Research Square

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Sociodemographic and Clinical Characteristics of Adult Frequent Users of the Emergency Department in a High-Complexity Hospital in Bogotá, Colombia, 2022–2024: A Cross-Sectional Descriptive Study

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Abstract

Background:

Objective: To characterize the sociodemographic and clinical profile, as well as the patterns of emergency department use, of adult non-gynecological and non-obstetric patients who had four or more visits/ who are frequent ED users within 365 days in a high complexity hospital between 2022 and 2024.

Methodology: A descriptive cross-sectional study was conducted using the electronic medical record system to identify patients with multiple visits (>4 visits) within ≤365 days. Sociodemographic and clinical variables were described. Morbidity was classified according to ICD-10 into major categories and subcategories, and comorbidity was assessed using the Charlson Comorbidity Index.

Results: A total of 470 patients were included; 60.4% were women. The median age was 33 years (IQR 26–46), with a median of 5 visits per year. Most patients were classified as Triage Level IV (58.1%). The main morbidity categories were non-communicable diseases (27.0%) and ill-defined signs and symptoms (25.1%). A Charlson Index score of 0 was recorded in 81.7%. Following the ED visit, 98.3% of patients were discharged, and no in-hospital mortality was observed. Multiple visits were attributable to the same cause in 54.9% of cases.
Conclusions: FEDUs were predominantly young women with low comorbidity as measured by the Charlson Index and presented with complaints of low to moderate acuity, showing high discharge rates and no in-hospital mortality. This profile supports the development and implementation of an institutional care pathway.

Introduction

Frequent Emergency Department Users (FEDUs) represent a small proportion of patients yet generate a significant burden on emergency department (ED) services (1, 2). The literature most commonly defines FEDUs as individuals with four or more ED visits within a 12-month period; however, this definition is not universally accepted (1, 3, 4). Under this definition, these patients may account for up to 28% of all ED consultations; nevertheless, only a minority continues to meet this criterion in the subsequent year (4). Paradoxically, FEDUs have more outpatient and primary care visits than the general population, suggesting that their healthcare needs remain unmet despite frequent contact with the healthcare system (3, 5)These patients often present with complex clinical conditions, multiple chronic diseases, and psychosocial factors that hinder access to and continuity of ambulatory care (3, 6).

FEDUs exhibit considerable demographic heterogeneity, with no consistent age or sex patterns reported across studies; however, there is a tendency toward older age groups and a higher proportion of women (1, 7, 8). Additionally, socioeconomic disadvantage and social vulnerability are recurrently identified as key factors associated with frequent ED utilization (3, 8, 9). This characterization may inform the development of interventions aimed at reducing service overload, improving quality of care, and strengthening institutional policies.

Therefore, this study was conducted to characterize the sociodemographic profile of FEDUs, identify the most frequent causes of morbidity, and explore the association between in-hospital mortality and its most common underlying causes among patients presenting to the ED.

Methods

Study design

A retrospective cross-sectional study was conducted using de-identified data from the electronic medical record (EMR) system of a high-complexity academic hospital in Bogotá, Colombia, to characterize frequent ED users and their associated clinical characteristics. Hospital Universitario San Ignacio (HUSI) is an academic institution that experiences persistent ED overcrowding and sustained overoccupancy. It provides care to a broad and heterogeneous patient population, predominantly covered by Colombia's mandatory social health insurance —primarily the contributory (payroll-based) regime—with smaller proportions enrolled in the subsidized regime or covered by prepaid or private health plans; a minority of patients are self-paying. The ED reports an annual volume of approximately 120,000 to 135,000 visits and consistently elevated National Emergency Department Overcrowding Score (NEDOCS) values, reaching the maximum score of 200 points (10)

