Offshore Helicopter EMS Operations

CHI Aviation’s Sikorsky S-92 is a combination rescue truck and critical care transport ambulance

EMS Compass Update

ACE Inhibitor-Related Angioedema

Community Paramedics and the Drug-Seeker
Junkin Safety Appliance Company manufactures a variety of Safety and Rescue equipment including:

- Basket Stretchers
- Plastic Stretchers
- Aluminum Break-apart Stretchers
- Air-Rescue Stretchers
- Aluminum and Steel Pole Stretchers with Vinyl Covers
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- Wooden and Polyethylene Backboards
- First Aid Equipment
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For More Information Circle 10 on Reader Service Card

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Prevent Blood & Secretions from Blocking Video Laryngoscope Views

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Together, the Pulmodyne O2-MAX™ with integrated nebulization and Microstream™ sampling lines allow you to nebulize your patient while delivering positive and consistent pressure as well as providing the earliest indication for patients at risk of respiratory compromise.
The ResQPR® System is a CPR adjunct comprised of two synergistic devices – the ResQPOD® ITD 16 and the ResQPUMP® ACD-CPR Device. Used together, these devices increase blood flow to the brain and vital organs, as well as increase the likelihood of survival.

For more information, please visit www.zoll.com or call 877-737-7763.


The ResQPR™ System showed a 49% increase in one-year survival from cardiac arrest.1

1. In adult patients with cardiac arrest from cardiac etiology. ResQPR System Summary of Safety and Effectiveness Data submitted to FDA.

For More Information Circle 13 on Reader Service Card
Illuminating the Path to Vein Access

Veinlite increases first-stick success, reduces waste and patient discomfort.

One of the most significant complaints among patients is being stuck too many times when a medical professional is trying to locate a vein to draw blood or start an IV. Thanks to Veinlite’s innovative product line, it does not have to be such a traumatic experience.

Venipuncture, or vein access, is one of the most routine invasive procedures medical professionals conduct every day. Sometimes, however, even the most experienced professionals have difficulty locating a suitable vein—due to age, especially with elderly and pediatric patients; obesity; or even skin color. This often results in sticking a patient several times, leading to patient discomfort, dissatisfaction and delayed treatment.

Veinlite solves that problem by illuminating and isolating a small portion of the vein for easy needle access. Veinlite delivers vein imaging in a unique and innovative way that increases first-stick success while costing a fraction of other similar products.

“I have been using the Veinlite in training nurses to start IV’s, primarily in the elderly,” says Richard Johnston, of Lifeguard Ambulance in Texas. “Infants and the elderly typically are the most difficult to gain IV access in. The Veinlite also gives care providers who are not that experienced in starting IV’s more confidence to attempt an IV.”

Johnston says there are several benefits to using the Veinlite. “In addition to reducing the number of attempts to gain IV access on those with hard-to-access veins, it reduces pain and stress to the patient,” Johnston says. “Using the Veinlite can also reduce the amount of supplies used, thereby reducing costs.”

Johnston says dehydration in particular among the elderly, inhibits the ability to find veins. “With dehydration being a major problem, the ability to start an IV is typically more difficult,” Johnston says. “The Veinlite can help us locate the vein more easily. The Veinlite can also help inexperienced nurses get needed fluids to patients faster and reduce hospital admissions.”

The Veinlite Vein Finder line of products is sold by TransLite LLC, a small high-tech company that designs, manufactures and sells medical devices to help reduce patient pain and trauma.

“Venipuncture is the most performed procedure in the country,” says TransLite President Nizar Mullani. “Yet one in five patients needs another nurse to come in and access the vein after two attempts at sticking the patient. And there’s just an 80% success rate after two sticks.”

Clinical Trials Demonstrate Veinlite’s Value

Several clinical trials have been conducted to assess whether vein finder devices help improve vein access. The results show that Veinlite improves vein access, while near infrared light (NIR) devices are no better than the normal standard of care. In eight clinical trials of devices that use NIR, just one—on neonates—showed improvement in accuracy for sticking veins.

TransLite LLC funded a study at Boston Children’s Hospital to use Veinlite in a randomized clinical trial to access veins in the hard-to-find vein patients in the emergency department. The three-year trial showed that the use of the Veinlite improved the success rate for vein access from 74% to 83% after two attempts.

“In hospital exit surveys, the biggest complaint among patients is being stuck too many times for drawing blood or inserting an IV,” Mullani says. “With Veinlite the medical professional can see the vein and put the needle right into it. If you don’t see the vein, you don’t stick it. We’re not a vein finder, we’re a vein access device.”

Mullani says Veinlite accesses veins without the need for a tourniquet, which can unnecessarily cut off circulation.

“The device accesses and helps hold the vein so it doesn’t roll,” Mullani says. “It anchors the vein. A whole bunch of devices use near-infrared light, which shines a light on the skin. Then they use a camera to get the image, but it only shows the vein on the surface of the skin. The medical professional can’t get to the actual vein. Those devices are vein finders, but they don’t help access or sequester the vein.”

The Veinlite ring helps close off the vein, and traction can be applied to the skin by pushing the ring back from the opening. This secures the vein and makes it easier to access.

“Veinlite creates a local tourniquet that pops the vein up but doesn’t block the entire area of circulation,” Mullani says.

Mullani also sought to create a hand-held device that could operate on a battery. Research showed that orange/amber light provided the highest contrast for imaging superficial blood vessels, while red light penetrated deepest for imaging deeper veins. The two colors of LEDs could produce reasonable images of veins using only two watts or less of power, and the portable Veinlite LED was created in 2004.

Three variations of the portable devices are available:

- **Veinlite EMS** is a simpler, lower-cost device for use by prehospital emergency medical services.
- **Veinlite LEDX** is a larger, more powerful version of the Veinlite LED and effective for use on overweight patients and for sclerotherapy.
- **Veinlite PEDI** is a tiny device, streamlined for use on neonates and infants.

And in 2015 the Veinlite EMS PRO was introduced. The Veinlite EMS PRO’s new, integrated exam light provides quick, one-button access to a built-in flashlight mode. Day or night, this aids in initial patient assessment and reduces the amount of gear required to deliver quality care. The device is suitable for use on adults and children, and for both light and dark skin tones.

For more information on TransLite LLC visit www.veinlite.com, e-mail info@veinlite.com or call 281/240-3111.

**Veinlite EMS PRO®**

The Ultimate Vein Access Device for Emergency

Integrated white exam light for low-light situations

For More Information Circle 14 on Reader Service Card
MOULAGE OF THE MONTH

NEW PODCASTS

WORD ON THE STREET:
REPORT FROM ECCU

Host Rob Lawrence reports from this year’s ECCU conference held in San Diego, December 8-11, 2015, just weeks after the release of the new Resuscitation Guidelines. What will the science tell us about ways to improve survival? How will the new guidelines impact instruction and practice? What are the best practices in training and community programs? Listen to the resuscitation professionals— instructors, practitioners, survivors and researchers—discuss the latest in cardiac care. See EMSWorld.com/podcast.

BUILDING BIG DATA

With the acquisition of Rural/Metro Corp., AMR—and the larger world of EMS—is poised to learn a lot more about the effectiveness of a lot of the things we all do. The company’s already-substantial focus on data will encompass millions of additional points with the subsuming of Rural/Metro’s various operations and patient loads. That will tell all of us even more even faster about the impacts of interventions across the spectrum from 9-1-1 responses to transfers to community paramedicine and mobile integrated healthcare. Read more at EMSWorld.com/12146730.

QUICK TIME

What’s next for you in EMS? Catching up on your PCRs is certainly in the mix, but what about a year from now or 10 years from now? Maybe you’ll want to try something different. In this month’s Life Support column, Mike Rubin discusses career options. Read more at EMSWorld.com/12146735.

FEATURES

WEBCASTS

Visit EMSWorld.com/webcasts to register for upcoming presentations:

FEB 10, 2 PM ET: RECOGNIZING AND REACTING TO THE LOST ADVANCED AIRWAY
All advanced airways are at risk of dislodgement and failing to recognize a dislodgement can lead to serious morbidity ranging from anoxic brain injury to death. This webinar offers best practices to prevent airway dislodgement and immediately recognize the lost airway, and offers five strategies for rapid and effective emergency airway intervention. Presented by Kevin Collopy, BA, FP-C, CCERMT-P, NREMT-P, WEMT, and sponsored by Physio-Control.

MOULAGE OF THE MONTH

Bobbie Merica continues her guide to simulating injuries and illnesses through effective use of moulage. This month: Industrial response, steam burn, second degree. See EMSWorld.com/12146211.

THE MEDBOT EDUCATOR

How many of you know what a mobile virtual presence device is? Of those who said yes, you probably first heard of them from an episode of the TV show The Big Bang Theory. Well, get ready to put your geek on, because we are about to look at how these devices might be used for prehospital education and even more. Read more at EMSWorld.com/12146983.

Paramedic Certification (Hybrid Program)

- Fully CAAHEP Accredited
- Different course options that allow currently credentialed EMTs, AEMTs, or individuals with no certification to train for their Paramedic certification.
- Hybrid Paramedic program offered through LCC Continuing Education Department. Only four on-site visits required for skills training and evaluations. All coursework is done online. Tuition is $380.
- Clinicals can be completed in your area. Contact LCC regarding available areas.
- Graduates are eligible for the NCOEMS Paramedic exam and the National Registry Paramedic exam.

Associate Degree in Emergency Medical Science — Bridging

- All degree classes offered 100% online.
- Currently credentialed state and national Paramedics earn up to 45 credits toward their degree just for being certified!
- Designed for demanding EMS work schedules. Complete the degree at your own pace!
Hire the right people based on science:

55,300 new medics by 2022

The Emergency Medical Services field is expected to grow more than 23% over the next decade, adding over 55,000 paramedic and EMT jobs. Are you ready?

Talent Science™

Infor® Talent Science measures 39 key behavioral attributes of your best employees and creates a profile for screening applicants. Profiles can be incorporated into your existing civil service processes to help select, develop, and retain your medics and EMTs.

For More Information Circle 16 on Reader Service Card

Addressing the EMS workforce crisis with science

Kurt A. Steward, Ph.D., Vice President, Infor Public Sector

The US Bureau of Labor Statistics expects the emergency medical services (EMS) field to grow by more than 23% over the next 10 years, adding over 55,000 paramedic and EMT jobs to the 235,000 skilled paramedics and EMTs already faithfully serving across the United States. The additional workforce needs are due to increasing call volumes, aging populations, and a generally heavier reliance on governmental services. This presents additional challenges to an EMS community already grappling with the impact of the Affordable Care Act, shifts towards community-based care, value-based payments, and an aging workforce, especially in fire-based EMS organizations.

Consider the findings of the most recent report from the National Highway Transportation Safety Administration Office of Emergency Medical Services:

• Retaining workers is a challenge, with poor management practices, low wages and benefits, lack of career ladders, and disability contributing to turnover.
• Retention of older or more experienced workers [conserves] talent and experience within the EMS organization at large.
• Developing strategies to accommodate older or more experienced workers and increasing successful recruitment and retention of older individuals would prove helpful for addressing the workforce issue.

