

Patient Demographics and Diagnoses of ‘Unnecessary’ Emergency Department Visits

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ABSTRACT

Introduction: Emergency department (ED) visits have increased steadily since 2021, affecting patients, families, health care workers, and insurance companies through burnout and rising costs. Thus, limiting unnecessary visits is imperative. The first step is to gain better understanding of the patients presenting to the ED for nonemergent services and the reasons behind their visits. The Area Deprivation Index (ADI) is a useful tool to gauge the impact of social determinants of health play on health care decision-making. It measures factors including income, education, employment, and housing quality and uses these data to rank neighborhoods by socioeconomic disadvantage (1=least disadvantaged, 100=most disadvantaged). This study reviews the demographics and diagnoses of patients presenting to the ED for nonemergent concerns.

Methods: Data were collected and analyzed in a retrospective cohort study of adults aged 18 and older from a single ED for a week in June and a week in November 2022. Data were filtered to include only unnecessary visits. Each visit was analyzed by 1 reviewer and deemed “unnecessary” based on procedures performed and medications administered. Data were analyzed for patient demographics and top diagnoses and were compared with necessary ED visits during the same time frame.

Results: The most common diagnoses for unnecessary ED visits were generalized pain, abdominal pain, and cold or flu-like symptoms. The average patient age was 39 years (SD, 15.73); most were single, employed full time, and lived in areas with a high ADI. Most patients had a primary care physician on file and were insured through Medicare or Medicaid. A majority of patients were Black and non-Hispanic. Compared with necessary ED visits, there were statistically significant differences in age, race, and employment status. All demographic data were self-reported and entered into patient chart by registration staff. The study site is located next to a children’s hospital; therefore, no pediatric patients were seen in this ED.

Conclusions: This study identified common chief complaints and demographic factors associated with ED encounters that did not require ED-specific resources. Understanding these patterns is the first step in designing education and resources to help patients and outpatient providers reduce unnecessary ED utilization.

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INTRODUCTION

The number of emergency department (ED) visits in the United States has increased steadily in recent years. According to the Centers for Disease Control and Prevention, there were 139.8 million ED visits in the United States in 2021.¹ At Froedtert Hospital in Milwaukee, Wisconsin, there was an increase in ED visits from 76 616 during July 2022–June 2023 to 80 115 during July 2023–June 2024. Of those visits, 8523 were triaged as an Emergency Service Index (ESI) level 4 or 5 and resulted in discharge from the ED. ESI is a validated triage tool that nurses use to stratify patients based on medical needs.² An ESI of 1 indicates most urgent cases, while 5 indicates the least urgent. Of all ED encounters, 12.1% of patients left the waiting room without being seen by a physician after triage by a nurse.

Presenting to the ED for nonemergent reasons can result in long wait times, a lack of access to care (if patients leave without being seen), and decreased patient satisfaction. Better aligning patient needs with the health care system resources may positively affect both providers and patients.

Choosing where to receive care has a financial impact on patients. ED visits are

more expensive than urgent care or primary care appointments. The average cost of an ED visit after insurance coverage increases with age and is estimated at \$290 for patients 17 years and younger and \$690 for those aged 65 years and older. These costs increase substantially for uninsured patients. The estimated average cost of

an ED visit in 2024 was \$2200.^{3,4} The total cost of an ED visit can range from \$200 to \$20 000, depending on diagnosis, services rendered, and location. In contrast, the average cost of an urgent care visit before insurance is \$258 and can range from \$150 to \$450, depending on the location and services provided.⁵ The average cost of a primary care visit is \$171.⁶ For patients insured by Medicare, the copay for a primary care visit is \$20 and \$50 for an ED visit. After that, Medicare covers 80% of the visit cost, and the patient is responsible for the remaining 20%, until the deductible is met, which varies by plan.⁷

Patient satisfaction is also affected by unnecessary ED visits. A major quality marker of emergency care is the ED Consumer Assessment of Healthcare Providers and Systems (ED-CAHPS) survey.⁸ This survey is distributed only to patients discharged from the ED, and the key measure is the percentage of patients who give top ratings for likelihood to recommend. High patient experience scores are associated with minimal use of hallway spaces, low wait times, and fewer patient arrivals per hour, among other operational factors.⁹ Therefore, low acuity presentations to the ED are at higher risk of low patient satisfaction, as these patients are stable enough to wait, often experience prolonged ED wait times, are increasingly seen in hallway spaces, and contribute to the rising number of ED arrivals each year. In this way, low-acuity patients face multiple risk factors for dissatisfaction with their care.

