2016 NATIONAL SURVEY
DATA COLLECTION, USE AND EXCHANGE IN EMS

By the National Association of Emergency Medical Technicians (NAEMT)

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National Association of Emergency Medical Technicians
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Introduction

We live in an increasingly data rich, information driven society. From consulting crowdsourced product ratings, to communicating instantaneously with personalized worldwide networks, to asking smartphone map apps to direct us to the nearest Starbucks, data is integral to everyday life.

The data revolution is clearly evident in healthcare. Improved health information technology coupled with an urgent need for information to improve quality of care and control costs has led policy-makers and insurers to emphasize the "meaningful use" of data. The goal is to demonstrate which healthcare services have value – and then to pay for those services, rather than simply paying for a series of services with no evidence that patient outcomes are improved.

Groundwork laid for change

Unlike many other healthcare providers, including hospitals and physicians, EMS reimbursement isn't yet tied to the ability of EMS to demonstrate value. EMS still operates on a fee-for-service payment system (or more precisely, fee for transport). Nor is EMS required to provide data on performance, costs and patient satisfaction.

But there are indications that changes in standard reimbursement models are right around the corner. To get ready for this paradigm shift, EMS experts and medical directors are collaborating to develop key indicators that EMS could use to measure performance and value.[1]

At the national level, organizations such as NAEMT, the American Ambulance Association (AAA) and large ambulance services have advocated for EMS to begin reporting on measures of cost and performance in exchange for reimbursement incentives that would allow EMS to continue to innovate in the years to come.

Already some EMS agencies providing mobile integrated healthcare or community paramedicine (MIH-CP) services have discovered ways for healthcare payers or other healthcare providers to reimburse them for patient outcomes. Across the board, these agencies are utilizing data collected on patient outcomes to demonstrate the value of the services they provide.

Growing awareness of the integrated role of EMS

Other developments also suggest the demand for EMS data is growing. In the larger healthcare community, there's growing awareness of the role EMS plays in the health of our nation's communities. Developments such as regionalized systems of trauma, stroke and cardiac care have led to a greater understanding of how prehospital decisions and treatments provided by EMS can impact patients' health far beyond drop off at the emergency department.

The number of EMS agencies offering MIH-CP services is growing, demonstrating at a local level how EMS can intervene to improve the health of patients who overuse emergency departments, who need post-hospital discharge follow up, or have chronic illnesses that put them at risk for needing emergency care.

In 2016, an editorial in the *New England Journal of Medicine (NEJM)* recommended changes to reimbursement and regulatory policies to create incentives to enable EMS to continue to develop and test MIH-CP – and asked how patient data can be made available at the point of care and shared among providers.[2]

[1]The EMS Compass Project (empcompass.org), funded by the National Highway Traffic Safety Administration (NHTSA) and led by the National Association of State EMS Officials (NASEMSO), is developing EMS clinical care performance measures, while the MIH Measures Development Group (http://www.medstar911.org/mih-cp-outcome-measures-project) is focusing on mobile integrated healthcare-community paramedicine outcomes measures.

[2]Lisa I. Iezzoni, et. al.,"Community Paramedicine – Addressing Questions as Programs Expand," N Engl J Med 374 (2016), 1107-1109. IN PDF version hyperlink to: http://www.nejm.org/doi/full/10.1056/NEJMp1516100?rss=searchAndBrowse&

About the Survey

With so much at stake for the EMS profession and our patients, NAEMT is pleased to present the results of our survey on data collection, use and exchange in EMS. The results provide a snapshot of the state of data in EMS today, and indicate where the EMS industry needs to focus greater effort to ensure that the data needed can be collected, analyzed, used and exchanged to demonstrate value to payers and improve the quality of care.

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The 23-question survey, developed by the experts who make up NAEMT's EMS Data Committee, was distributed electronically to more than 40,000 EMTs, paramedics, EMS managers and medical directors in November 2015. We received 2,453 responses from all 50 states.

In addition to analyzing overall responses, we also separately analyzed responses from those identifying themselves as EMS managers to determine if management perceptions of data practices and challenges might differ from those of the overall group. This provided additional insights on several key topics.

Demographics of survey respondents

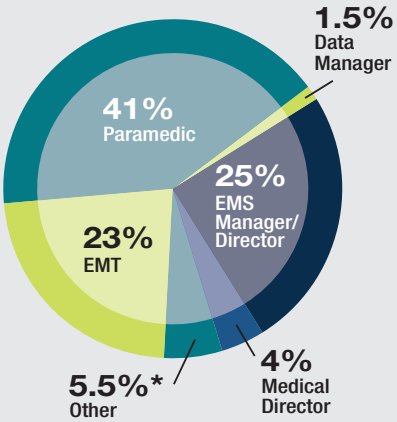
Respondents represented a diverse range of service delivery models, with about 30% from either private for-profit or non-profit ambulance services; 19% from fire departments; 24% from public (county, city, regional) agencies; 10% hospital-based; 10% volunteer, and 8% "other," including military, federal government, industrial and air medical.

