

## BRIEF RESEARCH REPORT

Geriatrics

# Older adult visits to the emergency department for ambulatory care sensitive conditions

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[Correction added on 17 September 2020, after first online publication: the name of the author is changed from "Alexander S. Lo" to "Alexander X. Lo".]

## Abstract

**Objectives:** Ambulatory-care-sensitive conditions (ACSCs) represent emergency department (ED) visits and hospital admissions that might have been avoided through earlier primary care intervention. We characterize the current frequency and cost of ACSCs among older adults ( $\geq 65$  years of age) in the ED.

**Methods:** This study is a retrospective analysis of Centers for Medicare and Medicaid Services (CMS) national claims data distributed by the Research Data Assistance Center, a CMS contractor based at the University of Minnesota. We analyzed outpatient ED-based national claims data for visits made by traditional fee-for-service (FFS) Medicare beneficiaries in 2016. ACSCs were identified according to the Agency for Healthcare Research and Quality's Prevention Quality Indicators criteria, which require that the ACSC be the primary diagnosis for the visit. Analysis was done in Alteryx and R.

**Results:** We documented nearly 1.8 million ACSC ED visits in 2016, finding that  $\approx 10.6\%$  of all ED visits by older adult FFS Medicare beneficiaries were associated with an ACSC. ACSC ED visits resulted in admission more often (39.7%) than non-ACSC ED visits (23.9%). Notably, 83% of patients with short-term complications from diabetes were admitted.

**Conclusions:** ED visits for a primary diagnosis of an ACSC highlight opportunities to improve access to preventive care, particularly earlier recognition and treatment of patients' deteriorating conditions that could have potentially precluded the need for the ED visit. An opportunity exists to leverage ED-based initiatives during an ACSC ED visit to support appropriate community and care transitions of these high-risk patients.

## KEYWORDS

Ambulatory Care Sensitive Conditions, Emergency Department, Older Adults, Prevention Quality Indicators

## 1 | BACKGROUND

Ambulatory-care sensitive conditions (ACSCs) represent emergency department visits and hospital admissions that might have been avoided through earlier primary care intervention. Previous research

has found that over 15% of ED visits made by older adults are for ACSCs, nearly double the overall rate across all ages.<sup>1</sup> Notably, ACSC-related ED visits exhibit a much higher rate of hospital admission (34.4% compared to 14.0% for non-ACSC ED visits among adults aged 18 and over).<sup>1</sup> Potentially avoidable ED visits are of concern as

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ED visits (and subsequent hospital admissions) have been associated with poor health outcomes, such as loss of mobility, function, and independence.<sup>2</sup> Furthermore, unnecessary utilization of these health care services is indicative of inadequate preventive care and inefficient use of high-cost resources.<sup>3</sup> Compared to an outpatient ACSC visit, payments for an ACSC ED visit have been reported to be 2.5 times higher, and payments for an ACSC admission are 12.7 times higher than an outpatient ACSC visit.<sup>4</sup>

Although the scope of potentially avoidable ED visits among older adults and subsequent hospital admissions have been previously reported among individual institutions and specific geographic regions, reports focusing on the burden of potentially preventable ED visits and hospital admissions at a national level are few, rely on outdated data<sup>5</sup> and do not follow the current version of standardized methodology developed by the Agency for Healthcare Research and Quality (AHRQ). To understand the current burden, we identified and analyzed national claims data for ED visits by older adults determined to be for potentially preventable conditions using the criteria defined by AHRQ's Prevention Quality Indicators (PQIs).<sup>6</sup> Analyses of potentially preventable conditions in health services research using previous versions of these criteria have been well documented.<sup>7</sup>

## 2 | METHODS

### 2.1 | Data source

This study is a retrospective analysis of Centers for Medicare and Medicaid Services (CMS) national claims data distributed by the Research Data Assistance Center, a CMS contractor based at the University of Minnesota. We analyzed outpatient ED-based claims data from the 2016 Limited Data Sets, which includes claims data from all beneficiaries enrolled in traditional Medicare plans (ie, Part A and Part B).

### 2.2 | Inclusion and exclusion criteria

We compared 2 groups: ED visits associated with an ACSC as the primary diagnosis and ED visits not associated with an ACSC as the primary diagnosis. For the ACSC cohort, we identified all ED visits that had a primary *International Classification of Diseases* 10th edition (ICD-10) diagnosis of specific conditions associated with potentially preventable ED visits using criteria defined by AHRQ's PQIs. As the purpose of this study was to describe the total burden of potentially preventable ED visits among this cohort, repeat visits by Medicare beneficiaries were included in both cohorts.