The rise of ED visits has also significantly affected the health care system. Health care teams are understaffed and overworked, contributing to increased burnout. A 2022 study defined burnout as a work-related syndrome that affects daily life and includes depersonalization, emotional exhaustion, and reduced personal accomplishment.¹⁰ This same study showed a strong association between increased ED volume, limited human resources, and burnout among health care workers.

Identifying the patient cohort that accesses the ED for non-emergent reasons is the first step toward addressing this issue through education or structural changes to help patients access more appropriate health care settings and reduce unnecessary ED visits. This study aimed to contribute to current research by reviewing the medications administered and procedures performed to determine whether an ED visit was unnecessary. This approach seeks to provide an unbiased, patient-centered definition for an unnecessary visit and to help guide patients in making informed medical decisions.

METHODS

Data were collected from the Clinical Research Data Warehouse for 2 separate weeks in 2022 (June 1–7 and November 1–7) to minimize any seasonality bias (eg, increased cold/flu symptoms in winter months and more outdoor-related injuries in summer months). Patient encounters from the ED at Froedtert Hospital in Milwaukee, Wisconsin—a large, tertiary care academic hospital in southeastern Wisconsin—were filtered to include only individual

patient encounters triaged as ESI levels 4 or 5 that resulted in discharge from the ED. Patients triaged as ESI levels 1-3, those admitted from the ED, and patients younger than 18 years were excluded. This was a retrospective cohort study conducted at a single institution.

Each visit was analyzed individually by 1 reviewer to determine whether an ED-specific resource was accessed. This determination was made by reviewing the procedures performed and medications administered during the visit. If the procedures could have been completed at a nonemergency health care facility (eg, urgent care, primary care clinic, or free clinic) or if the medications were available over the counter at a local pharmacy, the visit was considered unnecessary for the ED. Procedures considered available in the clinic setting included x-rays, simple laceration repairs, visual acuity screening, vaccines, COVID-19 tests, pregnancy tests, urinalysis, provision of braces or cold packs/hot packs, and basic bloodwork (eg, complete blood cell count, basic metabolic panel, blood glucose). Medications considered available over the counter included nonsteroidal anti-inflammatory drugs (NSAIDs), acetaminophen, lidocaine patch, antiemetics, and antacids. Requests for prescription refills were also deemed appropriate for outpatient care, as these are ideally managed in a primary care setting.

Patient demographics—including age, sex, race, ethnicity, marital status, employment status, insurance status, and ADI¹¹—were collected and analyzed from both necessary and unnecessary ED visits.

