

EMS Drive Dramatic Reduction in STEMI Door-to-Balloon Times Collaboration with Cleveland Clinic Slashes Heart-related Deaths

Every EMS provider knows that “time is muscle.” And recent heart attack cases at Cleveland Clinic hospitals underscore the fact that the sooner we treat a heart attack patient, the more heart muscle we can save.

Thanks in large part to local EMS squads that use 12-lead

technology in the field, Cleveland Clinic keeps shaving minutes off its door-to-balloon (D2B) times – the period between arrival at the emergency department (ED) and the moment the patient’s blocked artery is opened with balloon catheterization.

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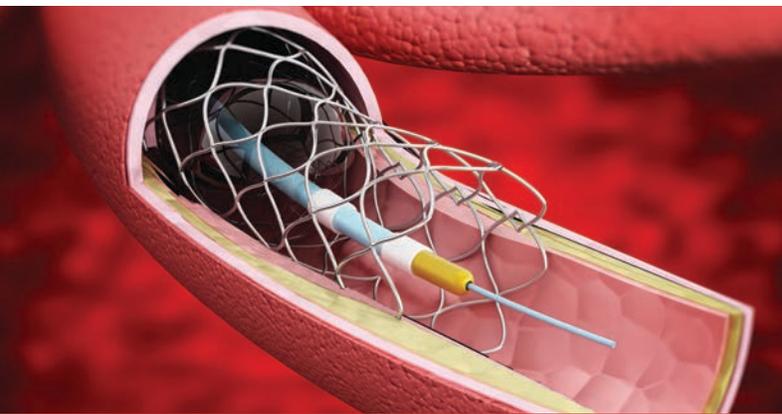
Heart attack patient Ed Stange (second from right) visits with EMS providers from Cuyahoga Heights Fire Department who helped save his life after he suffered a heart attack. The rescuers include (from left) firefighters Bryan Rini, Patrick Goldsworth and Lt. Reno Contipelli.

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“We had a good system for heart attack treatment, but we wanted it to be the best system,” says cardiologist Umesh N. Khot, MD, Chief Quality Officer for Cleveland Clinic’s Sydell & Arnold Miller Family Heart & Vascular Institute. “So we worked closely with our Emergency Services Institute partners to carefully examine each step in the process to see how we could make it even more streamlined.”

Of special concern are ST elevation myocardial infarctions (STEMIs), which are complete blockages of blood flow to the heart. Each year, more than 250,000 Americans experience a STEMI and require fast, lifesaving restoration of blood flow, which is achieved by surgically opening the blocked vessel.



Average Door-to-balloon Times AT A GLANCE

For hospitals with PCI* capability:

National benchmark

90 minutes

Cleveland Clinic hospitals in 2013

72 minutes

Cleveland Clinic hospitals in 2016

34 minutes

*PCI stands for percutaneous coronary intervention

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Cardiologist Umesh N. Khot, MD,
Chief Quality Officer, Cleveland Clinic Miller
Family Heart & Vascular Institute

Heart specialists perform balloon catheterization (also called angioplasty) by threading a catheter with a deflated balloon at the tip into the heart. The balloon is then inflated in the artery to open the blockage. Of course, the sooner blood flow is restored, the better – in terms of both mortality and quality of life for the patient.

A dramatic case in point

About a year ago, Cuyahoga Heights responded to a call for a patient having a stroke. “Our team soon determined it was a heart attack,” says Chief Michael Suhy. “Knowing Cleveland Clinic’s reputation for heart care, our EMS providers transported the patient to the main campus.”

According to Tom Beers, EMT-P, EMS-I, EMS manager at Cleveland Clinic’s main campus, “This was an exceptional case that set the standard for success of our improved D2B protocols. It was a Saturday morning, and the responding crew had heard about the great success of our new program with STEMI cases. So they made the additional effort to bypass other hospitals and reach the only hospital that has in-house interventional cardiologists 24/7/365.

Indeed, it’d be hard to be unhappy with a D2B time of only 14 minutes. “At the scene, the patient’s EKG readings were consistent with an acute STEMI,” says Beers. “Fortunately, the Cuyahoga Heights crew was able to transport him directly to the cath lab – thanks to our new collaborative process.”

Thanks to this case and many others like it, Cleveland Clinic’s main campus has seen a four-fold rise in volume of STEMI cases. “EMS squads are telling their patients, ‘Listen, the types of doctors you need are at Cleveland Clinic, and they have the right system in place,’” says Beers.

How EMS protocols changed

Squads use 12-leads anytime a patient complains of shortness of breath or chest pain. EKG readings and patient data are transmitted to EDs via cellular communication.

