

Cost Analysis of the Use of Emergency Departments for Primary Care Services in Charlotte, North Carolina

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BACKGROUND Patients often inappropriately seek emergency services for ambulatory care-sensitive conditions (ACSCs). The unnecessary use of emergency departments (EDs) is an expensive burden on hospitals and payers. Here, we identify factors influencing ED visits for ACSCs and analyze the costs of such visits for EDs and primary care clinics.

METHODS Age, race, sex, and insurance data from 2007 for 3 primary care safety net clinics and 4 EDs in Charlotte, North Carolina, were analyzed using the New York University (NYU) algorithm to identify ACSC diagnoses. Cost analyses used hospital charge data and net margins as surrogates for payer and hospital system costs.

RESULTS A total of 113,730 (59.4%) of 191,622 ED visits were for ACSCs. Factors that increased the number of ACSC-related visits included lack of insurance coverage; receipt of Medicaid insurance; age of less than 2 years; African American, Hispanic, or Native American race or ethnicity; and female sex. Charges in the EDs were 320%-728% higher than those in the primary care clinics, allowing for a potential savings of 69%-86% had ACSCs been treated in primary care clinics instead of in EDs.

LIMITATIONS The NYU algorithm may have inherent weaknesses in the categorization of ACSC-related visits and the accuracy of cost assignment, especially for vulnerable patients, such as those with comorbidities or those aged less than 2 years.

CONCLUSION The majority of conditions treated during outpatient ED visits are treatable in primary care clinics or even preventable. Some groups are at higher risk for inappropriate use of EDs. Solutions to this complex problem will require payers and hospital systems to design and invest in novel targeted interventions.

In the current debate over health care reform, much emphasis has been placed on health care costs. A bipartisan consensus exists in Congress to develop tangible solutions that encompass cost savings, improved access, and improved quality of care by seeking out areas of waste and poor quality. Use of the emergency department (ED) for the care of nonurgent illnesses treatable in primary care settings is one area of systemic inappropriate use of resources that deserves attention. Unnecessary ED use is associated with increased overall health care costs, diversion of attention from true emergency cases, and decreased quality of services [1, 2]. Over the past 15 years, ED overcrowding has been recognized as a growing problem, with the number of ED visits in 2007 totaling approximately 116.8 million [3-5].

Research has shown that a significant number of ED visits are for ambulatory care-sensitive conditions (ACSCs), a term that indicates conditions that are either treatable or preventable in a primary care setting. A 2001 study in Utah identified that 4 of 10 ED visits are for ACSCs [6]. Similarly, a study of ED use in New Jersey reported that 47% of outpatient ED visits were for conditions that were treatable in non-emergent settings [7]. Previous studies have correlated ED overuse with several demographic characteristics, including female sex, older age, African American race, low income, and poor health status [8, 9].

The potential scope of the effects that ACSC-related visits have on health care costs is reflected by the report from

Utah, which found that such visits accounted for \$131 million of the state's \$281 million total ED-related hospital charges [6]. However, the amount of potential savings in diverting ACSC-related visits from the ED is debatable, with studies showing anywhere from marginal to dramatic savings [6, 10, 11]. Calculations of savings are difficult and depend on the methods of analysis, the perspective from which the calculations were performed (ie, payer vs medical provider), and the different allocations of costs within a hospital's departments [12-14]. Despite these difficulties, considerable interest exists on the part of payers and providers to investigate solutions that curb increasing costs and solve problems associated with ED overcrowding. Interventions that effectively keep ACSC-related visits within a primary care setting or prevent such visits entirely have remained elusive [9]. While such interventions are admirable, they do not address current and projected shortages of primary care physicians. A solution is likely multifactorial and should be tailored to a specific area and population.

As the third-largest vertically integrated health care sys-

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tem in the United States, the Carolinas HealthCare System (Charlotte, NC) provides a unique opportunity to explore patterns of ED use and possible solutions to the problem of ED overuse. Carolinas HealthCare System is the largest provider of emergency and indigent care in Mecklenburg County, North Carolina, and maintains an extensive inpatient and outpatient database that allows for in-depth analysis of visit types, charges, and patient demographic characteristics [15]. The Mecklenburg Area Partnership for Primary Care Research was created in 2004 to study health care delivery among underserved populations in Charlotte. The primary goal of this network is to develop and implement interventions that increase the efficacy of health care delivery for underserved populations.

