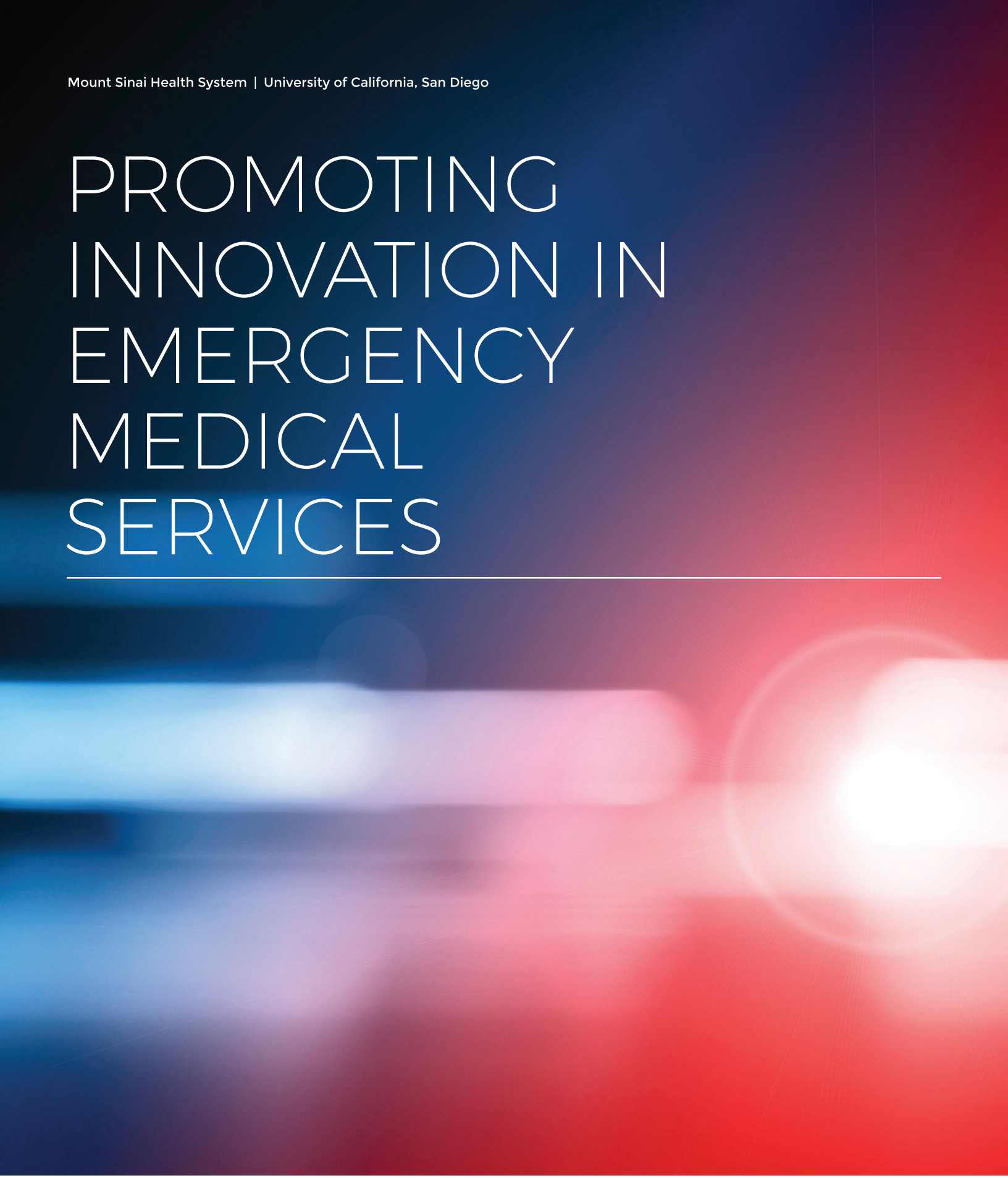
Mount Sinai Health System | University of California, San Diego

PROMOTING INNOVATION IN EMERGENCY MEDICAL SERVICES



Mount Sinai

UC San Diego

PROJECT LEADERSHIP

PROJECT PRINCIPAL INVESTIGATORS

Kevin G. Munjal MD, MPH
Assistant Professor of Emergency Medicine, Associate Medical Director of Prehospital Care, Mount Sinai Health System, New York

James Dunford, MD
Professor Emeritus (Emergency Medicine), UC San Diego School of Medicine; EMS Medical Director, City of San Diego

PROJECT STAFF

Hugh Chapin, MD, MS, EMT
Project Manager

Avis Harper-Brooks
Project Coordinator

Taylor Miller, EMT
Research Associate

ADVISORS

Lynne Richardson, MD
Vice Chair of Research, Department of Emergency Medicine, Mount Sinai Health System

Christopher Kahn, MD, MPH
Associate Professor of Clinical Emergency Medicine; Director, Emergency Medical Services and Disaster Medicine Fellowship; Base Hospital Medical Director, UC San Diego Medical Center

MEMBERS OF THE NATIONAL STEERING COMMITTEE

APPOINTED REPRESENTATIVES

American Ambulance Association (AAA)
Aaron Reinert, NREMT-P
Executive Director, Lakes Region EMS, North Branch, Minnesota; Treasurer, AAA

American College of Emergency Physicians (ACEP)
Jeff Beeson DO, RN, EMT-P
Medical Director for Acadian Ambulance of Texas; EMS Committee, ACEP; NAEMSP

Harry J. Monroe, Jr.
Director, Chapter & State Relations, ACEP

Emergency Nurses Association (ENA)
Mary Alice Vanhoy, MSN, RN, NREMT-P
Nurse Manager at Shore Emergency Center at Queenstown, Maryland

International Association of Fire Chiefs (IAFC)
John Sinclair
Fire Chief, Kittitas Valley Fire Rescue; Emergency Manager, City of Ellensburg, Washington; Board of Directors, Second VP, IAFC

International Association of Firefighters (IAFF)
Lori Moore, DrPH, MPH, EMT-P
Assistant to the General President, IAFF

National Association of County & City Health Officials (NACCHO)

Jeffrey Elder, MD
Director/Medical Director, Emergency Medical Services, City of New Orleans

National Association of EMS Physicians (NAEMSP)

Brent Myers, MD
President-Elect, NAEMSP

National Association of EMTs (NAEMT)

Jason White, MPA
EMS Consultant, Mid-America Regional Council

National Association of State EMS Officials (NASEMSO)

Tom Nehring
Division Director at ND Department of Health, Division of EMS and Trauma; Joint Committee on Rural Emergency Care

National Volunteer Fire Council (NVFC)

Ed Mund
Director At-Large, EMS/Rescue Section, NVFC

Visiting Nurse Associations of America (VNAA)

Tracey Moorhead, MA
President and CEO, VNAA

MEMBERS AT LARGE

Katrina Altenhofen, MPH
State Director, Emergency Medical Services for Children (EMSC) Program, Iowa Department of Public Health; National EMS Advisory Council (NEMSAC)

David Cone, MD
Professor of Emergency Medicine, Yale University; Chief, Section of EMS; Director, EMS Fellowship

Mike Edgeworth, MD
Medical Director, Cigna-HealthSpring; Tele-neurologist, HCA

David Emanuel
CEO & Co-Founder, Medlert

Lance Gable, JD
Associate Dean of Academic Affairs, Wayne State University Law School

Jay Goldman, MD
Medical Director of EMS and Ambulance, Kaiser Permanente NCAL

Sharon Henry, MBA
President, Evolution Health, West Region

Doug Kupas, MD
Associate Chief Academic Officer at Geisinger Health System; Council of Medical Directors, NASEMSO; NAEMSP

Baxter Larmon, PhD, MICP
Adjunct Professor, Emergency Medicine, the David Geffen School of Medicine at University of California at Los Angeles (UCLA); Founding Director, Prehospital Care Research Forum; National Association of EMS Educators (NAEMSE)

Chris Montera
Assistant CEO/Chief of Clinical Services, Eagle County Paramedic Services

Todd Olmstead, PhD
Associate Professor of Public Affairs, Lyndon B. Johnson School of Public Affairs, University of Texas, Austin; James M. and Claudia U. Richter Fellow in Global Health Policy

Lainie Rutkow, PhD, JD, MPH
Associate Professor, Johns Hopkins Bloomberg School of Public Health

Scott Somers, PhD
Former Vice Mayor, Mesa Arizona City Council; Professor of Practice, ASU College of Public Service; Senior Fellow, GW Center for Cyber and Homeland Security

Brenda Staffan
Project Director, CMMI, Regional EMS Authority (REMSA)

Dan Swayze, DrPH, MBA, MEMS
Vice President, COO, Center for Emergency Medicine of Western Pennsylvania, Inc.

Jonathan Washko, MBA, NREMT-P
Assistant Vice President, Center for EMS, SkyHealth, Northwell Health

David Williams, PhD
Executive Director, Institute for Healtcare Improvement

Gary Wingrove, EMT-P
Director of Government Relations & Strategic Affairs, Gold Cross/Mayo Clinic Medical Transport; Founder and President, Paramedic Foundation

Matt Zavadsky, EMT-P, MS-HSA
Director of Public Affairs, MedStar Mobile Healthcare; Joint National EMS Leadership Forum, NASEMSO; NAEMT

COMMUNITY STAKEHOLDER INTERVIEWEES

- Eric Beck
- John Brennan
- Lee Burns
- Brendan Carr
- Erin Denholm
- Michael Greenberger
- Tom Judge
- Kurt Krumperman
- Margherita Labson
- Teresa Lee
- Elizabeth Madigan
- Kevin McGinnis
- Nick Nudell
- Neal Richmond
- Robert Rosati
- Molly Smith
- Mitch Snyder
- Lynn White
- Michael Wilcox

PREFERRED CITATION

Kevin Munjal, Hugh Chapin, Taylor Miller, Christopher Kahn, Lynne Richardson, James Dunford on behalf of the Promoting Innovation in EMS Steering Committee. “Promoting Innovation in Emergency Medical Services.” New York: The Promoting Innovation in EMS Steering Committee; 2018. Available at: www.emsinnovations.org.

ACKNOWLEDGEMENTS

Federal Partners

This document was produced with support from the National Highway Traffic Safety Administration (NHTSA) Office of Emergency Medical Services, U.S. Department of Transportation, through a cooperative agreement, in collaboration with the U.S. Department of Health & Human Services Assistant Secretary for Preparedness & Response (ASPR), and the U.S. Department of Homeland Security (DHS). The opinions, findings and conclusions expressed in this publication are those of the authors and not necessarily those of NHTSA, ASPR or DHS.

New York Mobile Integrated Healthcare Association (NYMIHA)

We thank the NYMIHA for their steadfast support of this project. The dedication of their interns and the focus on improving EMS and healthcare in New York and beyond is greatly appreciated.

West Health Institute

The West Health Institute (WHI) was instrumental in the success of the project. We are especially grateful to them for hosting the California Regional PIE Conference in San Diego, CA. We also thank WHI for working with us toward a shared vision of improving healthcare for all Americans, especially our elders.

The Greater New York Hospital Association (GNYHA)

For generations, the GNYHA has been a prominent voice for improving healthcare delivery in the greater New York City area. We are thankful for their support in the PIE project, especially their enthusiasm and expertise hosting the New York Regional PIE Conference in Manhattan.

Henry J. Kaiser Family Foundation

The PIE project leadership thanks the Henry J. Kaiser Family Foundation for hosting the PIE Project National Steering Committee meeting in Washington, D.C. This meeting brought together leaders in EMS and innovation from across the country.

Participants in the NY and CA regional meetings

Thank you to all of you who attended the PIE project regional meetings in New York and California. These meetings were an important part of the process to bring conversations from the local and regional level to the national stage.

Participants in the survey and interviews

Surveys and interviews were conducted that brought in ideas and perspectives from across the country. We thank all of you who took the time to provide your input for this important project.

Participants in the open comment periods

From the beginning of the PIE project we felt it was very important to incorporate the experiences and views of EMS stakeholders across the United States. We would very much like to thank all of you that took the time to review the draft documents and contribute your feedback.

RedFlash Group

The authors appreciate the support of the RedFlash Group in creating the final document.

EXECUTIVE SUMMARY

The EMS system in the United States provides a critical foundation for our nation's health care safety net. While there are many examples of how EMS has made impressive progress in the treatment of critically ill patients, our EMS system suffers from fundamental challenges and remains characterized by wide variations in the way care is delivered. There is enormous divergence at the local, regional, and state level in terms of regulations, educational standards, and availability or coordination of resources.

Meanwhile, health care is changing dramatically and is increasingly focused on creating value through higher quality, lower cost care, and on promoting integration across the care continuum. While EMS has often been left out of national health policy discussions, now that health care is rapidly moving towards population-based care management, it potentially has much to contribute, especially given that EMS occupies a unique position at the intersection of public health, public safety and healthcare. Yet, this moment of healthcare transformation may not last forever, and the EMS industry should take steps quickly to promote the environment for innovation.

Despite their differences, local and regional communities throughout our nation are facing similar regulatory, financial, and other barriers to promoting innovative models of out-of-hospital care that could better meet the unfilled gaps within our healthcare, public health, and public safety systems. The purpose of this document is to identify the most significant barriers that our local agencies face, to champion opportunities and strategies to unleash innovation, and ultimately create a framework for local and state EMS entities to use to create a more dynamic EMS system that is more adaptive and responsive to society's needs. While the federal government has an important role to play, this document seeks to describe how local stakeholders can promote innovation independent of federal action.

The "Promoting Innovation in EMS" project leadership assembled a steering committee that included a diverse group of stakeholders including representation from state and local government officials, a disparate group of EMS agencies, health systems, payers, other healthcare professions, and experts in community paramedicine, health economics, public health, and political science. An iterative process of gathering data, soliciting input and providing opportunities for feedback was undertaken that included a national survey, two regional conferences, an open national steering committee meeting, posting of multiple drafts and a public open comment period. In the end, seven major themes of challenges to EMS innovation were identified: regulation, finance, education, regional EMS coordination, interdisciplinary collaboration, medical direction, and data and telecommunications.

LAW & REGULATION

Legal and regulatory barriers include prohibition of non-emergency use of EMS, limitations on scope of practice, overly burdensome processes to approve pilot programs, inadequate liability protections, lack of portability of EMS certifications or licensure, Emergency Medical Treatment and Active Labor Act

(EMTALA), misapplication of the Health Insurance Portability and Accountability Act (HIPAA), and certificate of need policies.

Strategies to create a more favorable regulatory landscape for innovation include the crafting of new legislation that: 1) ensures the provision of EMS as an "essential service" in all communities; 2) maintains flexibility of practice locations or transport destinations available to EMS providers; 3) delegates the process of defining practitioner levels and "scope of practice" to State EMS regulators rather than the legislature; 4) creates a process to enable rapid cycle innovation and conversion of successful pilots into permanent policy; and finally, 5) that provides comprehensive protection for the performance of quality assurance activities including those that cross organizational boundaries (e.g. hospital and EMS agency).

Other strategies to promote innovation include using the state regulatory authority over health insurers to require reimbursement for innovative models of EMS care, addressing EMTALA concerns through hospital by-law amendments or regionalized protocols, enabling portability of licensure, and relaxing certificate of need policies.

FINANCE

Financial barriers include the requirement by most public and private payers of transportation in order for an EMS claim to be reimbursed, difficulty demonstrating value and patient outcomes, lack of business acumen amongst EMS managers and leaders, and the perceived prevalence of fraud and abuse within the medical transportation industry. Strategies to enable innovation include the decoupling of payment from transportation through the pursuit of pay for performance and bundled payment arrangements, engaging community stakeholders for whom EMS can provide value, creating and pursuing State Medicaid initiatives, focusing on reporting and improving on emerging quality measures, and embracing telemedicine as an avenue to both improve care and obtain better reimbursement. Other strategies include investments in improving the business capabilities of EMS systems and EMS leaders, using grant opportunities to overcome start-up costs, and taking steps to combat fraud and abuse in order to boost the reputation of the industry and profession.

EDUCATION

Educational barriers to innovation include the relatively low entry requirements or educational requirements of the profession, the variability in quality of education and instructors, the difficulty in defining or measuring competence, and the lack of financial incentive for paramedics to pursue additional education.

Strategies to overcome these barriers include raising the bar on educational requirements, encouraging or rewarding paramedics who pursue higher education, developing career ladders and specialty practice opportunities, improving the quality of education through greater preparation of instructors and enhancing educational models and techniques, and increasing provider access to clinical feedback and patient outcomes.

REGIONAL COORDINATION

Barriers to regional coordination include the hyper-fragmentation of EMS systems and agencies, the high degree of variability from one agency or system to another, and the tension between standardization and local autonomy.
Strategies for improving regional coordination include measuring and reporting on quality both by agency and across regions, collaborating on initiatives to improve outcomes across a region for acute life-threatening conditions, supporting regional preparedness, public or population health initiatives equally, regardless of agency type, pooling data to improve analytics or research across a region, exchanging data via a health

information exchange, and working to foster a culture of safety both within and between agencies working in the same environment.

INTERDISCIPLINARY COLLABORATION

Challenges to improved collaboration between EMS and other healthcare disciplines include the historical legacy of operating in different siloes, the lack of existing opportunities for communication and operational, oppositional stances between different disciplines around scope of practice.

Strategies to improve interdisciplinary collaboration include aggressively seeking opportunities for dialogue and participation, including conversations peripheral to traditional EMS topics, the creation of partnerships with other organizations to provide combined services or at least exchange information, creating multi-agency partnerships to better align geographically with a hospital or health plans coverage area, and working with other community healthcare stakeholders to create a common vision for the full spectrum of community-based care.

MEDICAL DIRECTION & OVERSIGHT

Challenges to strong medical direction and oversight and leadership include a still dysfunctional job market, the underutilization of EMS physicians in system design and strategic planning, transforming educational needs for EMS physicians from emergency medicine only to new emphasis on population health, inconsistent roles of state EMS medical directors, and tension between greater physician involvement and paramedic professionalism.

Strategies to strengthen medical oversight in order to promote innovation include greater support for medical directors in practice, continuously improving medical director education to meet evolving needs, incorporation of medical directors into agency decision making processes, placing greater emphasis on measuring outcomes and improving quality, and optimizing the role of state medical directors.

DATA & TELECOMMUNICATION

Challenges to innovation in the area of data and telecommunication include inadequate data collection and data management capabilities, an incident-based record keeping system that is incongruous to other healthcare systems, an inability to exchange information between agencies or with other healthcare partners, inaccurate understandings and application of federal privacy laws, and slow adoption of new telecommunication technologies.

Strategies to overcome these barriers include moving toward longitudinal record keeping practices with more standardization of data elements and processes, pursuit of a universal patient identifier that transcends individual record systems, incentivizing the exchange of health information between EMS agencies and with health information exchanges, encouraging the use of EMS data for public health and population health analytics, partnering with new technology developers to make better use of social media and smart phone capabilities, integrating telehealth into EMS care, and preparing for integration with FirstNet, an interoperable public safety-grade broadband network.

CONCLUSION

Using the specific recommendations made in this document, the EMS industry and profession can create a more favorable environment for innovation through improved regulatory frameworks, better financial alignment, a stronger educational foundation, greater regional coordination and interdisciplinary collaboration, stronger medical oversight, and enhanced data and telecommunication capabilities.

INTRODUCTION

THE STATE OF EMS

If one set out to design a prehospital care system for the United States from the ground up, it might look very different from the EMS system that we have today. While EMS has made impressive progress in many of the technical aspects of treating critical patients, our current EMS system suffers from some fundamental challenges that inhibit innovation in the industry.

As the Institute of Medicine (IOM) explained in 2006, "Fragmentation, silos, and entrenched interests prevail."[1] There are wide variations in regulation, system design and standards of care. There is suboptimal compliance with evidence-based medicine, national guidelines, and educational standards. Certifications vary greatly from state to state, and there is little collaboration between EMS and the academic community. While many EMS patients often suffer from non-emergent conditions, current models of financial reimbursement, medical direction, and EMS educational standards focus almost exclusively on emergency care. Furthermore, there is very little penetration of modern telecommunication technologies and EMS rarely makes effective use of data or shares information with other agencies, community health stakeholders, or patient care teams.

As a result, EMS is neither designed to provide many of the services our communities need nor to adapt to new opportunities. While many barriers to innovation are external to EMS, others are the consequence of purely internal challenges. For example, the culture of many EMS organizations is bound by traditions and often resistant to innovation. Such resistance has contributed to a lack of recognition of EMS and its integration within the larger health care system. Conformance to the status quo has prevented EMS from adapting to new public safety needs and has contributed to our services becoming a neglected area of public safety, public health, and especially health care in America.

AN ALTERNATIVE VISION

EMS was at one time on track to developing standardized, high quality, coordinated emergency care as the result of initial direct investments and federal leadership stemming from the 1966 National Highway Traffic Safety Act and the 1973 Emergency Medical Services Systems Act. However, EMS splintered when direct support dissipated in the 1980s. The current system haphazardly evolved in an age of fee-for-service medicine and a hospital-based health care system that promoted an uncoordinated, poorly funded, transportation-focused system that falls short of providing the services communities need.

The EMS Agenda for the Future (1996) and the IOM *Future of Emergency Care* (2007) report proposed a very different EMS system- one that is proactive rather than reactive, and one that delivers necessary care rather than traditional care. According to the *EMS Agenda for the Future*, "In order to optimize the positive influence of EMS on community health we must move to a system of finance that is proactive, accounting for the costs

1 "Emergency Medical Services at the Crossroads." In *Future of Emergency Care Series* edited by Gail L. Warden. Washington, D.C.: Institute of Medicine, 2006.

of emergency safety net preparedness and aligning EMS financial incentives with the remainder of the health care system."[2] Similarly, the IOM Report also made the case for integration with the rest of the health care system: "To function effectively, the components of the emergency and trauma care system must be highly integrated. Operationally this means that all of the key players in a given region…must work together to make decisions, deploy resources, and monitor and adjust system operations based on performance feedback."[3]

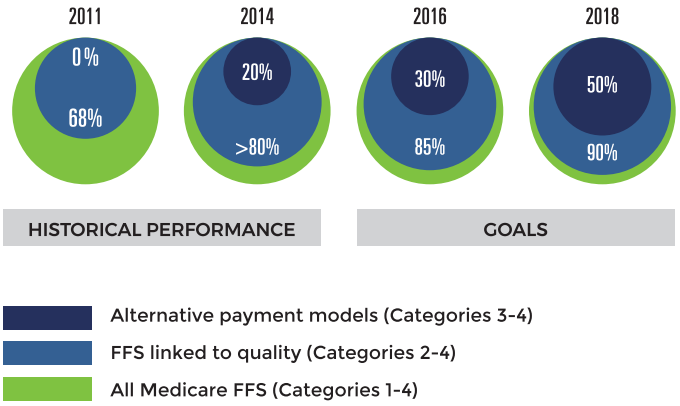
Going further, we envision an EMS system that maximizes value to the community by bringing definitive care into patients' homes and providing new and innovative services that support the Triple Aims of improving patient experience, improving the health of populations, and reducing the cost of health care.[4]

THE TIME TO INNOVATE IS NOW!

Health care has changed dramatically in the past few decades. It has started moving away from fee-for-service medicine and toward realigned incentives focused on value and efficiency. These recent trends have been facilitated and accelerated by the passage of the American Recovery and Reinvestment Act (ARRA) of 2009, which incentivized hospitals and physicians to adopt electronic medical records, and the Patient Protection and Affordable Care Act (ACA) of 2010, which authorized numerous demonstration projects within Medicare including the accountable care organization (ACO). The health care industry is now increasingly focused on creating value through higher quality, less expensive care, and on promoting integration of healthcare across the continuum. The Center for Medicare & Medicaid Services (CMS) recently announced a dramatic acceleration of the transition to quality-linked payments and alternative payment models. Projected future payment models reflect this change, as shown in **Figure 1.**[5]

FIGURE 1

Target percentage of payments in 'FFS lined to quality' and 'alternative payment models' by 2016 and 2018



While EMS has often been a neglected area within the national health policy arena, now that health care is rapidly moving towards population-based care management, it potentially has much to contribute. EMS has the advantage of being mobile, and operates 24 hours a day, 7 days a week rather than just during business hours. It is embedded in nearly every community and has extensive experience working with patients in their homes. While the health care system reorients itself toward community-based care and influencing the social determinants of health, in many ways, EMS providers are a step ahead. With a modest amount of additional training, perhaps they could coordinate care, navigate patients, provide education, and ultimately lower cost and improve

2 "EMS Agenda for the Future." *National Highway Traffic Safety Administration.* Last modified 1996. https://one.nhtsa.gov/people/injury/ems/agenda/emsman.html

3 "Emergency Medical Services at the Crossroads." In *Future of Emergency Care Series* edited by Gail L. Warden. Washington, D.C.: Institute of Medicine, 2006.

4 Berwick, Donald M., Thomas W. Nolan, and John Whittington. "The triple aim: care, health, and cost." *Health affairs* 27, no. 3 (2008): 759-769.

5 Tefera, Lemeneh. "Hospital Value-Based Purchasing Program." (PowerPoint Slides) https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/HVBP/2013-2015-HVBP-Presentation-.pptx.

the quality of patient care. Indeed, a 2013 white paper drafted by several federal agencies, entitled Innovation Opportunities in Emergency Medical Services, described the potential for significant savings if viable alternatives to transport to the emergency department were created.[6,7]

Yet this moment of health care transformation may not last forever. EMS agencies should take advantage of the shifting landscapes in healthcare to think outside the box, test new ideas, and strive to provide the enhanced care that they are uniquely positioned to deliver. Despite the challenges, the environment has never been more amenable toward creating the system that the EMS Agenda for the Future and the IOM report envisioned.[8]

THE PROMOTING INNOVATION IN EMS PROJECT

OBJECTIVE

Local and regional communities throughout our nation are attempting to overcome similar regulatory, financial, and other barriers to promoting innovative models of out-of-hospital care which will better meet the unfilled gaps within our healthcare system. The objective of this project was to engage a diverse group of stakeholders in a national dialogue about common challenges toward EMS innovation faced at the local level. This resulting national framework document seeks to serve as a guide for local communities and states to overcome those barriers and enable rapid cycle testing of promising ideas and treatments. The focus is not on any individual innovation, but rather to enable both current innovations seeking sustainability as well as clear the path for those future innovations that are as yet unknown. Though the authors of this document understand the important role Congress and federal agencies play in EMS, this document was primarily written to provide a framework that describes how local stakeholders can promote innovation independent of federal action.

Approach to National Framework: Building Blocks

DEVELOPMENT OF THE FRAMEWORK

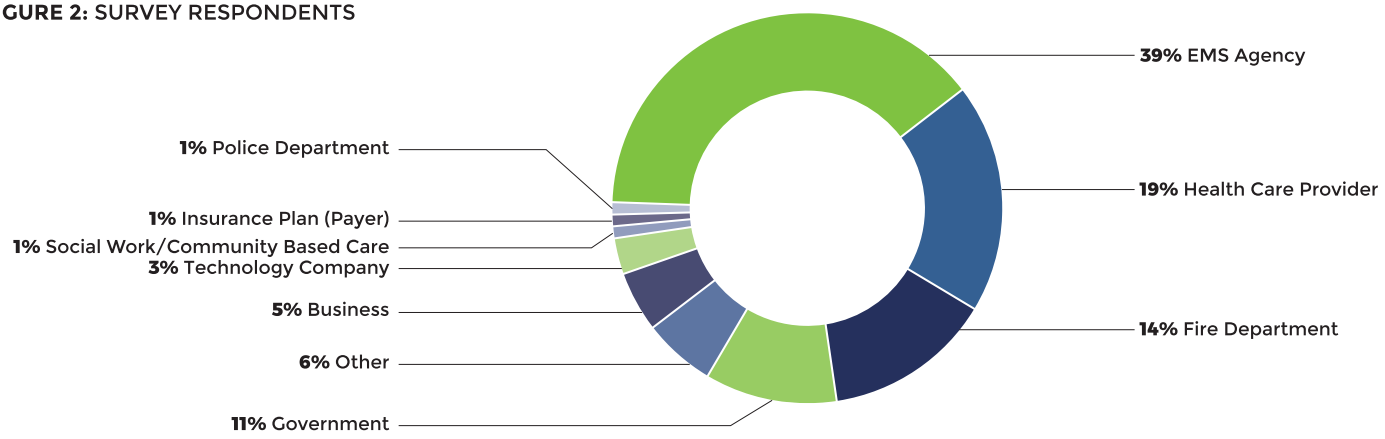
Partners representing New York and California, from the Icahn School of Medicine at Mount Sinai, the New York Mobile Integrated Health care Association, and the City of San Diego Emergency Medical Services, in partnership with local and regional stakeholders, worked collaboratively to lead this project seeking to overcome local, regional, state, and national barriers to promoting innovative models of EMS. A steering committee was assembled, consisting of local and state government representatives, a disparate group of EMS agencies including volunteer, commercial, hospital, third service, and fire-based services, experts in the fields of community paramedicine

6 "Innovation Opportunities for Emergency Medical Services." National Highway Traffic Safety Administration, Office of the Assistant Secretary for Preparedness and Response, Health Resources and Services Administration. Last modified July 15, 2013. http://www.ems.gov/pdf/2013/EMS_Innovation_White_Paper-draft.pdf

7 Alpert, Abby, Kristy G. Morganti, Gregg S. Margolis, Jeffrey Wasserman, and Arthur L. Kellermann. "Giving EMS flexibility in transporting low-acuity patients could generate substantial Medicare savings." Health Affairs 32, no. 12 (2013): 2142-2148.

8 Munjal, Kevin, and Brendan Carr. "Realigning Reimbursement Policy and Financial Incentives to Support Patient-Centered out-of-Hospital Care." JAMA 309, no. 7 (2013): 667-8.

FIGURE 2: SURVEY RESPONDENTS



and mobile integrated health care, health economists, and experts in public health and political science.

SURVEYS AND INTERVIEWS

Together, the steering committee and project leadership facilitated an expansive exploration of experiences and challenges faced by other localities throughout the United States through a structured process including an open survey and exploratory interviews. Overall, project leadership surveyed 189 EMS stakeholders, and used the survey responses to guide in-depth interviews of 48 providers, industry representatives, and experts. Insights gleaned from this exploratory process were fed into the conversation at subsequent stages, including the creation of our initial five "themes" or categories of challenges: legal, finance, education, workforce and culture, and data.

SURVEY RESULTS:

The 189 survey respondents came from 38 states and included 122 EMS providers, 32 physicians, 18 allied health providers, 43 EMS directors, 46 EMS administrators, and experts in business, public health, law, and policy (there was crossover between professions). EMS providers from commercial, volunteer, municipal, hospital-based, government/military, and public utility agencies were all included in the surveys. Of the 73 innovative projects highlighted in the survey, new clinical interventions, alternative destination initiatives, and programs to support high utilizers were the most common.

FIGURE 3: TYPES OF INNOVATIONS

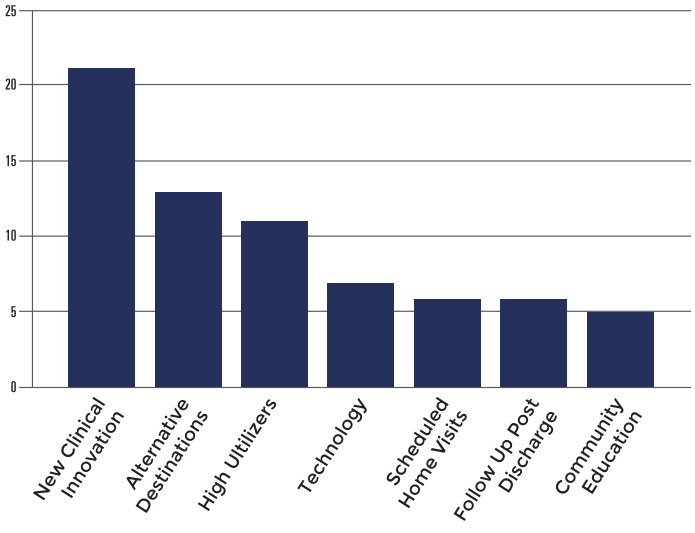
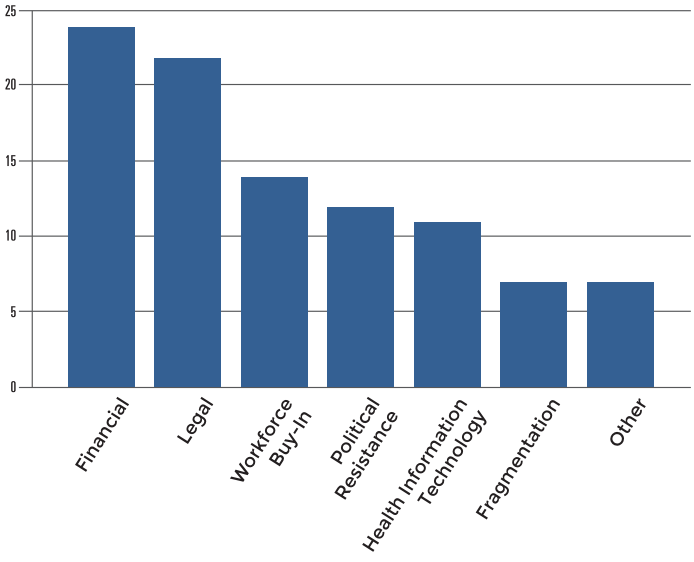


FIGURE 4: BARRIERS ENCOUNTERED



SELECTED QUOTES FROM SURVEYS AND INTERVIEWS:

On EMS Design
"We built this entire system around this 1% of patients, patients with cardiac arrest, patient with life taking trauma…whereas the 99% of the people, which is really what EMS deals with every single day, we designed a system that may be not the best."

"It would be great to have EMS be patient navigators because most of what they're doing now is navigating in a way that's not terribly beneficial for patients"

"The ability for EMS to enter into the patient's home and connect directly to providers (e.g. physicians) has limitless opportunities."

"There should be some process that allows the patient, the paramedic, and the physician – the primary care physician for that patient – to have some discussions, some collaboration, some discussion on care continuum so that the right decision is made for that patient."

"The connection to the PCP for 60-70% of our calls has to be considered. The determination of where that patient is going or even a notification that the patient went to the hospital, the connection to that PCP is weak at best and in most cases I would say non-existent."

On Innovation
"I think that perception of HIPAA is more of a barrier than HIPAA actually is. I think that HIPAA has become this overwhelming all-inclusive medium to say no to innovation in a lot of areas."

"You meet with whoever may be impacted by the innovation first, in private. The first time that the head of the nursing union for the hospitals should be hearing about the nurse triaging program is not on the front page of your local newspaper"

"Proving value for your innovation has, by definition, got to be with your local stakeholders. Now, local could be town, city, county, state or feds. We, as a profession, have done a pretty poor job demonstrating value."

On Regulation
"The current configuration of EMS at least by statute and regulation … doesn't reflect in any way, shape or form the way we are actually using the service"

"In most states, the EMS provider is [legally] tagged to an ambulance"

On Data
"MIH/CP for [my hospital] is a complete non-starter until the EMS providers are fully integrated into our electronic health [record]."

On Quality Measurement
"I try to get away from documenting how many calls you made and how fast you got there. Everybody can do that."

On Education
"It's time to rethink initial education and integrate more community and population health into the base."

"100% of our education for EMS professionals is preparing them for 1/5 calls"

On Becoming a Profession
"Becoming more professional, … I mean [EMS] being more like the rest of health care, where nurses have a degree, doctors have degrees."

"If you don't pay people enough to feel like they are a part of the health care profession and a professional then it is really tough to expect that we will have people in the profession that are looking at it as a lifetime career"

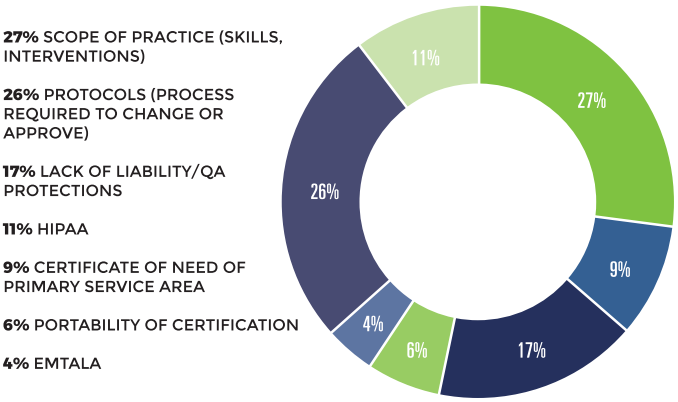
"We have for too long cried to be recognized as professionals, but are not willing to put in the time to be considered a professional."

CONFERENCES TO DEVELOP THE FRAMEWORK

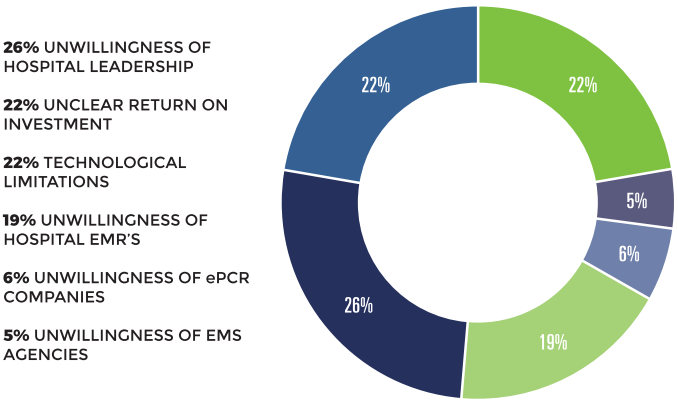
Regional meetings were held in New York and California to advance local efforts to promote innovations in EMS by coming up with local solutions to local challenges. Breaking into small workgroups across the original five themes helped subject matter experts with varied experiences come together to address the same problem. The ideas generated, while intentionally focused on the nuances of the local region, were found to be broadly applicable to other jurisdictions and became the earliest iteration of proposed recommendations to be considered by the steering committee. An example of the discussion can be seen in the following results from a survey of conference attendees:

FIGURE 5A AND 5B:
RESULTS OF SURVEY OF REGIONAL CONFERENCE ATTENDEES

Choose 3 issues from below that you feel most impede your innovation project or vision?



