



# CENTRAL IOWA EMS DIRECTORS Synergy

Fall 2009

BRIDGING THE  
GAP BETWEEN  
HOSPITALS  
AND EMS

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## Bridging The Gap Iowa Health – Des Moines

**B**ridging the gap between pre-hospital and hospital care is important to patient outcomes at Iowa Methodist, Methodist West, Iowa Lutheran and Blank Children's Hospitals. Paramedics and EMTs have traditionally been thought of as street medics. Their education and training prepares them for work in the public sector and out in their communities. As each new patient scenario arises, they function on the spot, independently and with skill and compassion.

Over the years, the hospital and medical community have grown to see the value and experience of the paramedic profession and have incorporated medics in many areas of practice "inside" the walls of healthcare institutions. Iowa Health - Des Moines has a long history of envisioning a team atmosphere in the hospital setting, where physicians, nurses, paramedics, EMTs and other medical professionals work collaboratively, side by side. The role of the paramedic has grown and evolved - continuing to allow greater utilization of paramedics scope of practice in a variety of patient care areas. Some of those areas include: Cardiac Cath Lab, Emergency Departments, Life Flight and Transport Teams.

"Incorporating paramedics within our teams has created a more skilled, efficient, and logical environment for our patients," stated Katy Hill RN, EMT-B and EMS coordinator for Iowa Health. "We see better outcomes as we continue to expand the numbers of paramedics utilized at Iowa Health, and strive to use all of our resources to the best of their abilities and at the highest allowable scope of practice."

The Life Flight nurses have worked alongside paramedics for more than 30 years. As the Life Flight program manager, Evelyn Jackson, explains: "The role of the paramedic has evolved from that of a volunteer second crew member to being an equal member of the full time crew."

Over the years, the orientation and educational components have grown to the highest standards, and the scope of practice has continued to climb as each team member relies on each other for expertise. Our Paramedic Specialists function as part of our trauma team, code team and specialty pediatric and neonatal transport teams. They respond to in-house IV calls and cardioversion procedures. They travel to all parts of Iowa and the country to speak at conferences and educate at EMS training sites. Some, like Paramedic

Specialist Rick Kallemeier, have attained national certification as a flight paramedic.

Kevin Boyd RN, Cardiac Cath Lab supervisor at Methodist, speaks to how paramedics are working in his department: "Today, we utilize our Paramedics in the Invasive Lab, Electro Physiology Lab and Recovery Area. They function in all roles (circulate, scrub and record for procedures). They administer medications within the lab (IV/PO), pull sheaths, maintain hemostasis, and perform assessments, IV starts, lab draws and intubations."

The new Emergency Department Care Delivery Model was developed

by Linda Clemen, Executive Director of Emergency Services: "We currently have many paramedics working in our EDs as clinical partners. This does not allow them to utilize their skills or fully function within their scope of practice. We are going to push to move in that direction. By incorporating a team approach in which a paramedic and a nurse partner together and are accountable for a block of rooms in the ED, we enable more patient care to be done in less time. The paramedics and nurse both greet and initiate plan of care for patients arriving via EMS or private car." The paramedics will do hourly reassessments, charting, start IVs and draw labs and be a major contributor during CPR situations."

Mark Amann, Career Paramedic/Firefighter,

Continued to back page.

When leadership at Iowa Health – Des Moines was asked: "How do Paramedics contribute to the professional and clinical atmosphere within the Iowa Health family?" these were the answers they provided:

- "Paramedics play an extremely important role."
- "Paramedics here at Iowa Health are confidently able to step in with sharp skills, assessments, and valuable street experience."
- "Paramedics are key members of our team."
- "They are an important element of our department where everyone is viewed as equal."
- "They are my back-up. I wouldn't feel comfortable without them here."

## Meds Under Scrutiny: FUROSEMIDE

Reprinted in part with permission from JEMS: The Declining Roles of Furosemide, Morphine & Beta Blockers in Prehospital Care, January 2009. Read the full article at [http://www.jems.com/resources/supplements/eagles2009/meds\\_under\\_scrutiny.html](http://www.jems.com/resources/supplements/eagles2009/meds_under_scrutiny.html)

By Jared McKinney, MD • Jeremy Brywczyński, MD • Corey M. Slovis, MD

The diuretic furosemide (Lasix) has long been used in the prehospital care of patients who have shortness of breath and/or hypoxia believed to be secondary to acute pulmonary edema. Because patients with pulmonary edema have an in-hospital mortality of 15–20%, there's an urgency to treat this condition aggressively and with the most effective medications.

