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# 2017

# National Survey on EMS ePCR Usability

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*NAEMT thanks Principal Investigator Alexander Garza, MD, MPH, Associate Professor of Epidemiology and Surgery at St. Louis University College for Public Health and Social Justice.*

*We also thank the members of the NAEMT EMS Data Committee who contributed their insights to the creation of the survey.*



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# Introduction

Healthcare reform, including the 2009 passage of the Health Information Technology for Economic and Clinical Health Act (HITECH), ushered in a period of significant change in the U.S. healthcare system.

HITECH provided billions of dollars in funding for hospitals and other healthcare providers to implement health IT with the goal of improving care coordination, reducing healthcare disparities and improving patient outcomes. One of the central changes was the move from paper to electronic patient health records.

EMS had already started making the shift from paper run reports to electronic patient care reports (ePRC) before 2009 and little of the HITECH funding flowed to EMS.

But during this period, ePCR became widespread in EMS. Although there is no firm data on the exact level of use of ePCR in EMS, the majority of EMS agencies now collect patient identifying information, insurance information, patient symptoms and care rendered using software that runs on tablets or laptop computers in the field.

## Why ePCRs matter

There are numerous reasons why collecting and storing patient information electronically is preferable to paper records. Electronic patient care records can improve efficiency, accuracy and when done correctly, safeguard patient privacy. The data contained in the records can also be more easily analyzed as part of research and quality improvement. Electronic data can also be exchanged more readily with other healthcare providers to improve care coordination, avoid duplicate procedures and improve efficiency.

ePCRs have the potential to contribute to the holy grail of healthcare reform, as articulated by the Institute for Healthcare Improvement's Triple Aim: improving the patient experience, improving the health of populations, and reducing the per capita cost of healthcare.

## NAEMT explores the role of data and challenges in EMS

Collecting data on its own isn't enough to meet those big and worthy goals. The data collected has to be of good quality. The data also needs to be analyzed, shared and put to use in a way that improves care.

In 2016, NAEMT published a national survey on data use, collection and exchange in EMS which looked at what data EMS collects, how agencies put it to use in assessing the quality of patient care and improving operations, and who EMS shares the information with. The results of that survey were published in July.[1]

This latest survey, conducted by St. Louis University College for Public Health and Social Justice on behalf of NAEMT, looks specifically at how EMS practitioners interface with the software systems they use on a day-to-day basis to collect and store information.

### WHAT IS ePCR USABILITY?

In EMS, data collection is done by EMTs, paramedics and other responders who are working in the field, often under time pressure, with rapidly shifting and often less-than-ideal conditions. The realities of the field mean that for EMS to be able to collect high quality data in a timely manner, ePCRs must have user friendly designs – otherwise known as "usability."

Usability is "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specific context of use," according to the International Organization of Standardization.[2]

In electronic health records, *effectiveness* is how well and how easily users can achieve a specified goal, such as create a new patient care report or record insurance information. *Efficiency* is how quickly tasks can be accomplished, while *satisfaction* is related to the user's perception of effectiveness and efficiency.

[1] "NAEMT 2016 National Survey on Data Collection, Use and Exchange in EMS." naemt.org. See "Featured Resources."
[2] RM Schumacher, November 2010, NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records, National Institute of Standards and Technology.

# About the Survey

To better understand the usability of commonly used EMS ePCR software and specific factors that influence EMS practitioners' perceptions of usability, NAEMT commissioned a national survey and research paper.

