

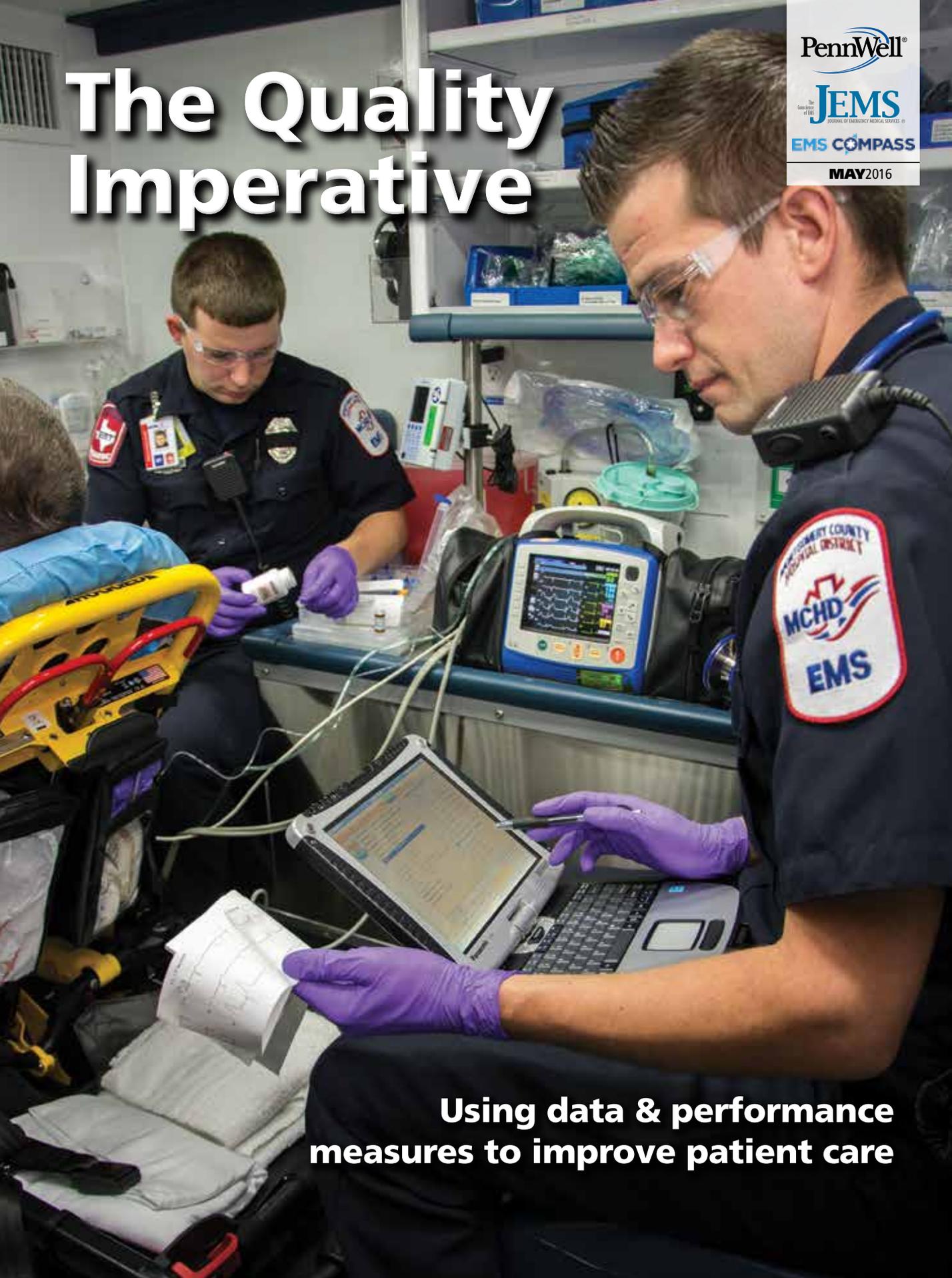
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# • contents •

## EMS COMPASS

Improving Systems of Care Through Meaningful Measures

2

### Introduction

Improving patient care & demonstrating value to our communities

By Bob Bass, MD & Paul Patrick

4

### Data Makes a Difference

How the information we collect every day improves patient care

By Alisa Habeeb Williams, BS, NRP

8

### Birth of a Performance Measure

EMS Compass defines a process for developing outcome-based performance measures

By Nick Nudell, MS, NRP

14

### Planning, Action & Continuous Evaluation

Using performance measures to improve is about more than just analyzing data

By Matt McQuisten, MBA, NRP;  
Gary Wingrove & Michael Gerber, MPH, EMT-P

16

### Demonstrating Value in Healthcare

Communities expect EMS to provide effective, efficient, high-quality patient care—and prove it

By Alex Garza, MD, MPH

19

### Connecting the Dots with Data

Linking data to improve patient care from dispatch to discharge

By Keith Griffiths

24

### About EMS Compass

Members of the EMS Compass steering committee and project groups



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## Harnessing the Power of Data

The National Highway Traffic Safety Administration (NHTSA) and its Office of EMS have supported EMS system improvements for over 45 years and we're proud to partner with the National Association of State EMS Officials on the EMS Compass initiative.

The work described in this supplement is the culmination of over a decade of efforts to standardize EMS data collection efforts across the nation. With nearly every EMS practitioner collecting the same data on every patient, every day, we have incredible opportunities to harness the power of that information



*Rosekind*

to advance patient care. NHTSA and our state partners didn't develop the National EMS Information System (NEMSIS) to simply populate a database, but instead to allow local agencies to use their own data meaningfully to track progress and improve. EMS Compass fulfills that goal by developing a system to create important measures based on NEMSIS Version 3 data elements—something every agency will be able to deploy.

The federal government is strongly committed to this work; the Federal Interagency Committee on EMS (FICEMS) is a group of 10 agencies across government that supports EMS activities. The very first objective of our five-year strategic plan is to develop data-driven performance measures for state and local EMS systems.

Ultimately, EMS Compass reflects the missions of NHTSA and of EMS agencies across the country: to save lives. We need to benchmark and measure our successes and challenges to understand what works and what doesn't, to know where to invest and evolve, and to recognize how to best serve our patients.

I hope you read these articles carefully and are as excited as I am to usher in a new generation of data-driven performance improvement in EMS.

Thank you for your tireless efforts to support the sick and injured in our country every day.

—Mark R. Rosekind, Administrator,  
National Highway Traffic Safety Administration

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## Improving Patient Care & Demonstrating Value to our Communities

**By Bob Bass, MD & Paul Patrick**

Two decades ago, the EMS community came together and created a vision for the future of the profession. At the center of the 1996 EMS Agenda for the Future was a system that harnessed the power of technology and information to make decisions based on evidence.

That vision is now being realized thanks to the widespread use of electronic patient care records, the success of the National EMS Information System (NEMIS) and the shared goal of EMS personnel everywhere to provide high-quality patient care and service to their communities.

EMS Compass represents another critical step on the path toward achieving the goals of the Agenda for the Future. An EMS system's ability and willingness to measure its performance—and take steps to improve based on those measures—is a sign of the EMS profession's maturity and growth. We've come a long way since the days of "ambulance drivers" and "scoop and run." There's no longer any doubt that EMS is an integral member of the healthcare team.

But EMS Compass represents a beginning, not an end. For too long, our profession has relied on theory and assumptions to steer our training and care. The last few decades have brought striking change as EMS embraced evidence-based care, challenging some concepts we've held dear since our beginnings but leading to more effective care and better outcomes.

The next step in this evolution is a learning healthcare system, one that measures performance based on the best possible evidence. It's one thing to develop an evidence base, and another to collect and analyze data. The power of each of those activities, though, is exponentially greater when they are combined.

Without measurement, an EMS system has no way of knowing whether changes, even those based on evidence and best practices, are being implemented correctly or having the intended impact on outcomes.

At the same time, measurement and improvement efforts can be ineffective or even dangerous without supporting evidence. Our history has plenty of examples of how measurement can lead us astray if we focus on the wrong aspects of care.

More than 60 volunteers have put their expertise to work on behalf of EMS Compass. For their work and continuing effort we are grateful. (For a list of the steering committee and working groups, see p. 24.)

### What's Inside

EMS Compass builds upon previous efforts to develop performance measures, but in many ways breaks new ground. The science of improvement, especially within the healthcare community, continues to evolve every day, thanks to behavioral research and the efforts of healthcare organizations across the country and around the world.

Another unique aspect of EMS Compass is its focus not just on the content of the measures, but on the process to

design and build consensus around them. The measures development process ensures incorporation of the latest science and the participation of the EMS community. In this supplement, EMS Compass project manager Nick Nudell, a veteran paramedic and technology expert, takes you through the process step by step. (See pp. 8–11.)

