Ambulatory Health Care Use by Patients in a Public Hospital Emergency Department

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OBJECTIVE: To describe primary care clinic use and emergency department (ED) use for a cohort of public hospital patients seen in the ED, identify predictors of frequent ED use, and ascertain the clinical diagnoses of those with high rates of ED use.

DESIGN: Cohort observational study.

SETTING: A public hospital in Atlanta, Georgia.

PATIENTS: Random sample of 351 adults initially surveyed in the ED in May 1992 and followed for 2 years.

MEASUREMENTS AND MAIN RESULTS: Of the 351 patients from the initial survey, 319 (91%) had at least one ambulatory visit in the public hospital system during the following 2 years and one third of the cohort was hospitalized. The median number of subsequent ED visits was 2 (mean 6.4), while the median number of visits to a primary care appointment clinic was 0 (mean 1.1) with only 90 (26%) of the patients having any primary care clinic visits. The 58 patients (16.6%) who had more than 10 subsequent ED visits accounted for 65.6% of all subsequent ED visits. Overall, patients received 55% of their subsequent ambulatory care in the ED, with only 7.5% in a primary care clinic. In multivariate regression, only access to a telephone (odds ratio [OR] 0.48; 95% confidence interval [CI] 0.39, 0.60), hospital admission (OR 5.90; 95% CI 4.01, 8.76), and primary care visits (OR 1.68; 95% CI 1.34, 2.12) were associated with higher ED visit rates. Regular source of care, insurance coverage, and health status were not associated with ED use. From clinical record review, 74.1% of those with high rates of use had multiple chronic medical conditions, or a chronic medical condition complicated by a psychiatric diagnosis, or substance abuse.

CONCLUSIONS: All subgroups of patients in this study relied heavily on the ED for ambulatory care, and high ED use was positively correlated with appointment clinic visits and inpatient hospitalization rates, suggesting that high resource utilization was related to a higher burden of illness among those patients. The prevalence of chronic medical conditions and substance abuse among these most frequent emergency department users points to a need for comprehensive primary care. Multidisciplinary case management strategies to identify frequent ED users and facilitate their use of alternative care sites will be particularly important as managed care strategies are applied to indigent populations who have traditionally received care in public hospital EDs.

KEY WORDS: emergency department; public hospitals; ambulatory care; primary care clinic.
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There are growing efforts to restrict access to emergency departments (EDs) on the premise that care can be more appropriately provided in alternative sites, such as primary care clinics.[1] These efforts may particularly affect indigent communities, in which many consider the ED to be their main health care provider.[2,3] A 1993 General Accounting Office report showed a 34% increase in ED visits by patients with Medicaid and a 15% increase in visits by uninsured patients between 1985 and 1990.[4] To reverse this trend, Medicaid managed care programs use gatekeepers, preauthorization, and payment denials to decrease ED use. Case management strategies have been limited to small groups of patients with a chronic disease, such as asthma.

There is considerable evidence of the benefit of continuity care with a primary care provider; however, imposing financial and administrative barriers to ED use on indigent populations without workable alternatives may have undesirable outcomes.[5] Indigent patients receiving care in public hospital EDs represent a potentially high-risk population that is increasingly subject to managed care restrictions despite a paucity of clinical information about the type and necessity of care being received. The appropriate managed care strategy for this population, from case management to cost sharing, will depend on the prevalence of underlying conditions and the availability of alternative sites of medical care. In the Health Insurance Experiment, cost sharing was associated with a reduction in appropriate as well as inappropriate office visits and a decline in health status for poor patients.[6]

This study was undertaken to follow a cohort of indigent patients seen in the ED and study their use of medical services. Hospital administrative data were used to capture prospectively all outpatient and inpatient encounters in a public hospital and its affiliated clinics. The purpose of this study is to describe the concurrent use of primary care and emergency services, predictors of frequent ED use over time, and the prevalence of chronic medical conditions, psychiatric diagnoses, and substance abuse among those with high rates of ED use. We tested the hypotheses that lack of a regular source of care, lack of insurance, and poor self-reported health status would be associated with more frequent ED use, and that concurrent use of primary care

clinics in the public hospital system would be associated with lower ED use.