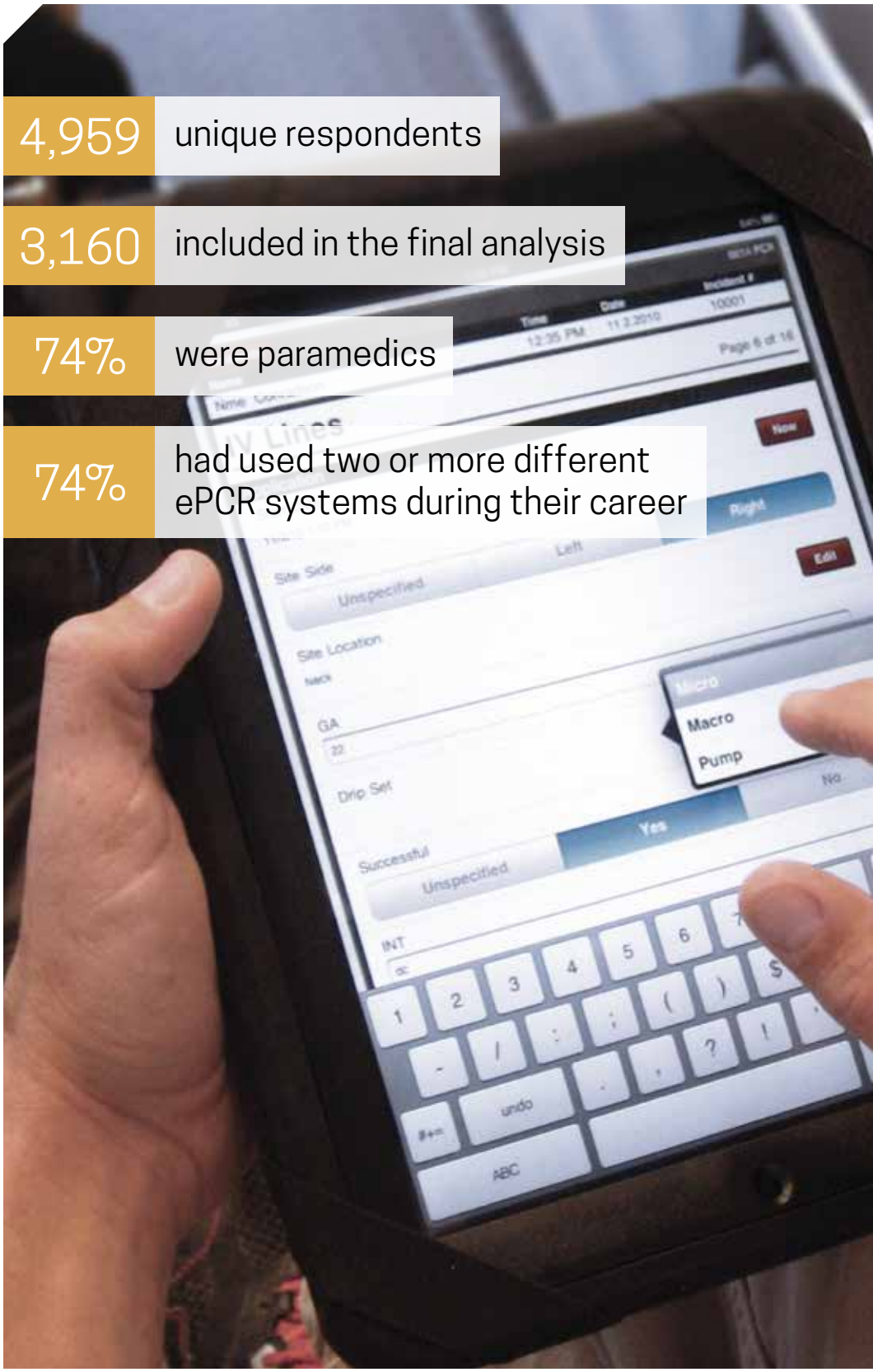
The survey was conducted by Dr. Alexander Garza of St. Louis University with input from NAEMT's EMS Data Committee. The survey included 18 questions adapted from the Computer System Usability Questionnaire (CSUQ) developed by IBM in 1993 and widely used to assess usability today.

The survey was distributed to 82,373 EMS practitioners from NAEMT's database. About 6%, or 4,959 responded. Those not currently using an ePCR, not currently working in EMS or who did not answer all 18 usability questions were removed from the analysis, for a total of 3,160 responses.