The study population comprised adult patients (≥ 18 years) who presented to the ED of HUSI between 2022 and 2024 and met criteria for frequent ED utilization, operationally defined as four or more ED visits within a 12-month period, consistent with the most commonly used definition in the literature (1, 3, 4). Gynecologic and obstetric emergencies were excluded. Data were extracted from the EMR system and included sociodemographic variables (age, sex, and socioeconomic status) and clinical variables related to morbidity, including diagnoses coded using the International Classification of Diseases, Tenth Revision (ICD-10), documented comorbidities quantified with the Charlson Comorbidity Index, and primary and secondary causes of morbidity. Patient-level classification variables included triage acuity at presentation, the most frequent disposition following evaluation (e.g., discharge or hospitalization), the number of ED visits within the 365-day period, and the primary reason for repeated visits, categorized as acute, chronic, or occupational conditions. ED encounters were linked using unique institutional identifiers and assessed within rolling 365-day windows. Data quality was ensured through systematic review and removal of duplicate, incomplete, or inconsistent records. Follow-up was limited to the interval during which repeated ED visits occurred, with administrative censoring at the end of each study year. Data were retrospectively extracted during the second half of 2025 and included demographic, clinical, and administrative variables.

Data sources and measurement

Study data were collected and managed using REDCap electronic data capture tools hosted at HUSI (11, 12). The comorbidity burden was quantified by mapping ICD-10 diagnoses to the Charlson Comorbidity

Index in accordance with internationally validated scoring criteria (13, 14). Use of the integrated electronic health record system and standardized coding practices supported consistency and comparability of measurements across the study population. Selection bias was minimized by identifying the study population through a comprehensive institutional database, ensuring inclusion of all eligible cases within the study period according to predefined inclusion and exclusion criteria. Because the study relied on routinely collected administrative and clinical data, some variables were unavailable or inconsistently documented, which could introduce information bias. To mitigate this risk, standardized data-cleaning procedures were applied, including dataset cross-validation, uniform categorization of clinical variables, and systematic documentation of missing data (Annex 1: Charlson Comorbidity Index).

Study size

Sample size estimation was performed using RStudio ((15) version 2026.01.0 Build 392, based on a binomial proportion framework. An expected prevalence of frequent ED users of 5% was assumed on the basis of prior literature. Calculations were conducted using a two-sided test with a significance level of $\alpha = 0.05$ and a statistical power of 80% ($1 - \beta$). Under these assumptions, the minimum required sample size was 427 frequent ED users. To account for potential missing data, incomplete records, or exclusions during data review, the estimated sample size was increased by 10%, resulting in a final target sample of approximately 470 frequent ED users.

Analysis

Quantitative variables were analyzed according to their measurement properties and summarized as continuous or categorical variables, as clinically appropriate. Age was categorized into clinically meaningful groups (18–39, 40–64, and ≥ 65 years) to facilitate interpretation of morbidity profiles and ED utilization patterns. The number of ED visits within a 365-day period was analyzed both as a continuous variable and in grouped intervals (4–5, 6–9, and ≥ 10 visits), consistent with definitions commonly used in studies of frequent ED users. The comorbidity burden was assessed using the Charlson Comorbidity Index as a continuous measure, with supplementary descriptive analyses using standard categorical groupings (0, 1–2, and ≥ 3 points).

All analyses were conducted following a structured data quality assessment. Continuous variables were summarized using means and standard deviations or medians and interquartile ranges, as appropriate, according to their distribution, which was assessed using the Shapiro–Wilk normality test. Categorical variables were described using absolute and relative frequencies. Correlation analyses were performed to explore the association between the number of emergency department visits and selected continuous variables. Given the non-normal distribution of these variables, Spearman rank correlation coefficients were used to assess the relationship between consultation frequency and comorbidity burden, measured using the Charlson Comorbidity Index, as well as between consultation frequency and age. Statistical significance was evaluated using two-sided tests with a significance threshold of $p < 0.05$. Potential

confounding variables, including age, sex, insurance type, and comorbidity burden, were explored through stratified descriptive analyses. Missing data were addressed through systematic review; when values could not be recovered, their frequency was reported, and a complete-case analysis was performed. Because this was a retrospective study using routinely collected data, loss to follow-up was not applicable.