What is most impeding data integration between EMS and hospital? (Multiple Choice)



The project leadership consolidated the lessons from these two regional conferences into conference proceedings documents and continued to analyze the data from the previous stages of information gathering. In consultation with the steering committee, the original five themes were reorganized into the seven themes that ultimately formed the basis of the current chapters within this document. The themes identified were legal, financial, medical direction, interdisciplinary collaboration, regional EMS coordination, education, and data and telecommunications. Despite the segmenting into chapters, it was recognized that there are complex inter-relationships between the issues discussed in various chapters. The project team wrestled with the idea of including a chapter on "quality" for quite some time but ultimately decided that since quality was the goal that required addressing barriers across all areas and not a distinct category of barriers, it would not be organized into a chapter. Instead, the reader will find strategies to improve quality throughout the document.

The steering committee organized itself into small workgroups for each of the seven themes and met to discuss both the recommendations offered by the regional conference attendees as well as the qualitative analysis performed of all interview transcriptions and survey submissions. The steering committee itself then went about the task of writing the next iteration of recommendations and began vetting the emerging draft national framework document.

At the midpoint of the project, a national steering committee meeting was held in our nation's capital to allow for discussion and debate of the key issues identified and advanced by the efforts of Mount Sinai and UCSD. At that national meeting, 77 attendees both in person and via web, heard presentations from the project leadership and

workgroup members, and voted on each and every one of the proposed recommendations. Written and verbal feedback, as well as web-based submissions, were collected.

DEVELOPMENT OF THE DOCUMENT

Following dissemination of conference proceedings, the steering committee members as well as other invited stakeholders continued to work in subgroups to explore issues and refine the recommendations ultimately included in this document.

The draft recommendations were disseminated in January and February of 2016 for an initial public comment period. Over 150 responses were received. Most of the comments were favorable, while others raised new issues or perspectives. All were thoughtful and contributed to the iterative vetting process that has resulted in the recommendations contained in this document. Each comment was reviewed by the project team and steering committee as the group worked toward a near-final draft.

Following a final open comment period in August of 2016, this final product was developed that we hope provides meaningful guidance on how to develop an infrastructure for states, communities, and agencies to promote, authorize, fund, regulate and evaluate innovative demonstration projects in emergency medical services.

USING THE FRAMEWORK DOCUMENT

As previously stated, we hope that the document can guide state and local EMS entities on the steps needed to unleash innovation in their communities. Along the way, we seek to inspire with examples of innovation in progress. There are numerous citations pointing to national reports, consensus guidelines, and even at times scientific results. However, the attempt was not to define the state of the scientific evidence, nor to report on the results of policy changes already in effect. Rather, this document by its very nature is forward leaning. Its purpose is to promote innovation and therefore it recognizes that there is evidence for some policy recommendations but not for all.

The formation of the recommendations in this document were, as described, formed through an iterative process of exploration, development, feedback, and refinement. The recommendations do not necessarily represent the views of any particular organization or government entity, nor do all of the people associated with the project agree with every single recommendation.

The readers of this document should consider the many ideas, observations, examples, and recommendations and develop their own action plan as to what steps can be taken to promote innovation in their state or local community.

STRUCTURE OF THE RECOMMENDATIONS

We organized the recommendations in this document to be applicable at the local, state and national levels. We use this format, rather than naming specific groups of stakeholders, to acknowledge the diverse ways in which EMS systems operate and are regulated at the state and local level in the United States. For example, in one community for a given issue, the relevant state EMS authority might be the State Office of EMS, however in another community, the authority for the specific issues lies with the State Office of Education, the State Medical Board or with the legislature. Because of this, we sometimes use the labels of local agencies / authorities, state authorities / associations, and national associations / organizations to encompass all of the stakeholders that work at the local, state, and national levels, including providers, payers, and government agencies. The exact details and relationships between stakeholders may vary, but we encourage all users of this document to

be flexible in their interpretations of the relevant actors, and to consider the recommendations addressed to their level of geographic involvement.

Local EMS agencies / authorities comprise a large variety of actors including types of EMS agencies, various levels of providers and managers, and local healthcare stakeholders. These include, but are not limited to:

- Commercial EMS agencies
- Fire departments
- Volunteer EMS
- Hospital-based EMS
- Individual EMS providers
- Labor groups
- EMS administrators
- Regional EMS committees
- Education/training programs
    - o Academic institutions
    - o Government sponsored training programs
    - o EMS educators
- Physicians & medical directors
- Allied health providers
- Local hospitals and health systems
- Payers (large self-insured employers)
- Local public health resources

The term state authorities could include, but is not limited to, the following stakeholders:

- State legislators
- Departments of Health
- State Offices of EMS
- Offices of Education and accreditation bodies
- State EMS Directors
- State EMS Medical Directors
- State EMS Councils
- State EMS Associations
- Labor groups
- Insurance regulators
- State Medicaid committees

The term national associations could include, but is not limited to, organizations or associations representing the following stakeholders at the national level:

- Large EMS agencies or any of their leaders or providers
- Credentialing bodies
- Advocacy groups
- Advisory groups
- Non-governmental organizations
- Payers
- Other national-level associations outside of the EMS industry engaged in:
    - o Health care
    - o Public health
    - o Public safety

While we recognize Congress and federal agencies have an important role to play in promoting EMS innovation, this document focuses its recommendations on what the above actors can achieve independent of federal action.

We encourage the reader to apply these recommendations to the relevant actors in their communities with the ability to achieve the desired results, rather than feel constrained by our word choice of 'authorities' or 'agencies.' Also, please note that in this document, we define the term 'regional' to be a larger area than the local communities (hospital catchment area, neighboring counties, etc.), but smaller than a state.

DESIGNING SUSTAINABLE INNOVATION

The business community defines innovation as "the process of translating an idea or invention into a good or service that creates value for which customers will pay." [9] An important takeaway from this is that innovation is not simply having a new idea; the idea is only the beginning. There are plenty of good ideas, but it takes perseverance and

9 Business Dictionary. Accessed April 13,2015. http://www.businessdictionary.com/definition/innovation.html

resources to nurture the right idea and allow it to grow into something that brings value to others. The innovator must capture some of that value for it to be sustainable.

The idea is only the beginning!

Fostering a Culture of Innovation

Steve Jobs was generally considered one of the most successful innovators of his lifetime. His success did not come from great technical knowledge, but rather from an unparalleled ability to know what the customer wanted before the customer did. When his technical expertise was questioned, he famously replied, "You've got to start with the customer experience and work backward to the technology. You can't start with the technology and try to figure out where you're going to try to sell it."[10]

Both medicine and EMS often fall into the trap of trying to build up a patient care model starting with pathophysiology, technology, and therapeutics. EMS leadership and providers should instead start by asking, "What gaps currently exist in the way our patients are served by the EMS system? By the health care system at large?" A system built around the patient experience will often produce results that improve care, lower costs, increase access, and be sustainable.

Empower Your Workforce to be Entrepreneurs

Innovation does not always originate from leadership. It is often those who work with patients every day who are most acutely aware of gaps in patient care and difficulties in providing services. Inspiring leaders are those who seek to promote a culture where all members of the team are welcome or even encouraged to pursue knowledge, gain insight, and question existing structures. The best resource of any organization is its human capital. By unleashing the creativity and passion of the workforce, it may be possible to generate new ideas, valuable services or develop ways to improve the patient experience.

Constantly Engage New Partners

EMS is one part of a greater health care and public safety infrastructure. The patient experience is not limited to the time a patient spends in the back of an ambulance, and thus the innovative EMS leader should look beyond the boundaries of the EMS agency to understand the needs of patients and the community, recognize which needs are not being met, and consider possible solutions. The best solution may or may not be one that EMS is best positioned to offer. The best solutions are often those that require interdisciplinary collaborations.

Planning for Sustainability

A major challenge of innovation in EMS is that it usually produces value that is difficult to capture, especially in a reimbursement environment that only rewards transportation. Often, an innovative EMS agency launches a pilot program to demonstrate proof of concept, either through a grant or through self-funding. Due to lack of planning for sustainability, many of these pilot programs have to be cut when funding runs out, even if they seemed to or were even proven to provide significant value to the community. If an innovation creates value for patients, communities, health plans, or hospitals, the EMS agency must have a plan from the beginning to measure and capture that value, or it risks providing a valuable service only temporarily.

Use Data to Demonstrate Value

Having data to support the need for a new good or service is often a critical element of convincing others of the potential value that an innovation might generate. It is often necessary prior to

10 Carson, Biz. "Steve Jobs' reaction to this insult shows why he was such a great CEO." Business Insider. October 22, 2015. Accessed September 21, 2016. http://www.businessinsider.com/steve-jobs-reaction-to-insult-2015-10

the investment of resources and capital to get a pilot off the ground. To achieve sustainability, an agency must be able use data to measure the effect of the innovation, improve the innovation, and demonstrate value to the community and to stakeholders.

Engage Payers Early

An effective strategy that can both help with the securing of data and demonstration of outcomes while also laying the groundwork for sustainability, is to invite potential payers to serve on a steering committee or advisory board of a pilot study. These could be traditional payers or healthcare provider group such as a nursing home, hospital, or independent physicians association, that are beginning to take on financial risk for the cost of care of their patients. An EMS agency can benefit from their wisdom and sharing of data while also beginning to secure their long-term buy-in. These partners can help establish benchmarks and milestones early in the process that would define success from their perspective, for which they might one day be willing to pay.

INNOVATION IN PROGRESS

EMS sits at the intersection of public health, public safety, and healthcare. There is ample opportunity for innovation across all of these fronts. Throughout the document, examples of innovation are included. In this section, we preview some of the innovation in progress and a few that may be just beyond the horizon. However, in no way should the examples described here or elsewhere in the document be considered the only areas worthy of focus.

Clinical Acute Care

The core of EMS has always been providing high quality emergency care for acute time-sensitive conditions such as cardiac arrest and trauma. More recently, acute myocardial infarction and stroke have become core clinical areas of focus for EMS. In these and other areas, EMS should be pushing the

FINANCIAL SUSTAINABILITY: THE CASE OF REMSA

The Regional Emergency Medical Services Authority (REMSA) was founded in 1986 as a community-based private non-profit EMS service serving Washoe County (Reno) Nevada. REMSA won a Round 1 Health Care Innovation Award (HCIA) (one of six awarded to EMS in the country) in July, 2012 to launch Community Health Programs including a community paramedicine program, a Nurse Health Line, and an alternative transport destination initiative. The HCIA was awarded by the CMS Innovation Center to develop "new models of care and payment that continuously improve health and healthcare for all Americans."

Analysis & Planning	Build the evidence-base for value-based community health programs
Community Outreach	Achieve improved stakeholder knowledge of new Community Health Programs
Business Development	Secure contracts with new sources of revenue
Public Policy	Generate support for reform of government payment systems

REMSA planned from the beginning of the grant to build a program that would be sustainable by the time the grant expired. To achieve sustainability, they decided to build a strong evidence base to demonstrate value, then work closely with local stakeholders to form partnerships based on the value they provided. By providing integrated patient-centered, quality care, REMSA saved the health system an estimated $9.6 million over four years and prevented 6,202 ED visits, as of June 2016. Because of its success, REMSA was able to secure contracts with local hospitals and commercial insurers that allowed it to continue to serve the community once the grant expired in July of 2016. On a larger scale, REMSA committed itself to advocating for reforming payment models that reward value, which will create a healthcare environment that makes these programs more sustainable in the future. In August 2016, CMS approved a Nevada Medicaid State Plan Amendment (SPA) that updates coverage and reimbursement to include Community Paramedicine services. In addition, Medicaid and all commercial insurers are reimbursing REMSA for transport to alternative destinations.

INNOVATIONS UNDERWAY
Responses from the PIE Survey

Survey respondents pointed to the following projects that they are currently pursuing:

- X-rays/Ultrasound on the ambulance
- Integrating AED location data into CAD system and notifying bystanders
- Sepsis pathway (blood cultures, lactate, & antibiotics)
- Video interface (telehealth) with:
    - ED physician
    - Primary care physician
    - Trauma surgeon (follow-up)
- Referral programs to:
    - Home health
    - Social services
    - Mental health services
- Emergency preparedness training for vulnerable populations
- EMS supporting "Directly Observed Therapy" (DOT) programs for TB patients
- Direct transport to:
    - Sobering centers

envelope and enabling the development and testing of new treatments or delivery models that result in better outcomes for patients.

Cardiac Arrest

EMS has found exciting new applications of technology and data sharing to improve cardiac arrest survival rates. Apps that notify the public of nearby cardiac arrests have increased rates of bystander CPR by 14%.[11] Data sharing will allow agencies to monitor CPR quality and track clinical outcomes, while improving cardiac arrest research.

EMS agencies are also exploring collaborations with organ donation centers to assist families who may be interested in organ donation following a cardiac arrest has been pronounced in the field. This example shows how an integrated EMS workforce can have an impact on areas of medicine that are not traditionally seen as part of the EMS role.

Stroke

Creating regionalized systems of care, and performing hospital pre-notification from the field have all played an important role in expediting door to needle (DTN) and door to thrombolytic times. Despite such interventions, the median times remain greater than 60 minutes.[12] To achieve further gains, there may be ways to leverage technology to improve the pre-notification process or to accelerate diagnostic imaging through direct to CT protocols.

Given new literature on the benefits of endovascular procedures,[13, 14] and comprehensive stroke centers (CSCs),[15] EMS systems need to revisit their approach to hospital destination decisions. Distinguishing which patients are appropriate for direct transport to CSCs is challenging without novel or improved EMS prehospital stroke scales to detect large vessel occlusions. Alternatively, some hospital systems and EMS agencies have turned to innovative technologies, namely telehealth and/or mobile stroke units (MSU) equipped with a CT

11 Ringh, Mattias, Mårten Rosenqvist, Jacob Hollenberg, Martin Jonsson, David Fredman, Per Nordberg, Hans Järnbert-Pettersson, Ingela Hasselqvist-Ax, Gabriel Riva, and Leif Svensson. "Mobile-phone dispatch of laypersons for CPR in out-of-hospital cardiac arrest." *New England Journal of Medicine* 372, no. 24 (2015): 2316-2325.

12 Fonarow, Gregg C., Xin Zhao, Eric E. Smith, Jeffrey L. Saver, Mathew J. Reeves, Deepak L. Bhatt, Ying Xian, Adrian F. Hernandez, Eric D. Peterson, and Lee H. Schwamm. "Door-to-needle times for tissue plasminogen activator administration and clinical outcomes in acute ischemic stroke before and after a quality improvement initiative." *Jama* 311, no. 16 (2014): 1632-1640.

13 Berkhemer, Olvert A., Puck SS Fransen, Debbie Beumer, Lucie A. Van Den Berg, Hester F. Lingsma, Albert J. Yoo, Wouter J. Schonewille et al. "A randomized trial of intraarterial treatment for acute ischemic stroke." *New England Journal of Medicine* 372, no. 1 (2015): 11-20.

14 Goyal, Mayank, Andrew M. Demchuk, Bijoy K. Menon, Muneer Eesa, Jeremy L. Rempel, John Thornton, Daniel Roy et al. "Randomized assessment of rapid endovascular treatment of ischemic stroke." *New England Journal of Medicine* 372, no. 11 (2015): 1019-1030.

15 McKinney, James S., Jerry Q. Cheng, Igor Rybinnik, and John B. Kostis. "Comprehensive stroke centers may be associated with improved survival in hemorrhagic stroke." *Journal of the American Heart Association* 4, no. 5 (2015): e001448.

scanner, to accelerate stroke care and improve the ability to diagnose and treat stroke prior to ED arrival.

Trauma

Trauma care is an area that can benefit greatly from EMS innovation. The National Academy of Sciences, Engineering and Medicine recently concluded that, in order to improve our civilian and military trauma systems to eliminate preventable death EMS should be considered a key component of the health care system rather than being viewed as a transport mechanism. To improve trauma care the Academies also recommended incorporation of EMS data into trauma registries; amending the Social Security Act and the CMS Ambulance Fee Schedule to detach reimbursement from the requirement of transportation; making HHS responsible for EMS; and conducting a national EMS needs assessment.[16]

Some EMS innovations are already being used in patient management. The inclusion of imaging technology, especially ultrasound, on ambulances is gradually becoming more common. Telehealth will further improve diagnostics and pre-hospital care, and may improve education by connecting EMS providers with EMS physicians or trauma specialists for debriefing and coordination.

Myocardial Infarction

The last 10 years have seen a great deal of improvement in the prehospital care of patients with acute myocardial infarction. Since 2007, when the American Heart Association began recommending EMS to balloon time of less than 90 minutes and began encouraging the use of prehospital electrocardiograms (ECGs), there has been a proliferation and dissemination of the technology required to not only perform an ECG, but also to transmit it to the hospital prior to a patient's arrival.[17]

However, prehospital activation of the cath lab is still not practiced in every hospital, and the logistics of performing the prehospital notification and the quality assurance and clinical feedback mechanisms to the prehospital providers associated with these cases is still rudimentary. New telecommunication technologies and HIPAA compliant sharing of information is available and may greatly advance the quality of care provided.

The next frontier for prehospital management of chest pain may include point of care lab testing with troponin levels and performance of simple, yet potentially impactful interventions like remote ischemic conditioning.[18] In addition, there has been an explosive proliferation of personal monitoring devices and implantable medical devices that could provide useful data to EMS providers. The installation of technology that can read the data from a pacemaker or other implanted monitoring device, and either interpret or transmit that data for remote interpretation, may significantly augment the care of patients in the field.

Emergency Management

The core of EMS has always been its public safety role supporting a community's emergency management and disaster preparedness responsibilities. While there have been improvements in the level of integration and coordination of EMS and other branches of public safety, there is still a need to improve coordination

16 National Academies of Sciences, Engineering, and Medicine. *A national trauma care system: integrating military and civilian trauma systems to achieve zero preventable deaths after injury.* National Academies Press, 2016.

17 Antman, E. M., M. Hand, P. W. Armstrong, E. R. Bates, L. A. Green, L. K. Halasyamani, J. S. Hochman, et al. "2007 Focused Update of the Acc/Aha 2004 Guidelines for the Management of Patients with St-Elevation Myocardial Infarction: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines: Developed in Collaboration with the Canadian Cardiovascular Society Endorsed by the American Academy of Family Physicians: 2007 Writing Group to Review New Evidence and Update the Acc/Aha 2004 Guidelines for the Management of Patients with St-Elevation Myocardial Infarction, Writing on Behalf of the 2004 Writing Committee." Circulation 117, no. 2 (January 15, 2008): 296-329.

18 Martin-Gill, Christian, Max Wayne, Francis X. Guyette, Oladipupo Olafiranye, and Catalin Toma. "Feasibility of remote ischemic peri-conditioning during air medical transport of STEMI patients." *Prehospital Emergency Care* 20, no. 1 (2016): 82-89.

of response to large events. EMS of the future should improve its victim tracking and use technology to seamlessly coordinate the movement of patients to nearby hospitals and create a single portal for patient information querying. EMS leadership at the scene needs greater fluidity and reliability in the communication between EMS, hospitals, and other public safety agencies. In light of the growing number of active shooter and other domestic terrorist events, enhanced training, communications and personal protective equipment will be essential to assure safety in the increasingly militarized environment in which EMS providers find themselves.

For disease surveillance and other purposes, EMS data integration with public health could improve efforts around investigative epidemiology and disease outbreak detection. EMS could also improve emergency preparedness and community resilience through community or personalized in-home education, especially for the elderly and homebound.

Mobile Integrated Health Care

EMS has long been interested in pursuing innovative models of providing care that expand the role and increase the value of EMS systems to the community, to patients, and to the health care system.[19,20] The EMS Agenda for the Future published in 1996 envisions EMS treatment to be a part "of a complete health care program," with "finances … linked to value."[21] In 1997, Neely et al. articulated the Multiple Option Decision Point model which allows for an EMS call to be responded to with a variety of transportation options and to a variety of destinations.[22] In 2001, a brief article in the Rural Health News described the idea of a "community paramedic" that would "integrate with the larger health care sector."[23] In 2006, the Institute of Medicine recommended detaching reimbursement for transportation from the assessment and medical treatment rendered by EMS and the funding of demonstration projects to explore alternatives to existing models of care.[24]

In recent years, all of these innovative ideas and efforts around expanding the role of the EMT and paramedic have manifested in a movement under the banner of mobile integrated health care (MIH). While the precise definitions of this term is not entirely agreed upon, we will use the definition recently laid out by the National Association of Emergency Medical Technicians (NAEMT) as follows:

[MIH] is the provision of health care using patient-centered, mobile resources in the out-of-hospital environment in a coordinated manner with physicians, hospitals, and other providers.[25]

The promotion of new and innovative models of EMS care in which existing health care resources are being redeployed to better meet patient needs is thus very much in line with the goals of the ACA and is now beginning to attract the attention from health care systems, payers, and providers beyond the EMS community.

19 Frank Pasquier, *Health Care Access: Innovative Programs Using Non-Physicians* (Washington, D.C.: United States Government Accountability Office, 1993).

20 "Discussion Paper on Development of Community Paramedic Programs." *Joint Committee on Rural Emergency Care (JCREC), National Association of State Emergency Medical Services Officials, National Organization of State Offices of Rural Health.* Last modified December 2010. https://www.nasemso.org/Projects/RuralEMS/documents/CPDiscussionPaper.pdf

21 Ibid. 2

22 Neely, Keith. "Demand Management: The New View of Ems?" [In eng]. *Prehospital Emergency Care* 1, no. 2 (1997): 114-8.

23 Rowley, Tom. "Solving the Paramedic Paradox." Rural Health News. 8, no. 3 (2001): 1-6.

24 "Emergency Medical Services at the Crossroads." *In Future of Emergency Care Series* edited by Gail L. Warden. Washington, D.C.: Institute of Medicine, 2006.

25 "Vision Statement on Mobile Integrated Healthcare & Community Paramedicine." *National Association of Emergency Medical Technicians.* Last modified February 28, 2014. http://www.naemt.org/Files/CommunityParamedicineGrid/MIHVision022814.pdf.

Primary Care & Population Health

There is an immense need to improve access to primary care and to improve the efficiency of coordinating care with primary care physicians. In the setting of increasingly realigned incentives that encourage physicians, hospitals, and health plans to focus more on population health and coordinating care in the community, EMS has an opportunity to reposition itself as a mobile health care resource capable of providing the type of on-demand coordinate care that patients and their health care teams are looking for.

In particular, there is a natural partnership and alliance between EMS and home based primary care (HBPC) practitioners. Both groups are familiar with caring for patients in the out-of-hospital environment and patients who qualify for HBPC programs are usually homebound, frail elderly adults who require ambulance or other medical transport assistance to leave the home. Thus, it could be envisioned that HBPC physicians could use EMS providers to help meet urgent or chronic care needs among their patient populations and that EMS could reach out to HBPC providers to coordinate care when called to respond to HBPC patients.

Because of this natural partnership, there are pockets of collaboration already under way including 1) the Mount Sinai Visiting Doctors group, which has partnered with a local private EMS organization, to provide telehealth enhanced community paramedic urgent assessments; 2) the Wake County EMS partnership with an HBPC group to reduce transports for minor falls in assisted living facilities;[26] and 3) Northwell Health which has an internally run HBPC group known as "House Calls" and an accredited EMS agency under the same organizational umbrella.[27]

To go even further, future collaboration between EMS and primary care / population health would benefit from the ability to deploy increased diagnostic and other capabilities to the patient bedside to support disposition decisions. There is a need for developing shared care plans between physicians and community providers like EMS and shared electronic platforms with which to share those care plans. Primary care might be able to utilize EMS to extend primary care or perform safety checks in the home.

Home Health & Hospice

In the setting of an increased emphasis on improving transitions of care and end-of-life care, EMS has an opportunity to improve its relationship with providers of home health care, palliative care, and hospice care. Improved communication, easy access to Medical (or Physician) Orders for Life Sustaining Treatment (MOLST, POLST) documents, and standardized care protocols are worthwhile areas of focus for EMS innovators. Perhaps EMS could help address gaps in home health and hospice care on-call coverage or support post-discharge transitions of care back to the community for patients with chronic conditions. This could include the provision of services for patients who would benefit from having health care delivered in their homes, but who do not currently qualify for home care. There should be recognition of EMS, home health, and hospice as being important parts of the same health care continuum.

Mental Health

Behavioral health remains one of the biggest gaps in our health care system. As a result, a significant portion of the nation's overall health care burden is related to untreated behavioral health conditions. Many super-utilizers of EMS and a substantial

26 Williams, Jefferson G., Michael W. Bachman, A. Wooten Jones, J. Brent Myers, Alan K. Kronhaus, Diane L. Miller, Benjamin Currie et al. "Retrospective validation of a protocol to limit unnecessary transport of assisted-living residents who fall." *Prehospital Emergency Care* 19, no. 1 (2015): 68-78.

27 Abrashkin, Karen A., Jonathan Washko, Jenny Zhang, Asantewaa Poku, Hyun Kim, and Kristofer L. Smith. "Providing Acute Care at Home: Community Paramedics Enhance an Advanced Illness Management Program—Preliminary Data." *Journal of the American Geriatrics Society* 64, no. 12 (2016): 2572-2576.

MENTAL HEALTH INITIATIVE AT GRADY EMS, ATLANTA, GA

Georgia launched the Grady EMS Upstream Crisis Intervention Group in January, 2013 to provide better services to its mental health patients and take pressure off its traditional 911 system. GEMS had found that 6% of its 911 calls were mental health-related, and that GEMS was losing on average $109 on each of these patients per call and the emergency department was losing $401 per patient per visit. Moreover, many of these patients were frequent users who were repeatedly subjected to restraint, police involvement, and uncoordinated care.

Instead of using an ambulance, Grady EMS now responds to mental health dispatches with a team of a paramedic and a licensed clinical social worker, who use telehealth to connect the patient with a mental health professional. As Michael Colman, the Director of EMS Operations explained, "The goal of the program was to replicate the ED process of medical clearance upstream from the ED, at the community level." Among other things, the team can schedule mental health appointments for the patient or transport him or her to a psychiatric facility. When not responding to emergency calls, the team visits the homes of super-utilizers and helps coordinate care. The program saved an estimated $248,000 and 1,925 bed hours in its first year- the equivalent of emptying a 24-bed ED for over 3 days. It also saved GEMS more than $100,000 in both 2014 and 2015. Frequent mental health user 911 calls have fallen by over 50%.

The program is also popular with EMS providers inside and outside the crisis response team. Crisis team members feel they are providing services that are needed by their patients, and traditional EMS providers are happy that non-emergent calls are being diverted or prevented. Some crisis response team members have turned down promotions to stay on the team. GEMS has allowed EMS providers to specialize in an area of medicine in which they are interested, which helps it retain talent and provide better services.

Colman, Michael, "Innovations: Upstream Crisis Intervention Unit". Urgent Matters (blog), (December 19, 2013), http://smhs.gwu.edu/urgentmatters/news/innovations-upstream-crisis-intervention-unit.

Stanaway, Nathan, "Community paramedic program cuts mental health patient call volume". EMS1.com (blog), (May 23, 2016), https://www.ems1.com/community-paramedicine/articles/93357048-Community-paramedic-program-cuts-mental-health-patient-call-volume/

portion of low-acuity EMS patients suffer from unaddressed behavioral health conditions. There may be significant opportunities for EMS to become more engaged with behavioral health crisis teams to fill gaps and improve care coordination for these patients. Service delivery between EMS and mental health services could possibly be integrated creating economies of scale for both. Mental health professionals may not be aware of the significant contact EMS has with their patients nor the potential to work closely with EMS to improve the services these patients receive.

Some EMS agencies are experimenting with better ways to care for low-acuity behavioral health complaints that don't fit into the traditional emergency role of EMS. Perhaps with additional training, researching of new triage protocols, or use of telehealth, EMS could divert patients to facilities other than emergency departments. Many patients may simply need transport to psychiatric facilities or assistance scheduling appointments with mental health professionals. More integrated EMS-behavioral health teams could reduce cost, provide better care, and avoid burnout.

Public Health

EMS and fire services have embraced their role in fire and injury prevention, from providing carbon monoxide detectors to participating in community education campaigns. In addition, many EMS agencies also conduct CPR classes and other first aid courses for laypersons.

While it may not always be viewed as such, these are very much public health initiatives. These efforts could be taken even further and open up a vast array of possibilities for EMS based efforts at promoting the health of the community and preventing injury and illness before they occur. Perhaps EMTs and paramedics could serve as public health educators in their local communities and build stronger relationships with the community outside of emergencies. For example,

FDCARES: ONE FIRE DEPARTMENT'S CREATIVE APPROACH SOLVES MULTIPLE COMMUNITY NEEDS

Mitch Snyder, a battalion chief at the Kent Fire Department (WA), understands that "EMS services are being forced to change. As we address the needs of our residents, we must work to reduce costs." Medical calls make up more than 70% of the department's responses1. The department has recognized that a large fraction of its medical calls are non-emergent in nature, while the health care system is moving away from supporting the transport-or-nothing approach.

The department launched Fire Department Community Assistance, Referrals and Education Services (FDCARES) program to expand the services it provides to the community by offering fall prevention, care coordination, social services, patient navigation, readmission prevention, and low-acuity medical consults. These services are provided by a team of firefighter EMTs and registered nurses who respond to non-emergent calls with home visits. In one year, ED visits by Medicaid recipients decreased by 9.9% and ED visits by frequent utilizers decreased by 10.7%.[2]

These services have made a positive impact on the department's community, and FDCARES has shown that fire departments can stay at the forefront of innovation and offer more services that increase the value of care provided to the community. According to Snyder, "FDCARES is the next generation of Kent's fire and emergency medical system. It is designed to maximize resources while saving tax dollars."[1]

Mitch Snyder, "Fire Department Program Helps Prevent Illness and Injury," EMSworld.com, last modified April 18, 2012, http://www.emsworld.com/article/10702385/fire-department-program-helps-prevent-illness-and-injury

2 http://www.agingkingcounty.org/ctconference/docs/Frequent-ER-Flyers_workshop.pdf

they could survey homes for fall risks and train the elderly in disaster preparedness. EMS could be harnessed to screen, intervene and refer patients for food insecurity, vaccination status, elder and child abuse, and domestic violence. Indeed, in some communities, they are already utilized to administer flu and other vaccinations.

Patient & Provider Safety

Perhaps the area of most pressing need for innovation is in improving the safety of both patients and providers. The "Ambulance" hasn't changed much in the last 30 years. Despite a few attempts, the ambulances commonly used in the United States are not designed for ongoing interaction between the provider and patient during transport. A great example is the fact that all of our ambulances are "left-handed," meaning that the patients left side is oriented to the provider. European ambulances often allow for left or right sided patient care. Perhaps new technologies could be added so that as you approach an ambulance with a critically ill patient, the exterior lights turn on and the doors open automatically to allow for fewer interruptions in care.

Accommodating children can also be a challenge on today's ambulances.[28] Many resources, such as NASEMSO's www.safeambulances.org, have been developed to aid providers and regulators in improving patient and provider safety, but more work is needed. Similarly, it will be incumbent upon regulators, providers and industry to continue to develop the types of equipment and safety systems that reduce error and preventable injury and death.

We must also recognize that EMS is a demanding occupation, and providing mental health and suicide prevention should be central to discussions of provider safety. Innovations that support provider mental health are needed.

28 "Working Group Best-Practice Recommendations for the Safe Transportation of Children in Emergency Ground Ambulances." *National Highway Traffic Safety Administration.* Last modified September 2012. https://www.nhtsa.gov/staticfiles/nti/pdf/811677.pdf.

AVOIDING PITFALLS

FILL UNMET NEEDS

Innovation in EMS often seeks to fill gaps in the way health care is delivered to communities. As such it is sometimes seen as conflicting with the interests of other providers, such as home health care or nurses. The current system provides enough gaps in patient care that EMS leaders should focus on providing services that are not currently offered by any industry before competing over turf with fellow health care providers. Many leaders in EMS innovation have found that coordination with home health care and nursing agencies has produced valuable allies in improving the way EMS and the system as a whole cares for its patients.

QUALITY FIRST, THEN INNOVATION

While in some cases, promoting a new innovation can be synergistic with improvements in operational performance or clinical quality, if not they can sometimes be in conflict or compete for limited resources. While it is the clear and expressed purpose of this document to promote innovation at the local level, an agency should not prioritize the development of new modalities of providing care over the implementation of known best practices and evidence-based care in its system. In most communities, it will take as much or more of the same entrepreneurial spirit, leadership, passion, strength, resources, and collaboration to move current EMS practice to what has been proven more effective elsewhere than it will to test some new innovation that is as yet unproven.

REDUCE UNJUSTIFIED VARIATION

Today, there exists a significant amount of unjustified variation in the quality of care delivered between EMS agencies. This has been most well described in the cardiac arrest literature but is true across most clinical conditions. Several evidence-based consensus guidelines[29] have been developed that help establish basic standards that every EMS agency should seek to achieve. Yet the implementation of these guidelines and other best practices has proved difficult and may be due in part to a multitude of factors including a large number of small agencies, lack of involved medical direction, limited data collection and few resources dedicated towards quality improvement. Indeed, these are the same barriers that we have described elsewhere in this document as inhibiting innovation at large. In particular, EMS education will play an important role in improving the quality of EMS care.

Thus, as a national EMS industry, we should strive to reduce unjustified variation between EMS systems. Doing so will take significant effort across all parts of the industry but will create the substrate for a far greater future for EMS – one in which the care we provide is high quality, consistently reliable, and determined by medical evidence, and where new ideas can be rapidly tested and the best ones can be disseminated to provide the greatest help to our patients.

INNOVATION FROM EVERY PERSPECTIVE

The following section contains perspectives from a number of stakeholders within and beyond the EMS industry, addressing challenges to and opportunities for innovation.

EMS PROVIDERS

EMS responders are intensely creative people. We spend every shift adapting and innovating to some degree. No two patients are exactly alike. While commonalities exist, there is no cookie-

29 "National Model EMS Clinical Guidelines." *National Association of State EMS officers.* Last modified October 23, 2014. http://nasemso.org/Projects/ModelEMSClinicalGuidelines/documents/National-Model-EMS-Clinical-Guidelines-23Oct2014.pdf.

cutter solution that works for every chest pain call, trauma call, or diabetic emergency. Transportation routes differ by destination, traffic, time of day and weather. What worked yesterday may not today.

Every day we rise to meet new challenges, whether they are operational, institutional, or cultural. We see first-hand what works and what doesn't. This means we are in an invaluable position to recognize gaps and use our creative, problem-solving ways to innovate on behalf of our agencies, our systems, our communities, and, most importantly, our patients.

To do so, we must embrace life-long learning, not just the nuts and bolts of our daily trade, but also how to research, identify evidence-based best practices, use data to frame solutions, advocate positions, and work with others toward a common goal.

Successful EMS leaders and systems embrace this "from the street up" process for innovation. They encourage input from their responders and work with them to translate good ideas into system-wide innovation.

Look for every opportunity to innovate. Advocate to create a culture of innovation among your colleagues. What is at stake? Nothing less than the EMS profession in which our successors will work, and the emergency care our children and grandchildren will receive.

Ed Mund
Director At-Large, EMS/Rescue Section
National Volunteer Fire Council

EMS EDUCATORS

Educators have an important role in shaping the personalities, actions and priorities of the future EMS workforce. Technology and evidence-based educational practices are continually changing for EMS educators; future educators must embrace the current evidence in education to provide the best educational delivery models for their students. Educators should commit to teaching evidence-based medicine with evidence-based practices. They should remind their students that the difference between what they learn in the classroom and "how it's done in the field" is that the medicine taught in the classroom is evidence-based, and they should encourage students to advocate for more evidence-based medicine in future care delivery.

The ideal EMS professional of the future will be a "continuous lifelong learner" and will stay actively connected to current research, will understand research methods and how to use data to solve problems, and will seek out higher educational opportunities. Because of this, the current EMS educator should become familiar with these skills and teach their importance to students.

Baxter Larmon, PhD, MICP
Professor Emeritus, Emergency Medicine
David Geffen School of Medicine at
University of California at Los Angeles
Founding Director, Prehospital Care Research Forum
National Association of EMS Educators

MEDICAL DIRECTORS

As medical directors, we have traditionally focused on ensuring high quality patient care through protocol development, provider credentialing, education and training, and quality assurance. Our efforts have not, however, always effectively translated from policy and program into 'rubber meets the road' quality and value. As such, we are now faced with the compelling responsibility to nurture innovation, and to thereby help redirect the cultural, political and financial forces that typically drive our systems. It is in this respect that we have the unique opportunity to broaden our traditional scope: to utilize clinical research and outcome-based performance measurement to ensure evidence-based patient care through evidence-driven system design, management, and policy development.

The challenge is a multifaceted one: how to develop and hone our own skills sets, and how to effectively couple these with sufficient authority and a spirit of collaboration both within and outside of our systems. To accomplish this, we also have to broaden our perspective from one of emergency medical care to one of emergency medical navigation. Not every patient needs an ambulance or an emergency department but may require, instead, an accountable and high quality, integrated system of care - one that incorporates and surrounds every aspect of the individual with a comprehensive approach to prevention, management, and population health.

Any such approach to innovation should focus not only on new initiatives - whether readmission avoidance or the management of primary or chronic care medical problems. The same spirit of leadership, collaboration and innovation that is being brought to bear on the out-of-hospital management of low acuity patients may also be brought to the prehospital management of those with acute, time-sensitive emergencies. The opportunities are similar and critical for both - value-based decision making and enhancing the health of all of our communities.

Neal J. Richmond, M.D.
Medical Director, MedStar Mobile Health care

STATE EMS OFFICES

State offices of EMS are uniquely positioned to provide an atmosphere that encourages change and innovation within their individual states. While frequently we are primarily perceived as regulatory agencies for EMS, we actually have the opportunity to influence the many elements of the health care continuum on a frequent basis.

The means we have for change and innovation are varied and may require a slightly different interpretation than we have used before. Because of our regulatory charge, it is easy to establish a relationship with our lawmakers. This relationship also gives us the opportunity to relate the needs of the industry, propose changes, and potential innovation to those that can help us facilitate needs.

