

DPM NEWS

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Kids Corner

Dr. Murray reviews the four prevalent pediatric respiratory infections and discusses what to look for and how to treat them. We can all use a refresher on these at this time of year! See page 4.

Introducing...

Dr. Aaron Farney recently joined the University of Rochester Faculty and is the EMS Medical Director for Livingston County. He will be writing a column focusing on rural EMS for our newsletters. Learn more about Dr. Farney on page 10.

Medical Director Minute

See page 6 for a brief introduction to the Zoll Life Vest which is a wearable external defibrillation device being used in our region. Dr. Cushman hits the highlights on how to treat patients wearing one of these devices.



What IS This?

Eric Rathfelder MS, EMT-P

Thank you for opening or picking up this newsletter! Within, you will find information about medicine, research, and other timely topics that impact your practice. This is the first quarterly edition of our newsletter that will provide updates on regional initiatives, local EMS and ED research, upcoming training and other important goings-on. Have you ever wondered what happens to the information you give to the research assistants in brown scrubs at Strong? Did you know the flow rate for different size IVs is listed right on the wrapper? Want to hear about what QA issue is driving your medical director crazy? These are some of the areas we will delve into in these newsletters. In general, you can expect to see contributions from Division of Prehospital Medicine (DPM) physicians, staff, and researchers. And, on that note, let me clarify a housekeeping issue. The Office of



Lounge at new office building in College Town.



Emergency Medicine Research Update

Heather Lenhardt MBA, EMT-P

Community Paramedicine

The Department of Emergency Medicine Research has been busy! The University of Rochester was awarded two Community Paramedicine grants designed to study older adults who are treated and released from the ED. These grants will be under the direction of Dr. Courtney Jones and Dr. Jeremy Cushman. The first grant, awarded by the National Institutes of Health (NIH) will work with Henrietta Ambulance to evaluate this program in a suburban setting. The second grant, funded by the Greater Rochester Health Foundation will work with Livingston County EMS to deliver essentially the same program to the rural population. The goal of both of these grants is to decrease ED readmission within 30 days. Community paramedic visits for both grants will be underway by January 2016.

Pediatric Trauma Triage

This study is ongoing! EMS, if you have a patient that is 15 or younger who you treated at the scene and has ANY mechanism of injury, please help us and take a short survey with our research assistants. (cont'd)

Prehospital Care (OPC) no longer exists (and hasn't for many years)!

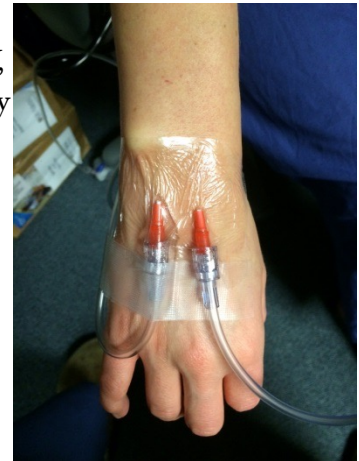
Instead, MLREMS contracts with the University of Rochester and the Division of Prehospital Medicine (part of the Department of Emergency Medicine) to take care of managing many of the EMS-related tasks required to keep the system running. Confusing, I know, but all you need to know is the DPM exists; OPC does not. If you ever want to come visit us, please stop in! Our office is at 44 Celebration Drive, Suite 2100 (above Constantino's and Breathe Yoga) in College Town off of Mt. Hope Ave. Lastly, if you have questions, suggestions, or comments about this newsletter, please let me know at e.rathfelder@gmail.com. Thank you! (By the way, my role at DPM is assisting the rest of the staff with educational initiatives).

Don't Let the Orange Catheters Collect Dust

Chris Galton MD, NREMT-P

You all know that patients who present to an Emergency Department for treatment almost always need vascular access for a variety of reasons. That vascular access can come in a variety of types, but typically is in the form of a peripheral IV. At the ALS level, part of our job is to initiate IV access in the appropriate patient with the "appropriate tool."

