

# 911 Patient Redirection

Karl A. Sporer, MD, FACEP, FACP<sup>1,2</sup>

1. Alameda County EMS Agency, San Leandro, California USA
2. Department of Emergency Medicine, University of California San Francisco (UCSF), Medical Center at Parnassus, San Leandro, California USA

## Correspondence:

Karl Sporer, MD  
 Department of Emergency Medicine  
 UCSF  
 San Leandro, California USA  
 E-mail: Karl.sporer@ucsf.edu

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## Abbreviations:

AMA: against medical advice  
 ED: emergency department  
 EMS: Emergency Medical Services  
 MPDS: Medical Priority Dispatch System

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The 911 Emergency Medical Services (EMS) system has become a victim of its own success. It is one of the few services coordinated by government that will always respond in a matter of minutes. The 911 EMS system is used for a variety of medical and non-medical reasons with most metropolitan systems noting sizable increases in the number of calls each year. Current practice, public expectations, and regulations have hampered innovation to best manage this tsunami of patients.<sup>1</sup> Multiple systems have been grappling with this issue and are developing various novel approaches to 911 patient redirection. Many of these have arisen spontaneously, are unique to their local system, and few have been published in peer-reviewed journals. Only a handful of countries have developed an organized approach to this issue.

In every EMS system, there is a large subset of patients – 23%–33% – who are not transported after EMS evaluation.<sup>2</sup> These patients are commonly lumped together as Against Medical Advice (AMA) patients, an unfortunate term that doesn't capture the full complexity of decision making in these post-evaluation, non-transported patients. Only one study has examined the complexity of these patients and found a number of themes, including resolution of symptoms, alternative follow-up and treatment, and alternative transport. The investigators felt that only eight percent of patients categorized as AMA were truly refusing the advice of the paramedics.<sup>3</sup>

There have been two studies of AMA patients that have matched hospital outcomes. One from Utah (USA) examined the outcomes of 14,109 prehospital AMA cases. It had a five percent rate of prehospital AMA cases, meaning that these were likely true refusal of care cases. Among these patients, three percent had another EMS dispatch within the week, fewer than two percent were hospitalized, and 25 adults died within a week of refusing care.<sup>4</sup> The authors noted that most of the inpatient admissions and causes of death were unrelated to the initial EMS incident. A similar study was performed in Australia. They had a non-transport rate of 15%, and of 19,737 AMA patients, six percent requested a subsequent ambulance, 3.3% were admitted to the hospital, and 0.2% died.<sup>5</sup>

Any program that is developed to redirect 911 EMS patients should be careful to compare the post-intervention rate of patient redirection with the pre-intervention rate of non-transport/AMA, as the idea is not just to recategorize the existing AMA patients. In addition, any systematic method of 911 patient redirection should have fairly standard methodology to measure efficacy. Metrics should include the total number of calls, the total number of post-contact non-transports, the total number of patients enrolled into the specific program, the total number of patients redirected, and to include patient safety and satisfaction surveys.

## Dispatch Redirection

There are a number of EMS systems that have incorporated practices that redirect specific categories of 911 medical calls that can be handled telephonically with a clinician to develop an alternative to dispatching a provider. These various practices use differing dispatch systems (Medical Priority Dispatch System [MPDS], Criteria Based Dispatch, and others), a variety of categories, and call takers with a diversity of clinical training. There have been a number of US cities (Fort Worth, Texas; Greenville, South Carolina; Minneapolis, Minnesota; and Louisville, Kentucky) that have implemented a nurse advice line using a specific program called Priority Solutions Integrated Access Management (PSIAM) system developed by MPDS.<sup>6</sup> The US experience has generally involved a small percentage

of total EMS calls.<sup>7</sup> Despite these small numbers, dispatch redirection is cost effective and has excellent patient satisfaction.<sup>6</sup>

