

Lessons From the Ebola Scare

Some scoff at calling it a crisis, but experts agree EMS needs more infection control training and improved preparedness

By now, the outlines of the event that kicked off the nation's Ebola mania are familiar. On Sept 20, Thomas Eric Duncan, a 42-year-old Liberian man infected with the Ebola virus, boarded an airplane bound for Dallas. He became ill shortly after arriving, but was sent home from the Texas Health Presbyterian Medical Center's emergency department five hours later with antibiotics. He returned to the hospital two days later – this time in a Dallas Fire-Rescue ambulance.

Duncan's diagnosis and death in early October rocketed Ebola to the top of every news show and headline in America. The U.S. Centers for Disease Control and Prevention (CDC) raced to prevent both the disease – and misinformation about it – from spreading, while hospitals and EMS agencies tried to figure out how to prepare. They conducted drills, listened to CDC webinars, beefed up their personal protective equipment (PPE) kits and stockpiles, and learned how to ready patient compartments for Ebola patients using duct tape and plastic.

And then, as quickly as it exploded, the Ebola crisis in the U.S. petered out. Two months after Duncan's death, the only other death on U.S. soil was a surgeon who had caught the disease in Sierra Leone. The infected Texas Presbyterian nurses survived – one even had her picture taken with President Obama. And no other infected West Africans had managed to slip undetected onto U.S. airliners.

Among U.S. first responders, Ebola fatigue set in. At EMS World Expo in Nashville last November, Ebola had become a running joke. "More Americans have married Kim Kardashian than have died of Ebola," said Dr. Bob Winter, National Clinical Director for Emergency Preparedness, Resilience and Response (EPRR) and Critical Care in England, speaking during the World Trauma Symposium.

Wisecracks aside, EMS leadership and other medical professionals continue to regard Ebola as a potent reminder of the vulnerability of our nation's population to emerging infections, and the importance of remaining vigilant and prepared to respond to dangerous pathogens that can threaten at any time.

"This is a bump in the road compared to other future threats we are going to face," says Dr. Paul Pepe, director of emergency medical services, speaking during a special session at EMS World Expo. "It was a good drill for the big one that is going to come, the pandemic or the SARS du jour." (Severe Acute Respiratory Syndrome, or SARS, is a viral illness that emerged in China in 2002 and quickly spread across nations, killing an estimated 775 people, including 44 in Canada. The outbreak dissipated in the summer of 2003.)

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Photo courtesy Grady EMS

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Preparing First Responders

In late August 2014, with the Ebola outbreak spreading in Africa, the CDC issued guidance for hospitals dealing with known or suspected Ebola patients, and shortly thereafter, for EMS, Public Safety Access Points (PSAPs) and other first responders. The guidelines recommended that PSAPs and first responders inquire about recent travel for patients with fever and other symptoms. (The International Academies of Emergency Medical Dispatch quickly released a new Emerging Infectious Disease Surveillance tool.)

When dealing with a potentially infected patient, EMS practitioners should don gloves, a gown, mask and goggles to protect from contact and droplet contamination. “Unlike patient care in the controlled environment of a hospital or other fixed medical facility, EMS patient care before getting to a hospital is provided in an uncontrolled environment,” noted the CDC. “This setting is often confined to a very small space and frequently requires rapid medical decision-making and interventions with limited information.”

The initial PPE recommendations are similar to the precautions EMS is urged to take to protect from other diseases, such as flu, norovirus, and MRSA (Methicillin-resistant *Staphylococcus aureus*), says Dr. Paul Hinchey, NAEMT’s medical director and medical director for Austin-Travis County EMS in Texas. Many EMS agencies, including his own, responded to the CDC recommendations by reviewing basic PPE usage for all responders.

And for a little while, that seemed like enough. But then the two nurses who cared for Duncan fell ill – and the Ebola frenzy reached a fever pitch.

It’s not known how the nurses became infected, Pepe says, though it’s thought that it may have occurred when they removed contaminated PPE. Under fire from nurses unions and politicians, on Oct. 20 the CDC issued more stringent Ebola guidelines for healthcare workers that stressed the importance of more infection control training and supervision, recommending that no skin be exposed when workers are wearing PPE, that health workers wear a disposable full-face shield instead of goggles, and that each step of PPE “donning and doffing” be supervised by a trained observer.