We are all equipped with at least six different sizes of peripheral IV catheters. When you are considering initiating a peripheral IV, how do you decide which of the many catheters is the appropriate one? Over the course of my career I have heard different answers to what I have always thought was a simple question. Of all the answers, the one that really frustrates me is "the one that will fit." My universal response is "that's garbage," and I think that because we are smarter than that.



Sick people generally need large bore venous access to manage their illnesses. Large bore venous access is a 14 gauge peripheral IV, plain and simple. Although each IV catheter manufacturer is different, a standard 14 gauge, 1.25 inch catheter will flow

Here is how we are doing:

As of November 6, 2015 a total of 4, 847 patients have been enrolled. 1, 256 (26%) from Rochester, NY; 1,597 (33%) from Milwaukee, WI; 1,994 (41%) from Dallas, TX.

Simulation Grant

Dr. Courtney Jones was awarded a simulation grant that will evaluate EMS providers' decision making process in the field. We need 200 ALS or BLS EMS providers to volunteer to participate in this grant. Providers will be compensated for their participation and the simulations will be held in the Simulation Center at Henrietta Ambulance. More information to come...

-300 mL/min and can flow close to 475 mL/min under pressure. Conceptually most sick patients do not need to get 300 mL/min of IV crystalloids, colloids, or blood products.

The reason we place large bore catheters is simple: we cannot be certain which patients will need high volume resuscitation as part of their care.

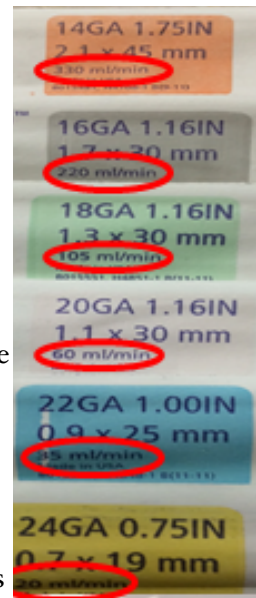
The biggest mistake we can make when speaking of venous access is to take a perfectly good site for a peripheral IV and stick in a catheter that is too small for the current and future needs of the patient. Once that catheter is placed, it is very rare and difficult to change to a bigger catheter. You would be hard pressed to find an emergency physician, trauma surgeon, anesthesiologist, or intensivist that would ever complain about having too much vascular access when resuscitating sick patients. On the other hand, many emergency room nurses spend their entire career improving vascular access in patients that come in by ambulance.

Do you actually know the difference between the flow rates of all the catheters you carry with you? I do not think it is high yield to actually memorize the flow rates, but understanding the differences is

critically important. Attached is a picture of the wrappers for one brand of peripheral IV catheters and the flow rates listed on the packaging.

Although the exact numbers are not as important, the difference between them is. One 14 gauge catheter roughly equals the flow rate of three 18 gauge catheters. One 16 gauge catheter is roughly equal to four 20 gauge catheters.

Most patients that EMS brings into the emergency department do not need large bore venous access. However, those patients that do need large bore access need competent paramedics to do the right thing when they are called upon. You are always going to be right if you bring your sick patient into the ED with more access than they end up needing. You are always going to be wrong if you bring any patient into the ED without enough access, especially if you had the opportunity to fix the problem and you decided to put in a smaller catheter instead. Sometimes 40 kg, 95 year old, fragile patients need multiple big needles and aggressive resuscitation. Sometimes 150 kg professional athletes need 20 gauge IVs for a medication route. We are paramedics that think, not one trick ponies with a pink catheter and a prayer.



Bottom Line: The patient's condition, not your comfort level, should dictate the venous access they need. Get out of your comfort zone and do the right thing when called upon. We are constantly faced with performing challenging tasks in less than ideal circumstances and vascular access is just one part of that duty.