Ethical considerations

This study was reviewed and approved by the Comité de Investigaciones y Ética Institucional (CIEI), Facultad de Medicina, Pontificia Universidad Javeriana – Hospital Universitario San Ignacio. The study was classified as minimal risk according to Resolution 8430 of 1993 issued by the Colombian Ministry of Health, as it involved documentary techniques and retrospective data without interventions or modifications of biological, physiological, psychological, or social variables. The research adhered to the ethical principles of the Declaration of Helsinki, the Belmont Report, and the International Ethical Guidelines for Health-Related Research Involving Humans (CIOMS) to ensure the protection of participants' rights, dignity, and well-being. Data collection, storage, and processing were conducted in accordance with Colombian personal data protection regulations (Law 1581 of 2012 and National Decree 1377 of 2013). All information was anonymized, used exclusively for academic and scientific purposes, and stored on secure REDCap platforms with access restricted to the research team, applying rigorous anonymization and coding procedures to safeguard confidentiality and prevent participant identification. The requirement for informed consent was waived because no direct contact with participants occurred, and all data were fully anonymized prior to analysis.

Results

A total of 550 individuals were initially identified as potentially eligible during the three-year study period, based on the definition of frequent ED use and the number of visits documented in the EMR. All identified individuals underwent eligibility assessment. After application of the exclusion criteria, pediatric patients and those with gynecologic-related visits were excluded (n = 80). Consequently, 470 individuals met the inclusion criteria and were included in the final analysis. Owing to the retrospective design and the use of routinely collected administrative data, there was no loss to follow-up, and all included individuals were analyzed.

Regarding age, the largest proportion of patients was 20–39 years. When categorized into five-year age groups, patients aged 25–29 and 20–24 years accounted for 19.8% and 17.2% of the sample, respectively, followed by the 30–34 (12.6%) and 35–39 (9.8%) groups. Female sex predominated, with 284 cases (60.4%), whereas male patients accounted for 186 cases (39.6%). With respect to insurance status, the contributory regime was most common (432 cases; 91.9%), followed by the subsidized regime (35 cases; 7.4%); the special, exceptional, and private regimes each accounted for one case (0.2%). Most patients had no documented comorbidities (384 cases; 81.7%), whereas 86 patients

(18.3%) had one or more comorbidities. The most frequent comorbidities were arterial hypertension (47 cases; 10.0%), nonmetastatic solid tumors (20 cases; 4.3%), and chronic obstructive pulmonary disease and/or asthma (13 cases; 2.8%); all remaining comorbidities occurred in fewer than 10 cases each (< 2%) (Table 1).

Table 1
Comorbidities distribution in patients with multiple consults treated in a high complexity Hospital ED, 2022–2024.

Comorbidities	**Number**	**Percentage (%)**
Arterial hypertension	47	10.0
Non-metastatic solid tumor or neoplasm	20	4.3
Chronic obstructive pulmonary disease and/or asthma	13	2.8
Human immunodeficiency virus (HIV) infection (asymptomatic carrier excluded)	9	1.9
Diabetes mellitus with target organ damage	7	1.5
Dyslipidemia	7	1.5
Tobacco use	4	0.9
Connective tissue disease	4	0.9
Heart failure with adequate response to treatment	3	0.6
Metastatic solid tumor or neoplasm	3	0.6
Coronary artery disease or equivalent	3	0.6
Chronic kidney disease (creatinine > 3 mg/dL or dialysis)	1	0.2
Cerebrovascular disease (including transient ischemic attack or minimal sequelae)	1	0.2
Gastroduodenal ulcer	1	0.2
Hemiplegia or paraplegia (any cause)	1	0.2
Source: Elaborated by the authors		