Of course, performance measures are only as good as the data they use. Alisa Williams and Jules Scadden provide us with a great overview of why it's so critical for information to be entered correctly in patient care reports and other records. (See pp. 4–7.) Electronic data open up a world of possibilities, but only if we enter the data in a consistent and accurate manner and then share information with EMS practitioners, patients and the communities we serve.

How do you take the idea of performance measurement and apply it to any size and type of EMS agency? Matt McQuisten, Gary Wingrove and Michael Gerber team up to show how performance measures have been used in EMS systems. (See pp. 14–15.) What's clear is that data-driven decision-making is possible, but we still have a long way to go.

We all know that EMS Compass isn't happening within a vacuum. The focus of the initiative is helping EMS systems improve, but data and measures can also help EMS systems demonstrate value to the communities that support them and the patients who use their services. Alex Garza puts EMS Compass into context and talks about why designing measures that improve the effectiveness of EMS systems is so important in a healthcare system that emphasizes value. (See pp. 16–17.) And we talk to the experts from outside the EMS community who are part of the EMS Compass team on how the initiative fits into the broader picture of healthcare and performance improvement.

Finally, Keith Griffiths discusses the potential that new technologies will bring to data collection and performance measurement. (See pp. 19–23.) From real-time feedback to integrated patient records, the future of performance improvement looks bright.

Since day one, EMS Compass has strived to be an inclusive, transparent and collaborative effort. We're grateful for the input and feedback we've received from the EMS community and other stakeholders, and we ask for your involvement to ensure that EMS Compass remains true to its vision: a future where the EMS profession embraces a data-driven approach to patient-centered and evidence-based care.

**Bob Bass, MD**, is chair of the EMS Compass Steering Committee.



**Paul Patrick** is president of the National Association of EMS Officials.

Bass

Patrick

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# Data Makes a Difference

How the information we collect every day improves patient care

By Alisa Habeeb Williams, BS, NRP

**I**t's the end of a long and difficult resuscitation and you're drained. The last hour was an onslaught of activity: managing a diverse team of responders, performing CPR, interpreting heart rhythms and providing care. You're finally sitting down at the hospital, your patient is in critical condition but maintaining a pulse, and your partner is putting your unit back together. Now that your adrenaline levels are receding, you really just want a few minutes of down time. But duty calls. The call isn't over until you've completed your electronic patient care record (ePCR).

After transcribing a few notes jotted on your glove, you enter the last set of vital signs, read

over your narrative one last time and hit submit. Your report vanishes, not to be seen or thought of anytime soon—that is, unless your supervisor has a question or you forgot to get the Medicare signature. Again.

But all that information you meticulously entered didn't just simply disappear. In fact, your ePCR is a critical piece of a puzzle that will help you provide better care and save more lives.

EMS data serves many purposes, not the least of which is allowing us to evaluate how we're doing—not only on the cardiac arrest you just finished, but on all cardiac arrests in your agency and on the many cardiac arrests across the country. Without basic baseline performance measures, EMS personnel from the field to the corporate office have no way of knowing



if they're meeting the ultimate objective: high-quality, evidence-based patient care.

### Uniform Industry-Wide Data

The need for uniform data in the 1980s and early 1990s led to the development of many statewide EMS data systems. However, those systems varied in how they collected the data, what they collected and how they allowed systems to review the data. In 2001, the creation of the National EMS Information System (NEMIS) set the standard for EMS data collection today. NEMIS helped states collect standardized elements, which means the way vital signs are collected in Jackson, Miss., is the same way it's done in Blue Earth, Minn. Today in Version 3, NEMIS includes over 400 data elements.

In simple terms, NEMIS created an alphabet so that every ePCR uses the same letters and words to tell the story of the call. It allows us to harness the power of all those records to conduct research at the state and national level to develop evidence-based protocols and study the impact of certain treatments. It also paved the way for EMS Compass, an initiative that's designing performance measures based on the NEMIS data definitions and allows ePCR developers to embed those measures into their software, so agencies can easily examine their performance and benchmark it against the rest of the state or nation.

### Collect, Analyze, Act

The first step to being able to use everyday data to improve EMS, however, is to recognize the value of accurate data collection.

Michael Arinder, South Region Clinical Services Director for American Medical Response (AMR), said, "Albert Einstein once stated that 'Insanity is doing the same thing over and over again and expecting different results.' It's true. Bad data is medical insanity."

Accurate data entry is the key to success. Poor data collection makes it challenging to see if what's done in the field is good patient care or just a good idea. The quality improvement process relies on quality data, quality analysis and accurate interpretation in order to understand, modify and improve field activities (e.g., protocol change). Without reliable information, processes in the field are reduced to speculation.

Precise, complete data entry allowed AMR in Jackson, Miss., to determine where they needed to target CPR outreach education by breaking down bystander CPR data by zip code. "For

every cardiac arrest, our field providers collect several data points including bystander CPR prior to arrival and location zip code," Arinder said. "We began to see a pattern. The areas where we provided CPR/AED outreach education had a high incidence of bystander CPR and a higher survival rate."

With that knowledge in hand, AMR's educators began providing CPR education opportunities to the zip codes where bystanders weren't performing CPR. According to Arinder, survival rates increased in those neighborhoods after the training. Only with accurate reporting in ePCRs and analysis of dispatch and patient information was the agency able to target limited resources at educating the communities that needed it the most—an effort that has saved lives.

Reliable, consistent data is essential. Data needs to be reviewed by running operational and clinical reports on a regular basis. These reports can also show how an agency is performing and what changes may require attention. Services need to ensure compliance even in well-functioning systems. There's always room for improvement, and always data that can show you where you need to improve.

The second step is to decide how to analyze the data that's collected. This is done through establishing performance measures to determine if protocols are leading to the right care and if they're improving patient outcomes.

For example, the 7th edition of *PreHospital Trauma Life Support (PHTLS)* recommends that EMS providers initiate transport of critically injured trauma patients to the closest appropriate facility within 10 minutes of making patient contact. A service can review its trauma call data to determine if the crews are meeting this benchmark and to evaluate the patient outcome.

Once the data has been collected and analyzed, it's time to act. This key part of the process allows the medical director, the leadership team and field providers the opportunity to evaluate clinical performance and the protocols and processes that are in place to support quality care.

### Back to the Basics

Part of ensuring accurate data is to make sure the patient care documentation is a true representation of the call. Often the first of many documents written about a patient is the EMS run report. The report represents the practices and the interests of the multiple professionals or caregivers engaged in caring for ill or injured patients.



Next to patient care, documentation is one of the most important things done in EMS. It shouldn't be thought of as something to be done after the call, but a key part of the call itself. Although many of us learned that documentation was critical because it provided a record of patient care read by other caregivers, such as ED staff or by attorneys in case of legal issues surrounding the call, there are also several other reasons why documentation and EMS data are so important.

- Only by looking at what we've done can we figure out how we can get better. Data taken from ePCRs and hospital records tells us whether protocol or process changes are doing what they're supposed to—improving patient care and saving lives.
- Data from ePCRs can be used by researchers to demonstrate the effectiveness of certain medical interventions. For example, ePCRs have been used in studies that have helped determine what ratio and rate of chest compressions are effective and whether inducing hypothermia leads to better outcomes.
- Data can help EMS justify its value. We know we make a big difference to our patients and our communities—but in today's culture we have to prove it. When the city council wants to know why it's important to buy a \$25,000 cardiac monitor, your service can use the data to show how many times it was used and how many patients were defibrillated.
- Because documentation becomes a part of

permanent medical records, it can be used in preparing bills and in submitting records to insurance companies. Complete and accurate documentation helps your agency pay for equipment and other necessary items.

- Electronic records, good documentation and data-driven decision-making will help EMS get the respect it deserves from the larger healthcare community. The people who read our reports may judge us both individually and as a profession based on what we write and the information we provide. Because of this, simple tasks such as using the spell check function on computer reports, looking for and completing all automatic “drop downs” on data fields, and making sure to read the report before submitting can all make a big difference.

### Conclusion

Measuring performance through data is critical to propelling prehospital care forward. It allows EMS practitioners to evolve from a trial-and-error system to one based on evidence, continually improving and meeting the ultimate goal of providing the highest quality care to the people we serve. ✱

*Alisa Habeeb Williams, BS, NRP, is on the Board of Directors of the National Association of State EMS Officials. She's been a paramedic for 20 years and has held her current position as Mississippi's EMS Director for nine.*

## Five Steps for EMS Managers to Improve Data Quality

By Jules Scadden, EMT-P

**1** Show providers that data matters. Electronic patient care reports (ePCRs) represent the practices of not only the EMS profession and caregiver; they're often used to measure quality of the EMS service itself. They provide the story of the patient encounter and also give the EMS manager a window into the overall performance of their service and its caregivers. It's therefore vital that the documentation be accurate, timely and measurable. There's little emphasis on documentation in EMS curricula, especially from a quality improvement perspective. Therefore, it's imperative that the EMS manager provide the “real-world” education on accurate and measurable documentation, as well as show examples of how the

data is used to make the system better. Data gathered from ePCRs is only as good as the data entered by providers. Showing providers why good data matters will improve the quality of data entered.

