THE JOURNAL OF THE MINNESOTA MEDICAL ASSOCIATION

MINNESOTA MEDICINE

MAY 2015

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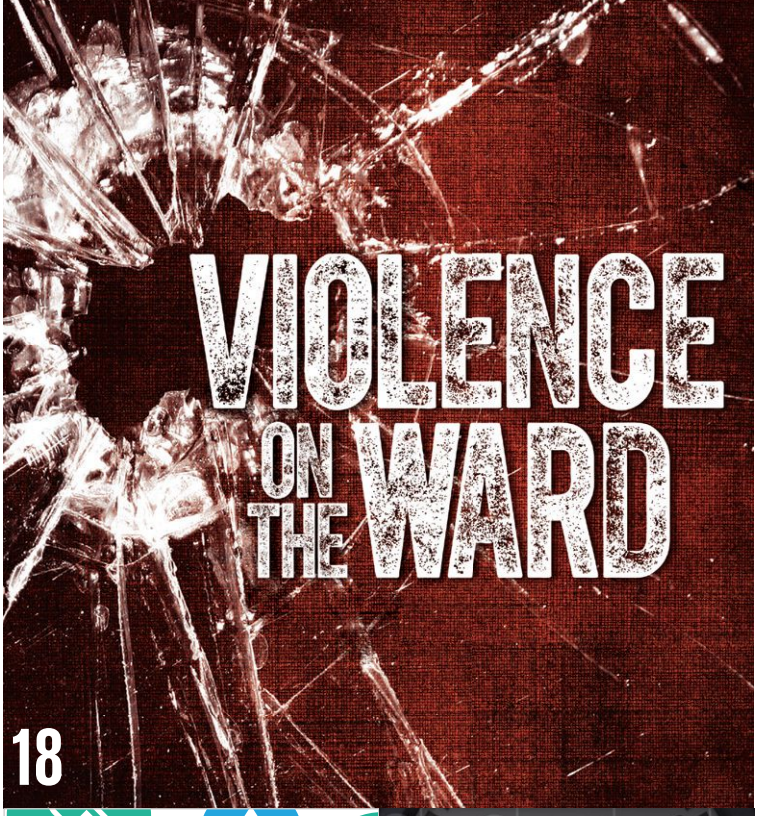

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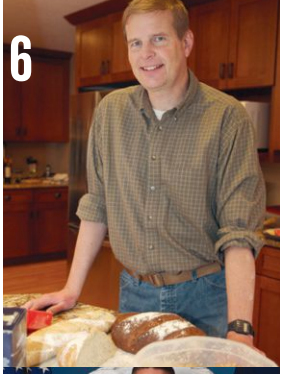

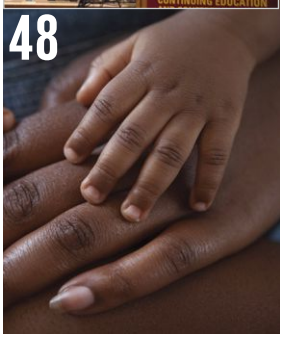

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PHOTO BY SCOTT WALKER

Charles R. Meyer, MD, Editor in Chief

Medicine's thrill-seekers

ER doctoring is excitement, exasperation and exhaustion.

Emergency medicine doctors ought to like roller coasters. Their frequently quiet early mornings are like the slow climb to the top of the ride with a second or two to enjoy the view. Then comes the stomach-losing swoop to the bottom of the first hill as the EMTs roll in with a cardiac arrest. A neck-snapping turn follows quickly as a GI bleed arrives. There are many more climbs and dives and wrenching turns before the end of a shift in the ER. Adrenaline-depleted, they leave the amusement park only to return the next day to hop in the car for another ride. ER doctoring is excitement, exasperation and exhaustion.

Which is why I've always thought of emergency medicine as a young person's sport. I can count on one hand the number of emergency medicine docs I know who are even approaching 60. The acuity of the patients and the rigor of the schedule are guaranteed to give even the hardiest of physicians serious thoughts about early retirement.

Not only are many of the patients they see quite ill, most are unknown to them as well. Although computerized medical records fill in some of the blanks and although the recidivists get to be familiar faces, for doctors in the ER most patients are one night stands whom they treat and dismiss, never establishing any kind of long-term relationship.

While it's tough to do much about the acuity of conditions and the unfamiliarity of the patients, medical groups and hospitals are tweaking schedules in recognition of the energy-sapping, mind-numbing effects of shift work. The "just suck it up" attitude of yesteryear is being replaced by understanding that sleep disruption and deficits do bad things to physician performance, which can lead to bad results for patients. Working in the ER requires alertness and mental agility, and schedules that recognize sleep needs should help.

Being on the frontline of medicine also can mean having to protect oneself and one's team members, as the incidence of violence in health care settings rises, with the ER being the epicenter. Realizing that their obligation to their workers goes beyond 401Ks and good health insurance, hospitals and other health care employers are attempting to train doctors and other employees in the art of defusing potentially explosive confrontations.

So if you add fear for personal safety to sleep-depriving schedules and a coterie of sick strangers requiring instant attention, it might provoke the question, "Why are so many medical graduates choosing to practice emergency medicine?"

The emergency medicine docs featured in this issue supply some answers. Dr. David Handley sees service in the ER as a contribution to the community. Dr. Keith Lurie looks for opportunities to refine CPR and improve survival. And Dr. Kjell Lindgren sees it as a path toward understanding the way the body behaves in space.