The most frequent number of ED consultations was four visits (Figure A), observed in 152 patients (32.3%); the median was five visits per year. Overall, patients with four to six consultations accounted for 329 cases (70.0%), whereas higher consultation frequencies represented fewer than 10% of cases. Noncommunicable diseases were the most common broad category of morbidity (127 cases; 27.0%), followed by ill-defined signs and symptoms (118 cases; 25.1%) and transmissible and nutritional conditions (94 cases; 20.0%). Less frequent categories included other causes (83 cases; 17.7%) and injuries (42 cases; 8.9%). The most frequent diagnostic subcategories were musculoskeletal diseases

(78 cases; 16.6%), ill-defined signs and symptoms (64 cases; 13.6%), other causes (62 cases; 13.2%), infectious and parasitic diseases (56 cases; 11.9%), and respiratory infections (49 cases; 10.4%); together, these accounted for 91.8% of all cases (Table 2).

Table 2
Great cause of morbidity distribution in patients with multiple consults treated in a high complexity Hospital ED, 2022–2024.

Morbidity of the Study Population	Number	Percentage (%)
Non-communicable diseases	127	27.0
Ill-defined signs and symptoms	118	25.1
Transmissible and nutritional conditions	99	21.0
Other causes	83	17.6
Injuries	42	8.9
Bacterial resistance	1	0.2
TOTAL	470	100
Source: Elaborated by the authors		

Most patients had a Charlson Comorbidity Index score of 0 (383 patients; 81.5%), corresponding to an estimated 10-year survival of 98%, followed by scores of 1 (43 patients; 9.1%; 96% survival) and 2 (18 patients; 3.8%; 90% survival). The predominant disposition after ED consultation was discharge (462 cases; 98.3%), whereas hospitalization (7 cases; 1.5%) and intensive care unit admission (1 case; 0.2%) were uncommon. No transfers, discharges against medical advice, or adverse events attributable to multiple consultations were recorded. Recurrent consultations were most frequently attributable to the same cause (258 cases; 54.9%). Overall, acute diseases accounted for 265 patients (56.4%), chronic diseases for 113 patients (24.0%), occupational diseases for 12 patients (2.6%), and mental health conditions for 9 patients (1.9%).

No intrahospital deaths were recorded among the 470 patients (100%), which precluded comparative or association analyses involving mortality in relation to triage patterns. Most patients were classified as triage levels III–IV (98.7%), and the majority of encounters resulted in discharge (98.3%) (Figure A). A Spearman correlation analysis was conducted to assess the relationship between the number of consultations and the Charlson Comorbidity Index. The analysis demonstrated a weak and non-significant correlation (rho = − 0.036; p = 0.43), indicating that comorbidity burden, as measured by the Charlson index, was not meaningfully associated with the number of emergency department consultations in this population. Similarly, the correlation between the number of consultations and age was weak (rho = 0.057) and not statistically significant (p = 0.22), suggesting the absence of a linear relationship between age and consultation frequency.

Figure A. Number of consultations per year distribution in patients with multiple consults treated in a high complexity Hospital ED, 2022–2024.

Source: Elaborated by the authors

Discussion

The sample included 470 FEDUs treated between 2022 and 2024, with a predominance of women (60.4%). Age was non-normally distributed, with a median of 33 years (IQR, 26–47), suggesting a younger population than that described in several international reports, in which frequent ED users tend to be older or exhibit a bimodal age distribution (young and older adults). This demographic pattern, together with the high proportion of patients enrolled in the contributory insurance regime and the predominance of single or common-law union marital status, is consistent with the case mix of a high-complexity university hospital that serves a largely working-age population and aligns with prior literature reporting higher ED utilization among women and variability according to socioeconomic factors (4, 7).

