

# Frequent Users of Massachusetts Emergency Departments: A Statewide Analysis

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**Study objective:** We describe the epidemiology of frequent users of emergency departments (EDs), using a statewide dataset derived from linked ED, observation stay, and inpatient hospital discharge databases.

**Methods:** Unique patient identifiers were used to link visits across databases, encompassing all ED visits regardless of disposition. Individuals with 5 or more visits during a year were considered frequent users and were compared with infrequent users, as well as nonusers, using descriptive statistics.

**Results:** Only 1% of Massachusetts residents were frequent users, but they made 17.6% of all ED visits in fiscal year 2003; 57.8% of residents used multiple EDs. Compared with infrequent users, frequent users were more likely to die at their last visit (2.6% of frequent users versus 1.1% of infrequent users), were hospitalized at higher rates (18.8% versus 14.2% of visits), and were transported more frequently by ambulance (18.6% versus 12.1% of visits). Two percent of the uninsured individuals were frequent users compared with 2.1% of Medicaid enrollees, 2.0% of Medicare enrollees, and 0.4% of privately insured individuals. Only 15% of frequent users were uninsured. Frequent ED use is typically temporary; just 28.4% of frequent users in fiscal year 2002 remained frequent users in fiscal year 2003.

**Conclusion:** Uninsured individuals are no more likely than publicly insured individuals to be ED frequent users and compose only 15% of them. Frequent users tend to be sicker than infrequent users, but most use the ED at high rates temporarily and visit the ED less frequently or not at all the following year. [Ann Emerg Med. 2006;48:9-16.]

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### INTRODUCTION

#### Background

Frequent users of emergency department (ED) services have been of a topic of concern in the emergency medicine and health policy literature for more than 20 years, although related articles have appeared with increasing frequency since the mid-1990s.<sup>1-17</sup> Moreover, this phenomenon is not limited to the United States. Despite very different organization of their health care financing and delivery systems, ED frequent users are an issue in several foreign countries, including Canada,<sup>18-23</sup> Sweden,<sup>24-28</sup> Ireland,<sup>29,30</sup> New Zealand,<sup>31,32</sup> Spain,<sup>33</sup> Taiwan,<sup>34,35</sup> and Australia.<sup>36</sup>

#### Importance

Frequent users are a topic of interest to emergency physicians, payers, purchasers, and other decisionmakers for

several reasons. First, EDs are not generally designed to provide continuous, long-term care to patients, so frequent users might receive better care in a different setting. Second, the generally higher charges for an ED visit compared with those for other settings result in a general preference by payers to avoid any unnecessary use of the ED by their enrollees. The high number of visits by frequent users leads to concerns about their necessity, which is closely related to a third theme: that frequent ED users may be using the ED for nonurgent conditions, often regarded as "inappropriate," and that such visits could be diverted to primary care settings such as physician offices or ambulatory clinics. Finally, given a chronic problem of crowding in many EDs in Massachusetts, as well as elsewhere in the United States and even other countries, any potential connection between frequent users and increasing volumes of ED patients is important to understand.

**Editor's Capsule Summary***What is already known on this topic*

All emergency departments (EDs) have frequent users, but the demographics and epidemiologic patterns of such visits have not been formally assessed in large studies.

*What question this study addressed*

This study analyzed the frequency of ED use by all adults in Massachusetts during 12 months in 2002 to 2003, describing patterns of use and comparing frequent users with infrequent and nonusers of EDs.

*What this study adds to our knowledge*

One quarter of all adults in Massachusetts used an ED during this 12-month period; 4% of ED users had 5 or more visits, accounting for 18% of all ED visits. Uninsured and publicly insured users were equally likely to be frequent users and were more likely to be frequent users than privately insured individuals. Frequent users appear to be sicker than infrequent users. A majority of frequent users visit more than 1 ED. Frequent users commonly have a period of high ED use, followed by a period with a markedly reduced visit rate.

*How this might change clinical practice*

These findings highlight the complexities of frequent ED utilization and indicate that visits by frequent users cannot simply be dismissed as inappropriate. Strategies to reduce ED visits must account for the health status of frequent users and the fact that multiple EDs are often involved.

**Goals of This Investigation**

The majority of studies of frequent users have depended on data drawn from a single ED, whereas a few have combined data from several EDs in a specific region.<sup>37,38</sup> One recent study was based on statewide, all-payer ED visit data collected in Utah; however, this study excluded all patients admitted as inpatients from the ED.<sup>15</sup> Zuckerman and Shen<sup>17</sup> used national survey data to study occasional and frequent ED use. Only a few foreign studies have taken advantage of province-wide or nationwide data to develop a comprehensive picture of frequent ED users in their areas.<sup>19,20,23,26</sup> We believe our study is the first in the United States to use data on all ED visits regardless of disposition in an entire state and to develop a comprehensive description of frequent users to that state's EDs. We determined frequent-user use patterns, clinical characteristics, and demographics and how these differed from those of other ED patients and the Massachusetts population as a whole. We examined variations within the frequent user population, its persistence over time, and the implications of our findings for potential interventions to address frequent use of the ED.

**MATERIALS AND METHODS****Study Design**

This was a retrospective observational study. The primary sources of data were 3 encounter-level databases collected by the state of Massachusetts from all nonfederal, acute care hospitals in the state; however, the databases do not include data from Veterans Administration hospitals, 1 of which has an ED. Submission of data is mandatory.<sup>39</sup> The Massachusetts Outpatient Emergency Department database contained visit-level information for patients who were discharged as outpatients. The Hospital Inpatient Discharge database and the Outpatient Observation database were also used to identify ED visits that resulted in inpatient admissions or observation stays. These visits were marked by ED flags in both databases. The combination of such records from these 3 databases constitutes an essentially complete census of ED visits to Massachusetts acute care hospitals, with the exception of visits to the Veterans Administration hospital. Results for visits occurring during fiscal year 2003 (October 1, 2002, to September 30, 2003) are reported here. This study was approved through the Data Protection Committee process at our organization.

Patients were considered frequent users if they visited a Massachusetts ED 5 or more times in fiscal year 2003. In most cases, unique patient identifiers based on encrypted social security numbers were used to associate visits with individual patients. For the 15% of visits reporting no social security number, we constructed an identifier based on date of birth, sex, race, and zip code. Further details of our methods are available in Appendix E1, Section 1 (available online at <http://www.annemergmed.com>).

**RESULTS**

We found that ED utilization is concentrated in a relatively small proportion of the population; only 24.5% of Massachusetts residents made even 1 ED visit in fiscal year 2003. An even smaller fraction of residents, only 1.0%, made 5 or more ED visits, meeting our definition of frequent user. Frequent users accounted for only 3.8% of all ED patients, yet they made 17.6% of all ED visits in Massachusetts hospitals (Table 1). The total number of ED visits made by an individual frequent user ranged from 5 to 254. Large variation also existed in the number of distinct facilities visited by an individual, with patients visiting anywhere from 1 to 43 hospital EDs in the 12-month period. Most frequent users visited multiple facilities: 42% visited 1 ED, 34% visited 2, 15% visited 3, 5% visited 4, and 4% visited 5 or more. At individual hospitals, the percentage of total ED visits that were made by frequent users ranged from 8% to 31% (see Appendix E1, Section 2, available online at <http://www.annemergmed.com>).

