EMS AGENDA 2050

A PEOPLE-CENTERED VISION FOR THE FUTURE OF EMERGENCY MEDICAL SERVICES

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16. Abstract *EMS Agenda 2050: A People-Centered Vision for the Future of Emergency Medical Services* is the culmination of a collaborative and inclusive two-year effort to create a bold plan for the next several decades. Building on the foundation established by the landmark 1996 EMS Agenda for the Future, EMS Agenda 2050 lays out a vision for EMS systems that serve the needs of patients, families, clinicians and communities. To achieve that goal, EMS Agenda 2050 describes six guiding principles that need to be at the heart of efforts to implement the vision. EMS systems must be: inherently safe and effective, integrated and seamless, reliable and prepared, socially equitable, sustainable and efficient, and adaptable and innovative.		
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A NOTE ABOUT EMS AGENDA 2050

When we were tasked with creating this vision for the future of emergency medical services in the United States, our charge was clear: to create a bold vision for EMS and the people we serve. The world in 2050 will be dramatically different, with new challenges and opportunities. We hope this vision, created through a community-driven effort by people like you, will both challenge and unite us as we work to make it a reality.

Our work was guided by a few values:

- Avoid the temptation to wallow in the problems of today;
- Focus on bold, ambitious ideas for the future;
- Commit to open and inclusive input from anyone and everyone; and
- Listen to opinions, criticism, and critique.

More than 20 years ago, emergency medical services (EMS) pioneers and leaders described a vision of data-driven and evidence-based systems in the EMS Agenda for the Future. Since then, the profession has worked tirelessly to fulfill the vision set out in that landmark document.

This project began as a grassroots effort among leaders in the EMS community to build on that foundational work and advance the vision for the future of EMS. EMS Agenda 2050 was made possible with their support as well as that of the funding Federal agencies. We want to thank our Federal sponsors for providing input and for stepping back and giving us the freedom to execute. We are grateful to the thousands of people involved directly and indirectly in all aspects of EMS. By attending our regional meetings, participating in conference sessions, posting to our website, sending us e-mails, commenting on social media, and grabbing us for one-on-one conversations, you created this document. Dozens of national associations and hundreds of individuals contributed to and critiqued the drafts, passionately debated controversial topics, and stretched their minds to see three decades into the future.

Organizing each of these ideas into a coherent vision was challenging. We had long debates, both within our group and with many of you individually, about what to include, what to omit, and how to make sense of it all. We wrestled with many of the same topics that each of you confronts every day.

Our goal was not to predict exactly what will be, but to create a vision for what could be.

Some of you will easily see your role in the vision described in the following pages. Others may not; you may wonder why your particular service model, job title or certification level isn't mentioned. That is by design. This vision is not intended to address every single aspect of EMS completely. EMS is no longer just "the ambulance service"; rather, it is a complex network of all types of professionals, all of whom serve in a broad range of roles from providing care in an ambulance, to serving as educators, to practicing community paramedicine, to conducting research. How many more areas of EMS expertise will sprout up and evolve by the year 2050? The thought is mind-boggling, intimidating and exciting all at once. Our goal was not to predict exactly what will be, but to create a vision for what could be.
We grounded this vision with principles that we believe should guide every step of that evolution. To that end, we've included stories of what one EMS clinician's day may be like in 2050—not to recommend specific technologies, terms or clinical guidelines, but simply to help us envision one version of EMS in three decades.

We hope that you will be inspired by this new Agenda as you build and lead the EMS systems of the future. Think of actions you can take to help make the vision a reality. How will the principles influence you and your role? The future described here glimmers with potential, and it is the people of EMS—patients and communities, the people who care for them, and the people who support those clinicians—who will lead the way toward 2050. That includes you.

It is commonly said that, "The best way to predict the future is to create it." We are committed to creating a people-centered EMS system in the coming decades, starting today. We hope that you'll join us!

Thank you,

The EMS Agenda 2050
Technical Expert Panel

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A GLIMPSE INTO 2050

It's Sunday, May 22, 2050, and 9-year-old Carla Hernandez walks into the backyard, taking care not to step on the tomato plants just beginning to grow. As she kneels to begin pulling weeds, she feels a sharp pain in her leg and reflexively swings for the bug that might be biting her. A minute later, she suddenly feels lightheaded and sick to her stomach. The wooziness scares her, and the panic is evident in her voice when she calls out to her grandmother for help.

Carla's grandmother hurries outside and finds her granddaughter lying on the grass, pale and gasping for air. Carla's earring beeps—wearable devices come in almost any shape nowadays—and then a voice comes out of the tiny speaker.

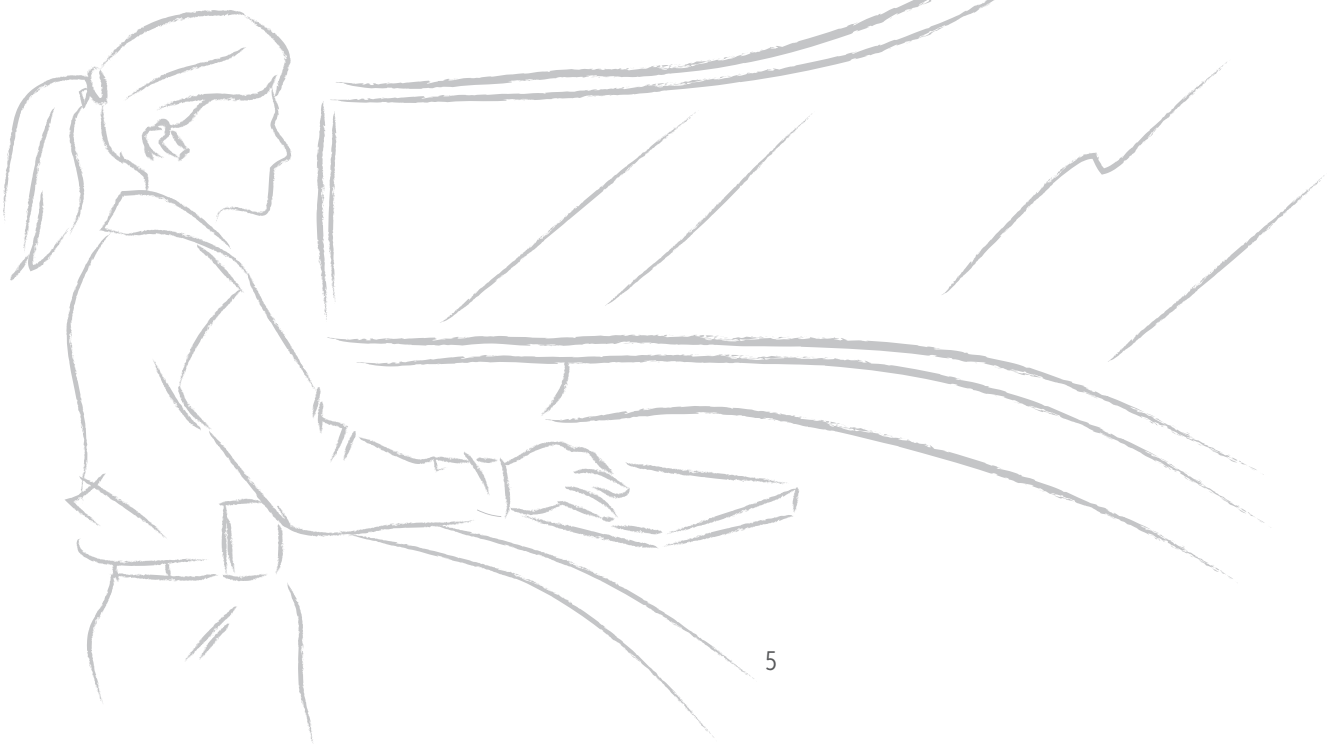
"Carla, Hi, it's Abdi, a telemedic at the Medical Communication Center. We received an alert that there might be a problem. Are you feeling OK?"

Pressing a button on her mobile device, Carla's grandmother activates the emergency program and Abdi's face appears on her screen.

"I see her eyes are open," Abdi says. "Is she responding to you?"

"No, and her breathing doesn't sound good either. Please help! I don't know what to do."

Abdi continues to speak to Carla's grandmother while monitoring the young girl's vital signs. Soon, a familiar voice calls out that he's here to help, and Carla's grandmother recognizes one of her neighbors as he walks around the corner of the house to the backyard. A retired respiratory therapist, he is a registered community medical volunteer and received a notification at home that a serious medical emergency was occurring nearby. Carla's grandmother waves him over, just as an emergency medical kit drone lands safely a few yards away. She feels her heart pounding in her chest as she watches her neighbor talk to Abdi and quickly access the medication administrator from the drone. He programs the device to epinephrine and sticks it on Carla's arm. It quickly reassesses her vital signs, weight and other parameters and administers the calculated appropriate dose.



A GLIMPSE INTO 2050

Jana Nguyen sits in the back of an ambulance watching live video of the stroke specialists treating the patient she brought to the neurology clinic just 15 minutes earlier. Before reaching the station, a voice interrupts as the dispatch system notifies Jana and her partner, Chip, that they are responding to a call for a sick child. The screen on the wall displays information about their new patient. Jana begins reading about Carla's medical history—other than being born 6 weeks premature, she's been healthy—and sees her current vital signs. Based on information collected on the scene, the AIM—artificial intelligence medic—states that there is an 82 percent probability the patient is experiencing anaphylaxis.

The ambulance accelerates onto the interstate and a few miles later exits onto Highway 133. Traffic is light in this semirural community, and a few self-driving vehicles automatically get out of the way. As they arrive, Jana finishes reviewing the most recent allergic reaction evidence-based update, looks at Carla's latest vital signs and steps out of the ambulance.

A quick respiratory and cardiac scan with a monitor confirms that Carla has some constriction in her airways. Her perfusion levels have improved, though, and she's beginning to regain color in her skin. "How are you feeling?" Jana asks, putting her hand on Carla's shoulder. Still groggy, she says she's starting to feel better. Over the next several minutes, Jana explains to Carla and her grandmother what has happened, while also continually assessing her comfort.

After a few minutes, Jana contacts Abdi again, and asks him for a connection to the EMS physician on call. The physician talks to Carla and her grandmother, reviews the assessment findings, and asks the paramedics what they think. They discuss their findings and agree that leaving Carla at home with her grandmother is the best plan. Carla breathes a sigh of relief and smiles, squeezing her grandmother's hand.

"If it's OK with you, our telemedics will be monitoring your granddaughter and will call to check in shortly," Jana says. "You should get a notification later today about scheduling a visit with an allergist, and the complete report will be available in just a few minutes in Carla's health portal."

The paramedics help Carla inside and make sure she and her grandmother are comfortable with the plan. They quickly do a home health assessment before heading outside to the ambulance. Heading back to the station, Jana reviews the information in her report, which was created based on voice recordings and data transmitted from the Telemedic Center and the medics' diagnostic equipment.

Meanwhile, Carla rests at home and soon feels better. Her grandmother is too nervous to let her play outside, but they find an old movie to watch—an old 2D classic that she remembers from her childhood in the 1990s. The next day, Carla follows up with an allergy specialist, who is able to identify what she reacted to and prescribe gene therapy to prevent future reactions.

To be continued...

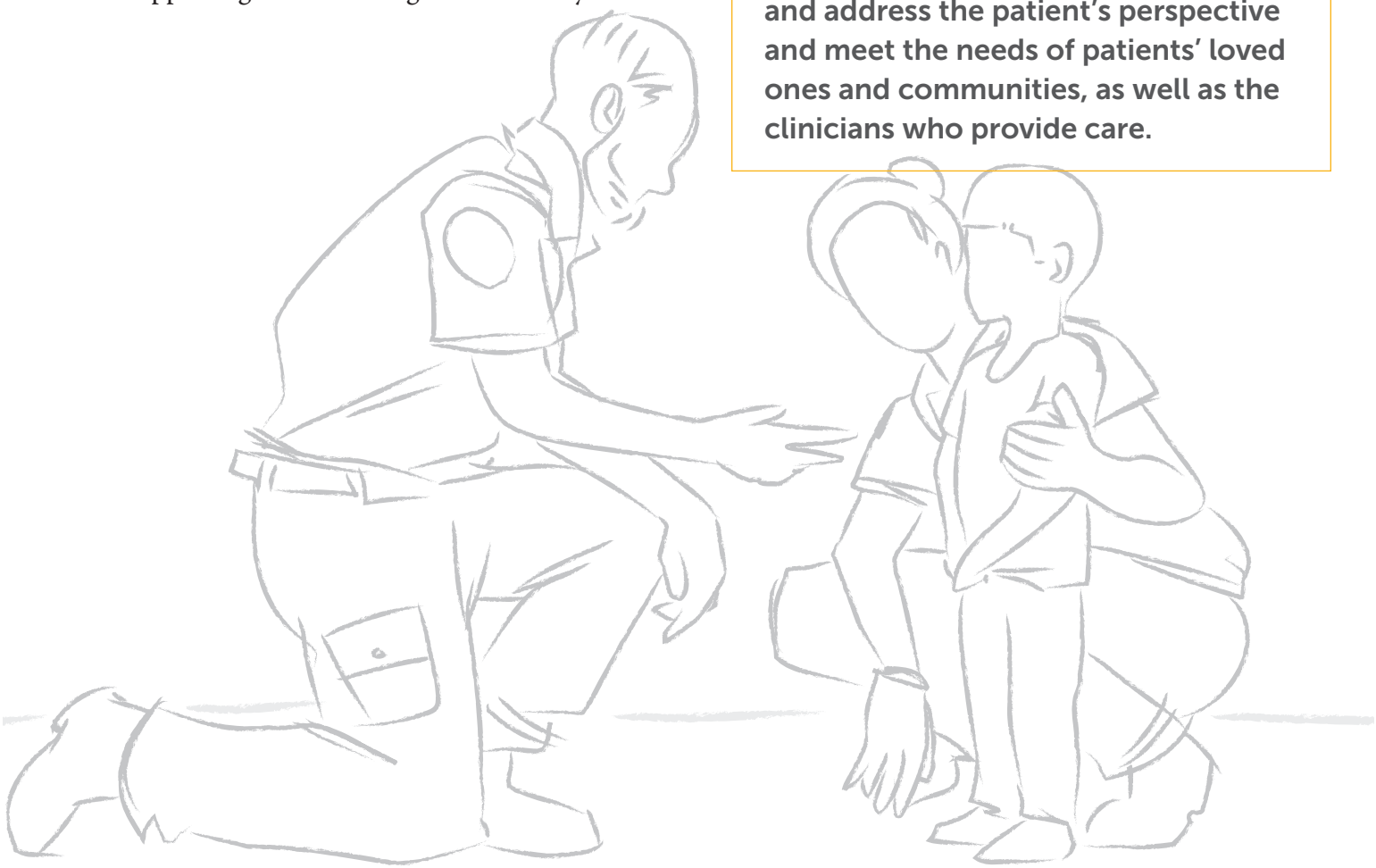
THE VISION

IN 2050, EMS SYSTEMS ARE PEOPLE-CENTERED.