Traditionally, patients underwent another EKG upon arrival in the ED, and after a final diagnosis was made, the patient was transported to the cath lab. “Now, if the squads’ EKG readings and the patient’s story make sense, we immediately activate the heart team,” says Bradford Borden, MD, Chair of

“This was an EMS-driven process. It took years to develop, but the results are worth it. Mortality rates have dropped from 6 percent to just 2 percent. That’s astronomical. We’re going to keep improving because this is the right thing to do.”

Tom Beers, EMT-P, EMS-I, EMS Manager,
Cleveland Clinic main campus

the Emergency Services Institute, whose team worked with Dr. Khot to spearhead efforts to streamline protocols. “This totally transforms the way EMS works with us.”

“EMS providers enter the squad bay, where our ED staff members perform a quick check of the patient,” Dr. Borden explains. “If the patient is stable, the squad rushes them directly to the cath lab. The end result is that we’ve cut in half the time it takes between the arrival of EMS and the delivery of the patient to the cath lab.”

Thanks to this important change in heart attack treatment, D2B times are dramatically faster at Cleveland Clinic main campus. In 2013, the average D2B time was 72 minutes, which meets national benchmarks of 90 minutes or less. In 2016, it was a mere 34 minutes.

“This was an EMS-driven process,” says Beers. “We listened to EMS providers’ thoughts on how we could speed up the system. Due to the complexity of such a large system, it took a few years to develop, but the results are worth it. Mortality rates have dropped from 6 percent to less than 3 percent. That’s astronomical. We’re excited about what we’ve accomplished and are going to keep improving the system with EMS because this is the right thing to do.”

“The process is very tight at our main campus,” says Dr. Khot. “At our regional hospitals that don’t have the capability to perform percutaneous coronary intervention (PCI), our D2B times are still very low. While the national benchmark for non-PCI hospitals is 120 minutes, our average is just 90 minutes.”

How overall protocols were improved

The protocol revisions involved about a year of research and preparatory work that resulted in the following key process improvements:

1. **Standardization of criteria** by which ED physicians can activate the cath lab. This helps the ED staff and interventional cardiology teams to work in a more coordinated way.
2. **Creation of a STEMI handoff checklist** that outlines distinct roles for all caregivers involved – from EMS providers and ED physicians to cardiologists and



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Emergency Services Institute

nurses in both the ED and the cath lab. The checklist includes instructions and key phone numbers, assigns accountability, and calls for a short “time out” to ensure all tasks have been completed. Handoff signatures are required.

3. **Facilitation of immediate transfer to the cath lab.** For both self-transport patients and those transported by EMS, the decision to activate the cath lab lies with the ED attending physician and a cardiovascular medicine fellow available to advise as needed. If a patient has an EMS-obtained diagnostic EKG and meets criteria for activation, the ED attending physician discusses the case via phone with the en-route EMS crew and then activates the cath lab so that the patient can bypass the ED.
4. **Constant cath lab readiness**, thanks to an in-house transfer team. The protocol ensures 24/7/365 STEMI treatment availability by giving cath lab priority to STEMI patients.

“These process changes were designed to fundamentally structure STEMI management so that patients receive the same care every time with clear consistency,” says Dr. Borden. “We want to provide fast, standardized treatment for all STEMI patients.”

Dr. Khot adds, “For me, the greatest reward of this project has been the opportunity to create a system that brings life back to people who otherwise would’ve died.”



Getting Home Safely

How to Protect Yourself and Coworkers at Roadway Scenes

If you keep up with the news, you're probably aware that a couple emergency responders died at the scene of highway accidents during the past few months in Cleveland. These incidents underscore the fact that working at motor vehicle crashes is one of the most dangerous things we can do.

"It's tragic when one of our public safety partners dies in the line of duty," says Nicole Carlton, Commissioner of EMS for the City of Cleveland. "You think you're doing the right thing, but unfortunate accidents happen."

The first fatality occurred when a state trooper (who was three days away from retirement) was hit by a car at a traffic stop. The other deceased responder was a Cleveland police officer who was setting up hazard lights when he was struck by a car. In both cases, Investigators suspect the drivers were under the influence of drugs and/or alcohol.

"The police officer who died had on his safety vest and was doing everything right," says Carlton. "Both accidents happened on the Cleveland/Lakewood border within two football fields from one another. These incidents bring awareness to how we should work to be safe."