Ebola patients at the end stages of the disease can emit a startling amount of fluids – vomit, diarrhea and blood, Pepe explained. As the disease progresses, their viral load increases, making these fluids highly contagious.

As the spotlight turned to the correct usage of PPE, it became increasingly clear that “putting on PPE and taking it off is not that easy to do safely,” noted Dr. Richard Carmona, a former paramedic, nurse and U.S. surgeon general, speaking during the World Trauma Symposium.

Following the Lead of Hospitals

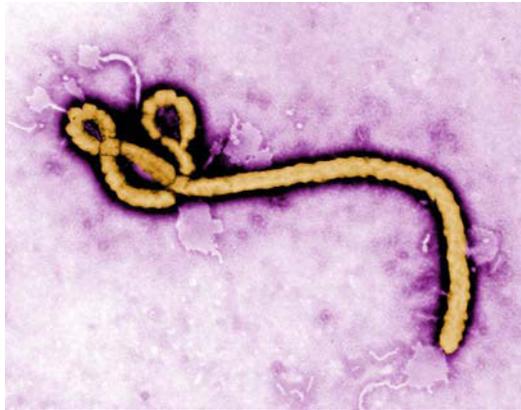
When the CDC issued more stringent guidelines for hospitals, there was one group of healthcare workers missing from the recommendations – EMS. Without specific guidance for pre-hospital care practitioners, Hinchey says, EMS agencies struggled to interpret the extent to which the new guidelines for hospitals should be applied to the EMS workforce.

Some discussions centered around whether EMS needed to suit up in full PPE when taking care of patients in the so-called “dry” phase of the disease, which is characterized by fever and muscle aches, or only

during the significantly more contagious “wet” phase. The thinking was that EMS was most likely to encounter patients in the “dry” phase, whereas by the time patients reached the “wet” phase, they would already be known to have Ebola and special response units could be called in.

Following the lead of hospitals, many EMS agencies determined that attempting to train every staff member to respond to Ebola was neither feasible nor necessary. Instead, they established Ebola response teams. In Austin-Travis County, for example, all responders received refresher training in basic PPE, but a select group of about 40 to 50 received specialized Ebola training. This included the daily practice of putting on and taking off full PPE using a buddy system and spot checks, Hinchey says.

“I couldn’t train every single person in the system to get in and out of every level of PPE and keep them proficient,” Hinchey says. “We started to use the hospital model, picked a small cadre of people and trained them to a very high level.”



Resources Strained by Hoaxes

As Ebola worries spiked among the public, so did the number of scares and hoaxes, making identifying who was actually a suspected Ebola patient increasingly difficult.

At University of Toledo Medical Center in Ohio, a frequent EMS user with a fever claimed she had contact with a man from West Africa, leading to four EMS practitioners and the patient being placed into isolation, and hospital staff treating her wearing full protective gear, for what turned out to be a common viral illness, according to the Toledo *Blade*.

At EMS World in Nashville, many practitioners swapped stories about Ebola scares. In Delaware, a woman known to be an EMS frequent user claimed she had close relations with a man from West Africa who had Ebola symptoms, which led to activation of the receiving hospital's Ebola response plan and the responding ambulance being put out of service and decontaminated, says Mike McMichael, a longtime volunteer EMT. The woman was eventually charged with making a false report to emergency services.

Whether real or imagined, none of those responses were free. In the weeks after they treated Duncan, Texas Presbyterian lost 50 percent of their business, with patients cancelling scores of elective surgeries and other procedures, Pepe noted. University of Nebraska's Medical Center, which treated two Ebola patients, put its cost at \$1 million. Harder to measure are the costs to other hospitals that have yet to see a single Ebola patient, but readied biocontainment or isolation chambers nonetheless.

Resource challenges for EMS were outlined in NAEMT's testimony submitted to Congress for the Nov. 12 Senate Appropriations Committee Hearing on the U.S. Government Response to the Ebola Outbreak.