A people-centered EMS system includes processes, protocols, technology, policies and practices designed to provide the best possible outcome for individuals and communities—every day and during major disasters. EMS is a versatile and mobile community healthcare resource, integral to regional systems of care that prevent and treat acute illness and injury, as well as chronic ailments.

The people-centered EMS system serves as the front line of a region's healthcare system and plays a core role in supporting the well-being of community residents and visitors through data-driven, evidence-based and safe approaches to prevention, response and clinical care. EMS organizations collaborate with their community partners and have access to the resources they need, including up-to-date technology and a highly trained, healthy workforce.

WHY PEOPLE-CENTERED? Because while caring for patients is our top priority, we must strive to understand and address the patient's perspective and meet the needs of patients' loved ones and communities, as well as the clinicians who provide care.



In a people-centered EMS system:

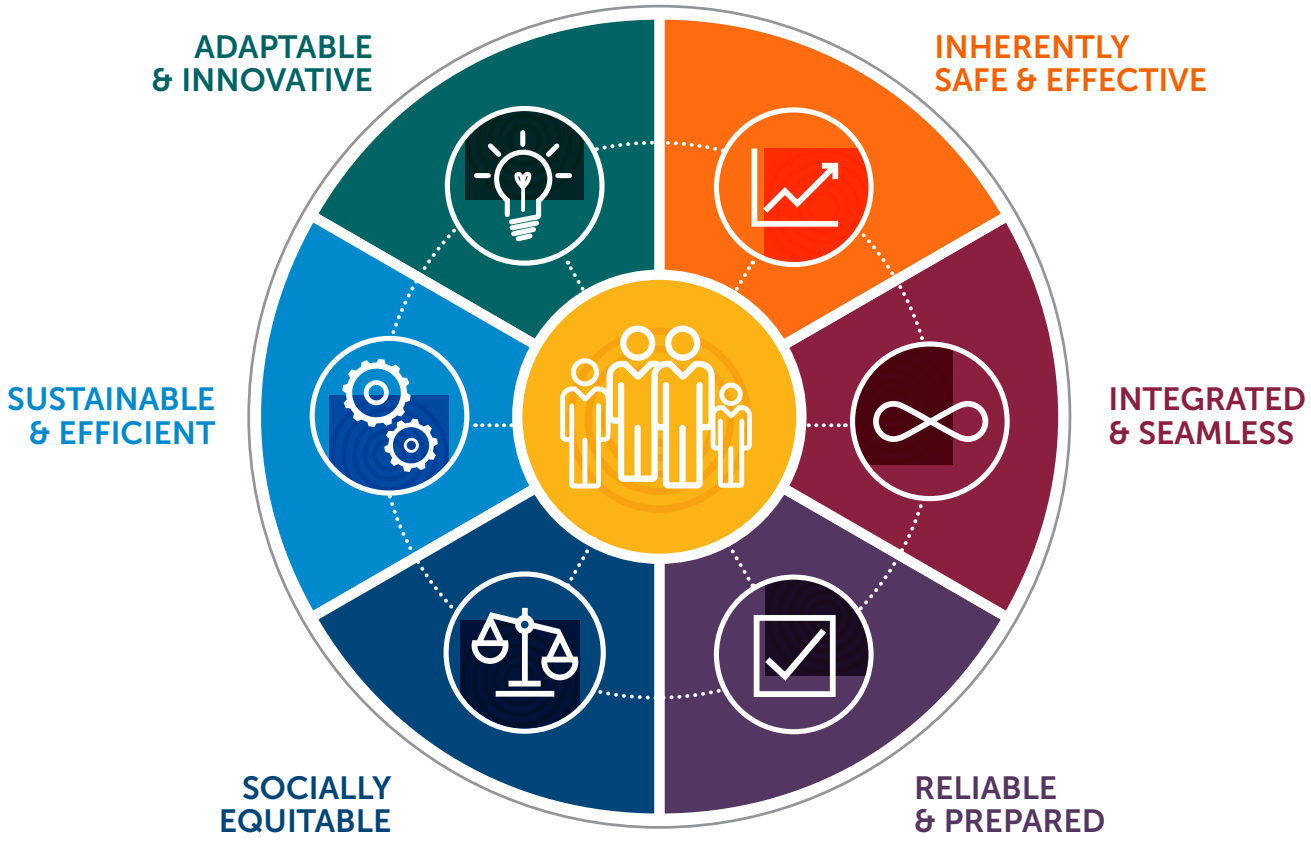
- People will receive comprehensive quality care in the place that is most convenient and comfortable.
- Clinical care will be driven by methodologically sound research, with patients receiving interventions that are proven to produce the outcomes they desire.
- If people would benefit from being transported, they will be moved efficiently and safely using technology that minimizes the risk of injury to both patients and clinicians. The ambulance will not require lights and sirens, but will take advantage of other advances that expedite transit and prevent collisions.
- People will not only receive lifesaving and disease-treating care, they will also receive care that reduces physical, emotional and psychological suffering; EMS clinicians will be given the education and training that adequately prepares them to meet the needs of the people they are called to help.
- EMS systems will be an integral piece of a public health and healthcare system focused on preventing injuries and illnesses, rather than simply responding to and treating them.
- EMS clinicians will have access to, and contribute to, a person's comprehensive medical record, the same one that is used by all other aspects of the healthcare system.
- Prevention, diagnosis and treatment will be supported by comprehensive expert systems that are continuously updated in real time as new scientific advancements emerge.

EMS is a versatile and mobile community healthcare resource, integral to regional systems of care that prevent and treat acute illness and injury, as well as chronic ailments.

THE GUIDING PRINCIPLES

To achieve this vision, EMS systems in 2050 will be designed around six guiding principles.

These principles provide a framework for addressing the most critical aspects of developing a people-centered EMS system. By considering the future of EMS through the lens of these principles, the EMS profession can imagine how the individual attributes of an EMS system—described by our predecessors in the original EMS Agenda for the Future—fit together to create a people-centered system.



WHY 2050?

To some readers, 2050 sounds like some futuristic time, a date we associate with the science fiction books and movies of our youth. In just over three decades, so much can change. Where were we in 1986? The first mobile phones in the United States had been introduced to the market three years earlier—for $4,000 each, equivalent to about $10,000 in 2018. Approximately 10 percent of American households owned a personal computer, and the majority of homes still did not have remote controls for their televisions.

What did EMS look like in 1986? In some ways, very similar to where we are now. People called for help, and ambulances responded, often with two people trained as emergency medical technicians (EMTs) or paramedics. They communicated with dispatchers and the hospital using radios and took most of their patients to hospital-based emergency departments. Many of the basics of clinical care looked the same as well, from defibrillation for cardiac arrests, to epinephrine for anaphylaxis.

EMS has also changed quite a bit since 32 years ago. When people do access 911, they no longer have to find a landline, but instead usually call using the cell phone in their pocket or even send a text message. Hospitals have become specialized, with EMS clinicians making critical decisions about the transport of trauma, stroke and heart attack patients to referral centers, often bypassing other emergency departments along the way. Many EMS systems now have policies to transport patients to mental health facilities when appropriate. Some have implemented policies to treat patients at home and safely avoid unnecessary and expensive transports at all. Technology has also changed, with automated external defibrillators (AEDs) bringing defibrillation first to basic life support (BLS) providers and then to the public. Almost every ambulance has at least one computer, if not two or more, displaying critical information and allowing for real-time communication and data entry. Clinical care has evolved based on research and evidence, with many once-heralded treatments now known to be ineffective or even harmful. And EMS is now recognized as a physician medical subspecialty, with hundreds of board-certified EMS physicians practicing across the country.

History shows that while change can occur rapidly, many systemic and cultural shifts take a generation. EMS Agenda 2050 looks to create a vision for what EMS should become, free from many of the constraints of today's environment. Trying to think that far ahead is a challenge. Some of the ideas presented here will be feasible immediately, while others may take decades to achieve. Many aspects of society, including healthcare, technology and politics, will evolve between now and 2050 in ways that we cannot imagine. But no matter what the future brings us, the principles described in EMS Agenda 2050 are intended to serve as a guide to help us create systems that truly allow EMS to fulfill its mission.

WHAT'S IN A NAME?

The profession continues to debate how well the term "emergency medical services" describes the full scope of services provided by EMS organizations and the EMS workforce. Some leaders have proposed alternatives, including using the term "paramedicine" to describe the profession and "paramedic" for EMS clinicians of all levels.

The EMS Agenda 2050 Technical Expert Panel considered this debate and chose to use "EMS," not necessarily as an endorsement of the continued use of this term or a rejection of alternatives, but in recognition that members of the community who participated in the process of creating this vision have not coalesced around new terminology.

While words certainly matter, even more important are actions. EMS professionals can—and must—take ownership of the future of their profession by implementing the principles of people-centered care, emphasizing the importance of education and embracing their role as providers of healthcare in non-emergent and emergent situations. This culture change will be a significant challenge. Once it takes hold, a change in nomenclature won't just make sense, it will be the only clear path forward.

THE EMS CLINICIAN OF THE FUTURE

EMS clinicians of the future will likely differ significantly from today's emergency medical responders, EMTs, paramedics and other professionals. Already in 2018, organizations and some states have developed certifications or credentials for critical care, community or advanced practice paramedics, whose training and sometimes scope of practice extend beyond the traditional paramedic's. Other services have given roles to behavioral health specialists, physician assistants, nurses and nurse practitioners, among others. In addition, the critical role of EMS physicians has evolved from one who establishes protocols to an integral part of the leadership team, often not only overseeing clinical care, education and other aspects of EMS delivery, but also playing a proactive role in direct patient care, whether through telemedicine or in person.

A future EMS system will rely on a strong backbone of responders with training to provide immediate lifesaving care. Supplementing and overseeing that level of response will be a highly educated EMS professional providing more advanced care. The deployment of all of these clinicians will be based on providing the best care, with the best outcomes, in the most efficient way possible, while providing joy in work for the practitioners.

In today's terms, one might see this as a large network of trained emergency medical responders and emergency medical technicians, with the basic tools and training to stabilize an incident, supported by degreed paramedics, with more extensive education equipping them to work hand-in-hand with other medical professionals, including EMS physicians.

These future clinicians may evolve solely from today's EMS clinicians, with additional clinical and public health education, as well as from other education and certification levels being piloted across the country. No matter how exactly their education is delivered, or what the patch on their shoulders might say, these EMS professionals must be prepared to play a much larger role in managing the health of the patient and the community.

INHERENTLY SAFE AND EFFECTIVE

A GLIMPSE INTO 2050

After returning to the community health center where she and her partner are based, Jana heads to the training room to quickly complete the afternoon fatigue assessment and ensure she's safe to continue her shift. Taking advantage of a few minutes of downtime, she initiates a training scenario. The walls of the training room suddenly change, now appearing like a restaurant. She puts on her safety goggles, which automatically activates a heads-up display and 3D virtual scenario. A woman frantically waves her toward what appears to be a middle-aged man—he can't be over 70—lying on the ground near the door. She quickly scans him and finds that he is not breathing and his heart is in ventricular fibrillation. Her goggles immediately remind her to place a Defib patch on the man's chest, which administers an electric shock and medication to remove any clots in his blood vessels.

Before Jana can initiate a teleconsult with the EMS physician, the walls turn white and she's back in the training room as she's alerted by her watch that there's a real call. An antique 2018 electric sports car struck a deer—vehicle collisions are rare, but occasionally still occur.

In the ambulance, the screen displays the views from a police cruiser and officer's body camera. There's a little bit of damage to the vehicle, which is pulled over on the side of the road. It looks like another car has stopped in front of the damaged one and a bystander is talking to the car's driver and the police officer. Other traffic has been diverted so no vehicles are on the road near the scene of the crash.

Once on the scene, Jana introduces herself to the driver of the car, who is holding his left arm and wincing in pain. Liam, who is 57 years old, thinks his arm is just bruised and he'll be fine. Jana puts a small sticker on his wrist to assess his vital signs. The sticker turns green, indicating that no immediate life threats have been detected—the full set of vital signs soon appears on her watch. Liam's arm is extremely tender and starting to bruise, so Chip puts the imaging gloves on his hands and holds them over the spot of the injury. The display on the glove indicates no fracture was found and there is less than 0.5 percent chance of any vascular injury. It also indicates that based on his vital signs and the injury, it is safe to treat his pain if he has any. Jana puts a nonaddictive pain patch on the site of the injury to provide some localized relief tailored to him specifically.

THE VISION

The entire EMS system, from how care is accessed to how it is delivered, is designed to be inherently safe and to minimize exposure of people to injury, infections, illness or stress. Decisions are made with the safety of patients, bystanders, the public and practitioners as a priority, from how people are moved to hygiene practices in the field and in the ambulance. Clinical care, operations and other aspects of the system are based on the best evidence in order to deliver the most effective service, with a focus on outcomes determined not only by the EMS service but by the entire community and the individuals receiving care.

TODAY'S CHALLENGES

The field of EMS in 2018 has made long strides since the Institute of Medicine described prehospital emergency care as a "stark example of how standards of care and clinical protocols can take root despite an almost total lack of evidence to support their use."[1] With a growing research base and more attention being paid to evidence and outcomes, most EMS clinicians are now using clinical care guidelines rooted in science, but much work remains.

Despite the improvements, EMS systems across the country, both large and small, rural and urban, sometimes fall short of providing safe and effective care. Best practices, based on evidence and patient-centered outcomes, frequently take years—or decades—to become broadly implemented across the country. Many organizations lack the resources, initiative or desire needed to implement meaningful performance measurement and quality improvement systems, leaving them in the dark as to whether the care they are providing is truly safe or effective.

Creating a safer and more effective EMS system has been a priority of many EMS leaders, as evidenced by the development of the *Strategy of the National EMS Culture of Safety* and creation of the National EMS Safety Council and National EMS Quality Alliance. But these national efforts will only be effective if they translate to local action. EMS systems must adopt a culture of safety that retains existing initiatives to improve driving and patient lifting techniques and also addresses other areas of patient, public and clinician safety, including diagnostic and treatment errors, hygiene practices, and much more.

A people-centered approach to a safe and effective EMS system will focus on interventions that have demonstrated benefit and prevent further injury and illness, while avoiding those that are ineffective or harmful.

[1]Institute of Medicine. Emergency Medical Services at the Crossroads. Washington, DC: National Academies Press; 2006.

WHAT 2050 LOOKS LIKE

EMS care and operations across the country focus on practices that yield good outcomes and reduce harm.

EMS care in every community is based on the best available evidence and best practices, with a focus on outcomes determined by the community and the patients, including patient-reported outcome measures. These outcomes, as well as the evidence-based processes involved in achieving them, are measured and publicly reported.

EMS leaders, including administrators, physicians and EMS clinicians, take ownership and responsibility for ensuring the care delivered in their systems adheres to evidence-based practices.

Community and regional quality improvement systems measure, analyze and work to improve outcomes for patients, EMS professionals and members of the broader community. These systems cut across organizational boundaries and include input from across the care continuum, including, but not limited to, patients and their families, first responders, EMS professionals, hospitals and medical specialists.

