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# WHAT DISPATCH REALLY SHOWS

## Creating a safer, more efficient response

By **Karl A. Sporer, MD, FACEP, FACP** & **Joshua English, EMT-P**

As our EMS systems become awash in data, it's important to use this information to create clinical and operational wisdom. We hope to demonstrate how to measure commonly available data that will allow the development of unique operational changes; to show the utility of merging dispatch data with prehospital clinical records; to reveal the optimal method of presenting this data; and to discuss real-world operational changes that have been made using this linked clinical data.

Emergency medical dispatch (EMD) is a system that:

- >> Categorizes and prioritizes emergency calls;
- >> Predicts patients who require rapid care;
- >> Has a goal to provide appropriate and timely prehospital response; and
- >> Allows local effectiveness to be measured when linked with electronic patient care records.

Almost all mature EMS organizations use some form of EMD. The system categorizes 9-1-1 calls—by analyzing things like the likelihood of the patient requiring a time-dependent treatment such as defibrillation or the need for an ALS crew—in order to send a quick and appropriate response.

**Above: Assessing dispatch data can determine if your service can cut down on code 3 calls, improving the safety of your providers. Photos Vu Banh**

Prior studies in differing EMS configurations have used a variety of EMD programs with both health- and non-health-trained dispatchers as well as different clinical measures to gauge success. The overall consensus, however, is that organizations using EMD usually have improved response times to urgent calls and a better ability to predict needed levels of service.<sup>1-15</sup>

### **MEDICAL PRIORITY DISPATCH SYSTEM**

Some large cities use their own locally developed EMD system; only a few

communities use a system developed by the Association of Public Safety Communication Officers. The Medical Priority Dispatch System (MPDS) is a proprietary EMD system used by 71% of major U.S. cities and commonly used internationally.<sup>17</sup> Because of its prevalence in EMS, it's been studied the most.

With the MPDS, 9-1-1 callers are asked a series of scripted questions that include the patient's level of consciousness, age, chief complaint and other complaint-specific questions. In the days before computers were widely available, each call would be assigned a card determining the level of care needed. Today, most dispatch centers use a computer program, which can also document the dispatcher's decisions for a robust quality improvement process.

There are 33 standardized, complaint-based categories a 9-1-1 call can fall into, which are further generally classified as Alpha (BLS cold), Bravo (BLS hot), Charlie (ALS cold), Delta (ALS hot), or Echo (ALS hot with AED support). Calls may be further assigned a numerical subgroup and a modifier, which provide responders with more specific details. Together, the numerical protocol, priority (Alpha through Echo), subgroup and modifier (when present) make up the MPDS category.

For example, a call may be assigned to the MPDS category 12D3E. The number 12 is the complaint-based category for seizure, D (or Delta) represents priority, 3 is a subcategory that informs prehospital providers that the patient has irregular breathing, and E is a modifier that indicates the patient has a history of epilepsy.

### COMPUTER-AIDED DISPATCH

Computer-aided dispatch (CAD) systems are general computer programs that can be paired with any EMD system. They usually record information about each call, including date, time and location of call; dispatch time; dispatch code; and disposition (e.g. "transported code 2"). Disposition codes are assigned when the on-scene unit has updated the call status. Most CAD systems generate a unique number for that run and another number used to identify the patient care record (PCR), which allows

for matching between these two data sets.

This combination of EMD, CAD and electronic PCRs can give our industry an unprecedented opportunity to measure the effectiveness of local EMD to predict the need for time-dependent care. The data allows you to see if there are certain lower priority (Alpha) subgroups that require

still had an unacceptably high rate of needing critical interventions. The data can also demonstrate other categories, such as man down or falls, that have truly low rates of lifesaving interventions and should safely remain a low-priority response despite that one case you heard about last week at the fire station.

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*EMD, CAD & electronic PCRs can give our industry an unprecedented opportunity to measure the effectiveness of local EMD to predict the need for time-dependent care.*