Two studies using expert opinion have concluded that 12% of usual EMS calls could be redirected.<sup>8,9</sup> Another retrospective study of transported low acuity calls determined that 15%-20% of all EMS calls could be diverted to an advice line. They examined the presence of normal vital signs and the lack of lights and sirens return to the hospital as proxies for categories that could be handled by an advice line.<sup>10</sup> Another study of low acuity patients who were transported and possible candidates for dispatch redirection found that seven percent of 656 patients had clinically important findings and 18% received treatment mostly with morphine.<sup>11</sup>

The London Ambulance Service (United Kingdom) National Health Service Trust has implemented dispatch redirection over the past several years. The UK Health Minister was quoted in 2002 as saying that there is "no absolute requirement to respond to every 999 call, and where the presenting conditions clearly do not warrant the attendance of an ambulance or paramedic unit, they should not be sent."<sup>12</sup> In 2009, the London ambulance dispatch center developed a Clinical Telephone Advice service staffed by experienced paramedics and nurses that was enlarged in 2012 and rebranded as a Clinical Hub. Calls sent to the hub are reviewed using clinical decision-making support software and advice is provided to patients as to how to manage their condition appropriately. This Clinical Hub allows an opportunity to review and re-triage lower acuity calls to determine if a response other than a front-line vehicle is appropriate. The London dispatch system handles over 5,000 EMS calls each day, and 393 (8.0%) of these calls do not receive a vehicle response. The possible outcomes of a call handled by the Clinical Hub include the following:

- Upgrade to emergent ambulance as soon as possible;
- Urgent Care Service Resource;
- Own transport to emergency department (ED)/Minor Injuries Unit; and
- Alternative Health Care Pathways, including:
  - General Practitioner Referral;
  - District Nursing Service; and
  - Self-care.

Over the past decade, Denmark has reinvented its EMS dispatch system with all emergent medical calls being routed to one of five Emergency Medical Communications Centers staffed with nurses, paramedics, and physicians who use a home-grown emergency medical dispatch system called the Danish Index for Emergency Care. This dispatch system has had the most comprehensive evaluation of its efficacy and safety.<sup>13-16</sup> Level E patients, those who are given telephonic medical advice and no ambulance, made up 22% of total medical calls. Among these 11,000 Level E Calls, 293 (2.6%) called 911 again, 1,204 (11.0%) were seen in an ED, and 425 (4.0%) were admitted to the hospital.<sup>15</sup> The median age of these Level E patients was younger than other 911 calls (median age 47).

### Redirection after Medic Evaluation

A number of studies have consistently demonstrated that paramedics perform poorly when asked to decide which patients will be admitted to the hospital after an ED evaluation.<sup>2,17-24</sup> These results are consistent but likely ask the wrong question. The medics should not be asked whether or not these patients will receive further evaluation and/or admission to the hospital, just

whether they will arrive at the ED via an ambulance. Among patients in one study of redirected patients, 59% sought care in an ED via private vehicle and 16% sought care in a local clinic or with their primary care provider.<sup>25</sup>

There are a number of EMS systems that are developing formal programs to redirect patients after they have received an evaluation by a paramedic.<sup>26</sup> These programs are currently ongoing in Houston, Texas (USA); Detroit, Michigan (USA); Greenville; New Zealand; the United Kingdom; Shreveport, Louisiana (USA); and San Antonio, Texas (USA). These systems use a variety of criteria and often require real-time oversight from peer paramedics, paramedic supervisors, or physicians.