> **"The entire system design should be refocused on producing good outcomes."**
>
> — Member of EMS Agenda 2050 Technical Expert Panel

EMS systems at local, regional and state levels embrace a culture of safety.

Education and training for EMS professionals covers all aspects of clinician and patient safety with a focus on evidence-based methods of harm reduction.

EMS systems across the country use a standardized method of collecting and reporting data on medical errors, injuries to patients, clinician injuries and illnesses, near-hits, and other safety issues in order to evaluate improvement efforts, facilitate research, and develop evidence-based safety training and procedures.

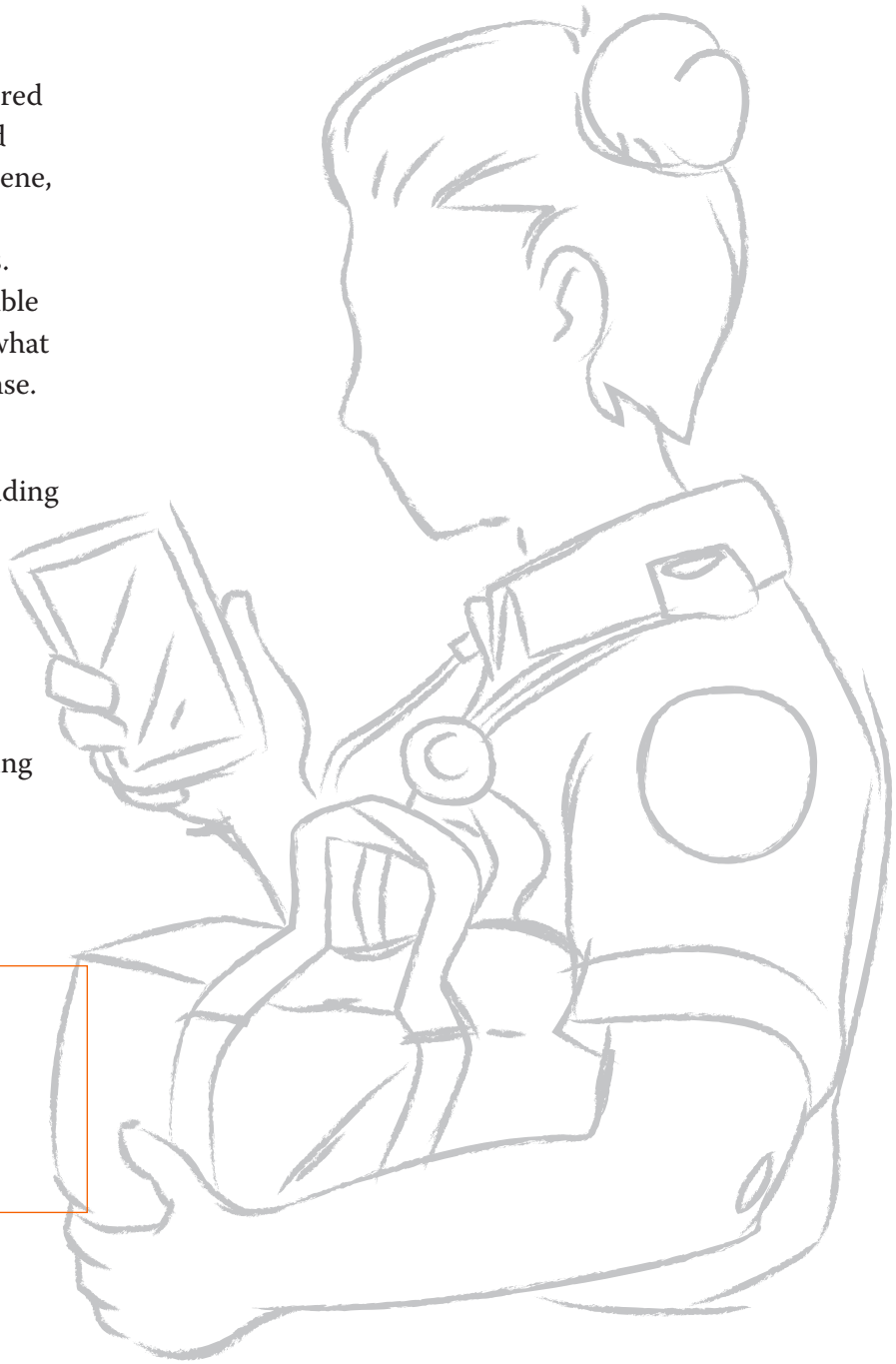
Funding and regulatory mechanisms promote safe and evidence-based practices, with a focus on improving outcomes and reducing harm rather than rewarding specific procedures or services.

Integrated technology provides real-time situational awareness and decision support to improve safety and reduce errors.

Real-time and predictive information is delivered to emergency medical telecommunicators and first responders prior to their arrival on the scene, including video and sensor data provided by patients, bystanders or devices such as drones. With this information, responders are better able to assess the safety of a scene and determine what resources might be needed early in the response.

Wearable devices alert EMS professionals to any potential safety hazard, from threats including nuclear, chemical or biological contamination to personal health issues that might impede their performance, such as heat exhaustion or excessive fatigue.

Real-time, automated artificial intelligence supports clinician decision-making by analyzing information instantaneously, including data from patient records, diagnostic equipment and other inputs.



EMS clinicians can focus on clinical decision-making and compassionately communicating with patients.

EMS systems prioritize technology, equipment and policies that use proven methods to limit the safety risk to EMS clinicians and patients.

EMS clinicians only lift and move patients in extremely rare circumstances, instead using technologies and mechanized equipment, avoiding injuries to both providers and patients.

Responders no longer use lights and sirens to race to a scene or transport patients. Instead, bystanders on the scene initiate first aid using public access equipment and guided by real-time integration with medical telecommunicators or other medical professionals. EMS clinicians deliver time-sensitive, lifesaving interventions on scene. In rare situations when rapid movement is required, infrastructure design and integrated technologies allow for more efficient and safer response and transportation of patients.

Medication delivery systems use real-time and historical data from health records to deliver appropriate and correctly dosed medications specific to each patient. EMS clinicians never calculate or measure out a drug dose, eliminating medication-dosing errors completely. Instead, they can focus on clinical decision-making and compassionately communicating with patients about their condition.

Evidence-based methods prevent EMS personnel fatigue from impacting the safety of the workforce, their patients or the public. These methods may include, but are not limited to, regulations to limit the number of consecutive hours worked by EMS personnel; adequate breaks and rest during shifts; sufficient pay and staffing to avoid the need for working extensive overtime or multiple jobs; and physiological or other types of testing to objectively measure an EMS worker's level of fatigue before, during and after shifts.

EMS data systems securely protect patient information and privacy.

Patient health information is owned by patients, but relevant information is readily accessed by EMS professionals and other personnel, as appropriate.

EMS systems invest in the equipment and expertise necessary to maintain and adequately secure data systems, which use the most advanced methods of protecting patient privacy.

AN INHERENTLY SAFE AND EFFECTIVE FUTURE

EMS systems must no longer be based on unproven processes, outdated medical interventions and outcomes determined by organizations and EMS clinicians without input from members of the community. Instead, EMS professionals should foster a culture that champions safety, the delivery of high-quality care and consistent performance. A people-centered EMS system will be built on a foundation of people-centered goals, focused on achieving patient-determined and community-guided outcomes.

INTEGRATED AND SEAMLESS

A GLIMPSE INTO 2050

With the patch helping to manage the pain in his arm, Liam is feeling much better. As Jana reviews the relevant information in Liam's medical record to make sure he has no major risk factors, an alert appears—Liam's blood sugar is a little outside his normal range. She's surprised—her teachers had taught her that these alerts happened so rarely now that most people monitor their own vitals regularly at home and received immediate treatments.

She tells him what she found, and says that while it's urgent, it doesn't need immediate treatment—but she tells him to continue to wear the vitals monitor for a few days to track his blood sugar. "Your primary medical team will contact you if they notice anything that needs attention," she explains. "They'll also follow up with you to make sure your arm is feeling better."

The self-driving transit vehicle, automatically sent by a Telemedic, arrives and Liam gets in, headed home. Jana and Chip return to the ambulance. They view the automated report, compiled by the computer through data transmission and voice recognition. It looks good, so Jana verbally confirms her authorization to complete the report and send it to Liam and his medical team.

THE VISION

Healthcare systems, including EMS, are fully integrated with each other and with the communities in which they operate. Additionally, local EMS services collaborate frequently with their community partners, including public safety agencies, public health, social services and public works. Communication and coordination between different parts of the care continuum are seamless, leaving people with a feeling that one system, comprising many integrated parts, is caring for them and their families.

TODAY'S CHALLENGES

EMS cannot adequately serve members of the community without being better integrated with its partners in healthcare. While the healthcare industry has made some progress breaking down barriers and removing silos, much work remains—and EMS has often struggled to find a "seat at the table."

EMS must also collaborate closely with public safety colleagues and emergency communications systems, as well as public health, mental health and social service resources, and many other public and private organizations. At any given time, EMS services may need to integrate with these agencies while responding to a major disaster, work with them to create an individual care plan for a patient, or share data in order to plan for future events.

The potential to improve information sharing already exists but has yet to be realized. Technology has made it possible for EMS to provide and receive real-time data that can help with decision-making, from patient's health records to safety information about a response location. In some ways, the inability to fully integrate data and technology is emblematic of EMS's challenges in integrating with healthcare at a higher level. EMS agencies trying to convince healthcare and hospital systems to share data frequently report difficulty convincing others of the value of that information exchange. A concerted effort to show how integration of information, communication and care will improve outcomes needs to be undertaken to help bring EMS and its partners in healthcare closer together.

Integrated and seamless goes well beyond technology platforms, though. In a seamless system, jurisdictional borders matter less than getting the right care to the right patient; and the entire team—first responders, healthcare providers, social services and many more—shares unified goals and objectives. Technology can serve to facilitate the system, but education, communication and collaboration will serve as its foundation.

WHAT 2050 LOOKS LIKE

EMS personnel have immediate access to any resources they need for their patients, including other healthcare providers, social services and community resources.

EMS clinicians know what resources are available and are able to connect patients to the appropriate organization or person who will provide the care or service they need.

Information and communication systems are connected and continuously updated and improved to ensure immediate access to the right resource for the right patient.

Medical communication centers, integrated with public safety answering points, serve as hubs for acute and non-acute unscheduled healthcare, using evidence-based methods to triage potential patients and provide the appropriate resource or referral, including telemedicine care.

> **"As EMS becomes more integrated into the broader healthcare delivery model, the need for collaboration and stakeholder engagement is going to be vital."**
>
> — EMS Professional

EMS and its partners coordinate to provide the most appropriate care to the patient, with transport to a healthcare facility being just one option.

Hospitals, skilled care facilities, medical offices and EMS communicate and collaborate to ensure smooth transitions of care for patients and their families.

All EMS assets in a region, including air medical resources, public and private systems, response agencies and inter-facility transport agencies, are part of a regional system of care that takes advantage of each partner's strengths to deliver the optimal, efficient and effective services needed at any moment.

EMS professionals can access and contribute to a fully integrated, patient-centered medical record that is owned by the patient.

A real-time healthcare data system that can be accessed remotely by both patients and clinicians through a safe and secure authentication process delivers pertinent patient health information to EMS personnel in the field. The information is easily digestible and relevant to the care and treatment decisions being made in the field.

Interoperability guidelines for healthcare information exchange at local, state and national levels include EMS as an essential provider and recipient of critical data.

EMS professionals are part of the patient's medical team, with access to their care plans and providers. Patient medical information is updated in near real time, so the entire care team is aware of what other providers are doing as they are doing it.

EMS clinicians and EMS system leaders receive rapid feedback, including patient outcome information and other patient data from the healthcare continuum, in order to improve performance measurement, quality improvement and education.

EMS data inform decisions made not only in EMS, but also in other areas of the community and to support population health and preparedness.

EMS data systems deliver real-time knowledge about patterns of disease, injury and access to care. Information collected and shared in these systems informs decisions made related to healthcare operations, public health and interventions related to social determinants of health and injury and illness prevention.

EMS and public health data are integrated in ways that aid in the monitoring and identification of emerging outbreaks or demographic trends in injury and illness patterns.

The education of EMS and other healthcare professionals promotes and supports an integrated system of care.

Interprofessional education systems prepare EMS professionals and their healthcare colleagues to work collaboratively together. Students learn early on in their education about the roles and responsibilities of other providers on the healthcare team and also spend time with those providers in both the clinical and educational environments.

Education of advanced EMS clinicians includes a comprehensive orientation to public health, social services, mental health and social determinants of health in a way that truly empowers them to provide integrated care. Curricula also ensure that EMS professionals are prepared to collect, share, analyze and use the data available to them.

EMS physicians lead a collaborative system of medical oversight and direction that also draws on other providers' expertise when needed.

EMS physicians' education and training prepares them to be leaders and patient advocates who lead the medical oversight of regional systems for acute and non-acute unscheduled healthcare, with expertise in the clinical aspects of care, as well as disaster management, telemedicine, care coordination, patient navigation and the social determinants of health.

EMS medical oversight for specific patients and populations includes close collaboration with the physicians who make up the patients' medical home. Care plans are developed in conjunction with EMS physicians to ensure the most appropriate use of EMS resources to care for the patient.

Input from other specialists, including but not limited to pediatricians, psychiatrists and other behavioral health experts, pain specialists, cardiologists, neurologists and pharmacists, is a key part of EMS care—from overall system development to real-time decisions for individual patients.

Technology connects patients, EMS clinicians and EMS physicians, patients' doctors or specialists when direct consultation adds value and improves outcomes.

EMS and its partners in public safety learn together, train together and prepare together in order to respond as a unified team.

EMS education systems include other public safety partners to ensure members of the team are aware of each other's roles and limitations and work together to coordinate operations and patient care.

Planning and training for scheduled and unscheduled events that will impact the health and wellness of the community includes EMS leaders and clinicians.

Interoperability of communications and data systems ensures that organizational and jurisdictional differences do not inhibit sharing of critical information before, during or after any incident.

AN INTEGRATED AND SEAMLESS FUTURE

A truly integrated system will go beyond sharing data and communicating during or after a specific incident or episode of patient care. To create a seamless system, EMS professionals and their community partners must commit to the same shared objectives and find ways to achieve them together. A people-centered EMS system takes advantages of the strengths and resources brought by each organization and clinician to protect the health and wellness of individuals and communities.

