911 Emergency Communication Nurse Triage Reduces EMS Patient Costs and Directs Patients to High-Satisfaction Alternative Point of Care

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ABSTRACT

Introduction: Recent estimates indicate that more than half of all Emergency Department (ED) visits could be avoided, reducing patient costs and increasing satisfaction with care. Since 911 is increasingly the first point of contact for many patients entering the health care system—even those with non-emergency conditions—one potential approach to decreasing emergency costs and ED overcrowding is to reinvent the 911 dispatch center as a clearinghouse for directing patients to alternative care providers. This study presents a cost avoidance analysis of two 911 dispatch centers that implemented such a service, the Emergency Communication Nurse System (ECNS).
Objectives: The primary objectives were to determine the amount of cost avoidance realized by payers using the ECNS to send patients to alternative final points of care, and to identify the amount saved by transporting patients by alternative means an ambulance. The secondary objective was to quantify patients' satisfaction with the service through analysis of patient follow-up survey data.
Methods: This was a retrospective cohort study involving two agencies employing the ECNS program in the USA. Fort Worth, Texas (MedStar) provided 9 months of 911 call data, and Louisville, Kentucky (LMEMS) contributed 34 months of 911 data. Both agencies are designated by the International Academies of Emergency Dispatch (IAED) as Emergency Medical Dispatch (EMD) accredited "Centers of Excellence". Certain areas affecting the study were also evaluated, including patient dispatch information, cost of care, and patient satisfaction.
Results: Patient records from 3,976 cases were analyzed (n=304 for MedStar, and n=3,672 for LMEMS). Collectively, nearly $1.2 million (USD) in payments were avoided as a result of directing patients away from the ED to alternative provider points of care. Additionally, MedStar avoided 284 emergency ambulance transports, and LMEMS avoided 209 emergency ambulance transports resulting in a combined savings of nearly $450,000 (USD) in costs (Table 2). Overall, 91.2% of the patients were satisfied with the ECNS service.
Conclusion: The study findings suggest that a 911-based service such as the ECNS is a feasible solution for reducing patient costs, using resources more efficiently, and maintaining high levels of patient satisfaction.

INTRODUCTION

Emergency medical care accounts for as much as 10% of the total $2.6-trillion U.S. healthcare bill, and this percentage is increasing fast.[1] Between 1992 and 2008, Emergency Department (ED) visits rose by more than 30%, despite ED visits costing up to five times as much as comparable office visits.[2] Compounding the problem is the fact that emergency care is commonly used by those least able to pay. Although they make up less than 5 percent of the total number of physicians, emergency physicians have been estimated to provide more acute care to the uninsured and to Medicare recipients than all other providers combined,[3] and overall, less than half of outpatient ED visits are ever reimbursed.[4] Overuse of emergency services is one of the major causes of the rising overall cost of emergency care. It has been estimated that as many as 56% of ED visits could be avoided, with a potential savings of $38 billion.[5] These avoidable visits are almost all low-acuity (non-urgent) cases,