Call volumes covered the spectrum:*

- 19% of agencies answered fewer than 1,000 calls annually
- 23% answered between 1,000 and 5,000
- 23% answered between 5,000 and 25,000
- 18% answered 25,000 to 100,000
- 8% answered over 100,000 calls

**8% didn't know*

RESPONDENTS



**including EMS educator, training coordinator, safety officer, and nurse*

POPULATION DENSITY SERVED BY RESPONDENTS

38%	29%	22%	7%
Rural	Suburban	Urban	Super rural

Data Collection

For EMS personnel rushing to and from calls and taking care of patients, data collection may seem like a chore. But collecting high quality data is vital to giving individual EMS agencies, the EMS industry and researchers the information needed to make evidence-based decisions for care improvement, and to demonstrate the value of EMS to payers and other healthcare providers.

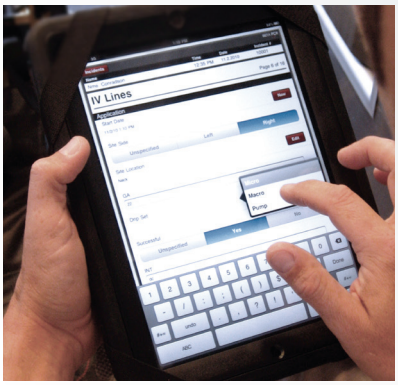
> ePCR use in EMS has become widespread. 73% collect clinical data electronically.

In EMS, electronic patient care reports (ePCR) have become widespread, making it much more feasible for EMS to collect vast amounts of data from the field.

About **three-fourths (73%) of respondents reported using electronic means to collect information on clinical processes**, such as endotracheal intubation, intravenous and intraosseous infusion success rates, trauma scene times, CPR quality and performance, and 12-lead acquisition.

Fewer (61%) said they electronically collect data on outcomes, such as rates of cardiac arrest return of spontaneous circulation/survival to discharge; STEMI, stroke and trauma patients identified and transported to respective specialty hospitals; and compliance with clinical bundles. (Clinical bundles are groups of clinical performance metrics for patients with certain symptoms. For example, a respiratory bundle would include giving oxygen and a bronchodilator when indicated).

Only 15% reported they still collect data on clinical processes manually (pen and paper), while 22% said they collect data on clinical outcomes manually.



DATA EMS AGENCIES COLLECT ELECTRONICALLY	
Clinical process	73%
Patient demographics	72%
Operational outcomes	71%
Performance compliance/improvement	64%
Payment/reimbursement data	63%
Clinical outcome	61%
Cost data	54%
Patient safety data	44%
EMS practitioner/ambulance safety data	43%
Operational process	43%

Majority of EMS Agencies Collect Cost, Other Financial Data

EMS agencies are focused on collecting data on clinical processes for good reason – those measures directly impact patient care.

But agencies also have to pay attention to the business side of the EMS equation. At a time when the reimbursement landscape is shifting and reimbursement rates from insurers are reportedly dropping, data that shows the true costs of serving a population, and that can help ensure the agency is recouping all of the revenue that it's entitled to receive, is becoming more important.

> EMS agencies are focused on collecting data on clinical processes for good reason – those measures directly impact patient care.

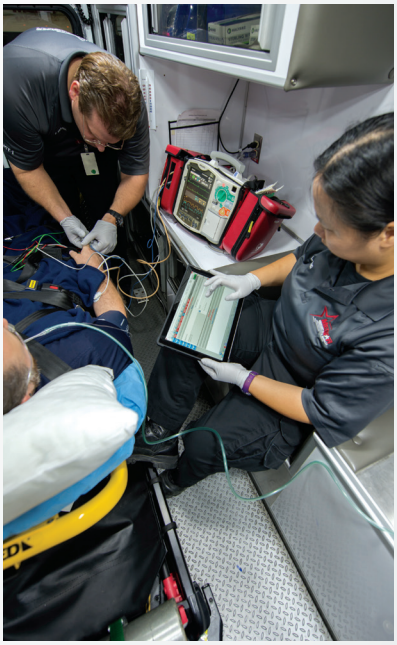
The survey found that about **75% of respondents collect cost data** such as cost per capita, cost per unit hour, cost per transport and supply cost per call either electronically or manually, while about the same number ***(78%) collect payment and reimbursement data***, such as gross and net revenue, collection percentage and payer mix.

This is a very encouraging sign that EMS will be prepared to answer questions about the costs of providing services, information that many other healthcare sectors are required to report.

One in Three Agencies Not Collecting Patient Safety Data

When asked how they collect patient safety data (such as patient drops or adverse outcomes) about **59% reported collecting that information electronically**, while **12% said they collect it manually**. But that left **29% of respondents answering "not applicable,"** suggesting that they do not collect this information.

About 70% of agencies report collecting EMS practitioner and ambulance safety data (such as crashes and injuries) either electronically or manually, but that left 30% answering "not applicable."



Challenges in Data Collection
Cost, Lack of 'Buy in' From EMS Personnel

Though there are many upsides to ePCR use, data collection also poses challenges.

