National Pre-Hospital and Hospital Data Integration Listening Session Summit
JW Marriott Hotel
Washington, DC 20001
January 29, 2020
Meeting Summary

Opening Remarks

Dave Wade, MD, Director for Medical Preparedness, National Security Council (NSC)

Dr. Wade opened the meeting at 8:30 a.m. He explained that the idea for this summit came from listening sessions about mass-shooting events, where participants pleaded for improvements in the interoperability of emergency medical service (EMS) and hospital records. Dr. Wade also noted that this meeting would follow the rules for listening sessions of the Federal Interagency Committee on Emergency Medical Services (FICEMS).

Purpose of the Listening Session Summit

Andrew Gettinger, MD, Chief Clinical Officer, Office of the National Coordinator for Health Information Technology (ONC)
Jon Krohmer, MD, Director, Office of EMS, National Highway Traffic Safety Administration, Department of Transportation

Dr. Gettinger reported that ONC's annual meeting had taken place immediately before this listening session, and this meeting would continue to address a theme announced at the beginning of the ONC meeting. Secretary of Health and Human Services (HHS) Alex Azar had explained that data interoperability is a priority for ONC, as stated in the 21st Century Cures Act. Secretary Azar had listed several new authorities that will allow ONC to support this priority, and a final rule will be issued in the future.

Dr. Krohmer welcomed participants on behalf of the Office of EMS and FICEMS. FICEMS brings together representatives of all federal agencies involved in EMS on a regular basis to discuss the provision of EMS in the United States and ensure consistent approaches among agencies. Interoperability and sharing health care information between EMS agencies and health care systems has been a FICEMS agenda item for several years. Dr. Krohmer thanked NSC and other agencies that helped plan this summit and noted that the Office of EMS is pleased to cosponsor this meeting with ONC.

Although a great deal of progress has been made over the last several years, these "multiple islands of success" have occurred at local, regional, or state levels. The discussions during this meeting would help build bridges between these islands on regional and national levels.

Panel 1: Hospital Data Collection (Electronic Health Records [EHRs])

Moderator: *Tom Kirsch, MD, Director, National Center for Disaster Medicine and Public Health, and Professor of Military and Emergency Medicine, Uniformed Services University*

Prehospital to Emergency Department Data Exchange: A SAFR Transition of Care

James Killeen, MD, Director of Urgent Care Services and Clinical Informatics Fellowship Director, University California, San Diego

Search, Alert, File and Reconcile (SAFR) is an electronic tool used in San Diego County to connect prehospital with hospital clinical data by enabling users to:

- *Search* a patient's health record in the health information exchange (HIE) for problems, medications, allergies, and end-of-life decisions to enhance clinical decision making in the field
- *Alert* the receiving hospital about the patient's status directly onto a dashboard in the emergency department (ED) to provide decision support
- *File* the EMS patient care report data directly into the patient's EHR for a better longitudinal patient record
- *Reconcile* the EHR information, including diagnoses and disposition, back into the EMS patient care report (PCR) for use in improving the EMS system

SAFR leverages National Emergency Medical Services Information System (NEMSIS) 2.4, so any electronic PCR (ePCR) software vendor can connect to SAFR. SAFR can now be used on smartphones, tablets, and personal computers in first-responder vehicles, and it can capture patient information from paramedics and hospitals. A user simply enters the patient's name, date of birth, and Social Security number. This information is sent to the HIE, which returns information on the patient, such as previous encounters, medical history, and allergies. The paramedic can then accept the information and add it to the patient's record. The paramedic uses this information to select the receiving hospital, and he or she sends the record to that hospital. The physician at the hospital can pull up details on the patient's location, chief complaint, and vital signs. This information allows EMS providers to transport the patient to the right hospital and ensure that the patient receives the right treatment.

Role of Hospital EHRs in Integration

Roland Phillips, MD, Executive Physician Strategist, Emergency Medicine, Cerner Corporation

Cerner serves approximately 1,000 EDs, and the company is collaborating with several ePCR vendors to improve communications. The Joint Commission has said that any emergency care, treatment, and service to the patient before arrival in the ED should be part of the EHR. The challenge is that this information is not inserted into the EHR contemporaneously.