**2** Audit quality of data in addition to quality of care. We often think of using the information in ePCRs to measure personnel performance on skills like intubation, IV access, medication administration, etc. But do you really know how accurate that data is? If you use data from ePCRs to track skill maintenance for individuals within the service, have you ever noticed how often the person writing the run report is also the person who did *everything* on the call, almost as if no one else was there? How many individuals were on the call? Did the same person really perform all the tasks? A quality assurance and improvement program must



## “Outsiders” Lend Expertise & Perspective

When putting together the EMS Compass Steering Committee, the initiative’s leaders knew it was important to include experts on performance measurement and quality improvement from outside of EMS. Those “outsiders” include a health economist, a patient advocate, a physician, and an expert in performance management in public organizations. Below is the first of four profiles of these experts who have helped put EMS Compass in the context of the broader healthcare continuum and performance management efforts. See pp. 12 and 18 for the other three.

### The Performance Management Expert

Including researcher Patria de Lancer Julnes, PhD, on the EMS Compass Steering Committee was a clear effort to reach far outside the EMS community. De Lancer Julnes, the head of the school of public affairs at Penn State Harrisburg, isn’t an expert in healthcare or public safety. But she has dedicated her career to the use of performance measurement and management in government.

“I think [the EMS Compass leadership team] really wanted to have a very broad perspective. Sometimes when you just talk amongst yourselves you lose sight of the bigger picture,” de Lancer Julnes said.

The bigger picture includes how people, not just systems and organizations, respond to performance measures.

“[People] aren’t used to actually applying evidence

to day-to-day operations,” she said, adding, “One, they feel like they are being judged. Also there’s the perception that trying to [use data and examine measures] is going to create more work.”

When employees feel performance measurement is being used to judge or punish them, rather than to improve service, it can have negative consequences.

“There is a risk, and unless we decide that the goal is really for learning and improvement and not for punishment, people are going to continue to be scared and they will continue to push back when it comes to performance measurement,” she explained. “Not just the people on the ground, but also the decision-makers.”

De Lancer Julnes also stressed the difference between establishing performance measures and establishing standards. In many cases, she said, organizations use good measures but establish meaningless or unrealistic standards.

“Politicians or bosses say we want to have a 99% [score on a measure]. You do have to be ambitious but you also have to be realistic,” she explained, adding that when unrealistic goals are set, “what happens when you don’t achieve those unrealistic goals is that you are blamed.”

—Michael Gerber, MPH, EMT-P



de Lancer Julnes

include auditing the quality of the data being entered, not just the quality of the care provided.

**3** Train new hires. Orientation to the service should include a course on ePCR writing, inputting accurate and pertinent data, the importance of data collection procedures and how that data will relate back to the provider. Go beyond a standard orientation about how to use the ePCR software, and show new hires how the effects of good or bad data input reflects both the provider and the EMS agency as a whole.

**4** Look beyond standard expectations. The “I will only enter as much in my reports as I’m required to enter” mentality has to be prevented at the management level. Providers will follow management’s leadership, so if you only look at the outcomes or benchmarks required by regulators, field providers will only enter the information required to get the job done, not to get it done well.

**5** Use data to provide praise. Sharing examples of how high-quality care led to a good patient outcome is just as important as using data for quality improvement. Providers should be praised not only for good care, but also for good documentation. They need to be educated and encouraged when documentation or care misses the standard, in order to prevent them from viewing quality assurance and quality improvement in a negative light, which may lead to a provider omitting actions they believe they may be disciplined on or only documenting the bare minimum to meet compliance.

**Jules Scadden, EMT-P**, a member of the EMS Compass working group, is executive director of EMS for the Lisbon-Mt Vernon Ambulance Service in Eastern Iowa. She’s a paramedic who continues to provide prehospital patient care along with her management duties.



# Birth of a Performance Measure

EMS Compass defines a process for developing outcome-based performance measures

By Nick Nudell, MS, NRP

**T**he value of performance measures is pretty clear: Once we see how we're doing it makes it much easier to know how to get better. And the only way to know if we're getting better is to measure our processes and the outcomes we're trying to achieve. But creating a good performance measure isn't as easy as it sounds.

## Types of Measures

There are several different types of measures. To do our jobs, we need to have the people, equipment, supplies, vehicles, computers, software and training in place. When we track or count these tangible things, the infrastructure that's

needed to get the desired outcome is called "structure measures." These measures are important for budgeting and allocating resources, but aren't always clearly linked to outcomes.

Once the right structure is in place, we need to take action and do something with all those resources. When we measure that action, those things we do, they're known as "process measures." In EMS, process measures often look at whether or not we performed an intervention appropriately. Even these can be tricky, as in the past we've often measured processes that weren't directly tied to outcomes.

Outcome measures look at what matters most to our patients and communities. The best examples are pretty simple to understand but often harder to actually calculate or access the right data for. People want to know if we make communities healthier—if we save lives, reduce suffering and improve recovery.

Think of that 14-ounce titanium milled, curved, hickory-handled hammer on sale at your local hardware store. I assume, like most of you, that when I buy a hammer, I'm buying a hammer because I need to put a nail in the wall to hang a portrait. I'm not buying it just because I want to own a hammer.

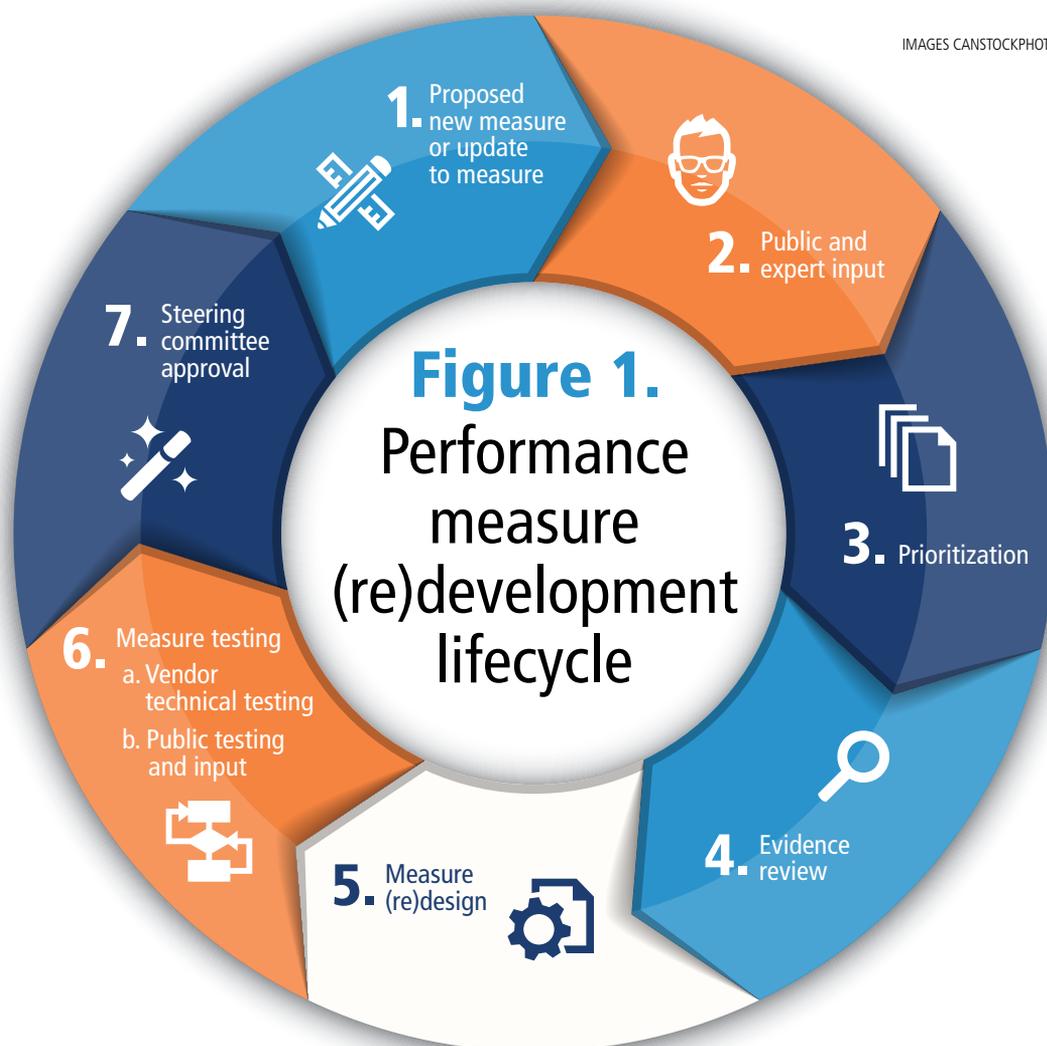
A structural measure would simply look at whether you own the hammer and nails. A process measure might look at whether you put the nail in the right place, hit it at the proper speed and to the proper depth. The outcome measure

## Exclusive Companion Article on JEMS.com

Log on for a bonus article by former paramedic David Williams, PhD, a leading expert in EMS system improvement and chair of the EMS Compass Measurement Design Group. This web exclusive, "Using Data to Enhance EMS Operational and Clinical Performance," provides an introduction to improvement science that will help you understand not just what performance measures are, but how they can help you help your patients. Find the article at [www.jems.com/ems-compass](http://www.jems.com/ems-compass).