"Paramedics and EMTs transported the first case of Ebola in Dallas and EMS practitioners have played a role in the care and safe transport of every Ebola patient in the country ... We are dedicating scarce resources toward creating dedicated ambulances retrofitted to make them capable of treating and transporting patients with Ebola."

Rough estimates put providing training and a set of single-use PPE, such as masks, gloves, gowns and goggles, for each of the nation's more than 850,000 EMS practitioners at more than \$34 million, according to this testimony. The higher levels of PPE needed to manage Ebola patients in later stages of the disease will cost more than \$255 million to equip and train as little as 20 percent of the EMS workforce.

The testimony called attention to the need for Congress to pass the Field EMS Bill (H.R. 809/S. 2400 in the 113th Congress). The legislation would provide additional preparedness funding for EMS, and would establish an Office of EMS and Trauma in the U.S. Department of Health and Human Services (HHS) – placing EMS squarely among its partners in public health and healthcare as they coordinate responses to emerging infectious diseases.

"What this event has done is highlight the fact that EMS is an integral part of the health system, and we may be a key piece of the first contact with emerging diseases, a key piece of identifying them and navigating them through the healthcare system," Hinchey says. "The Field EMS Bill helps better align EMS with the healthcare side of the universe, which will help with funding and the functionality of our response to these types of events."

Lessons Learned

As the immediate threat recedes, EMS leaders say it's crucial to make sure that lessons learned from the Ebola response aren't quickly forgotten.

A big one was that putting on and taking off PPE isn't as simple as it sounds, and that ongoing training is needed to keep skills fresh. "What did Ebola teach us? That skills are perishable," Carmona says.

In Austin-Travis County, EMS practitioners moving forward will be expected to demonstrate competency in correctly donning and doffing PPE annually, Hinchey says. "Before Ebola, folks very seldom spent a lot of time thinking about PPE – never mind training," he says. "We have a much greater awareness of the importance of wearing PPE and getting in and out of it safely."

Those infection control lessons also apply to other, more routine bacterial or viral illnesses, even the upcoming flu season, he adds. It's been well documented that even basic infection control guidelines are not always followed. "Pretty routinely, both in the hospital or the pre-hospital settings, healthcare workers will do some of the parts – wear the gloves and goggles but don't wear a mask, or take off the PPE and don't wash their hands after," Hinchey says.

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Grady EMS Supports CDC Clinicians

When word spread that Dr. Kent Brantly, an American aid worker who contracted Ebola while treating patients in Liberia, was coming for treatment to Emory University Hospital in Atlanta, the nation let out a collective shudder. His arrival marked the first time the scary disease from a far off place had reached American shores.



Photo courtesy Grady EMS

At Grady EMS, Brantly's Aug. 2 arrival was a day they had spent years preparing for. They reviewed protocols, draped the walls and floor of an ambulance in sheets of plastic and went over plans with multiple local, state and federal agencies, including the U.S. State Department and the Federal Bureau of Investigations (FBI).

Then, Grady EMS's Biosafety Transport Team headed out to transport the ill doctor from the airfield where his medical jet landed to Emory's isolation unit, about a 40-minute drive.

"There were people on social media saying, 'Don't bring him here,'" says Wade Miles, interim director of Grady EMS and Biosafety Transport Team supervisor. "But that's not the right thing to do. To be a part of a team that was willing to be there for him when he needed it means something to us."

Faith in the Training, Protocols

Think about it for a moment. You're called to respond to a patient who has a highly contagious, often lethal disease. Your job is to climb into the back of the ambulance, seal the doors, and provide the best care you can. Would you be willing?

For the Biosafety Transport Team, the answer is yes. "You train for all these years, expecting the worst and hoping for the best," Miles says. "It takes a lot of faith in our training, our processes and procedures, and our leadership to not put us in harms way."

Grady EMS's Biosafety Transport Team got its start 12 years ago, after the U.S. Centers for Disease Control and Prevention (CDC), headquartered in Atlanta, approached nearby Emory University Hospital about building a special isolation unit that

could care for CDC clinicians who, either working in the lab or in the field, became ill with an unusual or highly infectious pathogen. The Emory team realized that they needed a ground ambulance component, so they asked the Grady Memorial Hospital-based ambulance service to participate.