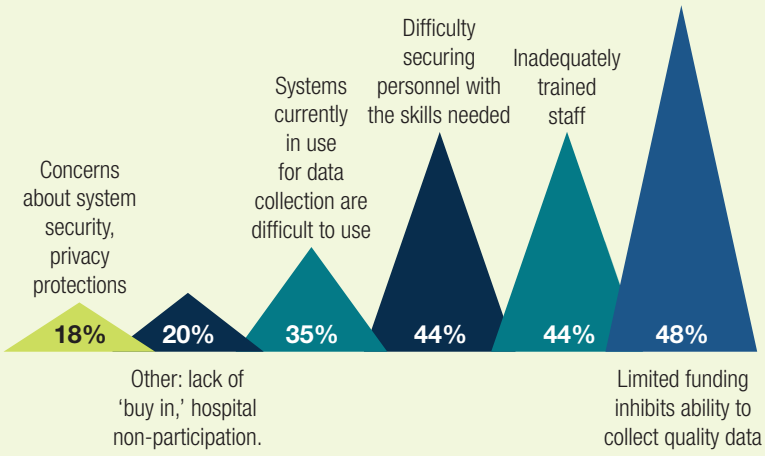
The majority of respondents (58%) reported that their agency encountered obstacles in collecting data.

EMS managers were even more likely to report difficulty, with 68% reporting challenges in data collection.

When asked about the specific challenges faced in data collection, lack of resources and lack of training were central themes. EMS agencies use software from multiple vendors, each with different capabilities and features. Customizing an ePCR to a particular agency can be cost prohibitive – in part because of vendor fees, but also due to costs associated with training and increased charting time until personnel become proficient. There may also be revenue implications as essential information necessary for reimbursement may be omitted during the learning phase.

Commonly, ePCR programs are web or cloud-based. Newer ePCR programs may require newer technology (faster processors, up to date operating systems, more memory, reliable Internet connections), and technical assistance and support requirements, also adding to costs.

RESPONDENTS REPORT CHALLENGES IN DATA COLLECTION



MANY RESPONDENTS UNCLEAR ABOUT THE ROLE OF NEMSIS

The development of the National EMS Information System (NEMSIS) created a standardized vocabulary for use in data collection, ensuring that EMS agencies were using the same terms so that they could compare their performance against others in their region or state, also known as "benchmarking." Today, thousands of agencies in all 50 states submit data, or portions of their data, to their states, which then send the national elements to the National EMS Dataset. NEMSIS currently has about 55 million records.

Despite the vast amount of data shared with NEMSIS, many respondents were unaware whether their agency was participating.

52% of all respondents reported using a (NEMSIS) compliant data collection system, while 34% were not sure.

However, 81% of EMS managers reported collecting NEMSIS compliant data. This likely reflects that many non-managers are unfamiliar with NEMSIS or the specifics about their ePCR.

Over 150 respondents who chose "other" offered a variety of explanations for their difficulty. Commonly mentioned issues included a lack of "buy in" from EMS personnel to fully/correctly input data or complete forms; hospital unwillingness to provide outcomes data to EMS that would make the effort worthwhile; and that it takes too much time to input the data during a busy shift.

> "Reports are filled out by various personnel, and not always by personnel who were on that scene. Reports are often very sketchily filled out."
>
> *– Survey respondent*

MIH Outcomes Measures Group Aims to Prove Value of New EMS Services

One of the most exciting EMS-led healthcare innovations in recent years is the development of mobile integrated healthcare (MIH) and community paramedicine (CP). By providing services such as post-discharge follow-up care in the home, hospital readmission avoidance interventions, and chronic disease management and education, MIH-CP uses EMS's 24-7, mobile workforce in new, more efficient ways, enabling them to better meet their community's healthcare needs.

> The goal of MIH-CP is to achieve the Triple Aim of improving the patient's experience of care, improving population health, and reducing healthcare costs.

The goal of MIH-CP is to achieve the Triple Aim of improving the patient's experience of care, improving population health, and reducing healthcare costs.

But to prove to other healthcare providers, patients, insurers and other payers that MIH-CP services are worth paying for requires data on outcomes. And the first step in measuring outcomes is determining what should be measured.

In 2015, several MIH-CP experts — including Brenda Staffan of REMSA in Reno, Nev., Dan Swayze of the Center for Emergency Medicine of Western Pennsylvania and Matt Zavadsky of MedStar Mobile HealthCare in Fort Worth, Texas — came together to determine what EMS should measure to build that body of proof.

Today, more than 75 EMS and healthcare associations and EMS agencies have provided feedback and contributed their ideas to the MIH Outcomes Measures project. Examples of measures identified by the group include demonstrating that MIH-CP interventions increase the number and percent of patients connected to primary care; improve patient satisfaction scores; reduce the number of emergency ambulance transports for patients enrolled in the program; and reduce the rate of ED visits for enrolled patients.

A draft of the measures has been presented to the Agency for Healthcare Research and Quality (AHRQ), the National Committee on Quality Assurance (NCQA) and the Centers for Medicare and Medicaid (CMS) — key agencies that are influential in determining national healthcare reimbursement policy.

"The goal of this project is to develop a consistent strategy for measuring outcomes across multiple programs, identify best practices and ensure our profession has the data it needs to show the value of MIH-CP to the patients and payers," Zavadsky said. "It was important that we came together, collaboratively, as a profession to move this forward."

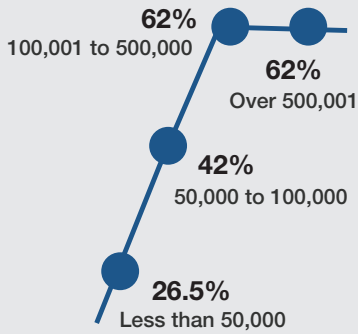
Understanding the Role of the Data Manager

To put data to work to improve operations and patient care, just collecting data isn't enough. EMS agencies must analyze the data, which can yield insights that can be used to guide decisions.