Williams



would actually look at the final product—is the picture on the wall? Did it stay up there for more than 10 seconds?

In these ways we're using performance measures to look at what's happened. Do we have the right structure in place to support the right processes that will achieve the right outcome?

There's one other type of measure, one that we don't use as much but can be critically important: the balancing measure. Balancing measures are used to make sure we don't have any unforeseen and negative consequences. After hanging the portrait, our outcome is achieved—but in the process, were all the other pictures on the wall knocked off? Or did you fracture your thumb with the hammer?

### Identify the Desired Outcome

When creating a good performance measure, you should start with the end in mind and

identify the desired outcome. Imagine it from the patient's perspective: What's the best outcome a patient should expect? While there are times that our outcome is related to EMS provider safety or satisfaction, in most cases an outcome that benefits a provider will ultimately benefit the patient as well.

The EMS Compass process places a lot of emphasis on simply choosing the desired outcomes and processes to measure, because it's a key step in performance improvement. EMS history is filled with examples of measuring things that might not be tied to patient-centered, evidence-based outcomes, at times with negatives consequences. For example, there may have been a time when systems measured whether they applied pneumatic anti-shock garments (PASGs). But it turned out that PASGs may have done more harm than good for bleeding patients, so measuring their application evaluated compliance



with a protocol, but not a patient outcome.

But measures also need to be applicable in the real world, so they're not developed solely by the researchers and scientists. The first step in the EMS Compass process is an open "call for measures" that's widely announced and publicized through multiple publications, websites and social media to reach as many people as possible. Members of the EMS community and the public then have several weeks to submit their performance measure ideas through the EMS Compass

website. Even after all the measures are submitted, public feedback is still solicited throughout the process. For example, the first EMS Compass call for measures was followed by a series of webinars where anyone could learn more about the measures, ask questions and propose ideas.

After the call for measures and further feedback from stakeholders, the EMS Compass Project Execution Group, which includes the chairs of the initiative's working groups, works together to refine the vast array of proposed

## Software Vendors Come Together to Test Performance Measures

EMS Compass has brought together a diverse group of EMS providers, medical directors, measurement experts, patient advocates and industry representatives, all working together to move the profession forward. Nowhere has that spirit of collaboration been more apparent than with the Technology Developers Group.

The eight members of the group represent software developers and other entities that have developed EMS electronic patient care reporting (ePCR) or data analytics programs. Usually they're seen as competitors—certainly not the people you'd expect to be sharing data and helping each other understand how best to use EMS data for their customers.

Yet, that's exactly what's happened. At meetings of the Technology Developers Group, it's a regular occurrence to see two software developers from competing ePCR vendors sitting side-by-side, looking at one laptop screen, trying to figure out which NEM-SIS data point correlates to the proposed measure or what code to use to calculate it.

"It's been truly exciting to be in a room where so many great ideas are shared among competitors," said Technology Developers Group Chair Debbie Gilligan, a product strategist with First-Watch. "Every member of the group has recognized that EMS Compass has the potential to revolutionize EMS, and they have put the

profession and the patients ahead of any corporate rivalries."

In many cases employers have encouraged group members not only to attend meetings and spend countless hours designing or testing measures, but also to share best practices with each other.

PHOTO COURTESY ZOILL



"The long-term health of the EMS profession depends on us working together to develop evidence-based care and ways to measure and improve performance," said EMS Compass Steering Committee Chair Bob Bass. "You can't find a better example of that than what's happened on the EMS Compass Technology Developers Group."

For a list of members of the EMS Compass working groups, including the Technology Developers Group, go to page 24.

—Michael Gerber, MPH, EMT-P



# What is a Performance Measure?

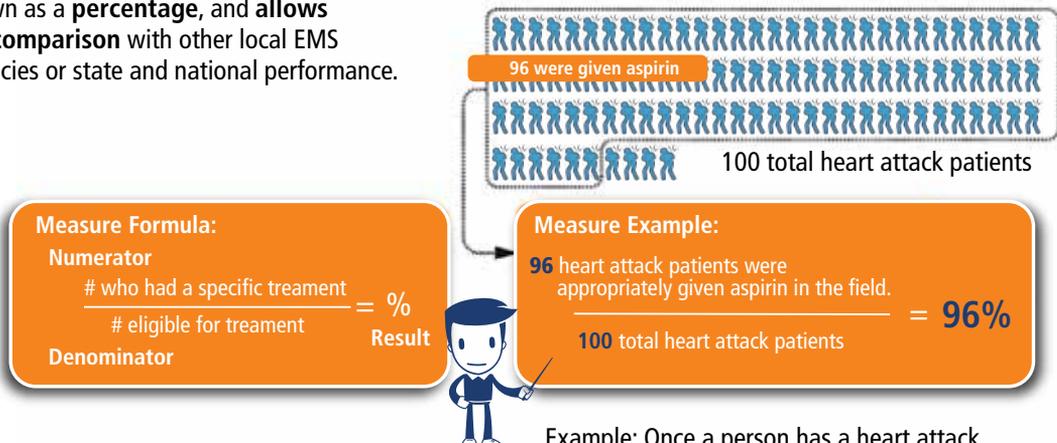
A performance measure is a **numerical indicator** showing **whether and how often** an EMS agency, as well as the entire healthcare system, achieves the **desired outcomes**.



EMS and Healthcare System

## Constructing a Performance Measure

The result of a performance measure is often shown as a **percentage**, and **allows for comparison** with other local EMS agencies or state and national performance.



Example: Once a person has a heart attack, taking aspirin daily has been shown to reduce the chance of having a second one. Guidelines tell EMS practitioners to provide aspirin to all patients presenting with symptoms of a heart attack in the field.

## Types of Performance Measures

### Outcome Measure

Was the desired outcome achieved?

### Process Measure

Are the processes performing as planned?

### Balancing Measure

What are the consequences of the processes?

### Structural Measure

Is the infrastructure in place to support the processes?



measures. This summary is then provided to the Steering Committee to prioritize and provide overall guidance. Measures are grouped into families aligned with clinical conditions or other general topics. For example, a stroke family of measures includes several process and outcome measures related to stroke, all of which are important in improving overall stroke care.

The next step is vital to the success of any measure but is most obvious for the design of clinical performance measures. In order to ensure that measures encourage and improve evidence-based care, a talented group of state and local medical directors, paramedics and researchers review the available published scientific literature. In reading the science, the Evidence Review Group considers the size of the study, how sci-

of EMS organizations and providers, including Fire-based, private, public, ground and air services located in rural, suburban, and urban areas of the United States, uses the graded evidence to make the measures. They discuss what the evidence shows so that they can create the first drafts of measures in “plain English.” In other words, they talk about which patients would be included in the measure, how to define what gets counted, and more. By discussing the measures in simple terms, they’re able to test the concepts in an attempt to make sure that they account for all the different types of EMS systems, geographies, levels of service and types of healthcare systems.

Once the members of the Measurement Design Group are satisfied they have a good first draft, they share it with the Technology Devel-

**Our profession has a huge advantage that makes EMS Compass different than performance measure projects in other areas of healthcare.**

entifically valid the methodology was, the outcomes that were measured and the reported results, as well as other relevant details.

Fortunately, some of the legwork for evidence review has already been done by groups such as the American Heart Association or through the national Prehospital Evidence-based Guidelines (EBG) Consortium. Although the Evidence Review Group still closely looks at these studies and their methodology, and examined more recent literature to see if any studies had shed new light on the topics, thorough and thoughtful grading of evidence had already been performed. In the future, one can imagine an even closer marriage of the two processes, as evidence-review is simultaneously used to develop EBGs and related performance measures.

### **Building the Measure**

Once it’s confirmed that a measure is supported by medical research and best practices, the next step is to actually design the measure. It’s one thing to say we want to measure whether or not EMS providers appropriately identify and assess stroke patients—it’s another to figure out exactly how to measure that. And that’s one of the main reasons for the existence of EMS Compass: to develop measures that can be used consistently by any EMS agency so they can work with each other to improve across borders.

