

# DPM NEWS

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## Hypothermia

On *page 4*, Adrielle Watkins provides timely information on the dangers and harm caused by hypothermia for our elderly patients who fall.

## RSI 2.0

Curious about the revamped regional RSI training process? See *page 7*.

## Diagnosis Bias

Mike Meyer provides a case study on the power and pitfalls of diagnosis bias, anchoring, and diagnosis momentum in an article that should make you think twice about your diagnosis on *page 12*.

A career in EMS is challenging. Low pay, shift work, physical demands, challenging patient populations, stressful calls, traffic, and dozens of other factors weigh on EMTs and Paramedics daily. Unfortunately, administrative concerns like maintaining certifications, scheduling classes, and completing mandatories can add to the list, especially for providers who work at multiple agencies. One small effort MLREMS Council and the Division of Prehospital Medicine (DPM) have made is to improve the consistency and frequency of common classes to make it easier for providers to plan their schedules.

For example, the regional Preceptor Training Class will be offered in December and June; Certified Instructor Update (CIU) in February (starting in '20); RSI in January; etc. If you have any questions about classes and trainings, check out the training calendar at [www.mlrems.org](http://www.mlrems.org), contact the office, or see what is upcoming in the next few months on *page 2* of this newsletter. Feel free to contact DPM or any member of the MLREMS Council if you have ideas about how we can reduce some of the pressure on our regional providers!

*Eric Rathfelder*  
*Editor-In-Chief*

## Child Fatality Review

Recently, members of a local EMS agency attended a Child Fatality Review and summarized their experience along with some learning points from the review. Their names and agency have been redacted to ensure the confidentiality of the process.

A Child Fatality Review is conducted, following a child fatality, by representatives from involved agencies including Child Protective Services (CPS), physicians, EMS providers, local law enforcement, the Medical Examiner's (ME) office, and representative from the Bivona Child Advocacy Center. These cases, which can include suicides, homicides, and unsafe infant sleep deaths, are analyzed in an effort to identify trends and reduce similar incidences. For example, the Baby Safe Sleep Coalition was started after the group noticed a trend in unsafe sleep deaths in infants. Also, a suicide prevention task force is completing their work evaluating

## Upcoming Events

*Melinda Johnston*

For more information about any event listed below, please visit the training calendar at [MLREMS.org](http://MLREMS.org)

### **January**

- 5 - BLS Core Content #1
- 11 - Saving Those Who Save Others: Family & Spouses
- 12 - Saving Those Who Save Others: Suicide Awareness
- 12 - BLS Core Content #2
- 12 - CIU
- 19 - PHTLS (1 of 2)
- 19 - BLS Core Content #3
- 20 - PHTLS (2 of 2)
- 26 - Emerg. Ped. Care (1 of 2)
- 27 - Emerg. Ped. Care (2 of 2)
- 28 - MLREMS Council

### **February**

- 18- REMAC

### **March**

- 2 - EMS Seminar (1 of 2)
- 3 - EMS Seminar (2 of 2)
- 9 - Emerg. Ped. Care (1 of 2)
- 10 - Emerg. Ped. Care (2 of 2)
- 19 - MLREMS Council

lifetime. The vast majority of and present a very low risk for the patient. Most isolated seizures are related to an underlying illness or injury, such as fever, head injury, drug effect, hypoglycemia, or alcohol withdrawal. Far less common is epilepsy which is defined as recurrent, unprovoked seizures due to a primary brain disorder; thus not every seizure is an indicator of epilepsy, but epilepsy is defined by recurrent seizures.

There are a number of different types of seizures, which can be broken down into generalized seizures and partial seizures. Generalized seizures affect the entire brain and are characterized by an altered level

what could possibly be done to help reduce the number of pediatric suicide cases in Monroe County.

During a review, first responders such as EMS providers, firefighters, and law enforcement officers are relied upon to provide information about the scene during first contact. Often, the scene has been disturbed in the process of rendering care by the time law enforcement or the ME's office takes photographs. Therefore, it is useful for first responders to document the condition of the scene as they found it upon arrival, which can include the position of furniture, suspicious objects, medications, and the patient. Documenting WHO was on scene is also useful along with their demeanor, conversations, and relationship to the patient or victim. When an infant is found in a crib, documentation of blankets, toys, or anything else in the crib along with its position is useful. Of course, providing patient care is always the priority but adding in specifics about the room or people present when you are completing your charting will be helpful to the investigative team.

Child fatalities are stressful cases that have a lasting impact on everyone involved. If you are involved in a child fatality case and need help, please reach out to leadership within your organization, peers, employee assistance programs, your physician, family members, or anyone else who can help you work through the incident. There are many organizations that provide support for first responders but you need to seek out that support when it is needed. First responders are an important part of the Child Fatality Review process for the information they bring and are benefited by the process through the case closure it can provide to the first responders.

For more information about the Bivona Child Advocacy Center and the services they provide, please visit: <https://www.bivonacac.org>.

## Seizures

*Jeremy T. Cushman, MD, MS, EMT-P, FACEP, FAEMS*

Seizures are fairly common, accounting for about one in 25 requests for EMS and nearly one in 10 Americans will have at least one seizure in their lifetimes. Most seizures are self-limiting, last for less than 2 minutes,



of consciousness. Tonic-clonic seizures are the most common generalized seizure characterized by a loss of consciousness and full body rigidity (tonic phase) and rhythmic contractions (clonic phase). Another example of a generalized seizure is an absence seizure (previously called petit mal) whereby the patient stares and stops responding appropriately, but often does not have any abnormal motor activity. Partial seizures can present with unusual feelings or sensations, or rhythmic convulsions of one area of the body, such as an arm or leg.

