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Likelihood of recurrent high Emergency Department utilization by Indigent Patients

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LIKELIHOOD OF RECURRENT HIGH EMERGENCY DEPARTMENT UTILIZATION BY INDIGENT PATIENTS

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ABSTRACT

Recurrent utilization of emergency medical services by certain patient populations is a challenge at the University of New Mexico Emergency Department (UNM ED) and at other institutions. Data suggest that a significant percentage of patients treated in the UNM ED could be treated in other, less costly outpatient settings. Existing data were used to analyze trends in UNM ED utilization among four distinct populations – managed uninsured patients (UNM Care), unmanaged uninsured patients (Self-pay), managed Medicaid patients (Salud), and unmanaged Medicaid patients (Medicaid). We hypothesized that those who previously had high usage of the Emergency Department (ED) in the index year would continue high use of the ED in the next year. In addition, we hypothesized that patients in managed programs, UNM Care and Salud, would likely have a lower recurrent use of the ED than patients in unmanaged programs, Self-pay and Medicaid, patients. Our data included 19,461 adult patients, with 1,104 having ≥3 visits in Fiscal Year 2004 (FY04). Of those patients, 145 (13.1%) patients had ≥3 visits in Fiscal Year 2005 (FY05). Unmanaged Medicaid patients who had ≥3 visits in FY04 were 17.80 times as likely to have ≥3 visits in FY05 ($p<0.001$) compared to unmanaged Medicaid patients with 1-2 visits in FY04. The next highest recurrent high utilization pattern was the Self-pay group with ≥3 visits in FY04, who were 9.37 times as likely to have ≥3 visits in 2005 as the Self-pay patients with 1-2 visits in FY04. The managed groups also showed that patients with high utilization in the index year continued high use in the next year, but to a lesser extent than the unmanaged groups. Salud patients with ≥3 visits in 2004 were 6.69 times more likely to have ≥3 visits in 2005, while the UNM Care group shows significantly less recurrent ED use at 4.28 times as likely to have ≥3 visits in 2005, compared to patients from the respective groups with 1-2 visits in FY04, which is also lower than the other three groups ($p<0.05$).

INTRODUCTION

BACKGROUND

Recurrent utilization of the emergency department (ED) has plagued hospitals, physicians, managed care organizations and society for decades. Past interventions were aimed at reducing the number of repeat visits to the ED, especially by patients with public insurance such as Medicaid. Previous data suggest that patients with public insurance, or no insurance, tend to frequently utilize the ED at higher rates compared with patients who are privately insured.[1,2] In New Mexico, the groups with the highest rates of repeat ED visits include Hispanics and Medicaid patients.[3,4] Similarly, repeat emergency medical services (EMS) utilization in New Mexico is reported to be highest in specific populations, especially those covered by Medicaid.[5] Medicaid does not allow co-pay or charges for services, thus there are no fiscal disincentives to discourage inappropriate ED utilization.

To reduce recurrent ED utilization, several inventions have been evaluated. Calling ahead to the ED is not associated with reduced utilization of the ED.[6] Others concluded, "improvements in communication of pertinent information must be implemented in managed care systems to better inform participants of the proper use of the system."[7] Efforts to decrease ED utilization rates by patients who could be treated in less costly outpatient settings depend on timely access to care, and correlate with insurance status.[8] Inadequate primary care access, patients without insurance, or those with public insurance, correlate with higher rates of ED utilization.

Patients utilizing the University of New Mexico Emergency Department (UNM ED) services can be grouped into broad financial categories – Self-pay, publicly insured (such as Medicaid), and privately insured. In 1997, a group of uninsured patients at UNM were enrolled in the new UNM Care Plan, which included an assigned primary care provider (PCP).[9] While inpatient utilization and overall costs decreased, utilization of the ED did not decrease to the extent desired. UNM Care patients have incomes below 235% of federal poverty level (FPL) and have co-payments for services based on a financial assessment and ability to pay. The UNM Care Plan's financial assessment method, benefits, and assignment of a PCP (PCP) mirror those of the Medicaid managed care program, Salud, instituted in 1997 by the New Mexico Human Services Department, which also include assignment to a PCP. Three managed care organizations were awarded Salud contracts (Molina-formerly Cimarron, Lovelace, and Presbyterian). Medicaid patients in certain eligibility categories were not included in the Salud program and remained in unmanaged Medicaid.