It's a complex proposition to hire the right candidates for roles that require highly technical medical skills and a willingness to put oneself in harm's way for the benefit of a stranger. To help meet this challenge, the EMS community could benefit from science-based hiring practices.

Talent science, or science-based hiring practices, is a predictive and analytics-based approach to managing human resource processes, like candidate selection, medics’ development, and succession planning. This approach both objectively and statistically links specified performance metrics to behavioral characteristics of medics within an agency to help establish a model of “best fit” that is unique to each agency.

Here’s how talent science works. Custom profiles are built using large samples of incumbent medics and EMTs that reflect the behavioral makeup of the best-suited candidate for a specific organization. This is important because while nearly all medics and EMTs share a common sense of civic duty to help those in need, the behavioral characteristics of a successful medic in a large fire-based organization may be different from the behavioral characteristics of a medic or EMT in private agency or a quasi-governmental organization.

Next, job candidates are evaluated and ranked based on their responses to a comprehensive online assessment that is designed to measure 39 behavioral characteristics. The assessment compares each candidate’s behaviors to the custom profile corresponding to the position of medic or EMT within a specific organization. A report is then generated, visually describing how and where the candidate aligns and differs from the unique requirements of the profile and the defined needs of the organization.

This approach has proven to significantly reduce turnover and improve organizational performance in an industry with similar challenges to the EMS community—the nursing profession. A recent controlled study of over 1,000 newly hired nurses comparing the use of science-based hiring practices to traditional hiring practices demonstrated a turnover reduction of 47% and produced an annual savings of over $2.4 million. By employing a similar approach within EMS, agencies can become more effective at identifying the most qualified candidates from a skills perspective and can isolate those individuals whose characteristics make them the best fit for the organization at large.

The workforce crisis facing the EMS profession will not solve itself through procrastination and inaction. When medics leave, the loss in knowledge capital is substantial and the ability to serve the community is diminished. The community deserves the best from our agencies; and using science can help the EMS community deliver on those expectations.
The Next Great Tradition

It’s time to support the more than 1,000 EMS providers working as community paramedics and MIH practitioners.

More than 200 years of tradition, uninterrupted by progress. I’ve heard that phrase often to describe how some firefighters hold strong to their rituals and practices. But truth be told, the same could be said of EMS.

Since the days of Napoleon, ambulance services have existed primarily to transport the ill and injured from where they fell to a hospital where they could be treated.

More than 200 years ago, tradition dictated that local townfolk would transport injured soldiers to the closest hospital in their hay wagons, but only once the battle moved away. At the hospital, surgeons would begin their lifesaving interventions on those who survived that long. But one surgeon, Dr. Dominique Jean Larrey, was different. He believed the surgeons should be deployed into combat to retrieve the injured even while war raged around them. He argued that by beginning care sooner, he could save many more lives. Despite a belief that was undoubtedly unpopular with his peers, Larrey persevered and invented the ambulance, the modern system of triage and many other surgical innovations.

I applaud EMS World Editorial Director Nancy Perry and Senior Editor John Erich for dedicating time and space to help these new providers. Thanks to their efforts and the bravery of the 1,000-plus providers willing to break from their traditional roles, we are looking at the start of the next great tradition of EMS.

ABOUT THE AUTHOR

Dan Swayze, DrPH, MBA, MEMS, is the vice president and COO of the Center for Emergency Medicine of Western Pennsylvania and is widely considered one of the pioneers of the emerging field of community paramedics. Dan has been involved in EMS for more than 35 years.
Virginia Office of EMS Awards Agency of Excellence Designation

At a recent event, the City of Manassas Fire and Rescue System was among the first agencies to be awarded with the Agency of Excellence designation from the Virginia Office of EMS. This was the first year of a pilot program that seeks to recognize agencies that strive to operate above the standards and requirements of Virginia EMS regulations. Agencies were evaluated in eight program areas: leadership/management; emergency medical dispatch; clinical care measures; operational medical direction; life safety; community support and involvement; recruitment and retention; and performance and risk.

“Taj glad we could be part of this pilot program,” said Manassas Fire and Rescue Chief Brett Bowman. “The men and women of the City of Manassas Fire and Rescue team are exceptional, and I am proud that they have been recognized for their service to the community.”

The designation as an Agency of Excellence lasts for three years, at which time an agency must reapply for the certification. For more information, visit www.vdh.state.va.us/OEMS.

Fla. Paramedic Elected to National Board Position

Sunstar Paramedics’ Community Outreach Coordinator, Charlene Cobb, has been elected to the Board of Directors for the National Association of Emergency Medical Technicians (NAEMT). She will serve as an at-large director.

During her two-year term, Cobb plans to work on creating industry solutions for an easier transition for military medic veterans who want to move into an EMS career. She also plans to develop strategies to improve workplace safety and working with government representatives and industry officials to pass the Field EMS Modernization and Innovation Act.

Cobb has been an active member of NAEMT since 2005. “I am extremely honored to have been elected by my fellow NAEMT members,” said Cobb. “Over the last 30 years, I have watched this field evolve and am excited to take a larger role in making a difference for EMTs around the country.”

For more on NAEMT, visit naemt.org.

EMS Supervisor Lt. Matt Fox (pictured), along with Battalion Chief Todd Lupton, helped steer the City of Manassas Fire and Rescue System through the pilot program.

JANUARY IS NATIONAL BLOOD DONOR MONTH

Every two seconds someone in the U.S. needs blood.

More than 41,000 blood donations are needed every day.

The average red blood cell transfusion is approximately 3 pints.

The blood type most often requested by hospitals is Type O.

The number of blood donations collected in the U.S. in a year is 15.7 million.

There are 9.2 million blood donors in the U.S. each year.
Repetitive Risks

For this EMS crew, unloading the stretcher proved dangerous to both patient and provider.

This inaugural column is dedicated to our peers who risk their lives to serve others daily. In this column we will explore cases in which things didn’t quite go as planned. Sometimes this means we were surprised by a clinical presentation, while others involve near-misses or adverse events. While we love EMS, the work we perform is often conducted in unpredictable and harsh environments with limited information and resources and high stress. EMS personnel are 2½ times more likely to be killed on duty, and five times more likely to suffer a transportation-related injury, than the average worker. We hope this column will help promote an open, honest and timely process to communicate potential mishaps and promote a culture of safety in EMS operations.

This Month’s Case

After an emergent transport to the hospital, the crew was unloading the stretcher loaded with a roughly 200-pound critical patient in congestive heart failure. Crew member #1 was at the foot of the stretcher, operating the manual control, while crew member #2 was on the patient’s right side, watching and ready to catch the wheels. As expected, with ER staff watching as they met the ambulance in the garage, the crew was moving quickly to get the critical patient inside. Crew member #1 began to give a quick report while starting to pull back on the stretcher. The hospital has a slightly uneven garage floor (to allow for drainage in the center), and the vehicle and stretcher were slightly tipped to the patient’s left side. As the crew pulled the stretcher out, the safety bar missed the safety hook. The stretcher came out of the back of the ambulance rapidly, with its wheels still retracted. Crew member #1 at the foot of the stretcher tried to hold the weight. Unfortunately the stretcher tipped toward the left, and the patient reached out to the left side as crew member #2 (on the patient’s right side) pulled up, trying to help prevent the stretcher from hitting the ground.

To complicate matters, this stretcher was equipped with a canvas basket behind the head. When the stretcher began tipping out of balance, a worn and loose strap caught the safety hook, making it harder for both crew members to maintain the stretcher upright.

At this point the stretcher twisted and inverted, almost completely falling to the ground. The patient struck their head, face and upper left shoulder on the jagged ambulance bumper first, then the floor. Assisted by the ER staff, the patient was rolled and placed on a long spine board with cervical precautions and then quickly moved into the critical care room.

Crew member #2, leaning while trying to lift, immediately felt severe back pain and fell forward, striking their head on the overturned stretcher and sustaining an inch-long laceration to the forehead. The patient died of heart failure shortly after admission. On review the traumatic injuries, while serious and possibly having delayed care, were not found to be directly responsible for the patient’s death. Crew member #2 sustained a herniated L5-S1 low-back injury that required a laminectomy and extensive rehab, and continues on light duty with the goal of returning to work in the field.

Root Cause Analysis

When analyzing adverse events, safety experts talk about gaps or holes in safety practices lining up to cause a “perfect storm” that results in injury. (See the “Swiss cheese model” explained here: https://psnet.ahrq.gov/primers/primer/21/systems-approach.)

In this case the crew, with a combined 14 years of experience, acted like so many other crews would.

With a critical patient’s best interest in mind, they moved quickly performing a routine task—unloading the stretcher, a procedure they have completed thousands of times without mishap. They were neither disregarding safety nor acting recklessly. In the blink of an eye, they became distracted with reports to the ER staff and relied on a safety hook that had never failed them.

It is common for us to be complacent and disregard risks during repetitive tasks that have never caused us harm. Like our use of stretchers on every call, pilots will take off and land an airplane on every flight. And like aviation, where most crashes occur on take-off and landing, we also know most injuries to providers and patients will occur during stretcher loads and unloads. Have you ever thought, I don’t need to wear my seat belt, I’m just driving down the block to the store? When “it hasn’t happened to us,” we can think it doesn’t happen to me. Our complacency leads us to slip, then trip.

Nonpreventable Factors

The single hook, combined with a stretcher safety bar that is curved, combined with straps from equipment baskets, combined with an unload procedure that requires holding weight until wheels descend and lock, is a system design disaster waiting to happen.

Preventable Factors

Crew distraction, lack of communication during a critical task, moving too quickly and disregarding risks are all elements that could have been mitigated in this case.

Lessons

This event is as tragic as it is common. Clearly we need systems that have improved safety design. Help may be on the way from stretcher manufacturers offering no-lift systems. In the meantime, what can you do to prevent this from happening on your next call?

We are big fans of crew resource management (see sidebar). In keeping with aviation’s “red rule” when potential risks exist, it is essential that we stop (or at least slow down enough to think about the procedure), perform a cross-check with a partner, follow a clear checklist, use clear verbalization of keywords, and repeat back confirmation (closed loop communication). Maintaining a sterile cockpit helps may be on the way from stretcher manufacturers offering no-lift systems. In the meantime, what can you do to prevent this from happening on your next call?
Editor’s note: Cases are obfuscated and amalgamated to protect patient privacy and provider anonymity. While staying as true as possible to the actual event, creative license is used to better explain the lesson(s) in the case.

Could also prevent unnecessary distraction. In this case identifying an environmental hazard (titled garage floor) and waiting for a third person to help is also possible.

Improving safety parameters, such as removing loose straps, placing two safety hooks and ensuring the stretcher bar is updated to be flat, will help mitigate some risks.

Standardizing the process of loading and unload would be the single greatest mitigator of risk in this case. Streamlined and vetted processes have been proven to mitigate almost all errors.

From simple procedures such as ensuring a door is locked before an airplane takes off to complex crash landings into a river, cross-checks with a standardized checklist have saved many lives. Remember, slow is smooth, and smooth is fast.

Why Do We Need This Column?