The EMS Compass Measurement Design Group, whose members represent a wide range

of operators Group comprised of software architects, developers and data experts who represent the majority of all ePCR systems used to collect pre-hospital data in the U.S. They break apart the measure into pieces to help identify specific data elements to use.

Our profession has a huge advantage that makes EMS Compass different than performance measure projects in other areas of healthcare. The National EMS Information System (NEMSIS) is a single nationwide standard for how EMS data is collected and identified. Nearly every patient encounter in the U.S. is documented using the same data definitions, removing any significant roadblocks to using EMS Compass measures or combining or comparing data from one patient or system to another.

At this stage, the measures look like a foreign language, but each of the letters and numbers refers to a specific checkbox or field in the ePCR, allowing a software developer or EMS agency to easily determine how to calculate the measure.

After identifying the data elements to use, the technology developers do extensive testing to verify the data is being collected consistently across the country and that the measure is actually calculating what it’s supposed to calculate.

To make sure the measures work using actual EMS data collected by providers in the field, two software vendors have contributed entire datasets of tens of thousands of records of prehospital data and linked hospital outcome data. This



## “Outsiders” Lend Expertise & Perspective

### The Physician

Although his medical training included little time in an ambulance, EMS Compass Steering Committee member Kedar Mate, MD, knows a bit about improving healthcare. As a hospitalist and professor in New York, he treats patients and supervises new physicians. And as a senior vice president for the Institute for Healthcare Improvement (IHI), he travels the world helping to improve systems of care. Prior to joining IHI, he worked with Partners in Health and in the HIV/AIDS division at the World Health Organization. He has led efforts to raise rates of HIV treatment and to reduce childhood mortality in Africa.

“To make any system behave differently, you have to have some way of knowing what’s happening, to know whether your change is resulting in improvement,” he said. “Measurement is the bedrock of improvement.”

Too often measurement in healthcare is associated with accountability, Mate says. So-called “poor performers” are chastised or punished for not meeting certain standards.

“One way to make your system perform better is to find all the defective parts in the assembly line and just get rid of them,” he explained. “The

problem with that theory is that it’s measurement for judgment—it’s measurement for discipline. You get a cycle of fear: ‘I don’t want to report my data because somebody’s going to fire me or kick me out of the system.’ Fear becomes the currency of that kind of system.”

People try to hide errors or bad outcomes, instead of examining why they occurred and fixing them.

“I think the opposite of that is continuous improvement. No matter where you fall on the bell curve, you can improve,” Mate said. “There’s no upper limit. Every year, we can [all] get a little better.”

Mate has seen how the development of performance measures can be a contentious and at times divisive process as the measures are dissected and debated. The solution, he argues, is not to aim for perfection, but rather to test measures and see whether they help improve processes and outcomes.

“We’re never going to get it exactly right—there’s no sense in even trying,” he said. “I’ve yet to see a situation in which the measures are, right out of the gate, completely nailed.”

—Michael Gerber, MPH, EMT-P



Mate

enables the workgroup to test and tweak their draft measure definitions using real-world data. It takes several revisions before all of the complications are identified and fixed and the measures are ready for public testing and feedback.

When a measure is released for public comment, the goal is to get feedback on both the technical aspects of the measure as well as the clinical and operational implications of using the measure. How will that measure impact patients, providers, services or the community?

This is one of the most important parts of creating performance measures, and it doesn’t end after the measures are finalized and approved by the EMS Compass Steering Committee. Performance measures must continually be evaluated, as new evidence changes clinical care, new data sources become available, or unforeseen side effects of the measures are discovered. Sometimes the creation of a measure leads to the realization that information isn’t being collected, or is being collected but not in the best way.

### Conclusion

The development of evidence-based care, the creation of performance measures, and the collection and analysis of data are all part of a fluid cycle that must frequently adapt and evolve. That’s why EMS Compass has focused on developing not only performance measurements for EMS, but also a performance measures development process, which in many ways is more critical than the measures themselves. Whether it’s used by individual organizations or the entire EMS community, the measurement development process can live on, making EMS Compass an ongoing collaborative initiative. ✨

**Nick Nudell, MS, NRP**, a national expert on data and EMS, serves as the EMS Compass project manager for the National Association of EMS Organizations. He previously served as the regional operations manager for the Idaho State EMS Bureau and as an EMS specialist with the San Francisco EMS Agency.

Using performance measures to improve is about more than just analyzing data—it takes planning, action and continuous evaluation.

PHOTO COURTESY IMAGETREND



# Planning, Action and Continuous Evaluation

Using performance measures to improve is about more than just analyzing data

By Matt McQuisten, MBA, NRP; Gary Wingrove and Michael Gerber, MPH, EMT-P

**A**lthough many agencies have begun measuring performance, few have truly figured out how to use that data to make improvements. They struggle deciding which measures matter, interpreting the numbers and figuring out ways to improve. The process can at times be overwhelming.

If you feel that way, the good news is that you're not alone. There *are* agencies out there that have used their data to support improvement efforts that are making a difference in patients' lives.

## Decide What to Measure

One of the very first steps is to decide what to measure. It might be that you know there's a specific area of care you'd like to focus on, either because it's a high-risk event, such as airway management; other times, partnering with a hospital ST elevation myocardial infarction (STEMI) or stroke team might lead you to start in those areas.

Measures, however, should be chosen carefully. They should be evidence-based and as patient-centered as possible. That's where the EMS Compass initiative will help—experts in EMS and measurement, along with a wide range of EMS stakeholders, are coming together to ensure that the EMS Compass measures meet those criteria.

But your agency still may want to choose which measures to focus on first, and there may be times when other measures are still appropriate.

In some cases, measures will help determine what areas you want to focus your improvement efforts on. In other cases, implementing a new program might then influence what you want to measure. Either way, many experts recommend focusing on one or two areas to try to improve. For example, Allina Health EMS in Minnesota picks one clinical area each year and focuses on improvements in that specific condition, such as treatment of stroke or sepsis.<sup>1</sup> While they continue to measure the quality of care in other areas to look for serious deficiencies and to ensure that previous gains do not backslide, most of their efforts through the year revolve around that one clinical topic and the measures that support evidence-based care.

## System-Wide Issues & Solutions

In Sioux Falls, S.D., the EMS system, like many others, tracks intubation success rates. But instead of focusing on individual statistics, the agency noticed that across the board, the rate of successfully securing an endotracheal tube decreased as the number of attempts increased.

"The first attempt was the most important because the second and third attempts had much



lower success rates,” said Julie Charbonneau, the Sioux Falls quality assurance coordinator. “Because the rate of complications increases with each intubation attempt, we wanted to make sure the first attempt was the best attempt.”

“After reviewing the data ... we added tools to the airway kit and changed policy to give the medics the best chance at first attempt success,” she explained.

They also made rapid sequence induction a standing order if needed to make that first attempt successful. Since implementing the new policies and adding tools to the airway kits, first attempt success has increased by 10–15% overall.

Focusing on a measure of individual skill performance could potentially result in creating improvements on the measures but not in patient care. For example, had they solely focused on improving first-pass rates without providing the tools and system-level changes to do so, it’s possible that the outcome would have been providers spending more time struggling to intubate on the first attempt—resulting in decreased oxygen saturations for the patient. For this reason, EMS Compass is focusing on even more patient-centered measures that are more directly linked to patient outcomes.

### Measure to Evaluate Changes

In addition to identifying areas for improvement, performance measures should also be implemented when significant changes are made in protocols or policies. Measures can let you know if those protocols are being followed and also whether the changes have the intended impact. Even the process of deciding what to measure helps an agency gain clarity around what the goal is of any change in practice, whether operational or clinical.

In Snohomish County, Wash., Fire District One Deputy Chief Shaughn Maxwell introduced checklists for several different clinical conditions, such as stroke, congestive heart failure (CHF), asthma and STEMI. These checklists included critical items in the protocols, such as checking blood sugar for potential stroke patients or using end-tidal carbon dioxide monitoring on CHF and other respiratory patients. But only by measuring would the agency know if the checklists made a difference in patient care.

In 2011, they had a documented rate of checking blood sugar 57% of the time for potential stroke patients. Three years later, after implementing the checklists, that rate was 91%. They saw similar improvements across the board.

Sometimes measures show an agency that a

change didn’t have the intended effect. Meds-1 EMS in Grand Rapids, Minn., added an ALS non-transport vehicle to respond to high-acuity calls along with an ALS transport unit in Grand Rapids because the city had no first responders. But they noticed that when the additional paramedic was dispatched on calls, on-scene times were increasing—which could detrimentally impact patients with certain time-sensitive conditions such as STEMI, stroke and trauma. There could be many reasons for this, including that the paramedics on scene were waiting for the additional provider to arrive, or the hand-off in care from one paramedic to the other caused delays. In the rural areas, where community first responders assisted the Meds-1 transport units, on-scene times had remained consistent, and lower than in the city. Based on the information gleaned from those measures, Meds-1 instead worked with the Grand Rapids Police Department to develop a first responder program.