Female patients had a slightly higher rate of frequent ED utilization (1.0% versus 0.9% of residents). The age of a patient had a much larger impact on the likelihood of being a frequent user (Table 2). Among Massachusetts residents, only 0.3% of children younger than 15 years visited an ED 5 or more times in fiscal year 2003 compared with 1.5% of patients older than 65

**Table 1.** Total ED users and ED visits.

Visits, Fiscal Year 2003, No.	Patients, No.	Total Patients, %	Cumulative Percentage	Visits, No.	Total Visits, %	Cumulative Percentage
One	1,156,629	68.6	68.6	1,156,629	41.6	41.6
Two	306,055	18.2	86.8	612,110	22.0	63.6
Three	110,212	6.5	93.4	330,636	11.9	75.5
Four	47,876	2.8	96.2	191,504	6.9	82.4
Five	24,565	1.5	97.7	122,825	4.4	86.9
Six or more	39,497	2.3	100.0	365,392	13.1	100.0
Total	1,684,834	100.0		2,779,096	100.0	
Frequent users ( $\geq 5$ visits)		3.8			17.6	

**Table 2.** Massachusetts residents by demographic characteristics and ED visit frequency.

Patient Characteristics	Non-ED Users, %	Infrequent ED Users, %	Frequent ED Users, %	Total, %
<b>Sex</b>				
Female	75.7	23.3	1.0	100
Male	75.2	23.8	0.9	100
<b>Age, y</b>				
0-14	76.6	23.0	0.3	100
15-24	70.8	28.1	1.0	100
25-44	76.1	22.8	1.2	100
45-64	80.1	19.1	0.9	100
$\geq 65$	68.9	29.6	1.5	100
<b>Race</b>				
White	77.4	21.7	0.9	100
Black	64.3	33.8	1.9	100
Hispanic	68.6	30.1	1.4	100

**Table 3.** Massachusetts residents by payer status and ED visit frequency.

Payer Type	Total Residents	Non-ED Users, %	Infrequent ED Users, %	Frequent ED Users, %
Medicaid	794,668	75.3	22.7	2.1
Uninsured	439,000	53.9	44.0	2.1
Medicare	965,943	70.8	27.2	2.0
Private	4,233,811	78.8	20.7	0.4
Total	6,433,422	75.5	23.5	1.0

years. Blacks and Hispanics were also substantially more likely to be either frequent or infrequent users of the ED than were whites.

The distribution of visit frequency differed among payer groups (Table 3). Uninsured residents of Massachusetts were most likely to make *any* emergency visit: 44.0% visited the ED between 1 and 4 times. However, 2.1% of uninsured users visited an ED on 5 or more occasions, comparable to the 2.1% of Medicaid enrollees and the 2.0% of Medicare enrollees who were also frequent users. Only 0.4% of patients with private insurance were frequent users, and 78.8% never used the ED in fiscal year 2003.

The clinical characteristics of frequent ED patients differed from those of infrequent users. Infrequent users were much more likely to visit the ED for an injury; 32.1% of their visits

had an injury-related primary diagnosis compared with only 17.3% of frequent users. In contrast, primary diagnoses related to substance abuse, migraine headaches, anemia, mental disorders, convulsions, diseases and disorders of the teeth, congestive heart failure, diabetes, lumbago, and complications of medical care were much more common at visits of frequent users compared to those made by infrequent users (Table 4). In particular, substance abuse- and mental health-related disorders were much more prevalent among frequent users than among infrequent users (Table 5). When associated diagnoses are considered, a quarter of frequent user visits were related to substance abuse or mental health compared with only 10.6% of infrequent-user visits. Considered at the person level, 54.5% of frequent users made at least 1 ED visit in which a mental health or substance abuse diagnosis was given (primary or associated) compared with only 12.0% of infrequent users.

However, the distribution of primary diagnoses among frequent users themselves differed substantially by payer source. Mental health-related diagnoses were much more common at visits by patients with Medicaid coverage (9.0% of total visits) and by Medicare enrollees younger than 65 years (13.4%) compared with 2.7% to 5.8% among other payers. Sprains, substance abuse, supplementary procedures, diseases of the skin, mental disorders, and diseases of the teeth were reported most frequently among uninsured users. Sprains were most common at visits of privately insured users, whereas primary diagnoses relating to the circulatory system, ill-defined conditions, congestive heart failure, the digestive system, urinary complaints, and chest pain were most common at visits of elderly Medicare patients (those aged 65 years or older). (See Appendix E1, Section 3, available online at <http://www.annemergmed.com>).

In addition, certain diagnoses, including substance abuse, mental health-related conditions, migraines, back pain, and dental problems were more common among frequent users who visited 4 or more EDs during the year compared with those who visited 3 or fewer (see Appendix E1, Section 4, available online at <http://www.annemergmed.com>).

Patient disposition (normal discharge, admitted to inpatient care, or admitted to an outpatient observation stay) was examined by age and payer for frequent and infrequent users. Among each age group, frequent users were admitted more

**Table 4.** Top 10 primary diagnosis groups more common among frequent users.

Primary Diagnosis	Infrequent User Visits	Infrequent Visits, %	Frequent User Visits	Frequent Visits, %	Ratio of Frequent to Infrequent Percentages
Substance abuse	22,748	1.0	21,182	4.3	4.4
Migraine	9,420	0.4	7,546	1.6	3.8
Anemia	3,848	0.2	2,355	0.5	2.9
Mental disorders	61,481	2.7	34,050	7.0	2.6
Convulsions	12,617	0.6	6,668	1.4	2.5
Diseases of the teeth	22,472	1.0	10,615	2.2	2.2
Congestive heart failure	14,336	0.6	6,663	1.4	2.2
Diabetes	12,105	0.5	5,495	1.1	2.1
Lumbago	20,453	0.9	9,079	1.9	2.1
Surgical and medical complications	16,501	0.7	6,160	1.3	1.8

**Table 5.** ED users with substance abuse or mental health diagnoses.

Patient Group	Frequent Users	Frequent Users, %	Infrequent Users	Infrequent Users, %
Total ED users	64,062		1,620,772	
Total ED users with a primary mental health diagnosis	13,731	21.4	51,295	3.2
Total ED users with a primary substance abuse diagnosis	7,422	11.6	19,726	1.2
Total ED users with primary medical diagnosis	63,616	99.3	1,582,709	97.7
Medical users with mental health associated diagnosis	20,499	32.0	89,286	5.5
Medical users with substance abuse associated diagnosis	15,400	24.0	58,638	3.6
Medical users with both mental health and substance abuse associated diagnosis	5,456	8.5	10,482	0.6
Total ED users with a primary or associated mental health or substance abuse diagnosis	34,888	54.5	195,232	12.0

often than infrequent users. Frequent users in all payer groups except nonelderly Medicare enrollees were more likely to be admitted as well. Overall, 18.8% of frequent user visits resulted in an inpatient admission and 2.3% of visits resulted in an observation stay compared with 14.2% and 2.5%, respectively, of other ED users.