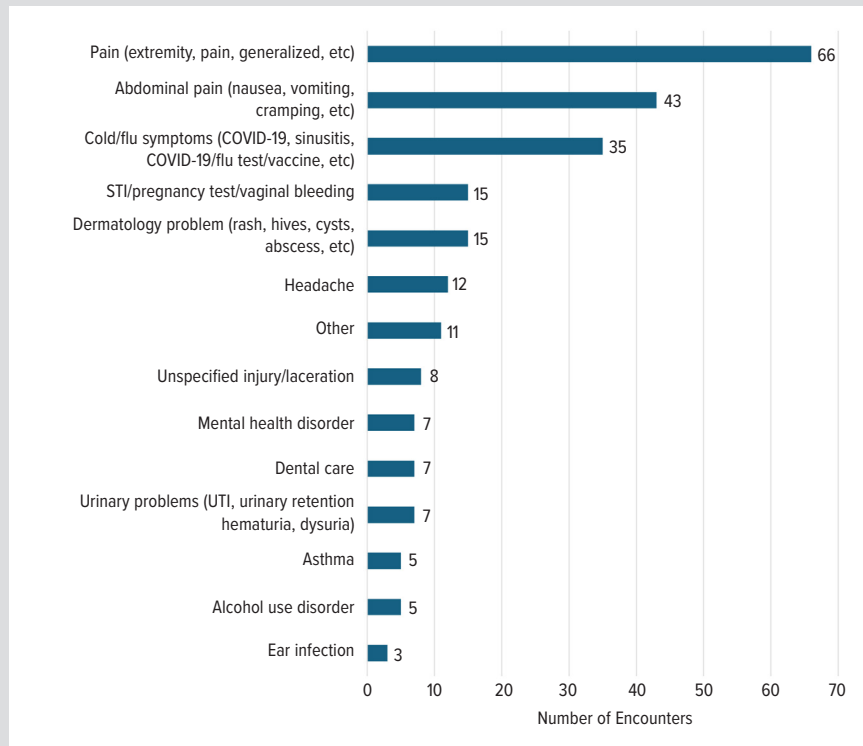
Data were analyzed using R version 4.3.1 (R Core Team). Descriptive statistics were calculated for continuous variables, specifically medians and interquartile ranges (IQRs), as the variables were not normally distributed. Frequencies were calculated for categorical variables. To compare demographic differences between necessary and unnecessary visits, Mann-Whitney U and chi-square tests were used. For marital status, only the categories single, married, and divorced were included; others were omitted due to small cell sizes. Similarly, for employment status, only the categories full time, not employed, retired, disabled, and part time were included. For race, American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, and unknown were grouped into the existing category of other.

The project was approved by Medical College of Wisconsin Institutional Review Board (PRO00046814) prior to data collection.

RESULTS

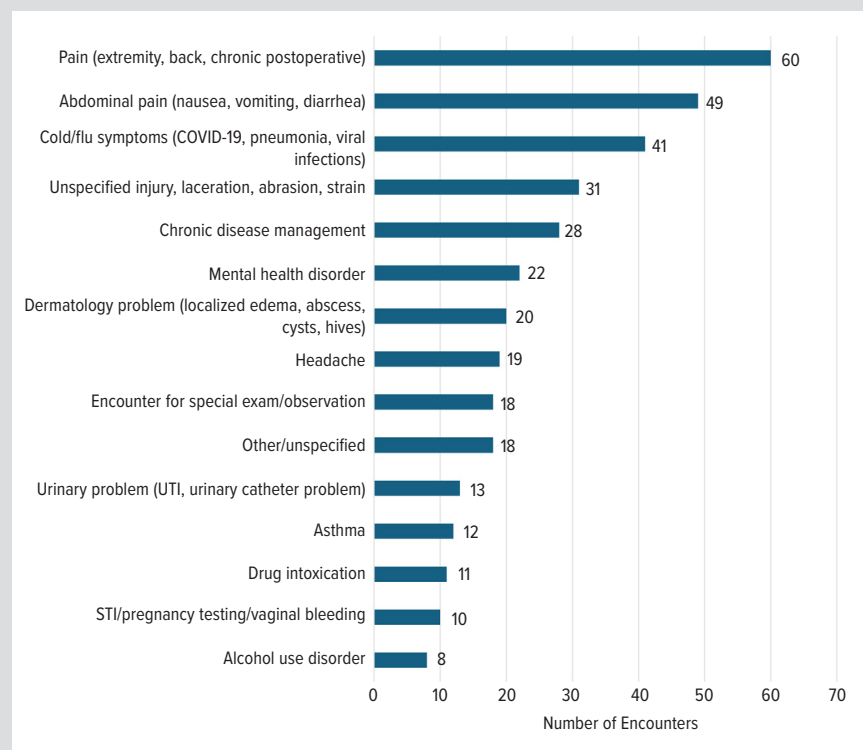
The most common unnecessary ED encounters were related to pain (27.6%; n=66), abdominal pain (18.0%; n=43), or cold/flu symptoms (14.6%; n=35) (Figure 1). Primary diagnoses from necessary ED visits show similar top categories: pain (14.4%; n=60), abdominal pain (11.8%; n=49), and cold/flu symptoms (9.9%; n=41). Additionally, a notable number of necessary ED encounters were related to unspecified injuries (7.5%; n=31), chronic

Figure 1. Primary Diagnosis for Unnecessary Emergency Department Visits



Abbreviations: STI, sexually transmitted infection; UTI, urinary tract infection.