Although data can be aggregated in every ePCR program (meaning, summary documents can be easily or automatically generated), agencies need personnel with the technical expertise to oversee the collection of data, interpret data, conduct analyses, and determine how to present and disseminate analyses.

On a practical level, for data analysis to occur, EMS agencies need to hire or train personnel for this job, whether as a full-time position or as a component of their job responsibilities.

The survey found that half (50%) of EMS agencies did not employ a data manager to manage the collection, analysis and reporting of data.

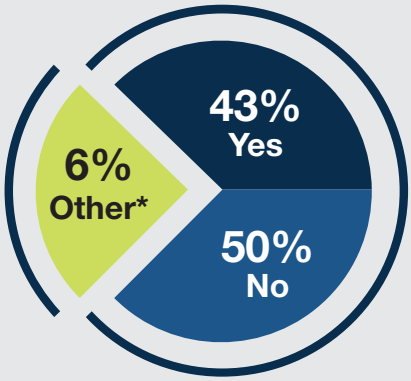


LIKELIHOOD OF HAVING A DATA MANAGER CORRELATES TO POPULATION SERVED

The percent of agencies with a data manager rose along with the population served, likely because larger agencies with a higher call volume are better resourced.

RESPONDENTS WHOSE EMS AGENCIES HAVE A DATA MANAGER

**The majority of those who responded "other" said they were unsure or didn't know if they had a data manager.*



TASKS PERFORMED BY DATA MANAGER	
Generates standard reports	81%
Generates custom reports	66%
Assists with system upgrades and updates	56%
Trains personnel in using the system	49%
'Cleans' data to eliminate duplicates, purge bad inputs	48%

WHAT IS A DATA MANAGER?

EMS systems collect a lot of electronic information. A data manager understands what information is being collected and why it's being collected (for example, for billing, state requirements, or quality improvement purposes.) Data managers help create processes to consistently collect information in a uniform way, and make processes easier for EMS personnel. After the information is collected, the data manager helps others use the information.

A data manager works closely with software vendors to understand the data systems and the capabilities, and may educate personnel about working with the system. When the system is not working, the data manager helps troubleshoot or evaluate alternatives. Data managers work closely with the education/training, quality improvement and billing staff in an agency.

Specific roles/tasks of a data manager may include:

- Understand security/privacy laws, standards, and best practices.
- Manage data points – Turn off elements or values that are not pertinent to the system.
- Manage accuracy/uniformity – Create rules/feedback mechanisms for those collecting information.
- Manage data flow – Ensure information is flowing to the required places, such as to meet regional and state requirements.
- Explore and use data – Create reports and data views that help drive quality improvement.
- Train EMS personnel – On interacting with the ePCR and collecting quality data.

Data Use

Collecting good quality data is the first step toward ensuring the information needed for research, quality improvement and decision-making is available. The next step is analyzing the data, ideally performed by a designated data manager or analyst trained for this role. Once these steps are completed, the data can be put to use in the real world by those who rely on its accuracy when making decisions

79% of EMS managers reported their data was used internally to assess agency performance.

61% of EMS managers reported using data to assess employee performance.

Challenges in Data Use: Lack of expertise, time

Of the 48% of managers who reported experiencing challenges in data use, the biggest obstacle (cited by 67%) was being "so busy handling day-to-day operations that we do not have sufficient time to analyze the data." These findings speak to the need for trained data managers tasked with the responsibility for managing, analyzing and disseminating data findings in a way that is useful and actionable by EMS agency personnel.

CHALLENGES IN DATA USE	
Too busy handling day-to-day operations	67%
Lack of expertise to analyze data collected	47%
Limited funding inhibits ability to implement quality improvements based on the results of the analysis	47%
Limited funding inhibits our ability to effectively analyze the data collected	44%
Lack of corporate interest in analyzing the data	32%

29% said their agency had sufficient resources to manage their data.

43% said their agency had insufficient resources to manage their data.

31% said their agency had sufficient resources to analyze and use data in performance improvement.

41% reported insufficient resources to analyze and use data.

> Although I am currently the only one in our entire fire department that can manage our data, I have so many other jobs that I often find that I cannot mine the data as well as I would like."
>
> *– Survey respondent*

How One EMS Agency in Nevada Is Collecting, Analyzing Data

Responding to 150,000 calls for service annually in Las Vegas and surrounding areas, Clark County Fire Department leaders wanted to go beyond measuring response times and look more closely at patient care performance.

But using their current software, reviewing performance was labor intensive and time consuming – they could look back at individual charts, or create spreadsheets about a particular indicator, but they couldn't look at multiple aspects of all calls systematically.

"We have one full-time quality assurance administrator, plus me, and I have other responsibilities," said Troy Tuke, Clark County EMS Coordinator. "We have to be able to demonstrate quality, and the only way to show that is to measure it. With 350 calls a day, the only way to measure it is to automate it."

Clark County decided to use a clinical performance measurement and protocol monitoring tool called FirstPass. The tool was created by FirstWatch, an Encinitas-based company known for its computer aided dispatch (CAD) system monitoring software. The software continually mines data in CADs and ePCRs, alerting managers to deviations in expected treatments based on national, evidence-based clinical guidelines, as well as local protocols.