“Ongoing data assessment has indicated improved procedure times and overall scene time reduction,” said Timothy George, director of EMS and community health outreach for Meds-1.

### Conclusion

Any EMS quality improvement plan needs measurement in order to know where to focus efforts and whether those efforts are succeeding. The measures serve as both a map and a guide that lets the agency know where it is, and in which direction it should travel. Performance measurement can be daunting, but it’s critical that every agency takes small steps toward using measures to guide improvement plans—otherwise, we’re doing a disservice to our patients, our communities and our profession. 🌸

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**Matt McQuisten, MBA, NRP**, a member of the EMS Compass working group, is an experienced paramedic and healthcare educator with more than 25 years of experience in healthcare.

**Gary Wingrove**, a member of the EMS Compass working group is director of government relations and strategic affairs for Mayo Clinic Medical Transport, chairs the International Roundtable on Community Paramedicine, and is president of The Paramedic Foundation.

**Michael Gerber, MPH, EMT-P**, is a paramedic, instructor, author and consultant in Washington, D.C. He has more than a decade of experience in EMS and the fire service.

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# Demonstrating Value in Healthcare

Communities expect EMS to provide effective, efficient, high-quality patient care—and prove it

By Alex Garza, MD, MPH

**T**he modern concept of quality improvement (QI) evolved from the field of engineering.<sup>1</sup> Instead of simply performing quality assurance—where defective products were discovered and removed through an inspection process—QI programs strive to figure out why errors occurred and design systems to prevent them. The motivation was to improve production, which would translate to better quality at a lower cost—and thus higher profits.

In healthcare, the less successful a treatment or procedure was, the more it would usually cost—patients would stay longer in the hospital or be forced to undergo further treatments and procedures. At the same time, the evidence base for much of medicine hardly existed, making it unclear whether you were paying for something that was proven to be effective. And there was little incentive for making the delivery of healthcare more efficient, eliminating errors or developing quality control processes.

In this legacy model, there's no incentive to improve patient care. A hospital that invests in quality, providing top-notch, evidence-based care on a cardiac patient will receive the same reimbursement (and possibly less) than another hospital that provides inferior care. And there's little transparency on how effective or efficient those hospitals are.

Today, with consumers demanding better care, it only makes sense that quality measures be used to achieve that goal and demonstrate value to the community.

## The Triple Aim

This move to quality in healthcare is based in part on the Institute for Healthcare Improvement's (IHI) Triple Aim that “describes an approach to optimizing health system performance.”<sup>2,3</sup> The three dimensions that comprise the Triple Aim are:

1. Improving the patient experience of care (including quality and satisfaction);
2. Improving the health of populations; and
3. Reducing the per capita cost of healthcare.

EMS exists now where healthcare was a decade ago, before QI and measures became part of the culture. Perhaps it has lagged behind because it benefited from its reputation of providing public safety. Rarely has the public demanded proof that EMS was effective—the public was happy as long as EMTs and paramedics showed up, spoke confidently and took patients to the hospital.

But just as the cost of healthcare overall has skyrocketed, so has the cost of EMS. Several recent reports by the U.S. Health and Human Services (HHS) Office of the Inspector General and the U.S. General Accounting Office detail how the cost of providing EMS care to Medicare recipients has grown exponentially and far faster than the overall cost of providing medical care.<sup>4,5</sup> This is an unsustainable model.

At the same time, EMS across the country is evolving as innovative programs try to provide more appropriate care, treatment and transport options. These programs aim to reduce costs while at the same time keeping patients healthier.

The reimbursement model for EMS, however, has always been almost entirely based on transportation, not the provision of healthcare. The U.S. Centers for Medicare and Medicaid Services (CMS) pays for ambulance transports, but not the assessment or treatment provided by prehospital personnel—and most other payors do the same.<sup>6</sup> The EMS community has long argued against this model, dating back at least as far as the 1996 EMS Agenda for the Future, which strongly recommended changing it.<sup>7</sup>

The focus on reducing costs and keeping patients out of the hospital presents a window of opportunity, when policymakers and the public may be more supportive than ever of recognizing EMS as an integral partner in the healthcare continuum. As that happens,



though, it only makes sense that those who pay for EMS care—patients, taxpayers, local officials, insurers—want to know what they’re getting for their money.

### Quality Measure in EMS

EMS, unfortunately, has few metrics to measure itself by to show value or quality. There are no universally agreed-upon metrics for the industry to benchmark against.

Just as quality programs are taking hold in healthcare and hospitals, there will likely soon be an expectation that EMS systems will adopt quality programs as well. Many of the measurements used to assess the quality of inpatient hospital care are directly applicable to the out-of-hospital environment, such as the time it takes to acquire an ECG on a patient with chest pain or a heart attack patient to get from the scene to the cardiac catheterization lab.

Beyond the clinical care domains, patient experience isn’t routinely measured for the out-of-hospital patient. However, it wouldn’t be difficult to translate the inpatient measures to the out-of-hospital setting by asking such things as:

- Was your pain relieved?
- Did the provider communicate with you?
- How clean was the ambulance?

EMS is a perfect laboratory for looking at quality. By and large, EMS controls the delivery of health for emergency care and the transport for entire populations and geographic areas with limited or no competition. This is good and bad for different reasons. It’s good because it means that the delivery of this care can be centralized and organized. Records are maintained using a standardized system, making data extraction and comparison easier. All of the healthcare providers are trained to a certain level and all follow common protocols. Because of all these things, it’s more straightforward to develop quality control measures and to impact the delivery of care because it’s an organized “system.” The same can’t be said about the rest of healthcare.

In many EMS systems, data to measure quality is bountiful (e.g., in dispatch and patient care reporting software). What’s key is capturing the data and then measuring it. The reality is that this can be done without changing any of the systems already in place in an EMS agency.

EMS systems that understand the need for quality to improve efficiencies and demonstrate value are investing in data analytics and information to improve the quality of care delivered to the populations they serve and are well positioned for the EMS of the future.

### The Path Forward

As EMS continues to evolve, investing in quality and measuring value will become a requirement. This shouldn’t be seen as a threat to the industry, but really as the maturation of EMS as a true partner in the healthcare community.

EMS has a unique opportunity to develop instruments to show how what we do matters and further professionalize this discipline of medical care. Whether those instruments or measures are used by individual agencies internally to assess quality, taxpayers to know what they’re getting for their investment, or insurers to determine reimbursement levels, the same rule applies: Measures need to be evidence-based, understood and supported by the EMS community, and focused on processes and outcomes that EMS agencies and providers can influence.

The push to measure quality and demonstrate value in healthcare isn’t going away, and the EMS profession has an opportunity to steer the effort to ensure it truly does improve the care patients receive and the critical service we deliver to our communities. ✿

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## “Outsiders” Lend Expertise & Perspective

### The Patient Advocate

**Martha Hayward** has never held any healthcare provider credentials. Yet for the last five years, she’s been immersed in the nuances of healthcare improvement as the lead for public and patient engagement at the Institute for Healthcare Improvement (IHI).

Hayward brings the patient’s perspective to healthcare improvement: 10 years ago she was diagnosed with breast cancer. She remembers arriving at the hospital one morning for surgery and learning firsthand how improvement efforts can have an unintended impact on patients. A hospital employee placed a band on her wrist and asked her why she was there—the first step in a safety procedure put in place to prevent performing surgery on the wrong patient or the wrong site.

“It took me about three minutes to say bilateral mastectomy,” Hayward recalled.

By the time she arrived in the operating room, she had been asked the same question about a dozen times. Her anxiety levels increased, and her husband’s frustration led him to shout, “Why does no one know what she’s here for today?”

A decade later, Hayward understands why they asked so many times, but also knows that there are ways to achieve the same result without increasing her fear. For example, hospital staff could have explained that the questions were a safety measure, making her feel like part of a team and reducing her anxiety.

“I would’ve felt confident with them, rather than completely freaked out,” she said.

Hayward later served on the Patient and Family Advisory Council at the Dana-Farber Cancer Institute before joining IHI, where she met Dave Williams, chair of the EMS Compass Measurement Design Group. She shared her experiences as both an EMS patient and a family member—her brother, an EMT, died in a line-of-duty helicopter crash.

Hayward says patient interaction with EMS is about more than just the care provided in the ambulance.

“When you’re meeting somebody in the midst of a crisis . . . prior to the activity at the hospital, that interaction can be so key to the patient’s safety,” she said, adding that EMS practitioners can help the patient “feel calm, feel focused on, feel safe. It’s going to change the way the patient presents at the hospital. It’s key to the entire patient experience.”