Status epilepticus, defined as a seizure lasting more than five minutes, or recurrent seizures without a return to baseline between episodes, is life threatening. Status epilepticus can result in hypoxia, metabolic acidosis, hyperthermia, aspiration, pulmonary edema, and brain injury – therefore early termination of seizures is critical. Generally, if the patient is still seizing by the time I get on scene, they are in status epilepticus and rapid administration of a benzodiazepine such as midazolam (versed) is critical. Status seizures are much more difficult to control the longer they last.

As indicated earlier, there are a number of causes of seizures, and although initially the majority are managed with benzodiazepines, it's important to consider the differential diagnosis in the seizure patient to identify the causes, and potential treatments. I often use the same "AEIOU TIPS" mnemonic that I have shared previously for altered mental status. Alcohol (withdrawal), Epilepsy, Insulin (hypoglycemia), Overdose, Underdose (not taking anti-epileptic drugs), Trauma (head injury), Infection (meningitis, febrile), Psychogenic, Stroke. This differential helps identify some of the key questions you should try to obtain answers to while taking history for someone with a seizure; for example, any recent trauma, illness, alcohol use, etc. ALS evaluation of blood glucose is mandatory, but since the patient is often seizing or post-ictal, oral glucose is almost never appropriate because of aspiration concerns.

#### AEIOU TIPS

Alcohol (withdrawal)  
Epilepsy  
Insulin (hypoglycemia)  
Overdose  
Underdose (anti-seizure meds)

Trauma (head injury)  
Infection (meningitis or fever)  
Psychogenic  
Stroke

Management of seizures is relatively straightforward. In addition to the important historical features identified above, it's also important to identify the time of seizure onset. Again, the longer the seizure, the greater potential for complication. Although ABC's are important, for the actively seizing patient the single most important intervention is medication administration. This is most efficaciously done by IM administration of midazolam. Once the IM administration of midazolam is given, then go ahead and place the IV and give subsequent doses IV. Often simple airway adjuncts such as a jaw thrust and supplemental oxygen is all that is required. Equally important is protecting the patient from injury, by removing objects that could harm, or padding the areas surrounding the patient. A physical exam to include pupillary assessment, and a thorough evaluation for signs of trauma or focal neurologic deficits is important given that both trauma and stroke can be precipitants of a seizure.

A post-ictal state will often follow a seizure and will present as a period of deep sleep, confusion, combativeness, poor short-term memory, or irritability. The post-ictal state should slowly improve, and if the patient remains unconscious or is severely obtunded after 30 minutes, there should be cause for concern. Given the frequent confusion after a post-ictal state, I always make it a point of repeatedly re-

orienting the patient. An example would be “Ma’am, you’ve just had a seizure in your house. I’m Jeremy, a Paramedic here to help you. We’re taking you to the hospital in an ambulance to get you checked out and to make sure you’re OK.” And then I repeat it a couple of times as they start coming around to re-orient and calm them. The post-ictal patient generally requires only reassurance and supportive care. Occasionally supplemental oxygen, suction, or positioning is required.

Keep in mind the different types and causes of seizures and be sure to obtain what information you can about the circumstances of the seizure while on scene. BLS providers can assist your ALS colleagues with necessary tasks to make sure that benzodiazepines are administered as soon as possible to the actively seizing patient, and don’t forget to prepare and be supportive during the post-ictal phase. Hopefully this article will help you brush up on that 4% of EMS calls that are seizure-related!

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## The Negative Role of Hypothermia in Elderly Fall Patient Outcomes

*Adrielle Watkins EMT-P*



Hypothermia is a state in which the internal body temperature drops below 95 degrees Fahrenheit or 35 degrees Celsius.<sup>1, 12</sup> Small drops in ambient temperature and short exposures can induce hypothermia, especially in vulnerable populations such as the elderly. Signs and symptoms include slurred speech, sleepiness, confusion, shivering or stiffness, poor control of body movements, slow reactions, and weak pulse.<sup>1</sup> Elderly patients are especially at risk due to their lower metabolic rate making it difficult to maintain body temperature. In addition, they have a decreased ability to detect changes in temperature and respond by constricting blood vessels and shivering. Patients with Diabetes Mellitus (DM), CVA, thyroid dysfunction, preexisting heart disease, malnutrition, and alcoholics, homeless populations, chronically ill and those taking certain medications may have also have diminished ability to regulate their body temperature.

From an EMS perspective, we should consider inadvertent or secondary hypothermia in our patients who have fallen. Data from the UK shows that accidental hypothermia was the primary or secondary diagnosis in over 100,000 hospital admissions from 2005 to 2015.<sup>3</sup> Falls are common in the elderly population and many of the above reported risk factors are also concomitantly present. Even the healthiest elderly patient is more susceptible to complications associated with hypothermia because of normal age-related changes in organ function with underlying diseases significantly increasing the risk.<sup>8</sup> According to the American Journal of Medicine, age greater than 75 years with disturbance of Activities of Daily Living (ADL) are especially important prognostic factors for this population. These individuals are thought to be particularly vulnerable to accidental hypothermia because of malnutrition, hypoactivity, and less muscle and fat.<sup>7</sup> Malnutrition has a profound negative effect on the thermal balance and leads to dramatic reduction in core temperature.<sup>6</sup> Moreover, in emergency and critical care age, frailty, and disturbance of ADL are well-known prognostic factors for in-hospital death. Similarly, we judged these factors to be valid as prognostic factors for accidental hypothermia.<sup>7</sup>

Establishing a set ambient temperature for when one is hypothermic is not a simple task. We must look to the cellular metabolism level and the great influence from ATGL-mediated lipolysis in cardiac muscles.<sup>4</sup> To simplify and summarize the research published in Cell Metabolism: this is highly variable and patient-specific depending greatly on the level and type of fatty acids. Elderly individuals, with

significantly less adipose tissue, and patients with malnutrition, such as those with alcoholism, anorexia, etc. reach hypothermia more quickly. This study also discussed the importance of a healthy cardiac system, especially in regards to non-shivering temperature regulation mechanisms, to maintain a normal body temperature.<sup>4</sup>