Regarding morbidity, the most frequent ICD-10 diagnoses were infectious gastroenteritis and colitis, acute nasopharyngitis, and headache. When grouped by major cause categories, noncommunicable diseases and ill-defined signs and symptoms predominated, followed by communicable and nutritional conditions. Notably, a single frequent ED user may present one or more comorbidities across encounters, which should be considered when interpreting aggregated morbidity estimates. At the subcategory level, musculoskeletal disorders, ill-defined signs and symptoms, infectious and parasitic diseases, and respiratory infections were most prominent. This morbidity profile is consistent with reviews and case series indicating that frequent ED users bear a substantial burden of low- to moderate-acuity conditions, nonspecific syndromes, and respiratory and digestive disorders that could often be managed in ambulatory or primary care settings with adequate continuity of care (2, 4).

The Charlson Comorbidity Index was 0 in 81.5% of cases, and scores ≥ 3 were infrequent. Although multiple studies report a high burden of multimorbidity among frequent ED users—particularly when higher visit thresholds are applied (e.g., ≥ 10 visits/year) and in subgroups with mental illness or substance use—this relatively low comorbidity burden may be explained by the threshold used in this study (≥ 4 visits within 365 days), the exclusion of gynecologic and obstetric visits, and the younger median age of the sample. In addition, underrecording, which is inherent to retrospective studies based on electronic health records, may have contributed to an underestimation of comorbidity prevalence (17, 18).

With respect to clinical outcomes, no in-hospital mortality was recorded. This finding is consistent with the triage distribution (Figure A), which suggests a predominance of low-acuity presentations and a pattern of demand that could be managed in ambulatory settings if timely access and continuity of care are ensured. The literature indicates that, although frequent ED users may account for a substantial volume of visits, mortality and hospitalization are concentrated in subgroups with higher comorbidity

burdens or with mental health and substance use disorders, rather than in cohorts characterized primarily by low-severity presentations (4, 17, 19).

From a temporality and utilization perspective, annual ED visit counts clustered between 4 and 6 visits (70% of the sample) and were non-normally distributed, with a median of 5 visits per year; very high frequencies (≥ 10 visits) were uncommon. This gradient suggests that most frequent ED users at HUSI fall within the lower end of the repetition spectrum, indicating that cost-effective interventions based on brief, structured postdischarge strategies may be beneficial. Such strategies include standardized discharge education, prioritized appointments or teleconsultation within 48–72 hours, and coordination with the primary health care network within the corresponding subnetwork (21).

Exploratory questions added by the research team identified opportunities for improvement. In 54.9% of cases, repeat visits were primarily attributable to the same cause, a finding consistent with prior literature indicating that frequent emergency department users often re-present with similar conditions. This pattern highlights the potential value of more structured and targeted approaches to care for common frequent-user presentations, such as headache, low back pain, and respiratory or digestive infections (2).

Overall, these results are consistent with the problem statement and the existing literature; FEDUs constitute a minority that accounts for a substantial volume of encounters, often for low- to moderate-acuity conditions, with marked needs for continuity and alternative pathways to ambulatory care (4, 18). Understanding the FEDUs profile is essential for designing effective interventions that optimize resource use and improve health outcomes. In our hospital, these findings support evaluating the implementation of an institutional care pathway for FEDUs, complemented by a reconsultation dashboard and cycle-time monitoring, as recommended in reviews and in reported experiences with health information exchange and case management (1, 2, 21).

Limitations

This study has several important limitations that should be considered when interpreting its findings. First, owing to the retrospective design, data quality and accuracy depended entirely on documentation within the institutional electronic EMR. Consequently, incomplete, inconsistent, or inaccurate documentation may have introduced information bias, potentially affecting internal validity. Second, the study was conducted in a single high-complexity university hospital, representing a single-system analysis. Therefore, the findings may not be generalizable to other institutional settings or to populations with different demographic or organizational characteristics. Finally, given the retrospective and quantitative nature of the analysis, the study did not examine in depth the specific causes, motivations, or contextual factors that may influence frequent ED use. This limitation constrains the ability to design individualized or context-sensitive interventions tailored to the needs of this population.