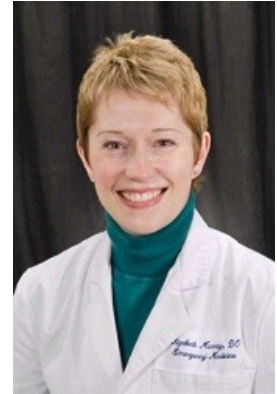
Kids Corner - 4 Minutes on the Big 4 Winter Viruses

Elizabeth Murray DO

This section of the newsletter aims to provide quick tips and to reinforce important teaching points when it comes to the prehospital care of children. As always, follow your local protocols. For brevity, each section is meant to highlight certain points, not represent the entire care plan.

Tis the season; sniffles and fevers and coughs galore! When it comes to the big four winter viruses, knowing what you are up against will help with your prehospital treatment plan. Plus, it's always helpful to talk through your thought process (yes, talk out loud, as if you are talking to yourself) as this will help calm understandably nervous parents.

So, here it is, one minute for each of the common winter germs: Influenza, Par-Flu, Respiratory Syncytial Virus (RSV), and Enterovirus.



Funky Flu

Is it Flu?

Of the 4, true Flu is most likely to have high fevers (>102) and muscle aches, sometimes that's all. Remember, there are always going to be Flu-like Illnesses around this time of year too and that's ok for you as your treatment is the same.

Watching for:

Altered Mental Status (AMS): Dehydration, hypoglycemia, and encephalitis can all be in play with the Flu.

Now suddenly much worse: A common history is that the child was improving and is now much worse, usually with respiratory symptoms. (secondary pneumonia from a bacterial infection is a common side effect of the Flu)

Actions:

The most helpful thing to do here is protect yourself (mask for you and the patient, if the patient can tolerate it) and reassure the family. We often hear "he's usually so active, something must be wrong because he just wants to sleep". Correct! Something is wrong, but decreased activity with a fever is a normal response. Your patient (their child) is ill, but decreased activity does not mean something more ominous is happening.

If you are faced with AMS, follow the standard protocols.

Croup (Para-flu)

Is it Croup?

This one is usually pretty easy to diagnose: barking cough, hoarse voice, worse at night. The more important question is "is there stridor at rest"?

Watching for:

Stridor: Stridor is an upper airway, inspiratory noise. Wheezing is a lower airway, expiratory noise. Crying in the setting of croup will often cause stridor, that's why we watch for stridor at rest. This is also why we suggest doing anything in your power to keep your little patient calm. Sometimes it will take 10-15

seconds to decide if your patient is having an upper airway or lower airway problem and that's ok. Remember, talk it out. Being still for 15 seconds is painfully long, go ahead, try it. Disproportionately unwell: Minimal stridor but child is sitting forward and drooling or won't snuggle in with a parent. Epiglottitis is a rare pediatric disease now, but tracheitis is something to consider. Neither of these two will change your care plan.

Actions:

If stridor at rest, then treat with an Epi Neb per protocol.
 If possible, take the child outside as any cool air will help
 If taking a blood pressure causes the child to become upset, skip the blood pressure. This is true for any part of your physical exam. Upset = more stridor

RSV

Is it RSV?

This is the germ that causes Bronchiolitis and these are the children that are full of mucous, often called the "happy wheezers" as they will often sound terrible but not seem too bothered about it. Low/normal oxygen saturations are common and should not dictate your care plan. That is, don't fight to keep the supplemental oxygen on a child's face.

Watching for:

RSV is well known to cause true apnea (no breath in at least 15 seconds) in very young infants (3 months or less). If you see a respiratory pause, stimulate the baby. In the early phase, BVM/Intubation is not needed. Many babies do well with nasal CPAP only (once in the hospital). Always check for crepitus (feels like rice crispies around the neck). Prolonged increased work of breathing can result in pneumothorax. Therefore, you need to look it.