Recent studies report between 98,000 and 210,000 deaths each year are due to preventable medical errors. We know that errors in areas like medication administration, airway management, assessment errors and patient falls are not just happening in hospitals. These same errors occur in ambulances, but providers are afraid to report them for fear of being dismissed, and agencies are afraid to report them for fear of being sued. Unfortunately, without reporting or tracking these errors, we cannot understand the depth of the problem or create systems to improve our safety.

In 2013, responding to a request from the National EMS Advisory Council (NEMSAC), the National Highway Traffic Safety Administration (NHTSA) collaborated with the American College of Emergency Physicians (ACEP) to publish the Strategy for a National EMS Culture of Safety (www.emscultureofsafety.org). This landmark document outlines the need, framework and steps for EMS to implement major operational changes that will lead to improved safety.

To become more reliable we must implement just culture. Learning from our mistakes so we do not make the same mistake again is vital. This is how we will learn from these cases, but we will also learn from them and strengthen. Send comments and feedback to editor@emsworld.com.

Video Challenge

Can you come up with a video that demonstrates sterile cockpit, key words and uses of a checklist for safe loading and unloading of the stretcher? If you do, please send the link to editor@emsworld.com. Our partners at North Ambulance and Jones and Barbiett Learning filmed this ‘stretcher cross-check’ seen here: EMSReference.com/checklists.

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About the Authors

David Page, MPS, NRP, is director of the Prehospital Care Research team at IGCA. He is a paramedic and PhD candidate at Monash University. He has over 20 years of experience in EMS and continues to be a field paramedic for Allina Health in EMS in the Minneapolis/St. Paul area.

Will Kroft, MND, NRP, is a fourth-year medical student and a Faculty member at the George Washington University School of Medicine and Health Sciences in the Departments of Clinical Research and Leadership and Health Sciences. He has over 20 years of experience in BLS operations, critical care transport and hospital administration.

For More Information Circle 19 on Reader Service Card

Humble Beginnings

When Linda and Larry Walsh filled their first order for SureStep™ stretcher sheets in the summer of 2005, they printed the paperwork in their dining room, packed boxes in the family room and mailed the first order in the family Suburban. It was a humble beginning for their new family business, but they knew their hard work would pay off. Not only did they sell a high quality product and foster the ambition to grow a successful business, they had a legacy to build.

It’s in the Name

Naming their company was an easy task. They needed a name that would reflect the strength of their product line, commitment to service and the character of their future employees. The choice was a natural one —Taylor Healthcare Products, Inc. after their youngest son, Taylor.

Taylor Walsh was born in February, 1989. Taylor’s birth was normal, but as he missed milestones, it became apparent that he would face a life full of challenges both mentally and physically. While doctors were unsure of what lay ahead, they believed he would never walk or talk and that his mind would not develop beyond that of an infant. Pursued by his condition and unsure of his strength and determination, doctors said he may only live to be 3 years old.

Beating the Odds

But Taylor had other plans. He defied medical experts as months turned into years and years turned into decades. He loved to be pushed on his swing in the backyard and to swim in Larry’s arm in the family pool. At the age of 5, he began a special program at school. As a student in a special education class, Taylor connected with his teachers and friends in his unique way and was beloved by everyone who worked with him. His love for life, family and friends was obvious in his small gestures, joyful smile and infectious laugh. Taylor sang along, in his own language, to Frank Sinatra and cheered on his older brother, Austin, from the sidelines at The Woodlands Highlander football games.

In early 2005, Taylor Healthcare Products, Inc. outgrew their cramped space and moved to a larger office and warehouse. The move was exciting for both the company and Taylor, who got his own office with his favorite thing, excluding all the Disney movies he could watch. His office room was purposefully divided between Linda and Larry. With large picture windows between the offices the three of them were constantly observed, so they always saw Taylor and he could see them. His smile became a fixture at the corporate office where he served as a reminder of the values of the company that shared his name.

Building a Legacy

After years of fighting for life and too many bouts of pneumonia to count, Taylor passed away on December 27, 2009. He died peacefully at home in his family’s arms.

That evening when paramedics arrived at the home, they realized that they were in the presence of the special person who inspired some of the products they used every day. A paramedic named Rhonda left Linda and Larry with a comforting message — she would remember their son every time she opened a pack of sheets or covered a patient with a Taylor Healthcare blanket.

In the days following their loss, Linda and Larry received a phone call from an old friend. She had just heard about Taylor’s death from her son, a Montgomery County firefighter. With both spread from ambulances to fire stations across the area that the little boy behind the name on the stretcher sheets and blankets had died. Rhonda and her colleagues were telling Taylor’s story.

Taylor, and will continue to touch the lives of millions through the company named after him. Taylor’s stretcher sheets, blankets and pillows provide warmth, comfort and protection for patients every day. Taylor left a legacy of compassion, dedication, respect and for every human being. With each case of product that leaves the warehouse a little bit of his legacy goes with it, and as company logo is also a reflection of Taylor; the star represents the North Star because Taylor is the company’s guiding light.

Now you, too, know Taylor’s story.
How Will You Be Remembered?  
It is your responsibility to leave your EMS organization better than you found it.

“Management is doing things right, leadership is doing the right things.” — Peter Drucker

When you come to the end of your career in whatever leadership role you retire from, how will you be remembered? Will the number of people who show up at your retirement party not even fill a telephone booth, or will it be a large hall overflowing with those who want to wish you well and thank you for everything you did to contribute to the organization?

I have worked with some chief fire officers in my career for whom the only people who showed up at the retirement party were the retiree’s family and those working in the building so they could get the free food. It is very sad that your subordinates could think so little of you and that you made no contributions to better the organization; in fact, you may have made it worse. For these individuals, that will be their legacy and how they will be remembered for years to come.

Clean the Campsite  
The Boy Scouts have a saying: “Leave the campsite better than you found it.” This means making sure you clean up any mess you created. All your trash should be picked up and all camp fires put out, restoring the campsite to its natural state. Even if you arrived and found cans and wrappers left by someone else, it is your responsibility to clean it up.

This saying can also apply to leaders of EMS organizations. Whatever leadership role you find yourself in, whether you supervise subordinates or work directly with the organization, you have a responsibility to move the EMS organization forward and leave it better than you found it. How do you do this? You become a leader instead of a manager.

Leadership vs. Management  
What is the difference between leadership and management? It is very simple: You lead employees and manage things. We manage budgets, fleets, payroll, inventories and computer systems, but we lead people.

Leaders who fail and whose staff cannot wait until they retire lack vision of where the organization should be and, since they have no vision, they cannot share that vision with their subordinates.

Leaders who leave an organization better than they found it learn to create a vision of where the organization should be and then find that one ingredient that motivates people to share in that vision. Just because you create a vision of where the organization should be does not mean your employees will rubberstamp your vision. You have to be able to share your vision and find a way of getting employees to buy into your vision.

Most leaders find a way to get employees to share their vision by empowering them in the process. As President Dwight Eisenhower said, “Leadership is the art of getting someone else to do something you want done because he wants to do it.” Eisenhower certainly understood this concept. Who else could command millions of troops in battle to conquer Europe while he had never been in battle himself?

You may not care what your employees think about you when you retire. You may just wish to walk out the door on your last day, never to be seen again. If that is the case, then you were not a leader and you were probably not even a manager.

In a leadership position you have a responsibility to lead your organization and your employees and make your EMS organization successful. If you do not accept this responsibility, you should have stepped down from your position way before your retirement.

When you accept a leadership position, it is not just a title. It is a responsibility that you should fully accept and strive for the success of your EMS organization.

ABOUT THE AUTHOR  
Gary Ludwig, MS, EMT-P, is chief of the Champaign (IL) Fire Department. He is a well-known author and lecturer who has successfully managed large, urban emergency medical systems in St. Louis and Memphis. He has a total of 37 years of fire, rescue and EMS experience and has been a paramedic for over 35 years.
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Improve EMS Systems

How to Measure and

EMS Compass is setting the profession on a path toward performance measurement and improvement

When staff in the National Highway Traffic Safety Administration (NHTSA) Office of EMS decided to support EMS Compass, it made perfect sense. For decades, NHTSA has funded projects that have helped make the nation’s EMS systems what they are today. Twenty years ago, the Agenda for the Future presented a vision of a data-driven EMS system; more recently, the National EMS Information System (NEMSIS) established data standards and the

Prehospital Evidence-Based Guidelines (EBG) project established treatment guidelines based on research findings. Each has built on those that came before it, and EMS Compass is no different.

It’s the logical next step—applying those standard data elements and medical research to create performance measures that will help EMS agencies meaningfully use their data to improve patient care.

In December 2014 the National Association of State EMS Officials (NASEMSO), through a cooperative agreement with NHTSA, publicly launched EMS Compass. Since then, the initiative has tackled difficult issues, from how to decide which measures to use to how to be inclusive of the entire EMS community. But the focus of EMS Compass has been creating a replicable process for identifying, designing and testing performance measures—a process that can be used well into the future by organizations and testing performance measures—a process that can be used well into the future by organizations.

During the session on population and public health, Taigman described the process measures that he believes EMS can use when true patient outcome measures are difficult to assess. A process measure, EMS Compass Project Manager Nick Nudell explained, is one that evaluates a step in the process that is linked to outcomes but is not the outcome itself.

Taigman’s examples included measuring the time from the first 9-1-1 call to certain evidence-based procedures for time-sensitive conditions, such as:

- First chest compression for cardiac arrest;
- Restoration of blood flow for STEMI;
- First CT scan interpretation for stroke;
- Infusion of two liters of fluid for sepsis.

There are six domains of measures that correlate to the priorities in the U.S. Department of Health and Human Services National Quality Strategy. Population and public health is one; the other five are patient and family engagement, patient safety, care coordination, efficient use of healthcare resources, and clinical process and effectiveness. In keeping with the project charter to address all aspects of an EMS system, the initiative added three other domains: workforce, fleet and data.

In the EMS workforce webinar, Daniel Patterson, PhD, a senior scientist with the Carolinas Healthcare System in Charlotte, NC, discussed ways to measure fatigue and the safety culture within an organization—all of which have been linked to safety outcomes by research, he said.

While in the past some of these measures have used questionnaires that can be time-consuming to administer to staff, Patterson and other researchers have been working to refine those surveys to make them shorter but still valid. Other ways of measuring these factors, such as using text messaging to assess fatigue, are currently being investigated.

Mike Ragone, director of system design for AMR, spoke about the difference between measuring “on scene” times and “at patient” times during the session on efficient use of healthcare resources. “On scene time versus at patient side, as we all know, can be a huge difference,” Ragone said, citing the example of responding to a casino where it may take 15 minutes to reach the patient after arriving. “If we do not separate them, we won’t be able to draw conclusions” about the clinical relevance of response times, he added.

Ragone discussed some of the different ways systems are trying to measure accurate at-patient times, from communicating via the radio in order to let dispatchers mark the time to using handheld devices, such as smart phones, that allow the practitioners in the field to accurately record the time.

Although EMS Compass aims to create performance measures around the data standards established by NEMSIS, it was clear that this effort to use data to assess system performance may also drive changes to how data is collected, as EMS systems determine which elements are most critical to analyze.
former director of the Maryland Institute for EMS Systems, who is serving as the EMS Compass steering committee chair. On January 13 the EMS Compass steering committee meets in person for the third time to discuss the progress of the measure development process. The committee, composed of several experts in performance measurement and improvement from both inside and outside the EMS community, is also expected to be reviewing and prioritizing the first sets of performance measures.