We also analyzed coding for services provided for indications of the relative resource intensity associated with outpatient visits by frequent users and infrequent users (Table 6). The relevant *Current Procedural Terminology (CPT)* codes are 99281 to 99285 and 99291 and represent ascending levels of intensity of services provided by hospitals at ED visits; unfortunately, these codes were available only for *outpatient* visits in our data. In fiscal year 2003, an ED visit code was reported for approximately 88% of outpatient ED visits. Of the visits made by frequent users, 30.5% were considered to be of high intensity (99284 to 99291) compared with 23.6% of visits made by infrequent users. Frequent users were slightly more likely than infrequent users to have the lowest-level visit code, at 5.3% and 4.3%, respectively. However, because frequent users are admitted at higher rates than are infrequent users, and it is very unlikely that the ED visits associated with these admissions would be coded at the 99281 level, this minor discrepancy likely would

**Table 6.** Outpatient ED visit CPT codes.

Visit Code	Examples of Typical Diagnoses	Infrequent User Visits, %	Frequent User Visits, %
99281	Suture removal	4.3	5.3
99282	Simple trauma (no radiographs); ear pain	25.1	21.5
99283	Fever; dyspnea not requiring medications	47.0	42.7
99284	Chest pain, with 1 diagnostic test	18.6	22.9
99285	Uncontrolled diabetes mellitus; chest pain with multiple diagnostic tests	4.4	7.0
99291	Multiple trauma	0.6	0.6
Total		100.0	100.0

disappear or reverse if coding for *all* ED visits could be considered.

Frequent users were also more likely to die during a visit or subsequent admission than were infrequent users. Of the total frequent users in fiscal year 2003, 2.6% died before discharge compared to 1.1% of infrequent users. These figures do not include deaths during other hospitalizations, ie, those not originating in the ED and thus not found in our data, or in nonhospital settings. Finally, 18.6% of frequent users arrived by ambulance for outpatient visits compared with 12.1% of

infrequent users. Because mode of transport was not available for admitted ED patients, this difference is probably an underestimate.

The issue of whether frequent users or some subset of them constitute an identifiable population that persists over time and to which an intervention might be targeted is an important one. In fiscal year 2002, there were 64,262 frequent users in Massachusetts. In fiscal year 2003, 28.4% (18,265) of these individuals remained frequent users, whereas 46.5% (29,863) made 1 to 4 visits. The remaining 25.1% (16,134) did not make any ED visits in fiscal year 2003. Approximately 11% of this last group did not appear in fiscal year 2003 because they had died during fiscal year 2002 during their last ED visit or ED-related hospitalization. Patients who remained frequent users the subsequent year had more visits in fiscal year 2002 (10.1 versus 6.6 mean visits) and visited more distinct EDs (2.4 versus 1.9). Female users and blacks were also more likely to remain frequent users in fiscal year 2003, as were those insured by Medicare who were younger than 65 years or who were insured by Medicaid.

Additional data tables, providing further detail on age, disposition, payer, and diagnostic group for frequent and infrequent users, are available in [Appendix E1, Section 5](#) (available online at <http://www.annemergmed.com>).

## LIMITATIONS

This study is limited by the type of data used. Administrative data include restricted detail about patients' clinical conditions and particularly their severity. Furthermore, coding practices can vary from hospital to hospital, and there can be coding errors, although the data are edited. The Massachusetts encounter-level databases do not include data from the Veterans Administration hospitals in the state, including the one with an ED. Neither do they include any ED visits Massachusetts residents make to EDs out of state. Therefore, utilization rates are probably somewhat underestimated by our analyses. Finally, Massachusetts data may not be representative of ED utilization nationwide.

Encrypted social security numbers, our primary means of assigning multiple ED visits to a single individual, are considered generally reliable, although there could be coding errors, and occasionally multiple individuals may report a single social security number. The constructed identifier we used for visits with no valid social security number tended to slightly undercount multiple ED visits when tested for visits with social security numbers. Therefore, we believe it is conservative overall, although it is possible that there were some cases of multiple individuals who were identified as 1 with this method. Because this identifier incorporates zip code, it would tend to undercount persons who have moved between zip codes or possibly the homeless who may not report a zip code. However, the Massachusetts databases do provide a dummy zip code to be used for homeless patients, which should ameliorate that problem.

We did not have comprehensive data on use of other outpatient services besides the ED, which would have been useful for evaluating the question of whether ED visits are utilized as a substitute for, or in addition to, primary care visits. However, the National Survey of American Families sample data were used to examine this relationship (see [Appendix E1, Section 6](#), available online at <http://www.annemergmed.com>). Furthermore, we had no comprehensive individual-level data on persons who did not use the ED at all, although we did use aggregate population data about Massachusetts residents to calculate percents of population subgroups that used the ED at varying frequencies.

## DISCUSSION

Analysis of the statewide, all-payer databases collected in Massachusetts permits a comprehensive overview of ED visits and patients and avoids the biases introduced by reliance on data from only 1 or a few EDs or from only 1 payer. Fifty-eight percent of frequent users use multiple EDs in the course of a year, and these were readily captured in these data. Statewide databases also permit an estimation of the proportion of the total population, or the population enrolled in a major payer group, that actually utilizes the ED and how frequently ED visits are made ([Tables 1 to 3](#)). Furthermore, we could detect variation among hospitals in the proportion of frequent user visits to their EDs, which ranged from 8% to 49%.

The common notion that most frequent ED users are uninsured is not supported by our data. The uninsured have by far the highest likelihood of using the ED at least once ([Table 3](#)) but are more or less equally likely to be frequent users, as are persons insured by Medicaid or by Medicare. Eighty-five percent of Massachusetts frequent users are in fact insured, predominately by public payers.

Another important finding is that frequent user status is, for the majority, only temporary; only 28% continue to use the ED frequently 2 years in a row. This finding is consistent with other studies that have examined this issue.<sup>7,11,15,31,40</sup>

Frequent users are a heterogeneous group, spanning all age groups and payer types. The clinical picture presented by this group shifts, depending on age, payer type, and number of distinct EDs visited. As a group, however, the pattern of diagnoses for visits by frequent users differs from that of infrequent users, with greater proportions of visits for conditions such as dental problems, congestive heart failure, complications of surgical and medical care, and especially mental disorders and substance abuse ([Tables 4 and 5](#)). The very strong association of mental health and substance abuse problems with frequent ED visits suggests that EDs in Massachusetts are experiencing the results of unavailable or inadequate treatment opportunities for these problems.

Is ED utilization by frequent users "inappropriate"? The evidence indicates that ED visits by frequent users as a group are at least as appropriate as those by infrequent users. Massachusetts frequent users as a whole appear to be sicker than infrequent users, and thus one might expect them to need more

ED visits than others. They have higher rates of mortality at the last ED visit (2.6% versus 1.1%), are substantially more likely to receive more resource-intensive visits (which is reflected in higher mean charges for outpatient visits, \$812 versus \$782), are more likely to be admitted (18.6% versus 12.1%), and are more likely to arrive by ambulance than are infrequent users (18.6% versus 12.1%).

Frequent user outpatient visits appear slightly overrepresented (5.3% versus 4.3%) among those that receive the least-intensive level of visit code (99281), suggesting that there may be a subset of visits by frequent users (as well as by infrequent users) that might be better handled in another setting. However, the apparent difference may be misleading because the visit-level codes for visits by admitted ED patients, which disproportionately have tended to be frequent users, were not available for analysis. Because it is very unlikely that the ED visits associated with these admissions would be coded at the 99281 level, this minor discrepancy likely would disappear or reverse if coding for *all* ED visits could be considered. In addition, potential alternative care settings such as physician offices may not be easily accessible, whether financially, geographically, linguistically,<sup>41</sup> or otherwise, to these users.

That the problem of frequent users of the ED has been identified in many countries with a wide variety of health care systems (most of which guarantee access to primary care to a larger proportion of their populations than does the United States) suggests that access to primary care is not the only, or key, problem for most frequent users, although this problem cannot be ruled out for some ED patients in the United States. Although some studies have reported an association between improved access to or continuity of primary care and fewer ED visits,<sup>42–46</sup> other authors have not found a lack of primary care by frequent users or that improving access to primary care effectively reduces ED visits.<sup>9,17,28,29,38</sup> Research suggests that intensive case management may be required, but even this has mixed evidence for success. For example, Okin et al<sup>47</sup> and Pope et al<sup>22</sup> found that case management improved care and reduced the number of ED visits by frequent users. However, Spillane et al<sup>6</sup> found that individualized care plans and case management did not significantly decrease ED utilization by frequent ED users.