Figure 2. Primary Diagnosis for Necessary Emergency Department Visits



Abbreviations: STI, sexually transmitted infection; UTI, urinary tract infection.

disease management (6.7%; n=28), and mental health disorders (5.3%; n=22) (Figure 2).

Patient Demographics

A total of 621 patients were included in the analysis (Table). The median age was 40 years (IQR, 28-56), and more than half (56.6%) were female. About two-thirds (67.7%) were single, and 34.4% were employed full time. Over half of the sample (56.4%) identified as Black or African American, and most patients (92.8%) were non-Hispanic. The median ADI was 76.5 (IQR, 55-89). Nearly two-thirds (63.9%) were insured by Medicaid or Medicare, and most patients (70.2%) had a primary care provider on file.

There was a statistically significant difference in age between patients with unnecessary visits (median 34 years; IQR, 27-50) and those with necessary visits (median, 42 years; IQR, 29-59; $P < .001$). A significant difference in employment status was also observed: a greater proportion of patients with unnecessary visits were employed full time (45.1%) compared with those with necessary visits (32.6%; $P = .004$). Additionally, there was a significant race, with Black or African American patients comprising a higher percentage of unnecessary visits (66.7%) compared with necessary visits (53.7%; $P = 0.01$).

There were no statistically significant differences between the 2 groups in terms of sex, marital status, ethnicity, ADI, or primary care physician status.

DISCUSSION

The present study expands upon prior research by providing a clear, operational definition of what constitutes an “unnecessary” ED visit. A retrospective study conducted in a similar setting—a large urban academic center—in 2021, reported patient demographics for nonemergent visits that were consistent with our findings. The study found that most patients were Black or African American, insured by Medicare, and lived in areas with a high index of socioeconomic disadvantage.¹² Our study

defined an “emergent” visit as one in which presenting symptoms required immediate intervention. We also identified differences in age and employment status between necessary and unnecessary visits. A 2013 systemic review of 26 retrospective or cross-sectional studies found that younger age (18-44 years) was associated with unnecessary ED use.¹³ Our findings align with this, showing that younger patients were more likely to present for unnecessary visits.

Diagnoses for unnecessary visits across studies. However, consistent with our findings, respiratory illness and abdominal pain are frequently among the most common diagnoses.¹⁴ A key limitation of comparing studies is the lack of a standardized definition of “unnecessary” visits, which has ranged from “able to wait for care without risking death” to “not needing any sort of treatment or medication.” We propose that our definition—based on the absence of ED-specific interventions—offers a reasonable, patient-centered approach that can help guide both patients and providers in deciding when ED care is appropriate.

Understanding patient factors associated with low-acuity presentations is important for designing interventions that help patients select the most appropriate setting to receive care. As a retrospective study, our findings suggest correlation rather than causation. Future research could include patient interviews to explore motivations for seeking ED care. Prior studies have identified several contributing factors, including anxiety about symptoms due to past experiences or trauma, friend or family member concern, the belief that the ED is the only place to obtain specific tests or procedures, and difficulty accessing timely primary care appointments.¹⁵

Social determinants of health also influence a patient’s decision to seek ED care. Although the majority of patients presenting for nonemergent reasons had a primary care provider on file (68%) and only a small percentage were uninsured (2.42%), many lived in areas with high ADI scores, where access to pharmacies, urgent care facilities, and primary care clinics may be limited. This suggests a need for deeper investigation into patients’ lived experiences and barriers to care. Educational interventions may help reduce unnecessary ED use by informing patients about available health care resources. Public health campaigns could provide information on medical transportation, clinic locations and hours, and how to access insurance or discount prescription assistance programs.