—Michael Gerber, MPH, EMT-P



Hayward

### The Health Economist

University of Texas Associate Professor of Public Affairs **Todd Olmstead, PhD**, wasn’t an EMS expert when he began advising a group of public policy students who were studying how to better integrate Austin-Travis County EMS with local healthcare networks. But in some ways, he was the perfect person for the project.

While his current research focuses on health economics, Olmstead previously made his living as a transportation logistician and wrote his dissertation on highway safety. At the intersection of healthcare and transportation sits EMS.

“I knew enough to be dangerous, when this was starting,” he said of his students’ study, which was part of a requirement for master’s students to participate in a policy research project. “I was invited because I was a health economist. I spend a lot of time thinking about how much stuff costs, and who’s paying for it.”

Olmstead brings to EMS Compass the perspective of someone who has spent time analyzing complicated systems—whether in his job as an operations research analyst at Union Carbide early in his career, as a consultant with McKinsey & Company, or researching the cost-effectiveness of substance abuse programs. To Olmstead, measuring the effectiveness and efficiency of EMS systems isn’t only possible, it’s necessary.

“Otherwise you’re just wasting resources, or misallocating them,” he explained. “[EMS leaders] have a lot on their plates, to be sure. But I don’t know if they have the information or the analysts at their disposal to tell them how they’re doing. And maybe they’re afraid to find out. What if we find out we’re terrible?”

Olmstead, who also sits on the steering committee for the Promoting Innovations in EMS project ([www.emsinnovations.org](http://www.emsinnovations.org)), recognizes that EMS agencies have limited resources and often lack the time or expertise to perform data analysis. He sees the potential of EMS Compass to help ease that burden and make data accessible to even the smallest agencies. He also sees it as a chance for EMS organizations to benchmark and share best practices in a professional environment that encourages open dialogue.

“One of the reasons for having EMS Compass is to try to develop measures that are pretty much apples to apples across agencies, so you can find the good performers and see what they’re doing right, and have them teach [other agencies],” he said.

—Michael Gerber, MPH, EMT-P



Olmstead



# Connecting the Dots with Data

One of the benefits of closing the patient care loop is giving dispatchers feedback on their initial assessments.

PHOTO BOB STRICKLAND PHOTOGRAPHY

## Linking data to improve patient care from dispatch to discharge

By Keith Griffiths

Imagine that for every 9-1-1 call you answer, you're able to close the patient care loop: Dispatchers know if they correctly assessed the chief complaint; EMTs and paramedics know if their assessment and treatments were appropriate; the receiving facility knows exactly what happened in the field; and finally, when the patient is discharged, all the pieces are communicated to all parties involved in the patient's treatment. The patient care loop is closed and that information can now be used for quality improvement.

In this ideal state, standardized performance measures, like those created by EMS Compass, can be applied to evaluate each step in the patient's treatment—and ultimately its effect on patient outcome.

For most EMS agencies, getting patient outcome data from hospitals has been difficult if not impossible. But that's slowly changing, as Version 3 of the National EMS Information System (NEMESIS), combined with a national push to make healthcare data systems interoperable at all

levels, has given momentum to the effort to integrate EMS data with other healthcare data. This article looks not only at the challenges of data integration, but also specific successes, where communities are using technology in innovative ways to close the patient care data loop.

### The Value of Outcome Data

Without data from hospital records, EMS is limited in what it can measure. For example, a critical prehospital action is to identify when a patient has stroke symptoms and notify the hospital—this has been shown to decrease the time it takes for the patient to receive treatment, which leads to better recovery with fewer neurological deficits.

But how can we measure the accuracy of EMS stroke identification without knowing who was ultimately diagnosed with a stroke? A measure using solely EMS system data might look at whether stroke scales were performed on patients identified as having stroke-like symptoms. But by using hospital diagnosis codes, an EMS system could measure whether it's missing any strokes and figure out ways to ensure that doesn't happen. The agency can also see if



improvements to protocols or processes actually improve important measures, such as how long it takes for the patient to receive appropriate treatment. And perhaps most important, the EMS system with access to hospital data can measure its impact on actual patient outcomes.

Other articles in this supplement describe the different types of performance measures, including process measures, which when applied to patient care are defined as specific steps—such as a medication or procedure—proven to benefit the patient. Outcome measures are what ultimately count most to patients—did my health improve after you treated me?

In the creation of performance measures through EMS Compass, the leaders of the initiative had to ask themselves if outcome measures should even be considered, because the data are largely unavailable to EMS. But at the same time, NEMSIS Version 3 added some outcome fields that align with

Integrating data from devices into the patient care report and transmitting this data to the hospital is important in being able to collect a complete record of care for the patient.

PHOTO COURTESY IMAGETREND



Health Level 7 International (HL7), a standard for data used throughout the healthcare world—which will help overcome some of the hurdles that have prevented agencies from getting automated outcome data in the past. In the end, they decided they should consider outcome measures, not just for the handful of agencies that will be able to access the appropriate outcome data now, but because outcome measures are critical to achieving the initiative’s vision of improving patient care.

### Barriers to Sharing Data

EMS agencies and hospitals share some outcome information, most commonly for cardiac arrest patients. This typically doesn’t happen through the seamless integration of data

or using a common database that automates and simplifies the process, but rather with the manual sharing of patient care reports and hospital records.

Although there are many examples of successful collaborations between EMS and hospitals, healthcare leaders rarely viewed EMS as a partner. In their eyes, EMS agencies were considered public safety, not healthcare, and their information and data wasn’t useful. Making EMS and hospital data interoperable wasn’t a high priority, and certainly not worth the time and expense—and perhaps risk—involved. And quite frankly, the technology wasn’t there to make it a simple decision. A variety of new technological innovations are now beginning to change that attitude.

### Health Information Exchanges

The U.S. Department of Health and Human Services (HHS) defines Health Information Exchange (HIE) as “electronic movement

of health-related information among organizations according to nationally recognized standards.”

HIEs were envisioned as regional networks, connecting the many disparate entities that interact with a patient with data relevant to that patient’s condition. Unfortunately, EMS has been involved in only a few HIEs nationally, either because of a lack of funding, lack of technology or lack of collaboration.

A notable experiment with EMS and HIEs is now happening in California, with a grant to specifically fund EMS participation. The results won’t be known until next year, but there are high expectations. Other regions and states are also experimenting.

In the meantime, some self-contained healthcare systems with their own EMS agencies have been able to create a version of an HIE for themselves, using translator software to make it efficient to connect a variety of disparate data sources.



Jonathan Washko, the assistant vice president of operations for Northwell Health's Center for EMS (formerly known as North Shore LIJ Health System) and a member of the EMS Compass Measurement Design Group, describes



An EMS system with access to hospital data can measure its impact on actual patient outcomes.

PHOTO COURTESY MEDSTAR MOBILE HEALTHCARE

EMS in his agency as a “mashup” of many different businesses under one roof, with data sources that include computer-aided dispatch (CAD), ProQA, Emergency Communication Nurse System, electronic medical records, billing systems, and AIMS (administrative info management system), along with internally developed products for decision support. None fully talk to each other.

Making these each interoperable with health-care systems data can be challenging. Even in his system, within one corporation, hospitals use as many as four different types of software for patient records. The good news is that they've been able to overcome these obstacles with a software solution that facilitates and translates the various databases, enabling their internal HIE and linking the multiple EMS data sources with the hospital data.

Very soon, Washko says, they'll be able to connect all the dots with data, with the ability to very quickly have a patient's information served up in a way that can be aggregated and mined for clinical decision support, quality improvement and outcome measurement—both for an individual patient and across the entire system. EMS Compass performance measures will be an important part of that process.

### Encouraging Hospital Cooperation

There are many approaches EMS agencies can take when facing hospitals that are hesitant to share data. EMS provides patients and patient information to hospitals every day, and to be good partners, hospitals should also share information. If hospital officials use HIPAA as an excuse, HHS—the agency that enforces

HIPAA—created a fact sheet and a letter from the assistant secretary for preparedness and response explaining when hospitals can share outcome data for quality improvement efforts. (The letter is available online at [www.naemsp.org/Documents/HIPAA%20Letter-NAEMSP.pdf](http://www.naemsp.org/Documents/HIPAA%20Letter-NAEMSP.pdf).)

Sometimes, the easier it is for a hospital to provide outcomes, the harder it will be for hospital officials to say no. For example, MedStar Mobile Healthcare, the EMS agency serving Fort Worth, Texas, has tapped into enterprise software already in use in many hospitals to integrate disparate data systems. According to MedStar's Matt Zavadsky, the software acts as a Rosetta stone to translate discrete data elements. Rather than sending PDFs back and forth, they're able to actually populate trauma, stroke and cardiac registries automatically, and then as part of the bi-directional exchange of data, MedStar receives patient outcome data and patient utilization data back from the hospitals in discrete data units.