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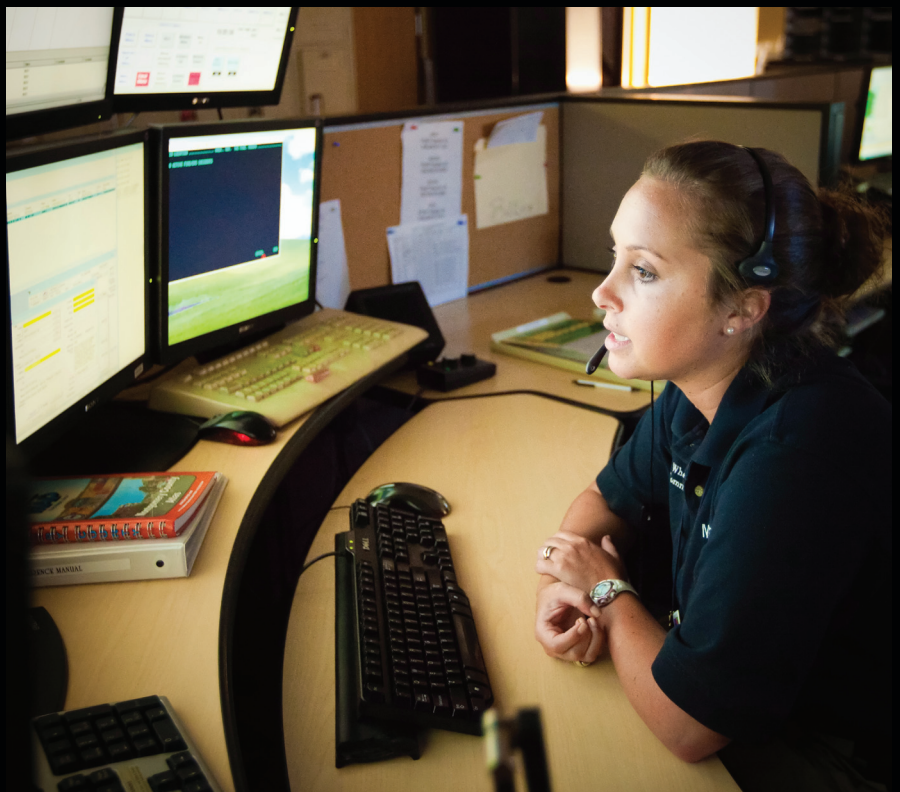
### PERSONAL EXPERIENCE

Sporer has been the medical director for three distinct EMS systems in the Bay Area and noticed significant local differences between them. For example, there was a large difference in the rate of Echo respiratory distress between two counties as well as a significant difference in the Man Down categories. The rate of benzodiazepine administration to 12As ranged from 2–7% in differing counties. This

variation leads us to conclude it would be prudent to use your local experience to make any substantive decisions about your EMD system.

After years of attempting to make clinical sense of this linked CAD and PCR

more interventions than you would expect for calls with a relatively long response time (or BLS-only response in some systems). In our system, we noted 27 Bravo calls (e.g. penetrating trauma calls from a third party) had a high rate of non-transport but

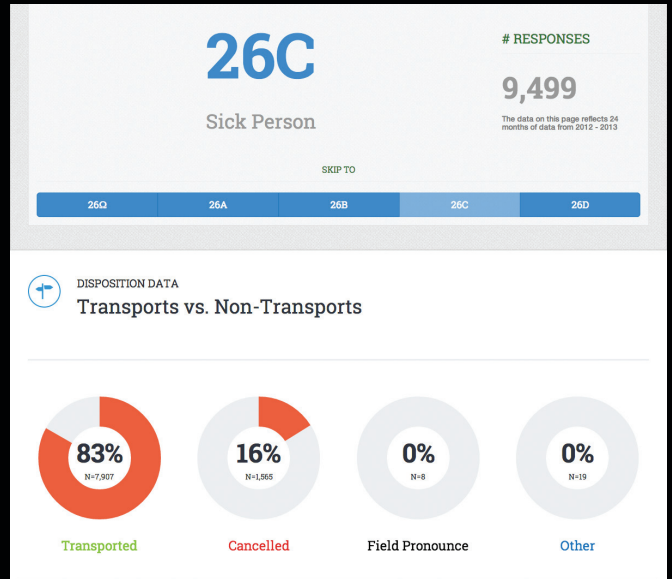
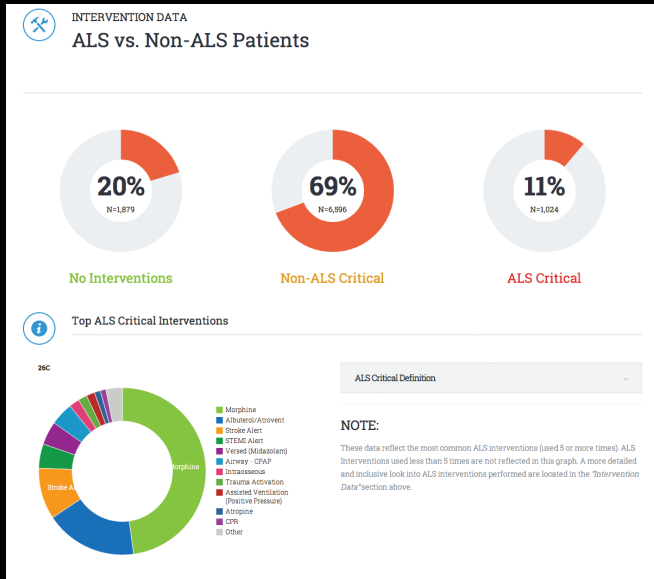


