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ORIGINAL CONTRIBUTION

Costs Associated with Ambulatory Care Sensitive Conditions Across Hospital-based Settings

Jessica E. Galarraga, MD, MPH, Ryan Mutter, PhD, and Jesse M. Pines, MD, MBA

Abstract

Objectives: Ambulatory care sensitive conditions (ACSCs) are acute care diagnoses that could potentially be prevented through improved primary care. This study investigated how payments and charges for these ACSC visits differ by three hospital-based settings (outpatient, emergency department [ED], and inpatient) and examined differences in payments and charges by their physician and facility components.

Methods: This was a secondary analysis of data (2005 through 2010) from the Medical Expenditure Panel Survey. Multiple linear regression models were used to assess differences in the mean-adjusted payments and charges for ACSC visits by clinical setting and further divided payments and charges into physician and facility components.

Results: Of all ACSC visits from 2005 through 2010, 41% were outpatient visits, 36% were ED visits, and 23% were hospital admissions. After adjusting for patient demographics and comorbid conditions, charges for an inpatient ACSC visit were four times higher ($11,414 vs. $2,563) and payments were five times higher ($4,325 vs. $859) when compared to an ED visit. By comparison, charges for an ACSC ED visit were two times higher ($2,563 vs. $1,084) and payments 2.5 times higher ($859 vs. $341) relative to an ACSC visit managed in an outpatient hospital-based clinic. Across all clinical settings, hospital facility fees account for 77% to 94% of the charge differences and 81% to 93% of the payment differences.

Conclusions: For hospital-based ACSC visits, inpatient hospitalizations are by far the most expensive. Finding ways to expand outpatient resources and improve the health management of the chronically ill may avoid conditions that lead to more expensive hospital-based encounters. Across all hospital-based settings, facility fees are the major contributor of expense.

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The cost of U.S. health care has been increasingly in the forefront of the national dialogue on health care reform.[1] The clinical setting in which a patient receives care is an important determinant of the cost of medical encounters. Some conditions, such as time-sensitive critical illnesses, require treatment in emergency departments (EDs) and hospitals. For more minor conditions, there is flexibility in the setting where care can be safely provided.[2–4] There are also certain critical conditions, such as severe asthma exacerbations, that require timely ED or inpatient care, but are amenable to prevention through improved primary care. The primary care capacity of communities continues to be a challenge,[5–9] and EDs have become increasingly the primary source for acute care, treating 28% of all acute care visits in the United States.[8]

The discussion on how to reduce health care costs has focused on the concept of improving health care delivery—specifically enhancing primary care—as a way to lower the burden of illness. The Agency for Healthcare Research and Quality (AHRQ) has defined a list of ambulatory care sensitive conditions (ACSCs), which are conditions "for which good outpatient care can potentially prevent the need for hospitalization or for

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which early intervention can prevent complications or more severe disease."[10] AHRQ uses the prevalence of ACSC encounters to measure quality in health care systems and to assess demonstration projects aimed at improving care delivery. The rationale is that communities with better primary care and outpatient resources will have fewer avoidable health care encounters.[10] Researchers have expanded on the use of ACSCs as a targeted area for cost reduction through the prevention of avoidable encounters, specifically in high-resource settings such as EDs and hospitals.[11–14]

Comparing care settings and related costs for ACSC visits is important because it frames the discussion on quantifying how much cost savings could be achieved by interventions that minimize avoidable hospital-based encounters. Additionally, understanding the breakdown of ACSC costs in hospital settings by payment type—physician fees (i.e., separately billed provider services) versus facility fees—is important to understand what types of fees drive the costs for various hospital-based visits. Care in hospital-based settings is more expensive than nonhospital settings due to high fixed costs required to maintain an operational capacity 24 hours a day, 7 days a week.[15]

Data from the Healthcare Cost and Utilization Project demonstrated that potentially preventable hospitalizations may account for up to $30.8 billion in annual health care costs.[11,12] Several regional studies have explored the charge and activity-based cost differences for ACSC visits across clinical settings. In five California Veterans Administration hospitals, activity-based costs for ACSC hospital admissions heavily outweighed ACSC ED visits, with costs approximately $15,000 and $500 per inpatient and ED encounter, respectively.[13] In a study in Charlotte, North Carolina, ED charges for ACSC-related visits were 320% to 728% higher than primary care clinic charges.[14] Although the higher costs incurred by managing ACSCs in higher resource settings may be intuitive, the magnitude of the cost difference for ACSC visits in different clinical settings and the relative contribution of provider versus facility fees has not been explored on a national level to the best of our knowledge.

