

AN EMERGENCY MEDICAL SERVICES PROGRAM OF ALTERNATE DESTINATION OF PATIENT CARE

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ABSTRACT

Objective: The emergency department (ED) is ideally reserved for urgent health needs. The ED, however, is often the site of care for nonurgent conditions. The authors investigated whether emergency medical technicians could decrease ED use by patients with nonurgent concerns who use 911 by appropriately identifying and triaging them to alternate care destinations. **Methods:** From August 2000 through January 2001, two King County fire-based emergency medical services (EMS) agencies participated in an alternate care destination program for patients with specific low-acuity diagnosis codes (intervention group). Eligible patients were offered care at a clinic-based destination as an alternate to the ED ($n = 1,016$). The frequency of the destination of care (ED, clinic, or home) for the intervention group was compared with a matched control group that was comprised of a preintervention historical cohort of EMS encounters from the same two fire-based agencies and with the same acuity and diagnosis criteria and seasonal interval ($n = 2,617$). **Results:** Compared with the preintervention group, a smaller proportion of patients in the intervention group received care in the ED (44.6% vs. 51.8%, $p = 0.001$), while a greater proportion of patients in the intervention group received clinic care (8.0% vs. 4.5%, $p = 0.001$) or home care (no transport) (47.4 vs. 43.7%, $p = 0.043$). Results were comparable when adjusted for other patient characteristics. Similar relationships were not evident among nonparticipating King County EMS agencies. Based on physician review and patient interview, the alternate care intervention appeared to be safe and satisfactory. **Conclusion:** An EMS-based program may represent one approach to limiting nonurgent ED use. **Key words:** emergency medical technician; emergency medical services; prehospital care; triage; emergency department; alternate destinations.

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Medical care in the emergency department (ED) is ideally reserved for persons with urgent or life-threatening health needs. The ED, however, is often the site

of care for nonurgent conditions. Investigations suggest that up to half of patients, or more, who receive care in the ED could be appropriately treated in a less emergent setting.^{1–3} The causes of what could be characterized as ED “misuse” are complex and include the lack of a regular provider, poor access, poor insurance coverage, patient convenience, and other issues of patient preference.^{1,3–6} Regardless of the cause, the use of the ED for nonurgent health needs can contribute to ED overcrowding, a situation that may jeopardize patients’ health by diverting or delaying health resources for the most acute patients.^{3,7} Moreover, the delivery of care for nonurgent conditions in the ED may cost more compared with that in other medical settings.⁴ Even in the scenario when effective care is given to the urgent and the nonurgent patient in the ED, the practice of ED use for nonurgent conditions is perpetuated, a circumstance that potentially deprives these patients of preventive and health-maintenance measures that would be more appropriately delivered in an alternate care setting.^{4,8}

Activation of the 911 system for medical concerns in many U.S. communities produces a response by an emergency medical technician (EMT), a person trained in prehospital assessment and management of acute medical conditions. Many of these 911 responses are for nonurgent medical conditions that could be treated by walk-in or office-based clinics; yet in the experience of King County Emergency Medical Services (EMS), approximately two thirds of patients are transported for further care and more than 90% of all transported encounters are to the ED. We hypothesized that EMT personnel could decrease the use of the ED by patients with specific nonurgent concerns who use 911 by appropriately identifying and safely triaging them to alternate care destinations. In this study, we investigated the effectiveness of an EMS-based alternate destination program that was implemented in two King County fire agencies.