A clinician who receives patient information can enter into the Cerner EHR information received from an EMS provider about any patient before arrival. This information becomes part of the tracker, which can be posted in the EMS bay to inform the EMS provider where to take the patient. The tracker roughly describes the patient's condition and provides an estimated time of arrival. A PDF version of the EMS chart is incorporated into the EHR, where it is easy to find. However, the document is not formatted optimally for the clinician because, for example, the

demographic information (which is probably not important to clinicians) is at the top. However, the narrative provides the paramedic's impressions, and the record contains electrocardiogram (ECG) findings, although these ECG findings are not combined with other ECG records in the EHR.

A trial in Dr. Phillips's ED found that the rate of run sheet uploads into the EHR within 2 hours rose from 40% at baseline to as high as 98% during the trial. Abstracters used to have to track down run sheets and then enter the information manually. The system described by Dr. Phillips saves a great deal of time and personnel resources.

Vendors have an opportunity to collaborate on developing a standard for transfer of discrete EMS data elements to the EHR and to integrate EMS information and EMS run sheets (contemporaneously) into the EHR.

Overview of Hospital EHRs and Challenges of Integrating EMS Data
Ted Delbridge, MD, Executive Director, Maryland Institute for Emergency Medical Services Systems

The Code of Maryland Regulations requires EMS clinicians to enter data and for hospitals to include that information in their EHR for that patient. The EMS report, or at least the short form, must therefore be entered into the hospital dashboard. Maryland uses the Chesapeake Regional Information System for Our Patients (CRISP) to provide in-hospital and primary-care provider access to prehospital care data. CRISP can also share clinical data with mobile-integrated-health (MIH) programs, improve patient safety, enhance prehospital care effectiveness, and provide patient outcomes data to EMS providers.

EMS agencies in 24 Maryland cities and counties share a statewide ePCR that uses NEMSIS 3.4. EMS clinicians must complete the record within 24 hours, although many do so within an hour. A short form captures main points to share with the ED clinician. The prehospital record completed by EMS clinicians arrives at a central repository and is sent within minutes to CRISP. Any clinician working with that patient has access to the patient's information in CRISP, although the patient's information is not specifically sent to the hospital.

Next steps are to expand the data elements to emulate a completed record, export the eMEDS (Maryland's ePCR) report to a designated landing space in the hospital EHR, and enable data to flow from EMS to CRISP and vice versa.

Discussion

Dr. Kirsch asked about the biggest barrier to rapid data sharing between EMS providers and hospitals. Dr. Phillips replied that sharing these data is technologically feasible, but a standard is needed, and hospitals must understand that bidirectional data sharing is a government expectation. Dr. Delbridge called for a technology standard and laws that facilitate and do not impose impediments to data sharing. Dr. Killeen noted that standards allow data sharing in San Diego County, but the major barrier was the culture.

A participant commented on the challenge of matching an unconscious patient or one with no identifying documents to a record using such values as date of birth, last name, and Social Security number. Some patients do not want to disclose their Social Security numbers, which are linked to financial accounts, and matching using names alone can be difficult.

A representative of the American Heart Association reported that the association's leaders dream of reducing the abstraction burden for clinical facilities. Integrating EMS data into registries is important for creating clinical guidelines and monitoring quality of care and outcomes. Dr. Phillips shares this dream and believes that the first step is to create discrete data elements instead of blocks of text so that these data can be integrated automatically into the EHR.

The Interoperability Advisory Group of the American Hospital Association began building a standard to integrate discrete data elements, but the group has had difficulty finding hospitals and EHR vendors willing to test the standard. Dr. Killeen reported that he is interested in working on standards with the group. His hospital uses NEMSIS and Health Level Seven International (HL7) standards to integrate messages about a patient's arrival and clinical data into the hospital's EHR. Dr. Killeen would like to update this process and make it more standard across the country.