IMPORTANCE

Uninsured and publicly insured patient populations tend to utilize EMS at higher rates. Recurrent use can be defined a number of ways; one indicator is the frequency of ED visits per patient per unit of time. Excessive ED visits could be due to various factors. One possibility could be that those with higher utilization rates may not have a PCP to manage their medical needs. Patients who make frequent visits to the ED, and continue this behavior over extended periods of time, are difficult to manage, costly to the system, and present with potentially preventable problems at a later stage. Strategies to reduce recurrent ED utilization may lead to decreased morbidity and healthcare costs.

GOALS OF INVESTIGATION

The objective is to analyze the ED utilization patterns by indigent patients in the UNM system. For this study, indigent patients were grouped into four categories: UNM Care, Self-pay, Salud, and Medicaid. The primary hypothesis is that indigent patients with greater than three ED visits in 2004 will be more likely to have greater than three ED visits in 2005 than those patients who had 1 to 2 visits in 2004. Indigent patient demographics including sex, age, and financial classification were compared.

METHODS

Study Design

This was a retrospective, observational cohort study with four groups. The protocol was approved by the institution's review board (Sklar – HRRC# 02-183).

Setting and Selection of Participants

University Hospital is an urban teaching hospital in Albuquerque, NM within Bernalillo County. UNM has an annual ED census of approximately 50,000 visits. The four financial categories studied generated 60% of the ED visits in FY2004. Eligibility criteria for the UNM Care Program include residing in Bernalillo County for greater than six months, demonstrating US citizenship or legal residence, having an income below 235% of FPL and being ineligible for any state, federal, or other insurance plan.

New Mexico Medicaid has 34 eligibility categories. Categories include individuals receiving Supplemental Security Income, families in the Temporary Assistance to Needy Families (TANF)

program, poverty level women and children, and persons residing in long term care facilities. Full eligibility criteria are available on the State of New Mexico Department of Health Medical Assistance Division website (http://www.hsd.state.nm.us/mad/). Salud patients are enrolled with one of the three vendors. Most Salud patients are in the TANF or poverty level women and children Medicaid eligibility categories.

FY04 and FY05 UNM ED utilization data for indigent patients, provided by UNM Health Sciences Center Information Solutions, were analyzed. These data include information about the frequency of ED use by UNM Care, Self-pay, Salud and Medicaid patient populations.

The eligibility requirements for this study included indigent status and at least one ED visit in FY2004. This study determined what proportion of indigent patients are recurrent users based on two usage groups, those with one or two visits (FY2005 data included zero visits), or those with more than three visits per year.

Data Collection and Processing

UNM Information Solutions provided demographic and utilization data. Demographic data included age, gender, and payment category. For patients who visited the ED at least once during FY 2004, a dichotomous variable was calculated to indicate whether they visited 1-2 times or at least 3 times. For these patients, another dichotomous variable was calculated to indicate whether they visited 0-2 times or at least 3 times in FY 2005. Chi-Square tests were used to compare gender and age distributions among payment categories and also to test whether visiting at least 3 times in FY 2005 was associated with visiting at least 3 times in FY 2004

separately by demographic categories. Binomial regression was used to construct a multivariate model where visiting at least 3 times in FY 2005 was the dependent variable and the independent variables were gender, age, payment category and visiting at least 3 times in FY 2004. All analyses were done using SAS, Version 9.1.

RESULTS

In FY04, there were 29,706 ED patients who had at least one visit where the payment category was UNM Care, Self-pay, Salud and Medicaid. The age was missing for 83 patients and 7,459 were less than 18 years old, leaving 22,164 patients. Among these patients, there were 19,732 (89%) who had all visits using the same designated payment category. There were 271 patients where the payment category did not fall within one of the four categories and were therefore excluded. This left 19,461 patients in the analysis dataset, who accounted for 25,181 visits in FY2004. Demographic variables and payment category distributions for patients and visits are shown in Table 1.