METHODS

Study Design

This project was a cohort study in which the alternate care destination program was instituted and assessed prospectively. For the purposes of analysis, a matched historical control cohort was used. Oral informed consent was obtained from all participating patients and

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TABLE 1. Eligibility Criteria for the Alternate Care Destination Program

I. Severity Code:	
Nonurgent: patient needs medical attention but does not require it immediately	
II. Type Codes:	
Minor trauma	
Head, closed minor injury	Head, open injury
Face, closed minor injury	Face, open injury
Neck/back, closed, without backboard	Arms, closed simple fracture
Chest, closed minor injury	Arms, open injury
Arms, closed minor injury	Legs, closed simple fracture
Legs, closed minor injury	Legs, open injury
Pelvis/genital, closed minor injury	Abdomen, closed minor injury
Minor respiratory	
Respiratory difficulty, minor	Other respiratory, minor
Choking, without obstruction	
Musculoskeletal	
Noncardiac chest pain	Undefined musculoskeletal pain
Syncope	
Headache	
Abdominal	
Fever/infection	
Anxiety/grief	

written informed consent was obtained to access medical records. The study was approved by the investigators' institutional review board.

Study Setting and Population

King County EMS is a two-tiered response system that serves approximately 1 million people in the greater Seattle area. The first tier of response is provided by fire department-based personnel with EMT and basic life support (BLS) training. The second tier of response is provided by paramedics with training in advanced life support. The first tier responds to all 911 medical calls, while the second tier is dispatched according to predetermined dispatch criteria.⁹ This study took place within two of the BLS, first-tier agencies that serve an urban/suburban population of 150,000 persons with approximately 10,000 BLS responses annually.

To identify persons appropriate for potential alternate care destinations, information was used from the medical incident report form, a standardized report that includes demographic, event, and treatment information and is completed for each encounter by EMS personnel. This report form requires that EMS personnel record the level of acuity (nonurgent, urgent, life-threatening) and a diagnosis type code. The inclusion criteria required a low level of acuity and one of the specific diagnosis type codes (Table 1) and was derived by consensus of EMS providers and the EMS medical program director (JAM). Patients who were in police custody were excluded from the analysis because their destinations of care were determined by separate protocols.

Study Approach

The study was divided into two phases. Phase I consisted of non-intervention activities to validate patient inclusion criteria, identify alternative treatment destinations, and train staff. Phase II consisted of the intervention in which patients who met criteria were identified and offered an alternate destination for care.

Prior to instituting an intervention of alternate destination transport for select patients, the inclusion criteria were validated. During this first phase of the study, BLS responders in the study agencies were trained as to the rationale, criteria, and goals of the study. For a period of three months (mid-December 1999 through mid-March 2000), first-tier responders were asked to identify all patients potentially eligible for alternate destination of care other than the ED, but to continue established transport destination practices. A study physician (JAM) subsequently reviewed EMS records for all persons identified by first-tier personnel as potentially eligible for an alternate destination of care to determine whether the patient could have been cared for in a medical setting other than an ED. For the 127 persons identified as potential eligible cases for alternate care destinations by EMS personnel, the reviewing physician determined that 97% (124/127) of the cases received an appropriate referral from EMT personnel. Based on the physician review, no medical morbidity would likely have resulted in the 3% (3/127) of cases that were deemed eligible by the EMT but not by physician review.

During this period, potential alternate clinics were identified. The ED alternate destinations included

urgent care or walk-in clinics and office-based practices that accepted walk-in patients. To participate, clinics were required to have on-site physician staff, and laboratory and x-ray capabilities. The project team in concert with clinic staff from the four participating clinics drafted written criteria regarding diagnostic and treatment capabilities for clinics as well as protocols for communication and transport between EMS personnel and the clinics.

During phase II of the study, implemented from August 2000 through January 2001, BLS responders continued to screen all patients to identify persons eligible for alternate care destinations. For patients who were eligible, BLS providers offered patients an option of an alternate destination for care other than the ED. When a patient elected an alternate site, BLS communicated with the clinics to coordinate patient care. For those patients who received care in the ED despite eligibility, the EMT recorded the primary reason why the alternate clinic destination was not used. A physician continued to review all cases in which a patient sought care at an alternate care destination, for quality assurance purposes. For those patients who used an alternate destination of care, an effort was made to contact them within two weeks to determine the length of their visit and their level of satisfaction with the encounter. Information was also collected regarding demographic and clinical variables.