Jonathon Feit, Beyond Lucid Technologies, reported that standards developed with taxpayer funding are widely used now. The disconnect is with standards for interoperability among EHRs of every kind from clinicians to pharmacy benefit management systems and hospitals. The EMS side has a different kind of standard, as does the fire system. Mr. Feit wondered why many people are unaware of the existing standards. Dr. Killeen reported that a standard in California is used to translate information between systems, but this standard is less useful when a prehospital record is created for a patient who has no EHR. ED teams must be able see the paramedic's report quickly and easily, and the existing standard does not support this capability sufficiently.

A representative of the National Association of Emergency Medical Technicians (EMTs) asked about the HIE used in San Diego. Dr. Killeen replied that San Diego County uses ePCRs from three different vendors and has 17 hospitals, and the HIE maps and routes the county's data. The county also uses a statewide ONC grant to enable two hospitals and one ePCR system to connect to one another. A state grant will be used to extend the system to all ePCRs and all EDs in the county.

Reasons existing standards have not been adopted more broadly include:

- Resistance to sharing hospital data
- Large number of standards
- Lack of requirement for hospitals to adopt the NEMSIS standard
- Difficulty for hospitals to change their workflows, even if a new workflow is easier

NEMSIS data must be converted for integration into EHRs, showing that the standard is not meeting the need, and a separate standard is required for this conversion. One participant is working on a tool to convert NEMSIS data to clinical document architecture (CDA) because hospitals need CDA data.

An ONC representative asked about the transfer of data from the EMS provider to the hospital and the post-acute care setting, such as the nursing home. Dr. Killeen reported that in San Diego County, most post–acute-care facilities do not use the same EHRs as hospitals, and they receive some but not all patient data. Dr. Delbridge pointed out that EMS records are often more valuable to clinicians in hospitals or other post-ED sites than to post-acute care settings.

Bryant Karras, Washington State Department of Health, reported that NEMSIS 3 and later versions are compatible with HL7. No technological barrier exists, and the only challenge is taking the time to transfer the data.

Dr. Dan Smiley, California EMS Authority, encouraged participants to think of data as secure, actionable information that is moved electronically in real time to allow better decisions to be made immediately. This perspective helps turn the discussion away from standards because technologies and standards will change. Dr. Smiley also described the SAFR model as the minimum functionality that every ePCR vendor and hospital system should implement. This functionality benefits paramedics by giving them good clinical information in the field. Outcome measures must be revised to incorporate discharge transfer messages from hospitals.

Jonathan Washko, an EMS consultant, said that NEMSIS was developed before its value was identified. 911 centers need clinical data before EMS providers respond so that providers can understand and mitigate risk when they manage patients. When EHR information is available to providers at call centers, they can improve care and help keep patients safely at home. The true value must be identified of transferring the data, beyond the money saved by insurance companies. According to another participant, the value proposition extends to improvements in clinical care to public health, research, and education. In addition, data exchange can increase survivability and help manage EMS "superusers."

Panel 2: Prehospital Data Collection (ePCRs)

Moderator: *Jon Krohmer, MD*

Overview of Prehospital Data Collection in the United States

Clay Mann, PhD, Director, NEMSIS Technical Assistance Center, Department of Transportation

NEMSIS is a documentation standard for the collection of information on patient care resulting from emergency 911 calls. NEMSIS provides the framework for collecting, storing, and sharing standardized EMS data from states nationwide.

States decide which data elements their EMS agencies must collect. To date, 45 states and territories have submitted 50 million PCRs from 10,000 EMS agencies to NEMSIS. Most other states have local NEMSIS systems but are not yet sending their data to the national database. Implementation of NEMSIS version 3 has greatly improved the quality of the data because this version presents validity rules to EMS clinicians at the time of data entry.

ANSI-approved standards are now available for transmitting ePCR data from ambulances to EDs, but hospitals have been reluctant to implement them. Plans for NEMSIS 3.5.0 include manipulating the common clinical dataset approved by the Centers for Medicare & Medicaid

Services (CMS) to contain NEMSIS elements and support levels 1 and 3 implementation. The CMS unstructured document could be used as a wrapper for a PDF. A process was developed to transmit outcomes data from the EHR to the PCR, but uptake has been low because this standard is not a meaningful use requirement. Acceptance of NEMSIS 3.5.0 data will begin in February 2020. Vendors will release their 3.5.0 software in February 2021, and most systems will be using 3.5.0 by January 2022.