Therapy usually begins with oxygen, often followed by nitroglycerin and/or furosemide, a loop diuretic that acts on the kidney to promote diuresis. Many paramedics are directed to administer furosemide by protocol or direct orders from medical control. It has long been believed that patients in pulmonary edema are “drowning” from fluid in their lungs, and administering a diuretic will improve respiratory status in these often critically ill appearing patients. However, during the past two decades, research into the usage of furosemide in the prehospital setting demonstrates it may not be indicated in the EMS management of acute cardiogenic pulmonary edema. Additionally, it's possible that diuretics might actually be deleterious in the dyspneic patient believed to be suffering from pulmonary edema.

Acute pulmonary edema results from many different underlying conditions. The most common are cardiac ischemia, dietary and medication non-compliance, severe hypertension and cardiac arrhythmias. The syndrome represents a vicious cycle. The build-up of fluid in the alveoli leads to hypoxia. This lack of oxygen results in the release of catecholamines as a stress response. These hormones, such as epinephrine, result in constriction of blood vessels and an accompanying increase in blood pressure. As blood pressure increases, the heart is forced to pump against increasing resistance, leading to more edema in the lungs.

One of the mistakes in the use of furosemide in acute pulmonary edema is the assumption that the patient is “fluid overloaded.” Studies have shown that many patients with pulmonary edema are actually euvolemic, or even hypovolemic, in the acute setting and that furosemide can cause rapid deleterious fluid shifts. Despite these facts, many medical providers continue to believe that patients with acute heart failure syndromes are volume overloaded, thus necessitating a diuretic.

Studies have also shown that when patients in heart failure are acutely given furosemide, preload and blood pressure are paradoxically increased in the initial 15–20 minutes. Conversely, in 1987, Hoffman demonstrated that the administration of furosemide alone, or in

combination with morphine, added no benefit in the acute management of pulmonary edema and led to deleterious side effects, such as hypotension, and worsened clinical outcomes.

In addition to the established fact that some patients with pulmonary edema are not volume overloaded and that furosemide may cause worsening hemodynamics in the acute setting, evidence also suggests that we may be doing harm to patients because of incorrectly identifying pulmonary edema. Patients may have other medical conditions that can lead to acute shortness of breath, such as congestive heart failure (CHF), pneumonia, chronic bronchitis and emphysema. Many patients also have co-existing medical conditions.

In 2006, Jaronik et al studied the appropriateness of prehospital furosemide. They retrospectively identified all patients given this medication in the prehospital environment. The results were substantial. Of the 144 patients included in the study, 60 patients (42%) did not have any evidence of CHF during their hospital stay and 33 patients (23%) needed IV fluid administration from the dehydrating effects of furosemide.

The most compelling statistic was that 17% of the patients who received furosemide ultimately received a diagnosis of sepsis, dehydration or pneumonia and were “potentially harmed” by furosemide administration. The conclusion was that EMS personnel, faced with a sick patient with shortness of breath, don't have the time or resources to accurately diagnose a volume-overload patient in pulmonary edema. Moreover, almost half of the patients in this study received furosemide inappropriately.

The inability to correctly diagnose the cause of shortness breath in the acute setting is not limited to prehospital care providers. In one study, initial clinical judgment by an emergency physician had a sensitivity of only 0.61 and a specificity of 0.86 in predicting CHF. Misdiagnosis was highest in those patients with a history of both heart and lung disease. Physicians now routinely rely on history, physical examination, chest X-ray and the blood test BNP to correctly diagnose CHF as the cause of shortness of breath.

In conclusion, it appears that the prehospital administration of a potent diuretic such as furosemide may no longer be indicated. Many patients with CHF are not volume-overloaded, furosemide may acutely worsen the status of a patient in pulmonary edema if given alone, and prehospital providers have difficulty identifying pulmonary edema as the underlying cause of hypoxia and shortness of breath.