Hypothermia has been established as a compelling concern. Physiologically, our elderly patients are at greater risk, which impacts well-being and hospital course. There is a plethora of research available on hypothermia and its association with different pathologies showing that in most pathological states, hypothermia is detrimental (one exception being the potential benefit in post-cardiac arrest). Studies of interest focused on elderly patients with hip fractures and found hypothermia to be a common result of falls in the elderly. Epidemiologic predictions project the incident of hip fractures is expected to increase to 6.26 million globally by the year 2050.<sup>5</sup> Data supports that in hip fractures, inadvertent hypothermia is significantly associated with a higher 30-day readmission rate with a trend towards higher 30-day mortality.<sup>2</sup> A study published by the Journal of Orthopedics followed 929 hip fracture patients and found a 10% increased rate of this inadvertent hypothermia in elderly which led to a 30 day higher readmission and significantly higher mortality in these patients who needed to undergo surgical repair. “Rates of inadvertent hypothermia are high in operatively managed hip fracture patients and are significantly associated with a higher 30-day readmission rate with a trend towards higher 30-day mortality.”<sup>5</sup> Even mild hypothermia may worsen perioperative outcomes by augmenting blood loss and transfusion requirement, decreasing resistance to surgical wound infections, and prolonging hospitalization.<sup>8</sup> The cited studies are more focused on surgically repaired fractures and highlight the importance of perioperative normothermia. While in the EMS world we aren’t directly influencing the perioperative patient, if we deliver patients in a hypothermic state this can prolong the time before a surgical repair can take place while normothermia is restored.

Additionally, it would be an injustice in our consideration of these patients if attention was not placed on the effect of hypothermia on trauma, specifically clotting and mortality. Hypothermia is such a concern in the trauma patient that according to Samuel Moffat, from the University of Leicester, it is considered to be a third of the lethal triad in trauma patients. Spontaneous hypothermia following trauma has severely deleterious consequences for the trauma victim and is very common.<sup>9</sup> Even prior to the arrival of the EMS personnel, hypothermia is already a concern with an identified 29% prevalence after only a 30 minute delay in contact.<sup>10</sup> A cross sectional analysis of trauma also emphasizes the need to prevent hypothermia in trauma patients, reporting over a five times increase in mortality in hypothermic patients. The mortality rate in hypothermic patients was 13.5% versus 2.3% in normothermic patients.<sup>11</sup> If the patient was wet, the risk of hypothermia showed a two- fold increase in prevalence.<sup>10</sup> While this data was primarily gleaned from patients involved in motor vehicle crashes (MVC), it is reasonable to assume that we arrive to MVCs more promptly than lower priority falls in the current infrastructure of our dispatch system and that these delays in approaching our “trauma” falls could be at least as long. Additionally, a patient who falls outside such as in the snow or rain is likely to become hypothermic twice as rapidly.

There is also research to suggest that those taking acetaminophen may be at risk for hypothermia, even otherwise healthy adults. The study from the Clinical Drug investigation found a significant reduction in the skin temperature when healthy individuals on acetaminophen were exposed to cold versus their placebo counter groups.<sup>3</sup>

When we identify patients at higher risk for hypothermia, it is important to implement particular management practices to maintain body temperature. The first step in the process is to remove the patient from the exposure: get them out of the cold environment into a warm ambulance and remove any wet clothing. Passive rewarming can be accomplished with warm blankets and warm compress/heat packs placed in the groin and arm pit (insulated with a towel). Heating techniques should be focused at the core and not periphery as peripherally warming only can cause core temperature to drop. Warm IV fluids may be utilized by ALS personnel. Of note, hypothermic patients are commonly found to be bradycardic so remember that in extreme hypothermia rough handling of these patients can result in dysrhythmias. If a patient suffers cardiac arrest in this state it is important to limit defibrillation to 3 attempts and only use one round of appropriate ACLS medications for arrest or rhythm changes. In a cardiac arrest the hypothermia may be cardioprotective, so most cases should be transported to the hospital regardless of ROSC.

In conclusion, the effects of hypothermia in the elderly population and, specifically, injured elderly patients has been reliably correlated to increased mortality and decreased optimal outcomes. Practices should be implemented in our EMS system to minimize exposure and to consider this pathology a priority in our treatment and our dispatch system to improve response times to some of these “lower acuity” calls.