Role of EMS Services in Data Integration
Brian Frankel, Deputy Fire Chief, Prince Georges County, Maryland, Fire Department

To share data with hospitals, the Prince Georges County Fire Department worked with CRISP. The CRISP team was initially concerned about giving the department access to patient data and questioned whether the department's providers had the authority needed. However, the CRISP team ultimately approved a case study involving only the quality assurance (QA) team, which used CRISP to identify outcomes data on mutual patients. One unexpected benefit was that EMS providers could, for the first time, learn about the outcomes of their patients, and this information could be used to educate providers and ensure that the department's treatment and destination decisions were appropriate.

This pilot study was small. A challenge was identifying patients whose names could not be matched with their CRISP records. Fire department staff also had to learn the terminology used by the hospital. Prince George's County recently signed a contract to submit its data to CRISP because it finally obtained funding for the required fees.

Prehospital PCRs and Challenges of Integrating EMS Data
Richard Hale, Director, Data and Integration Products, ESO Solutions

Virtually every EMS agency uses software for documentation, and all of these systems follow the same national data standards. All ePCR vendors communicate with NEMSIS, and all collect the required data elements and submit them electronically to states, which then submit the data to the national registry.

EMS providers often give ED physicians a printed PCR or summary, which transmits the information the ED physician needs in a timely way. However, the information cannot be changed, and it must be converted into discrete data elements. Furthermore, this approach does not provide deep, meaningful integration of EMS data into the hospital EHR system. An alternate option is to use CDA, but without a meaningful use mandate, hospitals are unlikely to do so.

"Hot" trends in EHR interoperability include HIE integration, standardization of outcome information transmission from hospitals to EMS agencies, and integration of EMS data into specialty patient registries.

Recommendations are as follows:

- Eliminate interoperability barriers directly related to misconceptions about HIPAA (Health Insurance Portability and Accountability Act) requirements for quality improvement programs and the continuum of care
- Provide incentives for implementation of standards-based Integrating the Health Care Enterprise and NEMSIS interoperability profiles, which will require meaningful exchange of discrete EMS data elements with hospitals
- Require reciprocal delivery of standards-based outcome information to EMS agencies

Discussion

Dr. Krohmer asked the panelists to identify the most significant hot-button issue. The responses were funding and an approved standard for bidirectional exchange of EMS data.

Dr. Wade reported that HIPAA does not impose any legal impediments to the exchange of patient data for QA. Dr. Krohmer asked how to explain to the general counsels of hospitals that sharing this information is permissible.

Mr. Feit urged participants to discuss only version 3 of HL7 and to stop discussing version 2. The leap between version 2 and Fast Healthcare Interoperability Resources (FHIR) is huge, and the intermediate step should be discussed. Mr. Feit also noted that EMS agencies legally have access to patient data. However, the data in the documents that hospitals use cannot easily be separated into discrete elements, so hospitals cannot easily share outcomes of encounters. FHIR will allow hospitals to share only the data that EMS agencies need. Lawyers err on the side of protecting patient information because hospitals cannot share only the patient information that EMS agencies need. This is a technical issue that might be resolved with appropriate standards.

Daniel Chaput of ONC commented that some FHIR-designed patterns work with version 2.0 messaging and documents. He suggested that vendors come together to discuss data sharing. Dr. Mann reported that NEMSIS brings vendors together at its annual meetings.

A representative of the National Association of State EMS Officials explained that this association is a bridge among NEMSIS, providers, and vendors. One challenge is that the data-sharing cultures of EMS agencies differ. State officials need to be educated because many do not know whom to talk to about data sharing and interoperability.

A representative of Pulsara urged participants not to lose the focus on patients. In addition, simply inserting data into EHRs and hoping that physicians will find that information is not enough. To help patients, information must be communicated in real time and in a way that is compatible with the workflow. For example, an alert that a patient is coming to the ED should be sent to all members of the team that will care for the patient. Platforms exist for transmitting such information.