Building Measures
But the bulk of the work for EMS Compass has occurred between those meetings, when dozens of volunteer members of the initiative’s working groups have spent countless hours designing, refining and testing the measures.

When the EMS Compass Measurement Design Group first gathered in Washington nearly a year ago, its members knew they had a challenge before them. Since then, they have helped create a measurement design process that is transparent and evidence-based, with opportunities for members of the public to participate. In addition, they have sifted through hundreds of potential measures submitted by the EMS community and present in the literature, choosing the ones that EMS agencies can use to help them in their pursuit of providing high-quality care to patients and making a difference in their communities.

“Choosing the ‘vital few’ measures and making sure we specify clear operational definitions to know the data to include, what to exclude and how to calculate the measures are essential to ensuring EMS agencies can use the measures to support improvement,” says David Williams, PhD, executive director at the Institute for Healthcare Improvement and chair of the EMS Compass Measurement Design Group. “Measurement is vital to knowing how an agency is reliably delivering results and whether efforts to improve processes are moving their dots on their charts, and EMS Compass will help provide a good place for agencies to start to look at meaningful process and outcome measures that can enable them to focus on improvement and reliability.”

From the start, EMS Compass has focused on using NEMSIS data points in its measures when possible. Because NEMSIS creates a standard for collecting EMS patient data, the vast majority of U.S. EMS agencies are gathering the same information on each patient. NEMSIS-compliant electronic patient care reports (ePCRs) also ensure that the data are stored in the same way, so they can be sent to state and national databases and used for research and analysis.

But for EMS Compass, the NEMSIS standard also means that clinical performance measures can be designed so that any agency using NEMSIS-compliant PCRs can use the measures in the same way. They can even be built into software that automatically pulls the information from individual ePCRs and calculates how an agency is performing on a specific measure.

Patient falls are a regular part of the working day in a healthcare environment and performing a safe lift is vital for both the wellbeing of the fallen person and the EMS professionals. Injuries among EMS professionals can be costly not only to employers and employees but also can negatively impact the quality of care that a patient may receive.

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For More Information Circle 22 on Reader Service Card
To support EMS Compass’s efforts to design measures that can be automated when using NEMSIS data, the project has enlisted a group of volunteers from several leading EMS technology and software companies. Chaired by FirstWatch Product Strategist Debbie Gilligan, the EMS Compass Technology Developers Group has focused on matching the proposed performance measures to NEMSIS data points, and testing them to make sure EMS agencies could implement the measures with the EMS clinical data they already have.

“The possibilities created by having electronic records, a uniform data standard, and performance measures using that data are pretty exciting,” Gilligan says. “It’s been fun to get in a room with people from all these innovative companies who are in many ways competitors, but who all have one goal in mind—finding ways to make it easier for people to get more out of their data.”

Building consensus around performance measures is not easy, as many other areas of healthcare have discovered. During the EMS Compass process, the committee members and project leaders have navigated some complicated questions, from what level of evidence review was needed to which sources of data could be considered. Early on, it became clear that many members of the initiative recognized some key measures—clinical outcomes—would rely on EMS agencies being able to access data from outside sources, such as hospitals. “Information should flow seamlessly from prehospital care to hospital care and back,” Bass says. “To me I see that as a really important part of what we’re doing—to say here’s the science, here are the measures, here’s the way it needs to be done.” At the same time, he acknowledged, most EMS agencies continue to struggle to get access to outcome information from hospitals. Recognizing that, many of the measures were designed to serve as surrogate measures that use data currently collected by providers when they complete patient care reports only until they are able to link with hospital data to collect the complete measures.

“Maybe you have to do that initially just so you get some baseline on the EMS processes and start measuring,” Bass says. “But we have to be willing to say that the right way to measure performance often includes patient outcomes, such as survival to discharge for cardiac arrest. And maybe having a measure that says that will help improve the state of data-sharing between hospitals and EMS systems.”

**Establishing a Foundation Based on Evidence**

Equally important to using available data is creating measures that are based on the evidence. For More Information Circle 24 on Reader Service Card
latest evidence and best practices in pre-hospital care. The ultimate purpose of performance measures is to improve patient care and EMS practice—and therefore the patient experience and outcomes. Performance measures often drive programmatic changes, so it was essential to the EMS Compass leaders to only measure processes that have a demonstrated positive impact.

For example, while measuring IV success rates has long been a standard for many EMS performance management programs, there has never been a proven association between IV success rates and patient outcomes. While it is clearly important that paramedics can competently perform skills they are expected to perform, EMS Compass leaders chose to focus on measures linked to patient outcomes, such as the ability to accurately identify stroke patients, or administration of aspirin for heart attack victims. Members of the initiative looked to sources such as American Heart Association guidelines and articles published in the peer-reviewed medical literature to ensure the EMS Compass measures would be assessing evidence-based practices.

“A key opportunity in improvement is to use measurement to support EMS systems to reliably deliver evidence-based care,” Williams says. “Not measuring the care processes that matter will not improve outcomes.”

Focus on Local Improvement
EMS Compass leaders say the initiative is focused solely on creating measures that support systems to improve care, and the project has no ability or authority to require agencies to use or report the measures. But with changes to healthcare funding occurring across the industry, many members of the EMS community and EMS Compass team have acknowledged that in the future, healthcare payers, local governments and other entities may look for additional measures to use to assess EMS payments or hold systems accountable—in a sense, this is already happening in cities across the country that have response time requirements tied to contract payments for EMS services.

If insurance companies and the U.S. Centers for Medicare and Medicaid Services (CMS) later link payments to performance, some EMS leaders argue, it’d be better for them to use measures developed by the EMS community and based on solid medical research. “Our goal is to create evidence-based measures that support the improvement of the quality of care at the local level, period,” says Dia Gainer, executive director of NAS-EMS. “If agencies, regulators or communities choose to use the EMS Compass measures, then they will be using measures that are good for patients and good for EMS.”

Involving the entire EMS community and building consensus around measures was a priority for the initiative.

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For More Information Circle 25 on Reader Service Card
and building consensus around measures was a priority for the initiative, regardless of potential other uses of the measures. From the start, EMS Compass has involved dozens of EMTs, paramedics, educators, administrators, medical directors and other experts on its various committees. The steering committee also included several experts from outside EMS, including Kedar Mate, MD, a physician and improvement expert with the Institute for Healthcare Improvement (IHI); Patria de Lancer Julnes, PhD, a performance measurement expert and researcher at Penn State Harrisburg; Todd Olmsted, PhD, a health economist at the University of Texas; and Martha Hayward, a patient advocate with IHI.

**A Community Effort**
Beyond the impressive roster directly associated with the project are the dozens of individuals and agencies who submitted measures during the public “call for measures.” In order to be as open and inclusive as possible, EMS Compass began its measurement design process by asking members of the public to submit ideas for measures. The response exceeded even the expectations of the initiative’s leaders when they received more than 400 submissions.

“It’s exciting to see so many people engaged and interested in contributing.”

Nudell, the EMS Compass project manager. Since then, EMS Compass has hosted several webinars and conference sessions to share information and receive feedback, and the proposed measures are all available for public comment on the initiative’s website, emscompass.org, prior to review by the steering committee. EMS Compass has also encouraged agencies to test the specific measures to ensure that agencies are able to access the data and calculate the measures as intended.

Even with a process that is so focused on inclusiveness and evidence and testing, it is clear that EMS performance measures created today cannot be thought of as permanent. As research reveals new findings and different data becomes available, the EMS community must be willing to adapt and re-evaluate performance measures. What EMS Compass has focused on, rather than specific measures, is a process for developing and revisiting measures. The members of the EMS Compass team hope that the process they’ve created—based largely on the model used by the National Quality Forum and the larger healthcare community—will be used in the future by the EMS profession to develop new measures, to reassess old measures and ensure that EMS agencies continue to have the tools they need to support improvement.

**It is clear that EMS performance measures created today cannot be thought of as permanent.**
“The real legacy of EMS Compass, and our main measure for knowing it is a success, will be a culture of performance improvement across EMS, from volunteers in the smallest rural agencies to chiefs in the busiest urban departments,” Gainor says. “Everyone in EMS shares the same goal—providing the best care to our patients—and EMS Compass will help us do just that.”

In fact, creating a sustainable process for designing measures is only part of the EMS Compass initiative—a result of the project will be a guide to using performance measures for improvement. Frequently in the past, efforts have focused solely on the measures. While agencies have started collecting the data and even calculating measures, many struggle with implementing change based on what they learn.

A critically important part of that process will be a shift away from thinking of measurement for compliance, accountability or judgment. Measurement for improvement focuses less on people and errors and more on understanding process reliability that enables outcomes. This is a major cultural shift for EMS, which has not had widespread experience of using measurement for improvement.

“Figuring out how to calculate the measures might seem like the difficult part, but it’s just the first step,” Bass says. “What’s usually the real challenge is knowing what those numbers mean and recognizing when improvements can be made and figuring out the best way to drive that change.”

The EMS Compass Legacy

Over the next several months, the EMS Compass team will also lead discussions about how to ensure the increased focus on measurement for improvement doesn’t end when the funding for the current initiative runs out. Some leaders in the EMS community hope that federal funding will be used to extend the EMS Compass process. Others have suggested that EMS stakeholder associations could work together to keep EMS Compass alive. Another possibility is that the EMS Compass process of designing performance measures is used by different organizations looking to create measures.

While the exact future of EMS Compass beyond its initial funding is not decided, it is clear that the EMS profession is ready to move beyond simply measuring IV rates and response times. By using evidence-based and thoughtfully designed performance measures, EMS agencies have the opportunity to improve the quality of patient care and enhance their service to their communities. And that’s a goal every EMS provider can agree on.

Editor’s note: The EMS Compass steering committee is scheduled to meet on Jan. 13 to review and prioritize several performance measures. For the latest update, visit emscompass.org.

ABOUT THE AUTHOR

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Is one any better than the other?

Out-of-Hospital Evidence-Based EMS

BiPAP vs. CPAP

Is one any better than the other?

Evidence-Based EMS

Out-of-Hospital Evidence

BiPAP vs. CPAP

Is one any better than the other?

Background

As a quick review, patients in acute respiratory distress have a problem with oxygenation, ventilation or both. Oxygenation is the process of providing oxygen to the patient. However, pathologies like COPD and CHF may require more than just oxygenation as a result of alveolar disease preventing appropriate diffusion of oxygen and carbon dioxide across the alveolar membranes (i.e., pulmonary edema and bronchoconstriction). This is when ventilation becomes important. Ventilation can be thought of as the actual physiologic process of breathing, which is inhalation, diffusion of gases and exhalation.

Ventilation and oxygenation are important for understanding the utility of noninvasive positive pressure ventilation (NIPPV). NIPPV is a form of mechanical ventilation delivered through the use of tight-fitting nasal or facial masks that does not require endotracheal intubation. It can be delivered in two forms: CPAP or BiPAP. CPAP provides a continuous pressure of oxygen to the alveoli. This constant pressure provides oxygen directly to the lungs, prevents alveolar collapse, and may even open up previously closed alveoli (alveolar recruitment). In essence, CPAP primarily provides oxygenation and may indirectly influence ventilation by allowing alveoli to remain or become available. As a result of this constant pressure throughout the respiratory cycle, the patient has to overcome this pressure during exhalation. Thus, CPAP is limited by the patient’s ability to overcome the very pressure CPAP provides.