### References:

1. Calvin, K. *Hypothermia and Older Adults*. National Institute on Aging. <https://www.nia.nih.gov/news/hypothermia-and-older-adults> Accessed 9/28/18.
2. Williams, M., Ashworth, M. *Is Inadvertent Hypothermia In Elderly Hip Fracture Patients Associated with Increased Readmission and Mortality?* *Orthopaedic Proceedings*. <https://online.boneandjoint.org.uk/doi/abs/10.1302/1358-992X.2018.9.010> 5/23/18.
3. Foster, J, Mauger, A, et al. *Acetaminophen (Paracetamol) Induces Hypothermia During Acute Cold Stress*. *Clinical Drug Investigation*. 37(11), pp 1055-1065 <https://link.springer.com/article/10.1007/s40261-017-0560-x> November 2017.
4. Schreiber, R., Clemens, D., et al. *Cold-Induced Thermogenesis Depends on tATGL-Mediated Lipolysis in Cardiac Muscle, but Not Adipose Tissue*. *Cell Metabolism*. 26 (5) pp 753-763. <https://www.sciencedirect.com/science/article/pii/S1550413117305557> 11/7/17.
5. Williams, M. Ashworth, M. *What is the Incident of Inadvertant hypothermia in elderly hip fracture patients and is this associated with increased readmissions and mortality?* *Journal of Orthopaedics*. 15(2) pp 624-629. <https://www.sciencedirect.com/science/article/pii/S0972978X18301399> June 2018.
6. Coccarelli, A. Boileau, E., et al. *Modelling accidental hypothermia effects on a human body under different pathophysiological conditions*. *Medical & Biological Engineering & Computing*. 55(12) pp 2155-2167. <https://link.springer.com/article/10.1007/s11517-017-1657-3> December 2017.
7. Okada, Y., Matsuyama, T., et al. *Prognostic factors for patients with accidental hypothermia: A multi-institutional retrospective cohort study*. *The American Journal of Emergency Medicine*. <https://www.sciencedirect.com/science/article/pii/S073567571830487X> 6/20/18.
8. Sessler, D. *Peroperative Thermoregulation in the Elderly*. *Geriatric Anesthesiology*. Pp 213-119. [https://link.springer.com/chapter/10.1007/978-3-319-66878-9\\_15](https://link.springer.com/chapter/10.1007/978-3-319-66878-9_15) 10/29/2017.
9. Moffatt, S. *Hypothermia in trauma*. *Emergency Medicine Journal*. <https://emj.bmj.com/content/early/2012/12/13/emmed-2012-201883?paper=12/14/2012>.
10. Lapostolle, F. Couvreur, J., et al. *Hypothermia in trauma victims at first arrival of ambulance personnel: an observational study with assessment of risk factors*. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*. 25(43) <https://sjtrem.biomedcentral.com/articles/10.1186/s13049-017-0349-1> 5/24/17.

11. Hsiesh, T., Kuo, P., et al. *Effect of Hypothermia in the Emergency Department on the Outcome of Trauma Patients: A Cross-Sectional Analysis.* *IJERPH.* 15 (8) <https://www.mdpi.com/1660-4601/15/8/1769> 8/17/18.

12. Mayo Clinic. *Hypothermia.* <https://www.mayoclinic.org/diseases-conditions/hypothermia/symptoms-causes/syc-20352682> Accessed 09/14/18.

## REMAC Updates

*Erik Rueckmann MD, MPH, FACEP*



As you may know (or maybe not), after years of dedicated service to our region Dr. Elizabeth Murray has stepped down as Chair of the MLREMS REMAC to focus more time on her role as an outstanding pediatric public health advocate. Dr. Murray has been a constant force always pushing our region's prehospital providers to ensure excellent care. Dr. Murray's dedication to EMS has deep roots ever since her days as a firefighter to working shifts in the Emergency Department as a physician. In her tenure as Chair, she has been influential with many aspects of the way we do business in EMS. These included the changeover to Collaborative Protocols, improvements in patient safety, navigating difficult funding issues, tackling difficult regional issues, and many more. While we will miss her leadership, we fully support her continued focus of advocating for some of the most vulnerable individuals in our community-our children. As she continues her career, we wish her the best of luck and continue to look for her advocacy of EMS in our region.

As we look to the future, I hope to continue the legacy Dr. Murray has entrusted to me. The New Year will feature some change as the REMAC looks to reorganize the committee structure and work to ensure that every patient in our region is receiving the best care. In order to do this, we will be creating two committees; Prehospital Clinical Care and Prehospital Care Operations. These two committees will encompass pillars of care such as regional patient safety, regional QA, regional clinical care metrics/benchmarks, and again reinforce the way we provide quality care to our region. These committees are new and are looking for input. I encourage you to think about the way we currently provide care and ways we can improve. Become a part of the process. Our next meeting is Monday February 18th, 2018 @ 5pm @ Public Safety Training Center on Scottsville road; I hope to see you there and engage in the conversation. As always, feel free to reach out to me at [Erik\\_Rueckmann@urmc.rochester.edu](mailto:Erik_Rueckmann@urmc.rochester.edu).

Happy Holidays and Best Wishes for 2019!

## Run for Your Life!

*Eric Rathfelder MS, EMT-P*

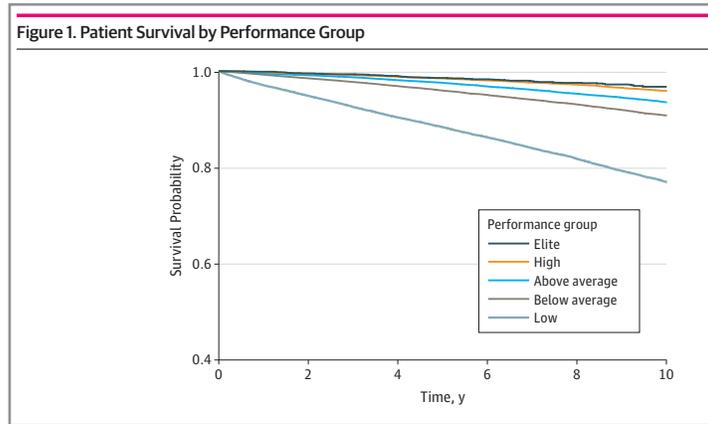


An article published in JAMA Network Open this fall might be great news or terrible news depending upon your outlook on cardiovascular exercise. The riveting title, "Association of Cardiorespiratory Fitness With Long-term Mortality Among Adults Undergoing Exercise Treadmill Testing" drew me right in. The bottom line of the study - the better a person's cardiorespiratory fitness, the longer the person is expected to live.