RELIABLE AND PREPARED

A GLIMPSE INTO 2050

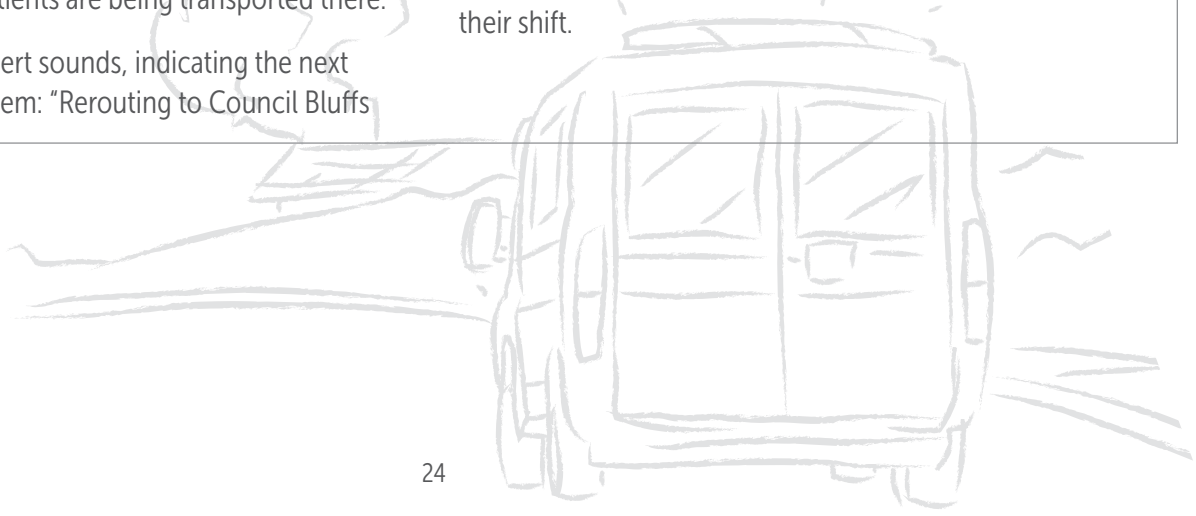
The ambulance has just started heading south when an alert flashes in front of Jana. An explosion has occurred across the river just outside of Council Bluffs, Iowa. She knows the area—she received her paramedic education and was initially licensed in Iowa. To pay for her degree in paramedicine, she signed up for a national service program, which assigned her for two years to her current area outside of Omaha. Her next deployment could be anywhere, although she would request a remote location out west; she loves the chance to see new places, expand her skills and help ensure paramedic coverage for communities that need it.

The explosion occurred three minutes ago and Chip and Jana are one of dozens of units on the initial response, but they are several minutes away. First responders and EMS personnel are arriving on scene, as are additional driverless vehicles to help transport seriously injured patients. The video feeds show Jana and Chip a tremendous fire and large amounts of smoke—it's hard to see how many people are hurt or what else is happening on the scene. They receive notifications that several patients are being taken to the burn center in Omaha. At the same time, a mobile burn unit is en route to one of the local trauma centers to augment its capabilities and other patients are being transported there.

A few minutes later, an alert sounds, indicating the next message is directly for them: "Rerouting to Council Bluffs Hospital for triage and decon assignment." Jana knows that probably means most of the patients have already been transported. Chip has special training in hazardous materials medicine; he will be assisting the emergency team at the hospital, while Jana will be assigned to help triage the patients arriving.

They immediately go to work. Although she's never been to this particular hospital before, she easily follows the directions of her augmented reality heads-up display and reports to her post, near the entrance. The heads-up display also shows basic information about patients on their way to the hospital, with numbers continually updating. Vehicles are arriving—some ambulances, some smaller cars with just a patient or a patient and a paramedic or a trained civilian responder. With the hospital staff now busy treating patients, paramedics like Jana take over initial triage and intake. She also records brief audio messages about each patient for the hospital staff.

After about 30 minutes, the last patient has been triaged. While hospital staff continue to treat the injured, Jana and Chip meet with the Clinician Mental Health Response Team before receiving the OK to return back to their station, where they will get a chance for a short rest before finishing their shift.

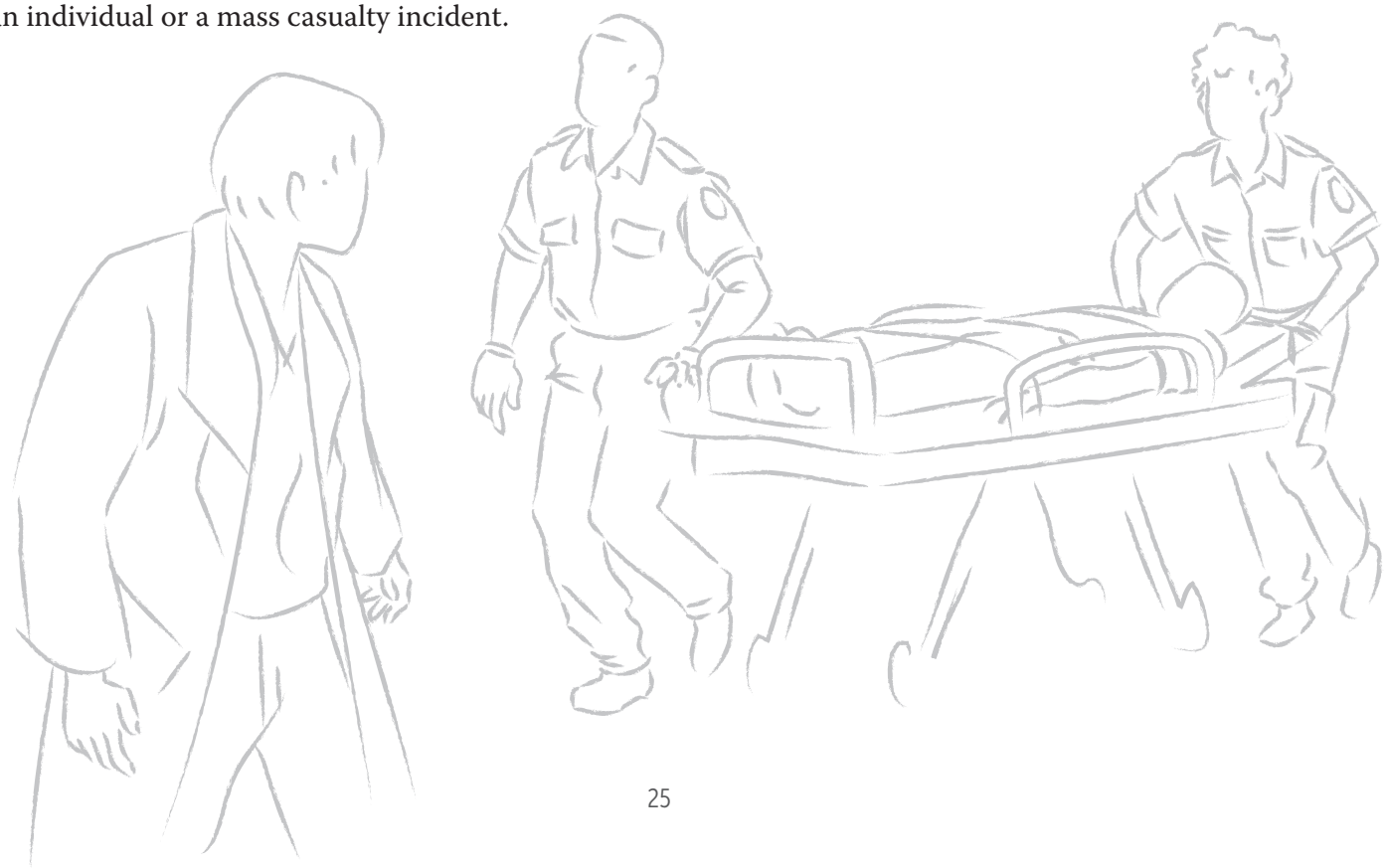


THE VISION

In 2050, patients receive reliable EMS care that is consistent, compassionate and guided by evidence—no matter when or where they need help or who the agency or individual EMS clinician is. EMS systems are prepared for anything by being scalable and able to respond to fluctuations in day-to-day demand, as well as major events, both planned and unplanned.

TODAY'S CHALLENGES

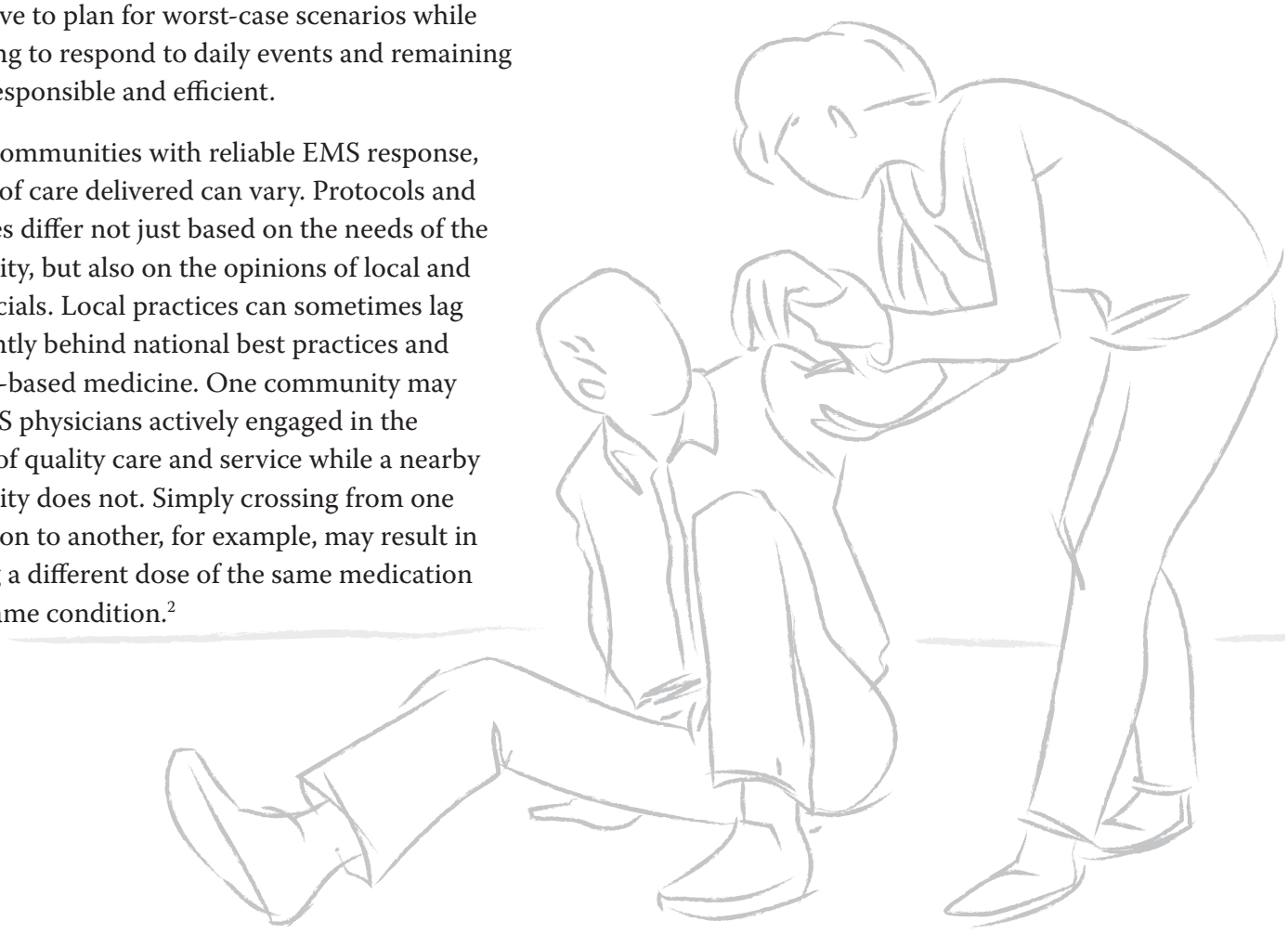
Over the last half-century, the EMS profession has transformed from a patchwork of responders, who may or may not have been available in every community, to a system that most Americans can rely on to respond, provide medical care and take them to the hospital. The public generally expects that when they call 911 for a medical emergency, someone will come—day or night, rain or shine, for an individual or a mass casualty incident.



Yet in many ways, EMS systems still struggle to be reliable and prepared. Inconsistencies abound, with levels of service varying based on location, time of day or other factors. In many urban settings, EMS systems find it difficult to keep up with increasing demand. In rural communities, a lack of personnel and other critical EMS resources compounds the overall strained healthcare infrastructure. Across the country, those responsible for training and education of EMS professionals at all levels are challenged to keep up with changing needs of the workforce, the evolution of the practice of out-of-hospital medicine and a high turnover rate. Threats from domestic terrorism to natural disasters strain the capabilities and capacity of local systems, which have to plan for worst-case scenarios while continuing to respond to daily events and remaining fiscally responsible and efficient.

Even in communities with reliable EMS response, the level of care delivered can vary. Protocols and guidelines differ not just based on the needs of the community, but also on the opinions of local and state officials. Local practices can sometimes lag significantly behind national best practices and evidence-based medicine. One community may have EMS physicians actively engaged in the delivery of quality care and service while a nearby community does not. Simply crossing from one jurisdiction to another, for example, may result in receiving a different dose of the same medication for the same condition.[2]

These inconsistencies and difficulties in providing reliable care across the country can be overcome. While funding is critical, money is not the only barrier; changes in EMS culture and matching public expectations with need are also crucial. Technological advances are also making it possible for healthcare providers to interact with patients in new ways, bridging divides created by geography and cost. Many barriers to providing unscheduled healthcare today will likely no longer exist in 2050. It is up to EMS professionals to ensure that we take advantage of those changes and commit ourselves to creating a truly reliable and prepared system that serves all communities.



[2]Rostykus P, Kennel J, Adair K, et al. Variability in the treatment of prehospital hypoglycemia: a structured review of EMS protocols in the United States. Prehospital Emergency Care. 2016; 20(4):524–530.

WHAT 2050 LOOKS LIKE

Adequate staffing for EMS exists across the nation.

Fully staffed EMS systems provide reliable and consistent service in every community through a diverse variety of service delivery models. Local communities prioritize the provision of out-of-hospital, unscheduled care by ensuring the availability of safe, educated and highly capable, and appropriately compensated EMS clinicians, managers and EMS physicians. Licensed and credentialed career and volunteer EMS clinicians serve under adequately resourced medical oversight systems, led by credentialed EMS physicians.