**EMD data allows you to see if there are certain lower priority subgroups that require more interventions than you would expect.**

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Figures 1a and 1b



The Medical Priority Dispatch System allows data to be easily analyzed. Here, the Alameda County EMS system looks at stats for 26C calls.

information, we have developed an optimal list of the information we believe is needed to assess the function of the EMD system in any jurisdiction.<sup>15,17-21</sup> (See Table 1.) When analyzing data to create this list, we decided not to analyze any categories that have fewer than 100 calls in a year. We also chose to include morphine in the list of critical interventions. This decision is highly debatable and an important one because it's the most common medication given and it might be reasonable to assign morphine its own special category. We didn't include some common procedures such as the placement of IV lines, pulse oximetry or the performance of blood glucose measurement, because they're so commonly performed and are a poor

proxy for illness.<sup>22</sup>

We've used this data-driven, decision-making process to help fine-tune our individual systems. In both San Mateo and San Francisco Counties, we had multiple complaints from providers about low-priority calls to seizure patients. Instead of having anecdote drive our response patterns, we examined those calls that were coded as 12A1, seizure stopped and breathing verified. We found that among these patients, 9% ultimately received midazolam for a recurrent or persistent seizure. Our committee thought this was a time-dependent treatment and that this percentage was too high for a non-code 3 response. However, EMD data showed it was best to keep 12A1 calls

as low priority despite provider complaints. This same category in Alameda County had a much lower rate of midazolam administration (3%) and has kept it at a non-lights and siren response.

In San Francisco, approximately 65% of EMS calls were sent with a lights-and-sirens response. The San Francisco Fire Department (SFFD) repeatedly defended its practice from a variety of neighborhood groups concerned about noise pollution. SFFD examined categories that were commonly used, were currently a code 3 response and were found to have a low rate of time sensitive ALS interventions such as CPR, advanced airway, or defibrillation. Some categories such as Diabetic Problem

Table 1: Title

For each MPDS category, the following elements are useful in assessing your local system:
Number of calls in each category
Transported/not transported
Rate of interventions or medications
Development of a local list of critical interventions or medications
Rate of those critical interventions or medications
Role of morphine
List of the exact interventions or medications

Table 2: Title

List of critical interventions and medications to assess with EMD data:		
Albuterol	Defibrillation	Pacing
Amiodarone	Disposable supraglottic airway tool	Return of spontaneous circulation
Assisted ventilation	Dopamine	Sodium bicarbonate
Atropine	Epinephrine (1:1000 & 1:10,000)	ST-segment elevated myocardial infarction alert
Bag-valve mask	Intraosseous	Stroke alert
Calcium chloride	Intubation	Trauma activation
Continuous positive airway pressure	Morphine	Versed
CPR (manual or mechanical)	Needle decompression	



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(13C1–C3) were felt to not be appropriate for downgrading and falls were maintained due to manpower issues (17D3–D5). It was agreed to change the response to a variety of categories such as abdominal pain, headache, sick person, heart problem, and man down resulting in a 15% drop in lights and siren calls in our community. In particular, the category of man down, vital signs unknown (32D1) was dispatched several times a day as a possible resuscitation with several apparatus. Our analysis demonstrated a rate of cardiac arrest of three out of a thousand such patients (0.003%) and we were able to change this to a non lights and siren response.

Alameda County has recently undertaken an extensive evaluation of our experience with two years of MPDS from our two Centers of Excellence. We have undertaken the unprecedented move to post our results on our website, [www.alcoems.org/mpds-data](http://www.alcoems.org/mpds-data), for all of our providers and our community to review. We're hoping to demystify some of the issues that exist in any system about the function of any

EMD system. This will be helpful for the ambulance medics, who are generally skeptical of the dispatch data that they receive each day. It'll be useful to the engine medic who's convinced the sick patient who was mis-triaged by dispatch last month isn't a systemic problem.

It becomes clear very quickly that the system works reasonably well but it is far from perfect. There's always a role for eyes on the patients, boots on the ground.

After publicizing this data locally, we plan on developing a working group to decide on the optimal EMS response for our system. Many of our local fire departments are currently overwhelmed with call volume and this will allow our group to see if there are categories that can safely wait for their transporting ambulance without an engine-first response.