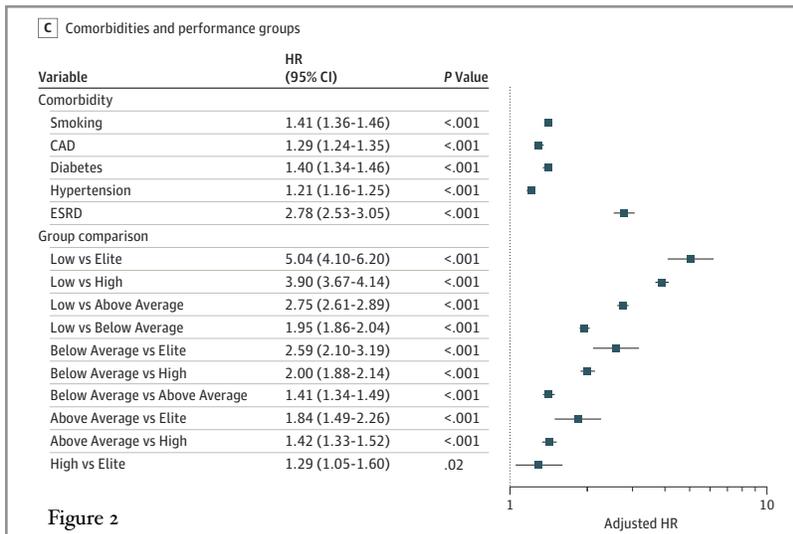
This was a retrospective study of more than 122,000 patients from 1991 through 2014 who were referred for exercise treadmill testing. Study participants' cardiorespiratory fitness was measured based on their treadmill tests. 13,637 patients died from the start of the study through 12/31/17, which allowed the

researchers to determine “risk-adjusted all-cause mortality was inversely proportional to cardiorespiratory fitness and was lowest in elite performers”. I don’t think this conclusion should be surprising to anyone reading the study but there were some interesting findings such as an answer to the question “can you exercise too much?”

In terms of the effect on reducing mortality, this study found no upper limit to the benefit of increased cardiorespiratory fitness, stating, “extremely high aerobic fitness was associated with the greatest survival...” Even in older patients, there was no level of cardiorespiratory fitness where the benefit plateaued.



This study also quantified the mortality risk associated with poor cardiorespiratory fitness as compared to traditional risk factors such as smoking, coronary artery disease (CAD), diabetes, hypertension, and end-stage renal disease (ESRD) and found it to have a greater impact on mortality risk than many of these traditional risk factors. *Figure 2* shows the hazard ratio (HR) of some comorbidities along with the HR of the difference in cardiorespiratory fitness between various subgroups in the study. So, the increased risk of mortality to an individual who has low cardiorespiratory fitness vs above average cardiorespiratory fitness is represented by a HR of 2.75, which is greater than that associated with each of the traditional risk factors except ESRD. That is a really large effect!



the difference in cardiorespiratory fitness between various subgroups in the study. So, the increased risk of mortality to an individual who has low cardiorespiratory fitness vs above average cardiorespiratory fitness is represented by a HR of 2.75, which is greater than that associated with each of the traditional risk factors except ESRD. That is a really large effect!

I think the conclusions from this study are intriguing and inspiring because cardiorespiratory fitness is a readily *modifiable* indicator of mortality. While hypertension,

CAD, and diabetes might be not be modifiable through behavior, almost everybody can improve their cardiorespiratory fitness through exercise. So, get out there and run, bike, swim, or Zoomba for your life!

If you are interested in reviewing the study yourself, it can be found at: <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2707428>.

Mandsager K, Harb S, Cremer P, Phelan D, Nissen SE, Jaber W. Association of Cardiorespiratory Fitness With Long-term Mortality Among Adults Undergoing Exercise Treadmill Testing. *JAMA Netw Open*. 2018;1(6):e183605. doi: 10.1001/jamanetworkopen.2018.3605

## Calling All Lab Instructors

As discussed in the last issue of DPM news, the MCC Paramedic Program has undergone significant reorganization prior to the start of the current class. As part of this transition, there is increased lab time overall within the curriculum.

We are currently looking for qualified lab instructors to assist in the education of the next generation of paramedics. If you have strengths in clinical education, including the teaching of assessment and psychomotor skills or scenario review, we would love to have you join us in the classroom as a lab instructor.

If interested, please contact Jennifer Everett at [Jennifer.everett@gatesems.org](mailto:Jennifer.everett@gatesems.org)



## MLREMS RSI 2.0

*Christopher Galton, Maia Dorsett and Michael Meyer*

As many of you know, we have recently completed the second candidate process for the competency based RSI program. Although there have been a few bumps and bruises along the way, we are very pleased to have promoted 27 very deserving paramedics to RSI status in 2018. Many of the candidates held RSI status previously and have continued their credentialed status after completing the process. We thought this would be a good opportunity to describe the process to you in more detail and share some of our retrospective thoughts with you.



### Program Design

The overarching goal of the program was to select and train a group of paramedics not only with strong cognitive knowledge and good psychomotor skills, but who also excelled in clinical decision making. The majority of “RSI requests” in our system do not result in intubation. Therefore, the objective of the program is to make endotracheal intubation available to the small subset of patients who require it to maintain adequate ventilation and oxygenation as well as to bring additional skills to the side of the most critically ill patients in our region.

This process of redeveloping the program began with many of us sitting around during various meetings trying to figure out what worked well and what did not with our current program. Given our overall goals, we decided that we wanted to transition the program into a “competency” based program rather than the “time” based program it was previously. To accomplish this goal, we started by coming up with a list of minimum standards that paramedics had to achieve to even be considered for the process. The current standards are listed below:

- 1) 10 documented prehospital intubations (our initial number was 50, so it can always be worse)
  - 2) A letter of support from the RSI agency leadership (ideally including the medical director)
  - 3) Two years of full time equivalent paramedic clinical experience in MLREMS\*
  - 4) Continuing employment at an RSI agency with an average of 8 hours/week of clinical time
- \*(There is a reciprocity process for experienced RSI providers new to the region)

Now that we had the minimum qualifications established and a framework to educate our people in place, we needed to figure out how to objectively evaluate candidates for entry into the program. Since our goal was to have paramedics demonstrate “competency,” we decided that our evaluation could not be a simple test with a passing grade of ‘X’. To that end, we developed a computer based, randomized, test that was written from scratch by many contributors. The question bank is divided into categories of anatomy, pathophysiology, pharmacology, clinical judgment and documentation which are weighted based on their respective importance and scored individually after each testing session. The computer test is graded by a blinded group of physicians who evaluate each candidate’s performance. These physicians then make a recommendation to determine if candidate “A21” is eligible to move forward in the candidate process. Although we are currently all sick of writing questions, we do continually update the questions and are determined to provide a large enough question bank to make every test administered unique and fair.