In addition, members of the community play an expanded role in EMS systems, including:

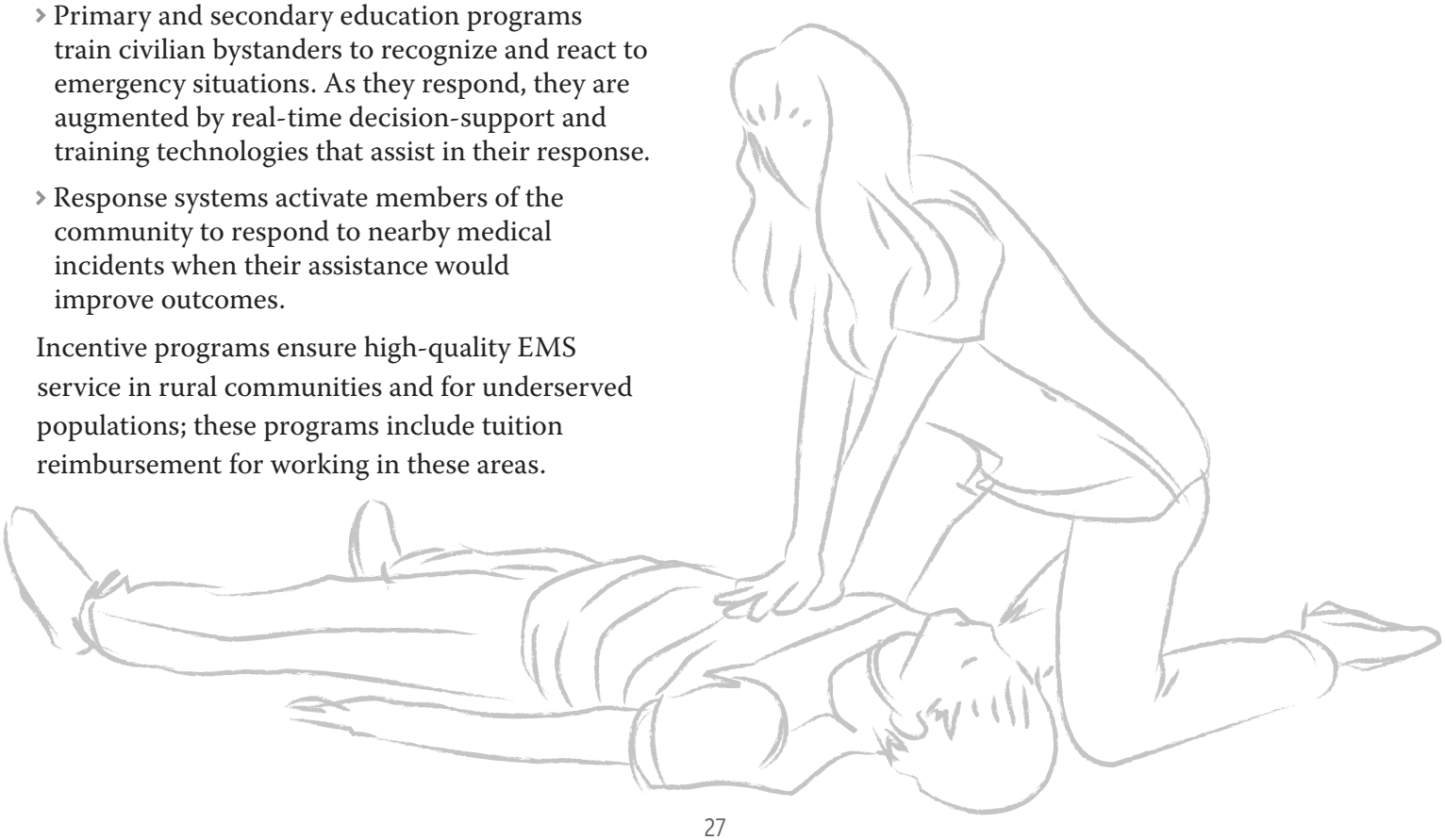
- Primary and secondary education programs train civilian bystanders to recognize and react to emergency situations. As they respond, they are augmented by real-time decision-support and training technologies that assist in their response.
- Response systems activate members of the community to respond to nearby medical incidents when their assistance would improve outcomes.

Incentive programs ensure high-quality EMS service in rural communities and for underserved populations; these programs include tuition reimbursement for working in these areas.

Career opportunities encourage members of the EMS workforce to pursue further education while remaining clinical providers, through the creation of EMS subspecialty and leadership education programs, as well as the further integration of EMS with other healthcare professions.

EMS systems take advantage of veterans' military medical training and experience, designing specific programs to bridge any educational gaps and ensure that veterans are adequately prepared to work in nonmilitary EMS environments.

The EMS profession prioritizes physical and mental readiness and resilience of the workforce.



The variability of care from community to community is reduced, while still meeting specific community needs and allowing for innovation and continuous improvement.

EMS practitioners at all levels deliver care guided by best practices and evidence as established through peer-reviewed research led by trained investigators. A minimum standard establishes a baseline for care throughout the country. Variations from the standard are made only to improve outcomes, including the patient experience, or to reduce costs without negatively impacting outcomes, based on the specific characteristics of the community and under the oversight of credentialed EMS physicians.

Licensed EMS clinicians are granted the privilege to practice across the country, with all EMS professionals able to practice at the level that their education prepares them for.

Technological advances are making it possible for healthcare providers to interact with patients in new ways, bridging divides created by geography and cost.

The education of EMS clinicians reflects practice in the field and prepares them to take care of patients in any environment.

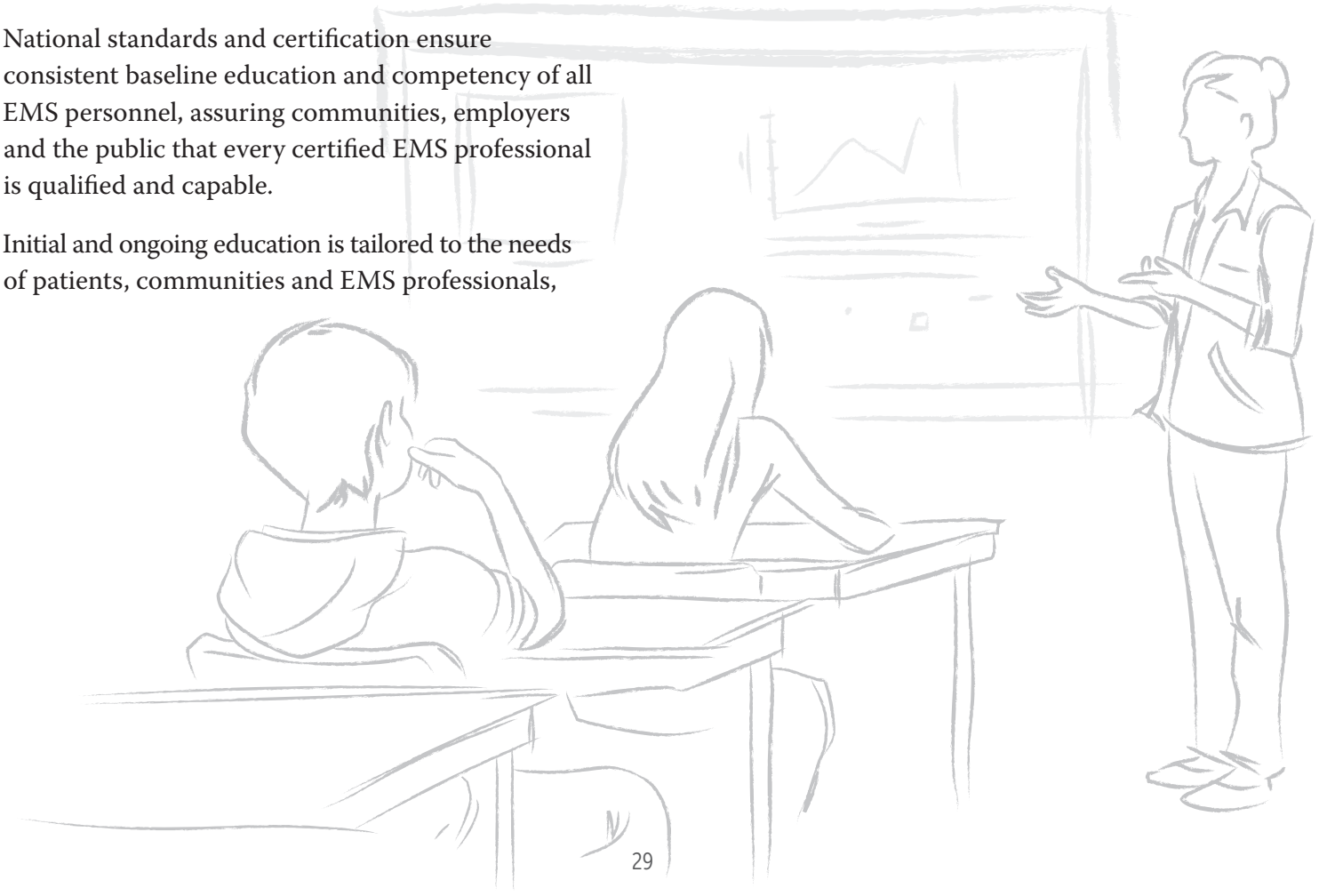
The education of all EMS professionals occurs in an academic setting, with a focus on clinical and operational problem-solving and decision-making. EMS educational programs are led by qualified teams of EMS physicians and educators who have been carefully selected, groomed and educated to prepare future EMS clinicians to deliver people-centered care. These teams include experts in the design and delivery of educational programs.

Clinical education includes realistic simulation and time in patient-care settings, with opportunities to perform hands-on assessments and technical procedures and develop critical communication skills while under the supervision of trained clinical educators.

National standards and certification ensure consistent baseline education and competency of all EMS personnel, assuring communities, employers and the public that every certified EMS professional is qualified and capable.

Initial and ongoing education is tailored to the needs of patients, communities and EMS professionals, taking advantage of technology and data to deliver education that fills gaps and supplements previous education to ensure continued competency and further growth. Technology facilitates "just-in-time" education focused on the current and emerging health needs of the community.

Opportunities exist for EMS professionals of all levels to receive specialty education and certifications. These specialists provide education in their areas of expertise and are also used when their services are needed in the field. Personnel information systems maintain accurate records of EMS professionals' specialty training to ensure the right resources can be utilized at the right time based on the needs of patients and communities.



EMS systems prioritize leadership development and succession planning, supported by EMS higher education programs.

Educational programs prepare all EMS professionals to take on leadership roles, helping EMS systems develop leaders who can fill roles ranging from field supervisors to executives. Opportunities also exist for aspiring EMS leaders to further their education and obtain advanced degrees that prepare them to lead and improve EMS systems.

> **"In the future I hope EMS will embrace continual learning that is timely, targeted and evidence based."**
>
> — EMS Professional

The delivery of high-quality EMS is a multidisciplinary endeavor that includes well trained and educated paramedics, nurses, advanced practice providers and physicians. Aspiring EMS leaders are recognized and encouraged early in their careers through proven methods of identifying those with the potential and desire to lead. They are given opportunities to take on new challenges that broaden and deepen their experiences and provide them a pathway to take on more responsibility and leadership throughout their careers.

Regional systems of disaster medical care ensure appropriate resource allocation and organization of resources during a major incident.

Regional Communication Centers ensure that everyone has immediate access to a trained professional via voice, video, text or other means of communication. Whether during an average day or a surge in demand or a major disaster, these centers use the combination of technology and educated personnel to quickly determine the resources needed and how to either deliver those resources to the patient, or the patient to those resources.

Allowing flexibility in the practice settings of healthcare providers, especially during disasters and other major events, strengthens the resilience and preparedness of the overall healthcare system.

For example, hospital-based providers receive training and are credentialed to practice in out-of-hospital settings when disasters are declared, and field EMS personnel are utilized in hospitals or other facilities when large numbers of sick or injured people exceed their capabilities.

With fewer patients receiving in-hospital care, EMS clinicians are trained and fully prepared to treat, evacuate and care for "hospital at home" patients and other residents of the community with special needs during a disaster.

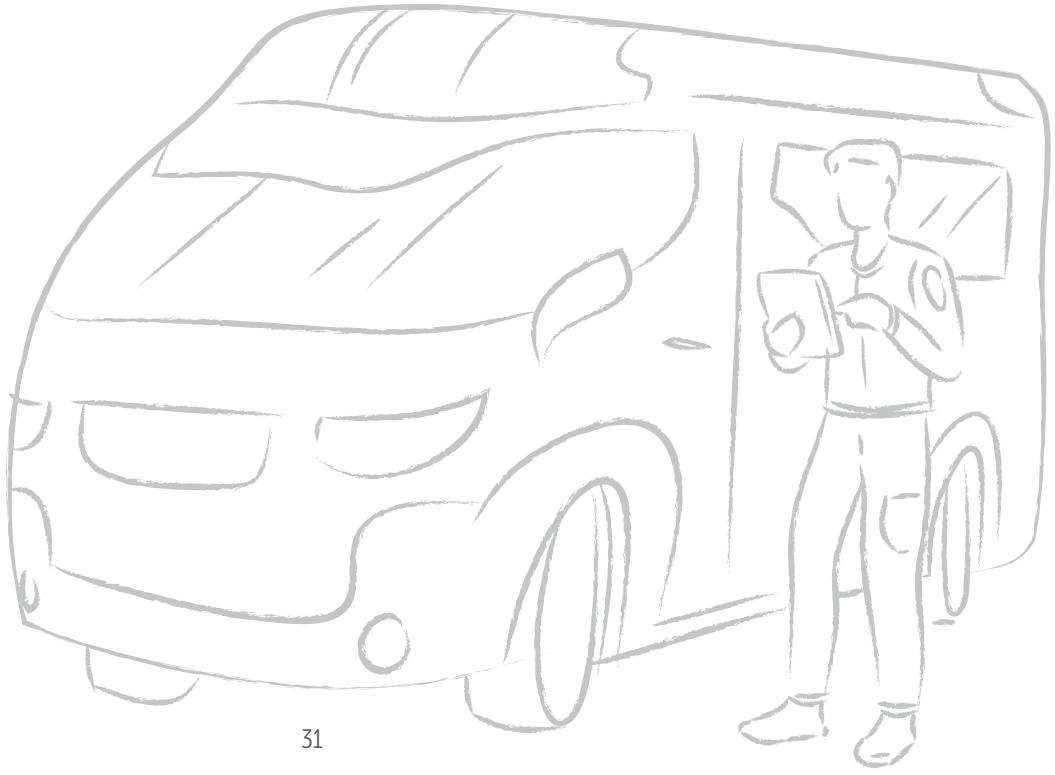
Real-time and historic data are used to predict or immediately respond to emergencies from cardiac arrest to mass casualty incidents.

Healthcare and other information systems are used to help identify members of the community in need of special assistance before, during and after disasters. Community disaster planning takes this information into account, with EMS at the table serving as a critical leader and collaborative partner.

These systems also deliver real-time information that helps keep patients and their families connected and informed.

A RELIABLE AND PREPARED FUTURE

From managing large incidents with only a small number of personnel to improvising equipment, members of the EMS profession have long taken pride in their ability to overcome challenges related to inadequate staffing, resources and preparation. A people-centered EMS system is prepared to reliably provide the right care at the right time for the right patients—through planning, education, leadership and communication that ensure the entire nation is protected.



SOCIALLY EQUITABLE

A GLIMPSE INTO 2050

Jana's alarm ends her brief nap—she and Chip have been assigned to conduct a few follow-up visits. While the telemedics conduct many follow-ups virtually, sometimes paramedics are sent to do them in person.

In the ambulance, Jana taps the screen and a physician's image appears. While Jana has never met this physician before, she recognizes her from previous patients' charts. Jana taps her earpiece so the sound will come through it, rather than the main speakers. The doctor is explaining that the patient, Abigail Maina, is scheduled to receive an artificial heart any day now. She's been a little short of breath the last few days, and her monitors indicated she has some fluid overload.