METHODS

The study population consisted of a 10% random sample (*n* = 362) of adult patients from a 1992 survey of 3,897 patients seen in the ED or walk-in clinic of Grady Memorial Hospital, a 900-bed urban public hospital serving the indigent population of Atlanta, Georgia. All patients presenting to an ED or walk-in clinic during 7 consecutive days in May of 1992 were surveyed. Informed consent was obtained at the time of the survey, and the study design was approved by the Human Investigations Committee of Emory University. At the time of the initial survey, patient medical record numbers were obtained. Details of the initial survey and study design have been described elsewhere.[3] Every 10th patient from the original survey, excluding repeated visits, was entered into this study. Medical record numbers were used to track subsequent outpatient and inpatient encounters for study patients within the public hospital system for a 24-month follow-up period.

All ambulatory visits to the ED, walk-in clinic, continuity general medical clinic, and subspecialty appointment clinics as well as visits to the five community-based primary care clinics run by the hospital can be retrieved from a central administrative database. A pilot study on 50 patients was performed to compare the electronic clinical information system (e.g., discharge summaries, clinic notes, laboratory studies, pharmacy records, radiology reports, operative reports), the administrative database (appointment scheduling, billing records), and the paper medical record. The administrative data base was found to be the most complete source of outpatient encounters (K. J. Rask, unpublished results, 1994). For the purposes of this study, if no further visits were identified through the administrative database, both the clinical information system and paper medical records were searched for each patient to ensure that there had been no visits to the public hospital or clinic system. In no case did this subsequent search identify any further visits.

Sociodemographic information, self-reported health status, regular source of care, initial insurance coverage, access to a telephone, and level of education were taken from the initial survey. Patients were considered to have a regular source of care if they identified a public or private physician or clinic where they could receive routine care. Patients who reported an ED or health department as their regular source of care were coded as not having a regular source of care. Insurance coverage was categorized as private, Medicare, Medicaid, or uninsured. Because there were only nine privately insured patients, the groups were collapsed to Medicare/private, Medicaid, and uninsured. Educational attainment was categorized as high school or less and more than high school. Subsequent outpatient visits were categorized as having occurred in (1) the ED or walk-in clinic, (2) a primary care clinic, or (3) any other appointment clinic. A primary care clinic was defined as the general medical clinic or a community primary care clinic. Appointment clinic visits included those to medical subspecialty clinics, surgical clinics, or any other specialty clinic within the hospital system.

Patients with more than 10 ED visits during the 2-year follow-up period were studied to identify clinical diagnoses that might explain the high rate of ED use. The cutoff frequency of 10 was selected because it represented more than 1 SD from the mean ED visit frequency reported in a previous study of a similar patient population.[2] The clinical information system for the public hospital and clinics was searched to identify (1) psychiatric diagnoses, listed as a diagnosis by discharging physician or prescriptions for psychotropic medication filled at least twice according to pharmacy records; (2) substance abuse, i.e., drug or alcohol dependency listed as a diagnosis by the discharging physician; and (3) chronic medical conditions, i.e., diagnoses requiring continuing medical management listed by the discharging physicians (e.g., hypertension, asthma, cardiac disease, diabetes) or prescriptions for chronic medical conditions (e.g., insulin, antihypertensive agents, bronchodilators) filled at least twice according to pharmacy records. Prescriptions for analgesics such as aspirin or nonsteroidal anti-inflammatory drugs, decongestants, or cough and cold preparations were not considered evidence of a chronic medical condition.[3]

Statistical analyses including analysis of variance were performed using Epi-info version 6 (Stone Mountain, Ga.). Regression analyses were performed using SPSS-PC+ (SPSS, Inc., Chicago, Ill.). Continuous variables were analyzed using two-sided Student's *t* tests. Categorical variables were analyzed using χ^2 statistics. Correlation coefficients were calculated for the explanatory variables included in the multivariate logistic regression. Age was significantly correlated with admission rates, insurance coverage, and primary care visit rates. Partial correlation coefficients were then calculated controlling for age. The only significant correlations that remained were a negative correlation between Medicare and Medicaid coverage (−.2339, *p* = .000) and a positive correlation between Medicaid coverage and admission rate (.2284, *p* = .000). The logistic regression models were specified in three ways. First, explanatory models were specified that included all potential explanatory variables. Second, explanatory models were built only from variables that were significant in the bivariate analysis. Third, a stepwise logistic regression model was built by adding significant variables individually to age, gender, and health status.