The next step is a mandatory four hour didactic session that is taught by the MLREMS EMS physicians. Prior to that session each paramedic is provided with some study materials that are relevant to the topic of RSI, as well as pertinent pathology that tends to require RSI services. The four hour session is broken up into two different two hour blocks. The first block is two hours of lectures from the physicians that covers pharmacology, pathophysiology, RSI logistics, and decision making. The second block is a two hour session where the class is broken into small groups. Each small group has an EMS physician moderator that guides the group through up to ten RSI scenarios. The discussion takes on a problem based learning format where the candidates work through the cases together to figure out how to best handle each scenario. These sessions are open to all MLREMS providers, but seating is limited so that we can ensure a low student to physician ratio in the small groups.

The final step of the process, and probably the most important, is the high fidelity simulation. Each candidate that successfully completes the computer test, then attends the didactic session, is eligible to schedule a simulation session. This session was designed to provide the candidate with the opportunity to demonstrate competence in a variety of clinical scenarios designed to challenge the decision making and execution of the skill set required to be a RSI provider in this region. Each candidate is paired with a “partner” that is played by one of the regional EMS physicians. Another physician is monitoring and adjusting the scenario in real time to ensure the highest fidelity available. Each candidate completes two unique simulations that are evaluated by both physicians. To successfully complete this phase, the candidate must meet the goals and objectives of both scenarios, as determined by both physicians. All of the scenarios are recorded and maintained by the DPM. If the two physicians disagree with the assessment, a third physician arbiter is brought in to evaluate the video and make the final determination.

### **Continuing Education and Quality Improvement**

Selecting providers for the RSI program is just the first step. All physicians within the program felt that it was essential that the RSI credential was coupled with continuing medical education and robust quality improvement mechanism.

The continuing education program will consist not only of traditional didactic content to keep people fresh with the current RSI practices, also includes a morbidity and mortality section to review RSI

requests and the conduct of our RSI credentialed paramedics. To date, we have held four didactic sessions as part of the initial certification process (these are open to all MLREMS providers if seats are available) and one M&M session.

On the quality improvement side, a new quality improvement tool has been developed through utilization of a RedCap survey. Whenever sent to an RSI request, RSI providers must complete the REDCap survey in order to maintain their credentials.

Importantly, there is also a survey for providers who make an RSI request. While this survey is not mandatory within the region, all providers who make an RSI request are **strongly** encouraged to complete the survey and provide this critical feedback.

The weblink for the provider who MAKES THE RSI REQUEST is:

[https://is.gd/RSI\\_Requestor](https://is.gd/RSI_Requestor)

The RSI requestor survey is designed to be completed by providers at both the ALS and BLS levels of care.

Since the RSI tech survey has been released last July, there have been 33 RSI surveys completed distributed across all the RSI agencies. The RSI requests have lead to attempted intubation 24.3% of the time. The most common etiologies of critical illness for which an RSI request was made were neurologic including trauma with brain injury (21.2%) and non-traumatic intracranial pathology (24.2%). The majority of the times that the patient was not intubated, it was because providers were able to maintain adequate oxygenation and ventilation with BLS airway maneuvers (56%). Other common reasons for avoiding RSI included anticipated difficult airway, improvement with non-RSI interventions, and short distance to the hospital. Overwhelmingly (96% of the time), RSI providers felt that the request for an RSI provider was indicated. We received 18 surveys from RSI requestors, which were mostly positive regarding the impact on patient care and also suggested some opportunities for system improvement.

### **Final Thoughts**

Many of you have interacted with the paramedics that have worked through the new credentialing process. Some have been successful and some have not. This process was not intended to be easy and many paramedics have struggled with various aspects. Those of us that developed the process were charged with finding the best paramedics in this region, educate them, and provide them with an advanced skill set that will benefit all the stakeholders in this EMS region. We took this responsibility very seriously and will continue to hold a high bar so when RSI credentialed paramedics are requested, whoever is making the request will feel confident that they are getting a well-trained, “competent,” paramedic who will arrive to help them in whatever capacity is needed.

We would like to say thanks to all of the candidates so far that have been patient with us as we have developed this process. It has been a privilege to work with each one of you.

If you have any questions about this article, please direct them to Dr. Galton at [christopher\\_galton@urmc.rochester.edu](mailto:christopher_galton@urmc.rochester.edu) and thanks for doing what you do every day.

## Diagnosis Bias

*Michael Meyer EMT-P*



It's eight o'clock when you and your partner are dispatched for trouble breathing (6Dt) in a 48-year-old male patient. You respond down the street and arrive at a home with what you'd describe as an unkempt yard and a driveway that could double as a used car lot. Entering the residence, you find several children, and even more adults mulling about without any particular interest in your arrival until you hear a woman's voice directing you up the cluttered staircase. In an upstairs bathroom, you find who you presume is your patient sitting on the floor, and the woman who called you upstairs begins to provide you with some history. She explains the patient is her husband, and she found him standing in front of the mirror and called EMS because he wasn't making much sense to her. She goes on to tell you that just before you arrived, he felt dizzy, stumbled, and sat on the floor where you see him now. He left for work this morning, came home and ate dinner, then smoked some marijuana like he does just about every evening. You inquire if the patient has a regular, trusted dealer and the wife confirms he always gets it from the same guy – has been for years. She isn't sure how much he smoked, but it must have been a lot because he's not usually this out of it. Directing your attention towards the patient, you quickly find that all of your questions are met with the same response – "I don't know".