STEMI

	Test	Pass/Fail	System-wide Pass %
+	12-lead within 10 minutes	✓	72.73%
+	Second IV established within 2 attempts (Track/Trend Only)	✓	36.36%
+	Telemetry prior to Transport time (Track/Trend Only)	✗	0.00%
+	ASA administered if not allergic	✗	72.73%
+	IO/IV established within two attempts?	✓	81.82%
+	If Hypotensive, was 2nd 12-lead done < 5 min from initial and Fluid Challenge done	✓	63.64%
+	Nitro administered if BP>90, Pain >2, and not allergic/hypotensive/on ED meds (Track/Trend Only)	✓	27.27%
+	If patient alert, was final Pain Scale 0 or < initial	✗	18.18%
+	If Pain >0 and BP> 90 was Nitro or MS administered	✓	27.27%
+	Scene time < 20 minutes from Patient Contact	✓	72.73%
+	Transport to STEMI Center	✓	90.91%
+	Monitor uploaded to PCR?	✗	27.27%
+	Scene time < 15 minutes from Patient Contact (Track/Trend Only)	✓	54.55%

> "We have to be able to demonstrate quality, and the only way to show that is to measure it. With 350 calls a day, the only way to measure it is to automate it."
>
> *– Troy Tuke, Clark County EMS Coordinator*

In early 2016, Clark County began measuring performance related to STEMI, stroke and cardiac arrest. Each condition has multiple indicators associated with it. For example, STEMI measures include: 12-lead ECG, aspirin if not allergic, nitroglycerine if pain is greater than a 2 on a 10-point scale, oxygen delivery when necessary, a second IV within two attempts, ED

> "We have assured our staff that this is all about improving quality. We're using it to drive education, training and improvement,"
>
> *– Troy Tuke, Clark County EMS Coordinator*

notification before transport, and a scene time of less than 20 minutes.

If any indicator is missing, supervisors are alerted and can follow up to determine if it was a documentation error, a patient care omission, or a reasonable deviation from protocol.

"We have assured our staff that this is all about improving quality. We're using it to drive education, training and improvement," Tuke said. "That's where you're going to affect quality, not through punishment."

Clark County also tracks trends. For example, they're considering lowering the scene time standard from 20 minutes to 15 minutes on certain call types like STEMI and cardiac arrest if they find it would result in better patient outcomes. They also have plans to track performance on trauma, stroke, airway management, and eventually, non-specific medical complaints.

Ultimately, they would like to share their data with hospitals for joint quality improvement. "First we have to show the hospitals that we have these numbers to get that collaboration with them," Tuke said.

CAN SMALL AGENCIES WITH LIMITED RESOURCES COLLECT, USE AND EXCHANGE DATA?

Yes, but getting the most out of the experience may require collaboration. In North Dakota, six EMS agencies in the northwest region of the state that are overseen by one medical director meet regularly for an in-depth review of cardiac arrest calls or calls with a scene time of greater than 41 minutes (indicating a serious medical condition, such as trauma).

Using data submitted by EMS agencies to the North Dakota Department of Health's EMS Division and outcomes information that the medical director retrieves from hospitals, EMS personnel get together to discuss what was done and why, if crews could have made different choices and if there are areas that could be improved. Though the data is shared without identifying specific patient information or the crews involved, in most cases the EMS personnel who responded are eager to share their perspective with the group, said Lindsey Narloch, a research analyst who has spearheaded the effort for the state health department. "It's a community of practice, where people come together and learn from each other," Narloch said. "Especially if your volume is low, you're not going to see these situations everyday. So you have to learn from each other."

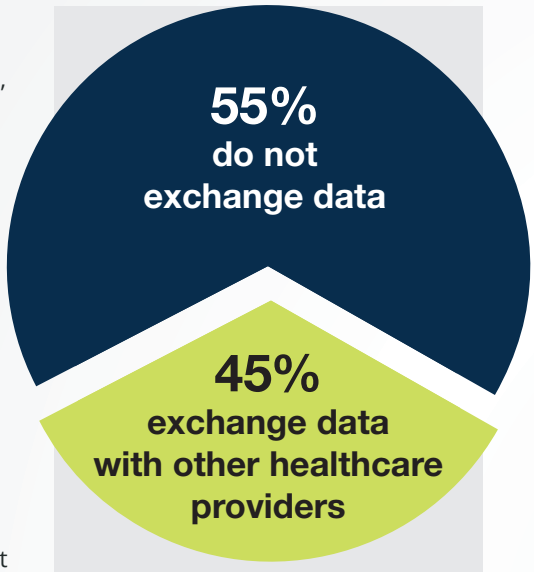
NORTH DAKOTA DEPARTMENT of HEALTH
Emergency Medical Systems

Data Exchange

The Institute for Healthcare Improvement's Triple Aim – improving the patient experience, improving population health, and reducing per capita healthcare costs – is at the core of health reform. To achieve the Triple Aim, healthcare silos have to be broken down. Healthcare delivery must be viewed as part of a continuum, with healthcare providers sharing information and working together to help patients achieve optimal health and avoid unnecessary spending. A necessary aspect of that is data exchange, or the flow of pertinent patient information among all healthcare providers caring for a patient.

From EMS participation in regional systems of stroke, STEMI and trauma care, to the collaboration and partnerships that are a hallmark of mobile integrated healthcare and community paramedicine (MIH-CP), the integration of EMS into the wider health system is expanding and deepening.