## Polk County Mass Casualty Incident (MCI) Trailers

By Ryan Young, Altoona Fire Department

Polk County has two MCI trailers available for use by any department needing additional resources on an emergency scene. These trailers are housed at the Altoona Fire Department and Clive Fire Department and are automatically dispatched at specified alarm levels on most departments TEAMS cards (in Polk County).

The trailers have a variety of equipment capable of assisting departments on large multiple patient incidents. Some of the items include: long backboards, oxygen masks, dressings and bandages, stethoscopes, blood pressure cuffs, DRASH tent w/ heater, generator, and scene lights. For a complete inventory list, log onto [www.ciemsd.org](http://www.ciemsd.org) and click on the resources page.

All departments are encouraged to include the trailers in MCI training and drills. If you would like to utilize a trailer for your department training or a walk through, please contact: Ryan Young at the Altoona Fire Department ([ryoung@altoona-iowa.com](mailto:ryoung@altoona-iowa.com)) or Brian Helland at the Clive Fire Department ([bhelland@cityofclive.com](mailto:bhelland@cityofclive.com)).

The Central Iowa EMS Directors Operations Committee along with area hospitals and Polk County Emergency Management are also in the process of updating the Polk County MCI plan. Look for an updated plan, training aids, and other resources in 2010. Once the plan is complete, an assessment will begin to determine how it can be integrated with surrounding counties.

*This procedure may vary depending on the brand and type of CPAP*

## Protocol Spotlight

# CPAP Procedure



### Indications:

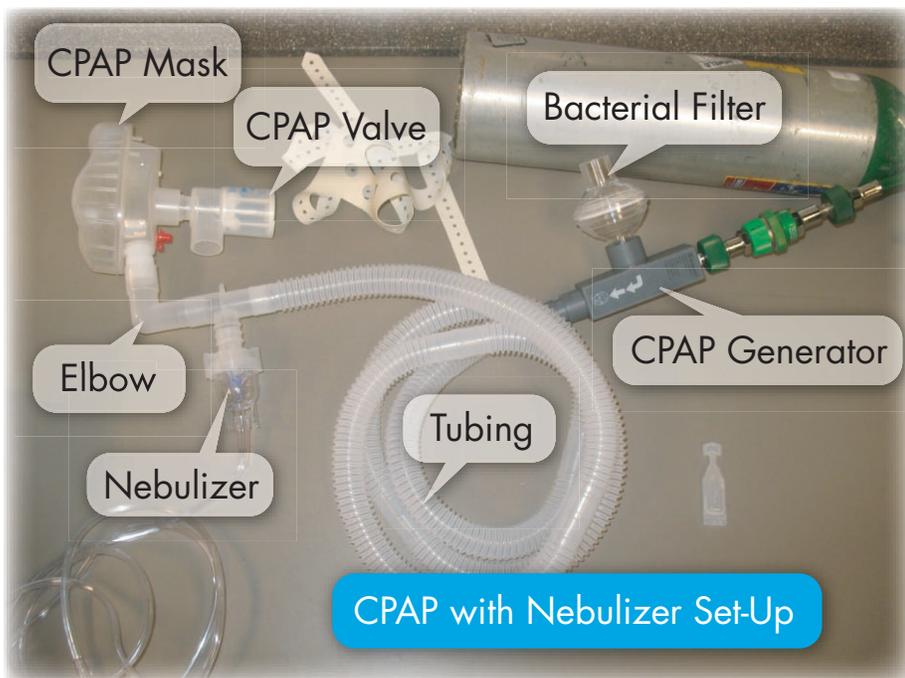
- Treatment of hypoxemia secondary to congestive heart failure (CHF) and acute cardiogenic pulmonary edema.
- Treatment for hypoxemia and shortness of breath in Chronic Obstructive Pulmonary Disease (Asthma, Chronic Bronchitis, Emphysema).
- A concern of impending respiratory failure is present
- Adults in respiratory distress that have bibasilar rales or wheezes plus two of the following
  - ◆ Increased work of breathing
  - ◆ Initial room air O<sub>2</sub> saturation < 90%
  - ◆ Respiratory rate >28/in
  - ◆ ET/CO<sub>2</sub> >45