Elysa Jones, OASIS Emergency Management Technical Committee, reported that international standards have been developed to track emergency patients and hospital availability

specifications. A common alerting protocol is used in more than 100 countries. She called for an XML data standard (or wrapper) to be developed for transmitting data to and from HIEs.

In response to a question from Dr. Wade about the impact of HIPAA, Dr. Phillips explained that EMS providers can receive the data they need from the HIE, and ED physicians receive different data to meet their requirements.

Dan Chavez, San Diego Health Connect, reported that in addition to providing the minimum data needed for patient care, it is important to consider the data needed to protect provider safety.

Panel 3: Data Exchange Between EMS and Hospitals and Other Health Care Sites

Moderator: *Andrew Gettinger, MD*

CRISP Overview

Lindsey Ferris, DrPH, Senior Director, Audacious Inquiry

CRISP is a regional HIE serving Maryland, West Virginia, and the District of Columbia. More than 100 hospitals, 1,500 ambulatory care practices, 200 skilled nursing facilities, and other health care organizations submit data to CRISP. CRISP's EMS-related services include a clinical query portal that provides in-context information at the point of care and a service that notifies providers when their patients visit an ED in the region or are admitted to a hospital.

Currently, 23 EMS programs participate in CRISP, which uses the HL7 standard and is working on implementing the NEMSIS standard. CRISP receives admission, discharge, transfer, and mobile device management data on EMS events in Maryland, and CRISP's District of Columbia partners are submitting NEMSIS data. CRISP can integrate EMS data into its portal, where these data can be seen by other CRISP users. In the future, EMS providers will have quick and easy access to CRISP data on their patients. EMS providers can also use clinical information in the CRISP portal for quality improvement and MIH use cases. EMS short forms are viewable in the portal and support strong handoffs between EMS and ED providers. CRISP triggers real-time notifications to providers, and it can produce hospital data from before and after interactions with a patient.

Future capabilities could include sending data on EMS overdose events to local health departments, filing EMS reports in hospital EHRs for Joint Commission purposes, sending EMS diabetic shock event reports to the primary care provider or care manager, and giving access to the CRISP portal to paramedics. Challenges include the lengthy process for each jurisdiction to sign an agreement with CRISP. Matching EMS patients to their EHRs is not usually difficult, but approximately 10% of EMS patients' records cannot be found. Finally, reports are not always submitted in a timely way.

EMS Data for Quality Improvement
Gregg Margolis, PhD, Director of Health Policy Educational Programs and Fellowships, National Academy of Medicine

The reason for collecting EMS data is to smooth transitions of care and improve care by EMS agencies and in the health care system. When paramedics arrive at a scene, they know nothing about the patient. They must make critical and sometimes lifesaving but always time-sensitive decisions with very little information. And they never find out what happened to their patients after transferring these patients to the hospital. Without feedback, paramedics keep doing things the way they always have and do not learn how to improve their care delivery. Feedback might help reduce the numbers of profoundly dehydrated patients with pneumonia arriving at the ED on diuretic treatment or of patients with unrecognized diabetic emergencies.

Data exchanges could close the feedback loop, help paramedics make better decisions, and improve their diagnostic accuracy and clinical decision making. These data could be used as benchmarks to help EMS providers improve and be held accountable for excellence and quality improvement.

Most ePCR records have only recently been able to collect outcomes data, and very few can link data across platforms. These capabilities are essential for developing quality metrics for EMS agencies. Well-intentioned leaders are being deceived by and communities are paying for meaningless structural and process performance metrics that are not linked to outcomes data. Simply making ePCR systems compliant with NEMSIS is not sufficient because NEMSIS was not designed to ensure data exchange.

EMS must be an essential component of the EHR. Currently, if an EMS provider enters the house of a patient in a diabetic coma and takes the patient to the ED, the patient's primary care provider will not learn about this event. This approach does not ensure continuity of care.

ED and EMS providers must have the ability to pull up a short summary of each patient's history. This capability will require full integration of EMS data with the HIE, and this information must be coupled with information support and medical direction for community paramedics and MIH systems. No incentives exist to ensure that the EHR systems purchased by EMS agencies have the data exchange capability required.