While we may see funding, from the state or other sources, as an opportunity to sustain current operations, we could instead enact initiatives to catalyze innovation. Our state office has supported the development of pilot projects to improve EMS; we have worked with designated regions to establish data collection and quality improvement efforts, as well as encouraged local ambulance services and communities to embrace community paramedicine and heart-healthy initiatives. Consideration of innovation centers, in conjunction with our partners' efforts and expertise, could affect real change in all we do.

Because of our unique position we are able to have a much broader perspective of EMS in our state, rather than individual agency perspective. This gives our office the advantage of recognizing all the elements of the health care continuum and how they should work together. This position also establishes the need for synergy among the many elements working together to form a far more effective team. Some tools at our disposal to aid in these synergizing efforts are quality improvement, system development, leadership and mentorship. While our focus to this point has been on state initiatives and progress, it should be recognized that we can also affect change nationally. Organizations of which we are members, such as the National Association of State EMS Officials (NASEMSO) and the Joint Committee of Rural Emergency Care (JCREC), give us an opportunity to work with other state offices to bring about change nationally.

We need to become facilitators of change and adopt attitudes that foster change, rather than become obstacles that hamper progress and

transformation. A favorite quote of mine comes from Henry David Thoreau; I believe this quotation reflects both innovation as well as practical application: ***"If you have built castles in the air, your work need not be lost; that is where they should be. Now put the foundations under them."*** We need to make it easier to build bridges than silos. Together with our diverse partners, with our institutional knowledge and the experience of our providers in the field, we can work together to truly lead, facilitate change, and foster innovation in EMS.

Thomas Nehring
Director, Division of Emergency Medical Systems
North Dakota Department of Health

EMS AGENCY LEADERSHIP

Most EMS leaders choose their profession because they recognize the unique opportunity it provides to serve their communities. They consider themselves fortunate be in their positions and are looking for ways to expand the value of their services to their communities. To improve their services successfully, EMS managers must transform from managers to leaders who can guide their agencies and local communities to support and encourage EMS innovation.

Leaders should strive to maintain a culture of innovation, and encourage and support providers who work to improve patient care. Leaders should encourage their workforce to question existing structures and constantly be looking for new ways to better serve their communities, even if these services don't always fit in the traditional role of EMS. They should try to stay up to date with current trends and innovations in the field and support providers in their agencies who want to pursue higher educational opportunities.

EMS leaders should also make measuring quality and outcomes a priority, and experiment with interventions that improve the quality of services their agencies provide. Quality in this context does not mean only clinical quality, but financial sustainability, community relations, and employee engagement. Thus, leaders should also be intimately familiar with their care models and cost/revenue streams, and work to find new ways to save costs by adding services that improve care and provide value.

Finally, for many agencies, successful innovation is a three-legged stool that depends on EMS leadership, the EMS workforce, and the community the agency serves. It is the responsibility of the leadership to work closely with the workforce and community to understand their needs and demonstrate how potential innovations can improve the value to patients, employees, and other providers. Many innovative projects stall due to resistance from one of the three legs, especially when they already have a shaky relationship. EMS leaders should consider maintaining a good relationship with the workforce and community as an important part of the job, and should collaborate with them proactively.

Aaron Reinert, NRP, MAOL
Executive Director
Lakes Region EMS

LEGISLATORS AND REGULATORS

Legislators and regulators should facilitate EMS inclusion in health care innovation as much as possible. This includes establishing an EMS regulatory board in the state, or if one already exists, delegating appropriate authority to the board to encourage innovative pilot projects. Currently, some states require approval from the legislature to launch pilot programs, which places an undue regulatory burden on innovation. While public safety is the first concern, regulators should be able to allow EMS agencies to test new ideas and provide new, valuable services to their communities under the supervision of local medical direction.

An ambulance ride to the hospital may not necessarily be the best way to improve patient outcomes in every circumstance. Community integrated paramedicine is the use of paramedics outside their customary public safety emergency response and transport roles to meet community needs and provide patient-centered health care services. To be successful, EMS providers must be allowed to practice to the full extent of their scope of practice. For example, paramedics trained to give intramuscular injections should be permitted to administer vaccines to their communities without onerous regulatory barriers.

All evidence-based calls for medical assistance need attention, but not all of them are medical events that require the typical 9-1-1 emergency response. Local officials should employ proven outcome measures, rather than process measures, to evaluate the effectiveness of their EMS systems. The use of outcome measures allows agencies more flexibility to find innovative solutions to the local health challenges that best match needs to resources. For example, many cities rely heavily on response times to each and every 9-1-1 call for medical assistance as a measure of EMS quality, even though research suggests little correlation between response times and patient outcomes in most circumstances. Focusing on response times alone forces EMS agencies to place an emphasis on "getting there faster" instead of investing in system improvements and innovations that can truly improve quality of care. If regulators and local officials were to instead use outcome measures, agencies would be free to explore innovative ways to improve patient care that may be much more effective and less expensive than decreasing response times. Furthermore, investing in EMS innovation frees valuable public safety resources to respond to emergencies where there is demonstrable benefit to a quicker response.

Scott Somers, PhD
Former Vice Mayor, Mesa Arizona City Council
Professor of Practice, ASU College of Public Service
Senior Fellow, GW Center for Cyber and Homeland Security

COMMUNITY HEALTH CARE GROUPS

Mobile integrated health through community EMS is rapidly emerging as a solution to prevent avoidable emergency room visits and hospitalizations. Patients who can be stabilized in their home through an escalated means of intervention are less likely to experience emergent symptoms, and with proper support and follow up through home health organizations and other community-based organizations, can remain out of the hospital. It will continue to be important to integrate the management of the care across the continuum so that appropriate care interventions, treatment, support, and education can be applied at the right time in the right setting.

We are encouraged by the development of programs in this space and look forward to continued collaboration between EMS and home health and community-based organizations, as well as those organizations who are responsible for the payment for services and ongoing support of the patients they serve.

Scott A. Vasey
Senior Vice President, Strategy
Visiting Nurse Service of New York

HEALTH PLANS

As we continue the evolution from volume to value-based health care, health plans should recognize the opportunity that exists within the EMS community and services they provide to greatly assist in this shift. Value, as measured by health outcomes relative to total cost incurred, can be easily achieved by utilizing and rewarding EMS agencies for assisting in the care of some of

our most costly customers. Many of these costly customers have complex and chronic medical conditions that result in overutilization of hospital services in ways that are largely preventable. Care coordination, transitional care and patient education are three proven methods that help reduce hospitalization rates, and innovative programs with EMS agencies have been able to implement each of these methods and bring value to us as payers as well as, more importantly, our customers (i.e. patients).

Health plans should consider innovative programs and contracts with EMS agencies that will increase value in our health care system by providing higher quality, less expensive care. Mobile integrated health care models have been clearly demonstrated to better coordinate care and avoid unnecessary ED visits and hospital admissions. Health plans should seek EMS partners willing to innovate and provide primary care, chronic disease management, mental health support, or patient navigation services on top of traditional emergency transport. We must stop looking at EMS agencies as just a transportation service and start utilizing EMS agencies in ways that ultimately improve the health outcomes of our customers at a markedly reduced cost.

Mike Edgeworth, MD
Medical Director, Cigna-HealthSpring
Tele-neurologist, HCA

HOSPITALS AND ACCOUNTABLE CARE ORGANIZATIONS

The best hospital discharge or outpatient plan on paper is of little value if it doesn't translate into a patient's real-life ability to follow the plan. Hospital and even personal outpatient providers may have too little awareness of the family, social, financial, cognitive, dietary, logistic, transportation, emotional, and even spiritual obstacles a patient may face. EMS has unique access to patients' living situations (including when homeless) and can both inform providers of challenges and potentially help overcome these challenges with innovative links to the providers and to community resources. Health plans should evaluate the role EMS in this broader sense (not just as a 911 responder and ambulance) might play within their internal structures that are built to address these issues. There are difficult workforce issues, information exchange challenges, branding and cultural issues to address when considering incorporating EMS into a health plan's approach to its population. The intersection of EMS as a community provider with a health plan is complex, and will likely be different for different kinds of health plans. Plans should be open to the possibilities, though, and consider pilot projects.

For hospitals, and accountable care organizations, whose goals are to sustainably maintain the health of their constituents, incentives of the community are entirely aligned with those of the health plan. There is really no "us" or "them." "Value" is care that improves outcomes in the insured population and also meets patients' (and families') service and convenience needs (or patients will take their business—and revenue—elsewhere). When obstacles to health in the patient's environment are not identified, they cannot be addressed. EMS may be a critical component to identifying these needs. Health plans should be willing to consider how EMS can increase their success as they expand their perspective to include the complex personal realities of their patients' lives.

Jay Goldman, M.D.
Medical Director of EMS and Ambulance,
Kaiser Permanente Northern California

HEALTH SYSTEM CHIEF EXECUTIVE OFFICER

Innovation is the cornerstone of EMS in both pre-hospital and hospital-based emergency care. In fact, in the absence of innovation and its diffusion - there would be no EMS framework, system or real-world capability to address community

medical and injury emergencies in a timely, life- and limb-saving manner. The first major innovation that created EMS as we know it today was the combining of disparate components such as communication, technology, specialized transportation, training and physician oversight into one interlinked emergency response system.

Since the early 1970s there have been considerable public and private resources focused on EMS development and operation. Funding, research, technology, education, leadership and public policy have been integral parts of the process. In America's hospitals and health care systems, EMS development fostered the rise of emergency departments and trauma, cardiac, burn, stroke and rehabilitation centers. People experiencing true emergencies are often dependent on every element of the modern EMS system for their survival.

Communities and hospitals across the country should share in the responsibility of assuring the availability and effectiveness of comprehensive EMS systems. Ironically, the success of EMS has also created a platform capable of spawning innovation related to non-emergency care. The best current example is mobile integrated health (MIH). This innovation brings together paramedics with additional primary care training, nurses, and physicians to provide field-based care designed to avoid unnecessary ambulance transport, emergency department visits, hospitalizations and readmissions. MIH is designed to improve patient outcomes and their care experience while reducing resource utilization and health care costs.

For EMS innovations to flourish, meaningful input from leaders across the health care spectrum is essential. This means that physicians, nurses, planners, administrative leaders and others will need to be actively engaged in discussions and actions. There is no question that the national health care system can improve, but to get there

EFFECTIVE PARTNERSHIPS WITH HEALTH SYSTEMS

MedStar Mobile Healthcare in Fort Worth has partnered with hospitals in their service area to fund and operate several MIH programs and collaborate closely with nurses and physicians to provide better quality care to their patients.

9-1-1 Nurse Triage

Low acuity 9-1-1 callers are referred to a specially trained RN in our Call Center who helps the patient find appropriate resources for their medical issue. Since June 2012, 5,175 low-acuity 9-1-1 callers have been referred to this program, and 35.7% of these patients have had a response other than an ambulance to the emergency department. Hospitals fund this program through annual cost offset payments.

High Utilizer Program

Patients who use 9-1-1 15 or more times in 90 days, or are referred into the program by ED case managers due to high ED utilization, are enrolled for 30-90 days. MedStar's Mobile Healthcare Providers (MHPs) conduct regular home visits, connect the patients to available resources and teach the patients how to better manage their own healthcare. The program reports having helped to avoid more than 4,800 ambulance transports, 1,917 ED visits and 462 admissions since 2009. Hospitals and others pay enrollment fees for referred patients.

Readmission Avoidance

Patients at high risk for a 30-day readmission are referred to MedStar by the patient's Case Manager or PCP. MedStar conducts a series of home visits to educate the patient and family on appropriate care management and loops the patient to their PCP. If appropriate, the MedStar MHP can coordinate in-home diuresis or other treatments with the patient's PCP, and arrange follow-up. Hospitals and others pay enrollment fees for referred patients.

we must take advantage of opportunities to share ideas, innovate, and lead. Innovations within EMS should continue to be part of the solutions.

William K. Atkinson
Ph.D., MPH, MPA, EMT-P
Former CEO, WakeMed Health & Hospitals

EMS SUPPLIERS (MANUFACTURES AND DISTRIBUTORS OF EMS PRODUCTS AND SERVICES)

EMS Suppliers bring solutions to market that improve patient care and make the job easier. EMS suppliers develop, manufacture, and distribute EMS products or services to regional, national, and international markets. Such market experience enables us to bring known and often proven ideas and solutions to the needs of the patient, medic, or service.

However, no one supplier can do it alone. To create an innovative and model EMS system for our nation, we must engage in a collaborative and cross-functional conversation among the many contributing partners in the EMS industry. EMS Suppliers should embrace and drive new innovations that have the ability to improve the process and efficiency of delivering service, while advancing the level and outcome of emergency care. Continual learning, insight, and sharing of what does and doesn't work among industry partners is an integral part of the innovation process.

From EMS software and system designers, to product developers and producers, to supply and process facilitators, we all provide expertise that is vital to the conversation. Our collective willingness to participate will increase the visibility and the necessary collaboration of the EMS suppliers to develop the output requirements called for by the U.S. EMS community.

Joe Bourgraf
President, Ferno Group Corporation

LAW AND REGULATION

The regulatory environment of EMS is largely shaped by state and local policy. While the federal government provides significant leadership and guidance through a mix of federal agencies, it is most often state law and regulation that dictates the scope, authority, and operation of local EMS systems.[30] While these may vary significantly from state to state, similar issues arise as potential barriers or challenges to EMS innovation.

LEGAL & REGULATORY BARRIERS TO EMS INNOVATION

LIMITED TO EMERGENCIES ONLY

Legal barriers to EMS innovation vary from outright prohibition of non-traditional uses of EMS to the more common situation of incomplete, outdated, or conflicting laws that fail to address or allow for new technologies, care pathways, or new roles such as community paramedicine or mobile integrated health care. Many state governments and state EMS offices seem to have taken the position that if it is not explicitly authorized, it is prohibited. There is little to no case law testing this assumption with regards to EMS programs, leaving most EMS innovators in an uncomfortable position of uncertainty. Similarly, where there is no legislation, there are rarely policy statements or other forms of clear guidance either allowing or prohibiting expanded roles for EMS providers or systems.

SCOPE OF PRACTICE

While the National EMS Scope of Practice Model (2007) sought to establish minimum competencies that should be constantly reviewed and revised as new evidence emerges,[31] it is often misused as a ceiling for the scope of practice of EMS professionals and, in some cases, state laws and/or regulations codify which skills, treatments, or assessments may be performed by the providers. As a result, changing EMS protocols or adding new technologies or skills to keep pace with evidence may be hindered. Furthermore, the ability to test new ideas in order to establish evidence may be impaired. Particular scope of practice issues that seem to be most affected by local statutes include the ability to transport to alternative destinations, to treat without transport, and non-emergency visits.

BURDENSOME PROCESSES TO APPROVE PILOT PROGRAMS

Many of these new or expanded roles for EMS providers have the potential to be very beneficial to patients, as well as to primary care physicians, emergency medicine specialists and others. In order to test their efficacy, a number of pilot programs have been initiated. Unfortunately, the process by which many of these pilots were initiated proved to be overly burdensome, and in some cases, pilot programs required legislative

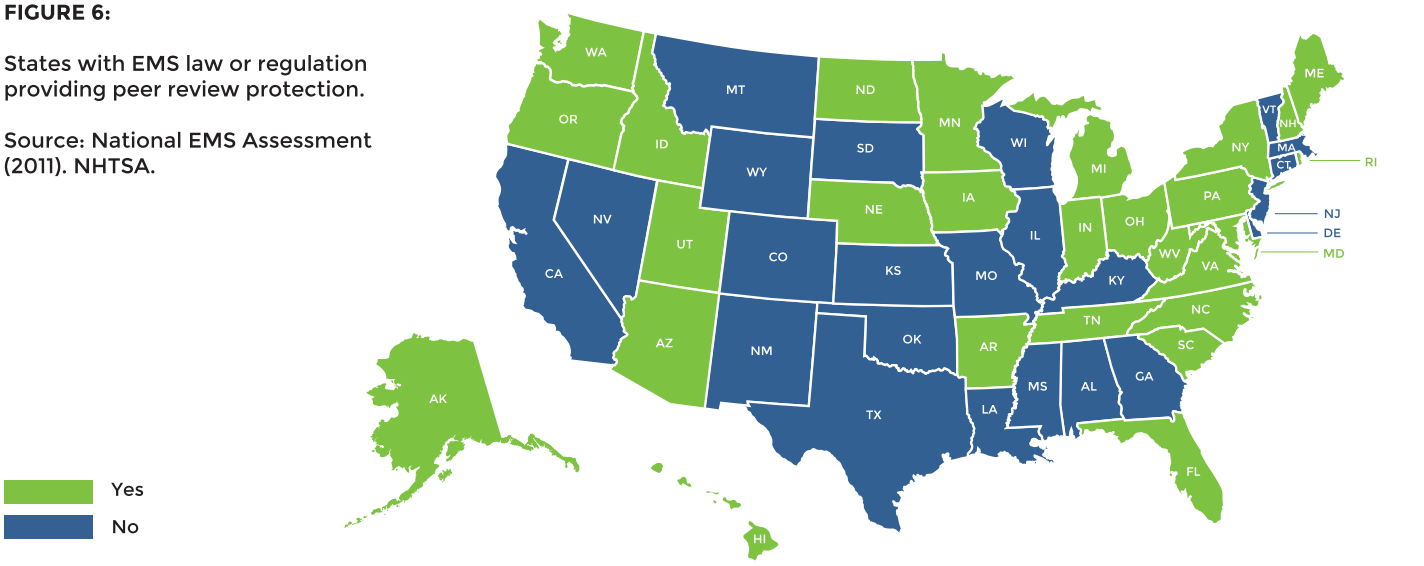
30 "Emergency Medical Services at the Crossroads." In *Future of Emergency Care Series* edited by Gail L. Warden. Washington, D.C.: Institute of Medicine, 2006.

31 "National EMS Scope of Practice Model." *National Highway Traffic Safety Administration*. Last modified February 2007. https://www.ems.gov/education/EMSScope.pdf.

FIGURE 6:

States with EMS law or regulation providing peer review protection.

Source: National EMS Assessment (2011). NHTSA.



action.[32] The ability for EMS to innovate, including developing, experimenting, and testing of new ideas, is greatly diminished by the amount of time and effort needed to obtain legislative approval of a pilot program. Further, for successful programs, there is not necessarily a clear process to change their status from pilot to permanent.

LACK OF LIABILITY PROTECTIONS

Pilot programs are further inhibited by a lack of liability protections and inadequate protection of quality assurance activities. However, the ability to improve the everyday care provided by EMS to the public is inhibited by a general lack of protection of peer review or quality assurance communications. According to the 2011 National EMS Assessment, 35 states lack general liability protection for providers or agencies, and 23 states lack any regulation or statute providing protection for peer review for the purpose of continuous quality improvement.[33] Even among those states with regulations or statutes in place, those protections are often weak, sometimes only protecting communications within the agency and not those between agencies or between hospitals and EMS.

PORTABILITY OF CERTIFICATION

An issue related to scope of practice is the lack of portability of licensure and/or certification. The lack of standardization of education, licensure, and protocols across jurisdictions makes it difficult for EMS providers to migrate across borders during large-scale events. Independent of the interstate variations, there seem to be excessive bureaucratic hurdles and insufficient planning on the part of many localities to consider how to rapidly integrate EMS providers across regions within the same state or across state borders. Although the EMAC (Emergency Management Assistance Compact) addresses this hurdle, it only applies to disasters for which an affected state's governor declares a state of emergency.

In addition, there are frequently restrictions on the application of a provider's skills based on the setting of care. For example, in some states, an EMS provider may not perform certain skills inside a hospital that they are authorized to perform outside of a health care facility. This adversely impacts a community's ability to maneuver health care resources and to care for patients as they move between settings.

32 Karen Pearson, George Shaler "Community Paramedicine Pilot Programs: Lessons from Maine." *Journal of Health and Human Services Administration* 40, no. 2 (2017).

33 "National EMS Assessment." *National Highway Traffic Safety Administration*. Last modified December 2012. https://www.ems.gov/pdf/2011/National_EMS_Assessment_Final_Draft_12202011.pdf.

FEDERAL STATUTES WITH FAR-REACHING IMPLICATIONS

While primarily an issue related to data sharing and communication, the Health Insurance Portability and Accountability Act (HIPAA) is often misunderstood and used as a reason for hospitals and health information exchanges to be unwilling to exchange data with EMS systems. This occurs despite the existence of a HHS-ASPR-produced clarification document on this issue in 2012.[34] Another federal law, the Emergency Medical Treatment and Active Labor Act (EMTALA), also presents some barriers to EMS innovation. EMS systems that are hospital-operated are required to function within a framework that was not designed for out-of-hospital patient care settings.

CERTIFICATE OF NEED POLICIES

To our knowledge, approximately 12 states require a certificate of need (or something similar) to provide EMS services, and a number of states and smaller jurisdictions designate a primary service area in which other EMS services may not enter or care for patients. While this can be an important tool for accountability and protection of the public, it can also be a barrier to new entrants into a given market, which thus has a negative impact on innovation.

STRATEGIES TO CREATE A MORE FAVORABLE REGULATORY LANDSCAPE

PROMOTION OF AN INNOVATION-FRIENDLY LEGAL ENVIRONMENT

As the traditional role of EMS providers evolves to meet the needs of local communities and the changes required by health care reform, legislative and regulatory barriers can prevent or delay the adoption of promising models of care delivery. While innovation can and often does occur despite these limitations, the EMS community should seek to establish a more favorable legal and regulatory environment that enables and encourages both new innovation as well as implementation of new treatments and care models that have been proven elsewhere, all while maintaining the state's duty to protect the public.

Certainly, EMS agencies are encouraged to consider pursuing innovation within the realm of acute care services that are less likely to run afoul of current statute and regulation, and to think creatively about ways to implement new models of care into existing frameworks. For inspiration or scientific evidence, one might look to academic journals, trade magazines, regional and national conferences, etc. For assistance on understanding the limits of what is authorized in his or her state, one might refer to the HHS-ASPR sponsored study entitled "Expanding the Roles of Emergency Medical Services Providers: A Legal Analysis,"[35] or to the state Office of EMS, or seek a determination from the Office of the Attorney General.

However, if EMS is to be fully embraced by other health care stakeholders and move forward into a brave new era of innovation and collaboration, the PIE steering committee recommends that states take action to review, modify or update their legislative and regulatory frameworks to be consistent with a set of principles that will enable rather than inhibit innovation. It is the hope of the committee that readers may use these guiding principles and key points to create legislation that both enables early adoption of evidence-based best practices and promotion of innovative practices in EMS that are right for their state. Local

34 Nicole Lurie, letter to Dia Gainor, Assistant Secretary for Preparedness & Response, Department of Health & Human Services. Sharing Patient Health Outcome Information between Hospitals and EMS Agencies for Quality Improvement. Washington, D.C. 13 Aug. 2012. MS.

35 Hodge, James G., Jr., Daniel G. Orenstein, and Kim Weidenaar. Expanding the Roles of Emergency Medical Services Providers: A Legal Analysis.Report. Sarah Day O'Connor College of Law, Arizona State University. Arlington, VA: Association of State and Territorial Health Officials, 2014.

EMS agencies, providers, collaborators, and other stakeholders are encouraged to be active advocates for the creation of sound EMS regulatory policies.

AN ESSENTIAL SERVICE

The first of these principles is that states should consider defining EMS as an "essential service."[36] While it may seem fundamental, in most states this is not the case. Therefore there is no requirement for any government agency to plan for or ensure sustainable EMS systems. This hurts innovation as there is no incentive for municipalities to consider new delivery methods. It has hurt EMS since its inception and is a significant factor in our over-dependence on volunteer providers.

RIGHT PLACE, RIGHT TIME

The second of these principles is that state statutes and regulations should be silent about the practice locations and transport destinations of patients assessed and managed by EMS providers (EMTs, AEMTs and paramedics). Many states limit the role of EMS to certain practice settings such as the out-of-hospital environment or, more commonly, to the initial treatment and stabilization of patients during an emergency. This has the unfavorable effect of potentially (depending on interpretation) preventing EMS from providing follow-up care after an emergency or hospitalization, proactively engaging patients who are at high risk or have a

PENNSYLVANIA OVERCOMES LEGAL BARRIERS TO EMS PUBLIC HEALTH INNOVATIONS

In the early 2000s, Pennsylvania EMS leaders looked into using paramedics to distribute vaccines to the public. Intramuscular injections had been within the paramedic scope of practice since the 1985 EMS Act, and these leaders saw EMS as a very effective potential distribution system. Compared to Departments of Health, EMS has access to the necessary manpower and can organize vaccination drives relatively easily. Like Departments of Health, they also know their communities well.

Unfortunately, the Pennsylvania EMS Act did not include vaccinations on the list of medications EMS providers were permitted to administer, and EMS could not distribute vaccines under the EMS Act unless the Secretary of Health declared a mass immunization emergency. In response, EMS leaders found that under the Medical Practice Act, physicians can designate technicians as extensions of their medical practices. EMS medical directors were able to designate off-duty EMS providers to distribute immunizations, and a paramedic-led pneumovax drive showed that these drives could effectively distribute vaccines to communities.

The success of this proof-of-concept was useful during the response to the H1N1 influenza epidemic. The Secretary of Health declared a mass immunization emergency, and EMS partnered with the Department of Health to distribute seven million vaccines. Paramedics were trained with a statewide online module on administering H1N1 vaccinations and the plan for distributing the vaccines around the state. The state government then approached local EMS chiefs to organize the distribution to their local communities. EMS chiefs were able to identify buildings that would support a vaccination drive, provide the staffing, and raise interest in the community.

Pennsylvania rewrote the EMS Act in 2009 to allow paramedics to give vaccines. The act also defined the role of EMS more broadly as an essential public service with responsibilities beyond emergency response and transport. The efforts of EMS leaders to move Pennsylvania towards using EMS to distribute vaccines provide an example of how seemingly impossible legal barriers to innovation can be overcome to allow EMS to better serve communities.

36 Van Milligan M, Mitchell III JP, Tucker J, Arkedis J, Caravalho D. "An Analysis of Prehospital Emergency Medical Services as an Essential Service and as a Public Good in Economic Theory." (Report No. DOT HS 811 999a). (Washington, DC: National Highway Traffic Safety Administration; May 2014).

record of high rates of utilization of emergency services, or caring for patients and providing support services within critical access hospitals.

Rather than placing firm restrictions on the scope of EMS practice, legislative and regulatory bodies should ensure that EMS agencies have the freedom to work with other public health and public safety authorities to maximize the health of their communities, while maintaining appropriate guidance to protect patient and provider safety. In particular, laws and regulations should be drafted or amended to consider provision of care at and in transport to destinations other than emergency departments. Alternate transport could be considered in circumstances where typical transport resources are unavailable.

PRACTITIONER LEVELS & SCOPE OF PRACTICE

The third principle is that "scope of practice" ought not be strictly defined in statute so as to preserve flexibility of regulatory entities responding to emerging needs of the population being served. By placing it in regulation, or tied to education, it becomes inherently more flexible and adaptive to changing community needs, changes in technology, or the availability of new medications and treatments. Where scope of practice is already strictly defined, legislative and regulatory bodies should examine and address obstacles to innovation or unmet societal needs that result from current policy.

While establishing practitioner levels or delineating the services they provide, states should recognize the floors set by nationally recognized minimal standards for EMS.[37] However, state regulatory bodies may build upon that floor while considering the unique needs of their patient populations with respect to the burden of disease and access to health care and transportation, the degree of physician oversight available, patient safety considerations, and whether they wish to support a higher standard of care.

ENABLING RAPID CYCLE INNOVATION

The fourth principle is that states should adopt a regulatory model that also allows communities to approve and conduct pilots quickly and evaluate the success of innovations that stem from grassroots initiatives. States should empower their regulators with the appropriate flexibility to investigate promising innovations while balancing the need to protect the public's safety and ensuring a viable EMS system.

Useful examples can be provided by the recent experience of several states trying to pilot community paramedicine programs. In California, it was determined that community paramedicine programs were not authorized under existing statute. Fortunately, they were able to make use of an existing waiver provision to allow up to 12 pilot programs. Unfortunately, in order to become permanent, the California legislature will have to review the results of the pilot program and take action to either enable community paramedicine or somehow extend or make them permanent. In Maine, the legislature had to pass a bill in order to authorize up to 12 pilot programs.[38] While this should certainly be heralded as a success for the EMS community, the difficult task of passing legislation is too high a bar to merely test a new idea. The pace of innovation will be greatly improved if the process of launching a pilot program could be streamlined from a regulatory standpoint. Furthermore, a pathway to long-term authorization without legislative action should be established. One potential methodology for achieving this would be to place greater authority in the State Office of EMS.

37 "National EMS Scope of Practice Model." *National Highway Traffic Safety Administration.* Last modified February 2007. https://www.ems.gov/education/EMSScope.pdf.

38 Karen Pearson, George Shaler "Community Paramedicine Pilot Programs: Lessons from Maine." *Journal of Health and Human Services Administration* 40, no. 2 (2017).

PROTECTING QUALITY ASSURANCE COMMUNICATIONS

Finally, the fifth principle is that quality assurance activities and related communications, for both standard EMS activities and pilot programs, should be protected from liability proceedings. This needs to include communications between EMS agencies and between EMS and other health care entities like hospitals or ambulatory care practices.

While it would be preferred for this to be included within explicit legislation, alternatively, EMS entities can obtain a high degree of protection by participating in a patient safety organization (PSO). These organizations were enabled by the Federal Patient Safety & Quality Act of 2005. A health care provider can only obtain the confidentiality and privilege protections of the Patient Safety Act by working with a PSO listed with the Agency for Health care Research and Quality.[39]

FLEXIBLE REIMBURSEMENT MODELS

One of the most fundamental barriers to innovation is the requirement of transportation, often to an ED, for an EMS claim to be paid. This financial barrier, discussed in greater detail in the financial section, may in fact require a legal or regulatory solution. At the federal level, CMS currently does not authorize payment due to language in Title 18 of the Social Services Act that describes an ambulance service benefit "where the use of other methods of transportation is contraindicated by the individual's condition." This has been narrowly interpreted and codified in federal regulation 410.40. Although Medicaid is administered by the states and has a great degree of flexibility, especially through the 1115 waiver process, states are not able to circumvent this narrow interpretation. However, states that recognize that new and future EMS models may consist of both medical transportation and health care delivery services should seek to support a more favorable and flexible reimbursement model.

Besides changing federal law, there may be other actions state and local actors can take to unleash innovation.

First, in their power to regulate insurers, states should consider methods of promoting reimbursement for innovative models of EMS care. As one example, health plans might be required to

DRIVING QUALITY IMPROVEMENT

The Emergency Medical Error Reduction Group (EMERG) is a patient safety organization (PSO) that demonstrates that coordination can drive quality improvement across agencies. Many EMS agencies are small or under-resourced, and they find robust quality improvement processes difficult to maintain. EMERG seeks to fill that gap by providing personalized and coordinated quality improvement counseling to its members.

By specializing in quality improvement and serving multiple agencies at once, EMERG is able to provide a higher quality service at a lower cost than most agencies would be able to provide on their own. EMERG also condenses safety and incident data from across states and regions to identify trends in patient and provider safety and keep state EMS directors informed. Part of this data gathering system includes a free reporting site for any providers who wish to report a safety incident. The EMERG model also shows that innovation does not always have to come from EMS agencies themselves, but can be driven by enterprising individuals who find and build new services that help agencies provide value to their local communities.

39 "Federally Listed PSOs," *Agency for Health care Research and Quality*, accessed June 27, 2017, https://www.pso.ahrq.gov/listed.

cover EMS assessment and treatment regardless of whether the patient is transported. Regulators could require reimbursement for specific services such as paramedic home visits for specific types of patients. The state could also use its convening power and bring health plans and EMS agencies together on a periodic basis to either exchange data or explore new service offerings.

Second, payment and reimbursement could be addressed in new or revised legislation as this will address revenue streams and sustainability. One potential avenue is to alter the definition of EMS providers to dissociate their services from the "ambulance" or the "transportation benefit", which may make them eligible for reimbursement from Medicaid.

Third, it is important to consider increasing the authority (and possibly budgets) of State EMS offices to enable them to play a more active role in the encouragement, vetting, authorization and direct funding of pilot programs. Perhaps their authority could grow to formally inform insurance regulation as it pertains to EMS. While states have an obligation to protect the public, they also have a responsibility to assure that public funds are expended wisely. Empowering these public officers would allow for both more rapid testing of innovations and an enhanced ability to protect both public health and public funds.

INNOVATING WHILE COMPLYING WITH EMTALA

In some states, it is fairly common to see EMS agencies that are owned and/or operated by hospital systems. For these agencies, the ambulance is considered part of the hospital, and EMTALA provisions attach when the personnel of such an ambulance make patient contact. Facilitating innovations that involve concepts including treat and refer/release or alternative destinations may place the hospital at risk of breaching EMTALA unless the patient is deemed to have received a medical screening examination and appropriate stabilizing treatment. Allowing EMS personnel on these units to be appropriately trained and deemed "qualified medical personnel" capable of performing a standard medical screening exam, possibly in conjunction with direct medical oversight, will be needed to allow these agencies to successfully innovate with these concepts while maintaining compliance with EMTALA.[40]

Another approach that may reduce liability for hospital-based EMS agencies and providers is to ensure that they are following regional (community-wide) protocols. If regional or state protocols direct EMS to transport a patient to a location other than an emergency department based on clinical criteria, the agency would be shielded from EMTALA violations. Of course, no evidence-based criteria have yet been established for safe triage of patients to alternative destinations, so medical oversight contact may be advisable. This can help from a protocol perspective, but might also serve to meet EMTALA if a physician can remotely evaluate the patient and determine that a there is not an emergency medical condition.

PORTABILITY OF EMS PERSONNEL

During large-scale emergency situations, there is often a need to move emergency personnel resources from one state to another (or one jurisdiction to another) quickly. As a consequence of our lack of standardization of education, licensure, and protocols across jurisdictions, it is not easy for EMS providers to migrate across jurisdictional borders. In some states, there seem to be excessive bureaucratic hurdles to rapidly

40 "Pub 100-07 State Operations Provider Certification," Center for Medicare & Medicaid Services, 2010, https://www.cms.gov/Regulations-and-Guidance/Guidance/Transmittals/downloads/R60SOMA.pdf

integrate EMS providers across regions within the same state. All of this limits the flexibility of EMS resources both during disasters, and for more routine purposes such as maintaining the fluidity of our industry's labor resources.

It would therefore be prudent for states to take action to enable greater portability of EMS licensure. One such action being promoted by the National Association of State EMS Officials (NASEMSO) involves model compact legislation known as REPLICA (Recognition of EMS Personnel Licensure Interstate Compact). While there is current legislation that allows for some cross-state EMS work during large-scale emergencies – most notably the Emergency Management Assistance Compact (EMAC) – this does not apply for routine operations.

As a means to growing and retaining a strong EMS workforce that self-identifies and is externally recognized as a profession, it may be valuable for state and national leaders in EMS to improve the portability of licensure for provider relocation purposes as well.

EVALUATE CERTIFICATE OF NEED POLICIES

While the regulation of entrants into EMS may be an important tool to maintain quality, local policymakers need to evaluate all the tools at their disposal to foster local innovation. By transforming to a model where the primary service has a "right of first refusal," it is conceivable that new entrants could potentially offer new services, such as non-emergent visits, telehealth, or services integrated with home care, hospice care, and others when the established service is not willing or lacks the capacity. Recognizing the complexity of this issue, policymakers may wish to proceed cautiously and perform detailed needs assessments prior to implementing changes.

UNITED ADVOCACY

To effectively innovate, EMS agencies must be allowed to provide safe, appropriate patient care within the carefully considered boundaries of legislation and regulations that are constructed with innovation in mind and with the assistance of EMS experts.

In order to overcome some of these legal and regulatory hurdles, it is critical that EMS as an industry, along with its partners in health care, be able to advocate for its needs with a unified voice. This has heretofore proved difficult, and many efforts at improving the landscape for EMS fail due to disagreements within the EMS community. Often these disagreements stem from the competing priorities and intersecting roles of EMS along the three domains of public health, public safety, and health care. There is no regulatory solution to this internal division, but this division must be overcome in order for EMS to advance. Some suggestions are provided in the Regional Coordination chapter.

The partners of EMS in the health care community have the potential to greatly enable innovation by advocating alongside us for a more favorable EMS regulatory framework. Finding ways to effectively communicate and collaborate with all stakeholder groups is critical to being able to find and implement new ways to improve patient health outcomes.

RECOMMENDATIONS

1. **Creating an ideal flexible legislative and regulatory environment**
   - a. ***Local EMS agencies and EMS providers should:***
     - i. Be active advocates for the formation of sound EMS policy at the county, state and federal level.
   - b. ***State EMS authorities should craft legislation or policy that adheres to the following principles:***
     - i. The provision of emergency medical response is an "essential service," but states should be careful not to overly limit the providers or agencies providing that service.
     - ii. State statutes and regulations should not place limitations on the practice locations where EMS may provide care and the transport destinations of patients assessed and managed by EMS providers.
     - iii. Scope of practice ought not to be strictly defined in statute so as to preserve flexibility of regulatory entities responding to emerging needs of the population being served.
       1. ***Where scope of practice is already strictly defined, legislative and regulatory bodies should examine and address obstacles to innovation or unmet societal needs that result from current policy.***
     - iv. States should adopt a regulatory model that also allows communities to pilot and evaluate the success of innovations that stem from grassroots initiatives. States should empower their regulators with the appropriate flexibility to investigate promising innovations.
     - v. Quality assurance activities and related communications should be protected from evidentiary discovery and liability proceedings.
   - c. ***National EMS Associations should:***
     - i. Provide support to state and local EMS leaders seeking to create a regulatory environment more favorable toward innovation.
     - ii. Advocate for federal leadership and sound national policy that promotes EMS innovation.