### Contraindications:

- Respiratory Arrest
- Agonal Respirations
- Decreased level of consciousness/inability to follow commands or directions.
- Cardiogenic Shock
- Pneumothorax
- Penetrating chest trauma
- Nausea/vomiting
- Facial Anomalies / Trauma
- If BP <100 systolic, contact medical control prior to administration

### Procedure:

- Assess Vital Signs
- Attach heart monitor and pulse oximeter
- Verbally instruct patient.
  - ◆ Patient requires “verbal sedation” to be used effectively.
    - Example: Patient - “I can’t get air in!” Caregiver- “This will help you get air in.” “This will help you breathe easier”.
  - ◆ Instruct patient to breath in through their nose slowly and exhale through their mouth as long as possible (count out loud slowly to four and then instruct to inhale slowly)
- Treatment should be given continuously throughout transport to ED even if patient condition improves. Once CPAP is discontinued, patients can deteriorate rapidly.
- Vitals should be assessed / recorded every 5 minutes.
- If the patient condition deteriorates despite CPAP and/or medications, then terminate CPAP and manage airway as needed.
- Notify emergency department early during transport that CPAP is being utilized.
- Terminate CPAP if patient is not tolerating procedure.



## CREW CORNER

By Amy Peterson, Mercy Ambulance

### Disinfecting Trucks

There will always be chores. Some we hate more than others. You know. The ones we manage to find excuses to avoid at all cost. But what is the cost of not regularly disinfecting our trucks? Think rats and cockroaches – not in the literal sense, but how they are known as carriers of disease. We glove up to minimize our exposure to our patient’s diseases, but once we are in the truck, what else (besides the patient) do we touch with our gloves on? The seats, monitor, bp cuffs, stethoscopes, door handles, the steering wheel, your coffee mug... Once we are clear the call and the patient is off the cot, we scrub the cot. Done! The truck is ready to go! WRONG! By cleaning only the cot, we are continuing to put ourselves and our subsequent patients at risk. C-diff, MRSA, VRE, Hep C. These all can reside on the surfaces within our ambulance. Don’t be a carrier. So while the chores are still hated, the consequences of not doing them should be hated more. Dedicate 15 minutes of each shift to protecting your patients, your partner, your family, and yourself! Disinfect that truck!

### Flu Shots

I hate needles, especially to be on the receiving end of a needle. Even more so when it is to get the annual flu shot, when I know full well that I’m going to get the flu later this year anyway. I’m strong. I don’t get sick that often. But... we are all in contact with so many people who are sick. And while we may not exhibit any symptoms of the flu, or we may be able to recuperate easily, we still become carriers. Consider the patient types we commonly have contact with: cancer patients on radiation and chemo, pediatrics (including our own children), or the elderly. Now think about who most likely would/could, will/can give us the flu bug: our coworkers, our family members (including our children), people at the store, the restaurant, or anywhere else in public. Our patients already have weakened immune systems, making them more susceptible to contracting the flu and a longer recovery time. We wear our gloves to protect ourselves without protest. In fact, we won’t touch our patient’s without our gloves. We can help protect our patient’s by getting the flu shot.

## Meetings/Events

Visit [www.ciemsd.org](http://www.ciemsd.org) for a full schedule of events, committee meetings, etc.

### CIEMSD Regular Meeting

Monday, January 25th, 2010  
Location: Ankeny Fire Department  
Dinner: 1800  
Meeting Time: 1830-2030

### Central Iowa EMS IN ACTION Conference

February 26th-28th, 2010  
West Des Moines Marriott

### CIEMSD National Refresher

Basic Providers, February 26th  
– 28th (In conjunction with EMS  
IN ACTION Conference)  
Advanced Providers,  
March 12th-14th, 2010  
Visit [www.ciemsd.org](http://www.ciemsd.org) for more  
information and to register



For several years, the public has been aware that CPAP (Continuous Positive Airway Pressure) is an effective device for maintaining an open airway during sleep, alleviating the loud snoring that accompanies sleep apnea. EMS units are now deploying CPAP as an effective, non-invasive method of treating pulmonary edema.