RESULTS

Electronic records of medical appointments were obtained for 351 (97%) of the 362 patients in the sample. The medical record number recorded for the remaining 11 patients did not match any existing medical record numbers.

The demographics of the study population are shown in Table 1. Insurance coverage, or lack of coverage, remained stable over the 2-year period for the majority (79.1%) of patients. Fifty-six uninsured patients (16%) gained public or private coverage, while 10 (2.8%) of the patients with public insurance and 8 (2.2%) of the patients with private insurance became uninsured. Bivariate and multivariate analyses were performed using both the insurance coverage at initial intake and the last known insurance coverage from the hospital information system. Results were similar, so the analyses reported here use the insurance status at the time of initial survey. At the time of the initial survey, a minority (48.1%) of patients identified a regular source of care. Even among patients reporting fair or poor health, only 38.9% identified a regular source of care. As a proxy for severity of illness, 34% of the study patients were hospitalized during the 24-month study period.

Pattern of Subsequent Ambulatory Care Use

Only 32 (9.1%) of 351 patients had no further ambulatory visits. Seven of these 32 patients were confirmed to have died by death certificates in the medical record. The 351 patients had a total of 4,101 ambulatory care visits over the 2-year study period. Of these visits, 2,235 (54.5%) were to the ED. A total of 38% of subsequent visits took place in appointment clinics outside the primary care clinic, and only 7.5% of subsequent visits took place in a primary care clinic. The mean number of ED visits was 6.4, and the median number of ED visits was 2. The mean number of appointment clinic visits was 6.6, and the median number of visits was 1. The mean number of visits to a primary care clinic was 1.1, and the median was 0. Figure 1 shows the distribution of subsequent ED visits. The 111 patients (32%) who had one or two subsequent ED visits accounted for 6.7% of the total ED visits by the study cohort. Fifty-eight patients (16.6%) had more than 10 subsequent ED visits, and this group accounted for 65.5% of the total ED visits by the study cohort.

Variations in Ambulatory Care Use

Only 90 patients (26%) visited a primary care clinic during the subsequent 2 years. Patients who identified a regular source of care were more likely to have had at least one subsequent primary care clinic visit, but the rate was still low (Table 2). Thirty-nine percent of patients who identified a regular source of care had a primary care clinic visit during the 2-year follow-up period, while only 21% of those who reported no regular source of care had a primary care clinic visit ($p = .008$). Patients reporting poor health status were more likely to have had a primary care clinic visit. In bivariate analysis, patients with at least one primary care visit had a higher frequency of admissions than patients with no primary care visits (1.11 vs 0.55; $p = .000$), suggesting that ED patients who visited primary care clinics had a higher burden of illness than those who did not. Patients without a regular source of care had fewer total visits, significantly fewer primary care clinic visits, and a significantly higher percentage of ambulatory care received in the ED. Patients who did not respond to the question about regular source of care were excluded from this analysis.

The uninsured had a different pattern of ambulatory care use than the insured with fewer ED visits, fewer primary care visits, and fewer specialty clinic visits, but the percentage of ambulatory care they received in the ED was similar. The majority (65.5%) of patients in fair or poor health reported no regular source of care, and only 34.5% of these had any primary care clinic visits. Relative to patients reporting excellent or good health, those in fair or poor health had more ED visits, more primary care clinic visits, and more specialty care visits. The proportion of ambulatory care received in the ED, however, was similar regardless of either insurance coverage or health status.

