



## Targeting frequent users of emergency departments: Prominent risk factors and policy implications

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### ABSTRACT

This study investigates the characteristics of frequent users of accident and emergency departments (AEDs) and recommends alternative medical services for such patients. Prominent demographic and clinical risk factors for individuals accessing seven AEDs located in the metropolitan area of Genoa, Italy are identified and analysed. A truncated count data model is implemented to establish the determinants of access, while a multinomial logistic regression is used to highlight potential differences among different user categories. According to previous studies, empirical findings suggest that despite the relevance of demographic drivers, vulnerability conditions (e.g. abuse of alcohol and drugs, chronic conditions, and psychological distress) are the main reasons behind frequent AED use; the analysis seems to confirm an association between AED frequent use and lower level of urgency. Since frequent and highly frequent users are found responsible for disproportionate resource absorption with respect to total amount of AED costs (they represent roughly 10% of the total number of patients, but contribute to more than 19% of the total annual AED cost), policies aiming to reduce frequent use of AEDs could bring significant savings in economic resources. Thus, efficient actions could be oriented toward extending primary care services outside AED and toward instituting local aid services specifically addressed to people under the influence of substances or in conditions of mental distress.

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### 1. Introduction

The demand for accident and emergency department (AED) services has risen significantly during the last decades, comprising an increasing share of total health care expenditure. From 1996 to 2006, the overall number of AED accesses in the United States increased by 32% [1] and the same trend is confirmed in most industrialized countries [2].

This new pattern in AED utilization is attributable to the change in the type of services required by help-seeking patients. Nowadays, AEDs seem to be used mainly as a source of primary healthcare rather than an intervention point for urgent cases [3].

Patients accessing AED are indeed classified at acceptance according to their level of urgency of intervention (clinical need) using a colour triage code. Different triage systems exist internationally [4] and in Italy, the system is composed of four emergency levels identified by the following colour tags: white = non-urgent/inappropriate access; green = non-urgent access; yellow = urgent access; and red = emergency.

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Accesses by non-urgent patients or patients with minor medical problems (i.e. inappropriate accesses) tend to be predominant in most western countries [2,5,6], and Italy is no exception, as white and green code patients are found to be responsible for more than 80% of the total number of AED admissions [7]. Although this phenomenon is widespread, it is especially prominent among individuals – typically people without residence permits or the homeless – who are not entitled to receive healthcare from general practitioners or other local healthcare facilities [8,9].

Inappropriate access contributes to economic resource wastefulness; [10] suggests that the annual cost of AED overuse accounts for more than 40% of all outpatient AED charges and threaten the goal of AED efficiency. In fact, on the one hand, inappropriate accesses are responsible for high marginal cost of non-urgent AED examinations and, on the other, they affect quality, since overcrowding is the primary reason for deficiencies in the effectiveness of AED services [11–13]. Although the amount of potential savings is still debatable, [14] showed that AED charges are 320–728% higher than those in the clinic, allowing for potential savings of 69–86% if non-urgent patients are treated in primary settings instead of in AEDs.

In addition, the expected ageing of the population, which will characterize the next decades alongside increasing migration flows, will probably boost the demand for emergency services and associated costs [15–20]. As a consequence of the demographic changes, *ceteris paribus*, a problem of overcrowding and worsening in the quality of care will emerge in future years, leading to possible dramatic outcomes for vulnerable patients.

Thus, it is clear that the presence of frequent users of AED services – patients who access AEDs many times per year – impacts on present and future AED management. Some previous studies (see [21] for a review) showed that even if frequent users often represent a low percentage of the total number of patients, their absolute numbers affect costs disproportionately [22] and they are accountable for AED crowding and waiting times which are responsible for a quality reduction in emergency services offered [22,23].

Hunt et al. [24] showed that the 8% of users with four or more visits were responsible for 28% of visits. According to Hansagi et al. [25], 4% of patients account for 18% of the total number of visits, while Cook et al. [22] estimated that the 33% of patients who use AED more than once during a 3-year period accounted for 62% of the AED visits during the study period. According to the estimations of [22], the average AED charge for each visit is lower for serial users of AED (\$ 213 vs. \$ 259 for patients accessing AED once over the period) but the cumulative period charge is significantly higher for serial users (\$ 1880 vs. \$ 259). Ruger et al. [26] highlight that, compared to other users, patients visiting more than 20 times per year have significantly lower average costs in every category of treatments (i.e. laboratory and pharmacy) and overall (total cost).

Therefore, understanding the characteristics of this category of patients is essential to develop policies that reduce the costs associated with frequent use of AEDs and to address the needs of these patients properly.

Generally, the determinants of frequent AED use include two main drivers: demographic and clinical drivers.

Even if there is no general consensus about the impact of different factors on AED access rates, most previous studies agree on the identification of age, gender, and nationality/race as key demographic factors to be considered. Most of the US literature concurs that ethnic minorities, especially African Americans, seem to be disproportionately represented among frequent users [27,28], while the impact of gender is still controversial as some studies [27] have identified being male as a risk factor while others [28] identify being female as a risk factor (indeed, several authors [29] found no relevance for gender and race in the determination of AED frequent use). With respect to age, the risk of being a frequent user increases in middle-aged patients [27,29] and in those older than 65 years [28], often following a bimodal distribution. However, the impact of these variables seems to be controversial in different environments. In the Italian context, previous studies (e.g. [30]) found foreign-born individuals to have a higher utilization rate (309.7 visits per 1000 inhabitants compared to 253.9 for native Italians) and foreign individuals seem to attend AED more often for low-acuity triage codes. In addition, interesting associations have been found between ethnicity and specific diagnosis; for example, Cervellin et al. [31] found that women from Sub-Saharan Africa, especially Nigeria, record particularly high AED access rates for unexpected pregnancy, suggesting the need for information campaigns addressed toward certain vulnerable minority groups.

If the impact of demographic drivers is still doubtful, the relationship between clinical conditions and frequent AED use is widely accepted, as frequent AED users tend to report poorer physical health with a preponderance of chronic illness, such as asthma, renal failure, hypertension, and chronic pulmonary disease [27–29,32,33]. Psychological distress (e.g. depression, personality disorder, and schizophrenia) [21,34–36] and alcohol and drug abuse [21,27,34,36,37] are associated with frequent AED use, mainly in urban sites and patients younger than 65 years of age. For example, [24] found that patients with poor mental status are more likely than other patients to access AED more than four times a year (odds ratio = 1.70). According to Duope et al. [36], highly frequent users of AED (more than 18 visits a year) are strongly defined by addiction problems: 67.3% of them received a diagnosis of substance abuse. According to Fuda and Immekus [28], more than half (54.5%) of heavy users have a diagnosis connected to mental health or substance use disorder, while this percentage accounts for 12% of normal users.

The differences in clinical conditions lead to differences in the health care system use pattern (i.e. acuity of medical condition, ambulance transportation, and hospitalization rate). Frequent users have been found to have higher risk of being assigned lower triage codes: according to [27], 6.7% of frequent users are classified with the highest priority code, while this percentage accounts for 12.5% of non-frequent users, and [37] found that patients seen in AED once annually are more likely to be triaged at level A, whereas those with more than 20 visits are significantly more likely to present with non-urgent conditions (acuity level E). Moreover, due to the poorer health status of frequent AED users, the probability of hospitalization during the year is

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