Actions:

Some children will respond to Albuterol if wheezing from RSV, many will not. If the child will tolerate the Albuterol/Atrovent, it is worth a try. However, do not be alarmed if you see no improvement in the patient's work of breathing.
 If an infant is having respiratory pauses, cardiac monitoring is important to ensure there is no associated bradycardia.
 There is more and more data showing treating to a certain oxygen saturation is not helpful and often increases unnecessary interventions.

Enterovirus

Is it Enterovirus?

We all remember the new kid on the block last winter, Enterovirus. This germ is known for causing an impressive amount of wheezing with many patients needing continuous Albuterol nebs. In contrast to RSV, there is less mucous and more wheezing in a patient population that is usually older (preschool and beyond). You may also notice that Albuterol is quickly very helpful and then the wheezing will return within moments of the Albuterol stopping.

Watching for:

Pneumothorax: again, prolonged increased work of breathing increases the risk of pneumothorax.

Actions:

Albuterol, Albuterol, and likely more Albuterol.

You may not be able to rid the patient of wheezing, but you will likely be able to start to notice an improvement in their work of breathing and overall affect.

Remember, you can always call the Pediatric Emergency Department at either Strong Hospital or Rochester General Hospital.

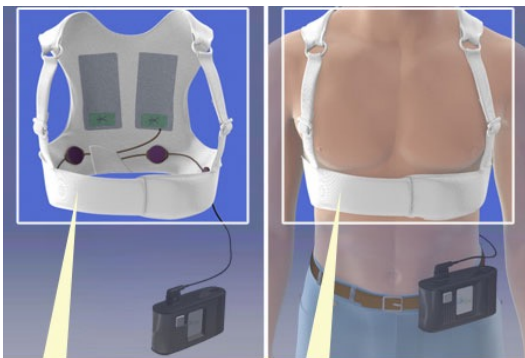
Kids, and hopefully, you have all had your Flu shot and are stocking Purell by the gallon!

Medical Director Minute - The LifeVest

Jeremy T Cushman, MD, MS, EMT-P

It's not what you think. Sure it can save your life, but it definitely does not float, and should not be mixed with water. Zoll Corporation has been producing the LifeVest for a number of years, however more and more are popping up in the community. The LifeVest is essentially a combination of a Holter Monitor and an AED. It is able to continuously monitor and record two leads constantly (like a Holter Monitor), and when it identifies a shockable rhythm, it is able to shock that rhythm (externally like an AED, but automatically like an AICD) without any bystander intervention. There are no invasive parts and the device can be easily removed. It is NOT anything like a VAD.

The good news is that this thing is not subtle (it's smaller than your average AED but still a pretty big "purse") with a backpack-like harness and wire coming out of it. It has a large pack (essentially an AED) that attaches to a waistband, and a harness that is worn. The harness has monitoring and defibrillating electrodes.



More info is available on the Zoll website including an 8 minute video that is worth your time: <http://lifestest.zoll.com/medical-professionals/first-responder-resources>

If someone has the device on, and it tells them that it's going to shock them, they can keep it from shocking them by pushing the silence button on the device. So for the person that has this thing alarming, but they are conscious and speaking, it can be silenced (the patient will know this). It's OK to silence it **AS LONG AS THE PATIENT IS CONSCIOUS.**

For BLS providers, it is important that the device is NOT taken off of the conscious patient even if it's alarming, else it won't be able to do its job if they become unconscious. If it's alarming and they are conscious it's doing so because of one of two reasons: 1-artifact or 2-they are in "stable" VTach. Most conscious folks are not going to be interested in getting a shock even if they are in VT. If they happen to become unstable (and lose consciousness) then they will get shocked shortly since they can't hit the silence button (pretty handy, eh?).

For ALS providers it is reasonable to turn off and remove the device while putting them on their ALS monitor to determine if the alarming is real (eg VTach) or artifact and then treat according to protocol. To remove the device, you simply undo the clasp located in the front of the device and turn the device off (there's both an on/off button and a silence button on the control panel).