"Does she live alone?" Jana asks. As the doctor responds—the answer is yes—Jana has to remind herself that the image is an avatar, not a live video, programmed to respond as Ms. Maina's actual primary physician would. Jana continues asking questions and learning more about Ms. Maina until they arrive in front of a small home with a yard in need of a mow.

Ms. Maina opens the door. She does not speak English very well, but wears a hearing aid that translates into her native language. Jana's earpiece will translate into English so she can understand what Ms. Maina says.

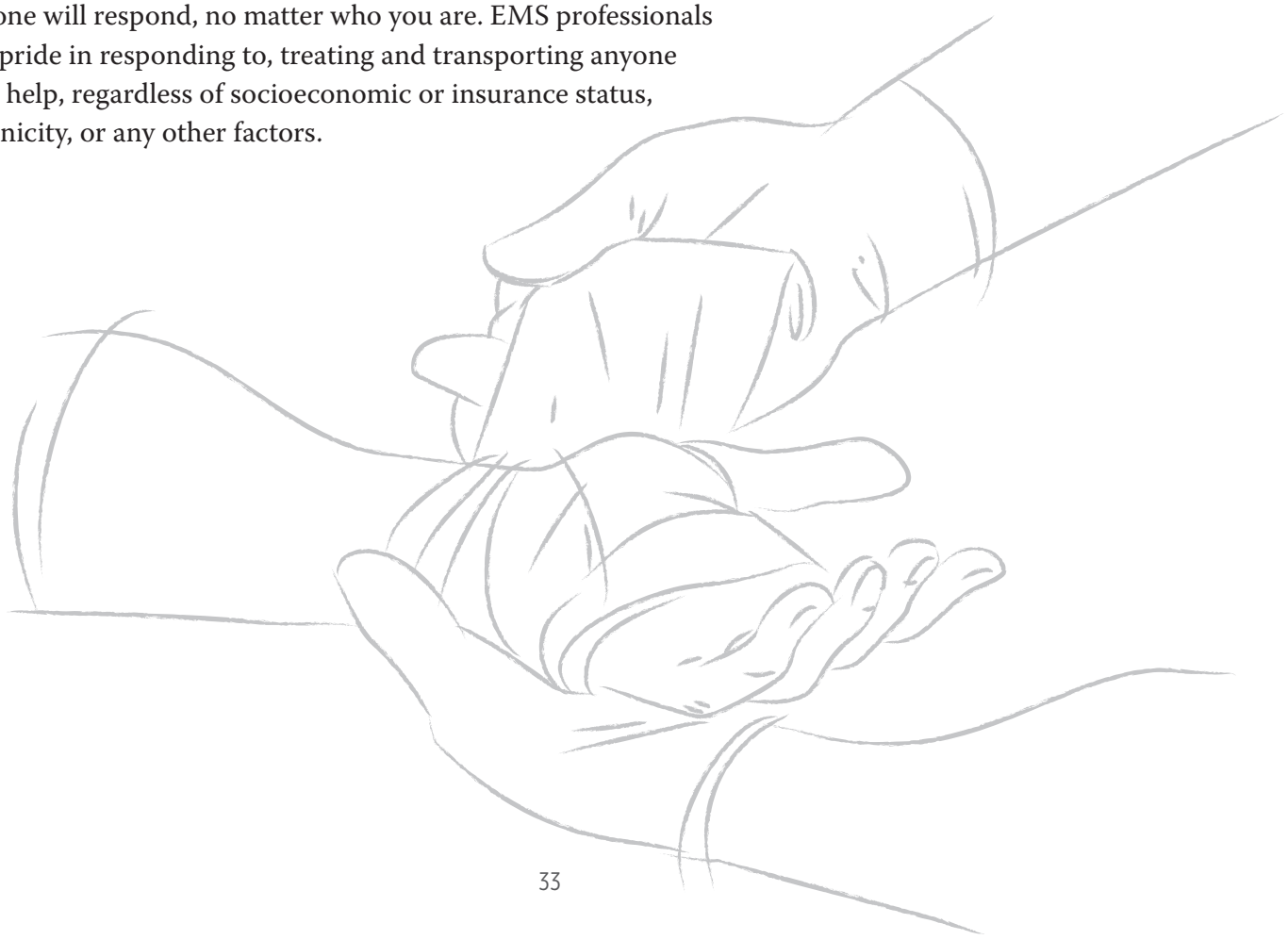
It's clear to Jana that Ms. Maina feels extremely worried. She says her breathing has improved over the last few hours since her medication patch adjusted the dose in response to her fluid levels, but she's nervous that it could still get worse again and she won't be able to have her surgery. She's also concerned about who will help take care of her home while she's recovering. Jana reassures the 68-year-old woman that her medical condition is being controlled, and sends a quick request for a community volunteer to help Ms. Maina with the house once she returns home.

THE VISION

In a socially equitable system, access to care, quality of care and outcomes are not determined by age, socioeconomic status, gender, ethnicity, geography or other social determinants. In every community in the nation, EMS systems provide any resident or visitor the best possible care and services, in order to maintain the health of individuals and populations. Caregivers feel confident and prepared when caring for children, people who speak different languages, persons with disabilities or other populations that they may not interact with frequently.

TODAY'S CHALLENGES

For several decades, EMS has considered itself part of the "safety net" of the healthcare system. Nearly anywhere in the country, if you call 911, someone will respond, no matter who you are. EMS professionals often take pride in responding to, treating and transporting anyone who needs help, regardless of socioeconomic or insurance status, race or ethnicity, or any other factors.



Yet even the best efforts of EMS professionals around the country have not prevented disparities in care. Research shows that in EMS, like the rest of healthcare, what a person looks like or where she lives can impact the level of care she receives, at the system level and the individual level.[3,4] These disparities are not solely the result of explicit bias against people in rural communities or endemic racism; they also stem from systemic and complex issues such as inadequate funding, a lack of cultural competencies, and implicit bias—the unconscious prejudices we all harbor. EMS professionals must recognize that these problems exist and seek to measure them and improve.

Socially equitable care in a people-centered EMS system does not mean every patient receives the exact same care—but it does mean differences in care are based on evidence and the desires of patients and their families. Some reasons for inequity in healthcare may seem beyond the scope of EMS, as they are not the result only of our actions but also of inequality at a much higher level. There are ways EMS can help address even these larger socioeconomic disparities, though—such as offering patients more appropriate options for care and taking advantage of technology to bring resources to communities that may not have them.

When people suffer a medical emergency, the emergency telecommunicators and EMS professionals who care for them are often some of their greatest advocates. On the phone and in the ambulance, those caregivers usually have only one patient, and they focus all of their energies on that person regardless of who he is, where he was picked up or what insurance he has. The EMS profession has a great opportunity to build on that one-to-one relationship during the time of care and become a strong advocate for reducing disparities and ensuring that everyone gets exceptional care.

> **"EMS training might be enhanced to create more awareness of social issues. Well-rounded individuals well-versed in broader societal issues could approach care differently."**
>
> — Comment from member of EMS community

[3]Hewes HA, Dai M, Mann NC, Baca T, Taillac P. Prehospital pain management: disparity by age and race. Prehospital Emergency Care. 2018; 22(2):189-97.

[4]Govindarajan P, Friedman BT, Delgadillo JQ, et al. Race and sex disparities in prehospital recognition of acute stroke. Academic Emergency Medicine. 2015; 22(3):264-72.

WHAT 2050 LOOKS LIKE

The setting where a person receives care, whether urban, rural or in between, has little impact on the quality of care they receive or patient outcomes.

Every community has access to EMS technologies and treatments that have been shown to have a significant positive impact on outcomes.

Using virtual technologies and telemedicine, rural communities have access to specialty care and resources, avoiding the need to transport patients long distances and separate them from their homes and families.

Incentives, including subsidized education, encourage EMS professionals to work in underserved communities.

People of all ages, including pediatric and geriatric patients, receive consistent, high-quality care.

EMS initial and continuing education, as well as access to specialists and other resources, ensures that EMS clinicians are comfortable treating populations they encounter less frequently in the field, including infants and children.

EMS systems have access to equipment that allows them to safely and effectively care for patients of all ages; equipment and medical devices are designed to easily adapt to patients of different sizes and ages without compromising patient safety.

EMS research includes investigations into the safety and effectiveness of interventions on patients of all ages.

The most effective and efficient care is available to individuals regardless of their health status, race, ethnicity, gender, socioeconomic status or other social factors.

EMS professionals receive education on how implicit bias impacts patient care and methods to recognize and overcome their own biases.

EMS education at all levels includes extensive discussions of behavioral health issues, making clinicians capable of and comfortable treating people who suffer from both acute behavioral health episodes and chronic mental illness.

Compensation for the EMS workforce recognizes the education and expertise required to perform the role and enables EMS professionals to live in the communities they serve. Local EMS leadership, educators and clinicians reflect the diversity of their communities.

Technology has eliminated the impact of language barriers on EMS care.

EMS professionals are well educated about end-of-life care and have immediate access to advanced directives and other ways of ensuring that patients' and their families' wishes are known and met.

A SOCIALLY EQUITABLE FUTURE

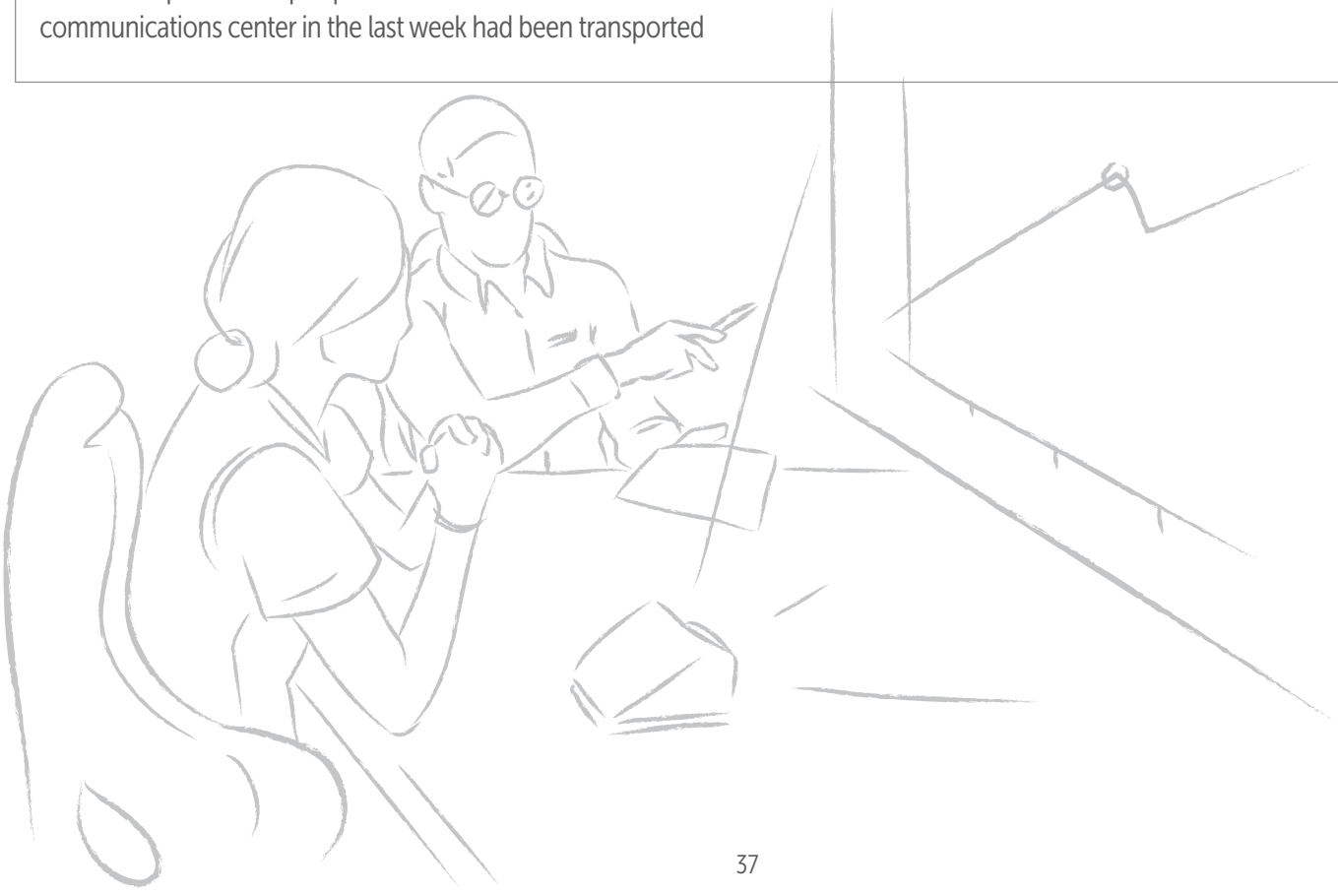
An EMS system can only be socially equitable if EMS professionals recognize the potential and actual disparities and embrace methods of eliminating them. In a people-centered system, potential disparities are measured at local, regional, state and national levels, and performance improvement efforts are undertaken to address them through education, technology and other methods.

SUSTAINABLE AND EFFICIENT

A GLIMPSE INTO 2050

Back at the community health center where she is stationed, Jana grabs the replacement pain patch and vitals sticker from the 3D printer so the next crew will have the supplies they need. When her shift ends, she changes out of her uniform and throws it in the disinfection chute. Before leaving, Jana heads into the office to say goodbye to the paramedic staffing the clinic.

The monitor on the wall is displaying the public performance measures that she learned about in school. The screen tells her that 12 percent of people who contacted the medical communications center in the last week had been transported by an ambulance, a slight increase over the norm. She slides her hand across the screen and looks at a chart showing years-of-life saved per dollar spent on the community's emergency care system in the last month. She doesn't know the specifics of these calculations, but she does know how critical it is to provide effective and cost-efficient care in order to demonstrate to payers the value of the EMS system. After all, employers, insurers and taxpayers are all paying for her equipment, her training and her salary so that she keeps members of the community safe and healthy.



THE VISION

EMS systems across the country have the resources they require to provide care in a fiscally responsible, sustainable framework that appropriately compensates clinicians. Efficient EMS systems provide value to the community, minimize waste and operate with transparency and accountability.

TODAY'S CHALLENGES

One of EMS's biggest challenges today is making systems sustainable and efficient despite outdated funding and reimbursement models that often encourage EMS clinicians to deliver unnecessary, costly care options—and don't always adequately reimburse meaningful, evidence-based care. Many EMS systems struggle to stay afloat, unable to pay for infrastructure, education and other necessary investments in the future.

Current funding mechanisms for EMS vary from community to community. Many communities subsidize EMS with tax dollars, some organizations rely on donations, and other agencies are funded entirely through reimbursement for services. Most depend on a combination of several different revenue sources. And some communities do not adequately fund high-quality EMS services, sometimes because of insufficient funding, but often because leaders have not created systems that use resources effectively.