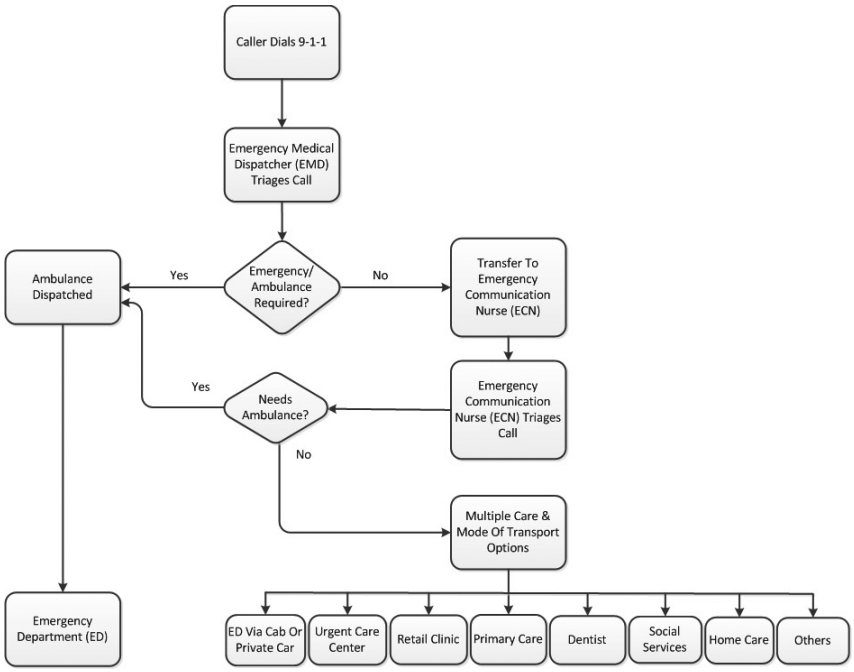

Figure 1. ECNS call triaging process

which suggests that patients are not being matched with the healthcare resources most appropriate for their symptoms. In essence, emergency care providers have become the primary access points for all kinds of unscheduled care—a broad and increasingly costly mandate.

One of the growing challenges for emergency dispatching is the increasing number of non-emergency calls coming into the 911 call center. Like EDs, the 911 service is now very commonly used as an entry point into the health care system by those without insurance or a primary care provider, even when their conditions are minor. Lacking both primary care resources and basic health education, many people call 911 because they are not sure whether a condition is serious. Such callers have been known to call 911 for chronic pain, stomachaches, flu and cold symptoms, and even for hiccups.

One solution for the problem of emergency services overuse that has been shown to reduce costs to payers while helping ensure that patients are able to access alternative care is nurse triage at the 911 dispatch point. Calling for an ambulance via 911 has become a common method of accessing the health care system not only for life-threatening emergencies, but also for non-life threatening urgent conditions and even non-urgent medical problems. Many patients who access 911 have non-emergency conditions that do not require a "hot" ambulance response (using lights and siren), and that in many cases can be handled without transport to an ED—and in fact more adults access emergency medical care because of lack of access to other providers than because of the seriousness of their problem.[6] Traditionally, however, 911 systems dispatch an ambulance, often with an accompanying first response vehicle such as a fire engine, for all medical problems. In most cases the only destination available for these responding ambulances is the hospital emergency room. Thus, intervening upstream from the ED may hold some of the greatest potential for decreasing emergency care costs and appropriately allocating scarce and costly healthcare resources.

Thirty years ago, medical dispatching was considered the "weak link" in the chain of prehospital care.[7] Emergency Medical dispatchers (EMDs) were largely untrained laypeople who simply collected an address, phone number, and complaint information and sent an ambulance to every call. This is no longer the case. The use of scripted, medically-approved protocols is now the standard of practice for certified EMDs, who use such protocols to accurately and efficiently prioritize and triage calls by categorizing patients into high, moderate, low, and non-emergency acuity levels.[8]

Nearly two decades ago, the "Agenda for the Future" of Emergency Medical Services (EMS) distributed by the U.S. Department of Transportation called for EMS systems to offer "community-based health management that is fully integrated with the overall health care system" and to "improve community health and result in more appropriate use of acute health resources."[9] The current study proposes, and investigates, the cost-effectiveness of one 911 method for finally achieving this goal.

The 911 nurse triage system studied in this paper was the International Academies of Emergency Dispatch (IAED) Emergency Communications Nurse System (ECNS). Agencies using this system in the United States hire nurses to work in the 911 emergency communications center itself, not off-site or at EDs. This provides a pathway to alternative care at the earliest point of patient interaction with the

emergency system. The ECNS integrates into existing practices in the 911 dispatch center. A caller reporting a medical emergency (whether their own or someone else's) calls 911 and is connected to an EMD, who triages the call to determine its severity and urgency as well as the most important, highest-priority symptoms. If the EMD determines—using medically-approved scripted protocols—that the caller is reporting a low-urgency, low-acuity call with no immediate life-threatening symptoms, the EMD transfers the call to the Emergency Communications Nurse (ECN). The IAED and the medical directors at the 911 centers can determine which types of calls may be transferred. These include common low-acuity conditions such as minor injuries, chronic pain and chronic illness, weakness and flu-like symptoms, rashes, and allergies, among others.

Once the call is transferred, the ECN performs a more detailed triage of the caller's complaint and, with the aid of software-based protocols, determines the most appropriate level, location, and type of care. Possible dispositions include a wide range varying from home care to sending an ambulance immediately. If the patient requires treatment (for example at the ED, at an urgent care clinic, or at a primary care provider's office), the ECN can also arrange for alternative transportation (e.g., a wheelchair van or a cab) (figure 1). Often, the ECN not only recommends but actually arranges appointments, calls with pharmacists or other providers, and transportation.