Many patients who have suffered previous heart attacks or cardiac abnormalities will also begin to develop pulmonary edema. As blood is unable to be pumped effectively from the left side of the heart, it begins to back up into the pulmonary tissues. The accumulation of fluid in the tissues forces extra fluid into interstitial spaces, and eventually into the alveoli. This fluid displaces the surfactant normally found in the alveoli which blocks normal alveolar function, eventually leading to the collapse of the alveoli. Additionally, the increased fluid makes it harder for the O<sub>2</sub>/CO<sub>2</sub> exchange to occur due to pressure imbalance. The result is an overall decrease in pulmonary function, leading to respiratory distress.

Studies involving the use of CPAP to treat pulmonary edema have found it is an effective tool in the pre-hospital setting. CPAP provides a positive flow of air into the lower airways, increasing the pressure inside bronchioles and alveoli. As a result, the increased pressure within the alveoli facilitates a more even O<sub>2</sub>/CO<sub>2</sub> gas exchange while keeping the alveoli from collapsing. The effort of respiration is decreased, which means some patients who might previously have needed intubation can avoid it.

CPAP devices are relatively simple to set-up and operate. There are several different styles

to consider. Each of them utilizes compressed oxygen to supply positive pressure airflow to a mask that the pt. wears. Inhalation pressures can be varied in most styles depending on the size of the patient and their level of response to the treatment. The constant flow creates a positive pressure within the airways, even during expiratory/resting phase of ventilation.

There are some considerations for using CPAP in the pre-hospital setting. First is the application of the CPAP mask. The CPAP mask must be fit tightly to the patient, which the patient at first may find suffocating – it takes getting used to. While CPAP has been found to be effective in patients suffering from CHF-caused pulmonary edema, its effectiveness is less documented in treating patients with COPD or acute asthma. Services and their medical directors will have to evaluate which type/style of CPAP is best for them.

Finally, there are set-up and on-going costs for CPAP. Initial set-up for a CPAP generator/connection can range from \$25.00 for disposable CPAP systems, to \$500 for a fixed flow generator, to several thousand dollars for a transport ventilator with CPAP capabilities. Once your service has made the decision to adopt CPAP for treating pulmonary edema, training is vital. Ensure a policy is put into place outlining indications and contraindications for its use. Make sure all personnel are fully trained on the device and its operation. Finally, practice regularly how to set-up and apply CPAP to the patient. CPAP is an effective tool in treating pulmonary edema. Remember though, it is only one additional tool. Good basic care is still an important part of treating the respiratory patient.

## CIEMSDA

Central Iowa EMS Directors Association

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## BRIDGING THE GAP Continued from front page.

works part-time as one of the newly converted ED paramedics at Methodist. He explains: "This model has already improved patient flow and speeds up initial assessments and the first line treatments our patients need. Patients are ready for physician exam sooner, are receiving medications faster and arriving for procedures in much less time. We had a patient to the Cath Lab in nine minutes last week because the nurse could focus on report from the pre-hospital medics and completing her admission assessment and transfer paperwork. While she did that, I started the lab work, placed a second IV, and prepared the patient and family for the Cardiac Alert process."

Mark described the new paramedic role and how they will be highly utilized in the protocol bay as patients arrive for triage. Coming from the field, these paramedics have become expert clinicians at initial assessment and prioritizing care. He added that working in the acute care hospital setting has also made him a better paramedic out in the field as well. "We are learning everyday and it makes us all better! This has been long time coming and

I am so glad to see Iowa Health taking a progressive approach to the advancement of this profession within the hospital setting."

Maria Nelson, Blank Children's ED supervisor, also speaks highly of the paramedic employees: "We have used paramedics in the Blank ED since 2002. They all have varied backgrounds and have brought strength to our team. Their skills from working in the field are invaluable to the department.

Bridging the gap to maximize success is a goal at Iowa Health - Des Moines. We strive to capture and utilize our resources to the best of their abilities. Our patients and families deserve the best and we know that Paramedics have been making a positive impact in patient's lives out in the field for a long time. It is our goal to find more ways to effectively incorporate skilled EMS professionals into our system and onto our critical care teams. By working together through strong relationships, we truly can make a difference.

