarding contraceptive methods.

Conclusions: Even considering a “best-case scenario” of prevention-focused visits with reproductive age women, a minority of faculty and resident providers reported routinely providing CC. Obtaining a sexual history and high provider self-efficacy were strongly associated with providing CC and are likely predictors of provider CC behavior. We need to design and test interventions to increase contraceptive counseling among internists to reduce unplanned pregnancies. Such interventions should include elements to increase provider CC knowledge and self-efficacy, and should also target health care system intake processes and provider preferences to ensure that a sexual history is taken routinely.
Multimorbidity and health care utilization among high-cost patients: Implications for care coordination

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Background: Within the U.S. and many subpopulations, the most costly 5% of patients often account for close to half of total health care expenditures. A number of innovative health care delivery models have recently emerged that aim to enhance these patients’ care and optimize their use of services. We sought to inform these programs by investigating multimorbidity patterns, and associated health care utilization, among the costliest 5% of patients in the Veterans Health Administration (VHA) system.

Methods: We obtained total health care costs and sources of costs (inpatient, outpatient, pharmacy, and VHA purchase care) for 5.2 million patients who received care within the VHA system in fiscal year (FY) 2010. We identified the costliest 5% of patients, and examined the proportion of care they received in the inpatient and outpatient setting, as well as their insurance status and sociodemographics (including age, sex, and race/ethnicity). Using Chronic Condition Indicators (CCI) and body system groupings established by the Agency for Healthcare Research and Quality, we assessed the prevalence of 33 chronic conditions and rates of multi-system multimorbidity (presence of conditions affecting more than one body system). We then used multivariate linear regression to examine the association between multi-system multimorbidity and origins of health care costs (i.e., inpatient versus outpatient), after adjusting for age, sex, and health insurance.

Results: The most costly 5% of patients (n = 261,699) accounted for 47% of total VHA costs in FY 2010. The mean (SD) age of these patients was 63 (13) years, and 41% were ≥ 65 years. Median and mean (SD) health care costs were $52,807 and $72,977 ($64,040) (total), $26,979 and $42,179 ($58,680) (inpatient), and $12,699 and $19,182 ($30,269) (outpatient), respectively. The most common chronic conditions included hypertension (63%), diabetes (34%), ischemic heart disease (27%), cancer (25%), and low back pain (21%), and close to half (47%) of patients had a mental health condition. Multi-system multimorbidity was extremely common: 85% had conditions affecting ≥2 body systems (e.g., coexisting cardiovascular and mental health conditions), and 18% had conditions affecting ≥5 body systems (e.g., coexisting cardiovascular, respiratory, gastrointestinal, genitourinary, and endocrine conditions). There was a positive association between multi-system multimorbidity and total cost of health care, with most of the increased costs originating in the outpatient setting. The mean absolute and relative costs generated in the outpatient setting increased with each additional system affected by chronic conditions (p < 0.001), from $16,495 (29% of total costs) among patients with one affected system to $22,440 (35% of total costs) among those with ≥5 affected systems. In contrast, multi-system multimorbidity was associated with a decrease in costs originating in the inpatient setting (p < 0.001). These relationships persisted when analyses were stratified by age (<65 and ≥65 years).

Conclusions: Multimorbidity is extremely common among VHA’s 5% highest-utilizing patients, who account for nearly half of the system’s total health care expenditures. The observed association between multi-system multimorbidity and proportion of costs originating in the outpatient setting suggests a role for interventions that coordinate primary and specialty care for high-utilizers with multiple chronic conditions.
Association between resident laboratory test utilization, uncertainty & the biopsychosocial model of patient care

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Background: There is significant variation in physician laboratory test utilization, with potential negative consequences for patients, provider organizations and the health care system from over- and under-utilization. Prior studies have found that some variation is explained by patient factors, physician demographic factors, or physician characteristics including clinical competencies and personality; however, much of the variation remains unexplained. Additionally, previous research has focused largely on attending physician and inpatient utilization. Our interest was in factors accounting for utilization that are potentially modifiable during residency, specifically how residents deal with uncertainty in primary care settings and their comfort with the biopsychosocial model. We aimed to assess the relationship between resident physician outpatient laboratory test utilization and reaction to uncertainty in the clinical encounter and to investigate whether this relationship was modified by belief in the biopsychosocial model of care.

Methods: We conducted a cross-sectional study of internal medicine residents at an urban academic medical center. Residents were asked to complete a self administered web-based survey. Uncertainty was measured using an 8-item version of the Physician Reaction to Uncertainty Scale (PRUS) which measures anxiety due to uncertainty and concern over bad outcomes. To measure beliefs about the biopsychosocial model we used the 32-item Physician Belief Scale (PBS). Additional survey items included post graduate year (PGY) and gender. The outcome of laboratory test utilization was operationalized as the number outpatient of laboratory tests ordered by each resident during the academic year 6/15/11-6/14/12 divided by the total number of patient visits to that provider in that same academic year. Analyses were conducted using correlation, ANOVA and multivariable linear regression.

Results: The survey response rate was 53% (n=62). Respondents were 59% male and about equally distributed between each post-graduate year (PGY1 31%, PGY2 37%, PGY3 32%). The PRUS was normally distributed with mean 27.2±6.1 and cronbach alpha 0.86. The PBS was normally distributed with mean 73.6±15.0 and cronbach alpha 0.90. The mean laboratory test utilization was 2.5±0.9 tests ordered per patient visit. Interns ordered more laboratory tests per patient compared with PGY2 residents (3.0±1 vs. 2.3±0.8 p=0.04); gender was not associated with laboratory utilization (p=0.60). Resident discomfort with uncertainty was associated with increased laboratory utilization (r=0.3 p=0.03). After adjusting for PGY, discomfort with uncertainty remained associated with laboratory utilization (r=0.3 p=0.03). The association between physician reaction to uncertainty and laboratory utilization was not modified by belief in the biopsychosocial model (p interaction=0.55).

Conclusions: Residents who were more comfortable with uncertainty in the clinical encounter ordered fewer laboratory tests. This association between uncertainty and laboratory utilization did not depend on degree of agreement with the biopsychosocial model of care. Further research should continue to assess the unexplained variation in utilization and design medical education interventions to support resident decision analysis and uncertainty in primary care settings with the goal of promoting safe and effective test utilization.