This paper presents a cost avoidance analysis of two 911 dispatch centers in the USA that implemented the ECNS. It describes the relative patient costs of traditional (ambulance-to-ED) emergency response versus ECNS-driven alternative care pathways, examines levels of patient satisfaction with the service, and proposes best practices for such 911 nurse triage programs.

OBJECTIVE

The primary objectives were to determine the amount of cost avoidance realized by payers using the ECNS, via sending patients to alternative final points of care (primary care physicians, urgent care clinics, etc.) or providing home care, rather than routing them directly to the emergency department, and to identify the amount saved by transporting patients by alternative means (a cab, the patient's own car, etc.), than by an ambulance. The secondary objective was to quantify the percentage of patients who were satisfied with the ECNS service.

METHODS

Study Design and Setting

This was a retrospective cohort study involving two agencies (MedStar, Fort Worth, Texas and LMEMS, Louisville, Kentucky) employing the ECNS program. Each agency is similar in general population as well as the number of 911 emergency calls fielded by their emergency dispatchers. MedStar EMS-Mobile Health (MedStar), located in Fort Worth, Texas, serves a population of nearly 810,000 residents (with a daytime population of approximately 1 million) and handles roughly 107,000 911 calls per year. Louisville Metro EMS (LMEMS), located in Louisville, Kentucky, serves a population of approximately 741,000 and handles about 91,000 911 calls per year. Both are designated by the IAED as EMD "Accredited Center of Excellence"—meaning that they meet stringent criteria set by the IAED. (This is an IAED requirement for implementation of the ECNS program.)

Both centers implemented the ECNS as a pilot program during the study period. For this reason, staffing and coverage hours varied considerably during that period. Staffing varied from a single ECN working regular business hours to four part-time ECNs taking shifts that varied based on the schedules of their other jobs. While 24-hour, fully-staffed ECNS programs would be ideal in terms of providing the greatest cost savings and patient benefits, this was not possible in either center during the pilot stage. Although the two agencies are approximately equal in size and handle a similar number of 911 calls per year, MedStar chose to use the ECNS program more conservatively during its pilot program than did LMEMS (e.g., assigning a smaller number of call types as eligible for ECNS triage). Therefore MedStar handled significantly fewer calls through the ECNS system than did LMEMS. The system is designed to be used in this flexible manner, according to the needs of each user agency and the decisions of its medical directors.

Outcome Measures

The primary endpoint was the amount of cost savings achieved using an alternative point of care as compared to going to the ED, and an alternative mode of transport as compared to a typical ambulance response. The secondary endpoint was the percentage of patients who were either satisfied or not satisfied with the ECNS service.

Data Analysis

Cost savings were determined by comparing actual costs incurred with the costs that would have been incurred by going to the ED and sending an ambulance. Cost data were obtained from the US averages per patient and/or figures provided by each agency. STATA for Windows® software (STATA Statistical Software: Release 13.1 ©2013, StataCorp, College Station, TX, USA) was used to analyze patient dispatch data. As for patient satisfaction, each agency provided data they collected using a 5-point Likert Scale. These scores were then simply converted into percentage points and graphed on a bar chart.

RESULTS

Patient records from 3,976 cases were analyzed (n=304 for MedStar, and n=3,672 for LMEMS) (Table 1). Collectively, nearly $1.2 million (USD) in payments were avoided as a result of directing patients away from the ED and to alternative providers or points of care (Table 1). Redirect-

Final point of care	MedStar				LMEMS			
	Cost per patient[a] (US$)	Patients (n) (N=304)	Savings per patient[b] (US$)	Total saving[c] (US$)	Cost per patient[a] (US$)	Patients (n) (N=3,272)	Savings per patient[b] (US$)	Total saving[c] (US$)
ED *(Base)*	1,349	111	0	0	1,349	2,896	0	0
ICC/UCC	156	63	1,193	75,159	156	330	1,193	393,690
PCP	145	115	1,204	138,460	145	196	1,204	235,984
HC/LA	0	11	1,349	14,839	0	250	1,349	337,250
Other[d]	218	4	1,131	4,524	218	0	1,131	0
Sub-total				232,982				966,924
Total (combined)								1,199,906

LMEMS: Louisville Metro Emergency Medical Service ED: Emergency Department ICC/UCC: Instant Care Clinic/Urgent Care Clinic PCP: Primary Care Physician HC/LA: Home Care/Lift Assist [a]USA average [b]Saving per patient i.e., if a patient avoided using emergency department as his/her primary point of care [c]A product of the number of patients and savings per patient. [d]Includes dentist, specialty, social services, or health information agency.

