

Web-based Primary Care Referral Program Associated With Reduced Emergency Department Utilization

Michael Murnik, MD; Fornessa Randal; Mary Guevara;
Betty Skipper, PhD; Arthur Kaufman, MD

Background and Objectives: *Uninsured patients without a primary care home tend to use the emergency department (ED) for primary care. We examined whether an enhanced scheduling system for follow-up care from the University of New Mexico Hospital Emergency Department (UNMH-ED) that assigns patients to a family medicine home can decrease ED utilization.* **Methods:** *The Community Access Program for Central New Mexico (CAP-NM) is a consortium of primary care safety net provider organizations. CAP-NM developed a HIPAA-compliant (Health Insurance Portability and Accountability Act), Web-based information system used by the UNMH-ED to refer uninsured, unassigned patients to family medicine practices (“homes”) within the consortium. The Web site referral system operated 24 hours a day, 7 days a week; printed maps to clinic sites; and listed services offered. Analysis of quality assurance data compared (1) ED utilization outcomes of eligible patients referred by the CAP-NM Web site to a family medicine home to (2) outcomes of controls discharged from the ED in the usual manner.* **Results:** *The 756 patients referred to family medicine homes through the CAP-NM Web site demonstrated a significant 31% reduction in subsequent ED visits compared to controls. This reduction was most evident among those who had infrequent ED use before institution of the program.* **Conclusions:** *Implementing an enhanced referral system to family medicine homes from the ED is associated with decreased subsequent ED utilization by uninsured patients.*

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Emergency department (ED) overcrowding is a national problem exacerbated by ED closures, insufficient hospital bed capacity, and insufficient primary care capacity.¹⁻³ One factor in the problem of ED overcrowding is the rapid growth in the number of medically uninsured patients in the United States, now numbering more than 46 million.

The uninsured are high users of ED services and relatively low users of primary care. Compared to the medically insured, the uninsured tend to delay seeking care until their medical conditions are more advanced, complicated, and costly to treat. These trends lead to higher rates of ED use and more preventable hospitalizations.^{4,5} This is costly to hospitals, providers, and to society, since the uninsured can pay little of what they are charged.

Previous interventions that have attempted to reduce ED visits by a high-user subset of medically uninsured by providing access to primary care have not always been successful.^{6,9} The lack of reduced ED use from these interventions may reflect several barriers to care. In particular, uninsured patients have difficulty accessing primary care in a timely manner. This is a major problem at academic health centers, where the ratio of primary care to specialist providers is far lower than that in the private community and where most clinics are closed in the evenings and weekends.

Kaufman et al demonstrated that managing care through assignment of uninsured patients to primary care practices reduced the cost of care, attributable primarily to reduced hospitalizations without a demonstrable reduction in ED visits.⁶ ED physicians at the University of New Mexico report that only 25% of ED patients referred for follow-up care after discharge ever arrive at those appointments, perhaps because the customary appointment procedure is haphazard, with many patients discharged during evening or night-time hours when appointments cannot be scheduled. Many

patients have no phones or voice mail, hindering post-ED contact follow-up.

Starfield reported on the favorable effect of access to a primary care system on population health status, especially among populations with substantial income inequality.⁷ However, these health benefits escape many of the uninsured, who lack a primary care home and face a fragmented health system that can be difficult to navigate.

Can assignment to a family medicine home of uninsured, unassigned patients from the ED be enhanced such that subsequent ED utilization is decreased? An opportunity arose to answer this question through a collaborative effort between the University of New Mexico Department of Family and Community Medicine and the University of New Mexico Hospital Emergency Department (UNMH-ED) working in cooperation with a safety net community health consortium known as the Community Access Program of Central New Mexico (CAP-NM). CAP-NM received federal funding from the Health Resources and Services Administration and includes six safety net provider organizations—the University of New Mexico Health Sciences Center, First Choice Community Healthcare, First Nations Healthsource, Albuquerque Healthcare for the Homeless, the Albuquerque Indian Health Service, and the New Mexico Department of Health. The primary focus of this consortium is to increase access to care for the estimated 140,000 medically uninsured in the four-county region of Central New Mexico. CAP-NM developed a system for medical information sharing to decrease duplication of services and to improve the efficiency of care. Four provider systems within the consortium redesigned their clinical operations, streamlined their services, and thereby increased capacity at each clinic site. Additionally, the consortium engaged in cooperative hiring and support of health professional staff at all facilities. Nonetheless, the majority of uninsured residents of Central New Mexico had no identified primary care home and tended to use UNMH-ED for primary care services.

The CAP-NM consortium, in collaboration with the UNMH-ED, developed a system for assigning uninsured, unassigned patients discharged from the UNMH-ED to a primary care home. We studied whether this system could reduce ED utilization.

Methods

UNM's Human Research Review Committee reviewed and approved our study methods and use of the CAP-NM database and the University of New Mexico Hospital's physician billing service and patient-tracking databases.