There have been few studies done on redirection after paramedic evaluation. One cluster randomized controlled trial by week of service for those patients 60 years old or older clearly demonstrated a lower rate of transport to the ED, lower admission rates within 28 days, high satisfaction scores, and comparable safety.<sup>27</sup>

Another study examined the decision-making process of paramedics as they evaluated elderly patients who had fallen. They developed a fall assessment tool that had poor compliance. This paper outlined the many complexities that go into making an appropriate clinical decision in this complicated group of patients.<sup>28</sup>

In another study that focused on geriatric 911 patients who were randomized by week to usual care versus evaluation by a paramedic with extended skills evaluated the time on-task for the paramedic, clinical outcomes and a quality of life instrument (EQ-5D) for 28 days, as well as cost effectiveness.<sup>29</sup> Most of these calls involved falls. The paramedic with extended skills had longer contact times and a lower rate of ED visits (53% vs 84%). There was a short-term increase in the use of health services in the intervention group, but at 28 days, the total costs were lower in the intervention group and the intervention was considered to be cost effective. The satisfaction scores were higher in the intervention group. A more extensive evaluation of the paramedics' treatment of geriatric fall patients demonstrated some process improvement but did not decrease overall health utilization over a six-month period.<sup>30</sup>

A system in Shreveport was unique in its approach of clearly defining which patients should be transported and allowing discretion for other patients after discussion with a second paramedic. This system achieved an overall transport rate of 53%; however, this rate has increased recently due to staffing issues.<sup>31</sup> There were limited safety or customer satisfaction data.

The city of San Antonio recently instituted a process that allows its medics, with supervisor consultation, to redirect a large number of 911 patients after evaluation. This system transports approximately 57% of its evaluated patients. It uses taxi vouchers to provide alternative transport. This system has also instituted changes in the management of inebriated patients, high utilizers, and psychiatric patients and have had a significant overall decrease in the number of EMS transports.

The Emergency Telehealth and Navigation (ETHAN) project in Houston combines telehealth with an emergency physician, social services, and alternative transportation to navigate primary-care-related patients away from the ED.<sup>25</sup> This system incorporates the use of taxi vouchers and the ability of the EMS system to pay for the initial clinic visit at a local Federally Qualified Health Center. This project has demonstrated a lower transport rate (18.0%) as compared to control (74.0%). The time on-task decreased with the intervention. Among patients redirected,

59% of them went to an ED via a private vehicle or taxi and 16% sought scheduled care at a clinic or with their primary care provider. This pilot enrolled a fairly small number of the total EMS transports (less than five percent of total EMS calls). Analysis of the program has demonstrated it to be cost effective.<sup>32</sup>

### Sobering Centers

A number of communities (San Francisco, California [USA]; Anchorage, Alaska [USA]; Austin, Texas [USA]; Kansas City, Missouri [USA]; Albuquerque, New Mexico [USA]; New Zealand; Minneapolis; San Antonio; and Las Vegas, Nevada [USA]) have developed sobering centers for delivering EMS patients with isolated inebriation. Programs in San Francisco have been in operation for over a decade with an excellent safety record. A recent report discussed the two-year experience of EMS delivery of patients to a sobering center in Colorado (USA).<sup>32</sup> Among 718 intoxicated patients, 183 were transported to the sobering center. The most common reasons for not transporting to the sober center was inability of inebriated individuals to ambulate (334 patients) and uncooperative behavior (195 patients). Adverse events within this system were minor and occurred at a very low rate.

### Psychiatric Patients

Patients experiencing an acute mental health crisis, with or without psychiatric holds applied, comprise an increasing proportion of EMS calls. They are commonly transported by law enforcement, ambulance, and/or dedicated mental health vehicles. In a large number of jurisdictions, ambulances exclusively send patients with an acute mental health crisis to EDs. A number of communities (Alameda County, California [USA]; San Mateo County, California [USA]; Atlanta, Georgia [USA]; Austin; and Wake County, North Carolina [USA]) have extensive experience

directing a large portion of these patients who don't need a medical evaluation directly to psychiatric hospitals.

### High Utilizer Group

A large number of communities have developed specific care plans for EMS patients who have been identified as high utilizers of medical services. These include Fort Worth; Colorado Springs, Colorado (USA); Fresno County, California (USA); New Orleans, Louisiana (USA); San Francisco; Minneapolis; San Antonio; San Diego, California (USA); New Zealand; Portland, Oregon (USA); and Dallas, Texas (USA). These programs use a variety of inclusion criteria and some impose limitations in services or alternatives.<sup>33</sup> Most of these currently address a relatively small select group of patients. A number of health systems in California that are funded via a Medicaid waiver (Whole Person Care) are developing care plans to address the various needs of these complicated patients with their housing, substance use, and psychiatric issues. These programs will involve multiple county agencies (Housing, Mental Health, EMS, and Public Health) and will develop unique electronic methods to integrate and share the care plans for thousands of patients.