One way of safeguarding yourself and coworkers is to create a temporary traffic control zone around an incident. "Up to 18 percent of all fatalities are the result of secondary crashes," says Wayne Naida, Chief of Operations, Cleveland Division of Fire. "These have occurred on the opposite side of the highway, due to rubbernecking. To prevent secondary crashes, we set up

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Nicole Carlton, Commissioner of EMS,
City of Cleveland

advance warnings and siphon traffic around the scene."

What other measures can you take to ensure your safety? Follow your department guidelines, as well as the following tips.

- **Always be aware of your surroundings.** "This is the most important thing," says Carlton. "Taking your eyes off the road for just a split second is all it takes." As soon as you receive a call, take everything – including weather conditions, road conditions, construction and traffic flow – into consideration.
- **Watch for possible hazards.** Look for things that may pose a risk and determine how you might make a rapid escape, if needed. Hazards may include:
 - **Downed power lines.** When it comes to crashes with fixed objects, collisions with utility poles rank second only to trees, according to the Insurance Institute for Highway Safety.
 - **Flammable liquids.** Besides having the potential to ignite, gasoline and other petroleum products can off-gas in the ambulance and pose a respiratory irritant to patients.

“We use absorbent material like kitty litter to inhibit the ignitability of flammable liquids,” notes Naida.

- **Hazardous materials leaks.** “If a commercial vehicle is involved, look at placards and know what they mean,” says Carlton.

- **Set up advance warning systems.** The City of Cleveland sets up lighting packages with arrows that direct drivers around a scene. Other warning devices include flares, hazard lights, cones and signs.
- **Don’t try to play the hero.** If you suspect any violence (like road rage), stay at a safe distance until police secure the scene. Never follow a police car into the scene, where you could end up in the line of fire.
- **Wear appropriate safety gear.** Your department invested in this equipment for a good reason. Besides limiting injuries and exposure to blood-borne pathogens and chemicals, the gear can also keep you from transmitting diseases and exposing others to hazardous materials. “At roadway scenes, always wear your reflective gear,” says Carlton. “It may not stop accidents, but it mitigates them. That’s been proven across the board.”
- **Create a temporary traffic control zone.** According to Naida, the goals of these zones are to:
 - Ensure responder safety
 - Maintain traffic flow
 - Prevent secondary crashes

“It’s important to position your vehicles properly,” says Naida. “The fire truck goes behind the scene and an ambulance goes in front so that traffic is funneled around the scene.” Park at an angle with ample room for rapid access and to create a buffer between you and the accident. Remind everyone to stay within the protected area.

- **Designate someone to monitor the scene.** If you can spare a member of your team, have them serve as a lookout. If a car doesn’t yield to your warning lights, the lookout can yell a warning. This person and everyone else should always face traffic while walking. If you need to retrace steps, walk backwards.
- **Make sure vehicles are secure and stable.** Perform a quick examination of a vehicle before entering it. Be sure it’s in park with the keys removed and the emergency brake activated. “It’s possible that the car is still in gear and the patient’s foot is on the gas pedal,” warns Carlton.
- **Watch for un-deployed air bags.** Long after a crash occurs, airbags can retain a charge and have the potential to deploy while you’re caring for patients. Airbags may be hidden in the door panel, steering column, ceiling and B pillar. Avoid placing yourself in the potential path of one for any longer than you have to. “Wear a helmet and get the patient out of the car as quickly as possible,” Carlton advises.
- **Put away your cell phone.** That supposedly urgent text can

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Wayne Naida, Chief of Operations,
Cleveland Division of Fire

wait. It’s not worth the risk of litigation (or possibly even someone’s death) that could occur if you have an accident while texting or talking on your phone. “We simply do not permit cell phones while on emergency response,” Naida notes.

“When tragedies occur among our fellow workers, it’s very sad,” says Carlton. “My goal is to make sure everyone goes home safely. We’re looking at our policies to see what we can do to get off the highways faster and more safely.”

The Division of Fire is also considering how it can enhance safety for their 761-member force. “We’re coordinating two-hour training sessions for police, fire, EMS, ODOT and tow truck operators,” says Naida. “Our goal is to work together to clear accident scenes as quickly as possible.”

As an EMS provider, you and your colleagues are the most important individuals on scene. So it’s important that you ensure your safety. Without you, patients cannot receive the care they require.

When Silence Isn’t Golden: Don’t Miss the Quiet Patient in the Vehicle

It’s hard to miss loud patients whose cries and screams immediately capture our attention. But while we’re tending to their needs, the quiet (or unresponsive) patient is all too often inadvertently ignored.

You may not hear some additional victims because they might not even be in the car. If they left the vehicle on their own, they may be mistaken for bystanders. Worse, they may have been ejected from the car. If you see empty infant and child seats, ask who normally rides in those seats and where they are. If no one can tell you, comb the area.