Referral System

CAP-NM created a HIPAA-compliant (Health Insurance Portability and Accountability Act), Web-based

referral program. This program, "The Primary Care Dispatch," is an appointment scheduling and referral service designed by the UNM Department of Family and Community Medicine that links the UNMH-ED to family medicine clinics within the CAP-NM safety net provider organizations via the Internet. Using this secured, password-protected site, trained discharge clerks can schedule follow-up appointments for patients 24 hours a day, 7 days a week. Any UNMH-ED patient being discharged who has no assigned primary care provider or primary care home can be referred to any one of 15 CAP-NM-affiliated clinics. The Internet site offers access to reserved appointments, usually within 1–2 days of the ED visit and scheduled at the clinic most accessible from the patient's home or workplace.

At the time of referral, the patient receives a computer-generated appointment sheet that contains the appointment date and time, a list of services provided at that clinic, and a map to the clinic site. As soon as the patient referral is made from the ED, the receiving clinic is notified electronically that an appointment has been scheduled. The receiving clinic is prompted through the CAP-NM system the day after the scheduled appointment to record appointments kept or rescheduled and primary care provider assignment. The program predominantly is used for indigent self-pay patients who are uninsured and have not qualified for Medicaid or County Indigent Assistance programs.

In the first 17 months of the program, 834 self-pay patients were referred to clinics within the CAP-NM consortium. These referrals were made in the course of normal business in the ED by ED physicians availing themselves of the new service. Of these patients, 756 (91%) were 18 years of age or older and had complete data available in all three of the data systems used for comparison: the CAP-NM program logs, the UNMH billing records, and the UNMH patient tracking database. These referred patients with complete tracking data constituted our study group of "CAP participants." The date on which each CAP participant was referred via the system was considered their "CAP index date." Preliminary data analysis revealed that the CAP participants were older on average than the general ED patient population. Therefore, control patients were randomly chosen from the group of all self-pay non-CAP patients in the same age strata as the CAP participants seen in the ED on that same day. CAP participants and controls were followed in the UNMH Patient Tracking Database from the index date to the conclusion of the study. Follow-up times ranged from 2 to 20 months.

Data Analysis

Analyses comparing CAP and control patients showed disparity in the number of ED visits logged during the year before the index visit. Since a major predictor of future utilization is past utilization, we decided to

divide the sample into four strata based on the number of ED visits by the patients in the year preceding their index date. Groups were compared for each utilization stratum using the Z test for comparing incidence densities.⁸ Annualized rates for return visits to the ED following the index visit were calculated within each stratum. Rate ratios were calculated comparing CAP participants' rates of return to their controls' rates. An estimate of the reduction in ED utilization for 1,000 patient-years was then calculated using the overall return rates for CAP participants and controls.

Results

We found that patients referred via the CAP program to a family medicine home for follow-up were less likely to return to the ED than similar, unreferred controls. This decrease was most significant among those who did not use the ED frequently prior to their CAP program referral index date. While improvement trends are noted in each prior-utilization stratum, statistical significance was only achieved in the zero visits and single-visit-in-the-previous-year groups. The results of this analysis are shown in Table 1.

Table 2 shows estimated reductions in visits based on the rates in Table 1. It is estimated that making CAP referrals should reduce the number of return ED visits by 31%. These were overall return rate estimates, including return rates from all prior-utilization strata.

Discussion

While some have shown a reduction in ED utilization when primary care follow-up was appointed for a specific disease entity,¹⁰ we have shown a reduction in ED utilization without regard to disease presentations. Baren demonstrated that the provision of medications, transportation vouchers, and telephone reminders from

the ED increased the likelihood that asthmatic patients would keep their primary care follow-up appointments.¹¹ However, subsequent ED use was not studied. Kaufman et al failed to show a reduction in ED utilization despite a significant reduction in hospitalization and cost when an uninsured population was assigned to primary care providers and charged low copayments for visits, labs, and medications.⁶ A recent study at the University of New Mexico comparing long-term outcomes of UNM Care patients with commercially insured and self-pay patients again failed to show a change in utilization patterns.⁹ However, this study evaluated a relatively small, presumably sicker, group of patients who used services continuously over 5 years.

Offering uninsured, unassigned ED patients at the time of discharge a follow-up family medicine appointment within several days at a clinic near their home appeared to be associated with a decrease in subsequent ED utilization. Reduction in hospital cost is implied via reduction in uncompensated care. This success depended on a new approach to ED discharge planning and follow-up care that was timely, more comprehensive, informative, and personalized. An appointment could be made at any time, day or night, 7 days a week, thus avoiding the inevitable lack of success in attempting to reach patients the next day. The ability to schedule such a follow-up appointment within days decreased the no-show rate since the appointment was at a time of immediate need. The fact that the patient was given a map to the appointed clinic located in geographic proximity to their home reduced barriers to keeping the appointment in a city with poor public transportation. Finally, the fact that patients left the ED with specific information about their new family medicine home, such as the presence of dental services, a WIC program, or a drop-in immunization clinic, may have enhanced the attractiveness of the referral.