The objective of this study was to identify the cost differences in payments and charges for ACSC visits in three different hospital-based settings: outpatient visits, ED visits, and inpatient admissions. We also assessed these differences by provider and facility components to identify their relative contribution to costs. Additionally, we examined the differences in payments and charges among two subgroups of ACSC visits: encounters due to acute medical conditions and encounters due to exacerbations of chronic disease. We conducted this subgroup analysis because acute and chronic ACSC nonoutpatient encounters may be preventable for different reasons. Acute ACSC encounters may reflect a lack of access to an outpatient setting to seek the same medical care. By comparison, chronic ACSC encounters not only may reflect the lack of access to outpatient care, but also may reflect suboptimal primary care management.

METHODS

Study Design

We conducted a secondary data analysis using the Medical Expenditure Panel Survey (MEPS), a publicly available data set from the AHRQ. MEPS is an ongoing nationally representative survey of the U.S. noninstitutionalized civilian population and provides data on health care use and expenditures. We combined MEPS data from January 1, 2005, through December 31, 2010.

The data used were from the household component of MEPS, which contains detailed information on individual outpatient, ED, and inpatient encounters. Information in the household component is supplemented and verified by the medical provider component. Details of the MEPS data collection procedures are described in Data Supplement S1 (available as supporting information in the online version of this paper).[16] The institutional review board at George Washington University determined that the study was not human subjects' research.

Study Setting and Population

This study focused on clinical encounters by adults, ages 18 years and older, which were hospital-based outpatient, ED, or inpatient encounters. Clinical encounters paid by flat-fee arrangements were excluded (n = 3,998) because the charges and payments do not reflect the costs of the encounters. Clinical encounters with missing cost data (n = 213) and encounters with charges of $0 ($n$ = 678) or payments of $0 ($n$ = 8,296), which represent cases of charity care, no reimbursement, third-party payer restrictions on reimbursement, or reimbursements covered by clinical trials, were also excluded.[17] Additionally, respondents were excluded if they did not provide information for one or more of the covariates used in the regression models (n = 1,696). The final unweighted sample included 94,595 encounters, with 7,465 ACSC (7.9%) encounters and 87,130 non-ACSC (92.1%) encounters. Outpatient visits comprised 64.1%, ED 22.7%, and inpatient 13.2% of all encounters.

Study Protocol

The clinical setting of each encounter was the primary independent variable and was categorized as outpatient visits, ED visits, and inpatient admissions. Outpatient visits include outpatient encounters in hospital-based clinics. MEPS provides separate data on office-based outpatient encounters, which were not included in this study because the physician and facility components of fees are not provided for these encounters. ED visits included only encounters that resulted in treatment and routine discharge, because it is not possible to separate the inpatient and ED components of fees for ED encounters that result in admission, in MEPS. Hospital admissions include provider and facility data that pertain to both the ED encounter that resulted in the admission and the inpatient stay.

The main outcome measures were payments and charges. Payments for each ED visit were the total payments provided to treating physicians and facilities from both out-of-pocket expenses and other third-party

sources (primarily private insurance, Medicare, and Medicaid). Charges for each clinical encounter covered medical care, diagnostic tests, laboratory work, treatments, and any specialty services for each encounter. Charges reflect amounts before any negotiated discounts or adjustments for financial assistance are applied. Charges do not include prescribed medications purchased outside the hospital setting. Payments and charges were adjusted using the Consumer Price Index to convert all data to 2010 U.S. dollars. In addition, because the distribution of payments and charges was positively skewed, a typical characteristic of health expenditure data,[18] all payments and charges were winsorized for the 10% tails of each side of the distribution to minimize the effects of extreme outliers. Payments and charges were separated into their physician and facility components as secondary outcome measures.

Demographic factors previously identified as having associations with ACSC visits were used as covariates.[19] Covariates included age (continuous), sex (male, female), race/ethnicity (white non-Hispanic, African American, Hispanic, other), annual individual income (0–$9,999; $10,000–$29,999; $30,000–$49,999; ≥$50,000), insurance status (uninsured, Medicaid, Medicare, or privately insured), geographic region (Northeast, Midwest, South, or West), and residence in a metropolitan statistical area (yes, no). For insurance status, individuals with both Medicare and Medicaid coverage were classified as "Medicare" insurance. All analyses were also adjusted using the Charlson-Deyo score (0, 1, 2, ≥3) attributed to the patient involved in each clinical encounter, which was composed using the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM) codes of the patient's reported medical conditions.[20] The Charlson-Deyo score is a validated comorbidity risk adjustment index used to account for the disease severity of an individual.[20–23] The Charlson-Deyo score may range from 0 (no comorbidity risk) to a maximum score of 33, if the individual has all of the comorbid conditions pertaining to the algorithm. Based on comorbidity prevalence, the Charlson-Deyo score is commonly truncated to range from 0 to 3 or more, with the majority of study populations having a score of 0 or 1.[19,20] Survey year was also included as a covariate in all analyses to account for secular trends over the 6-year period.