Outcome

The destination of care for all eligible patients was recorded on the standardized medical incident report form for each EMS encounter. The destination was categorized under three headings: Emergency Department, Medical Clinic, and No Transport/Other. The very small proportion of patients who were coded as "Other" included patients who were transported home from the scene of the incident.

Statistical Analysis

To evaluate whether the alternate care destination program decreased ED visits, we compared the proportions of patients receiving care at the three outcome destinations between the intervention and a control group. The control group was selected from a historical cohort of EMS encounters from the same two BLS, first-tier agencies that participated in the program. The control group included all patients with the same acuity and diagnosis type criteria and seasonal interval (August through January). Initially, two control groups were formed using the 1999–2000 and 1998–1999 periods. Because the results for the two control populations were nearly identical, the groups were combined into one preintervention control population. To determine whether differences observed in the primary analysis were due to underlying temporal

TABLE 2. Patient Characteristics in the Preintervention and Intervention Groups

	Preintervention Group (n = 2,617)	Intervention Group (n = 1,016)
Age		
Average (SD)	36.5 (24.2) yr	35.5 (23.3) yr
Median (range)	33 (0–104) yr	33 (0–94) yr
Gender—male	45.9%	47.4%
Diagnostic category		
Minor trauma	57.7%	55.2%
Minor respiratory	12.5%	11.8%
Syncope	4.2%	3.6%
Headache	2.0%	1.1%
Abdominal*	4.9%	3.3%
Musculoskeletal	9.0%	10.4%
Fever/infection*	4.2%	6.4%
Anxiety/grief*	5.5%	8.2%
Time of day 07:00–19:59	66.7%	64.4%

*Differences were statistically significant (p-value < 0.05).

trends rather than the program, we compared the frequencies of care destinations between the preintervention and intervention time periods among the rest of King County first-tier responses (nonparticipating agencies) for patients with the same acuity and diagnosis criteria. For the purposes of presentation and analysis, the trauma diagnoses were grouped as a single category "minor trauma," the respiratory diagnoses were grouped as "minor respiratory," and the musculoskeletal diagnoses were grouped as "musculoskeletal."

Statistical comparisons between the intervention and preintervention groups were performed using the t-test or the Mann-Whitney rank sum test (when distributions were not normal) for continuous variables and the χ^2 test or Fisher's exact test for categorical variables. Multivariable logistic regression analysis was used to determine the odds ratio for specific destinations of care for the intervention compared with the preintervention group, while taking into account potential confounding factors.

RESULTS

Of the 5,724 BLS calls during the intervention period, 1,016 (18%) met the eligibility criteria as determined by acuity and diagnostic status. In general, the intervention and preintervention patients possessed similar demographic and clinical characteristics (Table 2), though fever/infection and anxiety/grief diagnoses were more common in the intervention group and abdominal concerns were more frequent in the preintervention group.

Compared with the preintervention group, a smaller proportion of patients in the intervention group received ED care, while a larger proportion of patients

TABLE 3. Destinations of Care for the Intervention and Preintervention Groups

Destination of Transport	Preintervention (n = 2,617)	Intervention (n = 1,016)	p-value
Emergency department	51.8% (1,356)	44.6% (453)	0.001
Medical clinic	4.5% (117)	8.0% (81)	0.001
No transport & Other	43.7% (1,144)	47.4% (482)	0.043

in the intervention group received clinic care or home care (no transport) (Table 3). The results were similar when adjusted for other patient characteristics, though the increase in the proportion of patients who received home care was no longer statistically significant (Table 4).

To determine whether these results were due to temporal factors, we evaluated the destination of care for patients with the same diagnostic and acuity criteria during the preintervention and intervention periods who received care from nonparticipating EMS agencies that serve King County. In contrast to the study agencies, there was no evidence of a decrease in ED visits or an increase in clinic visits in the nonparticipating agencies for the intervention compared with the preintervention period (Table 5).