Table 1 – demographic distributions for patients and visits

Variable	**Patients N(%)**	**Visits N (%)**
Gender		
Female	9,528 (49%)	12,465 (50%)
Male	9,933 (51%)	12,716 (50%)
Age		
18-29	7,730 (40%)	9,577 (38%)
30-39	4,490 (23%)	5,804 (23%)
40-49	4,062 (21%)	5,476 (22%)
50-59	2,171 (11%)	2,921 (12%)
≥60	1,008 (5%)	1,403 (6%)
Payment category		
UNM Care	3,796 (20%)	5,497 (22%)
Self-pay	12,801 (66%)	15,700 (62%)
Salud	1,941 (10%)	2,822 (11%)
Medicaid	923 (5%)	1,162 (5%)

Table 2 shows the gender and age distributions by payment category. With the exception of the Self-pay group, there were more female than male patients within each group. The majority of patients classified in the Self-pay, Salud, or Medicaid categories are in the 18-29 year old groups, whereas most of the UNM Care patients are roughly evenly distributed in the age groupings.

Table 2 – demographics by payment category

Demographic Variable	**Payment Category**				**p-value**
	UNM Care N (%)	**Self-pay N (%)**	**Salud N (%)**	**Medicaid N (%)**	
Gender					
Female	2,268 (60%)	5,245 (41%)	1,364 (70%)	651 (71%)	<0.001
Male	1,528 (40%)	7,556 (59%)	577 (30%)	272 (29%)	
Age					
18-29	863 (23%)	5,539 (43%)	844 (43%)	484 (52%)	<0.001
30-39	745 (20%)	3,150 (25%)	399 (21%)	196 (21%)	
40-49	1,060 (28%)	2,546 (20%)	332 (17%)	124 (13%)	
50-59	779 (21%)	1,104 (9%)	222 (11%)	66 (7%)	
≥60	349 (9%)	462 (4%)	144 (7%)	53 (6%)	

Table 3 shows percentages of those who had frequent visits (≥3) in FY05 by whether they had frequent visits in FY04. Of the 19,461 patients, 1,104 patients had ≥3 visits in FY2004. Of those patients, 145 (13.1%) patients had ≥3 visits in FY05.

Table 3 – number of FY05 visits by demographic characteristics and number of visits in FY2004

Variable	**FY04 visits**	**Sample Size**	**Fiscal year 2005 visits**		**p-value**
			0-2 N (%)	**≥3 N (%)**	
Total sample	1-2	18,357	18,066 (98.4%)	291 (1.6%)	<0.001
	≥3	1,104	959 (86.9%)	145 (13.1%)	
Gender					
Female	1-2	8,938	8,788 (98.3%)	150 (1.7%)	<0.001
	≥3	590	520 (88.1%)	70 (11.9%)	
Male	1-2	9.419	9,278 (98.5%)	141 (1.5%)	<0.001
	≥3	514	439 (85.4%)	75 (14.6%)	
Age					
18-29	1-2	7,387	7,302 (98.8%)	85 (1.2%)	<0.001
	≥3	343	309 (90.1%)	34 (9.9%)	
30-39	1-2	4,240	4,178 (98.5%)	62 (1.5%)	<0.001
	≥3	250	223 (89.2%)	27 (10.8%)	
40-49	1-2	3,773	3,689 (97.8%)	84 (2.2%)	<0.001
	≥3	289	242 (83.7%)	47 (16.3%)	
50-59	1-2	2,025	1,977 (97.6%)	48 (2.4%)	<0.001
	≥3	146	126 (86.3%)	20 (13.7%)	
≥60	1-2	932	920 (98.7%)	12 (1.3%)	<0.001
	≥3	76	59 (77.6%)	17 (22.4%)	
Payment Category					
UNM Care	1-2	3,431	3,331 (97.1%)	100 (2.9%)	<0.001
	≥3	365	319 (87.4%)	46 (12.6%)	
Self-pay	1-2	12,286	12,158 (99.0%)	128 (1.0%)	<0.001
	≥3	515	463 (89.9%)	52 (10.1%)	
Salud	1-2	1,755	1,698 (96.8%)	57 (3.2%)	<0.001
	≥3	186	146 (77.4%)	42 (22.6%)	
Medicaid	1-2	885	879 (99.3%)	6 (0.7%)	<0.001
	≥3	38	33 (86.8%)	5 (13.2%)	

Table 4 is a multivariate model illustrating the FY2005 high use rate ratio. Compared to females, males are 1.20 times as likely to have 3 or more visits in FY2005, although this result lacks statistical significance (P>0.05). With respect to those who are 18-29 years old, patients in all other age groups are more likely to have ≥3 visits in FY2005, with those in the 40-49 age group having the highest rate ratio (1.70) and therefore the highest tendency to become recurrent ED users (P<0.001). In relation to unmanaged Medicaid patients who had 1-2 visits in FY2004, those with ≥3 visits in FY2004 were 17.80 times as likely to have ≥3 visits in FY2005 (P<0.001). Although not as extreme, patients in the other payment categories show a similar pattern (P<0.001).

