

Battling a Deadly Condition

Medina Hospital Strives to Combat Sepsis Crisis in Prehospital Setting

Muhammad Ali was famous for knocking out opponents, but the boxing champ couldn't knock out sepsis before it killed him. Unfortunately, tragic cases like his are all too common. In fact, sepsis is a nasty infection that leads to 750,000 hospitalizations a year, with up to 50 percent of those cases resulting in death. This makes it the 10th leading cause of death in the United States.

According to a 2014 report in the *Journal of the American Medical Association*, up to half of all in-hospital deaths are related to sepsis. The infection causes more deaths than AIDS, prostate cancer and breast cancer combined. Anyone with an infection can develop sepsis, and it is the most expensive condition treated in hospitals, with an annual price tag of \$24

billion, according to the Agency for Healthcare Research and Quality.

The surprising thing is that sepsis has barely been on the radar screen in the prehospital setting. The emergency medicine team at Cleveland Clinic Medina Hospital is working hard to change that. Realizing that EMS providers can make a major positive difference in sepsis care, the team developed a sepsis alert system.

"We should respond to sepsis the way we do to other potentially deadly conditions like heart attack, stroke and critical trauma," says paramedic Debra Juba, the Medina Life Support Team (LST) member who came up with the idea for sepsis alerts.

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Medina Hospital Strives to Combat Sepsis Crisis in Prehospital Setting

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(From left) Paramedic Debra Juba, Christopher Myers, DO, EMS Coordinator Rick Moskalski

“The Medina Life Support Team goes on 4,500 EMS runs per year,” notes Rick Moskalski, EMS Outreach Coordinator, Medina Hospital. “From those runs, Medina Hospital received 120 cases of sepsis in 2017. “As requested by our hospital president, Dr. Rick Shewbridge, we’re setting goals and aiming for measurable improvement in our identification of sepsis in the field. If our initiatives work here, we’ll roll it out to other Cleveland Clinic hospitals and communities.”

To initiate the system, Juba spent many hours collecting data and reviewing EMS charts. She has been supported by Medina Hospital EMS Medical Director Chris Myers, DO; Rick Moskalski, EMT-P, EMS-I, and emergency department members Rosa Kovach, RN, and Brian Draiss, BSN, RN, CEN, EMT. Kovach and Draiss co-authored a program presentation that educates EMS providers on how they can be a valuable part of the sepsis alert system.

“We’re fortunate to have a fantastic group of EMS providers serving the Medina area,” says Moskalski. “They have the

ability to help us save lives by assessing sepsis in the field, initiating treatment and calling in sepsis alerts to the emergency department. Consequently, we can gain critical hours in our fight against this deadly condition.”

How you can fight sepsis

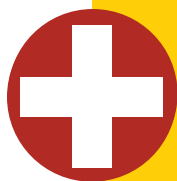
The word sepsis is derived from the Latin word *septicus*, which means to rot. And this is exactly what the infection does; it causes tissue to rot. Sepsis is a systemic inflammatory response syndrome (SIRS) that triggers a cascade of negative immune responses to infection. Survivors of sepsis often require readmission to the hospital.

By identifying the hallmark signs of

sepsis, EMS providers can partner with hospitals to stop the deadly cycle of organ damage that can result in death. “We’re trying to empower our local EMS agencies to treat sepsis cases way earlier than before,” says Juba. “We can all play a part in pioneering a successful program to limit sepsis deaths.”

EMS can initiate early goal-directed therapy that can lessen the ill effects of sepsis. To adequately manage sepsis cases, EMS providers should:

- **Know who’s at risk.** Populations at risk for sepsis include people who are:
 - Elderly or very young
 - Immune suppressed
 - Recovering from recent surgery
 - Implanted with IV or urinary catheters
 - Diabetic or have other chronic medical problems
- **Recognize signs and symptoms.** You may suspect sepsis if your patient has two or more of the following:
 - Temperature less than 96.8 or over 100.4
 - Pulse rate more than 90 bpm
 - Respiratory rate greater than 20 or Paco2 less than 32
 - WBC greater than 10K or less than 4K
- **Be aware of common sources.** Sepsis most often occurs in the following target organs:
 - Lungs – Pneumonia
 - Abdomen – Peritonitis
 - Gall bladder – Cholecystitis



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Rick Moskalski, EMS Outreach Coordinator, Medina Hospital