There does exist a small subset of frequent users who have a high number of visits, in the worst cases, repeatedly visiting multiple EDs in a given day and totaling dozens of visits during the course of a year. In fiscal year 2002, there were 599 patients with 30 or more ED visits. It seems likely that some of these patients do not always need the medical care that EDs are designed to provide but may need other services such as ongoing treatment for substance abuse or mental illness or a program to address homelessness or other psychosocial needs. Although patients such as these may be the source of anecdotes and stereotypic notions about frequent users who abuse the system, in fact they constitute a tiny fraction of all frequent users and are unrepresentative of most.

Our findings have several implications for the design of programs to address frequent use of the ED. First, the need and goals for such programs must be carefully assessed for specific populations. Seventy-two percent of frequent users decrease or end their utilization of the ED the subsequent year, with no intervention at all. If the goal is merely to reduce ED utilization, then for most users, the “problem” solves itself. This fact underscores the need for control groups to properly evaluate the success of any given intervention, a failing in many previous studies.

Because the majority of frequent users use more than 1 ED in the course of a year, as well as other health care providers, programs must involve coordination of care across multiple sites. Payer-based programs may be promising for most frequent users, although they are, of course, not possible for the uninsured.

Because frequent users are not homogeneous demographically or clinically, effective interventions must be targeted to the specific characteristics and needs of the patients served by the entity designing it and identified as most likely to benefit from it.

### In Retrospect

Our study would have been improved by examining more years of data to examine utilization patterns of frequent users during several years and also by developing a model to predict which frequent users will persist in high utilization rates in subsequent years. A more detailed analysis of frequent users by number of visits or by age group might also have proven useful in distinguishing meaningful subpopulations of these patients.

In summary, to our knowledge this is the first study that used a statewide database in the United States, including all ED patients regardless of disposition, to examine frequent ED users. Although frequent users constitute only 1% of the population, they account for 17.6% of ED visits. Overall, visits by frequent users do not appear any more “inappropriate” than those by infrequent ED users; indeed, frequent users as a group are sicker than infrequent users. They are more likely to be admitted than are infrequent users (18.8% versus 14.2%), tend to receive more resource-intensive services in the ED, have higher mean charges for outpatient visits (\$812 versus \$782), are more likely to arrive by ambulance (18.6% versus 12.1%), and are more than twice as likely to die at the last visit (2.6% versus 1.1%). Frequent users have proportionately more visits than infrequent users for conditions including mental disorders and substance abuse, dental disease, congestive heart failure, and complications of surgical and medical care. However, within the frequent user population itself, distribution of diagnoses varies by age, payer type, and number of distinct EDs visited. Frequent users as a group experience high rates of turnover so that 72% are no longer frequent users in the subsequent year. The uninsured are no more likely to be frequent users than are Medicare and Medicaid enrollees, and they constitute only 15% of frequent users in Massachusetts; thus, their role in driving up ED utilization should not be exaggerated. Programs to reduce ED

utilization by frequent users must be carefully designed to be successful and should be targeted to patients most likely otherwise to persist in using the ED at high rates. In conclusion, this large, statewide study reveals that the uninsured do not comprise most frequent users of the ED and that frequent users tend to be sicker and require more, not less, resource-intensive care in the ED than do infrequent users.

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*Author contributions:* KKF conceived the study and designed and supervised the analyses. RI provided statistical advice on the study design, obtained the datasets, and performed the analyses. KKF and RI drafted the manuscript, and both contributed substantially to its revision. KKF takes responsibility for the paper as a whole.

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## REFERENCES

- Purdie FR, Honigman B, Rosen P. The chronic emergency department patient. *Ann Emerg Med.* 1981;10:298-301.
- O'Shea JS, Collins EW, Pezzullo JC. An attempt to influence health care visits of frequent hospital emergency facility users. *Clin Pediatr.* 1984;23:559-562.
- Malone RE. Heavy users of emergency services: social construction of a policy problem. *Soc Sci Med.* 1995;40:469-477.
- Yamamoto LG, Zimmerman KR, Butts JR, et al. Characteristics of frequent pediatric emergency department users. *Pediatr Emerg Care.* 1995;11:340-346.
- Baker DW, Stevens CD, Brook RH. Determinants of emergency department use: are race and ethnicity important? *Ann Emerg Med.* 1996;28:677-682.
- Spillane LL, Lumb EW, Coughlin DJ, et al. Frequent users of the emergency department: can we intervene? *Acad Emerg Med.* 1997;4:574-580.
- Kne T, Young R, Spillane L. Frequent ED users: patterns of use over time. *Am J Emerg Med.* 1998;16:648-652.
- Malone R. Whither the almshouse? overutilization and the role of the emergency department. *J Health Polit Policy Law.* 1998;23:795-832.
- Lucas RH, Sanford SM. An analysis of frequent users of emergency care at an urban university hospital. *Ann Emerg Med.* 1998;32:563-568.
- Petrack EM, Palermo TM. Characterization of frequent versus non-frequent pediatric emergency department utilizers [abstract]. *Acad Emerg Med.* 1999;6:464.
- Mandelberg JH, Kuhn RE, Kohn MA. Epidemiologic analysis of an urban, public emergency department's frequent users. *Acad Emerg Med.* 2000;7:637-646.
- Okuyemi KS, Frey B. Describing and predicting frequent users of an emergency department. *J Assoc Acad Minor Phys.* 2001;12:119-123.
- Curran GM, Sullivan G, Williams K. Emergency department use of persons with comorbid psychiatric and substance abuse disorders. *Ann Emerg Med.* 2003;41:659-667.
- Sun BC, Burstin HR, Brennan TA. Predictors and outcomes of frequent emergency department users. *Acad Emerg Med.* 2003;10:321-328.
- Cook LF, Knight S, Junkins Jr EP, et al. Repeat patients to the emergency department in a statewide database. *Acad Emerg Med.* 2004;11:256-263.
- Chan BTB, Ovens HJ. Chronic migraineurs: an important subgroup of patients who visit emergency departments frequently. *Ann Emerg Med.* 2004;43:238-242.
- Zuckerman S, Shen Y. Characteristics of occasional and frequent emergency department users: do insurance coverage and access to care matter? *Med Care.* 2004;44:586-588.
- Grafstein E, Burton K, Innes G. Evaluation of a program to address frequent ED users. *Acad Emerg Med.* 2004;11:455-456.
- Chan BTB, Schull MJ, Schultz SE. Atlas report: emergency department services in Ontario 1993-2000: Institute for Clinical Evaluative Sciences, Toronto, 2001. Available at: [http://www.ices.on.ca/file/Emergency\\_department\\_services\\_in\\_Ontario.pdf](http://www.ices.on.ca/file/Emergency_department_services_in_Ontario.pdf). Accessed July 15, 2005.
- Demers M. Frequent users of ambulatory health care in Quebec. *CMAJ.* 1995;153:37-42.
- McCusker J, Healey E, Bellavance F, et al. Predictors of repeat emergency department visits by elders. *Acad Emerg Med.* 1997;4:538-539.
- Pope D, Fernandes CMB, Bouthillette F, et al. Frequent users of the emergency department: a program to improve care and reduce visits. *CMAJ.* 2000;162:1017-1020.
- Ovens HJ, Chan BTB. Heavy users of emergency services: a population-based review. *CMAJ.* 2001;165:1049-1050.
- Andren KG, Rosenqvist U. Heavy users of an emergency department: psycho-social and medical characteristics. *Soc Sci Med.* 1985;21:761-770.
- Andren KG, Rosenqvist U. Heavy users of an emergency department: a two year follow-up study. *Soc Sci Med.* 1987;25:825-831.
- Olsson M, Hansagi H. Repeated use of the emergency department: qualitative study of the patient's perspective. *Emerg Med J.* 2001;18:430-434.
- Williams RM. Frequent emergency department use in Sweden: implications for emergency medicine in the United States. *Ann Emerg Med.* 2001;37:627-629.
- Hansagi H, Olsson M, Sjoberg S, et al. Frequent use of the hospital emergency department is indicative of high use of other health care services. *Ann Emerg Med.* 2001;37:561-567.
- Byrne M, Murphy AW, Plunkett PK, et al. Frequent attenders to an emergency department: a study of primary health care use, medical profile, and psychosocial characteristics. *Ann Emerg Med.* 2003;41:309-318.
- Murphy AW, Leonard C, Plunkett PK, et al. Characteristics of attenders and their attendances at an urban accident and emergency department over a one year period. *J Accid Emerg Med.* 1999;16:425-427.
- Kennedy D, Ardagh M. Frequent attenders at Christchurch Hospital's Emergency Department: a 4-year study of attendance patterns. *N Z Med J.* 2004;117:U871-879.