If you come across a patient with the device that is unconscious, then we follow our usual protocol for unconscious/cardiac arrest patients. You should do CPR on these patients if they are without a pulse, and although there is sufficient data out there that suggests we can do "hands-on" defibrillation, this thing will squawk at you enough to stand back and even if you didn't hear it, the position of the patches (they are on the back) make it highly unlikely that an individual touching the patient or providing CPR will be shocked even with bare hands.

An unconscious patient that has had their LifeVest deliver a shock will have blue gel on their chest that is released just prior to the shock. For those of us that used paddles in years past, this is the same conduction gel and it won't cause any problems or harm you. If you find the patient is pulseless, you should perform CPR, turn off the device, and apply your AED or your ALS monitor. You do not need to take off the vest per se, just turn it off. The analysis and shock sequence on the LifeVest is longer than what is found in an AED, thus since we want to minimize any interruptions, you should switch over to the device you are familiar with (AED or ALS monitor) and minimize those interruptions in performing CPR. If you take it off, the LifeVest device should be brought to the hospital with the patient in the hopes that the information can be downloaded like most AEDs.

Those that might have a LifeVest generally have significant known cardiac disease and are either waiting for an implantable cardioverter/defibrillator (AICD) or are contraindicated to receive one. They continue to grow in their use, and at any one time there may be a few dozen patients in our community with them.

My Favorite Color is Tactical

Benjamin Sensenbach, EMT-P

In trauma we get so carried away with what we can do we sometimes forget what we should do. Major trauma makes up only a small percentage of all EMS requests for service in the Monroe-Livingston region, yet each year nearly 192,000 people die of trauma in the United States. The number of trauma related fatalities can be decreased by simple interventions. According to military trauma data, the preventable causes of trauma related death are: life threatening hemorrhage from an extremity, tension pneumothorax, airway obstruction, and hypothermia. A rapid and methodical trauma assessment by the first BLS provider can identify and intervene during the triage phase of patient contact.

Traditionally, we were all taught hemorrhage control with the old methods of direct pressure, elevation, pressure points, and then tourniquet placement as a last resort. This systematic approach to hemorrhage control just takes too long and your patient may bleed to death before hemostasis is obtained. It is often appropriate to attempt multiple modalities to provide hemostasis concomitantly such as kneeling on a patient's wound or adjacent pressure point while applying a tourniquet. Most EMS providers learned how to make homemade tourniquets as part of their initial training but based on the



Shown above: C.A.T. Tourniquet

infrequency of use providers would be better served to utilize commercial devices. Due to the wars in Iraq in Afghanistan the commercial tourniquets such as the CAT or SOF-T have been developed and evolved into simple to use and reliable devices.

Chest wounds should be dressed with occlusive dressings early in your assessment to minimize the amount of air than can be pulled into the chest. Commercial devices are quickly applied but a gloved hand, plastic wrapper or AED pad will work just as well. Avoid the common pitfall of failing to check for additional wounds. If your patient develops severe trouble breathing and hypotension the patient should be immediately reassessed by an ALS provider and their triage category may need to be upgraded. Often concomitant with tension pneumothorax, unconscious patients suffer from airway obstruction caused by their tongue or secretions in their oropharynx. Rolling patients and placing them in the recovery position combined with the placement of an oral or nasal airway adjunct can mitigate the risk.

Even on a ninety degree day trauma patients can quickly become hypothermic. In an effort to avoid missing occult injuries in trauma we typically cut away the patients clothing. This is imperative as it minimizes the risk of the patient hemorrhaging but it exposes the patient to the environment. Hypothermia inhibits coagulation, causes platelet aggregation and causes acidosis making it even more difficult to provide adequate hemostasis. At 35 degrees Celsius your body's ability to clot drops in half. Avoid hypothermia with rapid assessment and interventions, and then quickly moving the patient to the warm ambulance limiting exposure to the environment. The key is maintaining the appropriate ambulance temperature. If you are not sweating, then the ambulance is too cold.