- Appendix – Appendicitis
 - Skin – Cellulitis
 - Bone – Osteomyelitis
 - CNS – Meningitis
 - Urinary tract – Urosepsis
- **Identify severe sepsis.** In these cases, patients have a lack of oxygenated blood flow to organs and subsequent organ dysfunction, as indicated by:
 - Hypotension < 90 systolic
 - CNS – Altered LOC
 - RESP – Tachypnea <90% sats
 - CV – Tachycardia (decreased platelets and decreased O2 affinity)
 - Hepatic – Jaundice appearance
 - Renal – Decreased urination
 - **Recognize septic shock.** Septic shock occurs when a patient has SIRS in addition to a source of infection, organ dysfunction and persistent hypotension despite treatment. Hypotension will be less than 90 mmHg systolic.
 - **Consider sepsis as an underlying problem when your patient has:**
 - General weakness and feels sick
 - An altered mental status
 - Flu-like symptoms
 - Shortness of breath and/or difficulty breathing
 - Syncope
 - Fever
 - **Suspect sepsis at the scene if your assessment uncovers:**
 - Foul odor (indicating possible UTI)
 - Discoloration of fluid in Foley Catheter
 - Headache and/or altered mental status
 - Tachycardia and/or hypotension
 - Cough with sputum
 - Adventitious lung sounds such as rales, rhonchi and wheezing
 - Diarrhea, constipation and/or nausea and vomiting
 - Muscle aches and weakness
 - Decreased or no urine production
 - Apparent wounds, cellulitis, jaundice or skin that's hot to the touch

- Comorbid conditions that can cause or contribute to infection. These include COPD, renal disease, CHF, diabetes, immunosuppression and chronic conditions
- A healing surgical site or surgical drains
- Known infections and/or antibiotic use within the last 30 days
- Pulse OX less than 94% RA
- Capnography less than 26 mmHg
- Glucose levels above normal

Prehospital treatment

Initiate sepsis treatment if your examination reveals the above symptoms, especially:

- Altered mental status
- Temperature > 100.4 or < 96.8 F
- Respiratory rate > 20
- Blood pressure < 90 systolic
- Glucose above normal (not DKA and not low)
- Capnography reading < 26 mmHg (two separate readings at least 5 minutes apart)

AND ... if the patient's history discloses:

- Antibiotic use within the last 30 days
- Known or suspected infection source
- No comorbid conditions that would otherwise cause altered mental status

CALL A SEPSIS ALERT and DO THE FOLLOWING:

- **Provide oxygen** and maintain saturations at 94-99%.
- **Perform a 12-lead ECG** and transmit it to the ED.
- **Take a BGL reading.**
- **Support and maintain capnography and pulse ox.**
- **Start an IV**, giving a 500-ml fluid bolus (with the first 500 ml given despite PMHX).
- **Reassess the patient** if there's no improvement. He/she may require a

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How EMS Can Reduce Sepsis Deaths

Look for two or more signs of:



Systemic Inflammatory Response Syndrome



Patient history, including:

- Antibiotic use in last 30 days
- Suspected or known infection sources



Assessment findings



Provide appropriate sepsis treatment as needed:

- Perform a 12-lead ECG and transmit findings.
- Take the patient's BGL.
- Support Spo2 and PaCo2.
- Administer a 500-ml IV fluid bolus despite past medical history.
- Notify emergency department and call a Sepsis Alert.
- Monitor for fluid overload.
- Provide ongoing assessment during transport.





Breathing Life into Children Pediatric Emergency Medicine Expert Gives Big Advice on Small Airways

THE OLD MYTH: Pediatric airways are miniature adult airways.

THE UPDATED FACT: Pediatric airways are markedly different from adult airways, and consequently require size-appropriate equipment and special training.

As we enter the year 2018, EMS providers are undoubtedly up-to-date on the above myth and fact. Yet many of us still don't understand exactly how pediatric airways are different and how they should be properly managed.

"When it comes to pediatric airway emergencies, EMS providers see a low volume but a high acuity," says Purva Grover, MD, Medical Director of Cleveland Clinic's Pediatric Emergency Departments. "Consequently, these cases can be rather challenging – especially when limited exposure is combined with insufficient training."

Besides airways, there are many other differences between adult and pediatric patients. That's why it's important to try to transport pediatric cases to true pediatric emergency departments staffed by pediatric emergency medicine physicians.

"Children – whether they're 10-pound babies or 200-pound teens – receive the most appropriate care at a pediatric ED," says Bill Sillasen, BSN, RN, EMS-I, Regional EMS Director for Cleveland Clinic. "For serious medical emergencies, children should be seen by pediatric emergency medicine physicians who understand their unique needs, are skilled in pediatric care and have specialized pediatric equipment at their fingertips."