Here is where BiPAP can help. BiPAP provides CPAP, but senses and adjusts the oxygen pressure to the patient’s breathing cycle. The oxygen pressure increases during inhalation to provide maximal alveolar recruitment but decreases during exhalation to ease breathing while keeping alveoli open with its adjustable CPAP function. In essence, BiPAP provides greater control for acute respiratory distress and may provide better gas exchange to optimize cardiopulmonary performance. Thus, many hospitals use BiPAP for this very reason: better control.

The use of BiPAP is further supported by a 2004 Cochrane review in which the authors examined 14 randomized controlled trials in which standard medical therapy (SMT)—defined as supplemental oxygen, bronchodilators, steroids and antibiotics—was compared to BiPAP in patients with COPD. With a total of 758 patients analyzed, the authors found a 48% reduction in the risk of mortality for patients treated with BiPAP. This demonstrated a number needed to treat (NNNT) of 10, meaning that for every 10 patients treated with BiPAP, one life was saved compared to SMT alone. This review also demonstrated a 60% decrease in the risk of intubation with a NNNT of 4.

Clearly this review supports the use of BiPAP as a first-line NIPPV therapy in treating COPD. Before we claim that BiPAP is superior, though, let’s remember that this review did not specifically compare the use of CPAP against the use of BiPAP. So let’s look at the evidence comparing the two before we throw our CPAP machines out the window.

In-Hospital Evidence

To begin, there are studies that showed worse outcomes with BiPAP compared to CPAP. In 2012, Brazilian researcher Juliana Nalin de Souza Passarini demonstrated an increased need for endotracheal intubation in patients who received BiPAP compared to those who received CPAP in treatment of acute cardiac pulmonary edema (ACPE) and COPD exacerbation. However, this study was limited by a nonrandomization of subjects, leading to bias in the patients who received BiPAP and CPAP. This was demonstrated when the authors concluded that the increased need for intubation was likely due to greater disease severity in those patients who received BiPAP. Despite these limitations, this study still demonstrated that a majority of patients managed with NIPPV avoided the need for endotracheal intubation.

In contrast, an older, more methodologically sound study stated that BiPAP may provide slightly better results than CPAP. These authors attempted to evaluate whether BiPAP improved ventilation, acidemia and dyspnea more rapidly than CPAP in patients with ACPE by measuring vital signs and specific blood lab values. What makes this manuscript methodologically superior to the former study is that it was a randomized, controlled, double-blinded study, so bias was kept to a minimum. The authors concluded that BiPAP improves ventilation and vital signs quicker than CPAP. However, they added a word of caution after discovering a relationship with having a myocardial infarction (MI) and the use of BiPAP.

Some rural EMS systems may take the long-term effects of BiPAP into consideration given their longer transport times.
Fortunately, a meta-analysis nine years later demonstrated this relationship of new-onset MI and BiPAP utilization did not reach statistical significance. However, many who support CPAP state that both interventions lack a difference in meaningful outcomes (i.e., the need for intubation and/or effect on mortality). One such study compared BiPAP to CPAP in 200 patients with ACPE. The authors discovered that BiPAP was associated with faster resolution of respiratory failure (159 vs. 210 mins.). However, there was no difference in mortality or rate of intubation in BiPAP and CPAP patients. In essence, CPAP may be just as good as BiPAP in the long run. Furthermore, a recent article in the New England Journal of Medicine further supported that CPAP is just as beneficial as BiPAP in terms of meaningful outcomes. The objective was to determine whether noninvasive ventilation reduced mortality and whether there were important differences in outcomes associated with the method of treatment (CPAP or BiPAP). The authors discovered that 11.7% of patients on CPAP and 11.1% of patients on BiPAP either died or were intubated. This small difference was not statistically significant, and the authors concluded CPAP can be just as effective as BiPAP in short-term (seven-day) mortality.

Before we say that CPAP can be just as good as BiPAP, though, let’s look at the prehospital evidence.

Prehospital Evidence
Although limited in number of studies, the prehospital evidence for the utility of BiPAP and CPAP shows comparable results to the in-hospital research. The University of Sheffield’s Steve Goodacre, et al., published a systematic review comparing OOH CPAP and BiPAP to SMT. There was an overall reduction in mortality and intubation rate when compared to SMT, but they found no statistical difference with the use of BiPAP and CPAP. While this review seems to be the most complete to date, the authors noted, “The analysis of BiPAP in particular involved fewer studies and fewer patients (190 receiving BiPAP vs. 610 receiving CPAP).” Additionally, Sheffield’s Abdullah Pandor and colleagues provided a similar systematic review that showed a decrease in mortality and need for intubation in the CPAP group that was similar to the BiPAP group.

Bottom Line
After looking at the evidence of BiPAP against CPAP, the only advantage BiPAP appears to provide is a decreased time to resolution of respiratory symptoms, vital signs and improvement of laboratory values. However, keep in mind that this difference doesn’t occur until late in the treatment course. While this shouldn’t affect most EMS systems with short transport times, some rural EMS systems may take the long-term effects of BiPAP into consideration given their longer transport times. Otherwise, current evidence demonstrates minimal benefit to BiPAP over CPAP.
What we do know is that BiPAP provides better outcomes in patients with COPD when compared to SMT, and CPAP may be better for ACPE. However, the studies reviewed in this article have not shown a clear or consistent advantage to BiPAP over CPAP in clinically significant outcomes such as decreased mortality, need for intubation, ICU admission and length of hospital stay.

As a prehospital provider, it is always a good to question yourself, broaden your differential impression for acute respiratory failure and maintain that inquisitive mind. With the evidence reviewed here, the hospital changing your prehospital CPAP to BiPAP every time should not distress you. In the short run, CPAP is just as good as BiPAP. The next time you are faced with a patient with acute respiratory distress, the best thing you can do is relax, remember your training and think about what you can do to best help your patient. If you decide CPAP is the way to go, you now have the evidence to support your decision.

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ABOUT THE AUTHORS

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ACE Inhibitor-Related Angioedema: What You Probably Didn’t Learn in Paramedic Training

ACEI-RA is a different beast, less than responsive to standard pharmacological agents.

By Kristin Spencer, MS, NRP

If I were to ask you to list the treatment modality for angioedema, your list would probably include oxygen therapy, IV, cardiac monitoring, pulse oximetry, capnography, IM epinephrine, corticosteroids, diphenhydramine and, in some cases, rapid sequence intubation. In most cases of an allergy-induced angioedema, your answer would be spot on. Angiotensin-converting enzyme inhibitor-related angioedema (ACEI-RA) is a different beast, however. Before we discuss why ACEI-RA is less than responsive to the standard pharmacological agents listed above, we should cover its epidemiology and pathophysiology.

More than 40 million people worldwide are prescribed ACE inhibitors, and chances are several of your previous patients have been taking them for heart failure or hypertension. ACE inhibitors are the drugs that end in the familiar -pril: lisinopril, captopril and enalapril, for example. Like any prescription medications, there are potential side effects from ACE inhibitors, angioedema being one of the most serious.

Angioedema is estimated to occur in 0.1%–0.7% of patients on ACE inhibitor therapy. Of those who present to an emergency department with angioedema, 35% of cases are attributed to ACEI. Additionally, one study concluded that African-Americans are three times more likely to develop ACEI-RA within six months of starting ACE inhibitor therapy.

The most common signs and symptoms of ACEI-RA are mild and may not even be reported by the patient; in other cases the situation can be life-threatening. According to the Journal of Emergency Medicine (2011), the most common sign of ACEI-RA is asymmetric (and isolated) swelling of the lips and face, although cases of isolated swelling have been documented in the small bowel, genitals, uvula, tongue and floor of the mouth. Urticaria is usually absent. Unlike other types of allergic reactions that can occur rapidly and aggressively, several studies have shown ACEI-RA can occur with those who have been taking ACE inhibitors for weeks, months, even years.
Most cases of angioedema are mediated by IgE antibodies—the endogenous antibodies that attack seemingly innocuous allergens (antigens) in those with type I sensitivity reactions. Insect stings, seafood, pollen and some medications are frequently associated with IgE-mediated allergic reactions. IgE antibodies have a high affinity for mast cells and basophils, and when bonded together result in the formation and subsequent release of chemical mediators. Of course, the chemical mediator closely examined in the paramedic curriculum is histamine. Histamine causes its effects by binding to H1 and H2 receptors that cause contraction of smooth muscles of the airway and GI tract, increased vascular permeability, vasodilation, enhanced mucus production, pruritus and gastric acid secretion. Translated, a histaminergic-mediated angioedema means your patient with allergy sensitivities could present with a runny nose, conjunctivitis, nausea and vomiting, diarrhea, bronchoconstriction, increased bronchial mucus secretions, generalized swelling, urticaria/蕁es and hypotension—a multisystemic reaction. Again, angioedema induced by histamine will respond to conventional therapies like antihistamines and corticosteroids, pharmacological agents commonly emphasized in most paramedic curricula.

Interestingly, ACEI-RA is not IgE mediated; the physiology of the condition is caused by the levels of the blood vessel-dilating peptide bradykinin in the body.1,2 Bradykinin counterbalances the vasoconstrictive workings of the renin-angiotensin-aldosterone system and is thought to be a primary mediator in nonallergic angioedemas. There are two kinds of bradykinin receptors: B1 and B2. When bradykinin binds with these receptors, increased vascular permeability and isolated, nonpitting edema occurs. Gloopusitis is frequently seen. Given the pathophysiology behind ACEI-RA, you can now understand why conventional interventions for angioedema probably will not work with these specific cases.1,2

Safety is one of the biggest concerns in EMS when handling a patient. Making sure the patient is comfortable is another focal point. Mangar International’s Elk Lifting Cushion helps providers cover both of those areas.

The compact, battery-powered cushion inflates with the push of a button to help patients reach a seated position, making it easier for them to stand.

Chris Mulberry, assistant chief paramedic of Platte Valley Ambulance Service, says his agency has been using the lifting cushion and is very satisfied with the results.

“The nice part is that it’s not big and it’s not heavy,” Mulberry says. The cushion applicable for use on patients of any age.

Chris Lokits, of Louisville Metro EMS says the lifting cushion is “a blessing.”

“Being by myself doing lift assist, I was confident that I could successfully get the patient up without hurting them or myself,” Lokits says.

Mulberry says the cushion is especially useful when handling older patients.

“With elderly people, some have more fragile skin because they’re on certain medications,” Mulberry says. “The cushion makes it more safe and more comfortable, and makes it so you’re not just grabbing or yanking.”

Lokits says some elderly patients had concerns at first that the cushion was not stable, but after some explanation and doing his best to keep the patient stable, those concerns subsided.

The lifting cushion also allows the provider to come in less contact with any bodily fluids or waste from a patient because it requires less contact, Lokits says.

Prior to using the Elk Lifting Cushion, Mulberry says his agency just lifted patients manually. “I believe this device will pay for itself in the long run with a decrease in IODs and workman’s compensation claims,” Lokits says.