Excellence begins with the basics. Simple interventions such as nasal pharyngeal airway placement and blankets can prevent trauma related deaths. Advanced procedures should be deferred until after hemostasis, BLS airway management, addressing chest wounds, and hypothermia prevention. Being dispatched to a trauma call will cause an increase in your catecholamine release resulting in clouded judgement, narrowed vision, and difficulty with fine motor coordination. You can overcome this with practice and training.

The Rural EMS Corner - Check & Inject

Aaron Farney, MD, Livingston County EMS Director

Check & Inject NY
Syringe Epinephrine Kit for BLS Providers



Anaphylaxis is a killer. Left untreated, it can progress to cardiopulmonary collapse and resultant sudden death. The treatment is 0.3 mg (adults) or 0.15 mg (pediatrics) intramuscular (IM) epinephrine at the first recognition of anaphylaxis. Historically, in New York State, BLS providers have administered this life-saving treatment via commercially available auto-injectors. However, as the price of an auto-injector set approaches \$400, the skyrocketing cost can be prohibitive for many smaller, rural EMS agencies – agencies who may see these devices expire before use. Yet it is precisely these rural communities, where ALS might be delayed, where definitive care is often some distance away, when prehospital epinephrine administration by BLS providers arguably matters most.



Introducing Check and Inject - an initiative by the University of Rochester Division of Prehospital Medicine to trial a cost-saving alternative epinephrine administration method. While the protocols, indications, and contraindications for epinephrine administration in the setting of anaphylaxis will not change, the equipment to administer the medication, and hence the cost, will. Anticipated cost savings are on the order of hundreds of dollars per administration.

Agencies that participate in this program will be issued syringe-based epinephrine kits. These kits contain one custom manufactured syringe with 0.3 ml (adult) and 0.15 ml (pediatric) graduations, one 23 gauge 1" safety needle, one 1 mL vial of 1:1000 epinephrine, two alcohol prep pads, one instruction card, and one bandage. Participation in the program includes training, post epinephrine-administration debriefing with an on-call physician by phone, and reporting requirements. The duration of the trial program is expected to be about 18 months.



Check and Inject is open to any EMS agency in New York State whose local REMAC and Agency Medical Director have approved participation in the program. For more information about the program and how to sign up, go to www.mlrems.org and click on "Check and Inject."

Cold Injuries

Benjamin Ostrovsky, MD

As the end of the year approaches, we are all too aware of the falling temperatures and the falling snow. As a field that is required to work outside in the worst weather nature has to offer, we need to be mindful of the effects that this cold weather has upon not only our patients, but also ourselves.

As soon as we feel that rush of cold, we begin to shiver. These muscle fasciculations are meant to help generate heat. Physical movement, even as little as just pacing around will generate more body heat than just standing and shivering. Just remember, that morning cigarette and coffee you are having while standing there shivering, is actually making you colder! Nicotine leads to peripheral vasodilatation, which will lead to increased heat loss. The diuretic effect of the caffeine leads to dehydration, which increases your risk for cold injury as well.



When our bodies are exposed to cold, the arteries in our extremities begin to constrict. This vasoconstriction begins once the skin temperature falls below 95F and is maximal at a skin temperature of 87F. These effects can be most appreciated in the hands, feet, ears and nose. This natural body response to try and stay warm can lead to increased cold damage to these sensitive areas.

Our ability to work in the cold also suffers due to the cold temperatures. Exercise performance begins to decline with our core temperature. For every 1.8F drop in core muscle temp, our maximal endurance capacity decreases by 5%, the endurance time by 20% and our maximal strength and power drops by 5%. Cold hands are more than just a nuisance to patients; manual dexterity decreases by 10-20% as finger temperature drop to 60F. Tactile sensitivity is nearly gone once fingers reach a temperature of around 45F.