32. Helliwell PE, Hider PN, Ardagh MW. Frequent attenders at Christchurch Hospital's emergency department. *N Z Med J*. 2001;114:160-161.
33. Bellon JA, Delgado A, Luna JD, et al. Psychosocial and health belief variables associated with frequent attendance in primary care. *Psychol Med*. 1999;29:1347-1357.
34. Huang JA, Lai CS, Tsai WC, et al. Determining factors of patient satisfaction for frequent users of emergency services in a medical center. *J Chin Med Assoc*. 2004;67:403-410.
35. Huang JA, Tsai WC, Chen YC, et al. Factors associated with frequent use of emergency services in a medical center. *J Formos Med Assoc*. 2003;102:222-228.
36. Dent AW, Phillips G, Chenhall A, et al. The heaviest repeat users of an inner city emergency department are not general practice patients. *Emerg Med (Fremantle)*. 2003;15:322-329.
37. Kne T, Young R, Spillane L. Frequent ED users: patterns of use over time. *Am J Emerg Med*. 1998;16:648-652.
38. Sun BC, Burstin HR, Brennan TA. Predictors and outcomes of frequent emergency department users. *Acad Emerg Med*. 2003;10:321-328.
39. 114.1 CMR 17.00: Requirement for the submission of hospital case mix and charge data (October 1, 2001). Massachusetts Division of Health Care Finance and Policy. Available at [http://www.mass.gov/Eeohts2/docs/dhcfp/govern/regs/114\\_1\\_17.pdf](http://www.mass.gov/Eeohts2/docs/dhcfp/govern/regs/114_1_17.pdf). Accessed April 6, 2006.
40. Genell AK, Rosenqvist U. Heavy users of an emergency department: a two year follow-up study. *Soc Sci Med*. 1987;25:825-831.
41. Best practice recommendations for hospital-based interpreter series. Massachusetts Department of Public Health. Available at <http://www.mass.gov/dph/bhgm/2bestpra.pdf>. Accessed April 6, 2006.
42. Gill JM, Diamond JJ. Effect of primary care referral on emergency department use: evaluation of a statewide Medicaid program. *Del Med J*. 1996;68:437-442.
43. Gill JM, Mainous III AG, Nsereko M. The effect of continuity of care on emergency department use. *Arch Fam Med*. 2000;9:333-338.
44. Baker DW, Stevens CD, Brook RH. Regular source of ambulatory care and medical care utilization by patients presenting to a public hospital emergency department. *JAMA*. 1994;271:1909-1912.
45. Grumbach K, Keane D, Bindman A. Primary care and public emergency department overcrowding. *Am J Public Health*. 1993;83:372-378.
46. Plauth AE, SD Pearson. Missed opportunities: prevention and resource utilization among HMO members who do not receive periodic health examinations. *Prev Med Managed Care*. 2000;1:35-42.
47. Okin RL, Boccellari A, Axocar F, et al. The effects of clinical case management on hospital service use among ED frequent users. *Am J Emerg Med*. 2000;18:603-608.

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## APPENDIX E1.

### SECTION 1

#### Methods

This retrospective observational study used data from all patients who visited an emergency department (ED) in Massachusetts during fiscal year 2003 (October 1, 2002, to September 30, 2003). The primary sources of data were 3 encounter-level databases collected by the state of Massachusetts. The Massachusetts Outpatient Emergency Department database contained visit-level information for patients who were discharged as outpatients. The Hospital Inpatient Discharge database and the Outpatient Observation database were also used to identify ED visits that resulted in inpatient admissions or observation stays. These visits were marked by ED flags in both databases. The combination of such records from these 3 databases constitutes an essentially complete census of ED visits to nonfederal Massachusetts acute care hospitals; data from the one Massachusetts Veterans Administration hospital that has an ED are not included.

This study was approved through the Data Protection Committee process used at our organization.

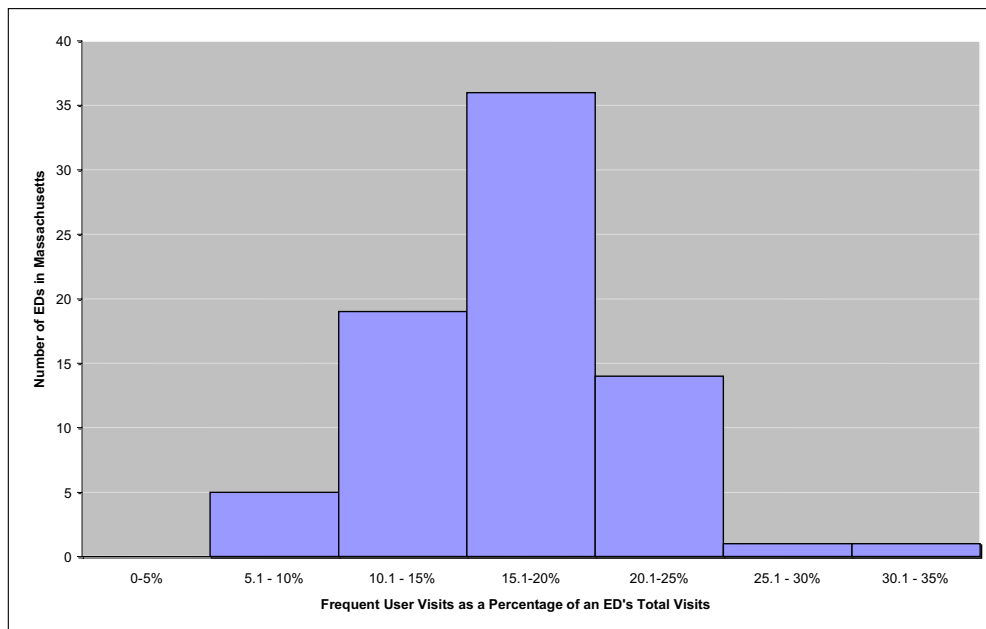
Patients were considered frequent users if they visited a Massachusetts ED 5 or more times in fiscal year 2003. This definition was based on a review of previous frequent user studies and the specific distribution of ED visit patterns in Massachusetts. When available, unique patient identifiers, based on encrypted valid social security numbers, were used to identify individual patients and their associated ED visits found in all 3 databases. There were 2,779,096 documented ED visits in fiscal year 2003. However, at 355,560 of these visits, a unique patient identifier was not provided. Sixty-three percent of visits lacking a unique patient identifier were made by children younger than 15 years. For these visits to be included in the analysis, patients without a unique patient identifier were given

a constructed identifier. Consistent across hospitals, this numeric identifier linked the patient's sex, race, zip code, and date of birth. Although it is possible that such an identifier could misidentify multiple patients as a single individual in some cases, tests showed that it was somewhat less sensitive than the unique patient identifier in detecting multiple visits to EDs by a given individual. Therefore, overall estimates of the number of frequent users and their associated visits are probably conservative, particularly among children. Records for individuals with extremely high numbers of visits were examined individually to check for indications of data errors, but none were found.