Loud patients are able to be noisy because they’re breathing adequately – even though they may have critical injuries. On the flip side, the patients who oftentimes need the most immediate attention are the silent ones.

Never assume that quiet patients haven’t been injured. Instead, make it a priority to find out why they’re silent.

Your Role in Murder Mysteries

Medical Examiner Tells Behind-the-Scene Stories

CORONER

You respond to a crime scene. Law enforcement secures the area, and you head in to care for victims. What's the best way to preserve possible crime evidence? What happens later to the guy you couldn't resuscitate? And what should you do about that object you pulled out of his airway?

We have some interesting answers for you. They come from Joseph Felo, DO, Chief Deputy Medical Examiner for Cuyahoga County and the presenter at Euclid Hospital's "Medical Examiner's Series," which focuses on forensic science and EMS involvement. (See page 7 for more information on the series.)

"People say that the case studies offer practical information they never heard before," says Dr. Felo. "This is gratifying to hear. I enjoy teaching and appreciate that there are people who keep coming back, in addition to new attendees."

"One particularly interesting case we discussed was a terribly bloody scene," he notes. "Initially, responders thought it was a homicide, but then factors pointed to it being a self-inflicted suicide. Ultimately, when we put all the facts together, we realized the patient's death was due to the use of a psychotropic drug. The patient was listening to imaginary voices telling him to cut the demon out of himself – or some such thing."

What should EMS providers do when they encounter a bloody scene – or any other possible crime scene? Dr. Felo offers the following tips:

- **Try not to contaminate the scene.** "If you arrive at a bloody scene, try to avoid the blood as much as possible," says Dr. Felo. "If you step in blood, be sure to tell the investigator that it's your boot print and not the print of a possible suspect."
- **Document everything.** "Let the medical examiner know if you altered the scene in any way," he advises.
- **Save objects found in airways.** "Whenever there's an alleged choking or aspiration and you remove the offending item, save it and place it in a biohazard bag or specimen



Greg Ivanovics, EMS/Disaster Coordinator at Euclid Hospital (left), works with members of the Cuyahoga County Medical Examiner's Office Joseph Felo, DO, Chief Deputy Medical Examiner (second from left); Elizabeth Mooney, DO, and Todd Barr, MD, (right) to present the Medical Examiner's Series.

container," says the doctor. "Otherwise, we're left with an open airway and no clue that choking was involved."

- **Record glucose readings.** "Glucose readings taken near the time of death are more accurate; so we like to have them," notes Dr. Felo.
- **Document body temperature.** "This is important, but unfortunately, is rarely documented," he says. "Patients have been in the cooler before we see them; so we have no indication that they had a high fever before dying."
- **Take note of petechial hemorrhages.** These tiny pinpoint red marks usually present in the whites of the eyes or over the face. "Know what these are, and document them," pleads Dr. Felo. "They can be a sign of asphyxia and may indicate death by strangulation, hanging or smothering. These subtle markers may disappear by the time we see them."

Determining the cause and manner of death is an involved process that can take several days or months. The Cuyahoga County Medical Examiner's Office provides medicolegal death investigations for Cleveland and 58 surrounding suburban municipalities. The county is home to 1.3 million people within a 458-square-mile area.

Medical Examiner's Series Enlightens EMS

Sponsored by Euclid Hospital's EMS department, the Medical Examiner's Series focuses on forensic science and the role of the Cuyahoga Medical Examiner's Office in supporting EMS, police, emergency departments and other community resources. The series covers actual case studies.

The cases are presented by Joseph Felo, DO, chief deputy medical examiner for Cuyahoga County. Continuing education credits are awarded to EMS nursing and OPOTA through Euclid Hospital's EMS Training Program. The next program will be held:

September 14

5:30 – 8 p.m.

(with refreshments served at 5:30 and the program starting at 6)

Location:

Cuyahoga County Medical Examiner's office, 11001 Cedar Ave., Cleveland

For more information, contact Greg Ivanovics, EMS/Disaster Coordinator, Euclid Hospital at givanovi@ccf.org.

To register, please follow these steps:

1. Log into Cleveland Clinic's EMS website at cfems.org.
2. Locate the Upcoming Events/Courses link on the right.
3. Click on Euclid Medical Examiner's Series.
4. Click the Register (individual) tab by scrolling to the lower center of the page.
5. Complete the requested registration information.
6. Click the Process Registration tab.