MedStar also will use this system for its mobile healthcare programs; for example, when they see a patient who's just been discharged from the hospital, the data from the community paramedic's assessment will flow into the system and be available to the patient's primary physician.

In Arizona, a statewide effort to provide outcomes to EMS agencies recently went online. In this case, the statewide EMS database vendor provided the technological solution. The system takes outcome information that's submitted by hospitals and brings it in to a state database and links it to patient care reports that have been submitted to the state. Local



agencies can then access that information for patients they transported. One drawback to this approach is that hospitals don't submit to the state registry in real-time, so the information isn't immediately available. But a benefit of the statewide model is that even the smallest agencies find out what happened to their patients, including hospital diagnoses, procedures and disposition information.

When the project was announced, Rogelio Martinez, the data and quality assurance section chief at Arizona's Department

of Health Services, said, "The new method reduces the strain on personnel resources and gives measurements that each agency can use for improvement."

### Outcomes for Every Patient

The Williamson County EMS System, outside Austin, Texas, gets patient outcome data on every patient. (See sidebar below.) While his agency is only one of a few that have been able to accomplish this, Williamson County Medical Director Jeff Jarvis, MD, thinks the benefits

## "You've Got Outcomes!"

Outcome measures are an important part of EMS Compass, and NEMESIS Version 3 has the capability to make these measures readily available to every agency, large and small. To see how some agencies are using outcome measures, we talked to Jeffrey L. Jarvis, MD, MS, EMT-P, the medical director of Marble Falls Area EMS and Williamson County EMS, both located outside of Austin, Texas. For nearly two years, these agencies have been receiving patient outcome data, facilitated by their ePCR vendor. We asked Jarvis about how having that information will help EMS and patients.

### What's your system doing in terms of connecting EMS and hospital data?

**A.** There are three main hospital chains in our region. One of those has been hooked up (to their equivalent of a Health Information Exchange) for about two years now ... and the other two are in the process and should be coming online very soon.

Let's say you ran a call before we were hooked up. There's a patient with chest pain. You take him to the ED [and] traditionally when you drop him off, the patient vanishes. You never know what happened to him.

Now you're able to (find out the disposition of the patient) on your next shift. You'll log in (to the EMS reporting software) and on that initial dashboard, there's an application that will pop up that says, "You have outcomes."

### How does that work?

**A.** You click on that and it will show you a list of every patient that you transported to one of those facilities that's participating. Let's use for example your chest pain patient. You thought he was having

an MI but he was actually released from the emergency department with a diagnosis of pneumonia. And then you can see from looking at the lab that he had an elevated white blood cell count and they had a chest X-ray done, which shows an infiltrate. And then it'll actually show their length of stay in the ED

was an hour and a half. Then you can link back to a PDF of your run record too, so you have access to all of that.

### Are you doing that for every patient who's transported?

**A.** Every patient who's transported to one of the participating facilities. Right now we're doing it with Saint David's. It's part of the HCA—Hospital Corporation of America—chain. Any HCA hospital will get that information



Jeffrey L. Jarvis, MD, MS, EMT-P

### How are the medics reacting to it?

**A.** We initially thought that that was going to decrease the number of follow-ups (with medics) because they already had the information. It actually turns out it's increasing the number of follow-ups because they (get this feedback) and it just gives them more questions to ask. "Oh that's great, this patient only had pneumonia but jeez I wonder what the temperature was and I wonder what antibiotic they went out on."

I actually look at that as a good thing—that they're getting more information about their patients and it's absolutely helping them go, "Oh, you know, the pain really was kinda on the left lower side ... and now that I think about it they had a fever and they were coughing up this green nasty stuff. Maybe I should've been thinking pneumonia instead of MI." So, I think it's a nice feedback tool for the medics.

Now in terms of formal quality improvement, that's a step we're taking right now. So the first one of



and possibilities are so great that it won't be long before it becomes the national norm, rather than an exception—perhaps in as little as five years.

This is good news for those in EMS who wondered just five years ago if that day would ever come.

### Conclusion

This year modern EMS will be celebrating 50 years, as defined by the release of the 1966 white paper by the National Academies of

Science, “Accidental Death and Disability: The Neglected Disease of Modern Society.” Imagine where EMS can go in the next 50 years, powered by data and the knowledge of how prehospital care ultimately affects patient outcomes. ❁

*Keith Griffiths is the chair of EMS Compass Stakeholder Communication Group and president of the RedFlash Group, a national consulting firm providing education and outreach for healthcare and public safety. He's the founding editor of JEMS.*

these reports that we're looking at relates to STEMIs. So what we're trying to find out is what are our sensitivity, specificity, false positive and false negative rates and overall ability to recognize STEMI in the field.

#### **What other benefits do you see coming from this?**

**A.** The next thing we're going to do is a sepsis alert program. But to really do it I need a tool to measure lactate in the field. And for a variety of reasons, those things are hard to come by right now. So there've been some suggestions that end-tidal carbon dioxide (EtCO<sub>2</sub>) may be a good surrogate measure for lactate. So we want to try and figure this out. What we're going to do is [conduct a research project to] look at all the outcomes data and say, “Show me everybody we transported to that facility or those facilities, and any diagnosis that included sepsis,” and then we'll go back and look at what our EtCO<sub>2</sub> levels were to determine if EtCO<sub>2</sub> is a valid surrogate for lactate. We're also independently researching to see if there is an EtCO<sub>2</sub> level that can predict sepsis.

#### **Do you eventually want to do the same research with your dispatch data to see if the EMD has correctly identified the chief complaint?**

**A.** Yes, absolutely ... I'm also the medical director for our dispatch ... we're in the process of writing that report right now that looks at dispatch determinant code compared to EMS impression. That's an easy report to write. We can do that now because we get a determinant code that gets pushed over from our CAD for every call. One report that's more interesting is looking at the determinant code and comparing that to an ED diagnosis.

#### **How are you using your outcome data with performance measures?**

**A.** Dr. Brent Myers and the Eagles did a paper a few years ago that recommended some clinical

benchmarks and related performance measures. I thought that was a great place (to start) and yes we're absolutely reporting on those measures.

#### **It's only been in the last couple years that technology has allowed the interoperability of data, correct?**

**A.** Absolutely. Having a platform that provides bi-directional data flow between different hospital electronic medical record (EMR) systems and different EMS ePCR systems is crucial. There's no way you can ask 18 different EMS systems to change their systems and certainly no way to ask a hospital to change their EMR. It's great having technology that makes this data connection in a platform-agnostic fashion. It really takes a lot of the angst and push-back out of the equation.

#### **What would you say to your EMS colleagues around the country who have come up against hospitals unwilling to share data?**

**A.** If you would've asked me this question four years ago when I was feeling a little more blunt, and less politically correct, I think I would've told you that what needs to happen is that the medical director and system director need to go to the hospital, and say, “Listen, these are our patients, we're referring them to you, you either give us that data back or we're not giving you our patients.” And I think that will get their attention.

If you ask me now, I would say you have some version of that, but you do it in the least offensive way possible ... you don't break out that big stick. But we're negotiating from a position of strength. Of course, if you're only transporting to one hospital then you can't make that argument.

We also have our champions through the trauma registries at the hospitals. They saw great value in automating some of the registries that they cared for. They stepped up to say, “Hey this is really important and this is why.”



## About EMS Compass

The EMS Compass initiative launched in 2014 with funding and guidance provided by the National Highway Traffic Safety Administration (NHTSA) through a cooperative agreement with the National Association of EMS Officials. Although funded as a two-year project, the goal of EMS Compass isn't just to create and evaluate performance measures, but to develop a system for designing performance measures that can live on well beyond the

timeline of the current initiative.

The EMS Compass performance measures will be based on the latest National EMS Information System (NEMSIS) data points, as well as other sources of data, and are being developed for use by local EMS agencies to use data meaningfully to improve care.

For more information about EMS Compass or to volunteer to be involved in the national effort, sign up to receive updates at [www.emscompass.org](http://www.emscompass.org), and follow the initiative on Facebook, LinkedIn and Twitter (@EMSCompass).

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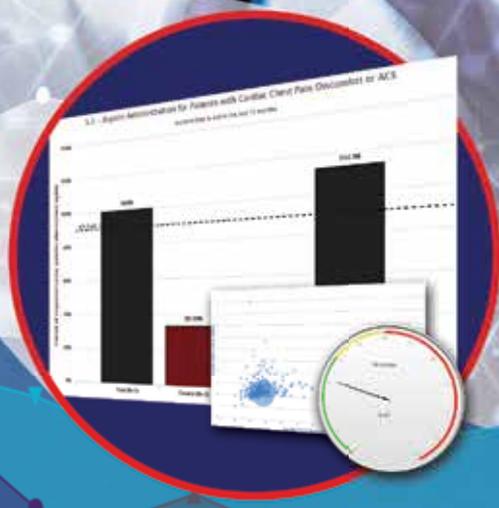
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