Respondents reported using software from 73 different manufacturers and 115 different ePCR software programs. The majority of respondents were unable to identify both the software vendor and specific software they were currently using, so software programs were combined according to manufacturer.

The survey found six vendors accounted for about 75% of the ePCR software in use by survey respondents. The other 25% were combined into a single group ("other").

NAEMT has not made available to the public the relative performance of individual vendors or specific software programs. However, NAEMT will provide vendor-specific information to each manufacturer to share with their product designers and programmers for their internal use. NAEMT's goal is for manufacturers to use the information to design better, more usable systems to serve the needs of EMS practitioners, EMS systems and patients.



# Results – ePCR Usability

To assess usability, the survey relied on 18 questions adapted from the Computer System Usability Questionnaire (CSUQ). The questions focused on three domains related to interacting with the software in the field: system usefulness, information quality and interface quality. The scores on each domain were used to calculate an overall usability score from one to seven, with seven being the highest.

The overall score for all ePCR systems was a **4.5 out of 7**, meaning that EMS practitioners rate their systems as "usable" but see substantial room for improvement.

> Overall score for ePCRs: 4.5 out of 7

The type of software the EMS practitioner used influenced the perceived usability of the ePCR.

These findings were independent of other factors, such as the amount of training, the amount of time using the software or any other variables.

**Six ePCR vendors made up 75% of the responses. The remaining 25% were grouped into the "other" category.**

The software with the **highest rated usability** received a score of **4.95 out of 7**. This software consistently scored the highest overall as well as across the three domains.

The software with **the lowest usability score was the "other" category with 4.17 out of 7**. The "other" category consistently scored the lowest across all three domains as well.

### SAMPLE USABILITY QUESTIONS

**System usefulness** questions asked the extent to which responders agreed or disagreed with statements such as: "I am able to complete my work quickly using my ePCR system" and "Whenever I make a mistake using my ePCR system, I can recover easily and quickly."

**Information quality** questions included: "The information provided by my ePCR system is easy to understand" and "The organization of information on my ePCR system screen is clear."

Interface includes items needed to interact with the system, such as keyboard, mouse and screen graphics. **Interface quality** questions included: "The interface of my ePCR is pleasant" and "I like using the interface of my ePCR system."

| ePCR | System Usefulness | Information Quality | Interface Quality | Overall Usability |
|---|---|---|---|---|
| **A** | 5.15 | 4.87 | 4.83 | 4.95 |
| **B** | 5.08 | 4.76 | 4.72 | 4.86 |
| **C** | 4.74 | 4.33 | 4.37 | 4.48 |
| **D** | 4.76 | 4.22 | 4.46 | 4.48 |
| **E** | 4.79 | 4.33 | 4.17 | 4.43 |
| **F** | 4.74 | 4.06 | 4.09 | 4.30 |
| **G** | 4.43 | 4.06 | 4.03 | 4.17 |

# Factors Impacting Perceptions of ePCR Usability

For software and product designers to improve the usability of ePCRs, it's helpful to understand if there are specific factors that impact the user's perception of usability.

As described on the previous page, usability varied according to which brand of software was being used. An analysis of the survey results found two other traits that predicted a higher overall usability score and higher scores across the three domains.*

### Trait 1: Type of Training

The type of training that EMS professionals received on their ePCR systems predicted who found the software usable.

- EMS practitioners who received no training on their ePCR rated the ePCR usability much lower than those who had received training: **3.7 out of 7**
- Those who received interactive training had the highest usability score: **4.66**

The low scores were consistent across the three domains of usefulness, information quality and interface quality.

### Trait 2: Social Media Experience

To determine if experience performing basic computer tasks was related to usability perceptions, the survey asked respondents about their comfort level using word processing programs such as Microsoft Word, performing internet searches and using social media such as Facebook and Twitter.