The key to sustaining a people-centered EMS system will be partnerships between providers and payers, including individual patients, insurers, employers, government entities and more. EMS services need to find ways to measure, calculate and share the value of the services they provide to communities. As some communities are demonstrating across the country, when EMS systems demonstrate that their services can improve health and lower costs, payers will fund their efforts. While many of these projects have been limited to "mobile integrated healthcare" programs aimed at reducing hospital admissions, EMS will need to take these same concepts and demonstrate value to patients and payers for every service it provides: from the response to mass casualty incidents to acute cardiac problems.

A key to sustainable EMS will be achieving the other guiding principles laid out in this vision. Systems that remain siloed and not integrated, ineffective, unsafe, unreliable and stagnant will struggle to sustain themselves, as patients and communities look for ways to do better. In the past, many EMS systems could rely on funding first, and then worry about performance. In 2050, sustainability will be achieved by EMS systems with leaders and clinicians who dedicate themselves to finding effective and efficient ways to deliver people-centered services.

WHAT 2050 LOOKS LIKE

Regional Medical Communication Systems, in collaboration with emergency communication centers, triage, assess and allocate resources based on patient need and preference.

Medical Communication Systems are staffed with medical telecommunicators trained to triage medical emergencies and provide emergent and non-emergent care instructions, taking advantage of artificial intelligence technology and evidence-based protocols to assist them in making accurate and appropriate decisions. They quickly send appropriate resources, including bystanders, equipment, first responders or transportation services to any patient requiring immediate, lifesaving care. For patients with non-emergent complaints, the telecommunicators connect them to the most appropriate resources, including immediate teleconsults, referrals to other healthcare or social service providers, or delayed EMS responses.

Medical telecommunicators inform patients about the reasons they are receiving the response that has been determined for them, as well as the potential costs. Decisions are made in coordination with the patient and their families.

The education of EMS physicians prepares them to provide indirect and direct medical oversight of these Medical Communication Systems, including communication with patients and EMS clinicians in the field when physician consultation adds value and improves outcomes.

Transport decisions, including the mode and destination, are made judiciously. Patients and their families are included in the decision-making process and are informed about the benefits, risks and costs of treatment and transport decisions.

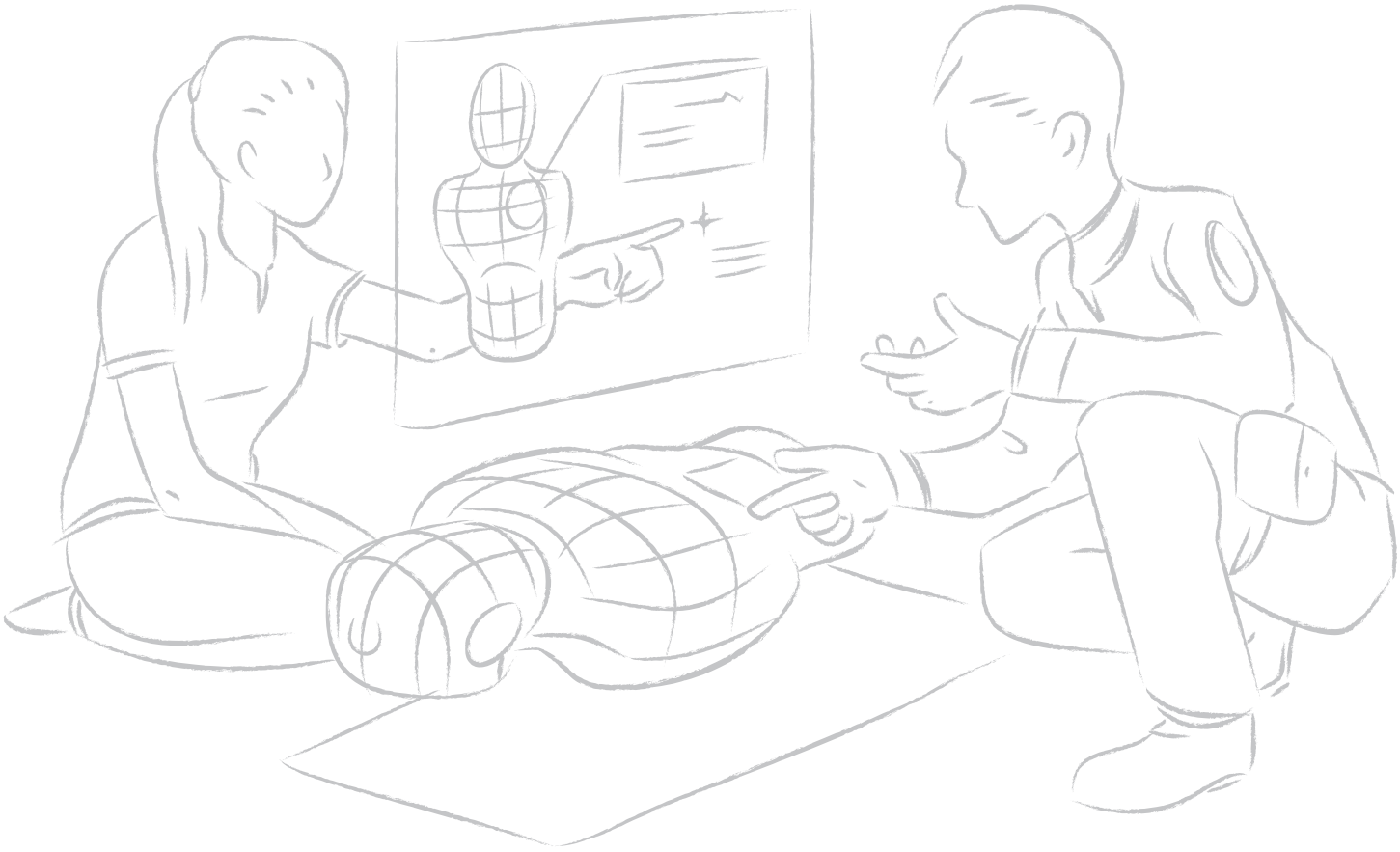
> **"Payers establish reimbursement and financing policies which support sustainable delivery of evidence-based medically necessary services."**
>
> — One EMS leader's input on EMS Agenda 2050

System design, equipment needs and treatment protocols provide value to the community by focusing on improving patient outcomes for the lowest cost.

Funding and payment models are in alignment with the delivery of the most effective and safest care, from the moment an individual accesses the EMS system, including decisions about which resources to send, or not send, in response. Reimbursement policies only incentivize EMS clinicians to provide the most appropriate, safest and cost-effective care.

Clinical, operational and financial outcomes are measured and reported publicly at the local, regional, state and national levels, ensuring transparency and allowing communities and policymakers to make informed decisions.

EMS systems have the ability to take a long-term approach to planning and budgeting, making it easy to invest in technologies, people and other resources that add value down the road.



EMS is supported as an essential service in communities across the nation.

Community leaders, elected officials and other key stakeholders understand how EMS systems operate and the value they provide to communities. EMS systems actively and honestly engage with their communities to educate the public about what EMS professionals do and how it improves the population's health on a day-to-day basis and during disasters and major events.

Innovators, manufacturers and EMS systems work together to ensure critical, lifesaving equipment and medications are available and affordable for EMS organizations without stifling innovation and entrepreneurship.

Funding supports the education and development of a highly professional, capable workforce.

EMS systems and payers collaborate and communicate frequently in order to partner in ways that benefit communities and patients.

Payers of healthcare services understand the unique value that EMS systems bring to communities and partner with them to practice out-of-hospital medicine in ways that take advantage of EMS professionals' knowledge and skills in order to best serve patients.

EMS leaders are educated in healthcare finance and maintain relationships with peers at payer organizations.

Large payer systems, such as the federal government, understand the capabilities of EMS clinicians and how they can improve the health of their members while also reducing the need for more expensive services.

A SUSTAINABLE AND EFFICIENT FUTURE

Whether funding for EMS comes from municipal budgets, health insurers, or organizations yet to be invented, it must align with the most appropriate, safe and effective patient care. In addition, payers and EMS systems need to collaborate to incorporate EMS professionals' unique knowledge and skills and the role they can play in reducing illness and injury and associated costs.

ADAPTABLE AND INNOVATIVE

A GLIMPSE INTO 2050

Before heading home, Jana checks a few messages that she received during the shift. The chief has passed along a message from the state EMS innovation officer. The memo describes the results of a recent test of a new patient movement device—according to the data, after only three months of use across the state, the number of injuries reported by paramedics has already significantly declined.

The next message is a personal one from the agency director herself, asking Jana to stop by her office next week to meet with her and the agency medical director to discuss joining the Research, Innovation and Performance Improvement Team—two spots on the committee are reserved for EMS clinicians in their first three years, and Jana already told her supervisor that she's interested. In school, she took elective courses in EMS Innovation Management and Clinical Research, so she's excited to get involved. The idea of meeting with the director is intimidating. Twenty-seven years ago, as an economics graduate student, Director Rodgers developed a model for EMS systems that fundamentally changed how medical care was provided outside the hospital. Since then, she spent time in academia and also launched a startup that revolutionized mental health care. Two years ago, the regional EMS system convinced her to lead the system.

Jana grabs her bag and heads for the door. On her way out, a voice reminds her that she hasn't completed her post-shift survey and fatigue screening.

She quickly answers a few questions about some of the new equipment being used on the ambulance, including the new imaging gloves she and Chip used on the guy who'd been in the car crash earlier in the day. Her paramedicine service was one of seven in the country currently testing the device. Based on analysis of the patient care data and the employee satisfaction survey, they will probably know in a few months if the gloves were an efficient and effective method of assessing patients.

Jana walks a few blocks, enjoying some time outside, and hops on a high-speed train. She lives just a few miles away, and in four minutes she's outside again, walking toward her apartment. She can't believe how lucky she is to be working as a paramedic, in a field that is constantly changing, improving and helping people live better lives.

THE VISION

Adaptable EMS systems quickly and effectively meet the evolving needs of the population. EMS continuously and methodically evaluates new technologies, system designs, educational programs and other aspects of the system in order to best meet the needs and desires of the people and communities it serves. Innovative individuals and organizations are encouraged to test new ideas in a safe and systematic way and implement effective new programs.

TODAY'S CHALLENGES

Perhaps the most important principle of an EMS system is that it be innovative—able to adapt and adjust to new evidence, technologies, political structures, and community and individual needs and desires. EMS has often been forced to evolve, but struggles to do so rapidly and effectively. Many systems remain designed to treat every incident as a life-threatening emergency, despite the majority of 911 medical responses not requiring lifesaving interventions. Incorporating new best practices often takes years, if not decades, even in the face of overwhelming evidence supporting change, or a complete lack of evidence for current practice.

It is not just EMS system design or medical care that evolves at a languid pace. EMS regulations and policies also frequently reflect a lack of adaptability. Federal payment policies date to a time when EMS "scooped and ran." Many EMS professionals cite state regulations as a frequent hindrance to innovation. And local and organizational policies sometimes force innovators to conform, rather than encouraging the development and testing of new ideas.

In order to successfully innovate without endangering the people they serve, EMS professionals must adopt a culture of science and improvement, and not be afraid to challenge themselves and the status quo—especially when the status quo benefits EMS professionals and organizations, but not the people they serve. Through quality improvement, rapid program evaluation and research, systems can learn what works and what doesn't. Just as critical will be the sharing of that information, through both formal and informal collaborative networks.

In order to stay true to the other guiding principles outlined in EMS Agenda 2050, EMS professionals cannot fear or impede change—as long as that change is based on evidence and doing what is best for patients and communities. Only through innovation and adaptability can the profession become and remain safe and effective, integrated and seamless, reliable and prepared, socially equitable, and sustainable and efficient.

> **"In order to deliver optimal patient care, EMS continuing education needs to ensure that our EMS professionals are actually being taught the latest and most up-to-date evidence."**
>
> — EMS Professional

WHAT 2050 LOOKS LIKE

EMS education provides a foundation of medical, operational and professional knowledge that develops higher order thinking and the ability to incorporate new evidence, science and capabilities into one's practice.

EMS professionals at every level learn how research and evidence can impact the standard of care and do not associate their profession with specific skills or medications that may or may not continue to be a part of their practice as the evidence base evolves.

Innovation techniques, including performance improvement, prototyping and rapid implementation, testing and evaluation, are taught in initial and continuing education.

Leadership development in EMS includes learning and practicing methods of fostering innovation in organizations.

Education and experience prepares EMS leaders to lead high-reliability organizations that are always seeking ways to improve, with a focus on safely innovating to enhance outcomes for patients. Leadership development that emphasizes these qualities is ingrained in the culture of every EMS organization.

The EMS profession looks to other industries not only for ideas and best practices, but also for talented individuals who can provide leadership and facilitate innovation. Whether as CEOs, as consultants or in other roles, these people bring a new, fresh perspective to EMS systems and help spur creativity and originality.

EMS organizations engage in rapid and safe innovation cycles and share their findings in order to encourage replication and improvement nationwide.

Leaders in EMS at all levels foster "psychological safety"—an environment where EMS clinicians can question current practices without fear of punishment or criticism. EMS professionals are encouraged and expected to collaborate to develop new solutions to old and new problems, and to test, measure and evaluate their ideas.

Regional, state and national organizations, including military and other federal EMS organizations, maintain systems for promoting the rapid testing and evaluation of processes, training and equipment and for disseminating the results widely throughout the profession and beyond. Collaborative learning networks allow local systems to learn what has worked and what hasn't worked in other systems, regardless of location.

Governmental and nongovernmental entities support innovative pilot projects with the potential to improve outcomes, using rigorous measurement and evaluation protocols. Regulations allow state officials more flexibility in supporting innovation while also protecting the public's safety.

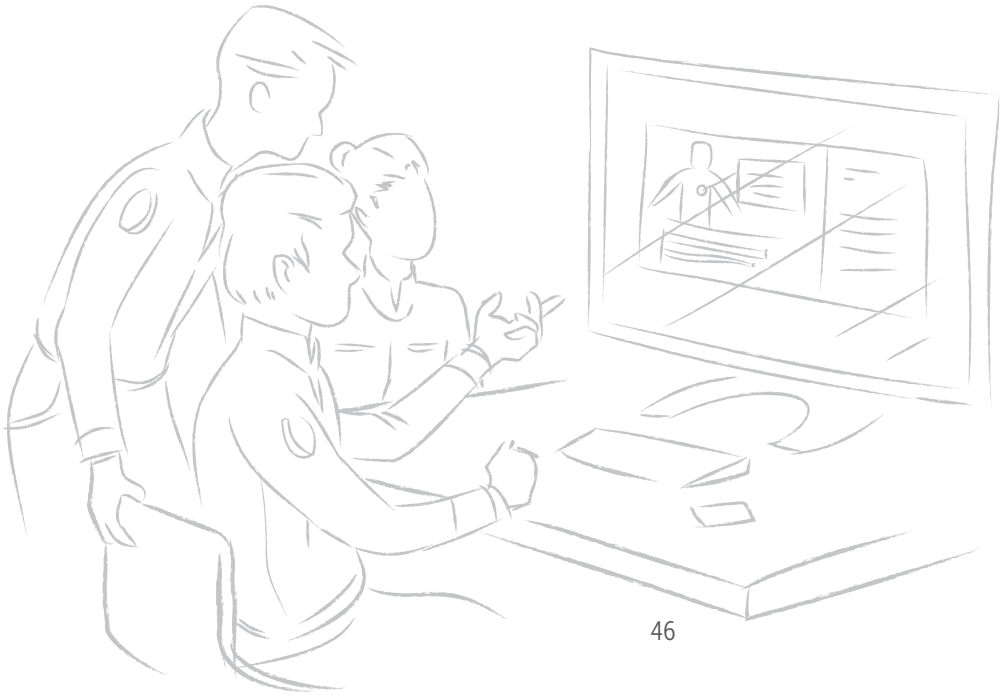
The federal government, academic institutions, EMS organizations, local EMS services and other partners prioritize funding EMS research that promotes more effective and safer patient care.