Data Analysis

The focus of the analyses was to compare mean total payments and mean total charges for ACSC visits by adults from three different clinical settings: outpatient, ED, and inpatient. ACSC visits included 11 of the 14 conditions identified by the AHRQ as Prevention Quality Indicators (PQIs), which are considered to be conditions for which hospitalizations may often be prevented through improved ambulatory care.[10] Two of the excluded PQIs were not based on adult populations: low birthweight (PQI9) and perforated appendix (PQI2). The third excluded PQI was only relevant to inpatient encounters: lower-extremity amputations among diabetic patients (PQI16). ACSC visits were identified using the ICD-9-CM codes specified in the numerator of the technical specifications for AHRQ PQI Version 4.5.[24] The ICD-9-CM codes used in this study represent the first diagnosis of the clinical encounter. Although the AHRQ PQIs use five-digit ICD-9-CM diagnosis codes, only the first three digits of the diagnoses codes were available in MEPS for this analysis. The first three digits adequately identified eight of the PQIs: congestive heart failure, hypertension, angina, asthma, COPD or asthma diagnosed at age > 40 years, bacterial pneumonia, dehydration, and urinary tract infection. The remaining three PQIs, uncontrolled diabetes, short-term diabetes complications, and long-term diabetes complications, were combined as a "diabetes complications" category, which was identified using the ICD-9-CM codes corresponding to the diabetes complication categories in the Clinical Classification Software (CCS).[25]

We specified multiple linear regression models that incorporated the study's covariates to predict the adjusted mean payments and charges for ACSC visits by clinical setting. We used six separate multiple linear regression models to estimate the adjusted means of: 1) total payments, 2) physician payments, 3) facility payments, 4) total charges, 5) physician charges, and 6) facility charges.

In addition to the cumulative analysis for all ACSC visits, we specified multiple linear regression models for ACSC visits by acute and chronic conditions. For each acuity category, an additional six separate multiple linear regression models were used to estimate the adjusted mean total payments/charges, physician payments/charges, and facility payments/charges. Acute ACSC visits were defined as visits for bacterial pneumonia (PQI11), dehydration (PQI10), or urinary tract infections (PQI12). Chronic ACSC visits were defined as visits for diabetes complications (PQI14, PQI1, and PQI3), congestive heart failure (PQI18), hypertension (PQI7), angina (PQI13), asthma (PQI15), or COPD or asthma diagnosed at age ≥ 40 years (PQI5). A total of 18 multiple linear regression models were used to conduct the study's analyses. Multiple linear regression models were also specified for non-ACSC visits to provide a context for the ACSC visit results, and evaluate whether patterns were unique to ACSC encounters, which is provided in Data Supplement S1.

All multiple linear regression analyses used the sampling weights, strata, and primary sampling units provided by MEPS to account for the stratified multistage sampling design of the MEPS survey. Pearson correlations between the outcome measures and the independent variables, including covariates, were all statistically significant ($p < 0.05$). The Pearson correlation between the most common ACSC, hypertension (PQI7), and clinical setting was evaluated to test for coding disparities and determined to have no statistical association with clinical setting ($p = 0.12$). Chi-square and Student's t-tests were used to test proportional differences in demographic factors by clinical setting. We used SAS version 9.3 for the statistical analyses.

RESULTS

Characteristics of Clinical Encounters

Among the clinical settings, 2.4% of ED, 0.03% of outpatient, and 0% of inpatient encounters had *charges* of $0. The ED had the highest proportion of visits unreimbursed, with 13.3% of ED, 6.7% of outpatient,

and 4.8% of inpatient encounters having *payments* of $0. ACSC visits comprised 7.9% of all clinical encounters. Of all ACSC visits, 41% were outpatient visits, 36% were ED visits, and 23% were hospital admissions. All descriptive characteristics had significant proportional differences among comparisons across clinical settings. Of note, ED encounters had a larger proportion of uninsured (8.8%), compared to outpatient (5.2%) and inpatient (4.4%) encounters (Table 1).

All characteristics had significant proportional differences for comparisons among ACSC visit types. Chronic ACSC visits had a higher proportion of individuals with Charlson-Deyo scores ≥ 3 (24.0%) compared to acute ACSC visits (18.1%). Additionally, a larger proportion of acute ACSC visits took place in the ED setting (47.3%) compared to chronic ACSC visits (30.5%), while a larger proportion of chronic ACSC visits took place in the outpatient setting (49.2%), compared to acute ACSC visits (22.7%; Table 2).