Conclusion

The sociodemographic profile of FEDUs was characterized by a predominance of women, a young adult median age, and enrollment in the contributory health insurance regime. The most frequent reasons for consultation were acute infectious and respiratory conditions, headache, and musculoskeletal disorders, which were predominantly categorized as noncommunicable diseases and ill-defined signs and symptoms. Most patients exhibited a low comorbidity burden and mild-to-moderate clinical severity, as reflected by lower-acuity triage categories and the absence of in-hospital mortality. A substantial proportion of encounters represented repeat visits for the same cause, with limited referral for specialist follow-up. Overall, these findings are consistent with international evidence and underscore the need for institutional care pathways focused on early identification, standardized management, timely outpatient follow-up, and strengthened coordination with primary health care to reduce repeat consultations, health care costs, and ED overcrowding.

Declarations

Disclosure

This study did not receive external funding. None of the authors have any conflicts of interest or financial relationships relevant to this article to declare.

Author Contribution

A.R.A., M.S., D.L.M., and L.G.A. contributed equally to the conception and design of the study, data acquisition, data analysis and interpretation, manuscript drafting, and critical revision of the manuscript. All authors read and approved the final manuscript.

Data Availability

The datasets generated and analyzed during the current study are not publicly available due to institutional and patient privacy restrictions but are available from the corresponding author on reasonable request and with permission from the institution.

References

1. Saef SH, Carr CM, Bush JS, Bartman MT, Sendor AB, Zhao W et al. A Comprehensive View of Frequent Emergency Department Users Based on Data from a Regional HIE. South Med J [Internet]. 2016 Jul 1 [cited 2025 Nov 23];109(7):434. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC4933324/
2. Soril LJJ, Leggett LE, Lorenzetti DL, Noseworthy TW, Clement FM. Characteristics of frequent users of the emergency department in the general adult population: A systematic review of international

healthcare systems. Health Policy (New York) [Internet]. 2016 May 1 [cited 2025 Nov 23];120(5):452–61. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0168851016300240?via%3Dihub

3. Hunt KA, Weber EJ, Showstack JA, Colby DC, Callaham ML. Characteristics of Frequent Users of Emergency Departments. Ann Emerg Med [Internet]. 2006 Jul 1 [cited 2025 Nov 23];48(1):1–8. Available from: https://www.annemergmed.com/action/showFullText?pii=S0196064406000680
4. LaCalle E, Rabin E. Frequent Users of Emergency Departments: The Myths, the Data, and the Policy Implications. Ann Emerg Med [Internet]. 2010 Jul 1 [cited 2025 Nov 23];56(1):42–8. Available from: https://www.annemergmed.com/action/showFullText?pii=S0196064410001058
5. Byrne M, Murphy AW, Plunkett PK, McGee HM, Murray A, Bury G. Frequent attenders to an emergency department: A study of primary health care use, medical profile, and psychosocial characteristics. Ann Emerg Med [Internet]. 2003 Mar 1 [cited 2025 Nov 23];41(3):309–18. Available from: https://www.annemergmed.com/action/showFullText?pii=S0196064402849915
6. Kne T, Young R, Spillane L, Frequent ED. users: Patterns of use over time. Am J Emerg Med [Internet]. 1998 Nov 1 [cited 2025 Nov 23];16(7):648–52. Available from: https://www.sciencedirect.com/science/article/pii/S0735675798901668?via%3Dihub
7. Locker TE, Baston S, Mason SM, Nicholl J. Defining frequent use of an urban emergency department. Emerg Med J [Internet]. 2007 Jun [cited 2025 Nov 23];24(6):398. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC2658272/
8. Krieg C, Hudon C, Chouinard MC, Dufour I. Individual predictors of frequent emergency department use: a scoping review. BMC Health Services Research 2016 16:1 [Internet]. 2016 Oct 20 [cited 2025 Nov 23];16(1):594-. Available from: https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-016-1852-1
9. Pines JM, Asplin BR, Kaji AH, Lowe RA, Magid DJ, Raven M et al. Frequent users of emergency department services: Gaps in knowledge and a proposed research agenda. Academic Emergency Medicine [Internet]. 2011 Jun 1 [cited 2025 Nov 23];18(6):e64–9. Available from: /doi/pdf/10.1111/j.1553-2712.2011.01086.x
10. Weiss SJ, Derlet R, Arndahl J, Ernst AA, Richards J, Fernández-Frankelton M, the National ED Overcrowding Study (NEDOCS). Estimating the Degree of Emergency Department Overcrowding in Academic Medical Centers: Results of. Academic Emergency Medicine [Internet]. 2004 Jan 1 [cited 2026 Jan 24];11(1):38–50. Available from: /doi/pdf/10.1197/j.aem.2003.07.017
11. Harris PA, Taylor R, Minor BL, Elliott V, Fernandez M, O'Neal L et al. The REDCap consortium: Building an international community of software platform partners. J Biomed Inform [Internet]. 2019 Jul 1 [cited 2026 Jan 24];95:103208. Available from: https://www.sciencedirect.com/science/article/pii/S1532046419301261
12. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)—A metadata-driven methodology and workflow process for providing translational