Characteristics of Frequent Emergency Department Users

We defined high utilizers as those who visited the ED more than 10 times in the subsequent 2-year follow-up period ($n = 58$). The characteristics of high utilizers relative to the rest of the cohort are shown in Table 3. Frequent ED users were older and more likely to be male. They had similar rates of insurance coverage (Medicare/private, Medicaid, or uninsured) to the rest of the cohort and were just as likely to identify a regular source of care. Self-reported

Table 1. Characteristics of Study Patients (*n* = 351)

| Characteristic	Value
Median age, years (range)	39 (18–91)
African American, *n* (%)	249 (86)
Female, *n* (%)	187 (51)
Initial insurance coverage, *n* (%)	
Medicare/private	65 (19)
Medicaid	67 (19)
Uninsured	222 (62)
Regular source of care, *n* (%)	
Yes	85 (26)
No	182 (52)
Unknown	84 (22)
Self-reported health status, *n* (%)	
Excellent	42 (12)
Good	111 (32)
Fair	72 (21)
Poor	37 (11)
Unknown	89 (25)
One or more subsequent hospitalizations, *n* (%)	120 (34)
Access to telephone, *n* (%)	212/268 (79)
Use public transportation to go to hospital, *n* (%)	99/225 (44)
Greater than high school education, *n* (%)	143/280 (51)
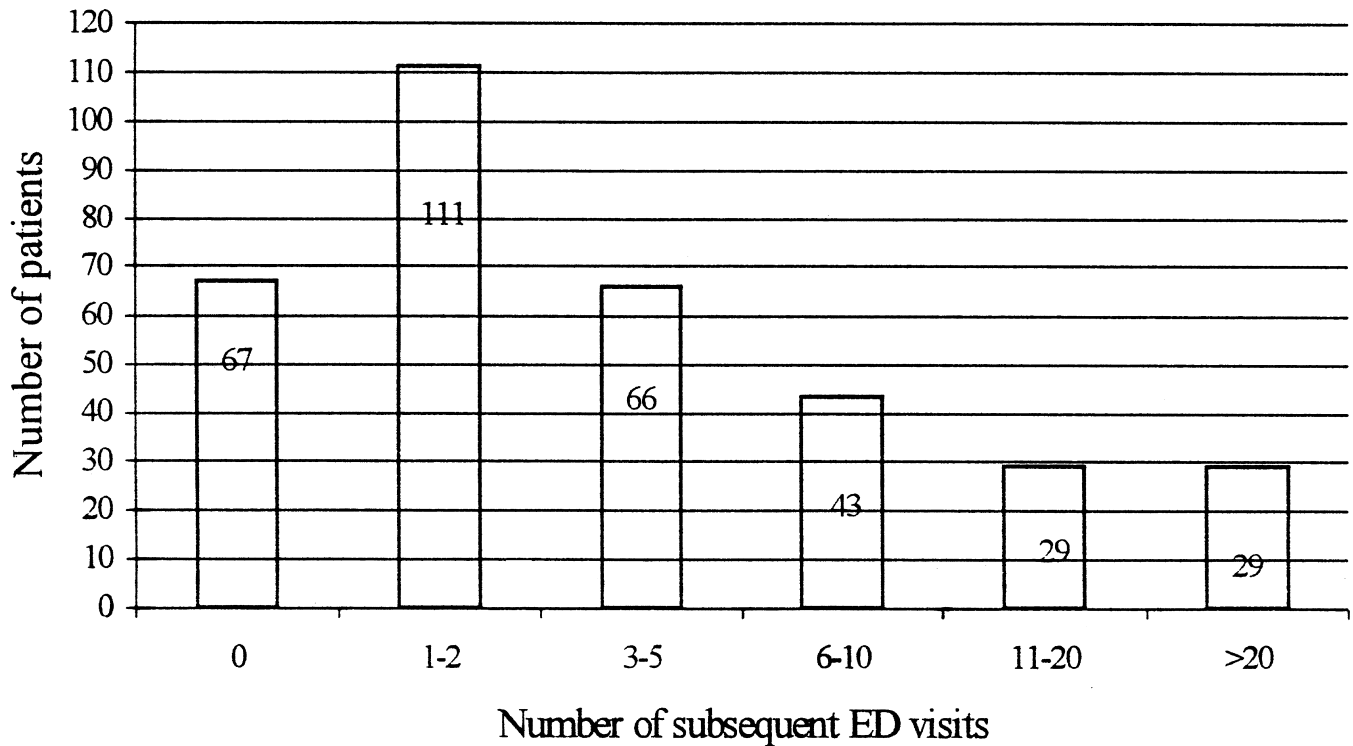
FIGURE 1. Frequency of visits to emergency department. Total number of subsequent ED visits = 2,235; *n* = 351 patients; mean = 6.4; median = 2.