ACSC Visits

For all ACSC visits, the adjusted mean total payment provided for ED encounters ($859, 95% confidence interval [CI] = $818 to $901) was 2.5 times higher than for outpatient encounters ($341, 95% CI = $295 to $388), and the adjusted mean total payment for inpatient encounters ($4,325, 95% CI = $4,265 to $4,384) was five times higher than for ED encounters. The difference in mean total payments between ED and outpatient encounters was $518 (95% CI = $479 to $557), of which 85% is due to differences in facility payments. The difference in mean total payments between inpatient and ED encounters was $3,465 (95% CI = $3,413 to $3,518), with 83% of the disparity also accounted for by differences in facility payments (Table 3, Figure 1).

Charges for ACSC encounters among the various clinical settings also demonstrated extensive differences. For all ACSC visits, the adjusted mean total charge for ED encounters ($2,563, 95% CI = $2,459 to $2,667) was two times higher than that for outpatient encounters ($1,084, 95% CI = $976 to $1,193), and the adjusted mean total charge for inpatient encounters ($11,414, 95% CI = $11,257 to $11,572) was four times higher than that for ED encounters. The mean difference in charges between ED and outpatient encounters was $1,479 (95% CI = $1,395 to $1,562), of which 83% was

Table 1
Descriptive Characteristics of ACSC Adult Visits By Clinical Setting: Medical Expenditure Panel Survey, 2005–2010

Characteristic	All ACSC Visits (*n* = 7,465)	Outpatient Clinic Visit (*n* = 3,068)	ED Visit (*n* = 2,660)	Hospital Admission (*n* = 1,737)
% All visits [non-ACSC + ACSC]	7.9	3.2	2.8	1.8
% ACSC visits	100.0	41.1	35.6	23.3
Age (yr), mean (±SD)*	58.6 (±18.0)	61.3 (±15.5)	52.6 (±19.8)	63.0 (±16.8)
Sex (%)*				
Female	63.0	58.7	68.8	61.7
Male	37.0	41.3	31.2	38.3
Race/ethnicity (%)*				
White, non-Hispanic	54.5	60.4	47.1	55.6
African American	16.2	14.1	19.2	15.3
Hispanic	24.1	20.2	28.2	24.7
Other	5.1	5.2	5.5	4.4
Income (%)*				
$0–$9,999	36.9	33.9	38.9	39.2
$10,000–$29,999	40.6	38.7	40.6	44.1
$30,000–$49,999	13.3	15.4	12.6	10.7
>$50,000	9.1	12.0	7.9	6.0
Insurance status (%)*				
Uninsured	6.3	5.2	8.8	4.4
Medicaid	17.3	15.0	21.4	15.0
Medicare	50.6	53.2	39.5	62.9
Private	25.8	26.6	30.3	17.6
Charlson-Deyo score (%)*				
0	23.7	25.6	27.3	14.9
1	34.0	32.6	37.7	30.8
2	20.1	21.0	18.0	21.8
≥3	22.2	20.8	17.0	32.6
Region (%)*				
Northeast	20.1	27.2	14.6	15.9
Midwest	24.5	28.1	22.1	21.8
South	37.5	29.5	41.7	45.2
West	18.0	15.3	21.6	17.1
Metropolitan statistical area (%)*				
Yes	79.2	80.0	81.1	75.0
No	20.8	20.0	18.9	25.0

p-values from the chi-square statistic for sex, race/ethnicity, income, insurance status, Charlson-Deyo score, geographic region, and metropolitan statistical area and from the t-statistic for age
ACSC = ambulatory care sensitive conditions
*$p < 0.05$ for comparisons across outpatient, ED, and hospital admission groups.

Table 2
Descriptive Characteristics of Adult Visits By ACSC Type: Medical Expenditure Panel Survey, 2005–2010