How pediatric airways are unique

A child's anatomy and physiology vary significantly from that of an adult. From an airway standpoint, these differences include:

- **Flexible neck.** When a child lays flat, their neck naturally tends to go into a position of flexion, which can block their airway. So it's important to keep them in a sitting position. Prop them up with pillows or rolled-up towels or blankets.
- **Larger tongue.** A child's tongue is disproportionately larger than an adult's. Consequently, there's a higher chance that it can obstruct breathing. "Unless the child has too much of a

gag reflex, try using an oral airway," suggests Dr. Grover. "With kids, less is more, and minimally-invasive procedures are best."

- **Higher larynx.** Not only is a child's larynx higher, it's also more anterior. "Knowledge is power," says Dr. Grover. "Knowing the position of the larynx can help you appropriately manage pediatric airways."
- **Shorter, stiffer epiglottis.** In infants and small children, the epiglottis is usually angled posteriorly. This makes it difficult to see the vocal cords during laryngoscopy. For this reason, it's often necessary to lift the epiglottis with the tip of the laryngoscope blade.
- **Much shorter trachea.** "This might inadvertently lead to right main-stem intubations," Dr. Grover explains.



"Considering the constraints they're under, our EMS squads do a fantastic job. By investing time and resources in training for pediatric medical emergencies, they can step up their game even more."

Purva Grover, MD, Medical Director of Cleveland Clinic's Pediatric Emergency Departments

How to open pediatric airways

Dr. Grover gives the following advice:

- **Train extensively.** "All EMS agencies should invest time and resources in pediatric airway training," says Dr. Grover. "Our local EMS squads love it when I visit their fire stations to offer continuing education on medical emergencies involving children. They know they can benefit from more training in pediatrics."
- **Disregard distractions.** Rather than being distracted by severe bleeding and other injuries, tend to the ABCs first, as always. An inability to breathe will kill a child faster than blood loss.
- **Identify the problem.** "The most important thing is to recognize illness in children," says Dr. Grover.

- **Prop up the child.** Counteract neck flexion by placing the child in a sitting position. “Intubation is one end of the spectrum,” Dr. Grover explains. “At the other end are simple things like placing a rolled towel beneath the child’s shoulders. These little things can help tremendously.”
- **Rely on what works.** If you’re more than 20 minutes from an ED or are unable to apply a bag-mask, then it makes sense to intubate pediatric patients. According to recent research, there’s no significant difference in outcomes between patients who are intubated versus those who are bagged.
- **Try suctioning.** “Infants are nasal breathers and have small nares,” says Dr. Grover. “You should suction their noses.”
- **Establish good mask seals.** First, select the correct mask size based on the patient’s weight. Ensure that it covers both the mouth and nose. Rather than trying to push the mask onto the child’s face (which can cause facial trauma), lift the patient’s face into the mask.
- **Avoid hyperventilation.** Follow the bag mask’s recommendation and keep the air flow slow and steady.
- **Use the right-sized equipment.** “I can’t emphasize this enough,” Dr. Grover stresses. “EMS agencies should invest in the right-sized bags, masks and other equipment.”
- **Keep the child calm.** Read Dr. Grover’s tips below.
- **Transport to appropriate facilities.** “Children who are transported to adult facilities can get lost in the shuffle,” says Sillasen. “At the pediatric EDs at Fairview and Hillcrest hospitals, we have age-appropriate equipment and treatments. Parents can stay with their children and we provide support for them.”

Cleveland Clinic Pediatric Emergency Departments

Fairview Hospital
18101 Lorain Ave.
Cleveland, Ohio 44111
216.476.7000

Hillcrest Hospital
6780 Mayfield Road
Mayfield Heights, Ohio 44124
440.312.4500

- **Request debriefings.** “This is a small thing that can go a long way,” says Dr. Grover. “Sometimes all it takes is for EMS to hear that they did a good job. A debriefing or run review is a nice educational way for EMS to pick up ideas so that they can do even better in the future. We’ve had some engaging conversations.”

Whether you’re a veteran paramedic or a newbie, pediatric emergencies can intimidate even the most skilled provider. Consequently, it’s always a good idea to brush up on pediatric care – especially as it pertains to the airway. Arm yourself with knowledge and hands-on training so you feel confident when confronted with your next pediatric case.

“Considering the constraints they’re under, our EMS squads do a fantastic job,” says Dr. Grover. “By investing time and resources in training for pediatric medical emergencies, they can step up their game even more.”