Patterns of frequent use were analyzed at the patient and visit levels. Patient-level data were obtained by aggregating visit-level data for each identified individual. Demographic and payer characteristics were assigned by using data reported at the last visit. Conducting 2 levels of analysis allowed us to examine both diagnosis patterns by visit, as well as an analysis of race, age, and sex at the patient level, which enabled comparisons to the overall population in Massachusetts. These population estimates were obtained from the US Census Bureau for 2003. When frequent and infrequent users were being compared to the overall Massachusetts population, only patients with Massachusetts zip codes were included in the analysis.

To determine whether frequent users persisted over time, data from fiscal year 2002 were used. Patterns of frequent use in fiscal year 2002 were compared with patterns in fiscal year 2003. Individuals who were frequent users in both years were flagged. SAS System for Windows, version 8, was used for all analyses (SAS Institute, Inc., Cary, NC).

## SECTION 2



**Figure.** Prevalence of Visits by Frequent Users at Individual EDs.

## SECTION 3

Frequent user visits: primary diagnosis group by payer type.

Primary Diagnosis Group	Medicaid, %	Medicare, <65 y, %	Medicare, ≥65 y, %	Uninsured, %	Private, %
Mental disorders	9.0	13.4	2.7	5.2	5.2
Substance abuse	5.6	5.5	0.7	7.2	3.2
Abdominal pain	4.6	3.8	2.3	3.7	4.0
Supplementary procedures	4.6	3.1	2.6	5.4	4.6
Sprains	4.5	3.4	0.9	7.3	7.4
Symptoms, signs, and ill-defined conditions (other)	4.0	4.8	8.5	3.2	4.4
Other diseases of the digestive system	3.8	4.1	5.8	2.8	3.9
Contusions	3.4	2.7	2.1	3.7	3.6
Chest pain	3.3	4.2	4.5	2.7	3.2
Diseases of the skin	3.3	3.3	3.8	5.3	5.4
Pharyngitis or bronchitis or bronchiolitis	3.2	3.2	4.4	2.9	2.8
Asthma	3.1	2.4	0.9	3.5	2.8
Diseases of the respiratory system, except for asthma and pneumonia	2.9	2.2	3.4	2.6	2.9
Diseases of the teeth	2.8	1.4	0.1	4.9	1.7
Infectious diseases	2.5	1.7	1.8	2.1	2.1
Dorsopathies, excluding lumbago	2.2	2.5	1.2	2.7	3.0
Open wounds	2.2	1.7	1.6	2.9	2.8
Disorders of the urinary system	2.0	2.2	5.0	2.0	2.2
Lumbago	2.0	2.0	0.6	2.5	2.1

Primary Diagnosis Group	Medicaid, %	Medicare, <65 y, %	Medicare, ≥65 y, %	Uninsured, %	Private, %
Disorders of the ear	2.0	0.8	0.4	1.5	1.6
Rheumatism, myalgia, peripheral enthosopathies, and allied disorders	1.9	2.1	1.4	2.0	2.0
Pregnancy/birth	1.9	0.2	0	1.0	1.1
Convulsions	1.7	2.3	0.7	1.1	1.2
Headache	1.7	1.6	0.6	1.7	1.8
Poisoning	1.6	1.5	0.3	1.1	1.0
Derangements and other unspecified joint disorders	1.6	1.6	0.9	1.7	1.5
Diseases of the circulatory system	1.5	2.9	11.5	1.4	2.5
Migraines	1.4	2.0	0.1	1.4	2.4
Disorders of the female pelvic organs and genital tract	1.4	0.5	0.1	1.4	1.0
Fractures	1.2	1.2	2.6	1.6	1.5
Pneumonia	1.1	1.4	4.2	0.5	1.0
Nausea or vomiting	1.0	0.9	0.7	0.8	1.0
Endocrine, nutritional, metabolic, and immunity disorders	1.0	1.5	2.9	0.8	1.3
Diabetes	1.0	1.7	1.7	0.7	0.8
Trauma	0.9	0.6	0.6	1.0	1.1
Surgical and medical complications	0.8	1.8	2.6	0.3	1.2
Fever	0.7	0.3	0.4	0.3	0.8
Superficial injuries	0.7	0.6	0.4	0.8	0.8
Other injuries	0.6	0.4	0.4	0.8	0.8
Disorders of the eye	0.6	0.5	0.3	0.7	0.7
Diseases of the nervous system, except for migraines	0.5	0.9	0.8	0.4	0.7
Anemia	0.5	0.5	0.9	0.2	0.3
Gastritis and duodenitis	0.5	0.4	0.4	0.5	0.4
Symptoms involving the urinary system	0.4	0.4	1.1	0.5	0.6
Congestive heart failure	0.3	1.0	6.0	0.1	0.5
Burns	0.3	0.2	0.1	0.3	0.4
Malaise and fatigue	0.3	0.5	1.0	0.2	0.3
Arthropathies, osteoarthritis, and related disorders	0.3	0.3	0.4	0.2	0.2
Disorders of bone and cartilage	0.3	0.3	0.6	0.3	0.2
Neoplasms	0.3	0.3	1.4	0.2	0.5
Foreign bodies	0.2	0.2	0.2	0.2	0.3
Disorders of the male genital organs	0.2	0.2	0.2	0.4	0.2
Intracranial injuries	0.2	0.2	0.3	0.3	0.3
Disorders of the breast	0.1	0.1	0	0.2	0.1
Hernia of abdominal cavity	0.1	0.1	0.3	0.1	0.1
Other blood disorders, not anemia	0.1	0.1	0.3	0.1	0.2
Diverticula of intestine	0.1	0.1	0.5	0.1	0.1
Ulcer of small intestine and stomach	0.1	0.1	0.2	0.1	0.1
Unknown	0	0.1	0	0.1	0
Esophagitis	0	0.1	0.1	0.1	0
Congenital anomalies	0	0	0	0	0
Perinatal conditions	0	0	0	0	0
Other disease of the musculoskeletal and connective tissue	0	0	0	0	0

## SECTION 4

All diagnosis visit groups that had a larger percentage of visits among frequent users who visited 4 or more distinct EDs.