In this study, the Mecklenburg Area Partnership for Primary Care Research set out to identify factors that influence ED visits for ACSCs and to compare the costs of such visits to those of the same type of visit in a primary care setting. The overarching goal of this study is to provide baseline and supportive data to payers and providers for mutual investment in novel and robust interventions targeted at specific high-risk populations.

Methods

This study was approved by the Institutional Review Board of the Carolinas HealthCare System.

Data collection. Data from 2007 for 3 primary care safety net clinics and 4 EDs in Carolinas HealthCare System were analyzed using Access software (Microsoft). The inclusion criteria were as follows: (1) the patient must reside within Mecklenburg County; (2) the ED visit was an outpatient visit or resulted in an "observation" admission that lasted less than 24 hours (we were particularly interested in very easily avoidable ED visits); and (3) a diagnosis code associated with the visit was on record. Of the 304,575 total visits (including visits that resulted in an inpatient stay), 191,622 met the inclusion criteria and were used for analysis.

Classification of diagnoses. Diagnoses from the *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) were used to classify visits. To categorize the primary ICD-9-CM diagnosis at each visit and determine the probability that the patient's condition required care in the ED, we used an algorithm developed by the New York University (NYU) Center for Health and Public Service Research [16, 17]. NYU researchers, with consultation from a panel of ED and primary care physicians, abstracted 5,700 ED charts and classified associated ED visits into one of 4 categories: nonemergent (ED1); emergent, but the condition could have been treated successfully in a primary care setting (ED2); emergent, but the condition was likely preventable or avoidable had timely care been received in a primary care setting within 12 hours (ED3); and

TABLE 1.
Demographic Characteristics Associated With 191,622 Emergency Department (ED) Visits

Characteristic	ED visits, no. (%)	Percentage of county residents ^a	Percentage difference ^b
Race			
African American	107,888 (56.30)	30	87.67 (86.72-88.62)
White	50,702 (26.46)	64	-58.66 (-59.04 to -58.28)
Hispanic	25,347 (13.23)	10	32.30 (30.55-34.05)
Other	7,679 (4.01)	4	0.25 (-2.50 to 3.00)
Payer			
Insurance	59,416 (31.01)	54	-42.57 (-43.03 to -42.11)
Self	63,870 (33.33)	18	85.17 (83.60-86.74)
Medicare	17,677 (9.22)	8	15.25 (12.93-17.57)
Medicaid	50,658 (26.44)	20	32.20 (31.07-33.33)
Sex			
Female	106,840 (55.76)	51	9.33 (8.78-9.88)
Male	84,782 (44.24)	49	-9.71 (-10.28 to -9.14)
Age			
≤2 y	18,895 (9.86)	5	97.20 (96.25-98.15)
3-18 y	32,999 (17.22)	21	-18.00 (-18.85 to -17.15)
19-40 y	80,183 (41.84)	35	19.54 (18.70-20.38)
41-64 y	48,736 (25.43)	31	-17.97 (-18.21 to -17.73)
≥65 y	10,809 (5.64)	8	-29.50 (-31.19 to -27.81)

^aData were determined on the basis of US census data for Mecklenburg County.

^bData are percentage difference (95% confidence interval) between the percentage of county residents and the percentage of ED visits.

TABLE 2.
Frequency of Emergency Department (ED)
Visits, by Visit Category

Category	Visits, no. (%) (N = 191,622)
ACSC related	
ED1	54,294.71 (28.33)
ED2	47,397.86 (24.74)
ED3	12,037.00 (6.28)
Overall	113,729.57 (59.35)
ED4	21,407.43 (11.17)
Injury related	39,905.00 (20.82)
Unclassified ^a	12,674.00 (6.61)
Drug or alcohol related	2,069.00 (1.08)
Psychiatric	1,837.00 (0.96)

Note. Visits were classified on the basis of an algorithm developed by the New York University Center for Health and Public Service Research [16, 17]. ED1, nonemergent; ED2, emergent, but the condition could have been treated successfully in a primary care setting; ED3, emergent, but the condition was likely preventable or avoidable had timely care been received in a primary care setting within 12 hours; ED4, emergent, and the condition could not have been prevented or treated successfully had timely care been received in a primary care setting within 12 hours.
^aConditions were categorized as unclassified if the diagnosis codes were not included within the algorithm.

emergent, and the condition could not have been prevented or treated successfully had timely care been received in a primary care setting within 12 hours (ED4). The algorithm places visits related to drugs and/or alcohol use, psychiatric conditions, and injury in separate categories. Visits are categorized as unclassified if the diagnosis codes are not included in the NYU algorithm.