health status differed between the two groups in that frequent ED users were less likely to report themselves in excellent health and more likely to have had a primary care clinic visit or been hospitalized. Frequent ED users were also less likely to have access to a telephone. Not surprisingly, high utilizers received a much higher percentage of their ambulatory care in the ED. There were no significant differences in education or use of public transportation for clinic visits.

After adjusting for age, gender, and health status in a multivariate logistic regression model, only access to a telephone (adjusted odds ratio [OR] 0.48; 95% confidence ratio [CI] 0.39, 0.60) was associated with lower ED use (Table 4). At least one hospitalization (adjusted OR 5.90; 95% CI 4.01, 8.76) and at least one primary care visit (adjusted OR 1.68; 95% CI 1.34, 2.12) were associated with being a frequent ED user. Ethnicity, insurance coverage, and regular source of care were not associated with a

Table 2. Use of Ambulatory Visits in Relation to Regular Source of Care, Health Insurance, and Health Status

Characteristic	Median ED Visits, *n*	Any Primary Care Visits, %	Median of Specialty Care Visits, *n*	Median Total Ambulatory Visits, *n*	All Ambulatory Care Received in the ED, %
Regular source of care					
Yes	3	39.1	4	11	36.5
No	2	20.7*	1	5	53.7[†]
Health insurance					
Medicare	3	47.7	2	12	44.8
Medicaid	4	22.4	2	10	48.8
Uninsured	2	19.4[†]	1	4	50.3[‡]
Health status					
Excellent/good	2	18.9	1	4	47.7
Fair/poor	3	34.5[§]	3	10	48.5[‖]

*p = .008.

[†]p = .001.

[‡]p = .26.

[§]p = .005.

[‖]p = .28.

Table 3. Patient Characteristics by Frequency of Emergency Department Visits*

Characteristic	10 or Fewer Visits (*n* = 293)	More Than 10 Visits (*n* = 58)	*p* Value
Median age, years	37	45	.002
Female, %	56.3	37.9	.030
Health status, %			
Excellent	15.1	0	.001
Good	30.3	36.2	.372
Fair	20.4	17.2	.583
Poor	9.2	17.2	.057
Any admission,%	26.8	61.9	.000
Primary care visit, %	22.0	39.6	.004
Access to telephone, %	82.8	57.1	.000
Percentage of ambulatory care received in the ED	47.8	83.3	.000

**Ethnicity, insurance coverage, regular source of care, use of public transportation to hospital, and educational attainment were not significantly different between the two groups.*

Table 4. Multiple Logistic Regression Analysis for Having More Than 10 Emergency Department Visits*

Variable	Odds Ratio (95% CI)	*p* Value
Age (decade)	0.67 (0.44, 1.03)	.072
Female	0.87 (0.70, 1.07)	.507
Fair or poor health	0.71 (0.47, 1.06)	.398
Hospital admission	5.90 (4.01, 8.76)	.000
Primary care visit	1.68 (1.34, 2.12)	.024
Access to telephone	0.48 (0.39, 0.60)	.001

**Ethnicity, insurance coverage, and regular source of care were not significant.*

higher likelihood of having more than 10 ED visits during the follow-up period. Because of the collinearity between age and insurance coverage (all patients with Medicare coverage were over age 65), a separate regression was performed without the age variable. Insurance coverage remained a statistically insignificant predictor of high ED use.