Recognizing the importance of EMS in the healthcare continuum, healthcare systems are beginning to "pull" data from EMS agencies for research and quality improvement – an effort aided by technology improvements such as automated data exchanges. This trend will likely increase as interoperability improves and performance measures reporting requirements increase in the shift to a value-based system.



EMS DATA EXCHANGE IS STILL LIMITED

But the survey suggested that while EMS is providing data to other healthcare providers, bi-directional data exchange between EMS and other healthcare partners is still limited.

45% of respondents reported exchanging data with other healthcare providers.

55% were not exchanging data.

Methods of data exchange

- 66% electronically transmit ePCR to the receiving facility.
- 34% fax the ePCR to the receiving facility.
- 22% electronically send discrete (specific) data elements to the receiving facility
- 23% electronically exchange information with the receiving facility (the hospitals sends outcome data to EMS)
- 14% automated vendor linkage (ePCR sends information automatically)

What are discrete data elements?

Discrete data elements typically refer to specific and important information (i.e., vital signs) that could flow automatically into a patient's medical record, rather than sending, for example, a .pdf or an image of a patient care report that would have to be reviewed and manually input into the record.

WHAT GROUPS DOES EMS EXCHANGE DATA WITH?

According to the survey, agencies that report exchanging data share their data with several different types of agencies and organizations.

66% Other healthcare providers

54% Insurance companies

47% Centers for Medicare and Medicaid Services

47% State public health department providers

33% Local government or other local agencies

Challenges in Data Exchange

Lack of Integration, Interoperability

Of managers who reported their agency exchanged data, about half (49%) said they had challenges in doing so.

The most common obstacle cited: lack of integration with other healthcare information systems, which 85% said was a problem.

OTHER BARRIERS

59%	Perceived HIPAA regulations issues/privacy concerns
50%	Lack of interest from other healthcare sectors in incorporating EMS data
14%	No integration with NEMSIS

IS EMS DATA EXCHANGE STILL A ONE-WAY STREET?

EMS agencies have long been frustrated by what often seems like a one-way flow of information. EMS may collect and provide information to hospitals, but EMS has traditionally had difficulty getting patient outcome information from hospitals, hindering EMS's ability to measure the effectiveness of treatments and interventions.

For data to have a greater impact on patient outcomes, there needs to be a process in place for the "bi-directional" exchange of data between EMS and other healthcare providers. Ideally, information such as patient drug allergies or medical history could help with EMS decision-making in the field, while outcomes data could help EMS in quality assurance and improvement.

According to the survey, there are some indications this exchange of information is beginning to occur. Of those exchanging data, **23% reported receiving outcomes data from receiving facilities (hospitals)**. It could not be determined from the survey results if the outcome data being provided is related to specific cases or case review, or more systematic sharing. But, feedback should be received far more frequently to reinforce high quality care and highlight opportunities for education and improvement.

What does data exchange have to offer to EMS and our patients?

In a sophisticated data exchange system, EMS agencies would have access to relevant portions of a patient's most recent medical history, medications, allergies, and DNR status. EMS could electronically share the information with the hospital prior to arrival to help expedite, or tailor care specific to that patient. The EMS ePCR would also automatically migrate into the patient's electronic health record, while diagnoses and disposition information would be pushed to a patient's EMS ePCR for feedback, education, research and process improvement.

Specifically, data exchange could provide information that can help EMS shave minutes off the time to treatment for STEMI or stroke. If permitting EMS to transport patients to alternative facilities such as urgent care, primary care or detox or mental health facilities were to become a widespread reality, patient history could also help guide EMS in decisions about the most appropriate facility to take the patient to, and would make collaboration between EMS and other healthcare providers easier and more efficient.

Data exchange is also crucial to the identification and measurement of key performance indicators in quality of care, and will ultimately drive research and the evolution of EMS's evidence-based protocols and practice.

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EMS Participation in San Diego's Health Information Exchange Underway

In the wider healthcare system, the federal government is providing substantial funding to create Health Information Exchanges (HIE) to securely share healthcare information electronically across organizations within a region, community or hospital system. The goal is to allow hospitals, doctors, pharmacists, public health, extended care facilities, labs and other healthcare providers access to pertinent patient information to improve the speed, quality, safety and cost of patient care.

A worthy goal, yet one that is not easy to achieve. Purchasing software, training personnel and managing the data is costly. Despite a significant push to move to the electronic exchange of information, most Americans' medical information is still stored on paper. Even when stored electronically, many databases are not connected or interoperable. That is a challenge well known to many EMS practitioners, who may collect information on an ePCR, only to have to provide a paper copy to the hospital.

Currently, few EMS systems are connected to an HIE or other electronic health/medical records exchange system. One exception is San Diego Health Connect, which began as the San Diego Beacon project funded by a $15 million grant from the Office of the National Coordinator for Health Information Technology (ONC) and led by physicians at the University of California San Diego School of Emergency Medicine. One element of the project, launched in 2011, was the automatic sharing of prehospital information with the ED.

Today, San Diego Health Connect has expanded to give a variety of healthcare providers secure, encrypted, HIPAA-compliant access to summaries of patient medical history, including problem lists, medications, allergies, immunizations, recent test results, professional notes, discharge summaries and operative reports.

Healthcare participants so far include 21 of San Diego's 23 hospitals, 14 federally qualified health centers, the San Diego County jail, 70 skilled nursing facilities, six hospices, one health plan, 10 doctor's offices and San Diego Fire Rescue.