One trait stood out. There was a clear relationship between self-reported expertise in using social media and the usability perceptions of ePCR software.

- Respondents that self-identified as "novice" in using social media gave their ePCR's the lowest usability score: **4.08**
- Those who considered themselves social media "experts" rated their ePCR usability higher: **4.8**

"This is strong evidence that EMS professionals who routinely engage in electronic social media platforms find ePCR software more usable because they are more familiar with how software works and have more skills at using software for their needs than those who do not," Dr. Garza said.

Respondents with strong word processing skills ranked ePCR usefulness and information quality, but word processing wasn't a predictor of scores for interface or overall usability.

#### USABILITY SCORES ARE IMPACTED BY TYPE OF TRAINING.


#### THE IMPACT OF AGE

It might be logical to assume that younger people, who grew up with smart phones and social media and may have never used a paper-based system, would rate ePCR usability the highest. But the findings weren't uniform across all domains. Younger users (ages 20 to 25 and 26 to 30) ranked usability higher than an older age group (46 to 50) for usefulness and information quality, but there were no statistically significant differences in interface quality or overall usability.

#### TIP: DEVELOP IN-HOUSE EXPERTS.

Every EMS agency needs ePCR users who have an interest in data and technology and become in-house experts who can train others in using the system, assist at go-live, maintain a relationship with the vendor, share system updates, educate other personnel about why good data collection is important, answer questions about the ePCR and assist with troubleshooting.

These ePCR "champions" shouldn't be expected to do this work in addition to all of their other responsibilities, but should have time set aside for helping others, especially when there are new hires or during periods when system changes are occurring.

* As with the software vendor scores, training and social media were statistically significant independent of other traits, meaning that other factors such as number of years in EMS, number of ePCRs used and the amount of time spent using the ePCR system were controlled for. These traits should be viewed as valid issues that impact how useful EMS practitioners find ePCRs, and could be areas of focus for improving ePCR usability.

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# Results – ePCR Training

Adequately training personnel on ePCR technology can improve productivity, boost the accuracy of information collected and ensure user satisfaction with the software system.

"I have not been made aware of any EHR [electronic health record] implementation program that failed because of too much training, but I know of a number that have occurred because of too little," Jason Mitchell, MD, director for the Center for Health Information Technology (IT) at the American Academy of Family Physicians was quoted as saying in *Medical Economics*[3].

Without adequate training, productivity can decline as practitioners spend extra time doing administrative tasks and staring at computer screens instead of providing patient care.

The survey found that 87% of respondents had some training on their ePCR system, while 13% had none.

The survey found that 87% of respondents had some training on their ePCR system, while 13% had none.

[3] Andrea Downing Peck. "EHR implementation: Training pays dividends." *Medical Economics*, July 25, 2013.

### TYPES OF TRAINING

34% Classroom instruction with software interaction

25% Instruction from a field training officer

23% Both classroom instruction with software interaction and instruction from a field training officer

10% Classroom instruction on using the ePCR software with no interaction with the software

### TIP: INCLUDE SOFTWARE INTERACTION AS PART OF EPCR TRAINING.

Software interaction indicates respondents actually got to practice using the software as part of training. An analysis of the survey data by Dr. Garza and his team found software interaction, whether in a classroom or with a field training officer, was positively associated with greater usability scores.

"It's important for providers to be able to interact with the software so that they feel more comfortable with it once they go out to the field, and they will feel like the software is more usable," Garza said.

# Measuring ePCR Proficiency

Let's say an EMS agency provides ePCR training to EMS personnel prior to sending them out in the field to use the software. How can you tell if personnel have understood the training and have an agreed upon level of proficiency in interacting with the software?

The survey found **38% of participants said they had to be "certified"** to use an ePCR software program before they were allowed to actively use the software in the field.

> The fact that so few EMS agencies have designated a specific level of proficiency for ePRC use indicates that not enough emphasis is being placed on quality data collection, Dr. Garza said.