2. **Support favorable reimbursement practices**
   - a. ***Local EMS agencies / authorities should:***
     - i. Explore partnership for alternative economic models through accountable care organizations and accountable care community models.
   - b. ***State EMS authorities / associations should:***
     - i. Continue to support and advocate for flexibility in EMS reimbursement.
     - ii. Convene payer groups and EMS agency representatives periodically to encourage data exchange and explore new service offerings that might be reimbursable.
     - iii. Consider requirements for health plans to cover EMS assessment and treatment independent of whether a patient is transported.
     - iv. Revise legislation that affects the way Medicaid or private payers can or should reimburse EMS.
     - v. Increase the authority and funding support for state EMS offices so they may play an active role in the encouragement, approval, evaluation, and funding of pilot programs.
   - c. ***Private and public payers should:***
     - i. Reimburse EMS for assessment and treatment independent of whether a patient is transported.
     - ii. Encourage and fund pilot programs to test new payment models.
   - d. ***National EMS associations should:***
     - i. Advocate for reform of reimbursement policies at the national level.
     - ii. Support state and local efforts and spread awareness of successful strategies.

3. **Innovate While Complying with EMTALA**
   - a. ***Local EMS agencies should:***
     - i. Work with jurisdictional authorities or protocol committees to consider developing protocols that guide the transport of appropriate patients to locations other than emergency departments.
     - ii. Collect data and perform research to further the science to support such protocols.

b. Local EMS authorities should:

i. Consider developing protocols that guide the transport of appropriate patients without emergency medical conditions to locations other than emergency departments.

c. Hospitals should:

i. Consider amending their bylaws to authorize EMS personnel in the field to perform or facilitate the necessary medical screening examination to comply with EMTALA and thereby enable alternative destination or treat and refer protocols.

ii. Use their convening power to bring multiple EMS agencies together to support jurisdictional amendments to protocols.

d. State EMS authorities / associations should:

i. Consider developing statewide policies or protocols that authorize or direct the transport of patients without emergency medical conditions to locations other than emergency departments.

ii. Facilitate knowledge transfer about best practices and EMTALA compliance.

e. National EMS associations should:

i. Encourage research to further the science around criteria for transport to alternate destinations.

ii. Gather and disseminate best practices around protocol development and EMTALA compliance.

4. Enabling Portability of Licensure

a. Local EMS agencies / authorities should:

i. Ensure that initial and continuing paramedic education is provided that meets the minimum standards established by national guidelines.

b. State EMS authorities / associations should:

i. Evaluate the credentialing processes for neighboring jurisdictions to establish expedited processes that will allow for rapid, safe reassignment of EMS providers across state lines during emergencies.

ii. Evaluate the training and credentialing provided by military branches to expedite the entry of skilled military EMS personnel into civilian EMS agencies.

c. National EMS associations should:

i. Advocate for more inclusive, standardized training and credentialing processes that enhance the portability of EMS providers, both during routine work and during regional or national emergencies.

5. Relaxing Certificate of Need Policies

a. Local EMS agencies / authorities should:

i. Clearly define which services are provided by their EMS agencies.

ii. Understand local health care and other community needs.

iii. Be mindful of their overall capabilities, and provide accurate assessments of these capabilities to local, state, and regional EMS authorities as requested.

b. State EMS authorities / associations should:

i. Maintain an accurate accounting of EMS agency capabilities and service provision to facilitate consideration of modification of "certificate of need" policies.

ii. Encourage local EMS agencies to meet unmet community EMS needs when identified through this accounting process.

iii. Assist local EMS agencies, in an unbiased fashion, with managing resources to meet community needs without fragmentation or inappropriate redundancy.

c. National EMS associations should:

i. Meet with other national stakeholder groups to provide resource typing guidelines that state EMS authorities and local EMS agencies can use when describing capabilities and services provided, while maintaining flexibility to include new capabilities and services not yet implemented or imagined.

FINANCE & SUSTAINABILITY

BARRIERS TO FINANCIAL SUSTAINABILITY

EMS REIMBURSEMENT POLICY

EMS agencies across the nation face misaligned incentives. CMS and most payers do reimburse EMS at various levels according to the care provided; however those payments are predicated on the provision of transportation.[41] Medical management of a patient may require the application of many skills and consume significant EMS resources, yet if it results in no transportation, there would be no reimbursement.

Multiple articles[42,43] and several influential federal documents including the EMS Agenda for the Future (1996), the Institute of Medicine report (2007), and the HHS Draft White Paper on Opportunities for Innovation in EMS (2012)[44] have cited the need for EMS payment to be disconnected from transportation and better aligned with improved health and better health care value. As the proverb says, "you get what you pay for." Currently, we primarily pay for transportation, not healthcare. Therefore we primarily receive transportation and its possible that the health care we receive is less than it might otherwise be. Although there are many things EMS may be capable of, an agency is unlikely to invest in the training, equipment or oversight necessary so as long as payment is linked to mandatory transport. Under the current payment model, the financial sustainability of any innovative program that might potentially reduce the number of transports to the ED is severely limited.[45]

There is value to patients, hospitals, and payers for the competent medical care provided by EMS independent of transportation, and thus reimbursement policies should reflect that. If CMS and other payers paid for the successful outcome of the patient, the patient might possibly experience improved outcomes and avoid unnecessary ED visits. The classic example of the misaligned incentive is the case of a 9-1-1 call for a diabetic patient suffering from hypoglycemia. In many cases, EMS can very easily correct the urgent hypoglycemia event and could triage out a portion of patients who would not benefit from being taken to the ED.[46] Potentially, they could coordinate care for the patient with their PCP or endocrinologist, without the need for an ED visit. However, because EMS is only paid if the patient is transported, EMS agencies generally transport such patients to an ED, triggering both the EMS payment and the downstream ED costs.

41 Ambulance Billing Guide. NHIC, Center for Medicare & Medicaid Services; 2010.

42 Munjal, Kevin, and Brendan Carr. "Realigning reimbursement policy and financial incentives to support patient-centered out-of-hospital care." Jama 309, no. 7 (2013): 667-668.

43 Morganti, Kristy G., Abby Alpert, Gregg Margolis, Jeffrey Wasserman, and Arthur L. Kellermann. "Should payment policy be changed to allow a wider range of EMS transport options?." Annals of emergency medicine 63, no. 5 (2014): 615-626.

44 "Innovation Opportunities for Emergency Medical Services: A Draft White Paper." National Highway Traffic Safety Administration (DOT), Office of the Assistant Secretary for Preparedness and Response (HHS), and Health Resources and Services Administration (HHS). Last modified July 15, 2013. http:// www.ems.gov/pdf/2013/EMS_Innovation_White_Paper-draft.pdf.

45 Eckstein, Marc. "The ambulance industry struggles to go the distance." *Health Affairs* 32, no. 12 (2013): 2067.

46 Lerner, E. Brooke, Anthony J. Billittier, Daniel R. Lance, David M. Janicke, and Josette A. Teuscher. "Can paramedics safely treat and discharge hypoglycemic patients in the field?." *The American Journal of Emergency Medicine* 21, no. 2 (2003): 115-120.

In many cases, payments for services within the EMS scope of practice are being paid to other provider groups through billing codes and mechanisms already in existence, but EMS is considered ineligible for that reimbursement. This is at least partly because many outside of our industry are unaware of the capabilities of EMS providers or the nuances of our credentialing policies or legal status. When setting policies that are intended to be broad, they often will use phrases such as "any licensed practitioner," which either intentionally, or perhaps unintentionally, excludes EMS from alternative payment models.[47] Similarly, EMS may be ineligible for certain types of reimbursement because of its status as a supplier, not a provider. EMS as an industry has done a poor job representing itself to the rest of health care and even to other stakeholders in public health or public safety. As discussed in other chapters, despite the development of the National EMS Scope of Practice model, there is a lack of standardization of provider types and scopes of practice across states. And despite the development of the National EMS Educational Standards, there is a lack of standardization of educational standards.[48] Together, these make it difficult for entities with a broader geographical span, like payers, to engage with EMS on reimbursing for services other than transportation.

DIFFICULTY DEMONSTRATING VALUE AND OUTCOMES

While the issue of payment reform is paramount, there are several important obstacles to achieving reform. One of those is the difficulty for most EMS agencies to demonstrate the financial value and health care outcomes of providing treatment independent of the transportation function.[49] Doing so would require several key components including access to the necessary data, and the measurement and analytical skills to turn that data into information.

Due to the frequent inability to obtain data from hospitals, as discussed at length in the data chapter, it often is difficult if not impossible to connect an individual EMS agency's practices to the patient-level outcomes or to the patient's clinical or administrative information related to utilization before and after an EMS encounter. However, within the EMS agency lies all the necessary information to analyze cost. And yet, most agencies lack a sophisticated understanding of their internal costs, miss opportunities to achieve greater efficiency, and have difficulty understanding the impact of new models of care on their cost structure.

Whereas the current mainstays of EMS quality measurement are response times and protocol compliance metrics, the basis of bundled payment and pay for performance initiatives rests on proven outcomes while improving patient satisfaction and reducing cost. Even the EMS Compass project is "prioritizing measures that can be calculated with data already collected by EMS agencies" over those that require outcome data from hospitals, due to the practical realities of our industry.[50] Until EMS can accurately report outcome data in a compatible way with health plans and hospitals, it will be very difficult to negotiate payment contracts for innovative models of EMS.

LACK OF BUSINESS ACUMEN

Often, EMS managers and leaders rise to their positions through seniority. They may or may not have had previous training in management, finance, or leadership, or understand the complexities of the health care business. As a

47 "Medicaid Reimbursement for Community-Based Prevention." Last modified October 31, 2013. http://www.astho.org/Community-Health-Workers/Medicaid-Reimbursement-for-Community-Based-Prevention/

48 "National Emergency Medical Services Educational Standards." *National Highway Traffic Safety Administration*. Last modified January 2009. http://www.ems.gov/pdf/811077a.pdf.

49 Munk, Marc-David. "Value generation and health reform in emergency medical services." *Prehospital and Disaster Medicine* 27, no. 2 (2012): 111-114.

50 "What EMS Compass Is And Is Not." *EMS Compass*. Accessed June 28, 2017. http://emscompass.org/ems-compass-is-is-not/

result, the overwhelming majority of local EMS agencies lack the necessary business acumen or entrepreneurial spirit to be successful when it comes to EMS innovation. Likewise, most agencies lack the resources needed to apply for (or be competitive for) grants that seek to promote innovation in health care, public safety, or public health.

We must acknowledge that our industry needs leaders trained in the acumen of business and financial planning. Despite the efforts of many national organizations to cultivate leadership skills and elevate the importance of higher education, there remains a knowledge gap. Thus, even after we overcome some of the challenges to obtaining meaningful outcome data and other clinical or administrative information, it is likely that EMS agencies will not have the critical measurement skills or resources necessary to perform accurate modeling and/or economic analyses of effectiveness. Since partnerships will often need to be driven by local EMS agencies, they require both adequate business knowledge and entrepreneurial spirit.

Should an agency be in possession of all the aforementioned resources and skills, it may still face financial challenges to innovation due to the fact that other partners in the health care system, including hospitals, physicians, and other care providers, and third party payers may still be operating in a fee-for-service environment fraught with perverse financial incentives.

FRAUD & ABUSE

Another barrier to economic innovation is the perceived prevalence of fraud and abuse in the ambulance industry. A September 2015 Office of Inspector General (OIG) report[51] documents that Medicare paid $24 million for ambulance transports that did not meet certain Medicare requirements justifying payment and paid $30 million for potentially inappropriate ambulance transports for which the beneficiary did not receive Medicare services at any origin or destination. While the findings in the report may involve only a handful of ambulance suppliers from the major metropolitan areas of Philadelphia, Houston, Los Angeles and New York, they cast a shadow over all ambulance providers making it difficult for some payers to trust EMS agencies enough to test alternate economic models. Fraud may not always be the doing of rogue EMS providers or agencies, but rather sometimes is a function of hospital or other facility staff requesting ambulances for patients who may not warrant them.

The American Ambulance Association (AAA) and others have made efforts to combat this serious problem for some time. They offer education, training, and compliance programs to their members to support proper adherence to Medicare regulations. They disseminate best practices and have worked with Congress on concerns related to non-emergency dialysis transports. However, until this issue is more definitively resolved from either within the industry or through regulation or enforcement action, it will continue to be a major barrier to EMS innovation.

STRATEGIES FOR OVERCOMING FINANCIAL BARRIERS TO INNOVATION

DECOUPLING PAYMENT FROM TRANSPORTATION

Solving the fundamental structural challenge of the link between EMS reimbursement and transportation will require a sustained effort on

51 "Inappropriate Payments And Questionable Billing For Medicare Part B Ambulance Transports." *Office of Inspector General*. Last modified September 2015. https://oig.hhs.gov/oei/reports/oei-09-12-00351.asp

the part of national advocates for, and potential collaborators with, EMS working at the federal level. However, a number of steps can be taken at a variety of levels to begin to unravel this inhibiting finance structure.

PAY FOR PERFORMANCE

With 90% of CMS payments planned to be tied to value by 2018, the time when pay for performance arrives in EMS is close at hand.[52] EMS agencies should be envisioning the structural and process changes necessary to succeed in that environment today. Reflecting on whether an agency would receive high ratings from your patients might inspire retraining of providers, or brainstorming new ideas to improve the patient experience. Reflecting on the quality of clinical care might inspire new investments in quality assurance staff or tools. While this transition may be daunting, if managed appropriately, it could improve the financial sustainability of both emergency response services and alternative models of care. By preparing for a future in which pay for performance is the norm, EMS agencies will organically be transforming their agencies into ones that are more likely to be able to innovate. Perhaps the movement towards value-based purchasing will create the environment needed for small fragmented EMS agencies in the same market or in nearby jurisdictions to collaborate in order to meet data reporting and quality assurance requirements.

Prehospital clinical bundles of care have been developed for acute conditions such as myocardial infarction, stroke, trauma, asthma, and hypoglycemia.[53] Compliance with these clinical bundles, or clinical processes of care, have been proven to improve patient outcomes and speed appropriate medical care. EMS agencies not already incorporating these bundles into internal quality improvement programs or reporting them externally should begin doing so. Meanwhile, national associations have been and should continue to work with CMS and other payers to design payment models that reward compliance with these clinical bundles to improve patient care and patient outcomes, independent of transportation.

BUNDLED PAYMENTS

External to EMS, many hospitals and physicians groups are beginning to participate in bundled payment programs in which a large lump sum is paid to a healthcare entity in order to manage a patient through an entire episode of care, sometimes as long as 90 days.[54] Payers would not

EMS & HOSPICE

MedStar Mobile Health care in Texas has partnered with VITAS, a national hospice agency with a presence in Fort Worth, TX, to help prevent unnecessary emergency department trips. Patients with high risk for revoking their hospice care plans are referred to MedStar. If one of those patients calls 9-1-1, MedStar is able to identify the patient by his or her address and send a hospice-trained mobile health paramedic to the scene. On scene the paramedic assesses the patient to determine if the issue is in line with their disease, gives medication from a 'comfort pack' if needed and contacts the patient's hospice nurse. The mobile health paramedic waits on scene until the hospice nurse arrives.

This program completely prevents patients from unnecessarily going to the hospital and possibly revoking their hospice plans. It has resulted in a 54% reduction in hospice revocation.

http://www.medstar911.org/mobile-health care-programs

52 Burwell, Sylvia M. "Setting value-based payment goals—HHS efforts to improve US health care." *New England Journal of Medicine* 372, no. 10 (2015): 897-899.

53 El Sayed, Mazen J. "Measuring quality in emergency medical services: a review of clinical performance indicators." *Emergency medicine internationa*l 2012 (2011).

54 "Bundled Payment for Care Improvement Initiative (BPCI)". *Centers for Medicare and Medicaid Services*. Last modified August 13, 2015. https://www.cms.gov/Newsroom/MediaReleaseDatabase/Fact-sheets/2016-Fact-sheets-items/2016-04-18.html

WAKE COUNTY EMS: ALTERNATIVE DESTINATIONS FOR MENTAL HEALTH PATIENTS

The Wake County EMS Alternative Destination program is designed for patients who suffer from substance abuse or mental health issues. Upon receiving dispatch of a psychiatric or drug related emergency an Advanced Practice Paramedic (APP) is dispatched along with a regular paramedic unit. Once on scene they go through a screening evaluation algorithm to assess if they can be transported somewhere other than the emergency department. The algorithm includes assessing whether the patient is combative, agitated or requires sedation.

If the patient meets pre-determined screening criteria, the APP calls one of four potential facilities and discusses whether the patient is a candidate for transport to their facility. If the facility accepts, transportation is arranged by the APP, which provide report upon arrival. This avoids unnecessary utilization of ED resources and properly directs patients to a more appropriate facility.

http://www.emsworld.com/article/11289649/advanced-practice-paramedics-and-alternative-destinations

directly contract with EMS for such a system, but EMS could bring added value to the care of patients in such programs. Therefore, the hospital or physician group could be convinced to compensate EMS with funds from its bundled payment for care that is not tied to transportation to an emergency department.

COMMUNITY STAKEHOLDER ENGAGEMENT

Within each community, there are likely numerous opportunities for EMS to bring value to other stakeholders. Although discussed in the interdisciplinary chapter at length, there is a strong economic argument for collaboration. There are often positive or negative externalities that affect other entities that are NOT currently bearing the expense or in control of a process. For example, while EMS might find it prudent and reimbursable to transport a patient in hospice to the ED when a caregiver becomes anxious when the end of life is near, the hospice agency experiences a significant cost associated with that transport in the form of lost revenue and poor quality metrics and patient satisfaction. This negative externality on hospice and palliative care is occurring in most communities.

However, as is quite often the case with opportunities related to EMS innovation, this adverse effect that EMS is having on the hospice agency can be turned into a positive one. If EMS takes on additional costs in the form of additional training and medical oversight, and potentially longer scene times to coordinate care with the hospice agency, and lost revenue due to not being able to bill for transport, they can keep that patient in the home which positively impacts the finances and quality metrics of the hospice agency. By agreeing to share some of that positive impact with the EMS agency that bears the expense, both parties can benefit.

Another example might be a new EMS initiative that navigates a patient to mental health services, thereby accruing benefits to patients via quality, EDs via decreased crowding, the criminal justice system via decreased recidivism, and to society via increased workplace productivity. From the state/taxpayer perspective, they should support such an initiative because it would lower societal costs overall.

Thus, the goal of community level engagement is to allow various societal stakeholders including nonprofits, criminal justice, government agencies,

health care and social services organizations to discuss the positive benefits that EMS currently provides or could provide that do not have a funding stream. Once these externalities have been identified, stakeholders can use their creativity to connect the dots so that beneficiaries might contribute to offset the cost of a program. Community and civic leaders should thus be convening meetings, facilitating conversations, and fostering partnerships between EMS with other public health, public safety, and community health care stakeholders.

One of the issues a community-wide approach such as this might address is how to generate a multi-payer solution for EMS. It is unrealistic for EMS to arrive at a unique payment agreement for EACH possible downstream group, since there are so many potential beneficiaries.

STATE MEDICAID INITIATIVES

Many states have established, or are seeking to establish, Medicaid reimbursement and reform committees, Medicare State Innovation Model projects, or other health insurance policy committees. EMS advocates need to push for representation on these committees while state authorities should themselves be seeking to have EMS representation on those committees. By being included in high level reform and innovation conversations, a state is more likely to direct resources and funding toward testing new payment models or new delivery pathways for EMS that help support the rest of an integrated health care system.

A useful example comes from Arizona, where in May of 2016, the state Medicaid program, interestingly called the Arizona Health Care Cost Containment System, created a program with the Arizona Department of Health Services called the Treat and Refer EMS Agency Recognition Program. Under the program, a high performing EMS system could qualify for reimbursement for situations where patients are assessed but not transported to a hospital emergency department.[55]

Where there is no representation, EMS agencies and their partners should still engage state Medicaid leadership to seek reimbursement for innovative care models through the Medicaid waiver process. While the state Medicaid program may not be able to directly reimburse EMS for non-transports due to the regulations on Medicare, it may be able to wrap EMS services into bundles of care or other innovative payment mechanisms that effectively enable EMS to participate in services not directly linked to transportation.

Some states such as Texas have been successful

MEDICAID SECTION 1115 (WAIVER) PROGRAMS:

As of March 1, 2015, eight states were participating in the Medicaid Section 1115 Delivery System Reform Incentive Payment Programs (DSRIP).

California	**Texas**
Massachusetts	**New Mexico**
New Jersey	**Kansas**
Oregon	**New York**

These programs can provide states with significant federal funding to support health care transformation. State EMS leaders should be vocal about their challenges, opportunities, and proposed pilots from the beginning of the application process through project implementation.

55 "Community Paramedicine – Treat & Refer EMS Agency Recognition." *Arizona Department of Health Services*. Accessed June 28, 2017. http://www.azdhs.gov/preparedness/emergency-medical-services-trauma-system/index.php#community-paramedicine-treat-refer-ems-agency

at obtaining funding for EMS care outside of traditional payment mechanisms through the Medicaid waiver process.[56] Using templates or provisions from other states may facilitate more rapid inclusion of EMS innovations in Medicaid waiver applications from the state to the Center for Medicare and Medicaid Services. (A sample of the Texas application is provided in the appendices).

Minnesota has engaged quality improvement organizations (QIOs), groups of health quality experts, clinicians, and consumers working under the care of CMS to improve the care delivered to Medicare beneficiaries,[57] in the development and evaluation of their community paramedicine and mobile integrated health care programs. Other QIOs should recognize the critical role EMS plays in the emergency care system and wishes to play in other areas such as population health, and include EMS representation on those committees.

TRANSFORMING TO EMS 3.0

At the national level, EMS associations should help EMS make the transition to a new era of health care. In the emerging concept of Health care 3.0, the patient becomes the center of health care commercial models and information becomes more available and optimized for both the patient's and the provider's ease of use.[58] EMS as an industry needs to come together and advocate in a unified way to be given the tools to transition EMS to its own 3.0.[59]

EMS leaders should continue to passionately articulate the need to decouple reimbursement from transportation across all public and private payers in order to achieve the very goals our partners in health care and public policy are seeking. CMS set a precedent for this change decades ago when they agreed to pay for response and treatment of cardiac arrest victims, regardless of ambulance transport.[60] This was most likely done to reduce the perverse incentive of the ambulance provider to transport patients who were clearly non-survivable simply to get paid for the response.

EMS leaders should also continue to educate and engage payers about what EMS offers and can bring to the unmet needs of their patients. Since multiple groups of providers may possess overlapping competencies, payers could choose to reimburse for those competencies and skills independent of the licensure of the provider.

Meanwhile, folks within EMS should become more familiar with quality initiatives in the health care sphere. An example is the National Committee for Quality Assurance (NCQA), one of the leading organizations in the development of health care quality measurement. NCQA is the steward of the Health care Effectiveness Data and Information Set (HEDIS) measures, one of the most widely used sets of measures in the United States. The EMS Compass Project, as well as the MIH-CP measures project, are seeking to follow the example of NCQA in their measurement development efforts. By improving our measurement of evidence-based

56 "Designing and Implementing Medicaid Section 1115 Delivery System Reform Incentive Payment Programs." National Governor's Association. Accessed June 28, 2017. http://www.nga.org/files/live/sites/NGA/files/pdf/2015/DesigningandImplementing MedicaidSection1115DeliverySystem.pdf.

57 "Quality Improvement Organizations." *Centers for Medicare & Medicaid Services.* Last modified November 30, 2016. https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityImprovementOrgs/index.html?redirect=/qualityimprovementorgs/

58 "Health care 3.0: Health care for the new normal." *Deloitte.* Accessed July 31, 2016. Available at: http://www2.deloitte.com/content/dam/Deloitte/sg/Documents/risk/risk-sea-health care-3.0-health care-for-the-new-normal.pdf.

59 "Realizing the Value of EMS in Our Nation's Health Care Transformation." EMS 3.0 Initiative. Accessed June 28, 2017. https://www.nasemso.org/Projects/MobileIntegratedHealth/documents/EMS-3.0-Initiative-Paper-Final-for-Association-Endorsement-and-Leadership-Participation-19Ap.pdf.

60 "Medicare Learning Network: Medicare Ambulance Services." Centers for Medicare & Medicaid Services. Last modified May, 2011. https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/Medicare_Ambulance_Services_ICN903194.pdf.

clinical processes and outcomes, it is possible that it will lay the foundation for payers to base their reimbursement models on something other than transportation.

REIMBURSEMENT THROUGH TELEHEALTH

An opportunity to find a new source of revenue for EMS agencies may be to harness the opportunity presented by telemedicine or telehealth. As EMS considers new initiatives to bring value to patients, it sometimes becomes useful to connect the care happening in the field in real time to an emergency physician or perhaps a primary care physician or other specialist. Although reimbursement for telehealth services, in general, lags behind reimbursement for traditionally delivered health care services, there are many states where payers are required to reimburse, and sometimes at equal rates with an in-person visit. Perhaps, EMS agencies that employ physicians could utilize this mechanism to bill for non-transport encounters.

Currently, reimbursement for telehealth services within EMS is nearly non-existent. In some jurisdictions, telehealth is only reimbursed if initiated from within a "health care facility." For billing purposes, the interior of an ambulance, and/or the location of care being attended to in the field by a trained health care provider (e.g. paramedic), should be considered a qualifying health care facility. EMS advocates need to make policymakers aware of this policy failure that misses an opportunity to provide patients with improved, telehealth-enabled, prehospital care. Payers might choose to separate EMS telehealth from other types of telehealth in which they are reimbursing the physician only. Perhaps they would consider reimbursing EMS for "delivering" a patient to definitive care, which might include a telehealth encounter with a physician if appropriate. Or they may prefer to develop a code modifier for EMS encounters that include direct medical oversight via telehealth. Ideally, the reimbursement sought should be uniform across all payer platforms, governmental, commercial, and private, in order to make it feasible for EMS to provide the same standard of care to all patients, regardless of payer type or the ability to pay.

IMPROVING EMS BUSINESS CAPABILITIES

EMS needs to acquire the business acumen to be able to evolve with the changing environment around them. Having a strong grasp and control of EMS system finances, on both the revenue and expense sides, will provide for the strong foundation necessary from which grassroots innovation can emerge. It will further be invaluable when attempting to negotiate financially sustainable payment contracts with payers or others for a new innovative service.

Specifically, EMS agencies should retain or internally develop leaders with the business acumen and education necessary to create a sound financial structure for the management of the financial health and wellbeing of the agency. While a few programs already exist, the industry may need to increase partnerships with institutions of higher education to develop educational curriculums that are geared toward EMS administration. Similar to the issues around provider education, agencies need to recognize the value of these skills and appropriately incentivize the acquisition of these skills. In the end, agencies must be able to dissect their finances until every component of the EMS response, every clinical or administrative process, is understood from a cost perspective.[61]

Industry leaders and national associations need to develop key performance indicators and benchmarks for financial data, and share best

61 Lerner, E. Brooke, Graham Nichol, Daniel W. Spaite, Herbert G. Garrison, and Ronald F. Maio. "A comprehensive framework for determining the cost of an emergency medical services system." *Annals of Emergency Medicine* 49, no. 3 (2007): 304-313.

practices. Perhaps the industry can develop better cost-reporting tools or a standardized industry-specific accounting approach so that a common financial language can be garnered and leveraged within the industry. Business leaders and others also need to find ways to align their financial measurement strategy with future reimbursement reform and emerging pay for performance payment schemes, even before the exact arrangements become certain.

Finally, EMS agencies might pursue new delivery models through internal funding mechanisms or through "selling" their ideas to local stakeholders such as overcrowded EDs, health plans, or risk-bearing accountable care organizations, who hope to gain from the innovation. However, "selling" the innovation and potential return-on-investment, or creating the business case may require developing additional business acumen and communication skills not often found in local EMS agencies.

GRANT SUPPORT

Occasionally, an agency might have a reasonable financial sustainability plan for a new service or innovation. However, for a small agency with limited financial resources, start-up costs can be an insurmountable barrier. One strategy to overcome the challenges associated with launching and evaluating a pilot program might be to seek academic, governmental, or foundational grant support. This has certainly worked for a few agencies to get pilots off the ground. However, for most agencies, even knowing about which grants they might be eligible for seems an overwhelming hurdle. A few categories worth pursuing are:

Academic Grants

The most prestigious of these are often available through the National Institutes of Health[62] and require significant research expertise. However, any EMS agency working with a nearby academic medical center should consider developing relationships with the emergency department's research division and its researchers. Inexperienced researchers should consider reaching out to the Office of Emergency Care Research[63] for guidance and assistance on how to successfully apply.

Hospital Preparedness Grants

These are issued through the Department of Health and Human Services , Office of the Assistant Secretary for Preparedness and Response. EMS initiatives that help improve a hospital's preparedness can qualify for grant support.[64] Perhaps improving the prehospital notification process or efforts aimed at reducing ED diversion such as alternative destination program could qualify.

Highway Safety Grant Programs

These are issued through the National Highway Traffic Safety Administration and support efforts aimed at reducing traffic injuries and fatalities.[65] This might be ideal for EMS initiatives that support trauma system development, piloting new clinical modalities for trauma patients or ambulance and patient safety initiatives.

Assistance to Firefighters Grants

This program, through the Federal Emergency Management Agency, is open to fire suppression

62 National Institute of Health. Accessed June 28, 2017. https://www.nih.gov/

63 "Office of Emergency Care Research." *National Institute of General Medical Sciences*. Last modified January 6, 2017. https://www.nigms.nih.gov/About/Overview/OECR/Pages/default.aspx

64 "HHS Grants Bolster Health Care and Public Health Disaster Preparedness." *Public Health Emergency*. Last modified February 7, 2017. http://www.phe.gov/Preparedness/planning/hpp/Pages/funding.aspx

65 "Highway Safety Grant Programs." *National Highway Traffic Safety Administration*. Accessed June 28, 2017. http://www.nhtsa.gov/About+NHTSA/Highway+Safety+Grant+Programs

and EMS organizations (whether fire-based or non-affiliated) for equipment and training, new operational and interoperability initiatives, and to support community resilience.[66] Many EMS innovative models could in part or in full qualify for this funding mechanism.

Once an appropriate grant mechanism has been identified, developing a successful application can be overwhelming without experienced grant writers, or samples of successful applications. State and national EMS associations should try to provide technical assistance for EMS agencies pursuing these programs. It's also true that not every innovation needs to be scientifically or otherwise proven to be valuable before being piloted in the marketplace. Even within health care, many care coordination efforts, clinical innovations, and educational initiatives are pursued by organizations large and small without external funding. EMS agencies should consider internally funding pilots that are likely to have little immediate detrimental financial impact.

COMBATING FRAUD & ABUSE

EMS leaders should take more aggressive action to reduce or eliminate fraud within the industry, thereby improving allocation of precious resources and enabling innovation. EMS agencies both large and small could possibly work to improve compliance with documentation and billing practices. Maybe state EMS authorities could provide assistance and guidance. Perhaps major industry organizations could partner with CMS, other federal authorities, and payer groups to form a task force to design and implement anti-fraud and abuse initiatives. Together, they may also be able to drive testing of alternative economic models that could reduce the perverse incentives associated with fee for service reimbursement that may contribute to fraud and abuse. Undertaking this challenge would communicate the industry's willingness to work collaboratively to combat the fraud and abuse issues in the ambulance industry which may in turn advance conversations about decoupling payment from transportation.

66 "Assistance to Firefighters Grant Program." *FEMA*. Last modified June, 26, 2017. https://www.fema.gov/welcome-assistance-firefighters-grant-program

RECOMMENDATIONS

1. Decoupling Payment from Transportation

a. Local EMS authorities / agencies should:

i. Envision and begin making the structural and process changes necessary to be successful in a value-based payment system.

ii. Consider collaborative relationships with other community health care stakeholders.

iii. Modify protocols or policies that require transport to the emergency department.

b. Community & civic leaders should:

i. Convene discussions and foster collaborations between EMS and other public health, public safety, and community health care stakeholders.

ii. Support the piloting of resulting innovative programs.

c. State EMS authorities / associations should:

i. Modify protocols or policies that require transport to the emergency department.

ii. Advocate for EMS representation on state committees related to health care finance and reimbursement.

d. State Medicaid and other health policy committees should:

i. Include EMS representation.

ii. Allow for EMS reimbursement for response and treatment, independent from transportation.

iii. Involve EMS in quality improvement organization (QIO) activities.

iv. Engage other payers to create multi-payer reimbursement agreements.

e. National EMS associations should:

i. Continue to advocate in a unified way for the decoupling of reimbursement from transportation across all public and private payers.

ii. Advocate for payments based on medically appropriate services provided regardless of whether or not the patient is transported to an emergency department.

f. Payers should:

i. Reimburse EMS for the successful performance of evidence-based clinical processes proven to improve patient outcomes.

2. Reimbursement Through Telehealth

a. Local EMS agencies / authorities should:

i. Develop the capabilities to transmit real-time video and audio from the field to a physician or other clinical provider for both routine direct medical oversight and potentially reimbursable telehealth encounters.

b. State legislatures & Medicaid committees should:

i. Amend laws and/or policies to allow for reimbursement for telehealth encounters that originate in the ambulance or in the field facilitated by EMS providers.

c. Payers should:

i. Reimburse EMS providers for arranging, coordinating, and/or participating in telehealth-enhanced clinical care in the field, independent of transportation.

3. Improving Business & Technical Capabilities

a. Local EMS agencies / authorities should:

i. Cultivate greater business and management skills.

ii. Acquire greater financial and technical capabilities to understand costs, support data management, and better inform financial and operational decision-making.

iii. Improve analytic skills to prove outcomes and value for individual patients and across populations.

iv. Develop and deploy patient satisfaction measurements to better understand our current service and measure the effectiveness of new processes.

v. Promote an innovative and entrepreneurial culture within the agency.

b. State EMS authorities / associations should:

i. Create technical assistance centers.

ii. Conduct educational seminars and disseminate best practices.

iii. Partner with higher education to develop new curriculums focused on management of EMS systems.

c. National EMS associations should:

i. Provide guidance and expertise to assist local EMS leaders and agencies to develop these skills.

ii. Develop a standardized set of key performance indicators within the industry.

iii. Establish benchmarks for good financial health.

4. Make Use of Available Grant Opportunities

a. Local EMS agencies should:

i. Be aware of the various grant mechanisms available to them.

ii. Consider collaborating with other EMS or non-EMS partners including academic institutions to pursue these grants.

b. State EMS authorities / associations should:

i. Provide technical assistance to local EMS agencies seeking grant support.

c. National EMS associations should:

i. Advocate or create additional funding opportunities for EMS agencies.

ii. Provide technical assistance to local EMS agencies seeking grant support.

5. Eliminate Fraud & Abuse

a. Local EMS agencies / authorities should:

i. Ensure that their billing and accounting practices are compliant with state and federal regulations.

ii. Voluntarily participate in audits of innovative service provision to assure regulatory compliance and program integrity.

b. State EMS authorities should:

i. Clearly define expectations for EMS service billing.

ii. Provide expert guidance, when needed, regarding billing for innovative services.

c. National EMS associations should:

i. Advocate for clear, freely available national guidance on compliance with federal regulations regarding Medicare and other federal EMS-related finance rules.

ii. Partner with CMS, and other federal authorities, and payer groups to form a task force to design and implement anti-fraud and abuse initiatives.

EDUCATION

As the EMS industry seeks to promote innovation amidst a quickly evolving health care system, it is essential to evaluate how Emergency Medical Services (EMS) should educate its next generation of prehospital providers. What are the competencies to which EMS providers should be trained? How will they be taught and by whom? Ultimately, where on the spectrum of health care educational requirements will EMS providers be represented along with medical assistants, technicians, nurses, pharmacists, physician assistants, therapists, nurse practitioners, physicians and others?

HISTORY AND CURRENT PROGRESS

The United States (US) has a long history of pursuing solutions to EMS education. The National Registry of EMTs (NREMT) was created in 1970 in response to a recommendation by President Johnson's Committee on Highway Traffic Safety that the U.S. establish uniform standards for training and examination of personnel active in the delivery of emergency ambulance service.[67] In 2000, the *EMS Education Agenda for the Future: A Systems Approach*[68] proposed the creation of a national strategy to maximize efficiency, develop consistent instructional quality, and enhance student competence. Five essential education components were identified: a national core content, a scope of practice model, educational standards, a process of program accreditation, and EMS certification.

Significant progress has occurred on all of these fronts. In 2005, the National Core Content was released[69], and in 2006 the National Scope of Practice Model[70] defined four nationally recognized levels of EMS providers (emergency medical responder, emergency medical technician (EMT), advanced EMT and paramedic) along with their respective minimum entry-level knowledge and skills. In 2009, the National EMS Education Standards[71] were published, which defined competencies, clinical behaviors and judgments required for entry-level EMS personnel. In 2013, the NREMT announced that paramedic applicants would henceforth be required to graduate from nationally accredited education programs. Further, states and territories that use the NREMT paramedic assessment exam for licensure were required to commit to implementing the national EMS program accreditation requirement by 2018 in order to retain access to the exam.[72] In 2014, the National Association of State EMS Officials (NASEMSO) National Model EMS Clinical Guidelines[73] were released by the NASEMSO Medical Directors Council. These guidelines will

67 "The History of the NREMT and EMS in the United States." *National Registry of Emergency Medical Technicians*. Accessed June 28, 2017. https://www.nremt.org/rwd/public/document/history.

68 "Emergency Medical Services Education Agenda for the Future." *National Highway Traffic Safety Administration*. Accessed June 28, 2017. http://www.nhtsa.gov/people/injury/ems/EdAgenda/final/

69 "National EMS Core Content." *National Highway Traffic Safety Administration*. Accessed June 28, 2017. http://www.ems.gov/education/EMSCoreContent.pdf

70 "National EMS Scope of Practice Model." *National Highway Traffic Safety Administration*. Accessed June 28, 2017. https://www.nremt.org/nremt/downloads/Scope%20of%20Practice.pdf

71 "National Emergency Medical Services Education Standards." National Highway Traffic Safety Administration. Accessed June 28, 2017. http://www.ems.gov/pdf/811077a.pdf

72 "The History of the NREMT and EMS in the United States." National Registry of Emergency Medical Technicians. Accessed June 28, 2017. https://www.nremt.org/rwd/public/document/history.

73 "National Model EMS Clinical Guidelines." National Association of State EMS Officials. Last modified November, 2014. https://nasemso.org/Projects/ModelEMSClinicalGuidelines/documents/National-Model-EMS-Clinical-Guidelines-23Oct2014.pdf

assist state and local EMS systems to ensure a more standardized approach to prehospital care by integrating contemporary knowledge and evidence-based guidelines.