Table 4 – multivariate model for the FY05 High Use Rate Ratio

Variable	**FY05 High Use Rate Ratio (95% CI)**	**p-value**
Gender		
Female	1.00	0.06
Male	1.20 (0.99, 1.44)	
Age		
18-29	1.00	<0.001
30-39	1.19 (0.91 1.55)	
40-49	1.70 (1.33, 2.17)	
50-59	1.55 (1.16, 2.08)	
≥60	1.31 (0.88, 1.95)	
Payment and FY2004 visits		
UNM Care and 1-2 visits	1.00	<0.001
UNM Care and ≥3 visits	4.28 (3.07, 5.96)	
Self-pay and 1-2 visits	1.00	<0.001
Self-pay and ≥3 visits	9.37 (6.87, 12.77)	
Salud and 1-2 visits	1.00	<0.001
Salud and ≥3 visits	6.69 (4.63, 9.67)	
Medicaid and 1-2 visits	1.00	<0.001
Medicaid and ≥3 visits	17.80 (5.70, 55.57)	

Table 5 shows comparisons between the different financial categories with respect to frequent ED utilization. Within each comparison, the interpretation of which group has more frequent ED use can be ascertained from Table 4 data. Two comparisons show significant differences between groups with a p-value less than 0.05 including both Medicaid and Self-pay groups having more frequent use than UNM Care patients. The most significant difference (P<.001) is between managed UNM Care and Self-pay, a demographically similar group of patients. Some of the other comparisons suggest differences in rates of ED utilization between groups although the p-values do not indicate statistical significance.

Table 5 – comparison of frequent user effects between payment categories

Comparison	**p-value**
Medicaid and Salud	0.11
Medicaid and Self-pay	0.29
Medicaid and UNM Care	0.02
Salud and Self-pay	0.17
Salud and UNM Care	0.08
Self-pay and UNM Care	<0.001

LIMITATIONS

The project requires analyzing large sample sizes but may be limited by the number of patients for which the data has been collected. The data may be confounded by the fact that some UNM ED patients in 2004 may not utilize the UNM ED in 2005 for various reasons, including changing healthcare providers or institutions, changing residence, or death. However, it is probable that each demographic group will be affected similarly, thus minimizing the overall effect.

DISCUSSION

In a UNM ED patient population comprised of publicly insured and uninsured patients, recurrent users one year are more likely to continue with a similar utilization pattern the following year. More specifically, patients within different demographic subgroups exhibited distinct frequency utilization patterns. For all age and payment groups, the percentage of patients is similar to the percentage of overall visits for each category, thus no group was over represented in terms of patients visits (Table 1). In addition, observed patterns between males and females were statistically similar (Tables 4).

Once patients establish recurrent ED use (≥3 per year), the likelihood that this utilization rate will continue in the subsequent year is higher ($p<.001$). The data illustrate that unmanaged high frequency ED usage patients (≥3 visits/year) groups tend to utilize the UNM ED at a higher frequency from the index year to next year than the managed groups. The continuance of frequent ED utilization from year to year, from highest to lowest, among the financial categories analyzed is unmanaged Medicaid, uninsured Self-pay, managed Medicaid - Salud, and managed uninsured - UNM Care.