Table 1. Healthcare cost savings by avoiding a visit to the ED as the primary point of care

Mode of transport	MedStar				LMEMS			
	Cost per patient[a] (US$)	Patients (n) (N=304)	Savings per patient[b] (US$)	Total saving[c] (US$)	Cost per patient[a] (US$)	Patients (n) (N=3,672)	Savings per patient[b] (US$)	Total saving[c] (US$)
Ambulance 1 (Base)	418	20	0	0	434	0	0	0
Ambulance 2	-	-	-	-	396	3,026	38	114,988
Wheelchair/Van	-	-	-	-	26	326	4,708	133,008
Other[d]	21	284	397	112,748	18	209		86,944
Sub-total				112,748				334,940
Total (combined)								447,688

LMEMS: Louisville Metro Emergency Medical Service [a]Average given by agency [b]Saving per patient i.e., if a patient avoided using ambulance 1 (base) to his\her final point of care [c]A product of the number of patients and savings per response. eIncludes cab/taxi, private owned vehicle, or bus.

Table 2. Transport cost savings by avoiding the use of an ambulance 1 (base mode of transport) as primary mode of transport to the final point of care.

ing patients to primary care physicians (PCP) and Immediate Care Centers/Urgent Care Centers (ICC/UCC) provided the most significant savings. LMEMS redirected a significantly higher proportion of ECN-triaged callers to home care options (n=250) and ICC/UCC (n=330) than did MedStar, while MedStar redirected the majority of its ECN-triaged patients to a PCP (n=115).

Overall, ECNS-based redirection of 911 callers away from the traditional ambulance-to-ED care pathway provided more than $1.6 million USD in costs avoided (i.e., $345,730 for MedStar, and $1,301,864 for LMEMS).

Patient satisfaction

Overall, 91.2% of the patients were satisfied with the ECNS service, and these rates were highly comparable between agencies (Figure 2). MedStar and LMEMS saw a 93.7% response rate and an 88.8% response rate, respectively. The specific overall patient satisfaction rates were: 92.4%

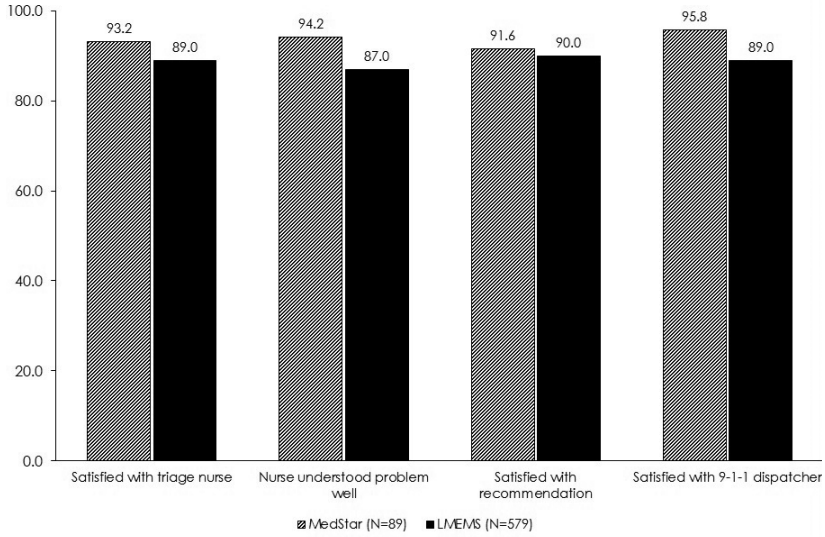

Figure 2. ECN and EMD Patient Satisfaction Outcomes

satisfaction with the EMD; 91.1% with the ECN, and 90.8% with the recommendation advised by the ECN; and 90.6% with the ECN's understanding of the patient's problem.