“The device provides additional safety for the crew, not to mention the safety provided for the patient we are lifting.”

Mulberry also says the device is durable.

“When you see the pictures, it doesn’t look too rugged,” Mulberry says. “EMS people are hard on equipment, but this product stands up to any EMS use.”

Lokits says the majority of the device is easy to clean when using the appropriate cleaner.

To learn more about the Mangar Elk Lifting Cushion or other products, visit mangarusa.com.
How to Proceed
So what do you do? Do you not treat the angioedema? Of course you do. Most cases of angioedema are not caused by ACE inhibitors, and it may be difficult to make a precise correlation between the two. If you’re a person who would prefer a specific treatment algorithm for ACEI-RA or a definitive diagnostic test, you will be disappointed.

When assessing a patient with upper airway obstruction/edema, conduct a fastidious yet rapid exam. Identification regarding its etiology is extremely time-sensitive, especially when dealing with ACEI-RA. For purposes of this discussion, the upper airway is defined as the conduit from the nose and mouth to the larynx.

You’ve probably heard it, but it bears repeating: Avoid approaching your patient with tunnel vision. Not all cases of angioedema are secondary to shellfish, hymenoptera stings or penicillin, so keeping a broad list of differentials is important. You must weigh the likely causes of upper airway obstructions considering age, medical history, recent events and physical examination. For example, you would not diagnose a young patient with a history of fever, dysphagia, sore throat and drooling as ACEI-RA.

There are multiple causes for upper airway swelling—some are progressive and potentially lethal, some more benign. Through your physical examination and history-taking, you can rule out some of the more common differentials. See box.

Understanding the underlying causes of common upper airway obstructions and identifying life threats is paramount, as treatment modalities differ. You would not treat a patient with massive maxillofacial injuries as you would a patient presenting with anaphylaxis, epiglottitis or croup. Although the endpoint may be the same in most airway management challenges (i.e., oral intubation), patients with ACEI-RA may be nonintubatable through the oral cavity; glossitis may be severe enough to make the mouth impenetrable with an OPA, endotracheal tube, LMA, Combitube or King. (As a side note, although glossitis may look outlandish, the larynx may not be affected, and the patient can still move air.) If the patient needs ventilatory assistance, perform BVM ventilations while simultaneously watching the rise and fall of your patient’s chest to ensure adequate tidal volume. Observe SpO2, the patient’s color, mental status, heart rate and EtCO2—you may respond surprisingly well. It would be difficult to justify performing, say, a surgical airway when assisted ventilations prove beneficial.

Causes of Upper Airway Swelling
• Burns;
• Epiglottitis;
• Laryngotracheobronchitis (croup);
• Massive maxillofacial trauma;
• Acute laryngeal injury;
• Ludwig’s angina;
• Laryngeal stenosis;
• Laryngeal tumors.

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ure. If you anticipate a difficult intubation (e.g., stridor, hoarse voice, uncooperative patient showing signs of imminent airway closure) when you have a contraindication and viable alternative, RSI can be very beneficial in some places, rapid sequence induction nasotracheal route may be your only option, a scenario may arise where using the nasotracheal route. Although it’s becoming more common, orotracheal intubation is successful in 97% of airway management cases, leaving only 3% of patients requiring immediate cricothyroidotomy. However, don’t let these numbers fool you into thinking I will never get that patient. You may get “that” patient and should always be prepared to perform this procedure if the worst-case scenario falls in your lap. Practice surgical airways frequently.

Once you have determined, through ruling out various differentials, that ACEI-RA is the probable etiology for your patient’s airways obstruction, examine the airway and act accordingly based on the patient’s presentation. Your ultimate treatment goal is more than managing the airway through basic or advanced devices; attempts to abate airway swelling through pharmacological agents are also vital.

- Corticosteroids (e.g., prednisone, methylprednisolone; class indeterminate);
- Cardiac monitoring;
- Racemic epinephrine;
- Epinephrine 1.000, 0.3–0.5 IM, repeat if needed.

Examining the list above, you may question why histaminic antagonists and epinephrine are included as part of the suggested treatment plan for ACEI-RA, given histamine release is not the triggering agent. Epinephrine is administered primarily for its alpha-1 properties; the vasoconstrictive actions may reduce swelling in the affected areas, although several case studies have shown less impressive results when using epinephrine for bradykinin-mediated angioedema. Histamine blockers are generally useful if the source of the angioedema is either histaminic-induced or unknown. It is reasonable to administer H1 and H2 blockers for angioedemas of unknown etiology because the side effects of unknown etiology make—they always come down to the ABCs.

Conclusion
Although ACEI-RA is rarely examined in either initial or ongoing paramedic training, airway management is. If your patient shows signs of airway closure or indicators that airway compromise is imminent, be aggressive in securing the airway before it becomes impossible. Although basic maneuvers such as the insertion of an NPA and BVM ventilations may prove successful, watch your patient closely to determine how he/she is trending. Complete airway obstruction secondary to laryngeal edema may occur rapidly and unexpectedly. Immediate intubation, by either the oral or nasal route, RSI or, in extreme cases, cricothyrotomy, may be required. With those suspected of ACEI-RA, this fundamental training may very well be the most important intervention we can make—after all, it always comes down to your ABCs.

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**ABOUT THE AUTHOR**
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Oxygenate and Resuscitate
Before You Intubate

Case #1
You are dispatched to a call for a 16-year-old female patient with a chief complaint of possible anaphylaxis. Upon arrival you find the patient lying supine in the front yard with a crowd of bystanders huddled around. The patient is not alert to even painful stimulus, and her breathing is shallow and laboring at a rate of 34 a minute. Her skin is pale, and her lips appear cyanotic. Her initial oxygen saturation reads 75%.

You instruct your partner to bag-mask ventilate the patient as you quickly move her to the ambulance. At a rate of 18, your partner places the endotracheal tube, the patient’s mental status, you decide to intubate. The paralytic is prepped and ready, and IV access has been obtained. You instruct your partner to bag-mask ventilate the patient to improve the oxygen saturation as you administer your induction agent followed quickly by your paralytic. The patient’s oxygen saturation begins to fall rapidly as you attempt intubation, but you secure the airway with the help of a gum elastic bougie. Intubation is confirmed via waveform capnography and bilateral breath sounds. Soon after intubation the patient goes into a bradyasystolic arrest and cannot be revived. What happened? How could this have been prevented?

Case #2
You are dispatched to a call to your local nursing home for a 64-year-old patient with altered mental status. Upon arrival you find the patient lying supine in bed with a nasal cannula placed in her nares, set at a flow rate of 2 lpm. The patient is responsive to painful stimulus, and her skin is pale and hot to the touch.

The staff informs you she has had a recent diagnosis of pneumonia and has become increasingly altered since this morning. They report her temperature is 102.3ºF and that she is normally alert and oriented to person, place and time. You quickly obtain a set of vital signs, which reveals the patient is tachycardic at a rate of 108 and tachypneic at a rate of 36. Her oxygen saturation is 82% on 2 lpm of oxygen, and her blood pressure reads 82/56. You place a nonrebreather on the patient at 15 lpm and obtain IV access as well as a 12-lead ECG.

The 12-lead shows a sinus tachycardia, and the oxygen saturation does not improve at all. You remember reading somewhere about using a high-flow nasal cannula to improve oxygenation, so you turn up the patient’s cannula to 15 lpm, along with the nonrebreather. This only improves the saturation to 84%, so along with the patient’s mental status, you decide to intubate.

Your equipment is prepped and ready, and IV access has been obtained. You instruct your partner to bag-mask ventilate the patient to improve the saturation as you administer your induction agent followed quickly by your paralytic. The patient’s oxygen saturation begins to fall rapidly as you attempt intubation, but you secure the airway with the help of a gum elastic bougie. Intubation is confirmed via waveform capnography and bilateral breath sounds. Soon after intubation the patient goes into a bradyasystolic arrest and cannot be revived. What happened? How could this have been prevented?

Oxygenation and Ventilation
Proper airway management is a fundamental skill in which every emergency care practitioner must be proficient. The two cases illustrated above, while different, occur in both hospital and prehospital arenas every day. Whether you are a paramedic, EMT, nurse or physician, it is imperative to have a firm understanding of both basic and advanced airway management.

Concepts such as delayed sequence intubation (DSI), apneic oxygenation and the use of supraglottic airways have broadened our medical armamentarium and helped improve patient outcomes. It is important to understand that not every airway case is the same, and there is no one treatment modality that works for every clinical situation.

If we are to truly “do no harm” for our patients, we have to understand the pathophysiology of those treatments as well as the end goal of oxygenation and ventilation. Before exploring these common pitfalls sometimes associated with our interventions, we must first discuss the principles behind oxygenation and ventilation.

Oxygen is transported in the body in two ways. Approximately 97% of it is bound to hemoglobin, while the remaining 3% is dissolved in the blood plasma.

Ventilation is the process by which we move oxygen from the environment into the body and the process of exhaling the byproducts of cellular respiration, mainly carbon dioxide.

In the prehospital environment we can measure oxygen saturation status via pulse oximetry. An acceptable range on the patient breathing room air is 95% or greater. Keep in mind that pulse oximetry only measures the amount of oxygen bound to the hemoglobin molecule and not the actual percentage of hemoglobin in the body. Anemic patients can show an oxygen saturation well above 95% and yet still be clinically hypoxic due to the lack of hemoglobin that can carry oxygen molecules.

Increasing our FIO2 (fraction of inspired oxygen) typically is the fastest way to correct hypoxia. During procedures such as RSI, we preoxygenate our patient with 100% oxygen, ideally for three minutes, to increase the amount of oxygen in the lungs, thus building a reserve. By filling every available functional alveoli in the lung with oxygen, we extend the time it takes before our patient becomes hypoxic.

As oxygen diffuses across the alveolar capillary membrane, it is bound to deoxygenated blood returning from the right side of the heart. This oxygen-rich blood can now be pumped out by the left side of the heart into the systemic circulation to diffuse into tissue cells and complete the process of cellular respiration.

One of the byproducts of cellular respiration is the production of carbon dioxide. Once again, blood returning to the right side of the heart is rich in carbon dioxide. This CO2 now diffuses across the alveolar capillary membrane into the lungs, where it is exhaled to the external environment. Many factors, such as cardiac output, percentage of hemoglobin, and certain disease processes such as pneumonia and acute respiratory distress syndrome (ARDS), can influence this process of oxygenation and ventilation. It is beyond the scope of this article to discuss every possible factor that influences cellular respiration, but this simplified explanation given above lays a foundation as we further explore three pitfalls that providers sometimes make in regard to positive-pressure ventilation and how to correct them.

Three Pitfalls
Overzealous bag-mask ventilation
Bag-mask ventilation is a cornerstone of basic life support. It is often one of the first airway skills we learn as
increase intrathoracic pressures, thus decreasing cardiac arrest shortly after intubation and positive-resulting in an undesirable outcome. Hypotensive to begin with. Any further drop in pre-
pressures. This is exactly the opposite of what we will also cause a resultant drop in cerebral perfusion venous return and left ventricular filling pressures. 