The survey left open to interpretation what constitutes certification. Often, it's having to achieve a certain score on a test or demonstrate they can complete certain tasks after a training class.


The fact that so few EMS agencies have designated a specific level of proficiency for ePRC use indicates that not enough emphasis is being placed on quality data collection, Dr. Garza said.

"We place a lot of importance on clinical care, as we should, and we make sure everybody is trained to a certain standard through testing and certification," he said. "When you start getting into other EMS tasks it quickly falls off. What these numbers tell me is we're not paying as much attention to the data. If you have a robust quality improvement program, you will be using data day in and day out to make improvements. By looking at your data every day, you have a better understanding of where your shortcomings are. It's a bigger issue than just the data entry. We have to establish a culture of quality on the back end that is keeping an eye on the data and making sure EMS personnel are capturing good data."

### TIP: FIND OUT WHO YOUR TECHNOPHOBES ARE AND OFFER EXTRA TRAINING.

According to survey responses, EMS practitioners described varying levels of experience with basic computer skills.

59% described themselves as "experienced" with using word processing programs

51% as experienced with Internet searches

43% were experienced with social media

Comfort with basic computer skills was associated with higher scores on ePCR usability, according to an analysis of the survey data.

But what about those staff members who are very inexperienced with basic computer skills? Identifying them and offering extra training will help avoid productivity and accuracy issues with your ePCR.

# Conclusion

Spiraling healthcare costs and the massive financial and quality of life burden of chronic disease in the American population gave rise to the healthcare reform movement. A key aspect of reform is transforming the healthcare system from one that incentivizes providing more and more healthcare services (volume) to one that encourages providing healthcare services with proven value.

To reach its potential as an integral part of the healthcare system, EMS also must show value.

Payment reform – to allow EMS to get paid for patient care rather than just patient transportation – requires that EMS gather hard numbers to show that the work that EMTs and paramedics do on a daily basis is money well spent. To build a case for support from payers for innovative services such as mobile integrated healthcare and community paramedicine, treat-and-refer and alternative destination programs, EMS needs good data as well.

## Factors that impact quality of data collected

There are many factors that impact data quality, including accuracy, timeliness, completeness, relevance, reliability and consistency. Initiatives such as the National EMS Information System (NEMSIS) Data Dictionary address the consistency component by developing a common vocabulary of terms that all EMS agencies can use for data collection, allowing results to be compared across regions, states and nationally.

Other groups, such as the EMS Compass Project (which developed EMS clinical performance measures) and the MIH Measures Development Group (which developed outcomes measures for MIH-CP programs), have addressed components such as relevance and completeness.

This survey looked specifically at the usability of the software used to collect the data, which has the potential to impact accuracy, timeliness, reliability and other domains.

## Findings demonstrate need for improvement

The findings of the survey demonstrate that the six most commonly used ePCR brands earned an average score of 4.5 out of 7 for usability – fair, but not great.

Software vendors need to work with EMS practitioners on improving the user experience. To measure usability, ePCR vendors should engage the EMS community with usability studies as new software is developed to improve their products for the end-user.

EMS agencies also have a role in improving usability perceptions, namely through enhanced training. EMS practitioners should offer interactive training on ePCR systems prior to use in the field, and perhaps periodic refreshers to ensure system updates or upgrades are understood and utilized.

EMS practitioners may also be helped through courses that boost their overall familiarity with using computers, such as community college courses in word processing or typing.

## Education on the importance of data

Training should of course include the nuts and bolts on how to use the ePCR system to capture quality data. But ePCR training and EMS education overall needs to include not just the "how" but the "why" – why collecting accurate, timely, complete, relevant, reliable and consistent data matters in a healthcare system increasingly expected, and rewarded, for showing value.

Rather than seeing data collection as a chore or another box to check, EMS practitioners need to understand the role of data in improving operations, ensuring limited resources are spent wisely, enhancing patient and practitioner safety, and in improving the quality of care for patients.


## 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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