DISCUSSION

Our findings show that the ECNS service substantially reduced both the overall number of 911 callers routed to the ED and the per-patient charges, while offering patients access to a broader range of alternative care. The two agencies that implemented the ECNS program, MedStar and LMEMS, were able to save $345,730 and $1,301,864 respectively during the pilot implementation period, with high patient satisfaction rates. Thus, this study suggests that the ECNS service, which introduces nurse triage at the 911 dispatch point, is a feasible and potentially cost-saving approach to effectively match healthcare resources with patient needs and to reduce ED use by patients with low-acuity conditions. The results of this study also indicate that patient savings could potentially be significantly greater for agencies that implement the system with 24-hour ECN coverage. In most communities, moreover, the patient cost savings will only be one of several benefits of this type of service. For example, emergency response agencies, including both ambulance and fire departments, will be better able to direct scarce resources to true emergencies and may see staffing and vehicle costs reduced.

ED overcrowding

The potential of a 911 nurse triage service such as the ECNS to reduce ED overcrowding is one of its most significant potential benefits. Even as ED visits have increased substantially and more patients are using EDs as their point of access for all unscheduled care, the number of EDs in the US has dropped.[10] As a result, EDs are increasingly overcrowded with patients whose conditions are not emergencies and who would be better served elsewhere.[11] (O'Malley, 2013). Many of these patients are uninsured, are on Medicare or Medicaid, or have no primary care provider.[12] The 911 dispatch point, as the earliest point of contact many of these patients have with the healthcare system, provides a strategically effective location for navigating them away from the ED to more appropriate—and significantly less expensive—care options. This issue may very well become more important for both providers and payers as Medicare begins to base is own reimbursement rates in part on patient satisfaction surveys.[13] In fact, one of the agencies involved in this study was able to convince local hospitals to fully fund the ECNS service (despite the fact that it diverted patients from those hospitals) because it reduced the number of low-acuity patients in their ED waiting rooms, thus reducing wait times and increasing overall patient satisfaction with the hospitals.

The spectrum of care

It is of paramount importance that administrators understand the broad spectrum of care and transport alternatives a community must offer, and the practices that must be in place in the emergency communication center, in order for a service such as the ECNS to reduce costs and increase efficient resource use without increasing patient risk. The ECNS service was successful in the emergency systems in which it was implemented in part because of the networks of services to which the ECNs—and thus patients—had access. For example, if the ECN advises the patient visit a doctor in the next 1-3 days, the ECN must also be able to provide names and locations of clinics or doctors, transfer patient information, and often contact the providers to set up appointments for patients. This is particularly necessary for the many callers who access the emergency care system specifically because they have no regular primary care provider.

In short, for a system to successfully implement the ECNS service, the community must offer clinic services and/or "retail" medical establishments that will see

patients on a one-time basis and are willing to offer same-day appointments. In the agencies studied here, many local clinics were willing to set aside, in advance, appointment slots that could be filled by the ECN. Community crisis lines, pharmacies, dentists, and other care access points must also exist in order for an emergency nurse triage program to most efficiently and accurately match patients with the appropriate resources for their conditions. In this way, emergency dispatch services may help provide an organizing model for effective well-coordinated care community-wide.

Best practices

A 911 nurse triage service such as the ECNS also cannot be effective without certain practices in place in the 911 dispatch center itself. Medically-approved protocols (considered the standard of practice in emergency dispatch) must be used in order for EMDs to be able to accurately and consistently identify low- acuity cases over the phone. Without such protocols in place, too much variation exists from one dispatcher to the next, and high-severity calls are too apt to be misclassified or high-acuity symptoms missed. Although nurses have more medical training than dispatchers and often have many years of emergency department experience before moving into telephone triage, they should be provided with decision-support systems in order to make accurate and consistent determinations of acuity. In addition, both EMDs and ECNs should be trained specifically in the identification of high- and low-acuity calls and receive ongoing training and skills maintenance, and must be subject to quality assurance processes through consistent, random review of their calls.

CONCLUSION

The findings in this study demonstrate that an emergency nurse triage service such as the ECNS may allow us to rethink the role of 911 dispatch centers more inclusively, allowing those centers to work effectively with the common attitude that when in doubt, patients should call 911. If every patient who calls 911 need not be transported via emergency ambulance to the ED—the most expensive possible route of care—then 911 can be a clearinghouse for directing patients to alternative care providers. A 911 nurse triage service such as the ECNS can change the way EMS responds to patients' calls for help, simultaneously reducing costs, using resources more efficiently, and maintaining high levels of patient care and satisfaction.

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