### Conclusion

As EMS systems strive to become more efficient, it has become clear that many 911 calls are not best served by Advanced Life Support-level transportation or by ED care. Many systems are trying a variety of methods to direct a number of their patients away from ambulance transport and EDs with reasonable safety and patient acceptability.

We can learn from examining the novel programs utilizing dispatch or paramedic-driven redirection to alternative modes of transportation and alternative sites of care. Future studies should measure standardized metrics that capture patient safety, patient satisfaction, and cost effectiveness.

### References

- Alpert A, Morganti KG, Margolis GS, Wasserman J, Kellermann AL. Giving EMS flexibility in transporting low-acuity patients could generate substantial Medicare savings. *Health Aff.* 2013;32(12):2142-2148.
- Snooks HA, Dale J, Hartley-Sharpe C, Halter M. On-scene alternatives for emergency ambulance crews attending patients who do not need to travel to the accident and emergency department: a review of the literature. *Emerg Med J.* 2004; 21(2):212-215.
- Shaw D, Dyas JV, Middlemass J, et al. Are they really refusing to travel? A qualitative study of prehospital records. *BMC Emerg Med.* 2006;6:8.
- Knight S, Olson LM, Cook LJ, Mann NC, Corneli HM, Dean JM. Against all advice: an analysis of out-of-hospital refusals of care. *Ann Emerg Med.* 2003; 42(5):689-696.
- Tohira H, Fatovich D, Williams TA, et al. Is it appropriate for patients to be discharged at the scene by paramedics? *Prehosp Emerg Care.* 2016;20(4):539-549.
- Gardett I, Scott G, Clawson J, et al. 911 emergency communication nurse triage reduces EMS patient costs and directs patients to high-satisfaction alternative point of care. *AEDR.* 2015;3(1):8-13.
- Smith WR, Culley L, Plorde M, et al. Emergency Medical Services telephone referral program: an alternative approach to nonurgent 911 calls. *Prehosp Emerg Care.* 2001; 5(2):174-180.
- Woollard M. Emergency calls not requiring an urgent ambulance response: expert consensus. *Prehosp Emerg Care.* 2003;7(3):384-391.
- Snooks H, Williams S, Crouch R, Foster T, Hartley-Sharpe C, Dale J. NHS emergency response to 999 calls: alternatives for cases that are neither life threatening nor serious. *BMJ.* 2002;325(7359):330-333.
- Scott G, Clawson J, Fivaz MC, et al. Using on-scene EMS responders' assessment and electronic patient care records to evaluate the suitability of EMD-triaged, low-acuity calls for secondary nurse triage in 911 centers. *Prehosp Disaster Med.* 2016;31(1):46-57.
- Schmidt T, Neely KW, Adams AL, et al. Is it possible to safely triage callers to EMS dispatch centers to alternative resources? *Prehosp Emerg Care.* 2003;7(3):368-374.
- Transforming Emergency Care in England. 2004. <http://aace.org.uk/wp-content/uploads/2011/11/Transforming-Emergency-Care-in-England.pdf>. Accessed October 5, 2017.
- Andersen MS, Johnsen SP, Hansen AE, et al. Preventable deaths following emergency medical dispatch—an audit study. *Scand J Trauma Resusc Emerg Med.* 2014;22:74.
- Andersen MS, Christensen EF, Jepsen SB, Nortved J, Hansen JB, Johnsen SP. Can public health registry data improve Emergency Medical Dispatch? *Acta Anaesthesiol Scand.* 2016;60(3):370-379.
- Lehm KK, Andersen MS, Riddervold IS. Non-urgent emergency callers: characteristics and prognosis. *Prehosp Emerg Care.* 2017;21(2):166-173.
- Gamst-Jensen H, Lippert FK, Egerod I. Under-triage in telephone consultation is related to non-normative symptom description and interpersonal communication: a mixed methods study. *Scand J Trauma Resusc Emerg Med.* 2017;25(1):52.
- Pointer JE, Levitt MA, Young JC, Promes SB, Messana BJ, Ader ME. Can paramedics using guidelines accurately triage patients? *Ann Emerg Med.* 2001; 38(3):268-277.
- Price TG, Hooker EA, Neubauer J. Prehospital provider prediction of emergency department disposition: implications for selective diversion. *Prehosp Emerg Care.* 2005;9(3):322-325.
- Levine SD, Colwell CB, Pons PT, Gravitz C, Haukoos JS, McVane KE. How well do paramedics predict admission to the hospital? A prospective study. *J Emerg Med.* 2006;31(1):1-5.
- Cummins NM, Dixon M, Garavan C, Landymore E, Mulligan N, O'Donnell C. Can advanced paramedics in the field diagnose patients and predict hospital admission? *Emerg Med J.* 2013;30(12):1043-1047.
- Fraess-Phillips AJ. Can paramedics safely refuse transport of non-urgent Patients? *Prehosp Disaster Med.* 2016;31(6):667-674.
- Neeki MM, Dong F, Avera L, et al. Alternative destination transport? The role of paramedics in optimal use of the emergency department. *West J Emerg Med.* 2016; 17(6):690-697.