As illustrated in Case #2 above, the patient was hypotensive to begin with. You were ventilating at a tidal volume of 700 ml, this would be around 4–5 breaths. At increased FiO₂ (fraction of inspired oxygen), the number of breaths needed to maintain an acceptable PaO₂ is decreased further (see Figure 3). While many other factors can influence oxygenation and cellular respiration, such as acid-base balance, physiological and anatomical shunts, and cardiac output, the take-home point is that faster ventilations are physiological and anatomical shunts, and cardiac output, the take-home point is that faster ventilations are

Improper mask seal The inability to obtain a proper mask seal can be the difference between oxygenating your patient or not. Prehospital and emergency care providers are typically taught a variety of methods for obtaining a mask seal, including the E-C technique. Much of what we learn in terms of airway management comes from experience and the practical application of taking care of patients. Many of the desired outcomes—such as oxygenation, ventilation, and perfusion—can be achieved through proper mask seal placement. A proper mask seal is one that is comfortably and securely placed on the patient’s face and fills the entire nasopharyngeal space without any leaks. When a proper mask seal is achieved, the airway is effectively occluded, allowing for adequate ventilation and oxygenation. A good mask seal will also help to prevent ambient air from entering the airway, which can dilute the inspired oxygen and reduce the effective FiO₂. In addition, a proper mask seal will help to prevent gastric insufflation, which can occur when the stomach is not effectively sealed from the airway. 

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from techniques used in the operating room. The difference between us and providers in the OR is that they perform this procedure many times daily over many years and develop mastery of it. We may go many shifts before we are called upon to mask-ventilate someone, causing skill retention to erode.

For the typical street paramedic or nurse in the ED, any break in the mask seal will negate any benefits to oxygenation due to entrainment of room air and a loss of high-flow oxygen. The addition of a high-flow nasal cannula under the mask can provide a continuous source of oxygen, even when the bag is not being squeezed.9

While there are many factors that can influence the oxygenation of your patient, collapsed and inefficient alveoli are one culprit when the administration of high-flow oxygen does not work. Positive-pressure ventilation can help achieve this, but only with a good mask seal.

An alternative way for obtaining a proper mask seal is called the thenar eminence technique or, more simply, the “two thumbs down” technique.10 This is done by placing your two thumbs down against the edge of the mask and performing a jaw thrust to lift the face into the mask (see Figure 2). A first provider is designated to squeeze the mask, while the second holds the seal. This works well because it incorporates the strongest parts of your hands to hold the seal while allowing you to detect the slightest mask leak and adjust accordingly.

Focus on intubation before resuscitation

Another possible pitfall that emergency providers can make is becoming fixated on securing an airway as fast as possible, while ignoring the physiological derangements the patient is showing.11 We should always take a step back and view the patient’s entire clinical picture before rushing in to place an endotracheal tube. The acutely decompensating patient with shock, whether from a hemorrhagic or cardiac etiology, may need to be stabilized first. Hypotension due to volume depletion or a failing pump only increases our possible adverse events from intubation.

As discussed before, intubation and positive-pressure ventilation increase intrathoracic pressures and will decrease preload. With decreased preload comes decreased left ventricular filling pressures. All of this sets the patient up for hypotension and possible cardiac arrest.

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Many medications used in the practice of RSI can also decrease preload and cause respiratory depression, further increasing our risk of an untoward event. BLS maneuvers such as the administration of high-flow oxygen and proper bag-mask ventilation should always be performed prior to intubation. Use slow, easy breaths, as discussed above, and administer a fluid bolus to increase volume status and stave off intubation-related hypotension. The administration of fluids will increase intravascular volume, thus increasing right ventricular preload to the heart. If the patient is in cardiogenic shock, vasopressors such as...
pressors are a relatively new treatment modality in the prehospital setting. If time allows it, push-dose pressors may be an option.12 Push-dose pressors are generally given in the form of a bolus, with the intent to rapidly increase blood pressure. One advantage of push-dose pressors is that they can be administered quickly and easily, even in situations where the patient is hypotensive and in the process of being intubated. However, it is important to note that push-dose pressors are not necessarily the first line of treatment for hypotension. It is crucial to always follow your local protocols and guidelines when administering pressors.

Conclusion

Now we can apply what we’ve learned to the cases above. In Case #1 you recognize that your partner is ventilating too fast. You instruct him to slow down and squeeze the bag with slow, easy breaths. You also have an engine crew member assist your partner using a twoway BVM technique. The addition of a high-flow nasal cannula under the mask helps to improve oxygenation as well.

Before stopping ventilations to intubate, ensure apneic oxygenation can sometimes be just as dangerous as advanced airway maneuvers and have a methodical plan in place to deal with these situations. You instruct him to slow down and squeeze the bag with slow, easy breaths. You also have an engine crew member assist your partner using a two-way BVM technique. The addition of a high-flow nasal cannula under the mask helps to improve oxygenation as well.

Before stopping ventilations to intubate, ensure apneic oxygenation via high flow nasal cannula is applied.

as norepinephrine or dobutamine can be started and the patient is further stabilized before proceeding with your RSI. If it is imperative to intubate immediately and your medical direction allows it, push-dose pressors may be an option.12 Push-dose pressors are a relatively new treatment modality in the prehospital setting. If time allows it, push-dose pressors may be an option.12 Push-dose pressors are generally given in the form of a bolus, with the intent to rapidly increase blood pressure. One advantage of push-dose pressors is that they can be administered quickly and easily, even in situations where the patient is hypotensive and in the process of being intubated. However, it is important to note that push-dose pressors are not necessarily the first line of treatment for hypotension. It is crucial to always follow your local protocols and guidelines when administering pressors.

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As you intubate, you notice substantial swelling of the oropharynx, but intubation is successful with the aid of a bougie. En route, you continue to monitor the airway and start the patient on an ephrine drip. Upon arrival at the hospital, it is determined the patient had a life-threatening anaphylactic reaction, and she is further stabilized.

In Case #2 you realize the patient may be septic and her hypotension needs to be further stabilized before proceeding with intubation. You administer a 500-ml fluid bolus as you maximally oxygenate the patient with high-flow nasal cannula and a nonrebreather. As a precaution you draw up a push-dose pressor of epi in case the patient’s blood pressure does not respond to the saline bolus.

Her saturation does not respond to high-flow oxygen, so you decide to quickly move to assisted ventilations with a BVM and a two-person mask seal. A nasopharyngeal airway and jaw thrust is also added to maintain airway patency. The patient’s blood pressure improves after administration of the fluid bolus and with the oxygen saturation. With the patient’s hypotension and oxygenation status corrected, you can now safely intubate. Intubation is successful, and the patient is transported to the emergency department, where a diagnosis of bilateral pneumonia and sepsis is confirmed. The patient spends several days in the ICU and is eventually extubated and discharged.

In conclusion, it is important to understand our patients’ physiological state and how it relates to the procedures we perform. We must first realize that oxygenation and ventilation are our main goals, not necessarily placing an endotracheal tube. We should understand that basic airway maneuvers such as bag-mask ventilation can sometimes be just as dangerous as advanced airway maneuvers and have a methodical plan in place to deal with these situations.

So remember, the next time you are faced with an airway emergency, think resuscitate and oxygenate before you intubate!12

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Beyond pain, emotional and psychological needs can help drive pseudoaddictive behaviors.

Opioid Dependency
The Substance Abuse and Mental Health Services Administration estimates that approximately 6.9 million people in the U.S. are dependent on or abusing prescription drugs. Community paramedics (CPs) working in programs designed to reduce 9-1-1 utilization or 30-day readmissions are likely to encounter this population of patients regularly. Yet, very little formal education is available to help CPs understand the nature of prescription drug dependency. This article will introduce the types of drug dependencies and the resources most likely to help patients suffering with addiction.

Common prescription opioids include hydrocodone (Vicodin), oxycodone (OxyContin, Percocet), morphine (Kadian, Avinza), codeine and similar drugs. These drugs work in part by blocking certain pain receptors, activating the mesolimbic (reward) system of the brain and creating a sense of euphoria. Opioids not only control the physical pain associated with an injury, but also alleviate the mental stress that both acute and chronic pain can produce. Unfortunately, the body soon develops a tolerance to opioids that requires the patient to take higher doses of the drug to achieve the same effect. Compounding the issue is the paradoxical effect opioids have on the perception of pain. Patients undergoing opioid therapy often suffer from opioid-induced hyperalgesia, which actually increases their sensitivity to pain. There are several theories about the molecular mechanisms involved, but the result is that the patient may require higher and more frequent doses of the opioid to achieve a pain-free state. Escalating the dose of opioids to counter the patient’s increased tolerance or hyperalgesic state increases the risk the patient becomes physiologically dependent on the drugs to function. Opioid dependency occurs when the patient experiences symptoms of withdrawal when the opioid levels are reduced. However, having a high tolerance to the medication or being dependent on opioids does not necessarily mean a person is addicted to their prescriptions. According to a joint policy statement issued by the American Academy of Pain Medicine, American Pain Society and American Society of Addiction Medicine: “Addiction is a primary, chronic, neurobiological disease, with genetic, psychosocial and environmental factors influencing its development and manifestations. It is characterized by behaviors that include one or more of the following: impaired control over drug use, compulsive use, continued use despite harm, and craving.”

Margaret was 74-year-old woman who lived alone in an apartment in a low-income senior high-rise. What little “help” she received was from a daughter who lived nearby but whom Margaret suspected of stealing her medications and money. As with many of our patients, Margaret had been dealing with a history of serious medical issues—high blood pressure, a dysfunctional thyroid and a heart bypass. She was simultaneously battling anxiety and depression that had been untreated for years. But it was the relentless and excruciating back pain that began after a back surgery 10 years ago that kept bringing her back to the emergency department.

The only thing that killed the pain was opioids. Most days Margaret would lie in bed all day, only getting up to take another pain pill. When the pain wasn’t being anesthetized by the pills (or if she ran out), she would head back into the emergency department to find comfort. At first we assumed she used the medications to control her back pain. However, the longer we worked with her, the more evident it became that the pain pills were also her only way of coping with her emotional pain.

Margaret told the community paramedics that the only thing that killed the pain was opioids. Most days Margaret would lie in bed all day, only getting up to take another pain pill. When the pain wasn’t being anesthetized by the pills (or if she ran out), she would head back into the emergency department to find comfort. At first we assumed she used the medications to control her back pain. However, the longer we worked with her, the more evident it became that the pain pills were also her only way of coping with her emotional pain.

Margaret told the community paramedics that she may have gone to the hospital two, maybe three times a month to seek relief for her pain. Different sources confirmed she was actually going to various local hospitals 2–3 times a week. Some days Margaret would be discharged home from one hospital in the morning, only to end up at a different hospital later in the day. Many of those same sources told us she had been labeled as a classic “drug-seeker.”

Editor’s note: In 2015 EMS World published a series looking at key aspects of establishing mobile integrated healthcare and community paramedic programs in EMS. This series continues in 2016 with coverage of clinical issues and profiles of systems that have moved beyond the early stages and contended successfully with more advanced issues. Magazine articles will be supplemented by additional content on EMSWorld.com. If your system has an MIH-CP program, let us know your experiences at jerch@emscom.com.
Patients with chronic pain are vulnerable to undertreatment, as providers fear promoting an addiction.