CHALLENGES TO INNOVATION

EDUCATION REQUIREMENTS

One of the most common issues raised by EMS stakeholders during surveys and focus groups concerned whether it is time for EMS to raise the educational bar for its providers. The sort of learning outcomes that paramedics are now routinely expected to convert to their clinical practice, particularly in terms of decision-making, could be considered graduate level. Meanwhile, their education is often not even recognized at the associate's degree level. The US now has a plethora of paramedic programs rooted in community colleges, or in programs affiliated with colleges or universities. Current research reveals that some colleges are providing enough credits or hours to actually confer at least an associate's degree, but the colleges aren't providing the degree option to the student.[74]

As many EMS agencies seek to further integrate with health care and explore new services, they are confronted by the fact that our current curricula are narrowly focused on life-threatening emergencies and do not match the distribution of medical complaints, complex environments and other issues that EMS routinely encounters where a lot of innovation could occur. They often also encounter barriers due to education models that are unfamiliar or poorly understood outside the industry. Hospitals, payers and other health care professionals are unable or unwilling to partner with EMS without proof of critical thinking skills or credentialing that resembles that of an independent licensed practitioner. There is concern that a high school diploma is no longer sufficient to be recognized by other health care professionals. Thus, many now believe that the US should require an associate's or baccalaureate education as a requirement to function as a paramedic.

England, Canada, South Africa, New Zealand and Australia are all redefining the training requirements for paramedics. The United Kingdom's National Health Service now requires that British paramedic candidates either complete a four-year university paramedicine science curriculum or become a student paramedic and study while working for an ambulance company.[75] At the University of Sheffield, nursing, paramedic and physician students share a common curriculum during the first two years of training, fostering a rich inter-disciplinary experience.

VARIABILITY IN EDUCATIONAL QUALITY

The debate on whether to update educational content and increase educational requirements is made more difficult by variability in how states regulate the quality of EMS education across states, and in some cases within states. There is a lack of consensus on training center certification, medical oversight requirements, and low penetration of accreditation of educational institutions. The problem Is compounded by the shortage of funds needed to attract qualified educators. Currently, many EMS educators lack formal training in adult learning principles and the completion of even brief workshops can serve as evidence of competency or meet credentialing requirements. As a result, the quality of EMS education and involvement of medical directors in training programs can fluctuate greatly.

74 Phelps, Scott. "Length of professional education of paramedics and nurses at community colleges in the Northeast United States." *Journal of Paramedic Practice* 7, no. 7 (2015): 336-343.

75 "Entry requirements and training (paramedic)". *Health Careers.* Accessed June 28, 2017.
https://www.healthcareers.nhs.uk/explore-roles/allied-health-professionals/paramedic/entry-requirements-and-training-paramedic

While the NREMT certification makes significant strides to address this variability, even accredited training centers vary widely in student first-time pass rates on the NREMT certification exams. Not having a reliable and consistent educational system likely handicaps the industry's ability to implement new clinical services and innovations. EMS education would be enhanced if faculty were academically better prepared and were utilizing and contributing to the scientific literature on the most effective methods of educating paramedics.

MEASURING COMPETENCE

Another educational challenge to EMS innovation has been the persistent difficulty defining and measuring provider competence. Rather than the number of hours, education levels should reflect the competencies required for each service level. But this transition has proved challenging. Even NREMT certification does not equate well with competency. Despite NREMT certification and demonstration of knowledge of local policies of local EMS system, EMS employers often cite a growing need to screen and remediate prospective new providers.

While true for all health care disciplines, some specialties have moved more quickly than others to refine training and accreditation requirements, often in response to the public's demand for reductions in preventable error.[76] EMS has yet to undergo such a level of scrutiny, but as prehospital care becomes bundled and reimbursed with that of others there is little doubt that greater accountability is coming.

INCENTIVIZING EDUCATION

Unlike other health care professions, EMS is in many areas provided by volunteers. While the reasons are multifactorial and likely include traditions of volunteerism in many communities, it is at least in part due to the insufficient volume of reimbursable transports that would allow a shift to a paid (career) model in those communities. Despite being volunteers though, these providers must meet the same standards as paid providers. Even among career providers, it is unusual for the employers of EMS practitioners (EMS agencies) to incentivize practitioners to pursue higher education. Thus, legitimate questions exist over whether practitioners could or should reasonably expect to earn more if they obtain higher degrees. Hospitals and similar health care organizations have little incentive to support EMS education because in today's environment, the relative quality of EMTs and paramedics provides little perceived incremental benefit to hospitals directly. Only when economic and policy impacts from prehospital services begin to effect hospital systems will there be sufficient justification to support more career staff with expanded educational requirements.

HIGH DEMAND FOR PARAMEDICS

Ironically, despite the aforementioned market forces that make it difficult to incentivize education and contribute to a reliance on volunteers, the EMS market is also plagued by a perceived workforce shortage particularly at the paramedic level.[77] This growing demand for paramedics has also led to new questions about the proper type, duration, and cost of education and field training, particularly for new graduates. New on-line training programs have created a generation of virtually trained students and have generated debate about the effectiveness of some forms of "distributive education"[78]. Many believe that the number of calls to which a medic has

76 "To Err Is Human: Building a Safer Health System." National Academy of Sciences. Last modified November, 1999. http://www.nationalacademies.org/hmd/~/media/Files/Report%20Files/1999/To-Err-is-Human/To%20Err%20is%20Human%201999%20%20report%20brief.pdf

77 Chapman, Susan A., Vanessa Lindler, Jennifer A. Kaiser, and Christine S. Nielsen. "Ems Workforce for the 21st Century: A National Assessment." Washington, D.C.: National Highway Traffic Safety Administration (2008).

78 Friese, Greg. "3 Reasons to Flip the Classroom Back to Lecture." *EMS1.com*. Last modified June 1, 2015. https://www.ems1.com/ems-products/education/articles/2180966-3-reasons-to-flip-the-classroom-back-to-lecture/

responded bears only superficial relation to his/her competency. How then should EMS educators determine when a new candidate is competent to operate independently? How should all personnel be assessed for their ability to manage infrequent events and rarely performed skills?

LACK OF CLINICAL FEEDBACK

Once in the workforce, a major structural deficiency of the EMS educational process over the past fifty years has been the lack of clinical feedback from hospitals to EMS personnel. The Health Insurance Portability and Accountability Act (HIPAA) has often been incorrectly cited as justification for not informing EMS providers of their patients' outcomes, which limits their ability to learn from their experiences.

STRATEGIES

RAISING THE BAR ON EDUCATIONAL REQUIREMENTS

It is not difficult to envision how EMS could benefit from advanced education of EMS professionals in information technology, data management, public health, chronic disease management, business, leadership and research. While some have called for additional research on the exact effects of higher education standards, from the innovation perspective, raising the bar is imperative to fostering a culture that promotes EMS quality and spurs EMS innovation.

If state or local EMS leaders are committed to raising the educational bar for EMS, they should take steps to support or encourage a gradual transition over a decade toward a new standard of degree-based education for paramedics. This might include reviewing entry requirements, educational standards, and performing workforce needs assessments. A baseline of formal degree-based education for paramedics could open up new opportunities for leadership and academic careers following further postgraduate education. It would also increase the likelihood of paramedics becoming the drivers of innovation and research affecting the paramedic profession and the patients that paramedics treat. Higher educational requirements may also help EMS providers break down silos and collaborate more effectively with other disciplines.

Such a transition could be disruptive to the current educational model. Local and state EMS leaders should survey existing EMS training centers for supplementary methods of raising standards and harness their experience and resources in developing degree-based programs. Local leaders could also look to groups like the National Association of EMS Educators (NAEMSE) or to the Bureau of Health Professions at the Health Resources and Services Administration (HRSA) to develop strategies to navigate the complexities of this transition.

They could also look to communities with existing degree programs. The National Association of EMTs (NAEMT) currently lists 20 EMS baccalaureate-degree programs.[79] The Oregon Tech - Oregon Health Sciences University Paramedic Education Program[80] offers a bachelor's degree in EMS Management with courses in critical care and community care paramedicine. In 2014, the California legislature established (through the Community College Professional Development Program, AB 2558)[81] a pilot 4-year baccalaureate program in EMS that will be offered at a community college. Additional work with the Committee on the

79 "Degree Programs in EMS." *National Association of EMTs*. Accessed June 28, 2017. https://www.naemt.org/About_EMS/degreeprograms.aspx

80 "Paramedic Education Program." *Oregon Tech*. Accessed June 28, 2017. http://www.oit.edu/wilsonville/academics/degrees/paramedic-program2016

81 "An act to amend Sections 87150 and 87151 of, and to repeal and add Section 87152 of, the Education Code, relating to community colleges." *Assembly Bill No. 2558*. Last modified September 19, 2014. http://www.leginfo.ca.gov/pub/13-14/bill/asm/ab_2551-2600/ab_2558_bill_20140919_chaptered.pdf

PARAMEDICS WITH DEGREES: THE KANSAS EXPERIENCE

Kansas is a state of 82,300 square miles populated by 2.9 million residents organized into 105 counties. Even though the state has significant rural areas, Kansas ranks 16th in the nation for the number of residents with a bachelor's level degree.

Vast distances between the seven schools that offer paramedic education make attaining a college degree not only a financial challenge, but also a geographic challenge as well. Yet, the state made the ambitious decision to require all paramedics being trained in Kansas to have at least an Associate's Degree prior to state licensure since 2001.

What effect has this policy had? Well, it did not kill the provision of paramedic services in a very rural state or create a supply shortage driving wages to unsustainable levels as some had feared. The number of paramedics has continued to grow at a steady pace over the last 15 years with some paramedic schools having more applicants than classroom seats allowing for selectivity at the point of admission.

Many paramedics experienced benefits. Some services did see a modest wage increase for paramedics. Graduating paramedics generally possess stronger English, math, anatomy, and physiology knowledge and are better positioned educationally to attain baccalaureate degrees or bridge in to nursing at the point that they are ready to leave the EMS field.

State regulators in Kansas report few complaints about the requirement and other EMS leaders believe it is laying the groundwork for a future of more prepared EMS providers, leaders, managers, and educators capable of innovating and driving the industry to new heights.

Accreditation for the EMS Professions (CoAEMSP) to increase standards, polices, procedures and oversight should be pursued.

It is important that as degree-based programs become the norm, they should continue to foster the independent nature of paramedic work, the value and necessity of basic life support skills and managing complex scenes. Degree-based programs should also emphasize competence on low volume high-risk procedures.

SUPPORTING PARAMEDIC HIGHER EDUCATION

To replicate the career ladders and practice opportunities available in other health care disciplines, EMS would benefit from reward systems that encourage the pursuit of advanced education. EMS agencies, providers, and educational facilities should explore a variety of funding opportunities as well as innovative incentive schemes both within and outside of traditional EMS systems to encourage more providers to pursue college degrees. Such incentives may, or may not, be financial. Meanwhile, national EMS associations should advocate for federal funding streams to develop national educational standards that incorporate a broader curriculum to better prepare and integrate EMS into the health care system at every EMS role and level (providers, educators, etc.) EMS should have access to the same federal programs for professional development that nursing has through the HRSA Bureau of Health Professions. Paramedics should also be recognized as a profession within the National Health Service Corps along with their primary care, mental health and dental counterparts.

IMPROVING THE QUALITY OF EDUCATION

Creating a more educated and innovative workforce needs to begin with training and recruiting high caliber educators. An educational system that not only teaches, but instills a commitment to high

quality patient care and inspires creativity and leadership in new entrants into the workforce, would be invaluable to each agency and to the industry as a whole for the purpose of driving innovation. To accomplish this, EMS educational institutions ought to require degrees for instructors and strive to support EMS instructor development through rigorous hiring, quality improvement, formal education, experience, and mentorship. Formal internships and fellowships in EMS education should also be developed. Meanwhile, agencies should include teaching and mentorship in performance reviews and enhance salaries for exceptional educators.

Finally, state and national EMS leaders should make a concerted effort to increase the pool of instructors that have advanced education degrees through incentive programs, scholarships and expansion of career opportunities. State and national average pass rates should be utilized to benchmark instructional performance and guide allocation of resources to programs with the greatest need. Simultaneously, well performing programs should be incentivized to identify and disseminate best practices and support the development of new innovative educational methods.

ENHANCING EDUCATIONAL METHODS

Students should leave formal EMS education with critical thinking skills, exposure to other health care roles, deeper knowledge about their role in the health care system, and have the ability to research new questions and learn independently. If that is accomplished, EMS providers would be more likely to be viewed as colleagues by other health care professionals.

To get there, the educational methods employed need to be revisited. EMS would benefit from optimizing instructional models that encourage competency-based education and allow students to advance based upon their ability to master cognitive, affective, and psychomotor goals. Competencies might be both developed and more accurately measured with more frequent and more effective use of problem-based learning, simulation-based training or incorporating new technologies such as virtual reality. Recognizing that EMS operates in an interdisciplinary environment, its educational models should incorporate integrated team-based experiences with other health care, public health, and public safety disciplines into both initial and ongoing training. Doing so would enable providers of all levels and disciplines to gain familiarity with each other's capabilities and workflows and foster better interdisciplinary collaboration and likely foster new innovation.

To the extent possible, EMS education and practice needs to be based upon scientific evidence. Although in some parts of the curriculum, there may be insufficient literature to implement this fully, a thorough effort to find evidence and frequent updates must be performed. Improving the evidence base for EMS practice would be made easier if formal education practitioners, educators, managers, and medical directors included exposure to basic principles of research, data collection and informatics. Similarly, giving providers early exposure to rapidly evolving fields of EMS such as population health and behavioral health might accelerate innovation in those areas.

Providers in remote areas or those seeking higher education would benefit from greater use of technology to facilitate distance learning. As a component of its 2-year Community Paramedicine Pilot Project, California EMSA developed a 200-hour curriculum for participating pilot sites[82] using a

82 Baxter Larmon. "State of California Community Paramedic CORE Education Program." Emergency Medical Services Authority. Last modified May 28, 2015. http://www.emsa.ca.gov/Media/Default/PDF/UCLA%20CORE%20Training%20Final%20Report%20May%2028%202015%20%20(1).pdf

spoke-and-hub distance training model with on-sight local medical supervision. Recent experience with community paramedicine has also shown that added training in longitudinal care is important for providers previously accustomed to incident-based medicine.

IMPROVING CLINICAL FEEDBACK

The role of EMS as a HIPAA-covered entity has been clarified (see NHTSA's Information Sheet in Appendix) but local EMS champions need to make a concerted effort to educate hospital and health information exchange leadership and compliance officers about this issue. As the goal of bi-directional EMS-hospital information exchange gets closer, EMS agencies need to take advantage of the data they already have access to and find ways to systematically provide clinical feedback to their providers for the sake of both EMS education and patient care. Reconciliation of EMS records to hospital records may be tedious, but it becomes slightly less so each year. Paramedics should no longer be left to wonder whether their assessment was consistent with that of the ED physician or whether their patient actually had a pulmonary embolus as the cause of their syncope. This dramatic health information technology (HIT) advance will allow EMS to consolidate its understanding of disease and injury and fix a critical defect in the current process of continuing education.

RECOMMENDATIONS

1. Promote higher educational standards for EMS Professionals

a. Local EMS agencies / authorities should:

i. Support, incentivize, and encourage a gradual transition over a decade toward a new standard of degree-based education for paramedics.

ii. Survey local EMS training centers for recommendations and involve them in transition planning.

iii. Explore funding opportunities to encourage EMS providers, specifically paramedics, to obtain academic degrees.

iv. Expand education of providers, educators, and managers to harness potential of EMS data and informatics.

v. Include emergency preparedness and population health education into all levels of EMS training.

b. State EMS authorities / associations should:

i. Review current requirements for EMS students and educators.

ii. Conduct EMS workforce needs assessments.

iii. Analyze impact of existing 4-year training programs.

iv. Survey college and university interest in expanded training.

v. Survey current educational standards of training centers.

c. National EMS associations should:

i. Develop guidance for local EMS stakeholders seeking to transition to degree-based education.

ii. Enlist assistance of HRSA Bureau of Health Professions to:

iii. Analyze current educational standards.

iv. Define optimal EMS workforce.

v. Analyze implications of enhanced educational requirements.

vi. Seek recognition for paramedics within the National Health Service Corps.

2. Support and cultivate EMS educators

a. Local EMS agencies / educational institutions should:

i. Strive to support EMS instructor development through rigorous hiring, quality improvement, supporting credentialing, formal education, experience, and mentorship.

ii. Enhance salaries for exceptional educators.

b. State EMS authorities should:

i. Enhance standards for EMS educators.

ii. Encourage EMS-interdisciplinary undergraduate-graduate training.

c. National EMS associations should:

i. Sponsor educational internships and fellowships.

ii. Promote the role of EMS educators in national decision-making roles.

3. Enhance educational methods

a. Local EMS agencies / educational institutions should:

i. Utilize evidence-based practices to teach evidence-based medicine.

ii. Include opportunities for integrated, team-based experiences with other health care, public health, and public safety disciplines.

iii. Incorporate problem-based and simulation-based learning.

iv. Provide exposure to research, population health, behavioral health, and health informatics.

b. State EMS authorities / associations should:

i. Hire EMS-trained professionals in leadership roles.

ii. Promote EMS-affiliated graduate training opportunities.

iii. Refine metrics of local training centers and perform benchmarking.

iv. Incentivize innovative training methods.

c. *National EMS associations should:*

i. Identify best educational practices related to problem and team-based learning, distance learning, simulation, use of standardized patients, and virtual reality.

ii. Encourage use of existing national standards and best practices.

iii. Define clinical competency.

iv. Revise current continuing education requirements.

v. Fund innovative EMS training grants.

vi. Advocate for federal funding streams to develop national educational standards that incorporate a broader curriculum to better prepare and integrate EMS into the health care system at every EMS role and level (providers, educators, etc.).

4. Improve Clinical Feedback

a. Local EMS agencies / authorities should:

i. Develop systematic methods of providing providers with clinical outcomes for their patients.

b. State EMS authorities / associations should:

i. Disseminate awareness that EMS is allowed to view hospital data for their patients under HIPAA.

ii. Advocate for the routine sharing of information with EMS.

c. National EMS associations should:

i. Promote efforts to integrate EMS and hospital records.

REGIONAL COORDINATION

BARRIERS TO REGIONAL COORDINATION

SIGNIFICANT VARIATIONS IN SYSTEM DESIGN AND CLINICAL PRACTICE

It's often been said that "if you've seen one EMS system, you've seen one EMS system." This quip alludes to the fact that there are often significant differences in system design between EMS systems in different jurisdictions. However, the truth is that there are even significant differences in training, technology, policies, protocols, medical oversight, and perspectives of different agencies operating in the same geographic area and serving the same patients. Unwarranted variations in care in medicine have been associated with inefficient utilization of resources and lower health care quality.[83] This likely holds true for EMS as well.

FRAGMENTATION OF EMS AT EVERY LEVEL

Most EMS agencies serve a defined geopolitical area that is often smaller and incongruent with hospital catchment areas. In many communities, it is not uncommon to have dozens of small EMS agencies bringing patients to the same hospital. At the local level, the hyper-fragmentation of EMS service results in inadequate harmonization of patient care practices and operations between different agencies in the same or in nearby jurisdictions. If the EMS agencies in that market are unable to collaborate, it could adversely affect a community's ability to respond to large-scale events, particularly if triage schemes, or other policies and procedures are not standardized. Further, it becomes difficult to expect the hospital to be able to participate in innovations in the EMS arena when most proposed pilots would only impact a small fraction of their patients.

Likewise, at a state or regional level (multiple counties that are served by the same hospital or specialty care resources), health plans and other health care stakeholders need to consider initiatives that serve their customers. If neither a single agency dominates the region nor is there a highly coordinated multi-agency EMS system, EMS is likely to be overlooked as a viable partner in regional efforts to come up with innovative or creative health care solutions. The tradition of home-rule contributes to a situation in which few governmental entities or agencies are willing to cede control, whether or not finances or public health or safety could be improved.

Within the industry, EMS stakeholders at local, state or national levels, tend to be significantly divided across multiple planes. There are often separate labor unions for different levels of providers or officers; there are separate professional societies for EMS educators, managers, physicians, and providers; and there are separate lobbying groups based on the type of EMS organization. Perspectives offered to external stakeholders can vary dramatically between commercial, hospital-based, fire-based, public-utility, non-profit, and volunteer EMS agencies. The political infighting between these groups is often a barrier to regional coordination, interdisciplinary collaboration, and ultimately to innovation itself.

83 Wennberg, John E. "Forty years of unwarranted variation—and still counting." *Health Policy* 114, no. 1 (2014): 1-2.

THE POSITIVE DYNAMICS OF MERGING EMS AGENCIES

In many parts of America, EMS is provided by local EMS agencies that were initially all volunteer agencies. Many smaller agencies have been struggling due to lack of volunteers, call volume, and funding. These were some of the factors leading to our agencies, Chili Ambulance, Henrietta Ambulance, and Scottsville Rescue Squad in New York merging to form CHS Mobile Integrated Health Care, Inc. in May of 2017. The merger was a two-year process whereby an agency doing 6000, 2500, and 400 calls per year respectivel came together in an effort to continue the community EMS services started as far back as the 1940's.

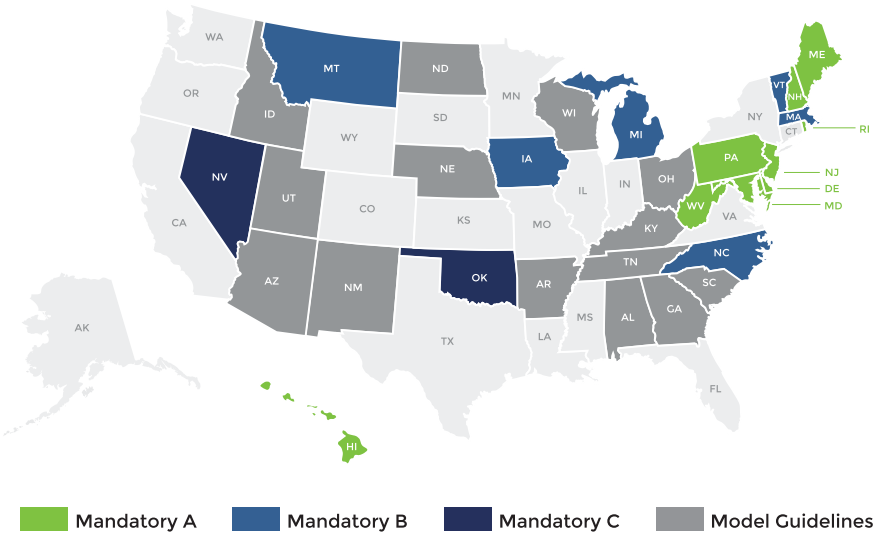
A merger is no easy task, however. How would we maintain our heritage and our community identity, what would the organizational chart look like, and who would comprise the Board of Directors? Our bylaws for the new non-profit corporation set aside seats for representatives of each of the agencies. We created a new corporation with a new name via a naming contest and welcomed participation from all of the members/staff from each agency. The name ultimately chosen (CHS Mobile Integrated Health Care) reflected a broad range of pre-hospital services and preserved our agencies' initials (although CHS does not actually mean Chili, Henrietta, Scottsville). Our fleet is all branded with CHS MIHC, but still have the local agency name, be it Chili, Henrietta, or Scottsville. We are currently working on a marketing campaign to acclimate our communities to the new corporation. Also, as part of the merger process, we formed work groups that consisted of representatives from each of the 3 agencies, the goals of which were to challenge everything. Why is any one agency doing what they are now and does it make sense to continue that process? The strength of the message empowered everyone to look inward and outward for new ideas and make suggestions for improvement to our overall operations. As a result of the merger, the quality of care across the entire coverage area has improved as all the members and employees have access to a high fidelity simulation lab for ongoing training. We instituted an after action review process for any major event/call. Our overall QA program was revamped to a clinical care program using the just culture model. Purchasing, fleet maintenance, administrative support, and medical billing resources were spread across the three agencies, allowing for a more efficient operation, stabilizing the overall cost of operation. In short, our merger spawned committees and work groups that have streamlined our operations and encouraged engagement by all of our personnel.

Reg Allen, BS, NREMT-P
Chief / CEO, CHS Mobile Integrated Health Care

FIGURE X:

States with mandatory statewide ALS protocols as of October 1, 2013. Types of protocols used by each state are indicated by colors (see key). Mandatory A protocols must be used by all EMS providers within the state. Mandatory B protocols are similar but there is a process for services to petition the state to alter some of the protocols. Mandatory C protocols are similar but there is a process for services to petition the state to develop and use their own protocols.

Reprinted with Permission: Kupas DF, Schenk E, Sholl JM, Kamin R. Characteristics of statewide protocols for emergency medical services in the United States. Prehospital emergency care 2015;19:292-301.



TENSION BETWEEN AUTONOMY & STANDARDIZATION

There are of course significant tensions between local autonomy and statewide efforts (whether led by State EMS Offices, professional associations, or individuals) to bring standardization. While having uniform protocols and procedures across a state or large region may reduce variation, improve quality, and make it easier for other stakeholders to become familiar with EMS, it might in turn become more difficult to accommodate local innovations including new treatment protocols and new collaborative care models. For example, Texas is probably the only true delegated practice state in which local agency medical directors have a broad range of authority to establish protocols and set policies.[84] As a result, several EMS agencies in that state have become well known in the industry as being centers of innovation. On the other hand, several states (see **Figure X**) have established statewide protocols and have experienced significant improvements in the consistency of data reporting, which can be an important ingredient for innovation, and preliminary indications of improved quality.[85]

This tension between local autonomy and statewide or other efforts around standardization are not limited to treatment protocols or adherence to scientific evidence. They are also found in EMS educational standards, policies and procedures, staffing standards, destination policies for specialty care centers, and even regulatory regimes that might differ based on EMS agency type. Often local government has a great deal of autonomy over fire services while the state often is the regulator of hospitals which may have implications for the hospital-based EMS services.[86]

STRATEGIES FOR IMPROVEMENT OF REGIONAL COORDINATION

In order to promote greater innovation in EMS, it is ideal that EMS agencies overcome fragmentation

84 W. Ann Maggiore. "Liability for Ems Licensing." *Journal of Emergency Medical Services.* Last modified February 2, 2011. http://www.jems.com/articles/2011/02/liability-ems-licensing.html

85 Spaite, Daniel W., Bentley J. Bobrow, Uwe Stolz, Duane Sherrill, Vatsal Chikani, Bruce Barnhart, Michael Sotelo et al. "Evaluation of the impact of implementing the emergency medical services traumatic brain injury guidelines in Arizona: the Excellence in Prehospital Injury Care (EPIC) study methodology." *Academic Emergency Medicine* 21, no. 7 (2014): 818-830.

86 "Emergency Medical Services at the Crossroads." *In Future of Emergency Care Series* edited by Gail L. Warden. Washington, D.C.: Institute of Medicine, 2007.

and improve their ability to work together, across jurisdictional lines or across agency, between transporting and non-transporting providers, and between 911 and interfacility EMS units. While it is true that our lack of regional coordination is a major impediment to many of our aspirations for greater quality and integration, we find a compelling argument to be that it is only by concentrating our efforts on achieving those very same high quality goals, that we have the best chance of overcoming our fragmentation challenges. It is our sincere hope that by setting high expectations for collecting and sharing data, for measuring and reporting on quality, and for protecting patients and providers, that we will produce the conditions necessary for EMS to improve coordination at the local level, reduce variation at the state level, and unify the industry at the national level.

FOCUSING ON THE CORE MISSION

While much of the current discussion on innovation centers around integrating EMS into prevention and chronic care efforts, the core mission of EMS remains its rapid treatment and transport of acute conditions such as stroke, myocardial infarction, cardiac arrest and trauma. Even in this domain, there are many opportunities for improvement. Many regions are not meeting goals for first medical contact (FMC) to balloon times for STEMI, or FMC to needle times for stroke.[87] There are huge variations in cardiac arrest survival rates.[88] Esophageal intubations are still going undetected. New technologies and evidence-based tools exist to facilitate data collection and sharing, telecommunication, training, quality assurance, and more. However, few EMS organizations (or regional systems) have taken advantage of these new approaches in large part due to the aforementioned barriers.

By focusing on improving patient outcomes for acute care conditions across a region larger than any one agency, political differences and competitive interests are more likely to be overcome. This can enable better cooperation among internal EMS stakeholders in everything from alignment of policies, greater interoperability of equipment to better communication during disasters, all of which is in the interest of our patients and communities. In addition, such a focus can enable mobilization of external resources (e.g. organizations interested in stroke outcomes or trauma outcomes) to facilitate transformation of EMS into a more integrated, higher quality system. Achieving higher quality in the core emergency response focus of EMS will have the added benefit of making EMS a more attractive partner to health systems and other stakeholders seeking innovative partnership opportunities.

MOVING BEYOND OUR DIFFERENCES

EMS systems are community health resources and the public's safety net for emergent and chronic health conditions. Whether an EMS organization is owned and operated by a hospital, a fire department, or any other entity, the mission of an EMS system and the type of care and services it provides ought to be similar and tailored to the needs of the community. Thus EMS should support public health, disaster preparedness and population health efforts independent and irrespective of the nature or ownership of the agency.

When EMS is defined by who provides it rather than what the service provides, the differences in the type of EMS organization get in the way of collaboration with other providers and between EMS organizations. Whereas a municipal third service might view themselves as public health

87 McKeown, LA. "The Numbers Game: Door-to-Balloon or First Medical Contact? Stemi Care Still Needs Work Nationwide." In, TCTMD (2017). Published electronically March 16, 2017. https://www.tctmd.com/news/numbers-game-door-balloon-or-first-medical-contact-stemi-care-still-needs-work-nationwide

88 Girotra, Saket, Sean van Diepen, Brahmajee K. Nallamothu, Margaret Carrel, Kimberly Vellano, Monique L. Anderson, Bryan McNally, Benjamin Abella, Comilla Sasson, and Paul S. Chan. "Regional variation in out-of-hospital cardiac arrest survival in the United States." Circulation (2016): CIRCULATIONAHA-115.

providers, a fire department is more likely to view themselves as public safety officers. While a commercial agency or hospital-based service is more likely to identify as health care providers, a volunteer agency may be more likely to identify as community advocates. When there is too much focus on the politics of identity, it becomes hard to agree on mission, vision, and values. However, patients are indifferent to the type of agency an EMS provider belongs to and are simply focused on receiving care. While the medical needs of populations of patients may vary, it is more often the variability in resources of a community that drive the need or opportunity for EMS to provide innovative programs.

It may seem reasonable for certain types of EMS agencies to decide that innovating to meet the needs of or fill the gaps in a community is optional. It is not! It should not be optional for EMS agencies to strive to improve patient outcomes for cardiac arrest, STEMI, stroke, COPD, asthma or any other condition. It should not be optional for EMS agencies to work to improve their notification process or their transmission of prehospital information to the hospital or coordination of care with the patient's primary care physician. It should not be optional for EMS agencies to seek to improve and constantly reevaluate their community's resilience to disaster. If the "what we do" is the same across all EMS system types, then EMS will be able to speak with a unified voice focused on the care of patients and populations.

One small step that local agencies can take to build cohesion is to come together to form or participate in a group purchasing cooperative. This would both improve negotiating ability for prices of drugs, and equipment, and help bridge cultural gaps and possibly improve interoperability of technology and equipment.

POOLING DATA TO CARE FOR POPULATIONS

The usual approach to EMS data is to focus on each incident and each patient encounter as unique, without considering either the longitudinal care of the individual patient, or the cross-sectional evaluation of what is occurring across a population at any given point in time. Multiple agencies working in the same county, city, or community each possess important subsets of the information needed to understand the care being provided by EMS to the population in a given geographical area. However, individually, none of them would have enough of the picture to understand all that is occurring, and would be hard pressed to address those issues unilaterally.

One step communities faced with hyper-fragmentation can take to seek improved quality and a greater environment for innovation in EMS would be to incentivize, facilitate or require the sharing of information between EMS agencies, and with the local hospitals and local government agencies. By combining their data, the EMS community along with local governments and health care partners would be able to improve a region's syndromic surveillance and situational awareness. In addition, administrative and medical oversight of EMS in a given area could be better coordinated and there could be improved operational efficiencies across a region by reducing duplication of services and unwarranted variation in care. It could also lead to a greater ability to measure outcomes and effects of new interventions and to enable more coordinated care for individuals and a population-based approach to health care. As a byproduct of coordination among EMS agencies, there may be increased willingness of health care and public safety stakeholders to collaborate with EMS on population health and other initiatives.

EXCHANGING DATA TO CARE FOR PATIENTS

In addition to looking at data in aggregate, EMS agencies should make an effort to more efficiently exchange data at the patient level. For example, nearly all EMS agencies print or fax their patient care information to the hospital rather than via a more direct electronic transfer of data.[89] This is despite much of the technical groundwork for interoperability already having been laid through the creation of the National EMS Information System (NEMSIS) and the creation of a standardized HL7 clinical document architecture (CDA). Multiple electronic patient care report (ePCR) companies and other health information companies now boast of their ability to translate EMS data, usually in XML format, into HL7 data compatible with hospital record systems and regional health information exchanges.[90]

The remaining barriers around data sharing are now primarily related to an EMS agency's ability to influence the hospital's workflows and information technology investments. Influencing the relatively larger entity requires making a case for efficiency gains and a return on investment. This is once again a harder conversation if the EMS system is fragmented. However, a properly motivated EMS community with collaboration across multiple agencies could choose to work with a limited number of vendors and fund the appropriate interfaces to improve the efficiency of data transfers. In the long run, this would likely improve EMS workflows, data collection, the quality of care for patients, and perhaps even make future EMS innovation in that community more likely.

MEASURING & REPORTING ON QUALITY

Early evidence suggests that emergency medical services contribute substantially to improvements in patient outcomes and financial savings to the health care system in certain circumstances where data is available.[91] The health care reforms brought about by the Patient Protection and Affordable Care Act create the potential for a significant shift of EMS toward new reimbursement models for healthcare provision. For example, accountable care organizations will create new partnerships between local and regional health care stakeholders with the goal of maintaining or improving the quality of care while reducing the overall cost to the population served. EMS is already exploring ways to accomplish these goals through care innovations and new models of care, but it is ultimately measurement and data that will drive changes to the current reimbursement model. As patients are increasingly moved to value based care, quality and performance metrics need to be developed to ensure good patient care and the financial viability of EMS systems.

These performance measures must be integrated with the EMS agency's patient-centered quality improvement process. Properly designed and validated performance measures ensure that patients receive the best care based on best scientific evidence, that communities receive high-quality service, and payers receive the best value for their health care dollar. There is currently a NHTSA-sponsored effort to develop meaningful EMS quality measures known as the EMS Compass project.[92] National EMS associations should work

89 "Health Information Exchange Readiness Assessment / Survey." Lumenta Healthcare Solutions. Last modified December 19, 2013. http://www.emsa.ca.gov/Media/Default/PDF/EMS%20Project%20Full%20Report%20FINAL%2012-19-13%20REVISED.pdf

90 Zavadsky, M. "Golden Age of Data Modern Approaches to Health Information Exchange." Journal of Emergency Medical Services. Last modified May 2015. http://www.jems.com/content/dam/jems/PDFs/1505JEMSsup-OnTheLeadingEdge.pdf

91 "EMS Makes a Difference: Improved clinical outcomes and downstream healthcare savings." National EMS Advisory Council. Last modified December, 2009. http://www.ems.gov/pdf/nemsac-dec2009.pdf

92 "Improving patient care through meaningful measures." *EMS Compass*. Accessed June 28, 2017. http://www.emscompass.org

with the federal agencies that support the EMS mission along with quality focused entities like the National Quality Forum, the Agency for Health care Research and Quality and other national health care stakeholders to support initiatives like the Compass project to further develop and continually evaluate performance measures for both traditional EMS and future EMS-based innovative health care delivery services. State and local EMS leaders seeking to promote quality and improved regional coordination could employ a range of incentives and/or penalties but ultimately must find a way to achieve compliance with the reporting of validated quality measures. States should also work with EMS stakeholders to develop and pilot new measures, which could then further inform national efforts.

FOSTERING A CULTURE OF SAFETY

As a critical component of the nation's public safety, public health, and health care systems, the EMS industry must adopt a culture of safety. EMS Providers in the course of their duties may find themselves exposed to a myriad of risks such as infectious diseases, emotional stress, fatigue, physical violence, vehicle crashes, environmental hazards, and personal liability. Each provider, regardless of the type of agency he or she works for, or the community or state in which he or she practices, deserves to be protected. Likewise, the patients we serve deserve the very best care with the minimum risk of additional harm that we can provide.

The primary objective of the *National EMS Culture of Safety* was to develop a strategy for a robust culture of safety within the EMS profession.[93] The strategy acknowledges the unique and varied nature of EMS provider agencies throughout the United States, as well as a number of cultural influencers that are believed to be relevant to the success of the strategy. It provides a framework with which to create measurable outcomes that improve the effectiveness and safety of prehospital health care for responders, patients, and the public. The framework includes encouraging the reporting of errors and "near misses", protecting individuals from retribution, and utilizing a root cause analysis approach to evaluate incidents.

Having been developed in response to a recommendation from the National Emergency Medical Services Advisory Council (NEMSAC), and with consultation from a broad array of internal and external stakeholders, it is time for the National EMS Culture of Safety (Strategy) to be widely disseminated and implemented at the local level. While the strategy necessitates that each organization's core values imbue principles relevant to responder and patient safety, the culture must transcend the level of the organization. In a multi-agency community, a region within a state, or even at the statewide level, the culture of EMS is a fragile communal asset that must be constantly nurtured. It has the power to influence our providers' shared beliefs, practices, rituals, norms and behaviors related to safety. A positive safety culture is associated with fewer errors, adverse events and other negative outcomes.[94,95] Perhaps most importantly, it fosters integration of EMS with health care and supports innovation.

By pursuing each of the above strategies, the EMS industry is likely to achieve better quality and greater harmonization of care, all while better enabling us to speak with one voice about the issues that matter.