For each ICD-9-CM diagnosis, the algorithm determines the probability of classifying the diagnosis in one of the categories of ED visits; probabilities are calculated for each ED visit category, with the 4 probabilities summing to 1.0. The probabilities take into consideration that, with many diagnoses, some proportion of people truly need emergent care. For example, while abdominal or chest pain are often benign, such complaints can indicate serious medical conditions requiring emergency care. For this study, we grouped ED1, ED2, and ED3 together into a category referred to as ED123. The ED123 category encompasses all of the visits for ACSCs. Visits categorized as ED4 were considered necessary emergency care. Visits classified as related to drug or alcohol use, psychiatric conditions, or injury, as well as those that were unclassified, were also considered to be necessary emergency care.

We linked all ED and primary care clinic visits to the respective primary ICD-9-CM discharge diagnoses. The NYU algorithm was then used to assign category probabilities to each visit. We calculated the percentages of diagnoses in each category, by 4 demographic characteristics:

race, payer type, age, and sex. All races other than African American, Hispanic, and white were combined into a category termed "other." Demographic data related to ED visits were compared to US census-based demographic data for Mecklenburg County.

Outcome measures. Data on hospital charges (defined as the fee hospitals charge patients for their services) and net margins (defined as the hospital's average profit or loss) were used as surrogate markers for costs. Charge data may more accurately reflect the actual cost to the payer (defined as individual or third party payers), while net margins reflect the actual cost to the provider. Total charge data were taken from the actual hospital system's charges but do not include ED physician charges. Hospital and clinic charge data were then used to calculate average visit costs and net margins for each NYU category and demographic characteristic. The net margin, defined as the hospital's profit or loss, was calculated using the hospital's accounting system, which allocates fixed and variable costs on a per-visit basis. For comparison, we determined the top 10 ACSCs diagnosed in the ED between 8 AM and 5 PM and then extracted data on all clinic visits in 2007 during which these same 10 diagnoses were recorded. Charge data were used to calculate average clinic and ED costs for each of the 10 diagnoses.

Statistical analyses. SAS software, version 8.2 (SAS Institute), was used to perform χ^2 analysis; a P value of .05 or less was considered to be statistically significant. Standard statistical methods, including calculation of means and standard deviations, were used to analyze data. 95% CIs were calculated with SAS, using either bootstrapping or normal approximation. Multiple logistic regression was used to examine the effect of risk factors—race, sex, payer type, and age (stratified as 3-18 years, 19-40 years, 41-64 years, and ≥ 65 years)—on the probability of having an ACSC-related visit. Odds ratios and 95% CIs were calculated for each risk factor to determine whether they were statistically significantly different from a chosen reference value.

Results

A total of 191,622 ED visits met the inclusion criteria. The demographic characteristics associated with these ED visits are provided in Table 1. Comparison of these characteristics with county population census data revealed that African Americans, Hispanics, people without insurance, Medicaid and Medicare recipients, and people aged 19-40 years or younger than 2 years were overrepresented in the number of outpatient ED visits.

By use of the NYU algorithm, we found that 113,730 ED visits (59.4%) were for ACSCs, 21,407 (11.2%) were classified as necessary emergency care, and 39,905 (20.8%) were related to injury (Table 2). The absolute numbers and percentages of ACSC-related ED visits were calculated for each demographic characteristic, using a denominator of total ED visits per demographic characteristic (Table 3). Percentage deviations from the population mean (ie, 59.4%) showed

TABLE 3.
Comparison of the Frequency of Emergency Department (ED) Visits for
Ambulatory Care-Sensitive Conditions (ACSCs), by Patient Characteristic