For information to be exchanged, patients must first consent (they can opt out of sharing HIV status, behavioral health and substance abuse information.) Over 2 million San Diego residents have consented, but one challenge is that patients have to consent at each facility they visit for those records to be shared, so it's not yet possible to get a full picture of each patient's medical information, noted Daniel Chavez, San Diego Health Connect executive director.

Although the EMS portion has not yet been fully implemented, the vision is that EMTs and paramedics will soon be able to input a patient's name into the ePCR on scene, confirm the patient's identity through basic demographic information, then receive specific elements of the medical record, including diagnoses, medication list and allergy information. So far, they have completed a "proof of concept," confirming that it's possible to link the EMS ePCR with the HIE.

Full implementation will be paid for through a $600,000 grant that's part of a larger, two-year, $2.75 million grant recently awarded to the California's Emergency Medical Services Authority to advance EMS HIE statewide.

"If it's a routine call there may not be a need for EMS to access a patient's medical record, but if it's a heart attack or stroke, there may be a real need for it," Chavez said. "Part of what we'll be determining is just how often this will be needed and what protocols will this be utilized for."

Advice From Our Experts

Tips and thoughts on data collection, use and exchange

EMS has the opportunity to make significant contributions to our evidence-based healthcare system through data collection and analysis. EMS data has the capability to directly impact quality of care, patient and provider safety, research, as well as demonstrate value when it comes to reimbursement. In fact, I would argue that EMS data is a vital component in the continuum of care.

Bryan D. Nelson, MBA | Regional ACS Program Coordinator | *Lehigh Valley Health Network*

Data, along with the devices that collect and analyze it, were once tools in our tool belt used as needed in the provision of patient care. Data and devices now are much more than that...they are a member of our healthcare team. They provide information, guidance, insight, and a level of intelligence directly connected to positive outcomes.

Greg Mears, MD | Medical Director | *ZOLL*

For the first time, when we collect data in an ePCR we are not creating 'ambulance run reports' like we did in the past, we are now updating a patient's electronic medical record. How and what we record will forever be a part of their medical record and will impact their life in major ways. Accuracy and precision are critical attributes for these records. It is important for patient safety, organizational efficiency, and customer service.

Nick Nudell, BA, MS | Project Manager, *EMS Compass Initiative* | Chief Data Officer, *Paramedic Foundation*

As the EMS profession continues to evolve, it is imperative that data collected from the field be used to quantify improved patient outcomes and identify areas where the profession can improve as a whole. The data should also be the main driving force behind the EMS Agenda for the Future, which is currently under revision.

D. Troy Tuke, RN, NRP | EMS Coordinator | *Clark County Fire Department*

If one of the many ways to define leadership is a person's ability to see a destination, inspire people to follow, and get things done, data is the underpinning for each. Without data, how do we know where to head? Could we create a powerful story to inspire others without data to provide validity and credibility to the story? Would we know we are getting the right things done without data? Leading is about having the right destination, matched with the right story, and measured so we know our progress, all of which comes from data.

Aarron Reinert, NRP, MAOL | Executive Director | *Lakes Region EMS*

Data accuracy is only as good as the data collected. Ensure providers understand the fields and that they are collecting data as intended.

Michael Zelenetz, BA | Critical Care Paramedic | *New York-Presbyterian Hospital*

Data should be used to create information. We need to start creating information from the data we collect. Be curious, skeptical, and confident that you can create information.

Lindsey B. Narloch, MS | Research Analyst, North Dakota Department of Health | *Division of Emergency Medical Systems*

Electronic data collection is the key to increasing the effectiveness of our EMS systems and improving our clinical practice. To accomplish this we must demand that our ePCR systems make the EMS practitioner's job easier by being thoughtfully designed, easy to use, and seamlessly integrated into workflow. Unfortunately, we are still well short of this goal.

Sean Caffrey, MBA, CEMSO, NRP | EMS Programs Manager | *University of Colorado Denver, Anschutz Medical Campus, Emergency Medicine Section*

When it comes to data use, be sure you are tracking, analyzing and reporting meaningful data to enhance your agency's performance, improve patient outcomes, or demonstrate value to your stakeholders to help ensure sustainability.

Matt Zavadksy, MS-HSA, EMT | Public Affairs Director | *MedStar Mobile Healthcare*

EMS PRACTITIONERS BELIEVE DATA IS BECOMING MORE IMPORTANT

The results of this NAEMT survey indicate that the message about the importance of data is being heard. When asked if data currently has a high level of importance in their EMS agency, 61% of respondents strongly agreed or agreed. Asked if data is becoming more important, nearly three in four – 73% – agreed.

Managers felt even more strongly about the importance of data – 72% of managers said data currently has a high level of importance and 88% said data is becoming more important.

The majority of EMS practitioners (62%) also report that their agencies plan to collect more data than they currently are.

Conclusion

"Facts do not cease to exist because they are ignored," reads the famous quote by a British philosopher. The statement is certainly true of EMS data – and the insights that could be revealed through its collection, analysis, use and exchange.