Given the exclusive focus of this analysis on older adults, claims for beneficiaries under 65 years of age were excluded, as was the PQI condition "Asthma in Younger Adults." Furthermore, in order to fully track post-visit utilization and cost patterns, both cohorts excluded a small proportion (<2%) of claims associated with beneficiaries that lacked continuous fee-for-service (FFS) eligibility over the entirety of the study period.

### The Bottom Line

ED visits for a primary diagnosis of an ambulatory care sensitive condition are common. This study identified opportunities to improve access to preventive care and earlier recognition and treatment of conditions that could have potentially precluded the need for the ED visit. An opportunity exists to leverage ED-based initiatives during an ambulatory-care-sensitive condition ED visit to support appropriate community and care transitions for these high-risk patients.

## 2.3 | Statistical methods

We determined the visit frequency and proportions for all PQI-defined conditions separately and in total. For each PQI-defined condition, we examined the financial impact of these visits by comparing the weighted average payments made by Medicare, the beneficiary, and any supplemental coverage; this amounted to the total average payment. We determined weighted average payment by calculating the sum of the payments made by Medicare, the beneficiary, and supplemental coverage. The average payment was then weighted based on the total population of beneficiaries with the given ACSC. Cohort construction was done in Alteryx and analyses were conducted in R.

## 3 | RESULTS

In 2016, there were nearly 1.8 million potentially preventable ED visits involving older adults, based on AHRQ criteria, accounting for 10.6% of all ED visits among continuous FFS Medicare beneficiaries. The average Charlson comorbidity index score was notably higher among ACSC ED encounters (2.6) compared to non-ACSC ED encounters (1.5) (Table 1). Just over half (52.7%) of the ACSC ED visits were for chronic conditions, and just under half (47.3%) were for acute conditions. The most common ACSC was urinary tract infection, making up 31.6% of all ACSC ED visits among older adults, followed by heart failure (23.4%).

Overall, 39.7% of ED visits for an ACSC (709,950 visits) resulted in a hospital admission, which was notably higher than the proportion of non-ACSC ED visits that resulted in admission (23.9%, Table 1). Interestingly, ED visits for chronic ACSCs were more likely to result in admission compared to acute ACSCs (52.7% and 47.3%, respectively). Notably, 83% of patients with short-term complications from diabetes were admitted.

The weighted total average payment for an ACSC ED visit was \$937, the majority of which (\$653) was paid by Medicare, with most of the remainder (\$270 on average) paid by the beneficiary (Table 2). The weighted average total payments for chronic and acute ACSC ED visits were similar, whereas the weighted average total payments associated with a chronic ACSC visit resulting in admission (\$9,886) was higher than the total payment associated with an acute ACSC admission (\$7,599, Table 2).

**TABLE 1** Descriptive demographics

	ACSC 65+	No ACSC 65+	P value (t test)
Total (N, (%))	1,789,679 (100)	15,118,699 (100)	
Age	-	-	0.722
65-74 years	699,764 (39.1)	6,759,865 (44.6)	
75-84 years	647,863 (36.2)	4,981,637 (32.8)	
85+ years	442,052 (24.7)	3,428,739 (22.6)	
Mean age (SD age)	77.7 ( $\pm$ 6.12)	74.1 ( $\pm$ 5.77)	
Race	-	-	0.003
White	1,483,643 (82.9)	12,578,621 (82.9)	
Black	204,023 (11.4)	1,668,037 (11.0)	
Asian	23,278 (1.3)	210,255 (1.4)	
Hispanic	35,793 (2.0)	274,326 (1.8)	
Native American	10,738 (0.6)	94,352 (0.6)	
Other	21,476 (1.2)	200,466 (1.3)	
Unknown	10,728 (0.6)	144,184 (1.0)	
Sex			0.022
Female	1,113,180 (62.2)	9,770,927 (64.4)	
Male	676,499 (37.8)	6,144,958 (40.5)	
Geographic region	-	-	
Northeast	429,522 (24.0)	3,717,418 (24.5)	0.745
Midwest	314,983 (17.6)	2,967,868 (19.5)	0.009
South	660,393 (36.9)	4,997,197 (32.9)	0.845
West	212,972 (11.9)	1,969,912 (13.0)	0.019
Other	171,809 (9.6)	1,527,846 (10.1)	0.602
ED to admission	-	-	
Inpatient care	709,950 (39.7)	3,632,904 (23.9)	0.412
30-day ED revisits	-	-	
All-cause ED revisits	516,926 (28.9)	4,120,414 (27.1)	0.817
Dual eligibility status	-	-	
Medicaid	402,678 (22.5)	3,310,990 (21.8)	0.116
Charlson Comorbidity Index (CCI)			
None	318,563 (17.8)	5,405,785 (35.6)	0.413
One (1)	461,737 (25.8)	3,850,623 (25.4)	0.009
Two (2)	302,455.75 (16.9)	2,038,790 (13.4)	0.987
Three (3)	255,924 (14.3)	1,658,193 (10.9)	0.075
Four (4)	130,647 (7.3)	1,302,713 (8.6)	0.022
Five or more (5+)	320,352 (17.9)	914,136 (6.0)	0.871
Mean CCI score	2.6	1.5	