The favorable results of the Web-based appointment system on subsequent ED utilization likely are an underestimation of its potential in different systems and over a longer period of time. One reason is financial. New Mexico has one of the highest rates of medically uninsured (more than 25% of the under 65 years of age population) for whom health services received in EDs are without charge if the patient cannot afford a copay at the time of service, a rule dictated by federal Emergency Medical Treatment and Labor Act

Table 1

Comparison of Annualized Return Visit Rates for CAP and Control Patients According to Numbers of Visits in the Year Before the Index Date

Prior Year Visits	CAP		Control		CAP/Control Rate Ratio	P Value
	#	Visit Rate*	#	Visit Rate		
0	487	0.71	258	1.28	.55	<.0001
1	148	1.09	228	1.55	.70	.001
2	63	1.77	101	2.14	.82	.16
3 or more	58	4.10	169	4.48	.91	.28

CAP—Community Access Program

* The visit rate is the number of emergency room visits per patient-year following the index date.

regulations. In contrast, required copays at safety net sites to which CAP referrals were made average \$20—a financial disincentive for patients returning to those sites. Another reason is legal. A sizeable portion of the medically uninsured in New Mexico are undocumented workers who are often attracted by the relative anonymity of services provided at the public hospital ED. And finally, in other studies,^{6,12,13} the favorable benefits of a primary care assignment on utilization of resources by the uninsured are realized over several years. During the first year, the focus of this study, there is usually an increase in resource utilization throughout the health system due to pent-up demand.

Reduced ED visits of self-pay patients offer a considerable financial benefit to the hospital. The average loss to the hospital for each self-pay patient's ED visit is more than \$200. An even greater savings from use of the CAP Web-based referral system will be realized if the family medicine assignment is shown to lead to a reduction in hospitalizations of self-pay patients. Increased assignment of uninsured patients to a family medicine home might also reduce the disease burden in the community, a major benefit to society. Shi demonstrated that adequate access to primary care reduces disease disparities, especially in populations with significant economic disparities.¹⁴

This innovation depended on the collaboration of safety net health care systems in the community that offered the university a broader primary care capacity. The university had to be cautious that it was not perceived as simply “dumping” its financial burden onto others. The collaborative program has continued because the university has supported each of the community safety net partners in other ways—sharing grants, assisting in the recruitment of health professionals, providing technical support, and referring to their systems Medicaid and Medicare patients for whom they are able to receive cost-based reimbursement. Although in most locales the primary care capacity may not exist to completely address this problem, variations on this program should be achievable wherever an overutilized

ED coexists with primary care resources able to provide care for uninsured and underinsured patients, such as federally qualified community health centers.

Limitations

The results should be interpreted with caution. This was an observational, quality-assurance, data-based study of a newly launched program, not a randomized, controlled study. The majority of eligible UNMH-ED patients were not assigned CAP appointments at the conclusion of their UNMH-ED visit since not all UNMH-ED personnel were familiar with it. Access to the Web-based CAP appointment system required training, and with high turnover in staff, working three shifts, training all providers and staff in this new Web-based innovation was logistically difficult. While we matched each uninsured, unassigned UNMH-ED patient receiving a CAP referral in a stratified manner with a randomly selected patient who was not referred, we again emphasize that this was not a randomized, controlled study. Before stratification, characteristics of those referred differed from those not referred. The older age of referred, self-pay patients compared to controls may indicate that UNMH-ED physicians had been biased in selecting those they felt were more in need of a referral, though this was controlled for in the analysis. Other potential differences in characteristics between referred and control patients such as number of comorbidities or patient motivation toward follow-up care might exist but could not be evaluated by the current study design. And finally, not all discharging ED physicians placed the same value on a patient's need for a primary care home.

Conclusions

Future studies will assess the degree to which referred CAP-NM patients remain in their assigned family medicine home and will assess the impact of CAP-NM referrals to family medicine on subsequent hospital discharges, specialty services, laboratory tests, and medication utilization after the initial phase of “pent-up demand.” It will be important to determine what factors motivate and deter UNMH-ED physicians from referring eligible patients to primary care follow-up.

A recent survey suggests that ED physicians' attitudes toward primary care are generally positive and that primary care capacity, and thus the capacity of the referral program, is the limiting factor in the follow-up process. Finally, further analyses of the influence of establishing continuity of care with a primary care physician on utilization of the ED needs to be a focus of future research.

Table 2

Estimated Reduction in Number of Visits Per 1,000 Patient-Years

Estimated Visits Using CAP Rate	Estimated Visits Using Control Rate	Difference in CAP Versus Control	Percent Reduction
1,130	1,648	-518	31%

CAP—Community Access Program

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Corresponding Author: Address correspondence to Dr Murnik, University of New Mexico, Department of Family and Community Medicine, 2400 Tucker NE, MSC09 5040, 1 University of New Mexico, Albuquerque, NM 87131-0001. 505-272-2165. Fax: 505-272-8045. mmurnik@salud.unm.edu.

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