Characteristic	ACSC-related ED visits, % ^a	Percentage difference ^b	Odds ratio (95% CI)
Race			
African American	63.44	7.53 (7.21-7.85)	1.63 (1.56-1.70)
White	49.18	-16.64 (-17.03 to -16.25)	1 (reference)
Hispanic	63.31	7.31 (6.54-8.08)	1.28 (1.19-1.37)
Other	55.94	-5.19 (-5.47 to -4.91)	1.17 (1.05-1.29)
Payer			
Insurance	52.26	-11.42 (-11.63 to -11.21)	1 (reference)
Self	60.71	2.90 (2.38-3.42)	2.00 (1.91-2.09)
Medicare	52.12	-11.66 (-11.90 to -11.42)	1.31 (1.21-1.41)
Medicaid	68.47	16.05 (15.88-16.22)	1.66 (1.56-1.76)
Sex			
Female	59.07	0.12 (-0.12 to 0.36)	1.34 (1.29-1.39)
Male	40.93	-30.63 (-30.87 to -30.39)	1 (reference)
Age			
≤2 y	73.76	25.02 (24.37-25.67)	Not done
3-18 y	59.81	1.37 (1.18-1.56)	2.52
19-40 y	59.22	0.37 (0.09-0.65)	1 (reference)
41-64 y	56.16	-4.81 (-5.10 to -4.52)	0.7
≥65 y	48.11	-18.46 (-19.19 to -17.73)	0.56

^aData are percentage of ED visits that were for ACSCs.

^bData are percentage difference (95% confidence interval) between the percentage of ACSC-related ED visits and the population mean of 59.4%.

that being African American or Hispanic, having Medicaid insurance, or being younger than 2 years old were each associated with an above-average proportion of ACSC-related ED visits. At the same time, being white, having private insurance or Medicare, being male, and being older than 65 years were each associated with a below average proportion of ACSC-related ED visits. The percentage of ACSC-related ED visits was significantly higher for African Americans and Hispanics (63% for both groups), compared with the percentage for whites (49%; $P < .001$ for both comparisons).

Although the 4 EDs in this study serve individuals who reside inside or outside Mecklenburg County, only patients from inside Mecklenburg County were included in this study. Two EDs serve the urban core of Charlotte, whereas 2 serve the more suburban populations in the northern and southern parts of Charlotte and Mecklenburg County. Although the large central and northern EDs serve different geographic areas, their number of ACSC-related visits and demographic characteristics were similar. These 2 hospitals served approximately 40,000 ED patients in 2007, or approximately 75% of the total patients who sought ED care during this period. The patient demographic characteristics differed for the ED in the southern part of the area, which served 30,000 ED patients in 2007 and included the largest proportion of white patients, and the lowest percentage of ACSC-related visits (50%). The smaller of the 2 central

EDs served almost 25,000 patients and had the largest proportion of African Americans and the highest percentage of ACSC-related visits (63%). Geographically, patients using the ED for ACSCs were concentrated in neighborhoods within 4 miles of the city center on the western, northern, and eastern sides. This concentration explains the greater number of ACSC-related visits to EDs in the urban core and northern area.

The total charge for ACSC-related ED visits (not including ED physician charges) was \$124,967,120, with an average per-visit charge of \$1,099 and a net margin of \$68. On the other hand, the total charge for ED4 visits and injury-related visits combined was \$100,971,019, with an average per-visit charge of \$1,647 and a net margin of \$187.

Total hospital charges and net margins were calculated across demographic characteristics for all ED visits categorized as ACSC related (Table 4). Privately insured patients (54% of the county population) and uninsured patients (18% of the county population) accounted for 31% and 33% of all ED visits, respectively, with total charges of \$41,226,649 (\$1,327/visit) among insured patients and \$37,158,128 (\$958/visit) among uninsured patients. The hospital system's estimated net margin for uninsured patients' ACSC-related ED visits was -\$5,981,219, or -\$154 per visit.

A comparison was also made between ED and clinic charges for the top 10 ACSC-related diagnoses that occurred

in the ED between 8 AM and 5 PM. (Table 5). Charges in the ED were 320%-728% higher than those in the clinic, allowing for potential savings of 69%-86% had ACSC-related visits been treated in clinics instead of in EDs.

Discussion

Our study highlights that certain demographic factors are associated with overuse of the ED for ACSC-related diagnoses, which is consistent with results of prior research [4, 8, 9, 18]. Findings that African Americans, Hispanics, and uninsured individuals are more likely to have ACSC-related ED visits may be explained by socioeconomic disparities and a lack of timely, affordable access to health care. Rust and colleagues [9] suggested that access itself is a broad category. Among American adults reporting a usual source of primary care, barriers to timely access, such as “no transportation” or “couldn’t get through on phone,” lead patients to use the ED as an alternative to primary care. Patient perceptions of illness severity and the potential diagnostic capabilities of an ED versus that of a primary care office are also likely factors in the complex decision about where a patient chooses to seek care.