93 "Strategy for a National EMS Culture of Safety." *National EMS Advisory Council.* Last modified May 16, 2012. http://www.ems.gov/pdf/nemsac/may2012/ems_culture_of_safety-draft_3-1_05162012.pdf

94 Weaver, Matthew D., Henry E. Wang, Rollin J. Fairbanks, and Daniel Patterson. "The association between EMS workplace safety culture and safety outcomes." *Prehospital emergency care* 16, no. 1 (2012): 43-52.

95 Singer, Sara, Shoutzu Lin, Alyson Falwell, David Gaba, and Laurence Baker. "Relationship of safety climate and safety performance in hospitals." *Health services research* 44, no. 2p1 (2009): 399-421.

RECOMMENDATIONS

1. Regionalization of Care For Time-Critical Conditions

a. Local EMS authorities / agencies should:

i. Work collaboratively with other EMS agencies serving a community to improve the care they collectively provide for time-critical and -sensitive injuries and illnesses such as stroke, myocardial infarction, cardiac arrest and trauma. Efforts may include:

ii. Developing regional protocols around treatment and transport destinations.

iii. Agree on common data definitions, terminology, and metrics.

iv. Work with regional health care partners (e.g. hospitals) to develop effective, comprehensive, integrated, and collaborative population-based strategies to improve care.

b. State EMS authorities / associations should:

i. Engage local EMS representatives in discussions around statewide protocols to reduce unwarranted variation in care.

ii. Consider recognition of specialty receiving centers for time-sensitive conditions.

iii. Require EMS agencies operating in the same jurisdiction to exchange clinical data.

c. National EMS associations should:

i. Highlight the evidence that supports regionalization of care

ii. Advocate for funding to support regionalization initiatives.

iii. Develop toolkits for the transition to regionalized care.

iv. Work with national representatives of hospital associations and other stakeholder groups to provide guidance on best practices.

2. Work Toward a Common Purpose

a. Local EMS authorities / agencies should:

i. Embrace a common mission to improve community health and safety and implement evidence-based models of care.

ii. Make innovation a part of a continuous quality improvement strategy to solve the community's health care needs.

iii. Measure and report on quality and outcomes at the population level.

b. State EMS authorities / associations should:

i. Enable consistent licensing and credentialing procedures.

ii. Implement operational and clinical performance standards to which all agencies are held accountable.

c. Hospitals / health systems / health plans should:

i. Encourage collaboration across agencies within their catchment areas by:

ii. Holding joint quality improvement meetings

iii. Requesting regular reporting of performance metrics in a standardized fashion.

d. National EMS associations should:

i. Advocate for the creation of grants and funding opportunities specifically for groups of EMS agencies collaborating in the same market.

3. Sharing & Utilizing Data

a. Local EMS authorities / agencies should:

i. Seek to share epidemiologic data with other agencies operating in the same geographic area.

ii. Enable access to patient clinical information for other EMS agencies and other health care stakeholders caring for specific patients with appropriate permissions.

b. State EMS authorities / associations should:

i. Incentivize or require EMS agencies operating within the same trade area or geographical region to share both patient-level clinical data and population-level aggregate data.

ii. Set flexible policies around the exchange of information between EMS agencies and between EMS and other community health providers.

iii. Facilitate data sharing through policy development that encourages interoperability.

c. ***National EMS associations should:***
   i. Promote the exchange of health care information at the community level.
   ii. Facilitate data sharing through advocacy for interoperability standards.
   iii. Advocate for the creation of incentives for the meaningful use of data.

4. Reporting on Quality

a. ***Local EMS authorities / agencies should:***
   i. Emphasize the importance of data collection and quality improvement amongst their providers.
   ii. Implement process measures supported by national guidelines such as time to EKG for suspected myocardial infarction and prehospital notification for suspected stroke.

b. ***State EMS authorities / associations should:***
   i. Require the reporting of measures endorsed by national guidelines.
   ii. Encourage the reporting of additional measures either endorsed by national guidelines, supported by literature, or developed in collaboration with local EMS authorities, agencies, and stakeholders.
   iii. Facilitate the reporting of outcomes through policy development that encourages clinical feedback to EMS agencies from downstream providers such as hospitals.

c. ***National EMS associations should:***
   i. Fund the research and development of EMS quality metrics.
   ii. Engage national quality organizations such as the National Quality Forum and the Agency for Health care Research and Quality in the ongoing development of quality metrics
   iii. Advocate for the creation of incentives for reporting on industry supported quality measures.

5. Emphasize Patient and Provider Safety

a. ***Local EMS authorities / agencies should:***
   i. Promote a culture of safety in which providers feel protected from retribution for raising safety concerns. (similar to the values in a school of thought known as "Just Culture.")
   ii. Establish policies that encourage reporting incidents and protocols for investigating those incidents utilizing a root cause analysis approach.
   iii. Educate providers about the importance of patient safety, provider safety and reporting incidents, including "near misses."
   iv. Develop capabilities to support provider resilience and recovery from physical and mental health stresses caused by critical incidents.

b. ***State EMS authorities / associations should:***
   i. Promulgate standards related to vehicles, equipment and training that protect the EMS provider and patients being cared for in the prehospital setting.

c. ***National EMS associations should:***
   i. Advocate for a national data system for reporting and tracking responder safety and patient safety in EMS.
   ii. Embed the culture of safety into national educational guidelines.

INTERDISCIPLINARY COLLABORATION

CHALLENGES TO INTERDISCIPLINARY COLLABORATION

RELATIVE ISOLATION & FRAGMENTATION

Historically, EMS has operated in relative isolation from other health professionals. Likewise, most provider groups and clinical practices have generally operated within their own silos. As health care transforms itself from a fragmented system to one that is more integrated, new opportunities for innovation emerge. To realize the opportunities however, EMS innovators first need to open the lines of communication between themselves and their partners in care across the continuum.

A challenge for EMS agencies to open these lines of communication is the general lack of knowledge among other health care stakeholders about both traditional EMS as well as newer models of care that include EMS in the coordinated health care enterprise. In addition, the wide diversity of EMS policies and protocols across jurisdictions adds to the confusion on the part of potential partners about what EMS as a system can and can't do. The lack of standardization of EMS levels of certification also contributes to the confusion about what any given provider can do. Finally, EMS often does not have a seat at the table when health policy and innovative collaborations are being discussed, simply as a function of not being identified by health care providers as an important stakeholder in a new integrated health care world.

OPPOSING GROUPS

In an ideal health care environment, different types of providers work together and support each other for the benefit of the patient and community. There are great examples of collaboration between EMS and other health professionals within the context of patient-centered medical homes (and in particular home-based primary care practices) and "hospital at home" programs. However, collaborative efforts are often stagnant where protectionist turf wars and provider-centric issues dominate the conversation, and it is the patients who are most likely to suffer. Thus, a major potential barrier to innovation is opposition among groups of providers that function in the out-of-hospital environment.

Similarly, in communities where the providers have been less successful at breaking down the silos, one commonly cited concern is whether novel EMS initiatives would undermine existing regulatory frameworks and criteria by which other provider types meet qualification for reimbursement. A potential community health care partner can quickly become apprehensive and competitive if concerns about overlapping roles and reimbursement are not addressed.

Potential collaborators may have regulatory, safety, or quality concerns. New roles for EMS might require regulatory change that could threaten the protected status of a partnering health care profession. Without a strong evidence base and quality measures still in development, agencies

need to be ready to both articulate and find data to support their proposals. Would a certificate of need be required for certain activities? Collaborators often need to learn about the level of training and education an EMT or paramedic would receive to safely perform new duties. Another concern is to what degree and by what mechanisms a novel EMS initiative be coordinated with the primary care team.

Finally, the threat of lost revenue motivates some potential partners to oppose integrating EMS into community health care initiatives. The fear that innovative EMS programs might steer some low acuity patients away from the emergency department, for example, has generated opposition from some hospital and emergency care groups. Objections are rarely described as being motivated by volume and are typically described as concerns over patient safety and overall quality.[96]

STRATEGIES TO IMPROVE INTERDISCIPLINARY COLLABORATION

JOINING THE CONVERSATION

The role EMS plays today and the value EMS could provide in the future in chronic care and as part of the health care safety net is not broadly recognized. Important reform and innovation initiatives, whether they are in the health care, public health, or public safety space should be inclusive of EMS. Local, state and national EMS leaders should actively participate in conversations about collaboration across health care sectors with the aim to improve patient-centered outcomes and the health status of the population. Representatives of EMS need to be politically savvy in order to ensure the prehospital perspective has a seat at the table.

By being present when problems and potential solutions are being discussed, it is far more probable that EMS, with its unique skills and access, might contribute to new innovative solutions. Home health agencies, hospital at home groups, home-based primary care groups, hospice agencies, public health, and other providers of home and community services are likely to benefit from collaboration with EMS. Together, they can better identify and understand the needs of patient populations traditionally served by each segment, avoid unnecessary duplication of services and contribute to improved health outcomes at the community level.

Rather than being on the sidelines as other stakeholders engage in discussions about public safety, community health, and preventing emergency visits, EMS needs to take the initiative to drive those conversations, and build the right sets of relationships to ensure its voice is heard. Engaging primary and acute care providers as well as payers can also improve patient outcomes, risk management, population health services, and information exchange. Enabling and facilitating cross-provider dialogue can ensure clarity of role, expand opportunities and improve support for patients and family caregivers.

PARTNERING FOR INNOVATION

EMS has a unique role in a health care reform environment that has started to focus on value and out-of-hospital care. Agencies with the desire and capability to improve out-of-hospital care should take advantage of their position to partner with community health care stakeholders and fill the gaps of the current system.

EMS provider agencies that have expanded their care delivery options beyond the traditional 9-1-1

96 Sugarman, Thomas J. "Opinion: Paramedicine Diversion Programs Post Patient-Saftey Risks." ACEP Now, 6/15/2015. Accessed 11/4/2017 http://www.acepnow.com/article/opinion-paramedicine-diversion-programs-pose-patient-safety-risks/ .

response and transport of patients should seek to partner or collaborate with other provider groups or agencies within a health care coalition including hospitals, health care systems, ACOs, payer groups, home health agencies, hospice groups, public health agencies, social services, home-based primary care groups, and hospital at home groups with similar geographic service areas. Partnerships should be considered with both public and private entities along the continuum of care. These collaborations could be approached as a way for each group to offer the services for which they have a comparative advantage in value, quality, or cost saving while providing the patient with the best overall care.

Partnerships may initially take the form of data sharing, referral programs, or shared quality improvement initiatives. They may progress to consider financial partnerships, joint ventures or mergers that take advantage of new health care incentive programs, such as the Bundled Payments for Care Improvement or the Medicare Readmissions Reduction Program, to enable improved coordination of community health services ranging from social services integration, to chronic health management, to acute stabilization and/or transport.

LOCATION IS EVERYTHING

As discussed in the Regional Coordination chapter, potential partners in health care may serve geographical areas incongruent with a single EMS agency's jurisdiction. Thus, many small EMS agencies that can come together to achieve regional standardization or merging of some administrative functions may seem more attractive as potential partners on population health initiatives by other large health care stakeholders.

CREATING A COMMON VISION

While much of the work of interdisciplinary collaboration must be local, there is a clear need for industry leaders of the various disciplines

OHIO'S "FIRST" PROGRAM

The First in Response to Seniors Team (FIRST) program in Delaware County, Ohio, is a model of how EMS and community organizations can collaborate to provide new services to their communities.

The City of Delaware Fire Department and SourcePoint, a senior services organization, recognized that there were high rates of utilization among its growing population of senior citizens. To address this problem, they partnered to launch FIRST in 2012, which was "designed to keep seniors at home and independent."

As part of FIRST, SourcePoint provided a service coordinator to the fire station, which allowed intensive collaboration between social work and EMS. The service coordinator would reach out to seniors after 9-1-1 calls and help coordinate home visits and safety checks for senior patients and make referrals to resources such as Meals-on-Wheels. Over time, EMS providers became more familiar with the non-medical needs of senior citizens while service coordinators gained access to hard to reach populations and learned about the challenges EMS providers face while caring for patients.

FIRST has helped reduce the number of non-emergent EMS calls and helped patients stay independent and out of the hospital while getting better service from more appropriate resources. A 2014 survey found that every patient served by the program was satisfied with the experience. The fire department has also benefited by receiving fewer sub-acute EMS calls, allowing them to spend resources on other services.

Daniel Casciato, "Social Workers at the Station," EMSWorld.com, last modified February 4, 2016, http://www.emsworld.com/article/12166308/social-workers-at-the-station

involved in community health to convene at the state and national levels to discuss a common vision for the future. Complex issues that would benefit from state and national consensus include workforce development, scope of practice, financial sustainability, interoperability of health information technology, and best practices for care coordination and population health initiatives. A state or national population health stakeholder roundtable with broad representation might be a venue for each discipline to provide updates on transformative service delivery models and serve as a forum to discuss opportunities for efficient integration as well as concerns among the stakeholders. The "Promoting Innovation in EMS" project steering committee perhaps represents a good example of the spectrum of stakeholders that would participate in the roundtable. As discussed in other chapters, EMS will only benefit from interdisciplinary discussions if it can unite around a common set of ideas to champion its interests and potential contributions.

CHANDLER FIRE, HEALTH & MEDICAL DEPARTMENT PARTNERS WITH THE VA

The Chandler Fire, Health & Medical Department (CFHM) partnered with the Phoenix VA to provide tailored community paramedicine services to VA patients in a six-month pilot program. This pilot program is an example of how fire departments and EMS agencies can partner with larger systems to provide the services that they are particularly well-placed to provide. CFHM already had a community paramedicine program in place, and by seeking out new partners for its services, it was able to expand its services and collaborate with new systems.

The CFHM pilot program offers the following services to the VA:

- **Complex Patient Management:** CFHM identifies high utilizing patients, and community paramedics visit them at home to better coordinate care along with physicians through telemedicine services.
- **Treat and Refer Follow-Up Program:** Community paramedics treat patients at home and help them navigate the healthcare system by referring them to the most appropriate resource, rather than only transporting to the emergency department. Community paramedics conduct follow-up calls or visits to ensure patients were able to complete referrals.
- **Community Outreach:** CFHM staffs a local clinic and partners with other local agencies to improve community outreach.
- **VA Program Benefits:** CFHM identifies veterans during emergency 911 calls and connects them with VA benefits for which they are eligible and telemedicine services they may need.

The pilot program is due for an 18-month extension of its MOU to gather more data, then continue the partnership if it proves to be effective. The CFHM program demonstrates that innovative agencies can often find partners who want to use their services. EMS agencies are encouraged to build services that complement the work of other disciplines and provide value to patients, and build partnerships to make these services sustainable.

RECOMMENDATIONS

1. **Facilitate & improve communication between EMS and other stakeholders**
   - ***a. Organizations providing services in the home or community should:***
     - i. Include EMS in discussions about patient and community needs to improve program alignment and enable optimal use of all community-based resources.
     - ii. Partner with EMS to pursue patient-centered and population health management approaches to meet quality goals and address priorities across care settings.
   - ***b. Local authorities / EMS agencies should:***
     - i. Actively engage organizations providing health care, public health, or public safety services in the home or community in their discussions to enable optimal use of all community-based resources.
     - ii. Convene discussions with hospitals, primary care providers, payers and other community health professionals to pursue patient-centered and population health management approaches to meet quality goals and address priorities across care settings.
     - iii. Engage their workforce in discussions around communication and collaboration with other stakeholders and evolving roles of EMS providers.
   - ***c. State policymakers / EMS authorities / should:***
     - i. Advocate for EMS perspectives to be consistently included in new health care, public health, public safety or emergency preparedness initiatives.
     - ii. Ensure representation of EMS on Medicaid committees.
     - iii. Advocate for EMS during review of state education policies.
     - iv. Periodically review state statutes to ensure laws facilitate innovation and partnerships with EMS agencies for public health initiatives.
     - v. Represent EMS interests across all other state agencies
   - ***d. National EMS associations should:***
     - i. Advocate for EMS representation within all relevant state and local committees and agencies.
     - ii. Open discussions about standardization of EMS roles, job descriptions, education, and performance improvement.
2. **Create EMS multi-agency collaboratives to match geographic territory of key stakeholders**
   Local EMS authorities / agencies should:
   - i. Consider financial or other partnerships to enable improved coordination of community health care services across geographies that better match the catchment areas of hospitals or other key community health care stakeholders.
   - ii. Engage in discussions around standardization/harmonization of terminology, services and offerings to enable interdisciplinary collaborations.
   - ***a. State EMS authorities / associations should:***
     - i. Act as a convener for local EMS agencies to facilitate conversations around coordinating across a region for the purpose of enabling collaboration with other disciplines.
   - ***b. National EMS associations should:***
     - i. Provide expertise and guidance to local EMS agencies and authorities seeking to better understand the benefits of multi-agency collaborations and examples of policies and written agreements.
     - ii. Create awards to recognize EMS agencies that have created unique or successful partnerships with other disciplines in their community.
3. **Develop a common vision for interdisciplinary collaboration**
   - ***a. Local EMS authorities / agencies should:***
     - i. Establish roundtable discussion with local community health care, public safety, and public health stakeholders around unmet patient and community needs to arrive at a common understanding of how those needs can be met.

b. State trade associations and labor unions should:

i. Meet regularly with state and local EMS authorities, as well as trade associations of other disciplines to develop mutually supportive workforce strategies to achieve common goals.

ii. Facilitate local EMS agency collaborations with other allied health organizations.

c. State EMS authorities / associations should:

i. Work with counterpart regulatory authorities that oversee other workforce groups to develop a regulatory framework that accommodates a shared vision.

ii. Facilitate EMS collaboration with other allied health organizations.

d. National EMS stakeholders and associations should:

i. Meet regularly with national organizations representing other community stakeholder groups.

ii. Establish a National Population Health Stakeholder Roundtable to create a long-term vision for population health and discuss integration, cooperation, and collaboration among health care and community-based providers and other stakeholders.

1. An example of representative stakeholders that could comprise the Roundtable, include, but are not limited to:
    a. Homecare
    b. Hospice
    c. Hospitals
    d. Health insurance plans
    e. Emergency planners
    f. Emergency nurses
    g. Visiting nurses
    h. Emergency physicians
    i. Primary care physicians
    j. Home based primary care
    k. Hospital at home
    l. Nursing homes
    m. Social workers
    n. Patient advocates

MEDICAL DIRECTION AND OVERSIGHT

HISTORY AND CURRENT PROGRESS

Over the past two decades, various professional organizations have attempted to provide clarity on the role of the EMS medical director.[97,98,99,100] In 1996, the EMS Agenda for the Future projected that physicians would play essential new roles to advance EMS in the community healthcare system.[101] Three key strategies would be required, including: (1) building new bridges between EMS and other components of the health care system; (2) enhancing infrastructure to support streamlined public access and rapid delivery of emergency care, and (3) developing new tools and resources. EMS would need to become better integrated with hospitals, physicians, clinics, researchers, legislators, educators, finance, prevention, communication and other stakeholders.

However, as was the case with many other disciplines and providers, EMS remained siloed. Recognizing the need to transform the nation's healthcare system, Dr. Mohammad Akhter, then Executive Director of the American Public Health Association, challenged the National Association of EMS Physicians at the 2000 Annual Meeting to meet with the public health community. Quickly, the EMS and Public Health Roundtable engaged leaders in prehospital care and public health to begin this process.[102]Over the years, there emerged countless examples of exceptional EMS medical directors who expanded and transformed the role beyond what was thought to be possible. Some have served as gifted community leaders during national disasters while others have charted visionary courses to care for STEMI, stroke, cardiac arrest, trauma and pediatrics. Each success clarified and enhanced the evolving role of the EMS medical director.

Following approval by the American Board of Medical Specialties in 2010, EMS became the sixth subspecialty offered to diplomates of the American Board of Emergency Medicine. The following year, the National EMS Assessment[103] determined there were nearly 21,000 licensed local EMS agencies operating in the U.S. and that 8,459 physicians served in some EMS medical director capacity. In October 2013, 203 physicians passed the first offering of the EMS subspecialty examination.

97 "Role of the State EMS Medical Director." *American College of Emergency Physicians.* Last modified October 2016. https://www.acep.org/clinical---practice-management/role-of-the-state-ems-medical-director/

98 "Handbook for EMS Medical Directors." *International Association of Fire Chiefs*. Accessed June 28, 2017. https://www.iafc.org/emsMedicalDirectors

99 Alonso-Serra, Hector, Donald Blanton, and Robert E. O'Connor. "Physician medical direction in EMS." *Prehospital Emergency Care* 2, no. 2 (1998): 153-157.

100 "Medical Direction Toolbox." *Emergency Medical Services for Children*. Accessed September 21, 2016. https://emscimprovement.center/resources/toolboxes/medical-direction-toolbox/

101 Delbridge, Theodore R., Bob Bailey, John L. Chew, Alasdair KT Conn, Jack J. Krakeel, Dan Manz, David R. Miller et al. "EMS agenda for the future: where we are… where we want to be." Annals of Emergency Medicine 31, no. 2 (1998): 251-263.

102 "EMS and Public Health Bulletin." *National Highway Traffic Safety Administration.* Accessed June 28, 2017. https://one.nhtsa.gov/people/injury/ems/Archive/ems_publichealth/benefits.htm

103 "National EMS Assessment." *Federal Interagency Committee on Emergency Medical Services.* Last modified December 20, 2011. https://www.ems.gov/pdf/2011/National_EMS_Assessment_Final_Draft_12202011.pdf

Recognition of EMS as a subspecialty serves as vivid evidence of the advancement of EMS in American medicine, particularly if one considers that medical direction was not even mentioned in the 1973 landmark Emergency Medical Services Act.[104] EMS subspecialty certification has standardized the optimal qualifications and training of EMS practitioners and provides tangible evidence of the expertise now sought for this increasingly vital role.[105]

CHALLENGES TO INNOVATION

DYSFUNCTIONAL JOB MARKET

With the creation of the subspecialty of EMS, it is becoming increasingly recognized that medical direction requires a unique body of healthcare, public health, and public safety knowledge not typically within the normal educational scope of medicine. However, given the relatively low number of EMS fellows, an optimal number of credentialed EMS physicians is highly unlikely for the foreseeable future. Simultaneously, there is a maldistribution of currently qualified medical directors - while many agencies find it difficult to recruit a single qualified individual, EMS physicians tend to cluster in urban centers or at academic institutions and in those markets, may struggle to find available compensated positions. Indeed, the National EMS Assessment found that in 31 of 49 states, the majority of local EMS Medical Directors served in uncompensated roles. Further, only eight (16%) states required continuing medical education specific to local EMS medical directors.[106] The problem is compounded by the lack of reimbursement for either online or offline medical oversight.

Several key barriers to effective, innovative EMS medical direction – lack of recognition, authority, independence, resources, compensation and responsibility - were repeatedly identified in surveys and focus groups conducted by the PIE project team. Unless these are addressed, the EMS industry will continue to struggle to retain and benefit from the talent and experience of the many physicians who desire a career in EMS medicine.

UNDERUTILIZED

In as much as EMS interfaces with an enormous array of providers, programs and organizations, it is a logical nexus for effective community team-building. The EMS medical director is well-positioned to champion the new systems to address a broad spectrum of healthcare needs. Unfortunately, it is uncommon for the medical director to be adequately resourced and effectively integrated into the decision-making processes of the EMS agency. Healthcare and public safety systems lose valuable input by failing to incorporate EMS medical directors in conversations involving integration, modernization, and new models of care.

TRANSFORMING EDUCATIONAL NEEDS

While the American healthcare system increasingly emphasizes the importance of population health, current EMS physician education and practice remains predominantly limited to oversight of emergency care for a small segment of high acuity situations. Medical directors need to develop experience working with the full spectrum of acute and chronic care providers and solicit input from all relevant sources of expertise including primary care and mental health. Having a consistent method to incorporate the input and direction of non-EMS physicians in both direct and indirect medical oversight would be valuable.

104 Harvey, John C. "The emergency medical service systems act of 1973." *JAMA* 230, no. 8 (1974): 1139-1140.

105 "EMS- Overview." *American Board of Emergency Medicine*. Accessed June 28, 2017. https://www.abem.org/public/subspecialty-certification/emergency-medical-services/ems-overview

106 Ibid. 7

INCONSISTENT ROLES OF STATE EMS MEDICAL DIRECTORS

The role of the state EMS medical director is particularly consequential. This individual can serve as a critical link between agency medical directors and the state EMS office, and ought to function as an advocate for local EMS medical directors. Despite the importance of this position, the 2011 National EMS Assessment found: (1) only 37 states had a designated State EMS Medical Director; and (2) only 80% of state EMS medical directors were board-certified in emergency medicine. Even among states where there is an officially designated position, there is still wide variation in the position's roles and responsibilities; approximately half serve in general advisory roles while the remainder have defined roles in state law. In the past, these duties ranged from serving as a state liaison at public meetings (94%) to participating in the education of EMS administrators stroke systems, STEMI systems or statewide pediatric systems (only 6%). Over 50% of state EMS offices reported they maintained a separate director for disaster preparedness and some identified separate specialty medical direction for pediatrics, trauma, STEMI, and stroke.[107]

In PIE focus groups, the state EMS medical director was often, but not always, seen as an asset, yet the position's authority and the degree to which it was focused on promoting innovation, were often assessed to be limited.

Balancing Medical Oversight against Paramedic Professionalism.

There is undoubtedly a necessary and important role for the EMS physician, and for the most part, innovation is enhanced by increased medical director engagement. Yet at the same time, efforts at increasing or expanding the role of the medical director can at times come into conflict with efforts to promote paramedicine toward a more mature profession. Perhaps there are times when EMTs and paramedics need to be able to advocate for themselves without relying on a physician intermediary. The most commonly cited comparison is nursing, where the profession has largely resisted being subordinate to medical oversight.

STRATEGIES

DEVELOPING AND SUPPORTING EMS MEDICAL DIRECTORS

As described by the National Association of EMS Physicians, "EMS is the practice of medicine."[108] As such, communities should endeavor to see that all care provided by EMS occurs under the meaningful oversight of physicians. To achieve this end, national EMS associations should develop programs to attract physicians to the subspecialty of EMS, while local agencies should seek to more effectively engage EMS-trained medical directors. Non-EMS trained physicians currently serving as medical directors should be provided opportunities to further their EMS-specific education and all medical directors should seek out continuing medical education specific to EMS. In addition, EMS Medical Directors should consider acquiring formal training in public health, business, policy development, information technology and leadership.

EMS agencies should provide medical directors with dedicated time, sufficient resources, and well-delineated authority and responsibilities. They should be allowed and encouraged to remain clinically active, but agencies should be discouraged from adopting restrictive criteria that select or preclude applicants based upon clinical

107 "National EMS Assessment." *National Highway Traffic Safety Administration*. Last modified December 2012. https://www.ems.gov/pdf/2011/National_EMS_Assessment_Final_Draft_12202011.pdf

108 "History." *National Association of EMS Physicians*. Accessed June 28, 2017. http://www.naemsp.org/pages/history.aspx

affiliation. Instead, EMS physicians should be held to high ethical standards, recusing themselves as needed to avoid conflicts of interest and maintain a patient-centered focus. EMS medical directors must also be sufficiently protected to fulfill their professional duty to serve as patient advocates. To help support the role of the EMS medical director, the EMS community should advocate for fair reimbursement for off-line oversight, online medical control, and the current and future services provided by EMS physicians including telehealth.

Looking ahead, It would be valuable for state authorities or national associations to provide a framework for EMS medical direction with regards to novel EMS services such as community paramedicine and mobile integrated healthcare that often involve collaboration with non-EMS physicians. While it would not be expected for EMS medical directors to be experts in the law, they should be proficient enough to articulate to potential collaborators the laws and regulations governing EMS personnel.

MAXIMIZING THE ROLE OF THE MEDICAL DIRECTOR

Today it is common for EMS to interact with an array of external stakeholders and EMS physicians can be valuable assets to any EMS agency seeking to effectively partner with the rest of healthcare or to innovate through new collaborative models of care. Both the medical director and local, state and national leaders in EMS need to actively foster opportunities for such partnerships and collaborations.

However, an EMS medical director cannot be successful at building external relationships if they are detached from internal agency decision-making. Successful innovation is most likely with meaningful integration of both frontline EMS providers and a well-trained medical director into all aspects of policy development and service delivery - including operations, finance, quality assurance, training and education. The decision-making team in any EMS agency should include the Medical Director. The Medical Director in turn should maintain close contact with and seek input and buy-in from EMTs and paramedics.

EMPHASIZING QUALITY & REDUCING VARIATION

It is the responsibility of the medical director to ensure the EMS agency embraces continuous quality improvement and evidence-based care. While local protocols should be tailored to specific needs, the adoption of national evidence-based and consensus-based guidelines[109] and quality measures offers the best opportunity for high quality care. To achieve minimum acceptable standards of care, EMS medical directors should therefore strive to align their protocols with national best practices and evidence based guidelines and NEMSIS-compliant quality improvement reporting requirements. Any deviations should have a justification documented. Only after developing this foundation should new models be tested. These principles should be reinforced in EMS curriculum taught to EMS providers, medical students, residents and fellows.

Medicine requires team-building and EMS agencies and their medical directors should be prepared to seek advice on systems improvement from individuals outside of their EMS system. Organizations with a shared out-of-hospital care mission, such as the American Heart Association, can provide valuable forums for such dialog and debate.

109 "National Model EMS Clinical Guidelines." *National Association of State EMS Offices*. Last modified October 23, 2014. http://nasemso.org/Projects/ModelEMSClinicalGuidelines/documents/National-Model-EMS-Clinical-Guidelines-23Oct2014.pdf

OPTIMIZING THE ROLE OF STATE EMS MEDICAL DIRECTORS

Selection of state and local EMS medical directors benefit by open, competitive selection processes. Therefore hiring practices should be transparent and well-documented. Selection criteria for such positions should take into account the candidate's professional and administrative skills. Among many necessary talents, the state EMS medical director must possess outstanding communication skills.

The role of the state EMS director should be clarified in law by all states. Furthermore, a state Office of the EMS Medical Director should be provided sufficient funding and authority to encourage collaboration, innovation, and modernization of regulation.

State EMS medical directors (along with their state EMS offices) should function as facilitators with the capacity to engage the machinery of government. State EMS medical directors should drive innovation by taking advantage of their unique role to shape the future of EMS in their state. They should nurture promising pilot programs and sustain those that demonstrate success. In no case should they function as mere bureaucratic entities or regulatory bodies. They should act as the critical link between agency medical directors and the state and advocate for providers and patients at the state and federal level.

STATE EMS DIRECTOR FACILITATING INNOVATION

Maine's State EMS Director, Jay Bradshaw, saw the value of community paramedicine early, and his support for community paramedicine in Maine serves as a model for how state EMS directors can foster innovation. Before community paramedicine programs had become common in Maine, he held a forum of about 100 stakeholders, both supportive of and opposed to community paramedicine. This forum opened communication between all stakeholders, and helped assuage fears while giving everyone input. A steering committee, which was formed out of the forum, allowed the state to foster innovation in community paramedicine while also shaping its future development.

The steering committee supported twelve pilot programs in the state, which were subject to a number of requirements. These requirements included medical direction involvement and partnerships with primary care providers in the community. This pilot award structure fostered interest among EMS agencies that were not originally interested in innovating in this area, while the requirements on the pilot programs allowed the state EMS director to shape the industry and ensure quality.

The example of Maine demonstrates that state EMS directors who see their role as supporting EMS in their state, rather than simply regulating it, can strongly influence the quality of care provided to state residents. State EMS directors often have relationships with state lawmakers, can support innovation with funding, or can simply offer a big-picture perspective that is helpful to individual EMS agencies. Maine's success in community paramedicine shows that state EMS directors who foster innovation in their state can be an invaluable resource for EMS providers and their patients.

RECOMMENDATIONS

1. **Assure EMS medical directors are well prepared and have sufficient resources to execute their duties**
   - ***a. Local EMS agencies / authorities should:***
     - i. Seek to engage and recruit EMS-trained physicians
     - ii. Provide their medical director with dedicated time, sufficient resources, and well-delineated authority.
     - iii. Meaningfully integrate medical directors into all aspects of policy development and service delivery - including operations, finance, quality assurance, training and education.
   - ***b. State EMS authorities / associations should:***
     - i. Convene EMS medical directors to discuss evidence and share best practices.
     - ii. Establish policies and guidelines around disclosure of conflicts of interest.
     - iii. Advocate for telehealth and online medical control reimbursement.
   - ***c. National EMS organizations should:***
     - i. Develop programs that attract physicians to the subspecialty of EMS.
     - ii. Advocate for competitive salaries for EMS medical direction.
     - iii. Develop relevant and targeted continuing medical education for EMS medical directors.
     - iv. Refine fellowship curricula and core content of EMS medicine to include exposure to and training in emergency preparedness, population health and non-emergent patient care initiatives.
     - v. Encourage and assist medical directors to acquire formal training in public health, business, policy development, information technology, and leadership.
     - vi. Support the availability of EMS medical director toolkits.

2. **Expand opportunities for EMS medical directors to engage in multi-disciplinary teams**
   - ***a. Local EMS agencies / authorities should***
     - i. Foster discussion between EMS medical directors and medical leadership of hospitals, clinics, payers.
     - ii. Invite participation of non-EMS specialties into protocol and policy development.
     - iii. Encourage collaboration and coordination with a multidisciplinary team of experts and specialists in both indirect and direct medical oversight.
   - ***b. State EMS authorities / associations should:***
     - i. Facilitate collaboration between state EMS and Medicaid medical directors.
     - ii. Include EMS medical directors in State level committees discussing healthcare, public health and public safety.
     - iii. Organize forums that introduce EMS medical directors to leaders of other related disciplines.
     - iv. Provide a framework for multi-disciplinary medical direction for community paramedicine and mobile integrated healthcare involving non-EMS physicians.
     - v. Remove barriers, facilitate innovative processes and sustainment of successful efforts among high performing EMS systems within the state.
   - ***c. National EMS organizations should:***
     - i. Meet with leaders of cardiology, diabetes, cancer and others to design and test novel care pathways.
     - ii. Host forums to illustrate best-practice teams.
     - iii. Seek opportunities for EMS representation.
     - iv. Expand input from EMS physicians in healthcare reform.

v. Endeavor to have EMS representation at key leadership conferences and healthcare committees.

3. Reduce variation in EMS medical direction

a. Local Medical Directors should:

i. Champion quality improvement efforts.

ii. Align system EMS protocols with evidence-based consensus guidelines and best practices.

b. Local EMS agencies / authorities should:

i. Strive to achieve high quality performance metrics before testing new innovative models of care.

ii. Ensure that the medical director's role in fostering innovative EMS is patient-centered and not based on conflicting interest of a hospital, health plan, or an EMS agency.

c. State EMS authorities / associations should:

i. Define outcome measures.

ii. Define reporting requirements.

iii. Establish high ethical standards and guidance on management of conflicts of interest.

d. National EMS organizations should:

i. Promote evidence-based guidelines and best practices.

ii. Advance the use of NEMSIS-based outcome measures

iii. Seek federal incentives for the use of NEMSIS-based outcome measures.

4. Optimize the role of State EMS Medical Directors

a. Local EMS agencies / authorities should:

i. Utilize the support and guidance offered by their state EMS medical director.

ii. Expect their state EMS medical director to be an advocate and facilitator for EMS innovation.

b. State EMS authorities / associations should:

i. Define the role and responsibilities of the EMS medical director in law.

ii. Fund a State Office of the EMS Medical Director

iii. Provide adequate authority to achieve the designated responsibilities

c. National EMS Associations should:

i. Support the appointment of EMS medical directors in all states.

ii. Develop model criteria for the selection of a state EMS medical director.

DATA & TELECOMMUNICATION

HISTORY AND CURRENT PROGRESS

The benefits of harnessing EMS data and telecommunications are well known and long-sought. As early as 1966, the National Academy of Sciences' *Accidental Death and Disability: The Neglected Disease of Modern Society*[110] identified a lack of [EMS] data as a core deficiency. The 1996 EMS Agenda for the Future listed Information Systems and Communications as core attributes of the EMS system,[111] and electronic patient care reports (ePCR) systems have been becoming more commonplace in EMS over the past 10-15 years.

In 2001 the federal government provided funding to the National Association of State EMS Officials (NASEMSO) to develop a National EMS Information System (NEMSIS). Since 2005, the National Highway Traffic Safety Administration (NHTSA), the Health Resources and Services Administration (HRSA), and the Centers for Disease Control (CDC) have funded a NEMSIS Technical Assistance Center (TAC) at the University of Utah to support the 50 states and 6 territories. It is hoped that NEMSIS will one day provide a sophisticated, data-driven platform that improves patient care, workforce safety, training, and fully integrates EMS into emerging health care systems.

In 2009, the Indiana Network for Patient Care was the first Health Information Exchange (HIE) to provide preexisting patient data to an EMS agency (Indianapolis EMS). This early experience demonstrated the importance and challenges of accurate patient matching.[112] It also indicated the need for longitudinal patient-oriented record-keeping instead of limiting data collection in EMS to incident-based collection and reporting. Since then a number of other states and localities have made progress on information exchange, but it remains exceedingly rare.

CHALLENGES TO INNOVATION

INADEQUATE DATA COLLECTION

Despite the creation of NEMSIS and the proliferation of ePCR vendors cited above, there are still too many EMS agencies that have not yet made the transition from paper to electronic records. In addition, information that is currently collected is somehow simultaneously too burdensome on the frontline EMS providers and frustratingly limited to potential users of that data. EMS agencies are often required to submit significant amounts of data to multiple different local and state authorities, and possibly national-level data collection efforts on specific conditions, yet rarely receive any reports

110 "Accidental Death and Disability: The Neglected Disease of Modern Society." *Division of Medical Sciences, National Academy of Sciences, and National Research Council*. Last modified December 1997. http://www.ems.gov/pdf/1997-Reproduction-AccidentalDeathDissability.pdf

111 Ibid 2.

112 Park, Seong C., and John T. Finnell. "Indianapolis emergency medical service and the Indiana Network for Patient Care: evaluating the patient match algorithm." In *AMIA Annual Symposium Proceedings*, vol. 2012, p. 1221. American Medical Informatics Association, 2012.

that provide meaningful insights. Some of these datasets, including NEMSIS, are of only marginal utility because they are not linked to hospital data or claims data. Meanwhile, much of the value EMS could bring by assessing a patient's environment and social conditions in the home and in the community is generally not captured in those datasets. EMS systems could be a valuable source of information on individual and community non-medical factors that could provide greater insight to the continuum of care.