Characteristic	Acute ACSC Visit (n = 2,291)	Chronic ACSC Visit (n = 5,174)
Clinical setting*		
% Outpatient	22.7	49.2
% ED	47.3	30.5
% Inpatient	29.9	20.3
Age (yr), mean (±SD)*	56.9 (±20.3)	59.3 (±16.9)
Sex (%)*		
Female	67.5	61.0
Male	32.5	39.0
Race/ethnicity (%)*		
White, non-Hispanic	61.7	51.4
African American	15.5	16.5
Hispanic	16.8	27.3
Other	6.0	4.7
Income (%)*		
$0–$9,999	35.8	37.4
$10,000–$29,999	40.3	40.8
$30,000–$49,999	15.4	12.4
>$50,000	8.5	9.4
Insurance status (%)*		
Uninsured	6.2	6.4
Medicaid	16.1	17.8
Medicare	48.9	51.3
Private	28.9	24.5
Charlson-Deyo score (%)*		
0	39.8	16.6
1	25.6	37.7
2	16.5	21.7
≥3	18.1	24.0
Region (%)*		
Northeast	14.5	22.5
Midwest	26.4	23.6
South	36.8	37.8
West	22.3	16.0
Metropolitan statistical area (%)*		
Yes	75.2	81.0
No	24.8	19.0

p-values from the chi-square statistic for sex, race/ethnicity, income, insurance status, Charlson-Deyo Score, geographic region, and metropolitan statistical area and from the t-statistic for age.
*$p < 0.05$ for comparisons between the acute and chronic groups.
ACSC = ambulatory care sensitive conditions.

due to differences in facility charges. The mean difference in charges between inpatient and ED encounters was $8,851 (95% CI = $8,711 to $8,991), with 79% of the disparity also accounted for by differences in facility charges (Table 4, Figure 1).

Similar to ACSC visits, non-ACSC visits had 93% to 94% of the payment and charge differences between ED and outpatient encounters accounted for by facility fees. Also, 77% to 81% of the payment and charge disparity between inpatient and ED non-ACSC encounters was attributable to facility fees (Data Supplement S2).

Acute and Chronic ACSC Visits

Chronic ACSC visits incurred fewer charges and payments across all clinical settings compared to acute ACSC visits. Specifically, chronic ACSC visits in the ED setting were associated with payments of $751 (95% CI = $694 to $809), while acute ACSC visits received payments of $1,019 (95% CI = $951 to $1,088). Additionally, charges incurred for chronic ACSC visits in the ED were $2,408 (95% CI = $2,274 to $2,542), while acute ACSC charges were $2,895 (95% CI = $2,715 to $3,076; Tables 3 and 4).

DISCUSSION

With the nationwide focus on curtailing the growth of health care costs, there has been increased attention on identifying areas where the value of health care can be improved by reducing costs without compromising quality. In this study, we examined the financial side of the value equation and found dramatic, manyfold differences in charges and payments for ACSCs seen in three hospital-based settings: outpatient, ED, and inpatient. It was not our intention to suggest that all or even a large proportion of ACSC encounters are directly substitutable across settings in a 1:1 manner. Outpatient, ED, and inpatient settings have different focuses and resources, and we were not able to adequately adjust for several factors specific to the setting, such as the acuity of illness, referrals, or other choices that may have guided decision-making about the management of any specific ACSC encounter. Moreover, the prevention of ACSC encounters in higher-intensity settings is reliant on community health interventions early in the course of a patient's medical care, prior to the onset of the acute care episode.

However, comparing payments and charges across the three settings does highlight the manyfold differences that hospitals charge and are ultimately paid for potentially preventable encounters. It demonstrates the potential savings that could be accrued from preventing encounters in hospital-based settings. It also serves to focus attention on where policy interventions that aim to reduce spending related to ACSC encounters may have the greatest effect. There has been considerable attention on reducing ED encounters.[14,26,27] Our study suggests, however, that the greatest savings may be generated by minimizing inpatient encounters. Comparing ED to outpatient encounters, ED ACSC visits resulted in twofold higher payments. Comparing inpatient to ED ACSC visits, the inpatient setting resulted in payments that were fivefold higher than the ED setting. Also, considering the magnitude of the payment for an average inpatient visit ($4,000), and the fact that hospitalizations currently make up the highest proportion of national health expenditures,[28] focus on these payments seems like a clear target for savings. In addition, given that recent studies have identified great variation at the hospital level and physician level in the ED regarding the decision to admit or discharge, replacing ACSC hospital admissions with ED-only encounters may be feasible.[29,30] A recent study by the Rand Corporation demonstrated that EDs may already be playing a constructive role in minimizing ACSC hospital admissions.[31] While nonelective admissions from the ED have been increasing at a rate of 27%, EDs curtailed the rate of ACSC admissions, with an increase of 13% during the same time period.[31]

There are several potential approaches to realize the savings from minimizing avoidable inpatient encounters.