Aside from the temperature itself, we need to be aware of the wind. Acting to magnify the cold, the greater the wind speed, the colder we feel and the less time we have before frostbite occurs. It's also important to keep your skin dry. Chronic exposure to damp, non-freezing temperatures will lead to Chillblains. These are painful, inflammatory lesions of your skin on your hands, ears, lower legs and

feet. The affected areas are itchy, burn, and can have paresthesias. Have a spare pair of socks and gloves to help prevent this complication of working in the cold.

What about our patients? What happens to them in the cold?

Mild hypothermia, defined as a temperature of 95 to 98.6F, is associated with violent shivering and bronchospasm. As the temperature drops to the mild-moderate range of 90-95F, mental status changes begin to occur and shivering is impaired. Once they reach moderate hypothermia with temperatures between 86-90F, patients will have a severely depressed mental status or may be unresponsive. Muscles may be rigid. Cardiac dysrhythmias are common and cardiac arrest may occur. Pupils may also be dilated. Below 86F, pupils become unreactive, vital signs become difficult to discern, ventricular arrhythmias are common as is cardiac arrest. Below 86F, it may be impossible to discern vital signs.

Your medications will not be effective; atropine wont work for the bradycardia associated with hypothermia. The metabolic acidosis that results from poor perfusion limits the effectiveness of pressors and epinephrine.

SCT Update

Jay Schueckler DO

For those of you that are SCT Medics or are aspiring to be one, changes have been happening. A committee has been meeting monthly for the past year reevaluating policy and protocol. There have been some changes and a few additions to the policies and protocols. At the most recent REMAC meeting the SCT policy was accepted with the changes that were proposed by the SCT committee. The majority of the changes were in regards to who is eligible to become and continue as a SCT medic and the continuing education component. In regards to the CME there will be a semi-annual SCT educational conference that will be given in conjunction with the ICU providers from RRHS and URMC. We are in the early stages of putting this conference together so any ideas or topics you feel would be good to cover please feel free to email john_schueckler@urmc.rochester.edu. There will be some protocol updates that are happening and they will be placed for comment in December and will be brought in front of REMAC in January.

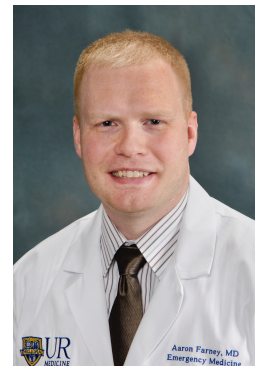
Introducing . . .

What brings you to the University of Rochester?

This is where I got my start. As a first year medical student back in 2006, I worked on a study regarding prehospital trauma triage criteria with Dr. Shah and Dr. Cushman, and later on a study looking at prehospital RSI. I enjoyed my time and experience in the Division of Prehospital Medicine, and even as I left Rochester after medical school, I hoped someday to come back.

What is your role at the University and, more specifically, with our regional EMS system?

I serve as a Clinical Instructor of Emergency Medicine in the Division of Prehospital Medicine. I work clinically at Strong Memorial Hospital, seeing patients and collaborating with residents, and at Wyoming County Community Hospital. I also serve as the Livingston County EMS Medical Director.



Do you have any unique focuses or interests within emergency medicine?

EMS! More specifically, I am particularly drawn to the unique challenges of delivering high-quality, safe, timely, and reliable prehospital emergency care in the rural setting. I am interested in resuscitation and cardiac arrest management, and more broadly, in rapidly converting evidence-based innovations into street practice.

Are there any specific areas that you would like to see improved or honed within our EMS system or involving prehospital patient care?

Thus far, I've seen that we have an outstanding EMS system with a high standard of care. As I become more familiar, I hope that my experiences in other EMS systems outside this region are an opportunity to bring forward a fresh perspective and some new ideas.

Anything else you want people to know about you?

My past lives include volunteer firefighting and working on the family dairy farm in Northern NY. I have thus far successfully evaded becoming a Bills fan. Time will tell!