INCIDENT-BASED REPORTING

Traditional EMS data systems are based on individual incidents, and not by patient. As a result, it is often not clear whether any patient involved in a specific incident has previously been attended to. Unlike the familiar "medical record number" that stays with a patient across multiple encounters, patients who encounter the same EMS agency twice will often have two different incident ID numbers that usually will not be linked in any meaningful way. Consequently, patients with multiple calls for assistance, special resource needs, complicated medical histories, or other historical factors that could affect their current call for help may not be promptly recognized. Perhaps the most challenging of all issues is accurate matching to longitudinal patient record systems – consider the fact that Houston, TX (population 3.4 million) has nearly 70,000 individuals who share the same first name, last name, and birthday.

INABILITY TO EXCHANGE INFORMATION

Whether or not patients can be linked across incidents, it is very rare for an EMS agency to be able to collect data on patient outcomes, either in the short term (What happened in the ED after a patient was dropped off? Was the patient admitted?) or in the long term (Did the patient survive? Did he or she recover?). This is because there is an almost universal lack of integration between prehospital and in-hospital electronic medical record systems.

This has important implications for quality assurance and improvement initiatives. In the era of value-based purchasing, EMS agencies need to understand if their actions have an effect on a patient's health care utilization downstream, and ultimately the cost of care. This will be essential information in order to enter into risk-based contract agreements for new or existing services.

DATA SECURITY & PRIVACY CONCERNS

Of course patient information needs to be protected, and the risk to that protection increases the more we try to share or exchange information. Data breach is an increasingly common occurrence in the financial world and is just starting to gain

BEHAVIORAL HEALTH PATIENTS PRESENT EVEN GREATER CHALLENGES

Perhaps the most challenging issue confronting health information exchange relates to the management of individuals with substance abuse and behavior health conditions. More than any other population, the proper integration of physical and behavioral health information is essential. Due to laws governing such highly sensitive health information, the Substance Abuse and Mental Health Services Administration (SAMHSA) has identified a "digital divide" separating behavioral health, substance abuse and physical health data exchange . Trust networks are required to facilitate such complex data sharing. In the interval, it is clear that obtaining patient informed consent (when feasible) remains the surest means of effecting such optimal care plans.

1 "The Current State of Sharing Behavioral Health Information in Health Information Exchanges." National EHealth Collaborative. Last modified September, 2014.

attention in the health care world. Currently, many EMS agencies lack the technical knowledge or capabilities to securely share electronic health information. While the electronic patient care record (ePCR) vendors sometimes can fill this role, ultimate responsibility usually lies with the agency. Many entities therefore run into roadblocks related to privacy concerns and compliance issues attributed to the Health Insurance Portability and Accountability Act (HIPAA), largely because they remain unclear as to the specifics of exactly what is or is not prohibited with new technologies, roles and collaborations.

Though generally erroneous, some hospitals and other entities claim that they are unable to share outcome data (or allow real-time access to data) with EMS due to HIPAA. As discussed in the legal/regulatory section, this issue has been addressed by NHTSA and an information sheet providing clarification has been disseminated.

KEEPING UP WITH CHANGES IN TELECOMMUNICATIONS

Technology is rapidly reshaping the telecommunications equipment essential to EMS. Today over 70% of 9-1-1 requests for emergency service originate from personal cell phones, yet the current 9-1-1 system technology cannot handle text, data, images, or video. There are also challenges to accurate caller geolocation and call routing. With few exceptions, public safety answering points (PSAP) are unable to transfer calls from one center to another when volume exceeds the available resources.

LIMITED DATA MANAGEMENT CAPABILITY

If some of the barriers mentioned above were to be overcome, the EMS industry would still need to address limited technical capabilities of both frontline providers and administrative staff. The industry may be challenged by inadequate capabilities or resources to transform the data into worthwhile information that can be used to demonstrate the value of EMS care. Furthermore, if individual providers gain real-time access to hospital data, a potentially significant challenge will be to ensure that the information is packaged in a usable form appropriate to the experience and training of the EMS provider, so that it can best be synthesized into improved clinical decision-making in the field.

STRATEGIES TO PROMOTE INNOVATION & CURRENT PROGRESS

DATA STANDARDIZATION AND COLLECTION

To begin standardizing EMS data collection, any remaining agencies not charting electronically should be incentivized or supported to adopt NEMSIS compliant ePCR's. Simultaneously, the collective EMS industry should think more strategically about what questions need to be answered by the NEMSIS data and work to improve the utility of the dataset so that it may better inform decision-making, policy, and research. According to a 2013 National EMS Advisory Council (NEMSAC) report on NEMSIS, the "vision has not been fully realized nor have the necessary supporting mechanisms been available at the national, state, and local levels for EMS stakeholders to achieve the full potential of NEMSIS to improve healthcare quality."[113] To help realize the vision, state governments and EMS agency leadership can pursue updates to the uniform standards that would facilitate inclusion in national data efforts such as the Cardiac Arrest Registry to Enhance Survival (CARES). States could also provide logistical and technical support to

113 "NEMSIS: Achieving its Full Potential for Advancing Healthcare." *The National EMS Advisory Council.* Last modified January 30, 2013. http://www.emsa.ca.gov/Media/Default/PDF/NEMSAC%20Final%20Advisory%20on%20NEMSIS.pdf

FEDERAL INVESTMENT IN THE USE OF EMS DATA

In January 2016, the Office of the National Coordinator awarded the first EMS-HIT grant to the California EMS Authority to develop a SEARCH, ALERT, FILE, RECONCILE (SAFR) information exchange to serve three EMS agencies, their hospitals, and emergency ambulance providers. San Diego Health Connect and One California Partnership Regional Health Information, two health Information exchanges (HIE), will develop SAFR functionality for EMS providers including the ability to:

SEARCH patients via an EMS Hub linked to the HIE by sending patient demographic data for patient matching. The HIE will return pertinent patient information from a continuity of care document that contains a patient problem list, medications, allergies and advanced directives.

ALERT receiving hospitals by transmitting prehospital clinical information (demographics, clinical impressions, vital signs and treatment) for display on hospital dashboards tracking incoming patients. FILE the completed patient record containing EMS patient data into the hospital electronic health record (EHR) in a searchable format to build a longitudinal patient record.

FILE the completed patient record containing EMS patient data into the hospital electronic health record (EHR) in a searchable format to build a longitudinal patient record.

RECONCILE the EHR after the patient has been discharged from the ED or hospital, incorporating the patient's disposition and hospital outcome obtained from the hospital EHR.

EMS Agencies through the development of more Technical Assistance Centers (TACs) or support additional training to increase computer or technological literacy of frontline providers. TACs should periodically issue reports on the progress of data systems enhancements to advise EMS agencies, state and federal legislators, hospitals, social services providers, and other stakeholders on the progress, barriers, and needed next steps to achieve greater utility from EMS data systems. The work of the TACs in improving IT capabilities could well be considered critical infrastructure for emergency preparedness.

LONGITUDINAL RECORD KEEPING & UNIVERSAL DATA

The ability to track and identify patients over multiple encounters is a much needed enhancement that could improve the care EMS provides to patients. Having a single patient record across encounters would facilitate integration with hospitals, primary care groups, health information exchanges, and possibly between EMS agencies. This improved data integration would benefit patients in the form of improved quality and patient safety, and benefit the providers through efficiency gains. EMS leaders at all levels can help drive this transition through exerting market influence to expect and demand this capability as a prerequisite to purchase or implementation.

Beyond having each single agency maintaining a longitudinal record, a goal for the EMS industry and healthcare at large is the creation of unique patient identifiers that transcend individual record systems. Associated with this vision is a transformative change in the ownership of data away from proprietary softwares or health care entities and into the hands of patients.

The Office of Science and Technology Policy oversees the federal *My Data Initiative* to increase

the ability to securely access one's own data. Blue Button,[114] developed in 2010 by the Department of Veterans Affairs, currently provides this capability to the Departments of Defense, Health and Human Services, and Veterans Affairs beneficiaries, and numerous health plans and personal health record vendors are expected to join. The ICEBlueButton app allows EMS personnel and physicians to download the personal health information with the patient's permission.[115] States and National EMS associations should support and advocate for such changes that would enhance the ability of the secure access to and movement of data across platforms.

To overcome the "digital divide" that sometimes exists between behavioral and physical health data, "Trust Networks" need to be established. State and national EMS authorities should provide guidance to local EMS agencies in forming or participating in these networks.

INCENTIVIZING & FACILITATING THE EXCHANGE OF INFORMATION

The Office of the National Coordinator for Health Information Technology (ONC) directs the federal effort in support of the adoption of HIT and the development of a nationwide health information exchange (HIE). Beginning in 2011, physicians and hospitals that could attest to meaningful use (MU) of electronic health records (EHRs) qualified for incentive payment. MU requires that the use of data improves healthcare quality, safety, efficiency, health disparity, patient engagement, care coordination or population health.[116] While EMS was not included in MU funding, ONC does recognize the value of EMS data as demonstrated by its recent grant award to the California EMS Authority to develop increased utility of information from several health information exchanges. Even more importantly, as of February 2016, the ONC made MU funding from the Health Information Technology for Economic and Clinical Health (HITECH) Act available to states for expenditures related to HIE integration for a much broader group of providers including EMS (see Appendix). Unfortunately, few states have accessed this opportunity.

To unlock the potential of EMS-HIE exchange, states may want to craft enabling legislation. In 2015, California (CA) AB 503 specifically authorized health facilities to release patient-identifiable medical information to a defined EMS provider, agency, or local EMS authority "… to the extent specific data elements are requested for quality assessment and improvement purposes." The bill also authorized the development of minimum standards for the

IMPROVING END-OF-LIFE CARE

The role of EMS HIE to improve end-of-life care is receiving increasing attention. Currently Oregon, Idaho, New York, West Virginia, and Utah maintain statewide registries for Physicians Orders for Life-Sustaining Treatment (POLST) . In October 2015, California SB 19 (Wolk) authorized a pilot test for an electronic registry (POLST eRegistry), mandating that providers in the pilot locations submit completed forms to this registry and identifying the CA EMSA as the lead agency for the pilot. In June 2016, the California HealthCare Foundation, in collaboration with the EMSA and the Coalition of Compassionate Care in California, awarded Alameda County, San Diego Health Connect and vendor Vynca a $350,000 grant to develop a pilot, cloud-based ePOLST registry.[1]

1 http://www.chcf.org/projects/2016/polst-eregistry

114 "Your Health Data." *HealthIT.gov.* Accessed June 28, 2017 https://www.healthit.gov/patients-families/your-health-data

115 "The Easiest Way to be Prepared for an Emergency." *ICEBlueBotton*. Accessed June 28, 2017. http://www.icebluebutton.com/

116 "Meaningful Use Definition." *HealthIT.gov*. Accessed June 28, 2017. https://www.healthit.gov/providers-professionals/meaningful-use-definition-objectives

implementation of data collection. In 2016, AB 1129[117] amended the CA Health and Safety Code to require that local EMS authorities use the most current version of NEMSIS and that they submit data to the CA EMS Information System (CEMSIS). The CA EMS Authority now hosts annual EMS-HIE summits to explore topics ranging from national HIT interoperability and Medi-Cal (Medicaid) funding to the use of stroke registries linked to regional HIEs to improve population health.[118]

Other state and regional HIEs have initiated EMS data exchanges as well. In 2010, the Rochester Regional Health Information Organization began integrating EMS data to improve care coordination and now receives data from eighteen regional EMS services.[119] South Metro Fire Rescue Authority joined the Colorado HIE, CORHIO, to enable paramedics to receive real-time hospital and lab information via a web portal,[120] permitting query for patient information at dispatch and patient record access and data transmission to hospitals en route. In 2015, MedStar (the Metropolitan Ambulance Authority that serves Fort Worth and surrounding areas) adopted a cloud-based health care integration engine called *Infor® Cloverleaf* to exchange ePCR data with emergency departments. Cloverleaf converts EMS data (XML format) to a hospital-compatible (HL7) format for delivery to hospital EMRs with the eventual goal of bi-directional data exchange.

Valuable use cases for EMS-HIE exchange include the potential to improve regional preparedness for disasters. For example, based upon an ONC-sponsored analysis of need, the CA EMSA is developing PULSE (Patient Unified Lookup System for Emergencies) to support mobile field hospital care sites where EHR may not be immediately available. In addition, web-based technology will provide rapid authentication of credentials for health care volunteers who need rapid access to patient records during disasters.

TRANSFORMING DATA INTO MEANINGFUL INFORMATION

To complement technology, EMS must steward the development and adoption of meaningful measures of quality. In this respect, the EMS Compass initiative[121] is vital, as it seeks to define EMS measures relevant to agencies, regulators, and patients. More broadly, EMS leaders should advocate for incentivization of the meaningful use of EMS data, whether that be through state or federal governmental programs, or by working with health plans and potential beneficiaries of the information that might be gleaned by analyzing, connecting, and reporting EMS data.

The power of EMS data to augment population-based health analysis and intervention is just being unlocked. Within the storage centers of emergency communication centers reside terabytes of valuable data. Recent studies have begun to demonstrate that geocoded, atomic clock-synchronized fire and EMS data can inform on better approaches to the management of sudden cardiac arrest,[122] major trauma, substance abuse,[123] diabetes, STEMI, and a range of other health issues. For example, when EMS data were explored with GIS analytic tools, it became evident that socioeconomic variables within communities significantly influence

117 "An act to add Section 1797.227 to the Health and Safety Code, relating to emergency medical services." *California Legislative Information*. Last modified September 20, 2015. https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB1129

118 "3rd California HIE in EMS Summit Agenda." *HIE In EMS in CA.* Last modified April 5, 2016. https://hieinemsinca.com/2016/04/05/3rd-california-hie-in-ems-summit-agenda/

119 "Provider Portal." *Rochester RHIO.* Accessed June 28, 2017. http://providerportal.grrhio.org/Data%20Providers.aspx

120 "Transforming Emergency Care." *CORHIO*. Accessed June 28, 2017. http://www.corhio.org/services/health-information-exchange-services/for-emergency-responders

121 http://www.emscompass.org/

122 Lam, Sean Shao Wei, Ji Zhang, Zhong Cheng Zhang, Hong Choon Oh, Jerry Overton, Yih Yng Ng, and Marcus Eng Hock Ong. "Dynamic ambulance reallocation for the reduction of ambulance response times using system status management." *The American Journal of Emergency Medicine* 33, no. 2 (2015): 159-166.

SAN DIEGO'S RESOURCE ACCESS PROGRAM

The San Diego Resource Access Program (RAP) is a community paramedicine program that assists frequent users.[1] San Diego EMS paramedics are equipped with wireless EHR that link to a regional HIE. A cloud-based software tool monitors the EMS system in real time, employing algorithms that identify frequent 9-1-1 callers, sorting them by call frequency (weekly, monthly, and yearly). As a result, the "most symptomatic" individuals who are also most in need of acute intervention can be recognized. Individuals can also be sorted by indicators of homelessness, coexisting mental health conditions, or even frequent falls. Their contact locations, chief complaints and hospital destinations are aggregated. When frequent callers are encountered, alerts are rapidly generated to community paramedics to provide acute interventions.

RAP supported Project 25 (P25), a "housing first" initiative addressing 25 of the most impactful homeless individuals as determined by San Diego Fire-Rescue and police. Over two years, P25 dramatically reduced public service expenses.[2] Additional RAP software permits paramedics to refer individuals (with consent) to health navigators at 211 San Diego, a regional call center.[3] This alerting system is also employed to alert EMS personnel to individuals who may pose risk based upon law enforcement "be on the lookout" bulletins and public health alerts regarding patients with active pulmonary tuberculosis.

1 James Dunford and Ann-Marie Jensen. "Data-Driven System Helps Emergency Medical Service Identify Frequent Callers and Connect Them to Community Services, Reducing Transports and Costs." Agency for Healthcare Research and Quality. Last modified August 18, 2016. https://innovations.ahrq.gov/profiles/data-driven-system-helps-emergency-medical-services-identify-frequent-callers-and-connect

2 https://www.pointloma.edu/sites/default/files/filemanager/Fermanian_Business__Economic_Institute/Economic_Reports/FINAL_FBEI_2016_Homeless-Study-Report.compressed.pdf

3 http://www.211sandiego.org/new/

the performance of bystander CPR, providing opportunities to address unrecognized barriers to survival.[124]

EMS data are now being searched and surveilled to identify and address high-cost, high-needs individuals, including the homeless, those with substance abuse or mental health conditions, and those with poorly managed chronic conditions. Data can also be used to assess the needs of vulnerable populations including children and the homebound, frail or elderly. In such ways, EMS provides essential elements of the CDC Vision of Public Health Surveillance in the 21st century,[125] including the ability to perform real-time analytics, alerts and intervene at a population level.

With social and behavioral determinants of health being increasingly emphasized predictors of outcome, the Institute of Medicine (IOM) identified necessary social and behavioral domains and measures that are helpful for development of care plans.[126] Given appropriate measurement tools,[127] EMS could play a role in contributing data to collaborative models such as CMS "Accountable Health Communities"[128] that seek to address health-related social needs (food insecurity, housing, etc.) through enhanced clinical-community linkages can improve health outcomes and reduce costs.

123 Seaman, Elizabeth L., Mathew J. Levy, J. Lee Jenkins, Cassandra Chiras Godar, and Kevin G. Seaman. "Assessing pediatric and young adult substance use through analysis of prehospital data." *Prehospital and disaster medicine* 29, no. 5 (2014): 468-472.

124 King, Renee, Michele Heisler, Michael R. Sayre, Susan H. Colbert, Cindy Bond-Zielinski, Marilyn Rabe, Brian Eigel, and Comilla Sasson. "Identification of factors integral to designing community-based CPR interventions for high-risk neighborhood residents." *Prehospital Emergency Care* 19, no. 2 (2015): 308-312.

125 "CDC's Vision for Public Health Surveillance in the 21st Century." *Centers for Disease Control and Prevention*. Last modified July 27, 2012. http://www.cdc.gov/mmwr/pdf/other/su6103.pdf

126 Institute of Medicine (US). Committee on the Recommended Social and Behavioral Domains and Measures for Electronic Health Records. Capturing Social and Behavioral Domains and Measures in Electronic Health Records: Phase 2. National Academies Press 2014.

127 "About Us." National Quality Forum. Accessed June 28, 2017. http://www.qualityforum.org/About_NQF/

One example of the use of EMS data to inform community-based providers is the San Diego Community Information Exchange (CIE). In this social data exchange, certain demographic EMS data (e.g., numbers of EMS transports) are confidentially shared with participating community-based organizations (CBO).[129] Early results demonstrate that when housing providers were able to see their clients' frequency of EMS use, they modified their approach to case management and achieved more stable housing outcomes. The CIE currently confidentially shares a discrete set of RAP community paramedic data regarding common clients with ten CBO's, two hospitals, and the local Meals-on-Wheels.

EMS data can be used to assess outcomes for a variety of other complex challenges. For example, the number of EMS transports is an accepted metric to assess interventions for serial inebriates,[130] chronically homeless,[131,132] and other frequent users.[133] In May 2016, a bill was introduced in CA which would require that homeless service providers submit annual reports on the number of ambulance transports, ED visits, hospital days and days of incarceration for all homeless children, youth, and adults.[134] If this is the metric, then at a population level, it seems intuitive that CMS or others will create value-based care incentives to states or communities that implement innovative approaches involving EMS systems.

ADVANCES IN EMS COMMUNICATION

Significant progress is being made in the area of EMS telecommunications. The Department of Transportation has designed a transition plan for a next-generation 9-1-1 (NG9-1-1) system,[135] which establishes the foundation for public emergency communications services in a digital, internet-based society. In addition, Congress in 2012 allotted $7 billion and 20 MHz of valuable radio spectrum to build the First Responder Network Authority (FirstNet) as an independent entity within the National Telecommunications and Information Administration. The purpose of FirstNet is to establish, operate, and maintain an interoperable public safety-grade broadband network. Each state will need to provide a radio access network that can connect to the FirstNet network core.

To achieve more immediate improvements, local and state governments could improve the environment for innovation by investing in wireless broadband for EMS providers on public, commercial carrier, and government (Wi-Fi, LTE & FirstNet) networks. Unfortunately, while such networks provide exceptional service for general use by the pubic, their ability to perform mission-critical, patient-critical tasks during large-scale events when the communications system is severely stressed is considered inadequate.

128 "Accountable Health Communities Model." Centers for Medicare & Medicaid Services. Last modified June 1, 2017. https://innovation.cms.gov/initiatives/AHCM

129 "CIE, a technology of 2-1-1 San Diego, Provides Context for Care." *CIE San Diego*. Accessed June 28, 2017. http://ciesandiego.org

130 Dunford, James V., Edward M. Castillo, Theodore C. Chan, Gary M. Vilke, Peter Jenson, and Suzanne P. Lindsay. "Impact of the San Diego Serial Inebriate Program on use of emergency medical resources." *Annals of Emergency Medicine* 47, no. 4 (2006): 328-336.

131 Larimer, Mary E., Daniel K. Malone, Michelle D. Garner, David C. Atkins, Bonnie Burlingham, Heather S. Lonczak, Kenneth Tanzer et al. "Health care and public service use and costs before and after provision of housing for chronically homeless persons with severe alcohol problems." *Jama* 301, no. 13 (2009): 1349-1357.

132 "United Way's Homeless Initiative, Father Joe's Project 25, Saves Lives, $3.5 Million." *Father Joe's Villages.* Accessed June 28, 2017. http://my.neighbor.org/united-ways-homeless-initiative-project-25-saves-lives-3-5-million/

133 Tadros, Anthony S., Edward M. Castillo, Theodore C. Chan, Anne Marie Jensen, Ekta Patel, Kerin Watts, and James V. Dunford. "Effects of an Emergency Medical Services–based resource access program on frequent users of health services." *Prehospital Emergency Care* 16, no. 4 (2012): 541-547.

134 "An Act to Add Chaper 7 (commencing with Section 8260) to Division 8 of the Welfare and Institutions Code, relating to homelessness." *California legislature.* Last modified February 18, 2016. https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB2256

135 "Next Generation 911." *911.gov.* Accessed June 28, 2017. http://www.911.gov/911-issues/standards.html

Meanwhile, a recent report from Stockholm demonstrated that a mobile-phone positioning system that dispatched CPR-trained lay volunteers was associated with significantly increased rates of bystander-initiated CPR.[136] Similar benefits are expected from PulsePoint, a U.S. mobile phone app that locates layperson rescuers as well as proximate AEDs, though early results were hampered by a lack of specificity.[137] The location and mapping of AEDs is also being supported through innovative crowd-sourcing techniques,[138] and not surprisingly there is enormous interest in making these life-saving devices more available.

There is little doubt that mobile applications and social media will play an increasingly valuable role in the early care of time-critical conditions. They may also be leveraged to encourage EMS innovation. A recent Defibrillator Design Challenge asked volunteers to vote for AED designs and share designs on social media, attracting 119 submissions that were shared over 48,000 times on Facebook and Twitter.[139]

TELEHEALTH

Telehealth promises to dramatically expand expert direct medical oversight for both acute and chronic EMS conditions. Local and state governments could dramatically improve the environment for innovation across a variety of sectors by enabling direct mobile telehealth in the form of voice, text, data, pictures, video clips and live video between EMS providers, physicians and hospitals. The Houston Fire Department Emergency Telehealth and Navigation (ETHAN) project is being funded by a Section 1115 Medicaid waiver, which is expected to generate nearly $12M to the program over 5 years. Board-certified emergency physicians are linked with Houston Fire Department EMS providers via tele-video (currently 180 hours/week, with double MD coverage during some peak times) to manage 9-1-1 calls that do not involve acute conditions. The physicians are able to schedule next-day appointments at 19 community clinics, including providing the necessary transportation. Follow-up is performed by Houston Health Department social workers and care managers. To date, the program is generating high patient satisfaction, lowering EMS transports and ED visits. Of note, ETHAN receives substantial funding from Houston's Pay-or-Play Fund, a pool of money paid to the City of Houston as a result of a legal provision requiring companies that do business with the city to either provide health insurance to employees or pay a penalty.[140] There are many other examples how HIT will be employed to augment EMS care. For example, it is feasible that real-time ultrasound images can be transmitted to stroke neurologists to diagnose and perhaps even treat acute stroke.[141] Further, immersive

136 Ringh, Mattias, Mårten Rosenqvist, Jacob Hollenberg, Martin Jonsson, David Fredman, Per Nordberg, Hans Järnbert-Pettersson, Ingela Hasselqvist-Ax, Gabriel Riva, and Leif Svensson. "Mobile-phone dispatch of laypersons for CPR in out-of-hospital cardiac arrest." *New England Journal of Medicine* 372, no. 24 (2015): 2316-2325.

137 Brooks, Steven C., Graydon Simmons, Heather Worthington, Bentley J. Bobrow, and Laurie J. Morrison. "The PulsePoint Respond mobile device application to crowdsource basic life support for patients with out-of-hospital cardiac arrest: Challenges for optimal implementation." *Resuscitation* 98 (2016): 20-26.

138 Merchant, Raina M., David A. Asch, John C. Hershey, Heather M. Griffis, Shawndra Hill, Olivia Saynisch, Alison C. Leung et al. "A crowdsourcing innovation challenge to locate and map automated external defibrillators." *Circulation: Cardiovascular Quality and Outcomes* 6, no. 2 (2013): 229-236.

139 Merchant, Raina M., Heather M. Griffis, Yoonhee P. Ha, Austin S. Kilaru, Allison M. Sellers, John C. Hershey, Shawndra S. Hill et al. "Hidden in plain sight: a crowdsourced public art contest to make automated external defibrillators more visible." *American journal of public health* 104, no. 12 (2014): 2306-2312.

140 "On-the-Scene Video Consultations with Emergency Physicians Reduce Unneccessary Ambulance Transports and Emergency Department Visits, Connect People to Medical Homes." Agency for Healthcare Research and Quality. Last modified December 16, 2014. https://innovations.ahrq.gov/profiles/scene-video-consultations-emergency-physicians-reduce-unnecessary-ambulance-transports-and

141 Hölscher, Thilo, James V. Dunford, Felix Schlachetzki, Sandra Boy, Thomas Hemmen, Brett C. Meyer, John Serra, Jeff Powers, and Arne Voie. "Prehospital stroke diagnosis and treatment in ambulances and helicopters—a concept paper." The American journal of emergency medicine 31, no. 4 (2013): 743-747.

technologies including virtual reality and augmented reality promise remarkable training and support for EMS in the near future.[142]

In summary, the barriers to harnessing EMS data and HIT are real but eminently solvable and worth the effort. To achieve these ends, the following recommendations have been developed for consideration by local, state, and federal EMS partners and stakeholders.

FIRSTNET: A PLATFORM FOR INNOVATIVE INFORMATION SHARING WILL CHANGE HOW EMS IS PRACTICED

KEVIN MCGINNIS, MPS, PARAMEDIC, FIRSTNET EMS BOARD MEMBER

As spectacularly as EMS has blossomed as a medical and operational public service in the past 50 years, we have not substantially progressed in the way that we share information. The VHF/UHF/ 800 trunked and other radios we used, and still use, to get dispatch information while speeding to a call, are narrow-band communications. These land mobile radio (LMR) systems are great for voice communications, but send data as slowly as dial-up internet access 20 years ago! That is insufficient to support text, picture, video, imaging and most other data communications.

With the right equipment, connections and broadband communications, EMS capabilities and practice itself would change. We could, for example:

- Be notified of a vehicle crash, exact location, and likelihood of severe injuries seconds after it occurs in a rural location;
- Use video transmission, voice to text transmission, biotelemetry transmission, and access to/transmission of emergency health data from HIEs, to populate a patient-incident data base for access by all involved responders and hospital team members sixty seconds after arrival on scene; and
- Train basic personnel in rural areas to use a portable ultrasound probe with trauma patients and transmit those images for remote interpretation.

Prehospital professionals today are using commercial wireless broadband access (e.g. Verizon, AT&T) to send various types of data, mostly for administrative purposes. Some are piloting telemedicine and other patient support uses in real time on calls. This exhibits positive attitude toward adoption of innovative technology, but a significant problem remains:

- Commercial wireless broadband is not an adequate platform for mission-critical/patient-critical purposes. It lacks the reliability and resilience of public safety grade LMR systems, is not adequately cyber-secure, and has no ability to offer EMS or other public safety providers priority or preemptive use. In short, it is susceptible to the same dropped calls, diminished data rates, and network failures as are regularly experienced by public customers. During local emergencies, when the public is communicating the most (e.g., talking, texting, streaming video), responders have their worst access.

The First Responder Network Authority ("FirstNet") was signed into law in 2012 as the nationwide wireless broadband network dedicated to public safety (http://www.firstnet.gov). It will provide virtually limitless broadband "pipe" for EMS and other responders, as well as for hospital EMS support services. Some early-builder sites already exist in New Jersey, New Mexico, Colorado, California, and Texas, and the nationwide network link is expected to be established in the next five years. It will serve as a platform for application innovation and is already seeing an explosion of EMS, police and firefighting applications being developed (e.g., http://appcomm.org/).

142 Duncan McConnell, The Paramedic Foundation. IRCP 2016 January. Youtube, 1:16:22. Published January 18, 2016. https://www.youtube.com/watch?v=Ufo68NxLvq4&feature=youtu.be

RECOMMENDATIONS

1. **Incentivize the collection and meaningful use of EMS data**
   - ***a. Local EMS agencies / authorities should:***
     - i. Promote education among EMS providers regarding collection and use of standardized EMS data.
     - ii. Share data across agencies and make performance dashboards transparent.
     - iii. Enable local partners to perform research and population health analytics using EMS data.
   - ***b. State EMS authorities / associations should:***
     - i. Support ePCR adoption by agencies, including those in rural and frontier regions.
     - ii. Reward innovative utilization of EMS data (e.g., alerting for care coordination, hot-spotting to target community planning.)
     - iii. Require or encourage reporting of EMS performance metrics or submission of data to public health registries (e.g CARES.)
   - ***c. National EMS associations should:***
     - i. Promote utilization of the ONC-HIT incentives for meaningful use of EMS data.
     - ii. Encourage expanded funding for EMS-HIE pilot programs for both population health and emergency preparedness purposes.
     - iii. Steward the development, harmonization, and dissemination of EMS performance measures (e.g. EMS Compass measures.)
     - iv. Create templates for open-access performance dashboards.
     - v. Advocate for establishment of a deadline for states to begin participating in NEMSIS.
     - vi. Advocate for expansion of EMS registries (e.g., CPR, CARES, STEMI, Stroke, Trauma) and to increase access for researchers to those registries.
     - vii. Reward "Accountable Healthcare Communities" use of EMS data for population health.

2. **Utilize Technical Assistance Centers (TACs) to support adoption of EMS health information technology.**
   - ***a. Local EMS agencies / authorities should:***
     - i. Support local provider access to TAC.
   - ***b. State EMS authorities / associations should:***
     - i. Support and champion the work of the TACs.
     - ii. Issue reports to local EMS authorities on TAC utilization and generalizable lessons learned.
   - ***c. National EMS associations should:***
     - i. Promote awareness of resources (e.g., NEMSIS.)
     - ii. Showcase best practices in utilization of information technology in public safety and healthcare to improve performance and promote innovation in EMS.
     - iii. Advocate support for TACs as part of federal disaster and emergency preparedness requirements.

3. **Transition to Longitudinal Record Keeping Systems**
   - ***a. Local EMS agencies / authorities should:***
     - i. Seek ePCR systems and data products that support longitudinal patient records.
   - ***b. State EMS authorities / associations should:***
     - i. Encourage or incentivize adoption of ePCR systems capable of longitudinal record keeping.
     - ii. Reward development that supports EMS use of "My Data" initiatives.
   - ***c. National EMS associations should:***
     - i. Support the implementation of a secure unique patient identifier.
     - ii. Support patient control and access to personal health information.

4. **Encourage and facilitate the secure exchange of health and social information to support population health**.
   - ***a. Local EMS agencies / authorities should:***
     - i. Aggressively pursue integration of EMS data with the local health information exchange.

ii. Explore opportunities for pilot programs which involve sending EMS data to social service organizations or receiving social information to inform EMS care delivery.

iii. Engage housing, law, and mental health agencies to identify gaps/opportunities to improve outcomes through the exchange of information.

b. State EMS authorities / associations should:

i. Assure EMS representation on state HIEs.

ii. Clarify rules and requirements for patient consent and consider opt-out policies where appropriate.

iii. Promote awareness among hospitals, health systems and HIEs that EMS is a covered entity under HIPAA.

iv. Facilitate and/or require EMS-HIE data integration and exchange.

v. Define standards for EMS data exchange (e.g. SAFR.)

vi. Incentivize pilot programs that utilize social and health data to improve patient outcomes.

vii. Establish ePOLST registries accessible to EMS in the field.

c. National EMS associations should:

i. Clarify the authority of health providers to exchange with social providers.

ii. Support the development of local and regional HIE-social information exchanges.

iii. Advocate for the ONC-HIT to support development of a nationwide HIE that includes EMS data.

iv. Support and guide the development of trust networks necessary to integrate behavioral and physical health data.

v. Encourage development of EMS measures of quality care.

5. Improve public safety IT infrastructure

a. Local EMS agencies / authorities should:

i. Anticipate Next Generation 9-1-1 (NG9-1-1) in CAD updates.

ii. Provide open access to data re: 9-1-1 performance.

b. State EMS authorities / associations should:

i. Ensure access to comparative 9-1-1 performance data and facilitating benchmarking.

ii. Ensure adequate funding for NG9-1-1.

iii. Explore low-cost ubiquitous coverage access for EMS.

iv. Champion funding and encourage research on effective EMS communication infrastructure.

v. Advocate for supporting development of interoperable broadband Internet, Wi-Fi, and telecommunications platforms.

vi. Advocate for enhanced security of public safety infrastructure .

vii. Advocate for greater funding of research in EMS HIT.

6. Enable and leverage telehealth technology to support new clinical care models.

a. Local EMS agencies / authorities should:

i. Adopt or pilot available technologies to enhance clinical care or systems management.

b. State EMS authorities / associations should:

i. Eliminate barriers to direct mobile telehealth between EMS providers, physicians and hospitals.

ii. Engage proactively with efforts to support and implement FirstNet.

c. National EMS associations should:

i. Promote utilization and exchange of biometric, audio, photo, and video data in EMS.

ii. Promote awareness among states and local EMS agencies about FirstNet.

iii. Encourage development of new telehealth platforms.

iv. Promote innovative applications of available telehealth and quality research that demonstrate its value.

CONCLUSION

The history of EMS in the United States is often told through the story of landmark documents. The NTHSA report *Accidental Death and Disability: The Neglected Disease of Modern Society* (1966) launched the development of a national EMS system, after which the EMS Agenda for the Future (1996), and the Institute of Medicine's Future of Emergency Care series (2007), among others, laid out the challenges faced by the industry and offered pathways to improving the way Americans receive emergency medical care. In the same tradition, this document aspired to capture the current challenges and offer practical steps toward overcoming those challenges, with particular attention to actions that could be taken independent of federal action.

Though this framework for Promoting Innovation in EMS is by nature a forward-looking document, it is instructive to compare the recommendations made in this document with those made in previous documents. Commonalities highlight areas where perhaps insufficient progress has been made since these older documents were published. As shown in the accompanying story, our recommendations often echo those that were offered by the previous documents of national scope.

At the same time, each document was shaped by the healthcare environment in which it was created. EMS Agenda for the Future in 1996 was influenced by the increasing use of managed care in the 1990s, and the Future of Emergency Care series in the 2000s proposed a future of EMS incorporation into a wider system of community health. This framework was developed in the healthcare environment at the time, largely influenced by the Patient Protection and Affordable Care Act, and the information and telecommunications revolution, in part supported by the 2009 HITECH Act which facilitated the widespread implementation of electronic health records. This document seeks to build on previous contributions, while exploring the current landscape of innovation and healthcare reform to present a vision of EMS as part of an integrated community healthcare system.