To further explore predictors of frequent ED use, clinical records were reviewed to identify clinical diagnoses that might explain high ED use. For 9 (16%) of the 58 high users, no chronic medical condition, psychiatric diagnosis, or substance abuse could be identified. For these patients, ED visit diagnoses were generally viral syndrome, upper respiratory tract infection, or musculoskeletal pain. Of 58 frequent ED users, 49 had at least one chronic medical condition (hypertension, 20; asthma or chronic obstructive pulmonary disease, 20; diabetes, 7; HIV, 7; heart failure, 6), a psychiatric diagnosis (7) or a diagnosis of substance abuse (alcohol abuse, 18; other drug abuse, 13). We identified only 6 patients (10%) with a single chronic medical condition. The remaining 43 patients (74%) had either more than one chronic medical condition or a chronic medical condition complicated by substance abuse or a psychiatric diagnosis. Of the 7 patients with a psychiatric diagnosis, 6 (86%) had a coexisting chronic medical condition. Of the 27 patients with substance abuse, 21 (78%) had a coexisting chronic medical condition.

DISCUSSION

Contrary to study hypotheses, all subgroups of patients examined in this study relied heavily on the ED for ambulatory medical care, regardless of the presence of a regular source of care, health insurance coverage, health status, or use of primary care clinics. Prior studies of ED

use in indigent communities have been cross-sectional rather than longitudinal or have relied on patient self-report of use of services.[2,3,7–10] These results are consistent with a study that interviewed ED patients in a large inner-city hospital and found that although most patients identified other clinics or private physicians where they received care, 63% identified the ED as their main source of outpatient care.[11] Another striking finding is that the majority of subsequent ED visits (65.5%) were accounted for by a minority (16.6%) of high-frequency ED users with a high prevalence of chronic medical conditions. That a minority of patients are responsible for a majority of utilization has been observed previously for inpatients and cross sections of ambulatory patients but not in a uniformly indigent population.[12,13]

The lack of correlation between self-report of a regular source of care and use of public hospital primary care or other continuity care clinics was surprising. Overall there were few visits to the primary care clinics, and the use of a primary care clinic did not appear to substitute for ED use in this cohort. In fact, higher ED users were more likely than other ED users to have had a primary care clinic visit. These results may reflect both a higher severity of illness, evidenced by the lower self-reported health status and higher hospitalization rates, and institutional barriers to primary care in indigent communities. Public hospital primary care clinics are rarely a reliable medical site for comprehensive primary care. The primary care clinics at this hospital offer free or discounted care to indigent patients, but there is generally a waiting period of 1 to 2 months for appointments. The clinics do not offer after-hours care and offer only limited walk-in care for established patients. Outside the public hospital system, private physicians may be willing to see uninsured or Medicaid patients for routine office visits but not for intercurrent illnesses that necessitate fitting patients into crowded schedules or after regular office hours.[5] Our study, as well as previous work, indicates that simply asking about regular source of care without assessing the actual use of medical services may underestimate the importance of the ED in the overall provision of care for indigent patients.

Also consistent with a previous study from a public hospital, health status had little impact on the proportion of subsequent care received in the ED.[2] This finding is of concern in that individuals in poor health are likely to benefit by having a provider familiar with their medical problems. Studies have shown that hypertensive patients without a regular source of care and those who receive their medications through the ED are less likely to have controlled hypertension.[14–16]

In multivariate analysis, only lack of access to a telephone, hospital admission, and at least one primary care visit were associated with higher ED use. Having access to a telephone is necessary for scheduling ambulatory visits and receiving health-related calls. More generally, access to a telephone may be a proxy for residential and economic stability. Hospitalization rates serve as a proxy for severity of illness, and reflect the higher severity of illness in the frequent ED users. The high prevalence of chronic medical and psychiatric conditions in the high ED visit group confirms this relationship. Although it was hypothesized that primary care clinic visits would substitute for ED visits, in this study primary care clinic visits were associated with higher ED use. This is most likely a consequence of the high prevalence of chronic medical conditions among the frequent ED users; sicker patients use more medical services.