It's increasingly accepted that EMS is an integral part of the healthcare system – and that actions taken by EMS practitioners at the scene and en-route to the hospital affect outcomes, quality of care and patient satisfaction. That understanding has fueled regionalized systems of care for trauma, STEMI and stroke, and has helped inspire EMS agencies to develop mobile integrated healthcare and community paramedicine as a better answer to vexing questions about how best to help patients with chronic disease, mental illness, substance abuse problems and other issues who might be better served somewhere other than the emergency department. As with the rest of medicine, EMS has a responsibility to make evidence-based decisions, and then to analyze those decisions and use data to continually make improvements. Data is at the core of this process.

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Not only is measuring performance the right thing to do for our patients, there's an element of self-preservation. In a healthcare environment rapidly changing into a system that rewards value over volume, the ability to measure performance and outcomes through data is increasingly expected by payers and healthcare partners.

The good news for EMS is that technology improvements have made it increasingly possible to collect, analyze and exchange data on crucial aspects of EMS patient care, patient and practitioner safety, and other aspects of EMS performance, that could inform EMS endeavors.

Likewise, many forward thinking EMS experts are already grappling with these issues and working to prepare the profession for this shift. Those efforts include developing uniform terminology for data collection (NEMSIS), determining what should be measured (the EMS Compass Project and the MIH Outcomes Measures Group), developing ePCR and other systems capable of efficiently collecting and analyzing data, and advocating for the inclusion of EMS in health information exchanges and financial incentives needed to develop and support such exchanges.

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So what would the full participation of EMS in data exchange look like? EMS could:

- Search a patient's health record for problems, medications, allergies, and end-of-life decisions to enhance clinical decision-making in the field.
- Electronically share information with the receiving hospital about the patient's status to provide decision-making support on scene and en-route.
- Transmit the ePCR directly into the patient's electronic health record.
- Receive information including diagnoses and disposition back into the EMS patient care report for use in improving the EMS system.

While progress is being made, the survey indicates there are significant obstacles at the practitioner, agency and healthcare system level.

At the practitioner level, a common obstacle cited by respondents was a lack of "buy-in" or understanding among EMS personnel about

the importance of data, which may contribute to data being entered inaccurately or incompletely because it is seen as a time-waster. The survey findings suggest the need for greater education of EMS practitioners about why data is important and how it can be used to inform care and drive decisions. (In addition to this survey, NAEMT has also sponsored research on ePCR usability, examining how easy it is for EMS practitioners to use and interact with ePCR technology. The results of the study, being conducted by St. Louis University, will be published later this year.)

A second theme that emerged was a suspicion that management did not want to analyze data because it would reveal deficiencies in their system. "Real data has a habit of showing up unpleasant issues that management wishes to be able to deny," wrote one respondent. "Stakeholders do not always want the data analyzed if it shows them not meeting standards," noted another. A couple of respondents also mentioned a belief that the data would be used "punitively."

These responses speak to the need for management to proactively educate personnel about how they will use data, and to be transparent in what will be measured and how it will be used. It also lends support for implementing a "Just Culture" program within agencies so that data is used for quality improvement and education rather than punishment.

At the agency level, a lack of resources to collect, analyze and disseminate data was another common refrain. This survey found that too few agencies have designated data managers trained and tasked with managing data, hindering their ability to analyze and put the data to use in improving patient care, safety or operational performance. EMS agencies need to allocate additional resources, including hiring and training data managers, to do this important work.

But EMS budgets are tight and there isn't typically a lot of extra funds available that aren't already spoken for elsewhere. As with the rest of healthcare, lack of interoperability and integration are also major obstacles involving significant costs to overcome.

Fitch & Associates recently addressed this issue in their excellent report, "The State of Data Use in EMS," which called for EMS agencies to work collaboratively with software companies and healthcare agencies to articulate the need for software that is affordable, user-friendly and allows for sharing across agencies and organizations.

At the national level, to maximize the use of EMS data in patient care, EMS needs to be included in plans for HIEs, as a participant in federal HIE planning, and in state and regional level HIEs. In 2015, NAEMT submitted comment to the ONC on its 2015-2017 Strategic Plan, urging the ONC to recognize the NHTSA's Office of EMS as a federal partner, and to include the nation's 900,000 EMS practitioners as stakeholders.

Likewise, EMS must have access to the same kinds of financial subsidies as hospitals and other healthcare providers have received to implement health IT. Much of the funding to build the health IT infrastructure has come from the federal government via the HITECH Act, enacted in 2013, which allocated $35 billion to health IT to increase efficiency, reduce costs and improve care. To date, none of the funds have been allocated to EMS.

Finally, as with all other important issues facing the EMS profession, collaboration is key. All EMS stakeholders, including national EMS associations, leading EMS agencies, ePCR vendors, other healthcare providers, payers, and state and federal agencies must come together to articulate a clear vision and strategy for what the future of EMS data collection, analysis and exchange should be, and how to work together to make it a reality.

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About NAEMT

Formed in 1975 and more than 55,000 members strong, the National Association of Emergency Medical Technicians (NAEMT) is the only national association representing the professional interests of all emergency and mobile healthcare practitioners, including emergency medical technicians, advanced emergency medical technicians, emergency medical responders, paramedics, advanced practice paramedics, critical care paramedics, flight paramedics, community paramedics, and mobile integrated healthcare practitioners. NAEMT members work in all sectors of EMS, including government agencies, fire departments, hospital-based ambulance services, private companies, industrial and special operations settings, and in the military.

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National Association of Emergency Medical Technicians
PO Box 1400 | Clinton, MS 39060-1400

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