During the intervention period for the participating agencies, 81 patients were referred to and treated at an alternate care destination. Five additional patients were initially referred to a clinic before proceeding on to the ED. Based on physician review, no medical morbidity resulted from the consequent minor delay in ED transport for these patients. Of these 81 patients who received clinic care, 42 were contacted by phone during the two weeks following the clinic visit. The age, gender, and diagnostic distribution of the 39 patients who could not be contacted by phone, despite multiple attempts, was similar to the distribution of those who were contacted. All patients who were contacted reported that they were feeling better and were satisfied with their care. The median length of visit for the clinic patients was one hour, with a range of 30 minutes to four hours.

The primary reason why the ED was used despite clinic eligibility was recorded for 418 of the 453 patients. For the 418 patients who were eligible for an

alternate care destination yet received care in the ED during the intervention period, patient preference and clinic closed were the most common reasons that patients proceeded to the ED for care (Table 6). For a smaller proportion, the EMT felt that the patient was more appropriate for ED care because of situational or medical comorbidity reasons. In a handful of cases, the clinic requested that the patient go to the ED rather than the clinic. These "diversions" to the ED were due to both medical reasons (the clinic judged that the patient should be treated in the ED rather than the clinic; $n = 4$) and logistic reasons (the clinic was too busy; $n = 1$).

DISCUSSION

We found that a carefully planned and implemented program of alternate care destinations by EMT personnel for specific low-acuity diagnoses was associated with a 15% relative decrease (51.8% vs 44.6%) in the proportion of patients who received care in the ED when compared with a historical control group with similar diagnostic, acuity, and seasonal characteristics and served by the same two fire agencies. This decrease in ED visits coincided with an increase in the proportions of patients who received care in a clinic or remained at home. A follow-up sample of patients who went to medical clinics suggested that they received satisfactory care. A combination of patient, EMS, and logistic factors accounted for those patients who received care in the ED despite their eligibility for medical clinic care.

This program of alternate destinations of care necessitated a systematic and stepwise approach. As recently outlined in a position paper by the National Association of EMS Physicians/American College of Emergency Physicians regarding alternate transport and destination,¹⁰ the study program included oversight and continuous quality assessment by an EMS physician; an educational program for participating EMS personnel, physicians, and clinics; compliance with established EMS dispatch criteria; and the consideration of medical necessity and patient preference in determining transportation destination. In addition to these published guidelines, a project leader from within the participating fire agencies (firefighter EMT) was

TABLE 4. Unadjusted and Multivariable Odds Ratio of the Destination of Care for the Intervention Group Compared with the Preintervention Group

	Unadjusted Odds Ratio		Adjusted Odds Ratio*	
	Odds Ratio	95% CI	Odds Ratio	95% CI
Emergency department	0.75	0.65, 0.87	0.76	0.65, 0.88
Medical clinic	1.85	1.38, 2.48	1.84	1.36, 2.49
No transport & Other	1.16	1.01, 1.34	1.14	0.98, 1.33

*Multivariable model adjusted for age, gender, time of day, and diagnostic codes.

crucial to ensure commitment and effective communication.

Compared with a matched historical control group, a smaller proportion of patients in the intervention group received care in the ED, while a larger proportion in the intervention group received care in a medical clinic. Several factors that might account for these findings were considered. Adjustment for potential confounding variables (age, gender, time of day, and diagnostic codes) did not alter the results. In addition, there was no evidence of a similar temporal change in the other (nonparticipating) King County EMS agencies during the preintervention and intervention periods for patients with the same acuity, diagnoses, and seasonal characteristics. As a consequence, the findings suggest that the program of alternate care destinations was responsible for the decrease in ED visits and the increase in clinic visits. There was also a similar absolute increase (smaller relative increase) in the proportion of patients in the intervention group who remained at home. This increase may have been due to the heightened awareness of the EMT personnel to the care and triage process of these patients.