This working group may also identify groups of patients with a small rate of critical interventions that could safely be sent without lights and siren, making all of our other citizens a little bit safer on the roads. We may also find that some

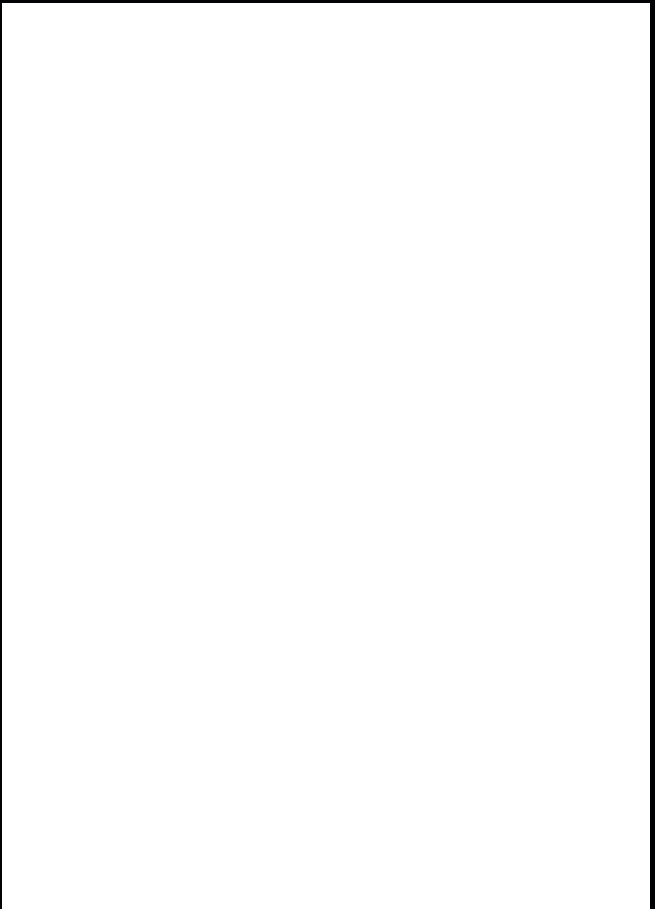
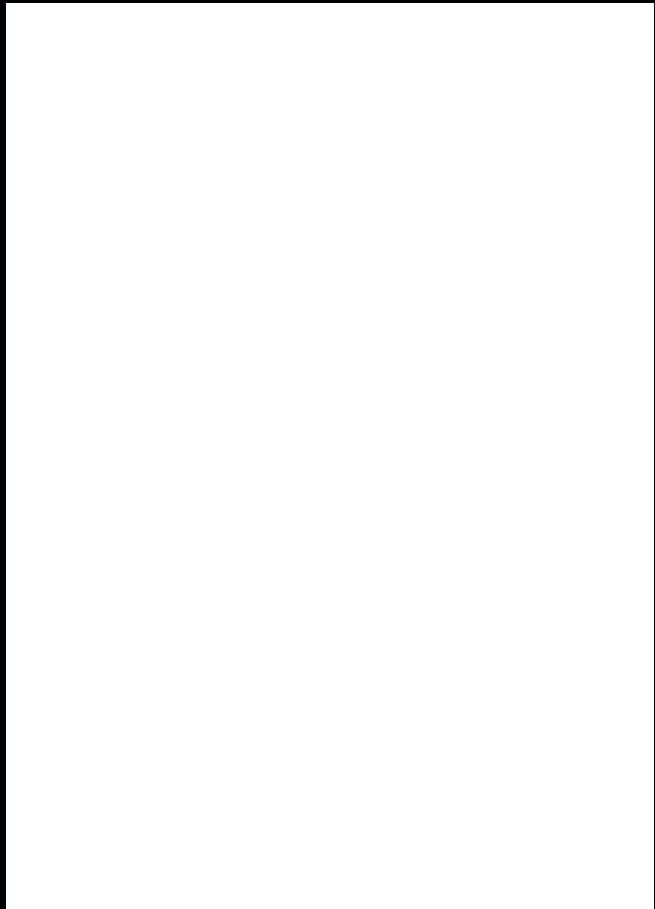
categories would benefit from an engine-only response in categories with a high cancellation rate and low incidence of time-sensitive ALS interventions.

Our current EMS system generates most of the lights and siren responses in our cities and these are for commonly perceived but not real threats to life. It behooves us to use the data generated by our EMD systems to use our ambulances and our paramedics in the smartest and safest way possible. This resourceful use of local data will allow us to tailor specific responses to our citizens in the safest and appropriate manner. **JEMS**

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**Joshua English, EMT-P**, has been in EMS for just over 10 years. He's been a paramedic since 2005 and has worked at the Alameda County EMS Agency as a prehospital care coordinator since 2007, where he's responsible for overseeing the dispatch centers as well as managing the 9-1-1 ambulance transport provider contract.



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