The factors responsible for these differences are likely multifactorial. The lower repeat high utilization in managed populations suggests that having a PCP might be an important factor. Co-morbidities with chronic disease, or lack of financial incentive to obtain care outside the ED in an outpatient setting were not studied and could contribute to high utilization. Low co-payments for primary care in the UNM Care Plan might provide incentive to utilize the PCP, which might account for its overall lower repeat high utilization rate. The Self-pay patients, have no assigned

PCP, and have much higher recurrent high utilization than the UNM Care patients ($p<.001$). These are demographically similar populations. There was a trend to less high utilization when comparing managed Medicaid Salud to unmanaged Medicaid, but not to a statistically significant degree – neither charges co-pays for ED or primary care utilization. Rates of emergency department utilization has been increasing nationwide.[10]

Financial and time constraints influence patient decisions to utilize health services. All of the patients studied had bills generated for their ED care, while Salud and Medicaid pay a discounted rate for the professional and facility components of those charges. Medicaid does not allow co-payment charges to patients. However, Self-pay are responsible for full billed charges. UNM Care patients are charged a low co-payment at the time of primary care visits, and are charged discounted rates for other services billed at a later time such as ED visits. Indigent patients utilize the ED for a number of reasons that may be influenced by acuity of the problem, convenience, access to primary care, cost, and other factors. Like other urban ED's, UNM's ED waiting time is unpredictable but most often very long (> 4 hours). However, the ED is open at all hours and no appointment or co-pay is required prior to being seen.

Education may contribute to high recurrent ED utilization in indigent populations. Patients may not know enough about the healthcare system and how it is structured to access the appropriate venue of care. The ED may be the only access point they know. Working poor may not be able to afford health insurance, or it may not be provided by their employer. Missing work in low income individuals makes it difficult to keep outpatient appointments. The complex, fragmented healthcare system may contribute to high ED use. Assigning a PCP can provide timely access to

care, reduce inappropriate healthcare utilization in the ED, and prevent illness and hospitalization. This may be why Salud and UNM Care patients have the lowest rates of sustained frequent ED use.

Patients might choose to visit the ED because the demand exceeds primary care capacity. UNM Care was initiated in 1997 to better manage the fiscal and quality aspects of our uninsured population. While it succeeded in reducing hospital utilization, improving prevention, and reducing specialty utilization, there was no statistically significant decrease in overall ED utilization. The assignment of a PCP and defined health care benefits did not reduce overall ED use in the UNM Care population studied.[1] Our new data show that UNM Care patients have the lowest rate of frequent ED use out of all the patient populations we studied. These results may reflect how UNM Care became more effective over time. Having been in place for ten years, the UNM Care Plan has been used by the state as a model to obtain a Medicaid waiver to expand insurance coverage to the working poor utilizing many of the principles such as assigning a PCP, charging low co-payments for primary care, and providing a defined set of benefits based on means testing. The expansion of Medicaid to provide insurance to New Mexico's working poor is a centerpiece of the Governor's comprehensive plan to insure all New Mexicans.

In addition to the UNM Care population, our study included Self-pay patients and those enrolled in publicly funded insurance programs, Medicaid and Salud. Our inclusion criteria consisted of patients with at least one ED visit in FY04, only one payor for the entire duration of the study, and at least 18 years of age. It was important to select patients with a single payor over the two year duration of the study to ensure that one patient was not over represented as a member of

more than one payment category. We chose to limit our study to the adult population (≥18 years) because many differences exist in the pediatric population. Pediatric patients utilize different emergency healthcare services, and they are distributed differently among the demographic categories studied.

Several interventions might lead to decreased recurrent ED utilization rates. Perhaps assigning a PCP or case management will decrease ED utilization rates. Our data suggest that a managed program will reduce recurrent high ED utilization rates. Therefore, the Self-pay patients should be managed and assigned a PCP. The reasons certain patients remain Self-pay is outside the scope of this paper. Some may hypothesize that individuals make economic choices and decline insurance when offered. Our experience in the UNM Care Plan suggests that offering a PCP and a set of benefits at discounted rates are eagerly accepted. The tendency to expand ED beds, staffing and services might not necessarily address the root causes of high ED utilization by an indigent patient population.

All patient groups with high utilization rates in one year (≥3 visits) have significantly increased rates of high use the next year as illustrated in the rate ratio data. UNM Care patients have significantly less recurrent high use compared to Self-pay patients and Medicaid patients as evidenced by the rate ratios and group comparisons ($p<0.05$). Further investigation is warranted to determine potential contributors and predictors of high ED utilization including chronic disease co-morbidity, substance abuse, time constraints, unmanaged care, access to a primary care home, financial resources, and lack of education. With additional analysis, these data could inform health policy and systems changes related to ED utilization in these groups.

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