The intervention appeared to be both safe and satisfactory for patients, based on physician review of the group who received care in a medical clinic and follow-up with these patients. The process of transfer of care (communication between the clinic and EMT regarding a potential patient) enabled accepting clinics to have a constructive role. As a result, only a handful of patients were referred on from the clinic to the ED, none of whom were judged to have adverse consequences due to the delay in ED presentation.

Although the 15% relative decrease in ED visits and the 80% relative increase in clinic visits during the intervention period were significant, these changes represent modest shifts when one considers that patients fulfilling the eligibility criteria accounted for only about 20% of all EMS responses in King County and the participating agencies. Thus, for EMS to further decrease the volume of nonurgent ED visits, one could expand the eligibility criteria or address the obstacles to clinic transport among the currently-eligible patients. The eligibility criteria were chosen because they optimized safety and practicality (ease of EMT use); expanding eligibility criteria may require EMTs to screen potentially higher-risk patients as well as be more work-intensive for EMTs. Alternatively, the major reasons for ED care despite clinic eligibility were patient preference and limited clinic hours, which together accounted for 80% of eligible patients not referred to an alternate care destination. Increasing clinic operating hours to serve the needs of more patients is a logistical challenge that may be difficult to overcome. Patient preference has been cited previously as a prominent cause of nonurgent ED use.⁴⁻⁶

TABLE 5. Destinations of Care among the Nonparticipating Basic Life Support (BLS) Agencies

Destination of Transport	County Results	County Results	p-value
	Preintervention Time Period (n = 22,095)	Intervention Time Period (n = 10,334)	
Emergency department	62.9% (13,899)	62.5% (6,452)	0.414
Medical clinic	2.0% (445)	1.5% (159)	0.003
No transport & Other	35.1% (7,751)	36.0% (3,723)	0.097

TABLE 6. Reasons Patients Received Care in the Emergency Department Despite Eligibility for an Alternate Care Destination

Reason for Not Referring to Alternate Destination	Patients Not Referred (n = 418)
Clinic closed	44.5% (186)
Patient preference	35.6% (149)
Emergency medical technician (EMT) discretion	18.7% (78)
Clinic refused	1.2% (5)

Given the results, it may be appropriate for medical and/or EMS providers to educate patients regarding alternate care resources once a standard of care has been assured at these sites. Finally, given the apparent trend of increasing ED workload, programs of alternate destination of care are unlikely to threaten the viability of the ED, but rather complement ED services and enable the ED to focus on more acute patients.¹¹

LIMITATIONS

This study has several limitations. Because the intervention was not instituted in a randomized fashion, a causal relationship between decreased ED use and the intervention must be interpreted carefully. However, evaluation of the "nonintervention" factors found no evidence that "nonintervention" causes (confounding, temporal influences) were responsible for the results. Although this analysis suggests that the intervention decreased ED visits, an evaluation of whether the program actually improved the care of more acute ED patients, facilitated ongoing or primary care of nonurgent patients, or decreased costs is outside the scope of the analysis. Importantly, third-party payers generally provided payment for those patients using the clinics. This program was instituted in specific fire agencies committed to the project and used carefully selected eligibility criteria. Indeed, the program is ongoing. The results, however, may not necessarily be generalizable to other EMS agencies or patient groups. Finally, only a subset of patients who used the clinics were contacted in the follow-up survey. It is possible that those who were not contacted would have been less satisfied with their care, though this group was similar to the contacted group with regard to age, gender, and diagnoses.

CONCLUSIONS

A program of alternate care destinations was associated with a modest decrease in ED visits and increase in clinic visits among patients with nonurgent, specific diagnosis codes. The program was safe and the care delivered at the clinics appeared to be satisfactory. Thus, an EMS-based program may represent one approach to limiting nonurgent ED use. However, the results also underscore the complexity of nonurgent ED use; hence, the ED will undoubtedly remain a prominent and sometimes appropriate site of care for the nonurgent patient.¹² Future efforts should address the limitations of this study and investigate other means to ensure the appropriate care of the nonurgent patient.

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