In addition to patient education, systems-based interventions are likely necessary to address unnecessary ED utilization. These may include expanding outpatient clinic hours to accommodate working patients and increasing clinics in high-ADI neighborhoods.¹⁶

The most common diagnoses for unnecessary visits in our study included pain (related to a minor injury or generalized), abdominal pain, and cold or flu symptoms (including COVID-19, sinusitis, and strep throat). These findings are consistent with prior research and can inform targeted interventions.¹⁷ Patient education on over-the-counter, multimodal pain therapy may be

Table. Patient Demographic Information and Comparison Between Unnecessary and Necessary Visits

	Overall (N = 621)	Unnecessary Visits (N = 205)	Necessary Visits (N = 416)
Age, median (IQR) ^a	40 (28–56)	34 (27–50)	42 (29–59)
Sex, n (%)			
Female	348 (56.0)	110 (53.7)	238 (57.2)
Male	273 (44.0)	95 (46.3)	178 (42.8)
Marital status (N = 569), n (%) ^a			
Single	385 (67.7)	141 (71.9)	244 (65.4)
Married	150 (26.4)	46 (23.5)	104 (27.9)
Divorced	34 (6.0)	9 (4.6)	25 (6.7)
Employment status (N = 579), n (%) ^a			
Full time	213 (36.8)	87 (45.1)	126 (32.6)
Not employed	176 (30.4)	54 (28.0)	122 (31.6)
Retired	79 (13.6)	16 (8.3)	63 (16.3)
Disabled	69 (11.9)	18 (9.3)	51 (13.2)
Part time	42 (7.3)	18 (9.3)	24 (6.2)
Race ^a			
Black/African American	350 (56.4)	134 (65.4)	216 (51.9)
White	217 (34.9)	58 (28.3)	159 (38.2)
Other	54 (8.7)	13 (6.3)	41 (9.9)
Ethnicity (N = 617) ^b			
Non-Hispanic	576 (93.4)	197 (96.1)	379 (92.0)
Hispanic	41 (6.6)	8 (3.9)	33 (8.0)
ADI (N = 438), ^c median (IQR)	76.5 (55–89)	78.5 (59–87)	75 (53.8–90)
Payor, n (%)			
Medicaid or Medicare	397 (63.9)	130 (63.4)	267 (64.2)
Managed care (private)	132 (21.3)	42 (20.5)	90 (21.6)
Other	77 (12.4)	28 (13.7)	49 (11.8)
Uninsured	15 (2.4)	5 (2.4)	10 (2.4)
Primary care provider (PCP)			
PCP listed	436 (70.2)	140 (68.3)	296 (71.2)
PCP not listed	185 (29.8)	65 (31.7)	120 (28.8)

^aP < 0.05.
^bFour patients listed their ethnicity as unknown.
^cADI was missing for 183 patients.

beneficial. Guidance on navigating the health care system and selecting the appropriate care setting may help patients receive care in environments better suited to their needs.¹⁸ Additionally, health system leaders can use data on common reasons for unnecessary ED visits to ensure that primary and urgent care settings are adequately resourced to manage these concerns.

This study has several limitations. Using ESI levels 4-5 to identify low-acuity patients could introduce variability, as triage decisions can differ among nurses. Some lower-acuity patients may be triaged as ESI 3, while some higher-acuity patients may be misclassified as ESI 4 or 5. The 2-week data collection also limited the sample size. Additionally, our analysis focused on orders entered, without reviewing physician notes, physical exam findings, means of travel to the ED, time of visit, or whether the patient had previously sought care elsewhere. Finally, reliance on data from the clinical data warehouse introduces the potential for coding inaccuracies in procedures and medications.

CONCLUSIONS

By defining a clear, patient-centered definition of an “unnecessary” ED visit, this study identified a cohort of patients who utilize the ED for nonemergent concerns and highlighted opportunities for further research to better understand and reduce unnecessary ED utilization.

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