Low numbers of ACSC-related visits and total frequencies of outpatient ED visits were seen in the group of patients with private insurance and the group of patients who were older than 65 years, suggesting a potential link between ease of primary care access and appropriate ED use. Also, most private insurance companies and Medicare use cost-sharing

mechanisms in which patients pay higher copayments if an ED visit does not result in an inpatient admission. While one would expect Medicaid to also provide for access to primary care, receipt of Medicaid correlated with comparatively higher proportion of ACSC-related visits. This discrepancy may be explained by confounding factors such as associated socioeconomic status, a higher-risk patient population, and the effects that more-limited primary care reimbursement rates have on access. The lack of admitted patients in the study cohort could explain the trend toward lower rates of ACSC-related visits among certain subgroups (eg, individuals aged >65 years) who are discharged from the ED.

ACSC-related ED visits were expensive for payers (ie, insurance companies and individuals), with total ED charges of \$125 million. Charges for the same diagnoses were found to be 69%-86% lower in primary care clinics, with potentially significant savings if these settings had been used for care. Hospital margins for ED visits were also much higher for emergency care than for ACSC-related care (\$187/patient vs \$68/visit), suggesting that hospitals benefit more when EDs are focused on providing emergency care. Overuse of the ED by uninsured patients was also a large expense to the hospital system in this study, which lost \$6 million treating ACSC-related ED visits. The demonstrated expense to both payers and providers suggests that collaborative innovations and interventions may result in significant savings.

Several successful evaluations of public-private collaborative interventions have taken place. In Guilford County, North Carolina, Guilford Child Health, a not-for-profit organization that collaborates with High Point Regional Health System, Moses Cone Health System, and the Guilford County Health Department, ensures that each Medicaid patient in the county is assigned to a primary care physician who is available (at least by phone) 24 hours per day. Evaluation of the program showed that the overall frequency of ED use among the pediatric Medicaid population decreased by 24% and that the frequency of nonurgent visits decreased by 37% [19]. Other ED interventions involving Medicaid recipients reduced nonemergent ED visits by over 10% [20] and, among frequent users, from a median of 26.5 visits per year to 6.5 visits per year [21].

One primary limitation inherent to examining ED costs is that hospitals offer a large number of services that are interconnected, with variations across hospitals in the methods used to allocate costs to departments, which makes finding actual costs extremely difficult [10, 11, 22, 23]. By using different economic models, 2 studies arrived at 2 different and distinct conclusions, highlighting the aforementioned difficulties [10, 11]. The first study reported the marginal cost of nonurgent and semiurgent visits as \$24 and \$67 (in 1992 dollars), respectively. In a separate study, previous costs were considered underestimates because EDs do not follow the principles of economies of scale [11]. Consequently, the estimated cost of additional visits is closer to the average cost of all visits. Bamezai and colleagues [11] reported

TABLE 4.
Hospital Charges and Net Margins Associated With Emergency Department Visits for Ambulatory Care-Sensitive Conditions

Characteristic	Charges, \$	Net margin, \$
Race		
African American	69,414,411.60	2,150,730.61
White	35,911,120.84	4,944,096.43
Hispanic	14,966,088.76	107,352.12
Other	4,673,582.96	574,901.63
Payer		
Insurance	41,226,648.64	12,844,814.71
Self	37,158,127.84	-5,981,218.56
Medicare	16,948,755.48	-355,623.82
Medicaid	29,633,587.86	1,268,835.74
Sex		
Female	78,382,627.58	5,351,787.06
Male	46,584,492.24	2,425,021.02
Age		
≤2 y	7,813,743.00	539,681.25
3-18 y	14,718,046.80	1,335,042.44
19-40 y	51,710,068.76	2,602,061.06
41-64 y	39,742,005.51	3,337,048.99
≥65 y	10,983,255.75	-37,025.66

TABLE 5.
Comparison of Costs Between Clinic and Emergency Department (ED) Settings for the Most Common Ambulatory Care–Sensitive Conditions (ACSCs) Treated in EDs