Table 3
Payments for ACSC Adult Visits by Clinical Setting: Medical Expenditure Panel Survey, 2005–2010

Setting	Outpatient Clinic Visit (n = 3,068)		ED Visit (n = 2,660)		Hospital Admission (n = 1,737)		Outpatient vs. ED		ED vs. Hospital Admission	
	Adjusted Means	95% CI	Adjusted Means	95% CI	Adjusted Means	95% CI	Mean Difference	95% CI	Mean Difference	95% CI
All ACSCs (n = 7,465)										
Total payments	$341	(295–388)	$859	(818–901)	$4,325	(4265–4384)	$518	(479–557)	$3,465	(3413–3518)
Physician payments	$46	(39–54)	$117	(110–124)	$446	(435–457)	$71	(65–77)	$329	(320–338)
Facility payments	$280	(238–321)	$721	(683–759)	$3,603	(3550–3656)	$441	(406–477)	$2,882	(2834–2930)
Acute ACSCs (n = 2,291); PQI10, PQI11, PQI12										
Total payments	$485	(408–561)	$1,019	(951–1088)	$4,435	(4363–4508)	$835	(473–597)	$3,416	(3343–3489)
Physician payments	$68	(56–79)	$119	(109–128)	$451	(439–463)	$51	(42–60)	$332	(319–345)
Facility payments	$401	(332–470)	$878	(816–941)	$3,700	(3628–3771)	$478	(423–532)	$2,821	(2753–2890)
Chronic ACSCs (n = 5,174); PQI1,PQI3,PQI14, PQI5, PQI7, PQI8, PQI13, PQI15										
Total payments	$299	(245–349)	$751	(694–809)	$4,248	(4169–4327)	$455	(412–497)	$3,496	(3437–3556)
Physician payments	$40	(31–49)	$117	(108–126)	$443	(430–456)	$77	(70–83)	$326	(314–337)
Facility payments	$240	(194–286)	$617	(565–669)	$3,539	(3473–3605)	$376	(337–416)	$2,922	(2871–2973)

All amounts adjusted to 2010 U.S. dollars.
All means are adjusted for age, sex, race/ethnicity, insurance coverage, income, region, metropolitan statistical area, Charlson-Deyo score, and survey year.
ACSC = ambulatory care sensitive conditions; PQI = prevention quality indicators.

First, spending on inpatient care for ACSCs can be prevented with a push for improved primary care. Measures to strengthen the primary care of communities face a significant challenge, which is the national shortage of 25,000 primary care physicians and a projected deficit of 45,000 primary care physicians by 2020.[5] Despite primary care shortages, integrated health care delivery systems, such as Kaiser Permanente and pioneer accountable care organizations, have demonstrated promising results in creating safe alternatives to admission through enhancements in outpatient resources and effective systems with which clinicians can interface.[32,33] A second approach to minimize avoidable inpatient encounters is setting substitution for admissions. Observation units in EDs can provide a less resource-intensive setting for some short-term hospital stays. A recent study estimates that observation units have the potential to prevent 2.4 million avoidable inpatient encounters annually, translating to $3.1 billion in health care cost savings per year.[34] However, observation stays can shift a greater proportion of the cost to patients, resulting in higher out-of-pocket payments.[35,36] Another option could be to improve connections between EDs and outpatient clinics to ensure follow-up for moderate risk encounters.[37] However, this would involve securing close follow-up, which can be challenging in many populations, particularly Medicaid patients and those without insurance. Additionally, pushing for ED discharges rather than admissions for many ACSCs will need to be carefully monitored, as some moderate-risk patients may be appropriate for outpatient management but could also experience complications if outpatient plans of care are unsuccessful.

Another important finding in this study is that facility fees, not physician fees, are the principle source for the charge and payment disparities seen across clinical settings, accounting for the greatest portion of the hospital payment (81% to 93%). Facility fees will be an important area for increased cost-efficiency, since they are driving the extensive spending differences for hospital-based encounters. Recently, the Centers for Medicare and Medicaid Services (CMS) changed its reimbursement structure for hospital-based outpatient visits to provide a flat rate for facility fees, which does not account for the level of services provided.[38] CMS is researching the use of this fixed-payment model for ED encounters to further minimize expense on facility fees.[38,39] A reduction in the facility fee variation that has been noted on the local level[40,41] may minimize expensive outliers and help constrain the increase in costs associated with higher-intensity settings.