Today, the team includes four paramedics and Dr. Alexander Isakov, the team's medical director.

Initial training is 24 hours of classroom discussions about the symptoms, transmissibility, characteristics and treatment of illnesses ranging from small pox to cholera, and then hands-on practice methodically donning, doffing and disposing of personal protective equipment (PPE).

Since its inception, the team has been called on to transport about a dozen people, with diseases such as SARS, extensively drug-resistant tuberculosis, and in recent months, four Ebola patients.

Despite the recent flurry of activity, the team may go months between calls, Miles says. To stay ready, they conduct rigorous and ongoing training that includes twice-annual drills with Emory simulating a full response to a high-risk patient.

"As many times we've done this, every time we train, we pull out our notebook and go line by line. We don't do anything by memory," he says. "When we're suiting up, the whole team is watching, making sure they do exactly what they're supposed to do. We do the same when taking PPE off."

Ebola Call Comes In

Because of that ongoing preparation, the Biosafety Transport Team can be ready to activate in moments. For Dr. Brantly, they were given 48 hours, much of that time spent coordinating with other agencies, including those that would provide security, given the highly publicized arrival of the physician.

A few hours before, they readied the patient compartment of an ordinary ambulance by removing all extraneous equipment and draping the walls and floor with impermeable sheets of plastic secured with gorilla tape, which can withstand the Georgia humidity. The plastic covering makes it easier to decontaminate the ambulance from blood or vomit after the transport, he says.

They also turned off the air-conditioner and heater and closed the vents, helping to prevent airborne germs from circulating around the patient compartment in the breeze.

A second ambulance was prepared identically, just in case something unexpected happened en route.

Depending on the condition of the patient, either one or two paramedics ride in the back, wearing full-body PPE and a powered air-purifying respirator (PAPR), which decontaminates air by forcing it through multiple filters. The driver wears full PPE, with a PAPR at the ready, in case he or she is called on to assist with patient care.

For Brantly, who could walk on his own, John Arevalo rode in the back, while Gail Stallings drove. (Grady EMS's second Ebola patient transport came a few days later, when Nancy Writebol arrived in the United States. Because she needed to be carried on a gurney, both medics rode in the back with her, while a third drove.)

Safely Delivered to the Destination

Inside the ambulance, Brantly also wore protective gear, and the transport went smoothly. After safely delivering him, medics began a key part of the mission: thoroughly decontaminating the ambulance and carefully removing and disposing of their

PPE, both done at a secure location at Emory.

The driver, who has not made patient contact, stays in the same PPE while they clean the ambulance. The other medic or medics change into clean PPE. It's a painstaking process, with the entire team watching their every move.

After the entire patient compartment is wiped down twice with a solution recommended by CDC, the PPE "doffing" steps begin again.

One of the easiest mistakes to make, Miles says, is to rush.

"After you've been in the suit for awhile, you just want to get that stuff off and get in the shower. It gets hot and stuffy. Your boots are full of sweat. It's like wrapping yourself in a plastic bag and there's no air movement," he says. "We don't rush anything. Everything we do is very deliberate. They don't make a move until their team leader tells them to make a move."

Visit the Ebola Response Resources section of the NAEMT website (www.naemt.org/emshealthsafety) for latest information in Ebola response.

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Another take-away is that preparedness is an ongoing endeavor. Austin-Travis County already stockpiles tens of thousands of extra sets of PPE for pandemic flu, Hinchey says. But when they tried to order the additional PPE for responding to Ebola patients, supplies were sold out. "What Ebola taught us is that some portion of our strategic reserves should be dedicated to an all-hazards response that can get to a much higher level of PPE," he says.

And finally, the Ebola crisis should serve as a reminder that EMS is a critical part of the nation's healthcare system.

"In any epidemic, the key pieces to responding to it are identifying people with the disease, isolating them and safely transitioning them into the healthcare system," Hinchey says. "EMS plays a big role in that. We can identify them, either on the phone or at the home by asking key travel questions. We can also isolate them. Then, we can send a special unit to transport them – all without exposing any EMS practitioners."

By Jenifer Goodwin, NAEMT Communications Projects Manager