23. Tohira H, Fatovich D, Williams TA, et al. Which patients should be transported to the emergency department? A perpetual prehospital dilemma. *Emerg Med Australas*. 2016;28(6):647-653.
24. Schmidt T, Atcheson R, Federiuk C, et al. Evaluation of protocols allowing emergency medical technicians to determine need for treatment and transport. *Acad Emerg Med*. 2000;7(6):663-669.
25. Langabeer JR 2nd, Gonzalez M, Alqusairi D, et al. Telehealth-enabled Emergency Medical Services program reduces ambulance transport to urban emergency departments. *West J Emerg Med*. 2016;17(6):713-720.
26. Mason S, Snooks H. Alternative services to deliver urgent care in the community. *Emerg Med J*. 2010;27(3):183-185.
27. Mason S, Knowles E, Colwell B, et al. Effectiveness of paramedic practitioners in attending 999 calls from elderly people in the community: cluster randomized controlled trial. *BMJ*. 2007;335(7626):919.
28. Halter M, Vernon S, Snooks H, et al. Complexity of the decision-making process of ambulance staff for assessment and referral of older people who have fallen: a qualitative study. *Emerg Med J*. 2011;28(1):44-50.
29. Dixon S, Mason S, Knowles E, et al. Is it cost effective to introduce paramedic practitioners for older people to the ambulance service? Results of a cluster randomized controlled trial. *Emerg Med J*. 2009;26(6):446-451.
30. Snooks HA, Anthony R, Chatters R, et al. Paramedic assessment of older adults after falls, including community care referral pathway: cluster randomized trial. *Ann Emerg Med*. 2017;70(4):495-505.
31. Pringle RP Jr, Carden DL, Xiao F, Graham DD Jr. Outcomes of patients not transported after calling 911. *J Emerg Med*. 2005;28(4):449-454.
32. Ross DW, Schullek JR, Homan MB. EMS triage and transport of intoxicated individuals to a detoxification facility instead of an emergency department. *Ann Emerg Med*. 2013;61(2):175-184.
33. Hess J. *Ambulance Abuse By "Super Users" In Fresno County Is Down 178 Percent - Here's Why*. 2017. <http://kvpr.org/post/ambulance-abuse-super-users-fresno-county-down-178-percent-heres-why#stream/0>. Accessed June 28, 2017.