Of interest, a study of frequent ED users in Sweden found a high prevalence of psychosocial distress, alcohol abuse, and a fivefold to sevenfold increased mortality relative to community controls.[17] Similarly, a study of Veterans Administration patients found that frequent ED users were high users of specialty care and had a higher prevalence of chronic medical conditions.[13] The lack of substitution of primary care visits for ED visits in this study is not a test of the potential of primary care clinics to provide care but a reflection of current use patterns. At the time of this study, there were no Medicaid or Medicare managed care plans in this community.

There are several important limitations to this study. Because patients in this study were drawn from a population of ED users, they may have a higher propensity to use an ED than the general population, thus explaining the relatively small influence of insurance and regular source of care. Thus, the data may overestimate the proportion of care provided in the ED. We did not collect any information about health care utilization outside our public hospital system. Of note, however, any care received outside the system would be in addition to the substantial rate of ambulatory care reported in this study. Given that 91% of the sample had at least one more visit in the public hospital system, it is clear that the public system is an ongoing, if not exclusive, source of care for this patient population. To evaluate potential bias toward high-frequency ED users, we weighted the logistic regression and bivariate comparisons by the number of ED visits. This did not change the main results reported here.

Information regarding insurance coverage, regular source of care, and health status were collected at the initial survey. Although analyses confirmed the stability of insurance coverage, we cannot ascertain to what degree regular source of care and health status changed over the study period. For this reason, admission rate was used as a proxy for severity of illness. The cutoff rate of more than 10 ED visits in 2 years was based on a previous study in a similar indigent population, reflecting the pervasive use of the ED as a source of care. Separate analyses using lower cutoff values did not alter the main results reported here. It is likely that the prevalence of chronic medical and psychiatric diagnoses in the study cohort is underestimated because in order to identify a diagnosis for this study, either the provider had to both identify the diagnosis and document it in a discharge summary, or prescriptions for those conditions had to have been filled at least twice at the public hospital. A previous survey of patients at this hospital, however, showed that more than 90% filled their prescriptions at the hospital pharmacy in part because of an income-based sliding scale payment plan for medications.[3] No attempt was made to interview patients to verify the clinical diagnoses contained in the medical record. We did not attempt to evaluate the appropriateness of care received in the ED. The purpose of our study was to describe patterns of longitudinal ambulatory care and identify predictors that might assist the care of these patients in an increasingly capitated environment.

The results of this study have relevance for Medicaid and Medicare managed care initiatives and other programs that enroll uninsured indigent patients into managed care. By self-reported health status and medical diagnoses, the resource-intensive frequent ED users are for the most part chronically ill and not the "worried well." As a proxy for severity of illness, one third of the study cohort was hospitalized during the 24-month study period. This raises concerns about the risk of denying ED care if care is not readily available at alternative locations both within and outside the public hospital system. Access barriers to other sites of care need to be addressed before limiting access to EDs. The high rate of psychiatric diagnoses and substance abuse among the frequent ED users confirms previous findings and complicates case-management strategies.[12,18,19] In a study of frequent ED users in Sweden, those who were contacted by a social welfare workers had fewer subsequent ED visits.[17] Conversely, an intervention in this country that sent letters to parents of pediatric patients who were high ED users had no effect on subsequent ED use.[20] Coexisting psychiatric illness, substance abuse, and chronic medical conditions complicate management and require complicated care plans, accentuating the need for continuity of care with a provider familiar with the patient.

Much of the impetus to limit ED use is predicated on the notion that ED use is a prime contributor to rising health care costs. Recent evidence suggests that the true costs of nonurgent care may be less than commonly thought.[21–23] More importantly for indigent patients, use of ED services in public or community hospitals is often

related to the lack of alternative sources of care. Given the high prevalence of chronic medical disease found in this study, limiting ED care as a shortcut to manage costs may remove the safety net on which these patients depend.

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