LIMITATIONS

This study was conducted at the visit level. There is a systematic undercounting of the national frequency of clinical encounters in the MEPS data set, particularly for ED encounters, because MEPS is a household-based survey that requires respondents to recall medical events.[42] For this reason, adjustments to the data cannot be made to account for visit frequencies by setting and examine total national payments and charges. Second, this study used the first reported ICD-9-CM codes,

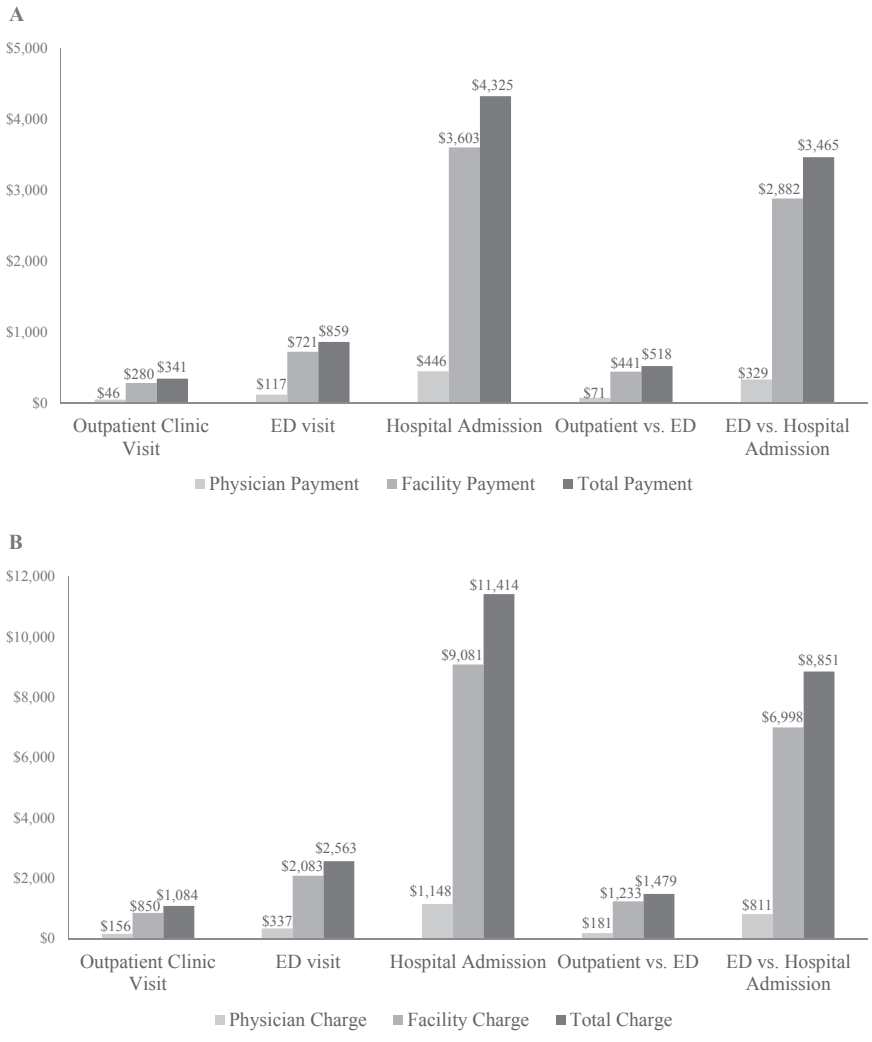

Figure 1. Mean payments (**A**) and mean charges (**B**) for adult visits by clinical setting from the Medical Expenditure Panel Survey, 2005–2010. Payments and charges are adjusted for age, sex, race/ethnicity, insurance coverage, income, region, metropolitan statistical area, Charlson-Deyo score, and survey year.

which are likely to reflect the primary diagnosis and reason for the encounter. However, there may be records in MEPS in which the first diagnosis code does not accurately represent the primary diagnosis. Additionally, PQIs are based on the discharge diagnosis of the encounter, which has been demonstrated to not always correlate with the patient's reason for the encounter.[43] Third, the Charlson-Deyo score used for risk adjustment is based on household-reported medical conditions, which may be subject to recall bias. The comorbidity score is also subject to surveillance bias, such that hospitalized patients are likely to have more comorbid conditions. The adjustment of higher comorbidity scores among inpatient encounters yields more conservative inpatient cost estimates. Fourth, because MEPS data are derived from household surveys, individuals who died or are too disabled to respond to the survey may be under-represented in the sample; this group typically uses a significant amount of health care resources. Fifth, encounters with charges or payments of $0 were excluded in this study, including cases of bad debt or charity care that are still associated with economic costs due to the utilization of health care resources.[44]

It is also important to note that PQIs have not been validated against medical records and therefore are not able to directly assess the appropriateness or preventability of clinical encounters. PQIs were originally devised as a measure of county-level hospitalization rates, which reflect the need for improvements in community health systems[45] Also, the use of the consumer price index to adjust for inflation may underestimate the inflation of health care costs, which has historically outpaced inflation across the overall economy.[46] Additionally, this study does not take into account the quality of care provided in the clinical encounters. Varying acuity levels of the same condition will have different needs with regards to the intensity of services provided, and the quality of care may suffer if an ACSC encounter is not managed in a clinical setting appropriate for its acuity.