Meet Chief Metz

Bainbridge FD Leader Exhibits Passion for Public Service



Lou Ann Metz always wanted to go into medicine, but getting into medical school was very restrictive during the 1970s. So for a few years after graduating from college, she served as a research and development director for a cosmetics company.

Meanwhile, she enjoyed watching the television show "Emergency," which featured fictional paramedics in Los Angeles. "I was fascinated by the type of work Johnny and Roy did on that show," she says. "I liked the variety they encountered and the independence they had."

Her fascination with EMS led her to become an EMT and to volunteer at her hometown fire station in Randolph, Ohio. "When I started volunteering, the excitement I saw on TV became real. Then friends convinced me to take a test at Ravenna. I passed and started working as the first fulltime female firefighter in Portage County."

Chief Metz is now an Ohio Fire Executive (OFE) heading up the Bainbridge Fire Department. "When I started in the fire service, I soon decided I like firefighting as much as EMS," she says. "Serving as fire chief for Bainbridge is a great opportunity. We're currently transitioning from a volunteer to a combination department, and the community is growing and very supportive."

Before joining Bainbridge last fall, she served as division chief at Stow for nine years – after working her way up from firefighter/paramedic to lieutenant to captain. She has taught classes in Canada, the United Kingdom and Ireland. "I really enjoy teaching and training," she says.

A nationally-registered paramedic, Chief Metz is certified as an instructor for courses in EMS, fire service, Trauma Life Support and American Heart Association classes. She's also a fire safety inspector and Chemical, Ordnance, Biological and Radiological (COBRA) technician.

Driven by a passion to serve

"My mother died when I was six, and I was raised by my grandparents who taught me the importance of hard work," says Chief Metz. "You don't compromise. You find something you're passionate about and you do it."

While growing up as the only girl among 10 brothers, Chief Metz learned to stand firm. "I'm pretty tenacious, and I really enjoy working hard," she says. "At Stow, I was one of 12 people hired to start EMS.

"There's no doubt that back in the day you had to be better and work harder to be considered an equal among your male counterparts," she notes. "It wasn't a pleasant road because the feeling was that women didn't belong in the fire station. But I stuck with it, and now I enjoy developing fire service leaders for the future. It's important to give back and to help others realize the dream you had."

A true "people person," Chief Metz claims she's most passionate about public service in general. "I believe in placing service before self," she says. "The most rewarding thing for me is to make a positive impact on someone's life. It's fulfilling to make a difference – whether it's by making someone smile or letting a young person shadow you to learn about your career."

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Bainbridge FD Leader Exhibits Passion for Public Service

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Chief Metz's passion to serve is also exemplified by her involvement in search and rescue (SAR) missions. She was a founding member of Summit Search and Rescue Dogs, Inc. and is certified as a SAR technician II, lost person incident manager and certified human remains detection dog handler.

"Our all-volunteer team responds to requests for assistance across the U.S. and Canada," she notes. "Last year was a busy year for the team with 12 callouts in three states. My dogs and I train eight hours a week. It's a constant process but very fulfilling."

How she got to the top

After graduating from Waterloo High School in 1976, Chief Metz earned a Bachelor of Science degree from Slippery Rock State College in 1980. Two years later, she became a paramedic, and a year after that, she became nationally registered. By 1987, she was a firefighter and fire safety inspector.

Chief Metz completed additional courses through the National and Ohio Fire academies. She has served in leadership positions for several professional organizations, including the International Association of Fire Chiefs and National Fire Protection Association.

"I believe in placing service before self. The most rewarding thing for me is to make a positive impact on someone's life. It's fulfilling to make a difference."

Chief Lou Ann Metz, Bainbridge Fire Department

She received the Women's Outstanding Leadership Award, OFE Class 9 Outstanding Research Project Award and Mayer Glimcher Award for Excellence in Trauma Education. In 2008, she was named EMS Educator of the Year.

Running a B&B

As if she doesn't have enough to do, Chief Metz is the co-owner of a bed and breakfast in Ravenna. "Again, it's a people-oriented business," she says. "Fortunately, I have a very good business partner."

In her limited spare time, Chief Metz enjoys cooking for friends and family. "My specialty is comfort food like peach cobbler," she says. "I also love to read mysteries and biographies."

What's Your Story?

NEO Siren welcomes your input

We always welcome your suggestions for newsletter articles. Please send them to Bill Sillasen, BSN, RN, EMS-I, Regional EMS Director, Cleveland Clinic, at wisill@ccf.org.

Check EMS website for educational offerings

Cleveland Clinic regional hospitals offer numerous events, continuing education classes and other opportunities for EMS providers. For a complete listing, visit ccfems.org.