Primary Diagnosis Group	Patient Visited <4 Distinct EDs		Patient Visited ≥4 Distinct EDs		Ratio of Percentages
	Visits	Visits, %	Visits	Visits, %	
Substance abuse	12,514	3.1	8,668	10.5	3.41
Diseases of the teeth	6,905	1.7	3,710	4.5	2.64
Lumbago	6,021	1.5	3,058	3.7	2.50
Unknown	141	0.0	62	0.1	2.16
Dorsopathies, excluding lumbago	8,166	2.0	3,352	4.1	2.02
Poisoning	3,997	1.0	1,513	1.8	1.86
Mental disorders	25,189	6.2	8,861	10.7	1.73
Migraines	5,641	1.4	1,905	2.3	1.66
Derangements and other unspecified joint disorders	5,505	1.4	1,797	2.2	1.61
Sprains	18,447	4.5	5,786	7.0	1.54
Trauma	3,288	0.8	1,011	1.2	1.51
Congenital anomalies	124	0.0	35	0.0	1.39
Contusions	12,277	3.0	3,245	3.9	1.30
Headache	5,906	1.5	1,500	1.8	1.25
Disorders of the male genital organs	987	0.2	237	0.3	1.18
Convulsions	5,406	1.3	1,262	1.5	1.15
Foreign bodies	863	0.2	201	0.2	1.15
Other injuries	2,465	0.6	573	0.7	1.14
Other disease of the musculoskeletal and connective tissue	52	0.0	12	0.0	1.14
Rheumatism, myalgia, peripheral enthesopathies, and allied disorders	7,470	1.8	1,703	2.1	1.12

## SECTION 5

	Inpatient	Observation	Outpatient	Total
<b>Frequent user visits by payer type and disposition</b>				
Medicaid	16,663	3,421	122,103	142,187
Row %	11.7	2.4	85.9	
Column %	18.2	30.2	31.7	
Medicare, <65 y	14,399	957	47,436	62,792
Row %	22.9	1.5	75.5	
Column %	15.7	8.5	12.3	
Medicare, ≥65 y	37,806	2,549	39,997	80,352
Row %	47.1	3.2	49.8	
Column %	41.2	22.5	10.4	
Private	17,807	3,518	111,938	133,263
Row %	13.4	2.6	84.0	
Column %	19.4	31.1	29.1	
Uninsured	4,965	873	63,664	69,502
Row %	7.1	1.3	91.6	
Column %	5.4	7.7	16.5	
Unknown	78	1	42	121
Row %	64.5	0.8	34.7	
Column %	0.1	0.0	0.0	
Total	91,718	11,319	385,180	488,217
<b>Infrequent user visits by payer type and disposition</b>				
Medicaid	22,918	5,846	264,392	293,156
Row %	7.8	2.0	90.2	
Column %	7.0	10.3	13.9	
Medicare, <65 y	18,300	1,457	54,258	74,015
Row %	24.7	2.0	73.3	
Column %	5.6	2.6	2.8	
Medicare, ≥65 y	161,464	12,602	186,801	360,867
Row %	44.7	3.5	51.8	
Column %	49.6	22.3	9.8	
Private	104,986	33,021	1,125,226	1,263,233
Row %	8.3	2.6	89.1	
Column %	32.2	58.4	59.0	
Uninsured	17,764	3,568	277,731	299,063
Row %	5.9	1.2	92.9	
Column %	5.5	6.3	14.6	
Unknown	218	9	318	545
Row %	40.0	1.7	58.3	
Column %	0.1	0.0	0.0	
Total	325,650	56,503	1,908,726	2,290,879
<b>Frequent user visits by age and disposition</b>				
0-14 y	2,285	607	24,150	27,042
Row %	8.4	2.2	89.3	100.0
Column %	2.5	5.4	6.3	5.5
15-24 y	4,292	912	62,706	67,910
Row %	6.3	1.3	92.3	100.0
Column %	4.7	8.1	16.3	13.9
25-44, y	20,064	3,359	166,591	190,014
Row %	10.56	1.77	87.67	100.0
Column %	21.88	29.68	43.25	38.9
45-64, y	24,669	3,490	87,299	115,458
Row %	21.4	3.0	75.6	100.0
Column %	26.9	30.8	22.7	23.6
≥65 y	39,348	2,862	42,830	85,040
Row %	46.3	3.4	50.4	100.0
Column %	42.9	25.3	11.1	17.4
Missing	1,060	89	1,604	2,753
Row %	38.5	3.2	58.3	100.0

	Inpatient	Observation	Outpatient	Total
Column %	1.2	0.8	0.4	0.6
Total	91,718	11,319	385,180	488,217
<b>Infrequent user visits by age and disposition</b>				
0-14 y	19,721	6,808	373,561	400,090
Row %	4.9	1.7	93.4	100.0
Column %	6.1	12.0	19.6	17.5
15-24, y	14,332	4,011	348,894	367,237
Row %	3.9	1.1	95.0	100.0
Column %	4.4	7.1	18.3	16.0
25-44, y	42,580	12,320	613,259	668,159
Row %	6.4	1.8	91.8	100.0
Column %	13.1	21.8	32.1	29.2
45-64, y	72,940	18,165	353,092	444,197
Row %	16.4	4.1	79.5	100.0
Column %	22.4	32.1	18.5	19.4
≥65 y	171,918	14,634	210,405	396,957
Row %	43.3	3.7	53.0	100.0
Column %	52.8	25.9	11.0	17.3
Missing	4,159	565	9,515	14,239
Row %	29.2	4.0	66.8	100.0
Column %	1.3	1.0	0.5	0.6
Total	325,650	56,503	1,908,726	2,290,879

Comparison of primary diagnosis groups for frequent user versus infrequent user visits.

Primary Diagnosis Group	Infrequent User Visits	Infrequent Visits, %	Frequent User Visits	Frequent Visits, %	Ratio of Frequent to Infrequent Percentages
Substance abuse	22,748	0.99	21,182	4.34	4.37
Migraines	9,420	0.41	7,546	1.55	3.76
Anemia	3,848	0.17	2,355	0.48	2.87
Mental disorders	61,481	2.68	34,050	6.97	2.60
Convulsions	12,617	0.55	6,668	1.37	2.48
Diseases of the teeth	22,472	0.98	10,615	2.17	2.22
Congestive heart failure	14,336	0.63	6,663	1.36	2.18
Diabetes	12,105	0.53	5,495	1.13	2.13
Lumbago	20,453	0.89	9,079	1.86	2.08
Surgical and medical complications	16,501	0.72	6,160	1.26	1.75
Supplementary procedures	60,595	2.65	20,395	4.18	1.58
Asthma	38,443	1.68	12,799	2.62	1.56
Disorders of bone and cartilage	4,857	0.21	1,549	0.32	1.50
Dorsopathies, excluding lumbago	36,485	1.59	11,518	2.36	1.48
Diseases of the nervous system, except for migraines and disorders of the sense organs	10,360	0.45	3,201	0.66	1.45
Malaise and fatigue	6,522	0.28	1,986	0.41	1.43
Headache	24,412	1.07	7,406	1.52	1.42
Poisoning	19,876	0.87	5,510	1.13	1.30
Gastritis and duodenitis	7,823	0.34	2,093	0.43	1.26
Derangements and other unspecified joint disorders	27,856	1.22	7,302	1.50	1.23
Abdominal pain	71,992	3.14	18,516	3.79	1.21
Esophagitis	1,134	0.05	291	0.06	1.20
Disorders of the breast	2,096	0.09	535	0.11	1.20
Other blood disorders, not anemia	2,980	0.13	752	0.15	1.18
Diseases of the skin	82,364	3.60	20,737	4.25	1.18
Endocrine, nutritional, metabolic, and immunity disorders, except diabetes	28,217	1.23	7,089	1.45	1.18
Arthropathies, osteoarthritis, and related disorders	5,350	0.23	1,333	0.27	1.17