research informatics support. J Biomed Inform [Internet]. 2009 Apr 1 [cited 2026 Jan 24];42(2):377–81. Available from: https://www.sciencedirect.com/science/article/pii/S1532046408001226

13. Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: Development and validation. J Chronic Dis [Internet]. 1987 Jan 1 [cited 2026 Feb 4];40(5):373–83. Available from: https://www.sciencedirect.com/science/article/abs/pii/0021968187901718
14. Charlson ME, Charlson RE, Peterson JC, Marinopoulos SS, Briggs WM, Hollenberg JP. The Charlson comorbidity index is adapted to predict costs of chronic disease in primary care patients. J Clin Epidemiol [Internet]. 2008 Dec 1 [cited 2026 Feb 4];61(12):1234–40. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0895435608000309
15. R Core Team. R: A Language and Environment for Statistical Computing. Austria: https://www.R-project.org/; 2025.
16. Rodríguez-Páez FG, Jiménez-Barbosa WG, Palencia-Sánchez F, Rodríguez-Páez FG, Jiménez-Barbosa WG, Palencia-Sánchez F. Uso de los servicios de urgencias en Bogotá, Colombia: Un análisis desde el Triaje. Univ Salud [Internet]. 2018 Aug 31 [cited 2025 Nov 23];20(3):215–26. Available from: http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S0124-71072018000300215&lng=en&nrm=iso&tlng=es
17. Capp R, Kelley L, Ellis P, Carmona J, Lofton A, Cobbs-Lomax D et al. Reasons for Frequent Emergency Department Use by Medicaid Enrollees: A Qualitative Study. Academic Emergency Medicine [Internet]. 2016 Apr 1 [cited 2025 Nov 23];23(4):476–81. Available from: /doi/pdf/10.1111/acem.12952
18. Andrén KG, Rosenqvist U. Heavy users of an emergency department—A two year follow-up study. Soc Sci Med [Internet]. 1987 Jan 1 [cited 2025 Nov 23];25(7):825–31. Available from: https://www.sciencedirect.com/science/article/abs/pii/0277953687900402?via%3Dihub
19. Del K, Caballero González C, Milena A, Guerra M, Sebastián A, Mejía B. Factores asociados a la policonsulta de los pacientes con enfermedad mental que asisten al servicio de urgencias de una institución prestadora de servicios de salud, 2014–2015. [Internet]. Universidad CES; 2022 Jul [cited 2025 Nov 23]. Available from: https://hdl.handle.net/10946/6052
20. Germán González. Marta Lía Valencia, Nelson Armando Agudelo, Liliana Acevedo, Isabel Cristina Vallejo. Morbilidad sentida de las urgencias médicas y la utilización de los servicios de salud en Medellín, Colombia, 2005–2006 [Internet]. 2007 [cited 2025 Nov 23]. Available from: http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S0120-41572007000200005
21. Pope D, Fernandes CMB, Bouthillette F, Etherington J. Frequent users of the emergency department: a program to improve care and reduce visits. CMAJ. 2000;162(7).