Your partner learns the patient has a history of atrial fibrillation for which he was "recently" cardioverted. The wife says "he's been fine since then." She mentions that he occasionally has some asthma and is able to provide the following list of medications: aspirin, metoprolol, and Spiriva. He has no allergies.

Your partner returns to the ambulance to fetch the stairchair as you continue to attempt an interview and obtain some vital signs. Your patient continues replying "I don't know" to your questions so you obtain the following vital signs: HR: 78, Manual BP: 130/86, Room air SpO<sub>2</sub>: 95%, with RR: 18 and you score his GCS at 4/4/5. Your physical exam is unremarkable, noting only that the patient is slightly diaphoretic. His lungs are clear, pupils reactive and he moves all of his extremities. He has no complaints despite your best efforts to illicit one from him. While you await the return of your partner with the stairchair, you have time to apply the EKG based on the "recent" cardioversion and obtain a 12-lead tracing – a regular sinus rhythm with no sign of acute MI or ischemia.

Your partner returns and it requires both of you to get the patient off the bathroom floor and into the chair – he makes no effort to assist you. You are able to remove the patient from the home, onto the stretcher and into the ambulance without difficulty. During your short transport, an IV is established from which you obtain a BG reading of 95 mg/dL. The next three sets of vital signs are essentially unchanged, and the patient continues to have a difficult time answering question logically. Your time with the patient ends after a brief report to the triage nurse where you report that his abnormal behavior is likely the result of his recent drug use. He is then assisted into a Geri-chair by the security desk with his wife in a chair nearby.

So what is the significance of this case? Why do I bring it to your attention? First let me ask how many people agree with the provider's assessment of the patient? Even if you don't, it seems clear that the triage nurse accepted the report as accurate, doesn't it?

Before I tell you what the eventual disposition of this patient was, I want to discuss three terms with you. These ideas are ones that all health care providers should be cognizant of in their own practice:

- **Diagnosis Bias:** Information about a group or individual, coupled with suspicions or prejudices, which could influence how diagnoses are made by affecting what examinations are performed and how quickly people are investigated.
- **Anchoring:** Prematurely settling on a single diagnosis based on a few important features of the initial presentation and failing to adjust as new information becomes available.
- **Diagnosis momentum:** Once a diagnostic label has been assigned to a patient by another individual, it is very difficult to remove that label and interpret their symptoms with fresh eyes.

If we start with the idea of diagnosis bias, what about this patient, and the initial presentation, could contribute to the development of a diagnosis bias? Was there any diagnosis bias in this case? Well, certainly the idea that the patient smoked marijuana daily could have factored into our developing a bias. Possibly the condition of the residence as well? It's difficult to say for sure what all the contributing factors are for this provider, but can you begin to understand how a diagnosis bias can develop.

As we look at this case, can you see any indication of where anchoring could have occurred? The initial conversation does seem to focus on the drug use both this evening and habitually. The physical exam is rather limited, and the history is dependent on the wife as the patient is not answering questions. Everything in those first few minutes can anchor you to the patient's drug use. Now the provider does briefly try to pull away from their anchor when they did a 12-Lead to rule out a cardiac cause, but when that is "normal" they get drawn right back down by the anchor. Coupled with the fact that there are no acute changes in the patient, therefore nothing to draw us away from our anchor, it is not terribly surprising the report at triage is that the patient is under the influence of drugs.

What about diagnosis momentum? As an EMS community, we have made significant progress in having our opinions (or our diagnoses) respected by the nurses and physicians in our region. In this particular case, the provider being recognized as experienced and well respected is likely a contributing factor of diagnosis momentum. The report they provided to the triage nurse, which seemingly fits the presentation they see on the stretcher, and without any additional assessment is exactly how diagnosis momentum perpetuates itself. The final act of placing that patient into a chair by security continues this momentum by classifying him as a 'drunk' or a 'regular' and how many providers will walk past him in the next several hours?

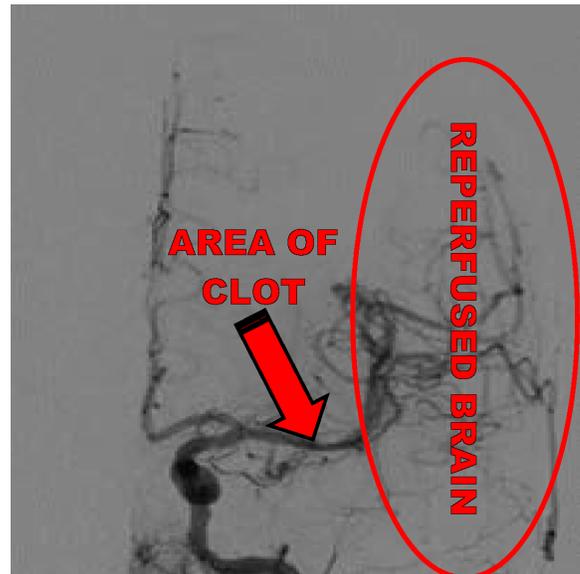
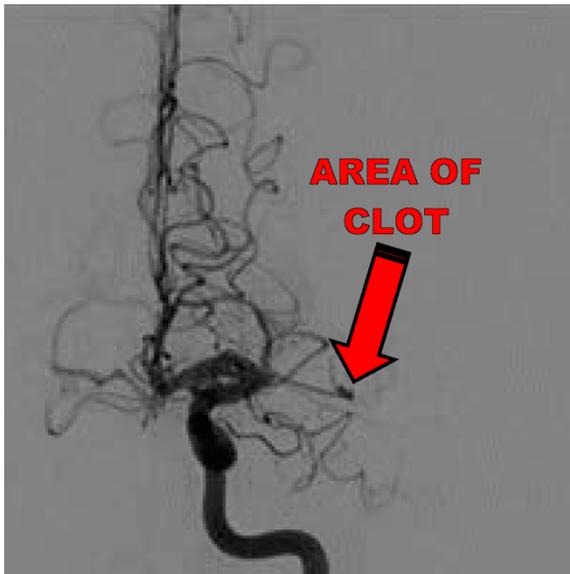
I bring these ideas to your attention not to assign blame, but to offer some awareness of practices that likely occur more often than we would want to admit. However, until you as a provider are made aware and educated about the ideas of diagnosis bias, anchoring, and diagnosis momentum, there can be little expectation for you to avoid them. I also want to make sure that these ideas aren't confused with laziness or inexperience on the part of any provider. Getting "caught up in the moment" or distracted by the "Oooo Ahhh" injuries of trauma are both ways we as EMS providers can begin heading down these paths. After being exposed to these ideas, hopefully they will remain in your consciousness as you develop differentials and care for your patients.