Another limitation of this study is that its inpatient group includes admissions classified as observation and inpatient status. This is because MEPS does not differentiate observation status hospitalizations. Short inpatient stays have been reported to incur greater total payments than comparable observation stays,[35] and so

Table 4
Charges for ACSC Adult Visits by Clinical Setting: Medical Expenditure Panel Survey, 2005–2010

Charges	Outpatient Clinic Visit (*n* = 3,068)		ED Visit (*n* = 2,660)		Hospital Admission (*n* = 1,737)		Outpatient vs. ED		ED vs. Hospital Admission	
	Adjusted Means	95% CI	Adjusted Means	95% CI	Adjusted Means	95% CI	Mean Difference	95% CI	Mean Difference	95% CI
All ACSCs (*n* = 7,465)										
Total charges	$1,084	(976–1,193)	$2,563	(2,459–2,667)	$11,414	(11,257–11,572)	$1,479	(1,395–1,562)	$8,851	(8,711–8,991)
Physician charges	$156	(138–174)	$337	(320–355)	$1,148	(1,121–1,175)	$181	(168–194)	$811	(789–832)
Facility charges	$850	(763–937)	$2,083	(1,996–2,169)	$9,081	(8,951–9,211)	$1,233	(1,165–1,300)	$6,998	(6,885–7,112)
Acute ACSCs (*n* = 2,291); PQI10, PQI11, PQI12										
Total charges	$1,698	(1,507–1,889)	$2,895	(2,715–3,076)	$11,788	(11,594–11,982)	$1,197	(1,050–1,344)	$8,892	(8,699–9,086)
Physician charges	$233	(201–266)	$357	(331–382)	$1,173	(1,140–1,205)	$123	(98–149)	$816	(783–849)
Facility charges	$1,331	(1,169–1,492)	$2,391	(2,233–2,549)	$9,393	(9,231–9,555)	$1,060	(943–1,178)	$7,002	(6,848–7,157)
Chronic ACSCs (*n* = 5,174); PQI1,PQI3,PQI14, PQI5, PQI7, PQI8, PQI13, PQI15, PQI17										
Total charges	$953	(833–1,073)	$2,408	(2,274–2,542)	$11,199	(10,982–11,416)	$1,455	(1,364–1,546)	$8,791	(8,617–8,964)
Physician charges	$136	(116–157)	$331	(309–352)	$1,136	(1,101–1,171)	$194	(181–208)	$805	(778–832)
Facility charges	$740	(646–835)	$1,931	(1,823–2,040)	$8,904	(8,727–9,081)	$1,191	(1,115–1,268)	$6,973	(6,832–7,114)

All means are adjusted for age, sex, race/ethnicity, insurance coverage, income, region, metropolitan statistical area, Charlson-Deyo score, and survey year.
All amounts adjusted to 2010 U.S. dollars.
ACSC = ambulatory care sensitive conditions; PQI = prevention quality indicators.

our study results likely underestimate inpatient costs that exclude observations.

This study used a national data set to make aggregate charge and payment comparisons across the nation. Variations exist in payments and charges on the state and local levels.[47] Local market variations in payments and charges would widen confidence intervals of the mean and likely increase mean payments and charges due to high-cost outliers. Also, there may be differences in the patterns of payments and charges for clinical encounters at the extremes of the distribution.

CONCLUSIONS

As efforts are mobilized to meet ambulatory care sensitive conditions quality measures, it is important to recognize that the cost savings of minimizing these encounters will ultimately be constrained by its prevalence, with ambulatory care sensitive conditions comprising one out of 10 hospital admissions.[48] Nonetheless, interventions that bolster community health resources may realize substantial cost savings by preventing ambulatory care sensitive conditions visits in higher-intensity settings, and the prevention of ambulatory care sensitive conditions hospital admissions would provide the most extensive reduction in costs on a per-visit basis. In addition, facility fees are the major contributor for the cost differences seen among different clinical settings, and research of strategies that minimize facility fees will become increasingly important as the demand for cost efficiency heightens with health care reform.

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Supporting Information

The following supporting information is available in the online version of this paper:

Data Supplement S1. Supplementary information on the Medical Expenditure Panel Survey and regression analyses results for non-ambulatory care sensitive conditions (ACSC) encounters.

Data Supplement S2. Charges and payments for non-ACSC adult visits by clinical setting: Medical Expenditure Panel Survey, 2005–2010.

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