EMS researchers partner with colleagues in other fields, such as other medical specialties, social services and public health, to conduct scientifically rigorous clinical and operational research to validate and advance EMS practice.

Education of EMS professionals at all levels prepares them to evaluate research and also to participate in research projects at the local level. EMS organizations prioritize providing access to relevant published research to EMS clinicians. Specialty training is available for individuals who wish to become research or improvement scientists. These professionals are encouraged, supported and actively recruited to this role. Regulations to protect patients' health and privacy do not inhibit clinical research and trials in EMS, taking into account the difficulties of getting informed consent in emergency situations. Rigorous oversight and transparency in the community maintain patient safety during these investigations.

AN ADAPTABLE AND INNOVATIVE FUTURE

Without innovation, none of this vision is possible. While we often associate innovation with technology or clinical care, it can occur in any area of EMS: in how we educate, how we lead, how we communicate. In order to adapt, members of the EMS profession must be willing to leave behind ideas and concepts that are no longer supported by evidence or the needs of patients and communities. The pace of change in society continues to accelerate, and EMS professionals at all levels must take deliberate steps to facilitate, encourage and support innovation.

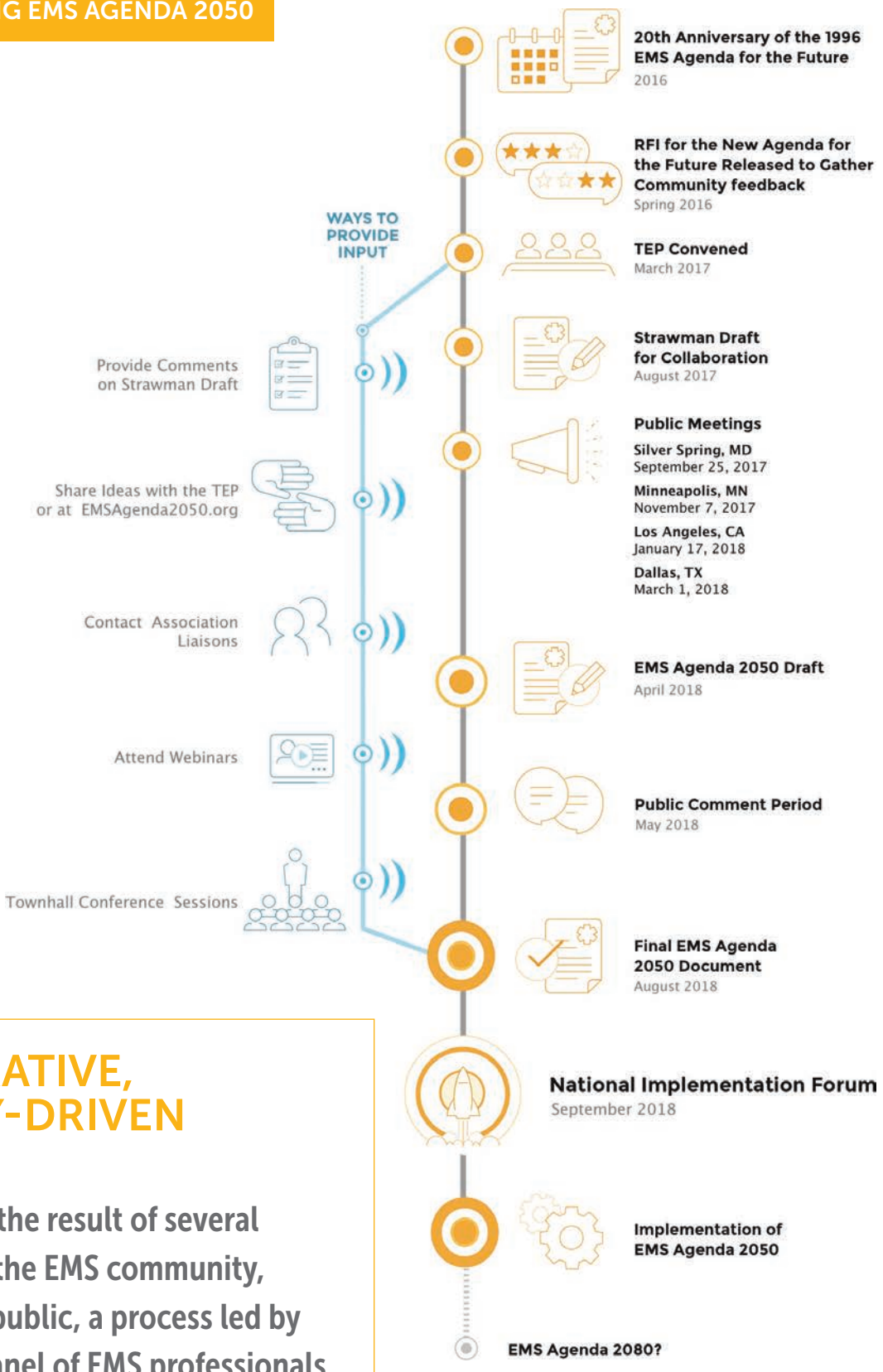


EMS Agenda 2050 creates a vision to unite everyone with a role in EMS around a singular purpose: a people-centered EMS system.

THE FUTURE STARTS NOW

EMS Agenda 2050 creates a vision to unite everyone with a role in EMS around a singular purpose: a people-centered EMS system. This system will be inherently safe and effective, integrated and seamless, reliable and prepared, socially equitable, sustainable and efficient, and adaptable and innovative. Achieving this vision will require deliberate actions of stakeholders at every level of EMS: individuals like you, EMS services of all models and sizes, public officials from local regulators to the Federal government, and national associations. It will also require bold collaboration with our partners in this effort: our communities, local volunteers, payers, healthcare systems, social services, public health, and our partners in public safety. The guiding principles illustrated in EMS Agenda 2050 should guide all of your decisions, from day-to-day EMS care and operations to system-wide strategic efforts.

The future of people-centered EMS is in your hands.



A COLLABORATIVE, COMMUNITY-DRIVEN APPROACH

EMS Agenda 2050 is the result of several years of listening to the EMS community, its partners and the public, a process led by a Technical Expert Panel of EMS professionals from around the country. This timeline shows just some of the opportunities the panel had to gather input and ideas.

BY THE NUMBERS

10 TEP members

4 REGIONAL public meetings

71 Organizational Liaisons

292 YEARS OF EXPERIENCE among members of TEP

769 REGISTRANTS for public meetings

132 Silver Spring, MD

250 Dallas, TX

166 Minneapolis, MN

221 Los Angeles, CA

180 PARTICIPANTS in the EMS Agenda 2050 webinar

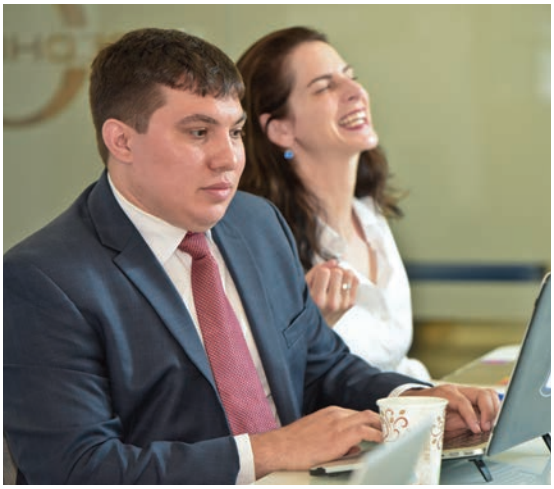
248 PAGES OF COMMENTS RECEIVED as response to FICEMS request for information

266 WRITTEN COMMENTS during public comment periods on EMS Agenda 2050 Straw Man documents and draft

1 VISION for the future of EMS

TECHNICAL EXPERT PANEL

The Technical Expert Panel (TEP) was tasked with listening to community input and gathering evidence to craft a vision for the future of EMS. Its members brought diverse competencies and backgrounds in public safety and healthcare as well as a history of innovative thinking and a passion for making a difference in the lives of patients and EMS professionals.



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The TEP would also like to acknowledge the contribution of **GRACE MANDEL**, MPH, EMT, who served as a member of the panel during the initial phase of EMS Agenda 2050 but resigned due to other commitments.

THE PROJECT TEAM

EMS Agenda 2050 was managed by the Redhorse Corporation, with support from the RedFlash Group, through a contract with the National Highway Traffic Safety Administration.

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ORGANIZATION LIAISONS

Many national organizations were asked to contribute to and provide a liaison to the EMS Agenda Project. Those organizations included:

American Ambulance Association

Association of Air Medical Services

American Academy of Pediatrics

American College of Emergency Physicians

American College of Surgeons

American Heart Association

Air & Surface Transport Nurses Association

Ambulance Manufacturers Division of the NTEA

Association of Public-Safety Communications Officials

American Public Health Association

Association of State and Territorial Health Officials

Commission of Accreditation of Ambulance Services

Commission on Accreditation for Pre-Hospital Continuing Education

Committee on Accreditation of Educational Programs for the Emergency Medical Services Professions

EMS Labor Alliance

EMS for Children Innovation & Improvement Center

Emergency Nurses Association

International Academies of Emergency Dispatch

International Association of Emergency Managers

International Association of EMS Chiefs

International Association of Fire Chiefs

International Association of Flight & Critical Care Paramedics

International Association of Fire Fighters

National Association of County & City Health Officials

National Association of EMS Educators

National Association of EMS Physicians

National Association of Emergency Medical Technicians

National Association of State EMS Officials

National Association of State 911 Administrators

National Emergency Management Association

National Emergency Number Association

National EMS Management Association

National Fire Protection Association

National Guard Bureau

National Organization of State Offices of Rural Health

National Registry of Emergency Medical Technicians

National Rural Health Association

National Volunteer Fire Council

Parent Heart Watch

Society for Academic Emergency Medicine

Sudden Cardiac Arrest Foundation

The Paramedic Foundation

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- Office of Health Affairs (OHA), U.S. Department of Homeland Security (DHS)

Thank you to the hundreds of people who registered for the public meetings, attended conference sessions, participated in webinars and shared their ideas in countless other ways. This vision could not have been created without the input and engagement of EMS, public safety, public health and healthcare professionals and members of the public across the country.

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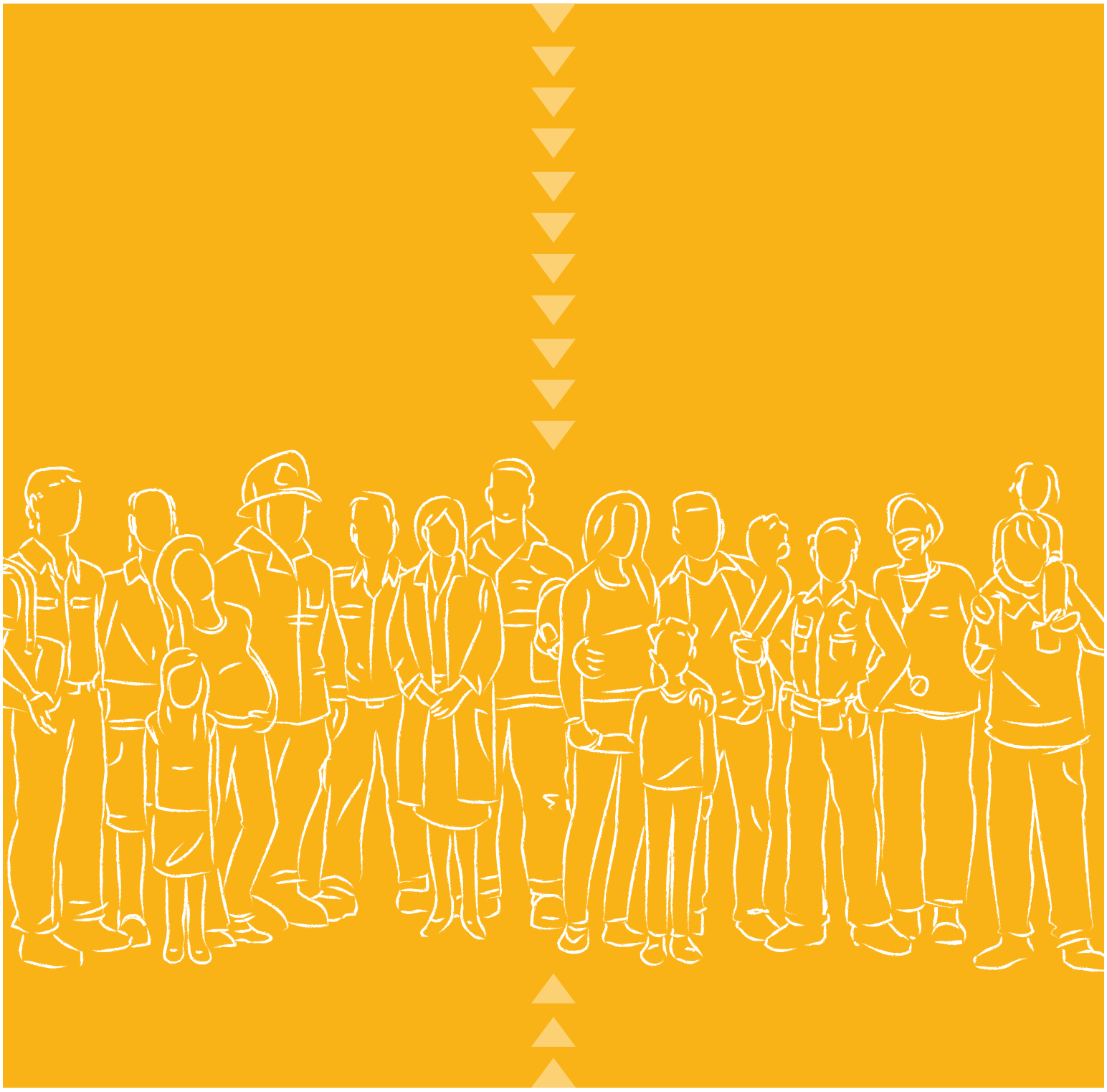
JANUARY 2019



EMS 2050 AGENDA

Envision the Future

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