Turning Stress into Child’s Play

How to Calm Down Children and Parents during Medical Emergencies

When a child is seriously ill or injured, the scene can quickly become emotionally charged. While the child is crying or screaming, the parents may turn into a wreck, and your own emotions may get as tightly wound as a tourniquet.

“Keeping a child with their parents will make the child much calmer,” says Purva Grover, MD, Medical Director of Cleveland Clinic’s Pediatric Emergency Departments. “I’ve seen kids with croup, extreme stridor and impending respiratory distress who can stay stable as long as they are comfortably placed in a parent’s lap.”

Here are some tips for lessening the stress of pediatric emergencies:

- **Take charge.** When a child and their family realize that a medical professional is in charge, they are usually filled with relief.
- **Present a calm demeanor.** No matter what you’re feeling inside, try to compose yourself.
- **Offer a comforting object.** “These things may seem loosey-goosey, but children of all ages really do better when they can cling to something comforting like a brand-new teddy bear, pillow or blanket,” says Dr. Grover.
- **Designate a specific caretaker.** So that the child is not overwhelmed, choose one member of your team who will stay with the child. This person should talk soothingly and explain what is happening.
- **Distract the child.** Try to divert their attention by getting them to talk about their favorite sport, pet, movie or book. You might also try telling them a story. Oftentimes children will stop crying so they can hear you.
- **Build trust.** Be honest and explain what you’re doing. Tell the child you are there to help them, that you’re taking them to the hospital and that their parents can go with them.
- **Relieve pain.** Pain control is crucial to the prehospital care of children and can go a long way toward easing a child’s stress. “Offer them adequate pain relief by either calling medical control for instructions or by looking up the appropriate medication in your protocol book,” suggests Dr. Grover.
- **Focus on the job at hand.** As difficult as it is, block out distractions and concentrate on tending to your patient’s medical needs.





Members of the University Heights Fire Department and John Carroll University Police Department worked closely with the JCU EMS squad during their Mass Casualty Incident drill.

It's Academic!

Student-operated EMS Squad Saves Lives at John Carroll University

The unfortunate death of a John Carroll University (JCU) student in 2002 led to the birth of something very positive – the formation of JCU's EMS team. Run by students certified in EMT-B or EMR, the team responds to on-campus medical emergencies, such as the preventable death in 2002 that was caused by cardiac arrest while the student played basketball in a campus gym.

"We stabilize patients before the ambulance arrives," explains Elisabeth Cahill, a senior who serves as Chief of the EMS Department. "A great thing about our squad is that, because it's a small campus, there's always someone nearby to help. Older students mentor the younger ones, and we've developed many friendships."

The JCU squad functions under the medical direction of Arnold Feltoon, MD, an area emergency department physician, and the organization relies on the University Heights Fire Department for ambulance transport when necessary. The team also works closely with the JCU Police Department and Office of Residence Life.

A number of EMS members go on to pursue careers in medicine. An example is Eric Beck, DO, a 2004 graduate who founded the squad and went on to be named a 2016 "Up and

Comer" by *Modern Healthcare* magazine. Cahill also plans to become a doctor and was recently accepted to one of her top medical school choices.

"Thanks to the JCU EMS squad, I've grown as a person and gained a lot of confidence – so that I'm now someone who can take charge of the team," Cahill says. "We joke that I'm a magnet for allergic reactions. If you're on campus and have an allergy, there's a good chance I've stuck you with an EpiPen®."

"One time I had to open an airway and put a patient on oxygen," she notes. "Another time, a professor had a heart attack on campus. A member of our squad responded, started a first round of CPR and then assisted University Heights EMS when they arrived."

To prepare for potential on-campus catastrophes, the JCU EMS squad hosts an annual mass casualty incident – with volunteers acting as patients and wearing special effects makeup. In addition, some team members take part in the annual National Collegiate Emergency Medical Services Foundation Conference, which is attended by students belonging to EMS organizations at schools across the country.

The team follows medical protocols, as approved by

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Achieving the Gold Standard North Ridgeville FD Earns Prestigious Accreditation for Its Ambulance Service



North Ridgeville Fire Department Members (from left) Lt. Bob Knowlton, Chief John Reese, Firefighter/Paramedics Justin Silvi and Matt Sullivan celebrate their Certificate of Accreditation.

Throughout the State of Ohio, only four EMS agencies have earned accreditation from the Commission on Accreditation of Ambulance Services (CAAS). The North Ridgeville Fire Department is one of them.

In achieving this noteworthy accreditation, North Ridgeville joins the company of Delaware County EMS (the second largest EMS provider in Central Ohio), Loveland-Symmes Fire Department outside of Cincinnati, and ProMedica Transport, a private agency in the Toledo area.