Benefits of Data Integration
W. Scott Cluett III, Director, Office of Emergency Medical Services, Massachusetts Department of Public Health

As fire department and EMS personnel arrive at the scene of a medical emergency, each crew needs to learn the story. Once the crew arrives at the hospital, they must tell the story to the triage nurse, receiving nurse, resident, and physician. Improving documentation could save time and reduce aggravation for patients.

Mr. Cluett helped develop an MIH community paramedic program in Massachusetts that offers bidirectional communication with the EHR. Mobile EHR applications give community providers

access to patient health records, giving paramedics a sense of being part of the clinical team, allowing real-time collaboration with other health care providers, and elevating the professionalism of the EMS field.

EMS data integration could increase the speed of interfacility transfer and improve patient care by making the process more efficient. EMS providers would no longer need to gather paperwork before a transfer, resulting in decreased transfer time. Access to the record of an unresponsive patient for EMS providers could be lifesaving. Reviewing the EHR on the way to the patient would let EMS providers act more quickly and efficiently at times when shaved seconds can save lives. Data integration could also leverage the continuous quality improvement capabilities of software and help determine the accuracy of paramedic diagnoses. Paramedics could use information on previous patients to provide better care for future patients.

Discussion

Mr. Washko reported that the National Quality Alliance is building outcome measures using NEMSIS data and evidence-based guidelines. EMS is ahead of health care in standardization. However, important outcomes cannot be measured because they are not included in the NEMSIS dataset. NEMSIS must capture the right data so that outcomes that matter can be measured.

Mr. Washko called for a national master patient index (MPI) identifier that allows EMS agencies to identify patients in the regional HIE. This national patient identifier number could also be used by hospitals and insurance plans. Dr. Gettinger reported that a rider calling for a national patient identifier was attached to the HHS appropriations bill from 1998 to 2019, but the House of Representatives lifted this rider in 2020, although the Senate did not. Congress has asked ONC to report back to Congress within a year on the feasibility of developing a national patient identifier, and a panel discussion addressed this topic at the ONC national meeting. ONC is likely to engage a broad group of stakeholders to develop recommendations on such a resource.

Dr. Ferris argued that an MPI is essential because HIEs cannot function without the ability to match patients to their EHRs. As more providers interact with patients, the matching rate improves, and the ability increases to develop a complete picture of the patient. CRISP uses an automated process for close matches, but some of these records need to be reviewed manually. CRISP works with a vendor that uses third-party datasets to supplement the demographic data in CRISP's database and resolve these cases automatically. However, matching takes time and money. Furthermore, a universal patient identifier will not solve all of the problems.

Dr. Margolis said that legislation would need to be changed to enable an MPI. But many of the goals discussed at this meeting cannot be accomplished unless patients can be matched with a reasonable degree of confidence. Privacy advocates are the largest constituency that is passionate about this issue, and they argue against unique identifiers because of privacy concerns. Until advocates for patient identifiers are louder than the privacy advocates, the law will not change.

Olivia Morgan, an EMS provider with a rescue squad in Saint Mary's County, Maryland, commented that rescue squad members do not always have time to submit their reports. Dr.

Ferris explained that the speed of report submission to CRISP varies by EMS agency based on the role of the person submitting the report and how much time they have between calls.

Donnie Woodyard, Jr., National Registry of EMTs, commented that the integration of EMS data with hospital and other datasets to provide outcomes data to EMS providers requires a database of EMS providers. The National Registry of EMTs recently launched a registry that will soon have data on EMS personnel in 18 states. These data can be used to link providers to PCRs, and the system can include PULSE registration.

One organization has a personal, open-source HIE that is mobile, secure, and interoperable and that that allows patients to own and control their own health information. The system integrates ED, ambulance, and telemedicine applications, and patients consolidate their own records. The data are stored on patients' own devices to ensure privacy. Patients are responsible for ensuring that their identity in the system is correct and that the record contains all of their medical information. This system notifies three points of contact about locations of emergencies. Insurance companies might pay for this system and embed the costs into their premiums. For patients who do not own a mobile device, a database could be developed containing only the emergency information needed at the point of care.