ACSC, ambulatory-care-sensitive conditions

The 30-day all-cause ED revisit rate among encounters with an ACSC index visit was 28.9%, compared to 27.1% in the non-ACSC arm (Table 1). There was notable variation between chronic ACSC and acute ACSC all cause 30-day ED revisit rates (32.4% and 25.0%, respectively, Table 3). The 30-day ED revisit rate for the same ACSC as at the index visit was 7.9% and was predictably higher for chronic ACSCs (10.6%) compared to acute ACSCs (4.9%). These differences were largely due to the outsize impact of the chronic ACSC “diabetes with long-term

complications,” which had both a high all-cause (59.7%) and same-cause (45.1%) ED revisit rate.

#### 4 | DISCUSSION

Our study found that  $\approx$ 10.6% of all ED visits made in 2016 by FFS Medicare beneficiaries over the age of 65 were for a

**TABLE 2** Weighted average payments for ACSC ED visits and associated hospital admissions

Condition	ACSC ED visit				ACSC hospital admissions from the ED			
	Average payment made by Medicare	Average payment made by supplemental coverage	Average payment made by beneficiary	Total average payment	Average payment made by Medicare	Average payment made by supplemental coverage	Average payment made by beneficiary	Total average payment
<b>Total weighted average (all ACSCs)</b>	<b>\$653</b>	<b>\$14</b>	<b>\$270</b>	<b>\$937</b>	<b>\$7,500</b>	<b>\$51</b>	<b>\$1,197</b>	<b>\$8,748</b>
<b>Weighted average for all acute ACSCs</b>	<b>\$601</b>	<b>\$13</b>	<b>\$320</b>	<b>\$934</b>	<b>\$6,425</b>	<b>\$32</b>	<b>\$1,142</b>	<b>\$7,600</b>
Community-acquired pneumonia (acute ACSC)	\$700	\$16	\$279	\$995	\$7,218	\$51	\$1,063	\$8,333
Urinary tract infection (acute ACSC)	\$502	\$10	\$362	\$873	\$5,632	\$13	\$1,221	\$6,867
<b>Weighted average for all chronic ACSCs</b>	<b>\$705</b>	<b>\$16</b>	<b>\$219</b>	<b>\$940</b>	<b>\$8,575</b>	<b>\$58</b>	<b>\$1,252</b>	<b>\$9,886</b>
Diabetes with short-term complications (chronic ACSC)	\$916	\$17	\$360	\$1,293	\$7,135	\$110	\$1,028	\$8,273
Diabetes with long-term complications (chronic ACSC)	\$478	\$9	\$129	\$615	\$13,109	\$26	\$1,162	\$14,296
Chronic obstructive pulmonary disease (chronic ACSC)	\$685	\$25	\$209	\$918	\$8,539	\$73	\$1,106	\$9,718
Hypertension (chronic ACSC)	\$436	\$13	\$132	\$581	\$5,276	\$16	\$1,062	\$6,354
Heart failure (chronic ACSC)	\$1,010	\$17	\$267	\$1,293	\$8,818	\$67	\$1,902	\$10,787

ACSC, ambulatory-care-sensitive conditions

diagnosis associated with an ACSC, and therefore may have been potentially avoidable given earlier preventive care intervention. Previous research has found that over 15% of ED visits made by older adults are for ACSCs,<sup>1</sup> yet variation in the case inclusion criteria and methodologies employed make it difficult to draw any conclusions regarding to what extent this decrease may reflect actual health system improvements as opposed to methodological variation. Regardless, ED visits made by older adults for ACSCs represent a burden affecting both patient outcomes and costs that could potentially have been mitigated through preventive care. The average out-of-pocket payments in our cohort (\$267 for an ACSC ED visit and \$1,197 for an ACSC-related admission) alone may pose a significant burden to lower-income beneficiaries and beneficiaries with multiple chronic conditions.<sup>8</sup>