"These three agencies are solid, and we're pretty proud to be numbered among them," says North Ridgeville Chief John Reese, EFO, paramedic. "This all started here when our department's EMS committee looked at what we do well and what we can do better. We thought we'd like someone from the outside to tell us objectively how to improve.

"We also considered all the other medical services that are accredited," he adds. "We transport patients to and from assisted living and nursing centers that are accredited, rehab centers that are accredited and hospitals that are accredited. We felt like the weak link. Shouldn't EMS be accredited also?"

North Ridgeville FD members who spearheaded the accreditation process included the following firefighters/paramedics:

- Capt. Steven Cook
- Tony Kotar
- Colt Eberling
- Justin Silvi
- Capt. Joe Gavlak

"These people organized our accreditation

"We transport patients to and from assisted living and nursing centers that are accredited, rehab centers that are accredited and hospitals that are accredited. We felt like the weak link. Shouldn't EMS be accredited also?"

Chief John Reese, EFO, paramedic, North Ridgeville Fire Department

efforts, but everyone here helped them," says Chief Reese. "Even dispatch was involved. They had to shut down their computers one day and show that they could function with just pencils and paper."

The nitty-gritty of accreditation

CAAS is an independent commission that established standards for the ambulance service industry in an effort to encourage and promote quality patient care. CAAS's three-year accreditation signifies that a service has met the "gold standard" for a modern EMS provider.

Designed to increase operational efficiency and clinical quality while reducing risk and liability to the organization, these standards often exceed those established by state or local regulations. The accreditation process includes a comprehensive self-assessment and independent external review of the EMS organization. All ambulance systems – including private, public, fire department and hospital-based services – are eligible for accreditation.

To start the accreditation process at North Ridgeville, the department conducted a self-assessment. "We found out that we were maybe 75 percent up to speed,"

says Chief Reese. "Then we spent a year revamping our policies and procedures and preparing a lot of documentation before applying for accreditation.

"With our accreditation, I think we're way ahead of the game," he notes. "But I see it coming as a universal requirement for EMS agencies down the road. Some states require it already. They've tied it to funding, and I think it makes sense.

"For example, in order to be accredited, your department's vehicles must be under the weight they're designed for," he explains. "EMS tend to overload ambulances with equipment, which is not a safe procedure. We weigh our vehicles yearly to make sure we're compliant. This is one example of how the accreditation process helped us improve policies and procedures."

Other changes at North Ridgeville included improving signage outside the station's front door and developing a blood-borne pathogen policy. "The new policy was one of the huge things we got out of the accreditation process," says Chief Reese. "Regularly inspecting our ambulances and equipment for cleanliness has made things better for patients and our own people."

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second 500-ml bolus, but first ...

- **CONTACT MEDICAL CONTROL**
- **MONITOR YOUR PATIENT FOR FLUID OVERLOAD**

Realize that if comorbid conditions exist, you may be treating two conditions simultaneously. For example, if your patient is having difficulty breathing, you should deliver the first 500-ml of fluid while treating the respiratory distress with nebulized medications.

"When EMS providers call a sepsis alert and give us advance notice, we can administer antibiotics to the patient faster," says Chris Myers, DO. "Across



"We should be reacting to sepsis the way we handle other potentially deadly conditions like heart attack, stroke and critical trauma. We can all play a part in pioneering a successful program to limit sepsis deaths."

Debra Juba, Paramedic, Medina Life Support Team

the nation, other emergency facilities that have initiated sepsis alert programs have seen reductions in antibiotic administration times go from an average of 131 minutes down to 69 minutes. Plus, they reduced the mortality rate from

severe sepsis from 26.7 percent to 13.6 percent.

"As a healthcare system that's committed to serving the community, Cleveland Clinic wants to partner with EMS to limit the ill effects of sepsis," he notes.

Student-operated EMS Squad Saves Lives at John Carroll University

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Dr. Feltoon, as well as standard operating procedures. To become a member of JCU EMS, students must have EMR or EMT-B certification and sign up for at least one week-day shift and one weekend shift every third weekend. Training days and monthly department meetings are mandatory for all members.

Once accepted into the program, candidates register for an EMR or EMT-B course. Both courses require ride-along training days with a local EMS squad and two responder-in-training shifts with JCU EMS. After passing the final exam for the course, candidates must pass an exam administered by the National Registry of EMTs, qualifying them for a certification and license to practice from the Ohio Department of Public Safety Division of EMS.



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Elisabeth Cahill,
College Senior and Chief,
John Carroll University EMS

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.