Figures

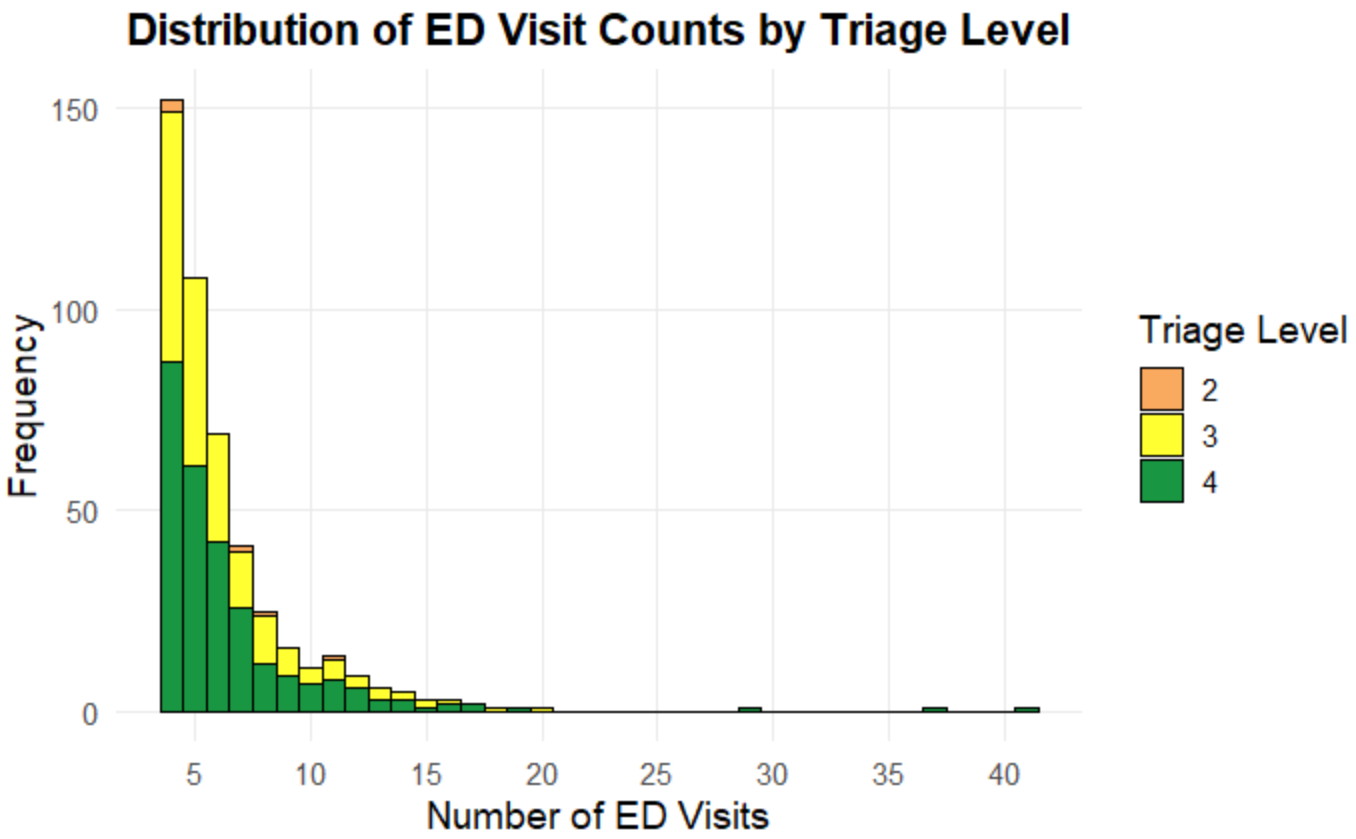


Figure 1

Figure A. Number of consultations per year distribution in patients with multiple consults treated in a high complexity Hospital ED, 2022–2024.