ACSC	ACSC-related ED visits, no.	Average charge in \$, by setting		Percentage increase ^a	Percentage savings ^b
		Clinic	ED		
Abdominal pain	4,447	247	1,378	558	82
Upper respiratory tract infection	3,259	102	553	542	82
Headache	2,078	189	1,219	645	84
Chest pain	2,061	284	846	298	66
Urinary tract infection	1,638	227	1,368	603	83
Vomiting	1,632	127	861	678	85
Sore throat	1,561	188	575	306	67
Limb pain	1,305	232	777	335	70
Ear infection	1,271	98	429	438	77
Oral soft-tissue disease	1,189	118	432	366	73

^aData are percentage increase in costs associated with treatment of ACSCs in ED rather than in clinics.

^bData are percentage savings in costs had ACSCs been treated in clinics rather than in EDs.

costs of \$295 and \$412 per visit (in 1998 dollars), respectively, for nontrauma- and trauma-related ED visits. Here we report actual charge data and used the hospital system's own accounting allocation system to determine fixed and variable costs, as well as predicted payments by payees. This provides the most transparent and accurate accounting of costs possible. The degree to which charges accurately reflect actual cost to the payer is arguable; by using charge data, we potentially inflate cost data.

Also, the NYU algorithm may have inherent weaknesses in the categorization of ACSC-related visits, especially with regard to vulnerable patients, such as those with comorbidities or those aged less than 2 years. Similar diagnoses are more critical for some patients than for others and may merit an emergency classification rather than the ACSC classification. The algorithm does not distinguish these cases. However, our estimates should be conservative because we included only ED visits involving patients with low-acuity conditions that were treated and discharged from the ED or required observation for less than 24 hours. Consequently, even for a presenting symptom such as wheezing or fever, outpatient management should be possible for the majority of individuals in this selected patient population. The NYU algorithm has been used in studies of ED overuse in Houston, New Jersey, and Taiwan. ACSC-related ED visits in the United States were strongly correlated with the rate of uninsurance and poverty, age of 4 years or less and traditionally underserved populations. In Taiwan, ACSC-related ED visits were associated with older females without major illness [7, 24, 25].

Attempts to qualify ED visits as emergent or nonemergent are often criticized for overlooking or minimizing the fact that seemingly benign complaints may actually be

clues to a serious medical emergency. The NYU algorithm addresses this criticism by factoring in the potential of severity for any given diagnosis, as described above in the Methods section. Furthermore, even with the exclusion of chest pain and abdominal pain (two of the more controversial ACSC-related diagnoses) from our comparison of clinic and ED visit costs, the substantial cost differences are still present for the remaining diagnoses. Beyond this, studies of hospitalizations among Medicare recipients have shown that the NYU algorithm is an effective predictor of subsequent hospitalization and an effective tool for reducing visits among nonimmigrants [17, 26].

Another limitation is that the cohort of patients who seek care at an ED is different from their counterparts who seek care at a primary care clinic. Therefore, a direct comparison of the costs in these care settings, as provided in Table 5, should be interpreted with caution. Last, we do not attempt to quantify the quality of care in clinic and ED settings. Quality is potentially compromised both for the patient receiving care for ACSCs inappropriately in the ED, as well as for the patient attempting to receive necessary emergency care in an overwhelmed, overcrowded ED.

Solutions to the complex problem of inappropriate ED use will require payers and hospital systems to work together to design and invest in novel, targeted interventions. Our charge data and the lower cost of clinic charges, compared with ED charges, make a case for payers (public and private) to encourage patients to establish a primary care practice as a medical home, thereby fostering a cheaper alternative than the ED for care access. Furthermore, the higher margins for emergent care, compared with ACSC-related care, and the significant loss attributed to ACSC-related visits by uninsured individuals bolster the same argument for hospi-

tal systems. As demonstrated by Guilford Child Health, an effective solution lies within a framework of collaboration between all stakeholders [19].

Furthermore, our data suggest that simply providing health insurance alone may not be a panacea. Health care reform must focus on the external factors that also influence inappropriate ED use. These factors include continued investigation into the best use of cost-sharing mechanisms, liability reform that limits the defensive practice of medicine, and altered reimbursement algorithms to encourage a more robust outpatient model that is centered on access and quality. By using identified risk factors for ACSC-related ED visits, population-specific interventions should be used and rigorously studied to demonstrate their effectiveness. **NCMJ**

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