Primary Diagnosis Group	Infrequent User Visits	Infrequent Visits, %	Frequent User Visits	Frequent Visits, %	Ratio of Frequent to Infrequent Percentages
Disorders of the female pelvic organs and genital tract	18,865	0.82	4,639	0.95	1.15
Symptoms involving the urinary system	11,932	0.52	2,819	0.58	1.11
Chest pain	75,541	3.30	17,021	3.49	1.06
Rheumatism, myalgia, peripheral enthesopathies, and allied disorders	40,975	1.79	9,173	1.88	1.05
Nausea or vomiting	20,034	0.87	4,471	0.92	1.05
Unknown	918	0.04	204	0.04	1.04
Other diseases of the digestive system	89,007	3.89	19,695	4.03	1.04
Pneumonia	33,897	1.48	7,422	1.52	1.03
Pregnancy/birth	24,238	1.06	4,928	1.01	0.95
Neoplasms	12,709	0.55	2,583	0.53	0.95
Disorders of the urinary system	62,440	2.73	12,512	2.56	0.94
Symptoms, signs, and ill-defined conditions (other)	119,973	5.24	23,700	4.85	0.93
Diseases of the circulatory system	88,729	3.87	17,518	3.59	0.93
Pharyngitis or bronchitis or bronchiolitis	84,376	3.68	15,872	3.25	0.88
Disorders of the male genital organs	6,843	0.30	1,224	0.25	0.84
Hernia of abdominal cavity	4,000	0.17	700	0.14	0.82
Diseases of the respiratory system, except for asthma and pneumonia	79,867	3.49	13,946	2.86	0.82
Congenital anomalies	932	0.04	159	0.03	0.80
Ulcer of small intestine and stomach	2,985	0.13	468	0.10	0.74
Infectious diseases	67,426	2.94	10,253	2.10	0.71
Contusions	112,856	4.93	15,522	3.18	0.65
Sprains	185,888	8.11	24,233	4.96	0.61
Burns	10,530	0.46	1,356	0.28	0.60
Other disease of the musculoskeletal and connective tissue	510	0.02	64	0.01	0.59
Diverticula of intestine	7,140	0.31	873	0.18	0.57
Other injuries	25,107	1.10	3,038	0.62	0.57
Fever	23,165	1.01	2,773	0.57	0.56
Disorders of the ear	58,195	2.54	6,708	1.37	0.54
Trauma	37,462	1.64	4,299	0.88	0.54
Intracranial injuries	10,751	0.47	1,151	0.24	0.50
Disorders of the eye	28,733	1.25	2,823	0.58	0.46
Superficial injuries	38,950	1.70	3,239	0.66	0.39
Fractures	98,411	4.30	7,601	1.56	0.36
Open wounds	163,080	7.12	11,291	2.31	0.32
Foreign bodies	15,511	0.68	1,064	0.22	0.32
Perinatal conditions	1,560	0.07	50	0.01	0.15
Total	2,290,879		488,217		

Diagnostic groups more common among persistent frequent users.

Primary Diagnosis Group	Frequent Users in Fiscal Year 2002 but Not 2003		Frequent Users in Both Fiscal Year 2002 and 2003		Ratio of Percentage of Visits
	Visit Count	Visits, %	Visit Count	Visits, %	
Migraines	2,479	0.8	5,201	2.8	3.4
Substance abuse	9,194	3.0	11,359	6.2	2.0
Diseases of the teeth	4,974	1.6	5,222	2.8	1.7
Anemias	1,295	0.4	1,309	0.7	1.7
Lumbago	4,215	1.4	4,186	2.3	1.6
Headache	3,696	1.2	3,627	2.0	1.6
Convulsions	3,443	1.1	3,259	1.8	1.6
Derangements and other unspecified joint disorders	3,474	1.2	3,074	1.7	1.5

Primary Diagnosis Group	Frequent Users in Fiscal Year 2002 but Not 2003		Frequent Users in Both Fiscal Year 2002 and 2003		Ratio of Percentage of Visits
	Visit Count	Visits, %	Visit Count	Visits, %	
Dorsopathies, excluding lumbago	5,912	2.0	5,188	2.8	1.4
Asthma	6,679	2.2	5,820	3.2	1.4
Abdominal pain	10,325	3.4	8,207	4.5	1.3
Chest pain	9,328	3.1	7,278	4.0	1.3
Mental disorders	17,720	5.9	13,755	7.5	1.3
Diabetes	2,965	1.0	2,286	1.2	1.3
Sprains	14,085	4.7	10,623	5.8	1.2
Unknown	281	0.1	206	0.1	1.2
Gastritis and duodenitis	1,310	0.4	954	0.5	1.2
Poisoning	3,117	1.0	2,237	1.2	1.2
Esophagitis	177	0.1	126	0.1	1.2
Disorders of the breast	256	0.1	181	0.1	1.2
Rheumatism, myalgia, peripheral enthesopathies, and allied disorders	5,339	1.8	3,690	2.0	1.1
Disorders of the female pelvic organs and genital tract	2,866	0.9	1,940	1.1	1.1
Contusions	9,527	3.2	6,422	3.5	1.1

## SECTION 6

### Analysis of Data From the National Survey of American Families (NSAF)

Because of the nature of the primary databases used for this project, only variables relating directly to hospital visits were available for our main analyses. Data pertaining to the patient's use of nonhospital medical services, access to a primary care physician, and attitudes and cultural practices are not available for analysis in our primary databases; all of these factors could play a role in whether a patient becomes a frequent user of the ED.

To explore some of these issues, data from the 2002 NSAF were used. This survey, as part of the Urban Institute's Assessing the New Federalism project, provides a comprehensive look at the well-being of children and the nonelderly in the nation as a whole. Data for 13 states studied in depth, one of which is Massachusetts, are available. Using the survey's sample of noninstitutionalized, civilian adults aged 18 to 64 years in Massachusetts, we were able to compare estimates of individuals making 5 or more ED visits a year (after weighting the sample) to frequent users identified with our data. The estimates of Massachusetts residents aged 18 to 64 years who were frequent users were similar in both data sets: 40,491 from NSAF and 43,915 in ours. Further analysis of the NSAF data enabled the examination of relationships between the number of ED visits per person and the number of physician visits, mental health visits, satisfaction of medical care, and individual assessment of overall health.

Of frequent users, 31.9% considered their overall health to be "poor" compared with only 1.9% of infrequent users. Excellent/very good health was claimed by 30.4% of frequent users and 68.1% of infrequent ED users. Frequent users also appeared to make more physician visits than infrequent users: 68.2% of frequent ED users visited a physician's office more than 5 times in 2002 compared with 15.0% of infrequent ED users. There was a significant correlation between the number of ED visits and physician visits ( $r=0.29$ ,  $P<.0001$ ). In addition, 29.4% of frequent ED users made 5 or more mental health-related visits in 2002 compared with only 6.6% of infrequent ED users. A significant correlation also existed between the number of ED visits and the number of mental health visits ( $r=0.18$ ,  $P<.0001$ ). Even though frequent users made more medical visits, a larger percentage claimed to be dissatisfied with the quality of their medical care (13.4% versus 9.3%).

In conclusion, the NSAF data provide further support to our finding that frequent users are sicker than are infrequent users. The majority of frequent users also seem to enjoy good access to physician office visits, although they express dissatisfaction with its quality at higher rates than others. The correlation between mental health problems and frequent use of the ED was also evident in these survey data.