This study has several limitations. First, although we used an established methodology for classifying ACSC-related visits, the methodology itself relies on generalized Medicare claims diagnoses (as opposed to in-depth, individualized chart reviews). Thus, we cannot conclude whether ACSC ED visits were truly avoidable – only that these visits represent “potentially avoidable” ED visits that may have been precluded given earlier recognition and treatment of patients’ deteriorating conditions. Furthermore, admissions originating in EDs have been shown to vary by region, age, and race,<sup>9</sup> and so the summary findings reported here should not be taken as representative of specific contexts. Finally, the goal of this study was simply to summarize ACSC ED visits among older adults. The non-ACSC group is presented not as any indication of an effect (as no intervention was evaluated in this study), yet rather precisely for the purposes of being able to assess the overall differences across these groups of patients. Our characterization of the extent of ACSC-related ED visits and hospital admission serves as an important first step in improving our understanding of these potentially avoidable health care utilization events and ultimately may help reduce the consequent adverse outcomes and financial burden that result from them. Improved characterization of the nature of ACSC ED visits could help highlight opportunities to improve access to, as well as delivery and quality of, preventive care, including earlier recognition and treatment of patients’ deteriorating conditions.<sup>1</sup> For example, our findings suggest that interventions targeting better management of diabetes could help reduce the high rates of potentially preventable utilization we see among older adults with this condition. Future research could focus on identifying potentially amenable characteristics and factors that address the fundamental unmet needs that contribute to these potentially preventable ED visits and hospital admissions.<sup>10</sup>

Interventions that address access issues prevalent in the Medicare population (eg, transportation, telehealth), as well as improve primary care quality and transitions of care in the ED are of potentially high value.<sup>4</sup> Community-based approaches such as home-based health care<sup>11</sup> and telemedicine interventions<sup>12</sup> have demonstrated success in reducing high-cost health care utilization for ACSCs. The geriatric emergency department model is an example of an ED-based approach that emphasizes care transitions and linkages to social supports, community-based clinics, and outpatient services that may reduce repeat utilization of high-cost emergency and inpatient services.<sup>13</sup>

**TABLE 3** 30 Day ED revisits

Condition (N, (%))	Number of ACSC ED visits 65+	30-day ED revisits for the same ACSC condition	All-cause 30-day revisit
<b>Total number of all ACSC claims</b>	<b>1,789,679 (100)</b>	<b>141,754 (7.9)</b>	<b>516,926 (28.9)</b>
<b>All Acute ACSCs</b>	<b>846,340 (47.3)</b>	<b>41,426 (4.9)</b>	<b>211,310 (25.0)</b>
Community-acquired pneumonia (acute ACSC)	281,408 (15.7)	9,170 (3.3)	63,558 (22.6)
Urinary tract infection (acute ACSC)	564,932 (31.6)	32,256 (5.7)	147,752 (26.1)
<b>All Chronic ACSCs</b>	<b>943,339 (52.7)</b>	<b>100,328 (10.6)</b>	<b>305,616 (32.4)</b>
Diabetes with short-term complications (chronic ACSC)	5,863 (0.3)	191 (3.3)	1,540 (26.3)
Diabetes with long-term complications (chronic ACSC)	167,029 (9.3)	75,412 (45.1)	99,675 (59.7)
Chronic obstructive pulmonary disease (chronic ACSC)	77,996 (4.4)	4,861 (6.2)	18,921 (24.3)
Hypertension (chronic ACSC)	273,522 (15.3)	18,353 (6.7)	60,859 (22.2)
Heart failure (chronic ACSC)	418,929 (23.4)	1,511 (0.4)	124,621 (29.7)

ACSC, ambulatory-care-sensitive conditions

Ultimately, expanding patient-centered interventions that improve connections and access to community services and primary care may help reduce potentially avoidable ED visits and hospital admissions among the growing population of older adults.

#### DATA ACCESSIBILITY STATEMENT

All data used in this study are available through CMS/ResDAC, subject to requirements and a fee.

#### CONFLICT OF INTEREST

The authors have no conflicts of interest to report.

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