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ABOUT THE AUTHORS

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[Image of conference brochure]
Providing medical and rescue services to the offshore oil industry is a massive mission.

Vital Statistics

It is licensed in the state of Louisiana as an air ambulance, but this is not your typical air ambulance—not in its size or the scope of its mission. Its fuselage is 56 feet long with a rotor diameter of 56 feet. Its maximum weight is 26,000 lbs. The cabin is 20 feet long, six feet wide and six feet high. It has a maximum speed of 190 mph. Its mission is to provide medical and rescue services to the offshore oil industry in the Gulf of Mexico.

CHI SAR crews train to hoist from land, open water and ships.

Cover Report by Barry D. Smith

Photos by Barry Smith
The contract covers personnel on oil platforms, the ships that supply the platforms and the helicopters that transport the workers to and from the platforms. Containing one of the world’s largest oil fields, the Gulf of Mexico has about 5,000 oil-related structures, supported by dozens of supply ships and a fleet of over 400 helicopters. In 2014 these helicopters made 740,000 flights over the gulf and transported two million people offshore.

“We use the S-92 because of its range, speed and payload capabilities,” explains David Jacob, CHI’s director of offshore operations and a longtime paramedic. “Some of the platforms are 200 miles or more offshore. We can carry a huge amount of rescue gear. Our rescue specialists are certified in vertical rope, confined-space and hazardous-atmosphere rescue. We can also rescue all of the passengers of the largest helicopters used for offshore transport if one ditches in the gulf.”

The S-92 is one of the newest helicopter designs. It has an all-glass electronic display instrument panel that incorporates the latest flight control, navigation, communication and engine systems. The helicopter can perform rescue missions day or night and in bad weather. It has a color weather radar that can also detect oil platforms. It has dual GPS systems for navigation.

It also has forward-looking infrared (FLIR) and low-light television cameras in a gyrostabilized turret. FLIR can be used as an airborne command post for an incident on an oil platform. Its crew can record and transmit imagery, and an oil company representative can be on board and talk with his personnel via the satellite phone in the cabin. They can also use it to see hot spots on an oil platform in case of a fire.

Another feature is a sophisticated autopilot system customized for search and rescue missions. It can automatically come to a 50-foot hover at any location specified by the pilot. Search patterns can be programmed and flown by the autopilot coupled to the GPS system to maximize search coverage. It is also equipped with dual rescue hoists in case one fails.

The facilities at Galliano are high-tech. The hangar is climate-controlled, which is especially important in the summer, with its high temperatures and humidity. The base has its own power supply, and the hangar is rated for a Category 3 hurricane.

**Staffing and Training**

“Acadian Ambulance provides the paramedics for our operation,” Jacob says. “They also provide all the medical equipment, protocols, 24-hour online medical control, and dispatching and flight-following services. We can use Acadian’s aircraft to back us up, and we may handle a local call for them with our AW139. Acadian ground operations span from Mississippi to Texas, so if we need additional equipment or personnel for an MCI, we can get them from Acadian ground ambulances.”

“The flight medics do not go through the rope and confined-space rescue training,” says flight paramedic Anthony Cramer, Jr., who is also an RN. “We do go through hoist training. In water rescues, the rescue swimmer would deploy and bring the patient into the helicopter, where the flight medic would then begin treatment. If the patient is on land, a vessel or an oil platform, the flight medic would hoist down to the victim, as well as a rescue specialist. There are always two people going down to the patient.

“The flight medics have a good working relationship with the rescue specialists. We pretty much live together when we’re on duty. The rescue specialists have a varied amount of medical training. The minimum is EMT, but many are EMTs and paramedics. They can work on the patient under the direction of the flight medic. Since we work so much together, they can anticipate the flight medics’ needs. It is just like a crew in the back of an ambulance.”

“The flight medics work under the same protocols as the Acadian Air Med flight crews, which are pretty extensive. We can do RSI, CPAP and 12-lead ECG, and we carry a ventilator. We can initiate a lot of treatment before arrival at the hospital because of our long transport times. They have a protocol for what they call chemical extraction. They use it in case they have a patient who is trapped by machinery or has a difficult extrication from where they fell. They use etomidate as a hypnotic sedative. The patient isn’t aware and has no memory of the event afterward.

“Our calls run the gamut from trauma to medical,” explains Cramer. “There is a lot of heavy machinery and moving heavy equipment on oil platforms. We have all the medical-type calls found in any community. One of our biggest complaints is chest pain. We do 12-leads and can send them to the hospital while we’re en route. We also carry beta blockers and IV nitrates for STEMI patients. Once the hospital has the 12-lead, the ED doctor and cardiologist decide whether to bypass the ER and send the patient directly to the cath lab when we land. We have done that several times with very good results. If we need to talk with medical control for orders or to contact the receiving facility, we have a satellite phone as part of the communications suite on the helicopter.”

“Acadian Air Med has a QA/QI process, and we are part of that as well. Our charts get reviewed like any other Air Med chart. We can also use the Air Med quality improvement coordinator for advice and opinions on patient care issues that occur. Our flight medics are all very experienced, and most have come from the Air Med side of Acadian. We work seven-on, seven-off, and many work shifts for Air Med to keep their skills fresh.

“An MCI is a real possibility on oil platforms. Do people just need to be moved off transport if one ditches in the water or in danger of sinking? Or was there an event that created a large number of casualties? If there is a medic stationed on the platform, he or she will have done the initial triage by the time the helicopter arrives. If not, we can begin to do the triage and packaging for transport. We might move victims to another close platform with medics.
A Hazardous Environment

OIL PLATFORMS ARE BUILT LIKE ships, with compartments, vertical ladders and complex machinery. Dangerous chemicals and gases like methane and hydrogen sulfide are common, so the rescue specialists can extricate people from hazardous atmospheres with low oxygen using air tanks. They can also do vertical rope rescue for victims of falls or others who cannot use the ladders inside the platforms.

Hoist missions in the water and bayous have their own set of unique hazards. “In addition to looking for the normal hazards for a helicopter hoist operation, we are also looking for natural hazards such as sharks and alligators,” says Mike Fout, a rescue specialist instructor and former U.S. Navy rescue swimmer. “We also look for debris or contaminants in the water. In addition, we have to think about the sea state and water temperature. For contaminants, we will minimize our time in the water and use a direct-deployment rescue method where we’re never unhooked from the hoist cable. We also have dry suits we put on to minimize skin exposure.”

Many of the rescue specialists had this training in the military, but all of them are current with the necessary civilian certifications for these skills. They have to recertify every two years on all of them. They also adhere to international standardized training and hold internationally recognized certifications for their rescue skills. All the paramedics are nationally registered and certified by the states of Louisiana and Texas.

“When we’re first hired, we get qualified in one position on the team, and then we get dual-qualified with time as both hoist operators and rescue swimmers,” Fout says. “The goal is to have all rescue specialists dual-qualified. A new person gets qualified on the aircraft first and then is sent to different rescue schools. We work with Roco Rescue, which specializes in industrial rescue training, for high-angle rope and confined-space rescue training. Medical training is done by Acadian Ambulance.”

There is an instructor cadre that includes hoist operators and rescue swimmers who meet regularly to discuss new gear and new procedures they might want to adopt. If a new piece of equipment looks promising, they will get it and test it both in a static environment in the hangar and then with the aircraft.

The instructor cadre also meets to decide on future training needs, updates that might be needed in the process, and any improvements to the operation they might be able to make. They also look at how other civilian and military rescue units do things to see if they might want to add to or adjust their program.

“We are fortunate enough to have a large cross-section of military rescue experience,” says Fout. “Each brings their own experiences we can look at to see if something would be a good fit here.”

Conclusion

CHI’s S-92 helicopter is a combination rescue truck and critical care transport ambulance. It can handle rescue and medical incidents on ships, oil platforms and in the bayous and open water of the Gulf of Mexico. All of the people interviewed by EMS World said there is no better air ambulance and rescue helicopter anywhere in the world.

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Find Your “Next”
What would you do if you could no longer work in the field?

If you woke up tomorrow and found your job was no longer there, or that you could not do the work, what would you do?

I cannot remember the last time I considered a role outside of EMS, or even different from what I have been doing. All my marketable skills tie back to EMS and the work I’ve done there. My options are limited. I have no “next.” The reality is that my strongest days may be behind me and one can only climb in and out of ambulances for so long.

As young providers we are resilient, enthusiastic and, with that patch on, we come dangerously close to believing ourselves invincible. Time and circumstance teach us otherwise on all counts. If you are careful and fortunate enough to escape injury, age remains the great equalizer. At some point double shifts are no longer a minor thing and a night of posting in an ambulance has you reaching for the Advil.

Adventures for the midlife medic come with recovery time and the realization that this is not a job that you can do forever.

Today the world of EMS is more than taking the patient to the hospital. Taking care of the sick and injured remains at its core, but as this still-young career field evolves there are new paths and opportunities that play an integral role in the effective delivery of care on a much broader scope.

What are you going to do when you cannot lift that stretcher anymore? Are you prepared to work outside of an operational role? Do you have a secondary skill set or an interest in areas outside of patient care?

Many of us began and remain in the field because we love the work. We should think ahead and understand our importance to the new providers that will come after. There is an absolute need for mentorship in this field that revolves around the human experience, things that have nothing to do with algorithms or dosages. Yet we lose priceless providers every year to injury or age, because there was either no mechanism in place for them to change their role or they were unwilling to consider it because they felt it was boring or beneath them—that it made them “less” than what they were.

Today’s EMS has avenues in leadership, emergency management, education and communication. If you have ever had an interest in any of those areas, did you pursue it? Everything from awareness level classes to certifications to college degrees are available in each of these arenas. A few hours out of your week might pique your interest and help you find an inroad into another component of the work you already love. Do not assume that because you are a good provider you are good at anything else, it takes work.

Communication is both an art and a science. Just because you can’t lift a stretcher does not mean you can’t lift a mic. Dispatching requires training, patience and the ability to multitask on a different level.

“How can’t you teach?” There is some nonsense right there, because the reality is that, “Most that can do can’t teach very well.” Learning how to educate is as important as the material you’re providing.

Emergency management in today’s world leads people to experience disaster planning, grant writing and public health. These are not small skills and can carry you effectively through to a lifelong career in this field that you love. Look at the clock, look in the mirror and ask yourself what you have done to prepare for the next phase of your life or career.

Me? I talked to my husband, reworked my budget, quit my part-time job and enrolled in school to finish my bachelor’s. I looked ahead, beyond the next class or next shift, and realized that the only thing that could change was me.

It is one year later, and I am four terms shy of my bachelor’s degree. I spent time on myself and looked outside of my box and confronted unique midlife fears about becoming obsolete and feeling past my value. Now I am about to embark on the biggest adventure of my life and career as I take my family and my experience across the continent to try my hand at EMS in America’s last great frontier, Alaska, working as a battalion chief for Matanuska-Susitna (Mat-Su) Borough EMS in Wasilla.

I am far from where I started when I was 18 years old and as invincible as my patch. However, I’ve also learned that I am far from being done—there is an entire field out there with room for growth and maturity.

What’s your “next”?

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