EMS AGENDA FOR THE FUTURE **1996**

Integration of Health Services

- Expand the role of EMS in public health (Intro)
- Involve EMS in community health monitoring activities (Data 4)
- Integrate EMS with other health care providers and provider networks (IC 1)
- Incorporate EMS within health care networks' structure to deliver quality care (IC 2)
- Be cognizant of the special needs of the entire population (Intro)

Education Systems

- Incorporate research, quality improvement, and management learning objectives in higher level EMS education (Ed 3)
- Commission the development of national core contents to replace EMS program curricula (Ed 3)
- Establish innovative and collaborative relationships between EMS education programs and academic institutions (Ed 1)

- Recognize EMS education as an academic achievement (Ed 1)

Human Resources

- Adopt the principles of the national EMS Education and Practice Blueprint (Ed 1)
- Develop a system for reciprocity of EMS provider credentials (L 4)
- Develop collaborative relationships between EMS systems and academic institutions (F 4)
- Conduct EMS occupational health research (RC 5)
- Provide a system for critical incident stress management (RC 5)

Medical Direction

- Formalize relationships between all EMS systems and medical directors (MD 1)
- Appropriate sufficient resources for EMS medical direction (MD 1)
- Require appropriate credentials for all those who provide on-line medical direction (MD 1)
- Develop EMS as a physician and nurse subspecialty certification (MD 1)
- Appoint state EMS medical directors (MD 4)

EMS Research

- Develop information systems that provide linkage between various public safety services and other health care providers (Data 1)
- Include research related objectives in the education processes of EMS providers and managers (Ed 3)
- Develop collaborative relationships between EMS systems, medical schools, other academic institutions, and private foundations (F 4)

Prevention

- Collaborate with community agencies and health care providers with expertise and interest in illness and injury prevention (IC 1)

Legislation and Regulation

- Pass and periodically review EMS enabling legislation in all states that supports innovation and integration, and establishes and sufficiently funds a EMS lead agency (L 1)
- Enhance the abilities of state EMS lead agencies to provide technical assistance (F 2)
- Establish and fund the position of State EMS Medical Director in each state. (MD 4)
- Implement laws that provide protection from liability for EMS field and medical direction personnel when dealing with unusual situations (L 1)

Evaluation

- Develop valid models for EMS evaluations (RC 4)
- Evaluate EMS effects for multiple medical conditions (RC 4)
- Determine EMS effects for multiple outcome categories (RC 4)
- Determine EMS cost-effectiveness (F 3)

Information Systems

- Adopt uniform data elements and definitions and incorporate them into information systems (Data 1)
- Develop mechanisms to generate and transmit data that are valid, reliable, and accurate (Data 1)
- Develop integrated information systems with other health care providers, public safety agencies, and community resources (Data 4)

Clinical Care

- Subject EMS clinical care to ongoing evaluation to determine its impact on patient outcomes (RC 4)
- Employ new care techniques and technology only after shown to be effective (Intro)
- Eliminate patient transport as a criterion for compensating EMS systems (F 1)
- Establish proactive relationships between EMS and other health care providers (IC 1)

Communications Systems

- Develop cooperative ventures between communications centers and health providers to integrate communications processes and enable

rapid patient-related information exchange (Data 1)
- Determine the benefits of real-time patient data transfer (Data 1)

System Finance
- Collaborate with other health care providers and insurers to enhance patient care efficiency (IC 1)
- Develop proactive financial relationships between EMS, other health care providers, and health care insurers/provider organizations (IC 1)
- Compensate EMS on the basis of a preparedness-based model, reducing volume-related incentives and realizing the cost of an emergency safety net (F 1)
- Address EMS relevant issues within governmental health care finance policy (L 2)

EMERGENCY MEDICAL SERVICE AT THE CROSSROADS **2007**

Chapter 3: Building a 21st-Century Emergency Care System

3.3 The Department of Health and Human Services should convene a panel of individuals with emergency and trauma care expertise to develop evidence-based indicators of emergency care system performance. (RC 4)

3.4 Congress should establish a demonstration program, administered by Health Resources and Services Administration, to promote regionalized, coordinated, and accountable emergency care systems throughout the country, and appropriate $88 million over 5 years to this program. (RC 2)

3.5 Congress should establish a lead agency for emergency and trauma care within 2 years of the publication of this report. This lead agency should be housed in the Department of Health and Human Services, and should have primary programmatic responsibility for the full continuum of EMS, emergency and trauma care for adults and children, including medical 9-1-1 and emergency medical dispatch, prehospital EMS (both ground and air), hospital-based emergency and trauma care, and medical-related disaster preparedness. Congress should establish a working group to make recommendations regarding the structure, funding, and responsibilities of the new agency, and develop and monitor the transition. The working group should have representation from federal and state agencies and professional disciplines involved in emergency and trauma care. (L 1)

3.6 The Department of Health and Human Services should adopt rule changes to the Emergency Medical Treatment and Active Labor Act (EMTALA) and the Health Insurance Portability and Accountability Act (HIPAA) so that the original goals of the laws are preserved but integrated systems may further develop. (L 3)

3.7 CMS should convene an ad hoc work group with expertise in emergency care, trauma, and EMS systems to evaluate the reimbursement of EMS and make recommendations regarding inclusion of readiness costs and permitting payment without transport. (F 1)

Chapter 4: Supporting a High Quality EMS Workforce

4.1 State governments should adopt a common scope of practice for EMS personnel, with state licensing reciprocity. (L 4)

4.2 States should require national accreditation of paramedic education programs. (Ed 1)

4.3 States should accept national certification as a prerequisite for state licensure and local credentialing of EMS providers. (Ed 1)

4.4 The American Board of Emergency Medicine should create a subspecialty certification in EMS. (MD 1)

Chapter 5: Advancing System Infrastructure

5.1 States should assume regulatory oversight of the medical aspects of air medical services, including communications, dispatch, and transport protocols. (L 1)

5.2 Hospitals, trauma centers, EMS agencies, public safety departments, emergency management offices, and public health agencies should develop integrated and interoperable communications and data systems. (Data 1)

5.3 The Department of Health and Human Services should fully involve prehospital EMS leadership in discussions about the design, deployment, and financing of the National Health Information Infrastructure (NHII). (Data 5)

Chapter 6: Preparing for Disasters

6.3 Professional training, continuing education, and credentialing and certification programs of all the relevant EMS professional categories, should incorporate disaster preparedness training into their curricula, and require the maintenance of competency in these skills. (Ed 1)

Chapter 7: Optimizing Prehospital Care through Research

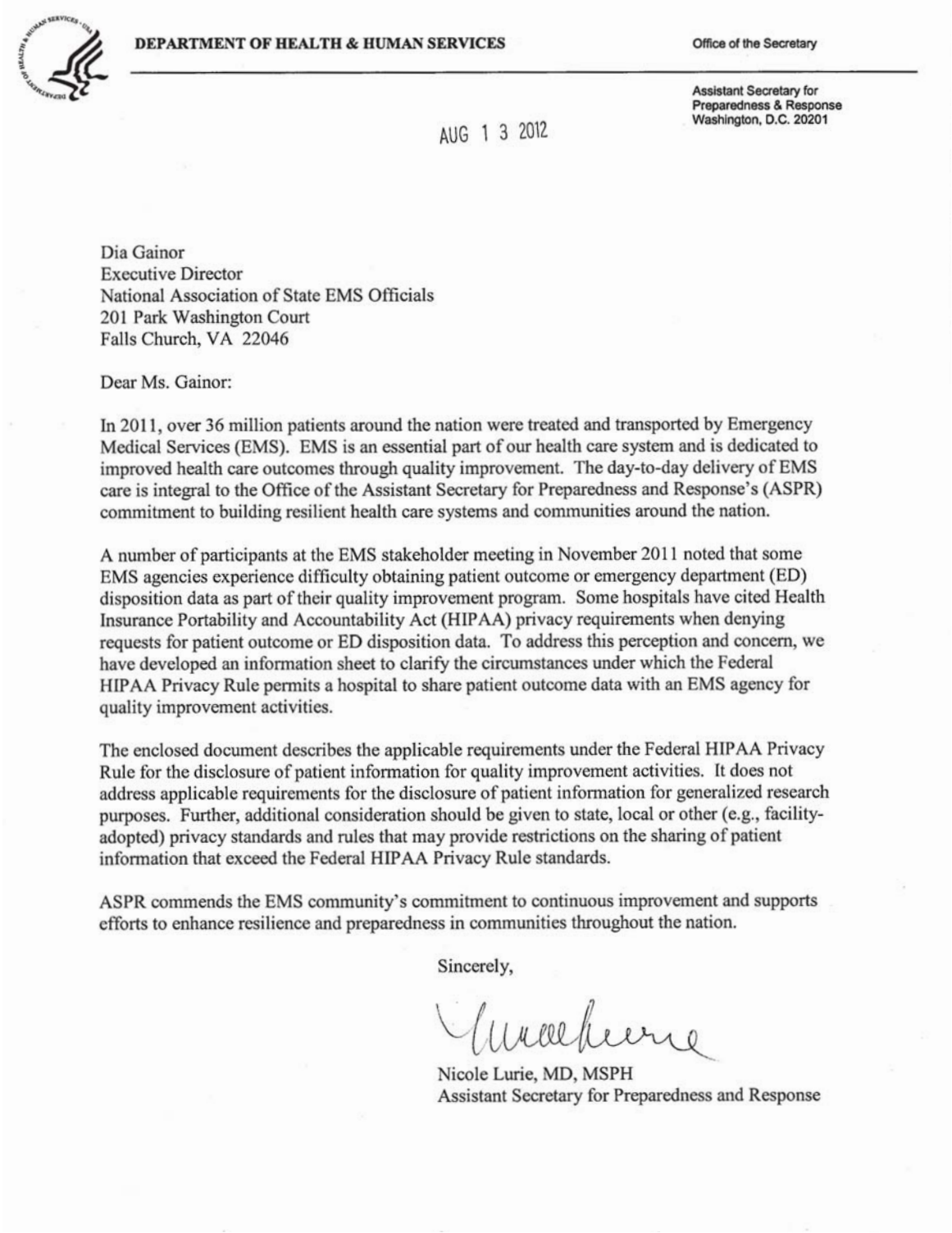
7.1 Federal agencies that fund emergency and trauma care research should target additional funding at prehospital EMS research, with an emphasis on systems and outcomes research. (F 4)

Some 20 years since the publication of the first EMS Agenda for the Future, the National Highway Traffic Safety Administration is in the process of commissioning a new "agenda" to guide EMS for the next 30 years. We hope that the vision set forth in the new document will be one that can serve to align the entire EMS industry and profession around a set of long term goals and principles. We anticipate that achieving the vision set forth by that forward-looking document will require using the specific recommendations presented in this Promoting Innovation in EMS National Framework Document.

Thus, it is with great thanks and appreciation to all of the members of the PIE steering committee, all those that participated in the surveys, the regional and national meetings, the public comment periods and the entire EMS community and other stakeholders that participated, that we proudly bring this project to its conclusion. It is now up to you, the reader, to make use of the ideas, insights, and recommendations contained herein to help create a more favorable environment for innovation for the EMS industry and profession through improved regulation, better financial alignment, a sturdier educational foundation, greater regional coordination and interdisciplinary collaboration, stronger medical oversight, and enhanced data and telecommunication capabilities.

APPENDIX

Letter from Secretary of Health & Human Services to National Association of State EMS Offices clarifying that EMS meets definition of a HIPAA covered entity.



DEPARTMENT OF HEALTH & HUMAN SERVICES

Office of the Secretary

Assistant Secretary for
Preparedness & Response
Washington, D.C. 20201

AUG 1 3 2012

Dia Gainor
Executive Director
National Association of State EMS Officials
201 Park Washington Court
Falls Church, VA 22046

Dear Ms. Gainor:

In 2011, over 36 million patients around the nation were treated and transported by Emergency Medical Services (EMS). EMS is an essential part of our health care system and is dedicated to improved health care outcomes through quality improvement. The day-to-day delivery of EMS care is integral to the Office of the Assistant Secretary for Preparedness and Response's (ASPR) commitment to building resilient health care systems and communities around the nation.

A number of participants at the EMS stakeholder meeting in November 2011 noted that some EMS agencies experience difficulty obtaining patient outcome or emergency department (ED) disposition data as part of their quality improvement program. Some hospitals have cited Health Insurance Portability and Accountability Act (HIPAA) privacy requirements when denying requests for patient outcome or ED disposition data. To address this perception and concern, we have developed an information sheet to clarify the circumstances under which the Federal HIPAA Privacy Rule permits a hospital to share patient outcome data with an EMS agency for quality improvement activities.

The enclosed document describes the applicable requirements under the Federal HIPAA Privacy Rule for the disclosure of patient information for quality improvement activities. It does not address applicable requirements for the disclosure of patient information for generalized research purposes. Further, additional consideration should be given to state, local or other (e.g., facility-adopted) privacy standards and rules that may provide restrictions on the sharing of patient information that exceed the Federal HIPAA Privacy Rule standards.

ASPR commends the EMS community's commitment to continuous improvement and supports efforts to enhance resilience and preparedness in communities throughout the nation.

Sincerely,

Nicole Lurie, MD, MSPH
Assistant Secretary for Preparedness and Response

Sharing Patient Health Outcome Information between Hospitals and EMS Agencies for Quality Improvement

This information sheet provides clarification as to the circumstances when a hospital and/or emergency department (ED) may share patient outcome information with the Emergency Medical Service (EMS) for quality improvement. The information provided is based on the requirements of the Federal Health Insurance Portability and Accountability Act (HIPAA) Privacy Rule that apply to the disclosure of patient information for quality improvement. It does not address applicable requirements for the disclosure of patient information for generalized research purposes. Further, additional consideration should be given to state, local, or other (e.g., facility-adopted) privacy standards and rules that may provide restrictions on the sharing of patient information that exceed the Federal HIPAA Privacy Rule standards.

If both the hospital and EMS provider are HIPAA covered entities[1], the hospital may share patient health outcome information with the EMS provider for certain health care operations[2] activities of the EMS provider, such as quality improvement activities, as long as both entities have (or have had in the past) a relationship[3] with the patient in question. The hospital may share the information without the patient's authorization, but must make reasonable efforts to disclose only the minimum amount of individually identifiable health information needed for the activity.

Definitions and Examples

[1]Covered entity: Includes a health care provider who transmits health information in electronic form in connection with a financial or administrative health care transaction for which the Department of Health and Human Services has developed HIPAA standards. If the EMS provider does not submit electronic claims to a health plan or government payer (such as Medicare or Medicaid) it may not be considered a "covered entity."
Example: EMS and EDs are considered covered entities if they transmit health care claims to a health plan via electronic transactions for payment purposes.

Source: HIPAA Rules at 45 CFR 160.103,
http://edocket.access.gpo.gov/cfr_2007/octqtr/45cfr160.103.htm, and at 45 CFR Part 162,
http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title45/45cfr162_main_02.tpl.

[2]Health care operations: Encompasses a number of activities to support health care treatment and payment functions, including quality assessment and improvement activities, (including outcomes evaluation and development of clinical guidelines), provided that the obtaining of generalizable knowledge is not the primary purpose of any studies resulting from such activities.

Source: HIPAA Privacy Rule at 45 CFR 164.501
http://edocket.access.gpo.gov/cfr_2007/octqtr/45cfr164.501.htm

[3]Relationship: Includes a current or prior relationship between a patient and each covered entity.
Example: EMS rendered treatment to and transported patient X to an ED for health incident Y. The EMS and ED therefore both have a relationship with patient X for health incident Y.

Source: HIPAA Privacy Rule at 45 CFR 164.506(c)(4).

Letter from Center for Medicare & Medicaid Services to State Medicaid Directors informing about the availability of Meaningful Use funds from the HITECH Act for eligible providers including EMS agencies.

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Medicare & Medicaid Services
7500 Security Boulevard, Mail Stop S2-26-12
Baltimore, MD 21244-1850

CMS
CENTERS FOR MEDICARE & MEDICAID SERVICES
CENTER FOR MEDICAID & CHIP SERVICES

SMD# 16-003

RE: Availability of HITECH Administrative Matching Funds to Help Professionals and Hospitals Eligible for Medicaid EHR Incentive Payments Connect to Other Medicaid Providers

February 29, 2016

Dear State Medicaid Director:

This letter updates guidance issued by the Centers for Medicare & Medicaid Services (CMS) about the availability of federal funding at the 90 percent matching rate for state expenditures on activities to promote health information exchange (HIE) and encourage the adoption of certified Electronic Health Record (EHR) technology by certain Medicaid providers. CMS previously issued guidance on this topic in State Medicaid Director (SMD) Letter #10-016 (August 17, 2010)[1], SMD Letter #11-004 (May 18, 2011)[2], and a 2013 guidance document, "CMS Answers to Frequently Asked Questions (9/10/2013)" (2013 guidance).

This updated guidance expands the scope of State expenditures eligible for the 90 percent matching rate, and supports the goals of, "Connecting Health and Care for the Nation: A Shared Nationwide Interoperability Roadmap Version 1.0,"[3] published by the Department of Health and Human Services, Office of the National Coordinator (ONC) for Health Information Technology, on October 6, 2015. In this letter, we are expanding our interpretation of the scope of State expenditures eligible for the 90 percent HITECH match, given the greater importance of coordination of care across providers and transitions of care in Meaningful Use modified Stage 2 and Stage 3. This letter supersedes the 2013 guidance but many of the principles of that guidance, as indicated in this letter, remain valid. We intend to issue updated, detailed guidance that integrates those principles with the interpretive changes set forth in this letter.

The Health Information Technology for Economic and Clinical Health (HITECH) Act, enacted as part of the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5, added sections 1903(a)(3)(F) and 1903(t) to the Social Security Act. These provisions make available to States 100 percent Federal matching funding for incentive payments to eligible Medicaid providers to encourage the adoption and use of certified EHR technology through 2021, and 90 percent Federal matching funding (the 90 percent HITECH match) for State administrative expenses related to the program, including State administrative expenses related to pursuing initiatives to encourage the adoption of certified EHR technology to promote health care quality and the exchange of health care information, subject to CMS approval. CMS has implemented these

[1] Available at http://downloads.cms.gov/cmsgov/archived-downloads/SMDL/downloads/SMD10016.pdf
[2] Available at https://www.medicaid.gov/Federal-Policy-Guidance/downloads/SMD11004.pdf
[3] Available at https://www.healthit.gov/sites/default/files/hie-interoperability/nationwide-interoperability-roadmap-final-version-1.0.pdf

provisions in regulations at 42 CFR Part 495. When attesting to Meaningful Use modified Stage 2 or Stage 3, professionals and hospitals that are eligible for Medicaid EHR Incentive Payments (collectively referred to in this document as Eligible Providers) must demonstrate the ability to electronically coordinate with other providers across care settings under the CMS regulations at 42 CFR Part 495. In order to meet these Meaningful Use objectives, Eligible Providers will often need to electronically coordinate care with other Medicaid providers that are not eligible for Medicaid EHR incentive payments.

SMD Letters #10-016 and #11-004 explained that state costs related to HIE promotion may be matched at the 90 percent HITECH matching rate only if they can be directly correlated to the Medicaid EHR Incentive Program. In the 2013 guidance, we therefore explained that States' costs of facilitating connections for providers to an HIE may be matched at the 90 percent HITECH matching rate only if the providers are Eligible Providers. We now explain that State costs of facilitating connections between Eligible Providers and other Medicaid providers (for example, through an HIE or other interoperable systems), or costs of other activities that promote other Medicaid providers' use of EHR and HIE, can also be matched at the 90 percent HITECH matching rate, but only if State expenditures on these activities help Eligible Providers meet the Meaningful Use objectives. Subject to CMS prior approval, States may thus be able to claim 90 percent HITECH match for expenditures related to connecting Eligible Providers to other Medicaid providers, including behavioral health providers, substance abuse treatment providers, long-term care providers (including nursing facilities), home health providers, pharmacies, laboratories, correctional health providers, emergency medical service providers, public health providers, and other Medicaid providers, including community-based Medicaid providers.

For example, an Eligible Provider might be a physician needing to meet the modified Stage 2 or Stage 3 Meaningful Use objective for health information exchange (*see* 42 CFR 495.22(e)(5)(i) or 495.24(d)(7)(i)(A)) when transitioning patients to another Medicaid provider such as a nursing facility, or a home health care provider. Or an eligible hospital might need to meet the objective for Medication Reconciliation and compare records with other providers to confirm that the information it has on patients' medication is accurate when it admits patients into its care (*see* 42 CFR 495.22(e)(7)(i) or 495.24(d)(7)(ii)(B)(3)(i)). Subject to CMS approval, States can claim 90 percent HITECH match in the costs of developing connectivity between Eligible Providers (whether eligible professionals or eligible hospitals) and other Medicaid providers if this will help the Eligible Providers demonstrate Meaningful Use.

CMS explicitly encourages and welcomes multistate collaboratives partnering on shared solutions for HIE and interoperability, including for the activities discussed in this letter (facilitation of EHR Meaningful Use and related communications through the HIE system). CMS will aggressively support such collaboratives as potentially cost-saving opportunities to increase adoption of interoperability standards and help Eligible Providers demonstrate Meaningful Use. Such collaboratives should promote Medicaid Information Technology Architecture (MITA) principles on scalability, reusability, modularity, and interoperability. We note that ONC is a willing partner in helping States develop open source and open architecture tools for HIE that are consistent with MITA principles.

Cost controls, cost allocations, and other payers

States must ensure that any 90 percent HITECH match claimed under the guidance in this letter supports Eligible Providers' demonstration of Meaningful Use modified Stage 2 and Stage 3, and must therefore report on the extent to which the activities they are funding help Eligible Providers demonstrate Meaningful Use. CMS will require States to describe in advance which specific Meaningful Use measures they intend to support in the Implementation Advance Planning Document (IAPD) as well as to confirm such measures are indeed supported post-implementation. Under no circumstances may States claim 90 percent HITECH match in the costs of actually providing EHR technology to providers or supplementing the functionality of provider EHR systems. This funding is available, subject to CMS approval, as of the date of this letter, and will not be available retroactively.

Additionally, States should claim the 90 percent HITECH match for HIE-related costs relating to Medicaid providers that are not eligible for Medicaid EHR incentive payments only if those HIE-related costs help Eligible Providers demonstrate Meaningful Use. For example, it would not be appropriate for States to claim the 90 percent HITECH match for costs related to an HIE system that did not connect to or include Eligible Providers and therefore would not help Eligible Providers demonstrate Meaningful Use.

States should continue to adhere to the guidance in SMD Letter #11-004 detailing how Medicaid funding should be part of an overall financial plan that leverages multiple public and private funding sources to develop HIEs. Similarly, States are reminded that per SMD Letter #11-004, the 90 percent HITECH match cannot be used for ongoing operations and maintenance costs. This updated guidance makes no changes to the general cost allocation principles and fair share principles States should follow in proposing funding models to CMS for HIEs or interoperable systems, although under this updated guidance, the Medicaid portion of such cost allocations may increase to include costs associated with connecting Eligible Providers to other Medicaid providers. CMS has approved several different cost allocation methodologies for States and those various methodologies will be affected differently by this guidance. CMS will provide technical assistance on the impact of this guidance on specific States. Similarly, States should continue to complete and update the "Health Information Technology Implementation Advance Planning Document (HIT IAPD) Template[4]," developed by CMS and the Office of Management and Budget, in which States detail cost allocation models and other financial considerations. States should meet with CMS to review cost allocation models that carefully consider the extent to which the HIE or other interoperable system benefits Eligible Providers, other Medicaid providers, non-Medicaid providers, and other payers.

Medicaid Information Technology Architecture (MITA) emphasizes the importance of interoperability and industry standards. States should take an aggressive approach to HIE and interoperability governance for purposes of supporting interoperability while focusing on security and standards to keep interface costs to a minimum. The CMS final rule published on December 4, 2015, "Mechanized Claims Processing & Information Retrieval Systems (90/10)"

[4] https://www.cms.gov/regulations-and-guidance/legislation/ehrincentiveprograms/downloads/medicaid_hit_iapd_template.pdf

requires in 42 CFR 433.112 a new focus on industry standards in MITA that support more efficient, standards-based information exchange as described in 45 CFR Part 170. Specifically, 45 CFR Part 170 defines the Common Clinical Data Set, transport standards, functional standards, content exchange standards and implementation specifications for exchanging electronic health information, and vocabulary standards for representing electronic health information. In implementing these standards, we encourage States to develop partnerships with non-profit collaboratives and other industry participants such as DirectTrust that further support Direct Secure Messaging through trust frameworks that reduce the costs and technical complexities of electronic health information exchange for providers.

The interoperable systems described in this letter are part of the MITA and interfaces to these systems should appropriately follow a Service-Oriented Architecture (SOA) as well as adhere to industry standards. States should aggressively pursue HIE and interoperability solutions for Medicaid providers that either obviate the need for costly interfaces, or utilize open architecture solutions that make such interfaces easily acquired. For example, consistent with the software ownership rights held by the state under 45 CFR § 95.617, States might require that HIE interfaces designed, developed, or installed with Federal financial participation be made available at reduced or no cost to other Medicaid providers connecting to the same HIE. Furthermore, States could require that such interfaces (or the code for such interfaces) be made publicly available. Additionally, CMS and ONC support States in sharing open source tools and interfaces with other States to further drive down the costs of HIEs, interfaces, and other interoperable systems.

States are also reminded that careful alignment and coordination with other funding sources should be thoroughly discussed with CMS and addressed in an Implementation Advance Planning Document Update (IAPD-U), specifically Appendix D. States continue to be encouraged to consult with CMS in advance of formal State Medicaid HIT Plan (SMHP) and IAPD submissions to obtain technical assistance regarding the funding options and boundaries outlined in this and the previous SMD Letters, and additional technical assistance will be provided when we release an update to the 2013 guidance that reflects the new criteria for the 90 percent HITECH match described here. States should reach out to their CMS regional office's Medicaid HIT staff lead as the initial point of contact.

Below are some examples of the types of state costs for which 90 percent HITECH match might be available, subject to CMS approval.

Federal Financial Participation (FFP) for On-boarding Medicaid providers to HIEs or interoperable systems

On-boarding is the technical and administrative process by which a provider joins an HIE or interoperable system and secure communications are established and all appropriate Business Associate Agreements, contracts and consents are put in place. State activities related to on-boarding might include the HIE's activities involved in connecting a provider to the HIE so that the provider is able to successfully exchange data and use the HIE's services. The 90 percent HITECH match is available to cover a state's reasonable costs (e.g., interfaces and testing) to on-board providers to an HIE. Subject to the parameters and cost controls described above, States

may claim 90 percent HITECH match for state costs of supporting the initial on-boarding of Medicaid providers onto an HIE, or onto any interoperable system that connects Eligible Providers to other Medicaid providers. Costs can be claimed both if they are incurred by the state to support the initial on-boarding of Eligible Providers and if they are incurred by the state to support the on-boarding of other Medicaid providers, provided that connecting the other Medicaid providers helps Eligible Providers demonstrate, and meet requirements for, Meaningful Use. States should coordinate with CMS on defining benchmarks and targets for on-boarding providers. States are reminded that, consistent with the principles described in both SMD Letter #10-016 and SMD Letter #11-004, the 90 percent HITECH match is for implementation only, and States should work with CMS on establishing an endpoint to onboarding and always ensure costs are allocated as appropriate across other payers. Also, the scope of the onboarding should be clearly defined and reviewed with CMS prior to IAPD submission to ensure that any costs claimed help Eligible Providers meet Meaningful Use and to ensure that HIE-related costs benefiting providers that are not eligible for Medicaid EHR incentive payments are claimed only if these costs help Eligible Providers demonstrate Meaningful Use. States should generally refer to SMD Letters #10-016 and #11-004 for other information about allowable onboarding costs.

Pharmacies: Similarly, subject to the parameters and cost controls described above, States may claim the 90 percent HITECH match for the costs of supporting the initial on-boarding of pharmacies to HIEs or other interoperable systems, if on-boarding the pharmacies helps Eligible Providers meet Meaningful Use objectives, such as the objectives around sending electronic prescriptions or the objectives around conducting medication reconciliations, both described in 42 CFR 495.22 and 495.24.

Clinical Laboratories: Subject to the parameters and cost controls described above, States may also claim 90 percent HITECH match for the costs of supporting the initial on-boarding of clinical laboratories to HIEs or interoperable systems, if on-boarding these laboratories helps Eligible Providers meet Meaningful Use objectives, such as the objectives for Electronic Reportable Lab Results or laboratory orders in Computerized Provider Order Entry (CPOE) described in 42 CFR 495.22 and 495.24.

Public Health Providers: Similarly, subject to the parameters and cost controls described above, States may also claim 90 percent HITECH match for the costs of on-boarding Medicaid public health providers to interoperable systems and HIEs connected to Eligible Providers so that Eligible Providers are able to meet Meaningful Use measures focused on public health reporting and the exchange of public health data, including activities such as validation and testing for reporting of public health measures described in 42 CFR 495.22 and 495.24.

FFP for interoperability and HIE architecture

As with expenses for on-boarding, States may claim 90 percent HITECH match for their costs of connecting Eligible Providers to other Medicaid providers via HIEs or other interoperable systems, if doing so helps Eligible Providers demonstrate Meaningful Use and the cost controls described above are met.

Specifically, 90 percent HITECH match would be available for States' costs related to the design, development, and implementation of infrastructure for several HIE components and interoperable systems that most directly support Eligible Providers in coordinating care with other Medicaid providers in order to demonstrate Meaningful Use. As described in SMD Letter #11-004, the 90 percent HITECH match cannot be used for ongoing operations and maintenance costs after this technology is established and functional. These components and systems include:

Provider Directories: States may claim the 90 percent HITECH match for costs related to the design, development, and implementation of provider directories that allow for the exchange of secure messages and structured data to coordinate care or calculate clinical quality measures between Eligible Providers and other Medicaid providers, so long as these costs help Eligible Providers meet Meaningful Use and the cost controls described above are met. The 90 percent HITECH match would not be appropriate for costs of developing a separate subdirectory for a class of providers that are not eligible for Medicaid EHR incentive payments and that are unlikely ever to exchange records with an Eligible Provider. CMS emphasizes the importance of dynamic provider directories with, as appropriate, bidirectional communications to public health agencies and public health registries. CMS particularly supports approaches to provider directories that provide solutions for Eligible Providers to connect to other Medicaid providers with lower EHR adoption rates, if doing so helps the Eligible Providers demonstrate Meaningful Use. Secure, web-based provider directories, for example, might help Eligible Providers coordinate care more effectively with long term care providers, behavioral health providers, substance abuse providers, etc. CMS expects that States will consider provider directories as a Medicaid enterprise asset that can also support Medicaid Management Information System (MMIS) functionality, with the reminder that, per SMD Letter #10-016, States should not claim 90 percent HITECH match for costs that could otherwise be matched with MMIS matching funds.

Secure Electronic Messaging: States may claim the 90 percent HITECH match for costs related to the design, development, and implementation of secure messaging solutions that connect Eligible Providers to other Medicaid providers and allow for the exchange of secure messages and structured data, so long as these costs help Eligible Providers meet Meaningful Use and the cost controls described above are met. States are encouraged to utilize Direct Secure Messaging as a transport standard that is secure and scalable. States should refer to the "Medicare and Medicaid Programs; Electronic Health Record Incentive Program – Stage 3 and Modifications to Meaningful Use in 2015 Through 2017" rule for guidance on meeting the Certified Electronic Health Record Technology (CEHRT) requirements for purposes of Meaningful Use[5]. States may also refer to ONC's 2016 Interoperability Standards Advisory (ISA), a publication that provides the identification, assessment, and determination of the "best available" interoperability standards and implementation specifications for industry use to fulfill specific clinical health IT interoperability needs[6]. States should also be prescriptive in governance requirements to ensure maximal interoperability in the most secure and efficient manner possible. ONC is a willing partner with CMS in helping States deploy Direct Secure Messaging systems and developing

[5] https://www.federalregister.gov/articles/2015/10/16/2015-25595/medicare-and-medicaid-programs-electronic-health-record-incentive-program-stage-3-and-modifications
[6] https://www.healthit.gov/sites/default/files/2016-interoperability-standards-advisory-final-508.pdf

Page 7 – State Medicaid Director

related governance requirements to ensure that Eligible Providers can connect to other Medicaid providers.

Query Exchange: States may claim the 90 percent HITECH match for costs related to the design, development, and implementation of query-based health information exchange, so long as these costs help Eligible Providers meet Meaningful Use, and the cost controls described above are met. States may support coordination of care between Eligible Providers and other Medicaid providers by linking them into a query-based HIE that allows for secure, standards-based information exchange with thorough identity management protocols. A Query Exchange might access a state's Clinical Data Warehouse and similarly be integrated with analytic and reporting functions. These activities may support aggregate queries from providers to support population health activities performed by public health or other entities involved in population health improvement, provided that doing so helps Eligible Providers meet Meaningful Use. Given the unique data and exchange governance challenges of Query Exchange, States are encouraged to reach out to ONC to help formulate governance guidance and best practices.

Care Plan Exchange: States may claim the 90 percent HITECH match for costs related to the design, development, and implementation of interoperable systems and HIEs that facilitate the exchange of electronic care plans between Eligible Providers and other Medicaid providers, so long as these costs help Eligible Providers meet Meaningful Use, and the cost controls described above are met. Medicaid providers coordinating care across multiple care settings may exchange care plans containing treatment plans and goals, as well as problem lists, medication history and other clinical and non-clinical content added and updated as appropriate by members of a patient's care team, including Medicaid social service providers. States are encouraged to consider care plan exchange for patients with multiple chronic conditions who might be coordinating care between many specialists, hospital(s), long term care facilities, rehabilitation centers, home health care providers, or other Medicaid community-based providers. Similarly, children in the foster care system might benefit from care plans shared across Medicaid providers (including Eligible Providers) to facilitate coordination of the children's care. As discussed above, costs related to exchanging care plans between Medicaid providers and other programs, such as foster care programs, may need to be allocated between benefitting programs.

Encounter Alerting: States may claim the 90 percent HITECH match for costs related to the design, development, and implementation of communications within an HIE or interoperable system connecting Eligible Providers and other Medicaid providers about the admission, discharge or transfer of Medicaid patients, so long as these costs help Eligible Providers meet Meaningful Use, and the cost controls described above are met. These communications among Medicaid providers may contain structured data regarding treatment plans, medication history, drug allergies, or other secure content that aids in the coordination of patient care, including coordination of social services as appropriate.

Public Health Systems: States may claim the 90 percent HITECH match for costs related to the design, development, and implementation of public health systems and connections to public health systems, so long as the cost controls described above are met, and so long as these costs help Eligible Providers meet Meaningful Use measures focused on public health reporting and the exchange of public health data described in 42 CFR 495.22 and 495.24. It is worth

emphasizing that state costs eligible for the 90 percent HITECH match might include costs related to developing registry and system architecture for Prescription Drug Monitoring Programs (PDMPs), as per FAQ #13413[7] PDMPs can be considered a specialized registry to which Eligible Providers may submit data in order to meet Meaningful Use objectives. States should, however, keep in mind that MMIS matching funds might in some circumstances be a more appropriate source of federal funding for costs related to developing a PDMP. Again, States should not claim 90 percent HITECH match for costs that could otherwise be matched with MMIS matching funds.

Health Information Services Provider (HISP) Services: States may claim the 90 percent HITECH match for costs related to the design, development, and implementation of HISP Services that coordinate the technical and administrative work of connecting Eligible Providers to other Medicaid providers, so long as these costs help Eligible Providers meet Meaningful Use, and the cost controls described above are met. HISP Services may coordinate encryption standards across providers, as well as coordinate contracts, Business Associate Agreements or other consents deemed appropriate for the HIEs or interoperable systems. States should be careful to distinguish between on-boarding services and HISP Services, as the scope of HISP activities overlaps with the scope of on-boarding activities, and the state should confirm that activities are only supported with federal funding once. States should clearly define the scope of HISP activities and on-boarding activities as appropriate.

This is not an exhaustive list of the types of state costs for design, development, and implementation of HIE components and interoperable systems for which 90 percent HITECH match might be claimed. Design, development, and implementation costs associated with other HIE components and interoperable systems might be supported by the 90 percent HITECH match as long as these costs help Eligible Providers achieve Meaningful Use and meet the cost controls described above, and will be considered by CMS accordingly.

Under this updated guidance, States remain able, subject to CMS approval, to claim 90 percent HITECH match for design, development, and implementation costs related to personal health records (PHRs), as utilizing a PHR through an HIE will often be the best way for many Eligible Providers to meet the Meaningful Use modified stage 2 Patient Electronic Access objective (*see* 42 CFR 495.22(e)(8)) and/or the Meaningful Use stage 3 Coordination of Care Through Patient Engagement objective (*see* 42 CFR 495.24(d)(6)). The parameters for HITECH administrative funding discussed in SMD Letters #10-016 and #11-004 continue to be relevant to PHR funding requests from States.

Conclusion

With more States utilizing or exploring the possibilities of vehicles for delivery system reform that benefit from coordination of care, such as health homes, primary care case management, managed care, home and community-based service programs, and performance-based incentive payment structures, there is an expectation that the Medicaid Enterprise infrastructure will be designed to support these efforts. These efforts therefore support the MITA principles of

[7] https://questions.cms.gov/faq.php?faqId=13413

reusability, interoperability, and care management in providing a foundation for further delivery system reform.

As States enter the fifth year of the Medicaid EHR Incentive Program, CMS and ONC expect them to leverage available federal funding for tools and guidance to help Eligible Providers demonstrate Meaningful Use, which might include strengthening data exchange between Eligible Providers and other Medicaid providers. States may have questions about the Health Insurance Portability and Accountability Act (HIPAA) considerations applicable to creating more diverse HIEs and interoperable systems, so we have included links to guidance from the U.S. Department of Health and Human Services Office for Civil Rights and the Office of the National Coordinator for Health Information Technology describing uses and disclosures that are permitted under HIPAA[8]. Note that the discussion in the linked guidance only concerns the uses and disclosures that are permitted under HIPAA, and does not address when state costs related to the discussed activities would be eligible for the 90 percent HITECH match. This next phase of infrastructure development and connectivity will best position all Eligible Providers to successfully demonstrate Meaningful Use of Certified EHR Technology while solidifying a broader network of health information exchange among Medicaid providers, writ large.

Sincerely,

/s/

Vikki Wachino
Director

Enclosure

cc:

National Association of Medicaid Directors
National Academy for State Health Policy
National Governors Association
American Public Human Services Association
Association of State Territorial Health Officials
Council of State Governments
National Conference of State Legislatures

[8] https://www.healthit.gov/sites/default/files/exchange_health_care_ops.pdf and https://www.healthit.gov/sites/default/files/exchange_treatment.pdf

LIST OF COMMON ABBREVIATIONS IN DOCUMENT:

ACA	Affordable Care Act
AED	Automated Electric Defibrillator
AEMT	Advanced Emergency Medical Technician
ARRA	American Recovery and Reinvestment Act
CBO	Community Based Organization
CIE	Community Information Exchange
CMS	Center for Medicare & Medicaid Services
COPD	Chronic Obstructive Pulmonary Disorder
CP	Community Paramedicine
CPR	Cardio-Pulmonary Resuscitation
CT	Computed Tomography
ECG	Electrocardiogram
ED	Emergency Department
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
EMTALA	Emergency Medical Treatment and Active Labor Act
ePCR	electronic Patient Care Report
HBPC	Home Based Primary Care
HCIA	Health Care Innovation Award
HHS	Department of Health & Human Services
HIE	Health Information Exchange
HIPAA	Health Insurance Portability and Accountability Act
HIT	Health Information Technology
HITECH	Health Information Technology for Economic and Clinical Health
HRSA	Health Resources and Services Administration
IOM	Institute of Medicine
NASEMSO	National Association of State EMS Offices
NCQA	National Committee for Quality Assurance
NEMSIS	National EMS Information System
NHTSA	National Highway Traffic Safety Administration
NREMT	National Registry of Emergency Medical Technicians
MIH	Mobile Integrated Healthcare
MU	Meaningful Use
PCP	Primary Care Provider
PSO	Patient Safety Organization
QIO	Quality Improvement Organization
STEMI	ST segment Elevation Myocardial Infarction
TAC	Technical Assistance Center
UCSD	University of California at San Diego
VA	Veterans Affairs