Dr. Ferris stated that everyone in the industry will use FIHR, which allows patients to download their records onto their phones. CRISP will probably offer this capability in the future. Sharing this information through FIHR with EHRs and with patients would be an excellent use case.

According to Dr. Margolis, identifying incentives for data exchange in fee-for-service models is challenging. He asked what a value-based purchasing model might be and how to gather the data that provide a value proposition to allow reimbursement for organizations. Everyone who provides emergency care would be part of the model, competition would be replaced by collaboration, and everyone would have incentives to share data. A participant noted that if CMS required data exchange for reimbursement eligibility, providers would have an incentive.

The EMS field has many "sources of truth," including the HIE, driver's license, and hospital EHR. For one participant, the driver's license is the ultimate source of truth on a patient's identity because it is updated regularly.

Mr. Feit suggested using biometric data, such as fingerprints, to identify patients. Patients might be concerned that this information will be transmitted to the Immigration and Customs Enforcement, but the system could make sure that these data never leave the server. The technology to collect fingerprints is cheap and ubiquitous. Dr. Ferris said that biometric data would need to be collected by people who interact directly with patients and not HIEs, which do not interact with patients. Dr. Gettinger commented that biometric identification methods can include facial and retinal recognition. No single modality might be effective, but a combination could offer value. The identity problem is cultural, not technical.

What We Heard

Dave Wade, MD

Dr. Wade shared lists of themes from the presentations and discussions at this meeting, and he asked participants whether these lists accurately capture what was said.

Data Integration

Zeke Peters, Director of EMS at CORHIO, identified culture and workflow as barriers to data integration and suggested asking EMS providers about the incentives that would make a difference. For example, some might be more eager to exchange data if they could thereby improve their ability to track patients during a disaster, whereas others might be more interested in MIH. EMS chiefs need to be willing to pay for these capabilities.

Mr. Feit offered to share a contract template that allows different systems to share information with one another. The Sequoia Project and Commonweal created a model that could be used to bring entities together for data exchange. Dr. Gettinger reported that ONC has a cooperative agreement with Sequoia, which is a recognized coordinating entity.

A participant asked whether the ONC Trusted Exchange Framework and Common Agreement will drive the development of standards and the adoption of a common platform by EHR vendors. This participant advocated for bringing EHR vendors together with ePCR vendors and NEMSIS representatives.

Legal and Technical Barriers to Data Sharing

Patients are important stakeholders. When patients are familiar with their own data, they are more willing to share their data to support research.

Standards

NEMSIS does a good job of ensuring data exchange among prehospital services. Different stakeholders need different types of data (e.g., documents vs. messages) to be shared. A participant suggested expanding the explanation of what constitutes data exchange and what data each stakeholder requires. Although various standards are good, they might not work well together.

Dr. Ferris asked which data should be integrated directly into the EHR or stay in a report format. She also asked about standards that allow people to view information not integrated into the EHR but that is visible within the workflow.

Prehospital vs. Hospital Care Requirements

Data exchange involves more than hospitals because EMS providers send patients to other types of facilities. Furthermore, many EMS systems provide medical triage at 911 centers and do not send ambulances, so patients are not always sent to a facility. Dr. Gettinger asked whether these

types of "mini-encounters" are entered into the patient's permanent record. A participant suggested informing the health care system whenever a 911 call is made about a patient.

A representative of the National Organization of Emergency Physicians stated that the social determinants of health, such as food or housing insecurity, affect the care needed in prehospital and other settings. Data on the social determinants might belong in the dataset being discussed. Another participant commented that payers collect these data to measure the effects of addressing these issues. EMS providers should record these data during patient visits. For example, an EMS provider might do a fall risk assessment when entering a patient's home and then follow up on the results of this assessment to prevent the next EMS call.

Human services data, such as on housing insecurity, are useful for health care. For example, a home health agency could use the information to identify other services that could help stabilize the patient.

Incentives for Change

What are measures of success—better patient outcomes? Saving money? Data integration alone? Is data integration of value in and of itself, or only because it leads to other outcomes? The true goal of data integration must be identified.