Let's look at what happened after EMS left the patient in the Geri-chair at 20:40.

- He was assessed by an ED provider at 21:22
- Assessed by neurology at 22:42
- At the time he was evaluated by neurology, he had an NIHSS score of 22 – he is having a major stroke!
- The patient receives tPA at 23:02
- He undergoes embolectomy at 23:51 where a large clot is removed from his left middle cerebral artery (MCA)
- He was discharged back to his home with an NIHSS of 1, only mild facial droop persists

NIHSS Score	Stroke severity
0	No stroke symptoms
1-4	Minor stroke
5-15	Moderate stroke
16-20	Moderate to severe stroke
21-42	Severe stroke

How did a patient this sick get misdiagnosed by an experienced EMS provider with more than 20 years of experience in the field? How did he sit in the ED for nearly 2 hours before being assessed as a stroke patient? I don't think those are questions that we can answer with certainty, but I think we can agree that diagnosis bias, anchoring, and diagnosis momentum all played a role. Not all patients who fall victim to these ideas have the favorable outcome of this particular patient, but it does demonstrate that it is possible to overcome some of our shortcomings as providers. Now, with some education into those shortcomings, we can be even stronger providers and even better advocates for our patients.



## The EMS Checklist Manifesto (Part II)

*Eric M. Thomas MS, PA-C, EMT-B*

*Contributors: Matthew Bushart MS, PA-C, Raymond Tan, & Kevin Valade*



Over the past 5 months I have had the opportunity to work with an outstanding team and take a meticulous look at prehospital intubation within our region. As part of a project for business school, we have been able to evaluate intubation attempts from July 2014 to July 2018. When we started this endeavor this past August, our team was most curious about what was contributing to the success (or lack thereof) among intubating Paramedics in our region. The project quickly evolved into a quality improvement initiative that we'll need your help with!

In review of just over 2,000 prehospital intubations in our region, the first-pass attempt success rate is 62%. I'm a believer that we can always strive to do better, and, a review of the literature in this area outlines that national averages are in excess of 80% for first-pass successes. With a few interventions and some teamwork, I'm convinced we can exceed this benchmark, improve quality, and reduce the costs of providing patient care.

Do the Paramedics in our region intubate more in the Summer or Winter months? Are we more successful at intubating trauma or medical patients? Does Paramedic experience influence the first-pass attempt success rate? Is our region more successful with Macintosh or Miller blades? How are our intubation attempts influenced by patient age? If we fail a first-pass attempt, how successful are we on additional attempts? What are the financial costs associated with a failed first-pass attempt? Does the data support the lack of a standard intubation process, and, need for an intubation checklist? What part of the intubation process do our Paramedics miss the most? Can we optimize engineering controls to increase the first-pass attempt success rate?

In the next part of this series and as our analysis is finalized, I will do my best to answer the questions presented in the prior paragraph. Though, the spoiler alert is that there is an intubation checklist coming soon to an intubation kit near you! I am including the checklist below for your preliminary review. As you look it over I would ask that you keep an open mind and recognize that checklists are a well validated method for process improvement. Additionally, if I haven't sold you yet that there is a lot of room to improve quality in this critical skill, please stay tuned for part III of this series.

I wish you all a great holiday season, safe travels, and always welcome questions or commentary by E-mail at [eric\\_thomas@urmc.rochester.edu](mailto:eric_thomas@urmc.rochester.edu).

**Prehospital Intubation Checklist:**

1. Airway Assessment	3-3-2/LEMON
2. Patient Positioning	Ramp to Sniffing Position
3. Oxygen Supply Adequate	Check Tank Levels
4. Preoxygenation	Maximize Oxygenation; Apply HFNC and Ventilate with BVM/ Adjuncts
5. Suction	Tested and Functioning
6. Monitoring	ECG, NIBP, SpO <sub>2</sub>
7. Endotracheal Tube End-Tidal CO <sub>2</sub>	Attached to BVM and Monitor; Ready for Intubation
8. Vascular Access Adequate	One line minimum (IV/IO); IV Fluid Connected and Runs Easy
9. Intubation Equipment	2 Laryngoscopes/Blades (tested), Gum Elastic Bougie, 2 ET Tube/ Syringe (test cuff), Tube Holder/Tape
10. Back-Up Airway Ready	Supraglottic device (iGel/King), Surgical Airway Kit Out and Ready
11. Post-Intubation Management	Plan for Post-Intubation Management
12. Briefing	Roles, Plan A, Plan B
Additions for RSI:	
13. Patient Weight	Ideal Body Weight _____ Actual Body Weight (Succinylcholine Dosing) _____
14. Drugs Drawn Up/ Labeled	Induction _____ Dose _____ NM Blocker _____ Dose _____
15. Induction / NM Blocker	Bolus Induction Agent; Immediately Followed by NM Blocker