Section 9010 of the Affordable Care Act gives CMS funding to enhance EMS HIE, but this opportunity expires on September 30, 2021. A participant suggested that this program continue after that date so that states could use this funding. Dr. Smiley said that if the 9010 funding ends, states should continue to work with their Medicaid agency, which should have some information technology architecture funding that can be used for maintenance.

Payers have the best source of truth. They know everything about patients, including their identities and hospital visits. Access to these data from CMS and large insurance providers would be valuable.

David Page, who directs the Prehospital Care Research Forum at the University of California, Los Angeles, commented that law enforcement agencies have a great deal of information on the health of community members, such as mental health issues, but they do not share this information with EMS providers, who need it to protect their own safety. Capturing data on EMS provider injuries is also important. Dr. Wade said that efforts are underway because of the opioid crisis to exchange these data because law enforcement agencies have information that could save lives if it were shared with EMS providers (and vice versa). Dr. Gettinger noted that law enforcement agencies often point out that they cannot gain access to patient information at a scene because of HIPAA.

Value Propositions

Comments on this topic were:

- Data are worthless if they are simply integrated into a chart and are not communicated to the right people.

- Data need to be updated immediately to be useful.
- Communication with patients should be required to close the loop.
- Patient matching is a prerequisite for many data-integration goals.
- HHS cannot issue patient identifiers, but patient matching is not prohibited.
- Different stakeholders, including lay people, need explanations of the risks of not being able to match patients. If the risks are understood, they can be overcome.

Next Steps

Jon Krohmer, MD

Dr. Krohmer announced that the presenter biographies, presentations, and other information from this meeting will be posted on the FICEMS page at ems.gov.

Physicians used to be told that taking the time to fill in the EHR would help them write prescriptions and discharge instructions, and they could use EHRs to see each patient's entire medical history. EMS crews were told similar things when ePCRs were first rolled out. A challenge is to be more realistic and proactive in communicating about improvements to the EMS and health care fields.

A structure to continue the work started at this meeting will need to be developed. This effort will need to include representatives of federal agencies as well as systems administrators, state data managers and EMS directors, medical directors, and EHR and ePCR vendors. Other important stakeholders to include are payers, including CMS (with representatives of both Medicaid and Medicare because they serve different populations), because they drive data use. Payers can pay providers to share their data, and CMS can tie meaningful use to EMS data. Perhaps FICEMS or the national associations could have these conversations with payers about the data that are valuable to them and what incentives they can offer.

A Centers for Disease Control and Prevention representative called for a landscape analysis to identify other stakeholders, such as immunization registries, that are also working on data integration. This effort needs to bring together those working on the same targets, including assets and laws. The next step is to identify other major modernization efforts.

In the short term, culture needs to change in hospitals and EMS agencies, which will require outreach and explanations of the reasons for integrating prehospital and hospital data. Another short-term need is to develop a value proposition that can support reimbursement for data integration and demonstrate that HIPAA does not prevent data integration. A midterm goal is to measure outcomes using evidence-based guidelines and integrate the needs for research and quality improvement into the NEMSIS data standard-setting process. In the long term, 911 and other data should be brought into the exchange.

Wrap-Up and Parting Thoughts
Dave Wade, MD
Jon Krohmer, MD
Andrew Gettinger, MD

Dr. Krohmer thanked meeting attendees for their participation. Dr. Wade said that making a significant leap in health care system performance will require actions on the prehospital side of the patient care continuum, and he also thanked those who attended this meeting for their input.

Dr. Gettinger shared some final takeaway messages:

- Data integration is an important topic for health care, emergency capacity, and the American people.
- The issue is very complex and will not be solved immediately.
- Achieving the goal of data integration will require resources.
- Sources of funding and other resources must be identified, and they must be adequate and sustainable.
- Patients must have control over their information.

Technical enhancements in the past few years have led to an ecosystem that can address many of the problems discussed at this meeting. Many comments from this meeting align with some of the regulatory proposals that ONC plans to finalize.

Dr. Wade adjourned the meeting at 3:24 p.m.