Every practicing physician has roller coaster days, disorienting frenzies of demands and responsibilities that feel more like aggravation than adrenaline rush. But if most of us have Valleyfair kind of days, most doctors in the ER ride the Kingda Ka. **MM**

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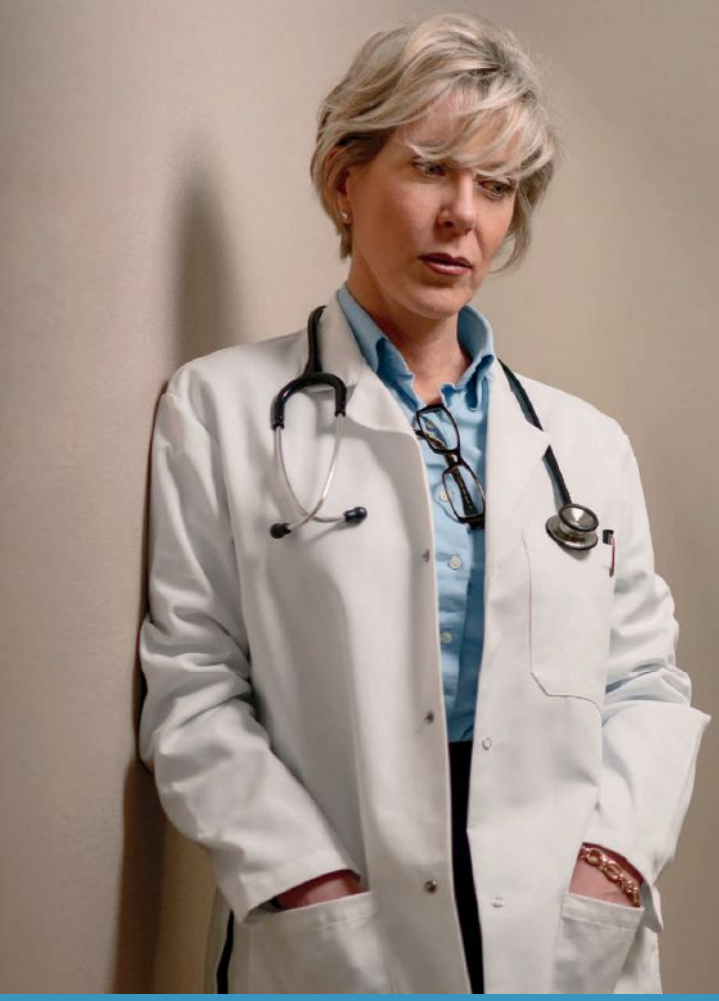
WHAT HAPPENS WHEN THE DOCTOR NEEDS A DOCTOR?



Physicians care for the health of others, but sometimes they may neglect their own health.

Research shows that physicians often don't have a personal physician, have difficulty accessing care in a timely convenient way, experience high levels of burnout, or may be concerned about seeing a colleague in their own practice for confidentiality or other reasons.

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MAYO CLINIC

His daily bread

If David Handley is working the ER at Rochester's Olmsted Medical Center over a weekend, chances are you'll find fresh-baked bread in the break room. Handley, an emergency medicine physician, has become known for his artisanal bread. He's been featured in the *Post-Bulletin* for his craft and regularly teaches bread-making classes through community ed. He bakes about three times a week and maintains a website (artisanbreads123.com), on which he posts some of the recipes he's either developed or adapted.

David Handley, MD, in his kitchen. The emergency physician bakes about three times a week.

PHOTO BY ELIZABETH NIDA OBERT / ROCHESTER POST-BULLETIN

For Handley, baking has been a part of his life since he was a child. His mother was a home economics teacher. "She taught me how," he says. "Her breads and pastries are some of my fondest memories. She did a whole wheat bread at the holidays that I just loved as well as cinnamon twist pastries that I still bake today." Even during medical school and residency, he occasionally found time to make some whole wheat loaves.

"There are a lot of similarities between baking and medicine," he says. "Both are a mixture of art and science, and a lot of variables go into each. But in medicine, you have to live with your mistakes, and in baking, you get to eat your mistakes."

Handley says he got into teaching baking when he realized it would be a way, other than medicine, he could give back to the community. For a number of years, he volunteered at the Salvation Army's free clinic in Rochester, but he grew frustrated. "The patients were a lot of the same ones I would see in the ED, and we had very few resources. I got kind of burned out," he explains.

He now teaches about 12 classes a year on everything from basic bread making to baking for health. During the two-hour sessions, which are held in a high school home ec room, he talks about ingredients (including a "seed of the month"—flax, sesame, chia, pumpkin, "whatever the health experts are talking about at the time"), the history of baking, and the fine points of mixing and fermenting dough. Participants sample loaves he brings to class and take their dough home to finish.

Some of his students have been his co-workers. One is Rochester physician Noel Peterson, MD, whom Handley describes as "an avid baker now." And he's passing his love of the craft on to others in his family. Handley's 26-year-old stepson and 24-year-old stepdaughter occasionally bake. But his 16-year-old daughters "still prefer grocery store bread."

In addition to developing recipes and making bread and pastries, Handley and his wife, Chris, enjoy what he calls "baking tourism." When they travel, they visit bakeries (he often tries to sneak around the back to take a look at the ovens and other equipment).

This summer, Handley says they plan to build an outdoor oven—an extension of another one of his many interests, natural building. He recently constructed an underground barn on his 35-acre property, True Nature Farm (truenaturefarm.com), which is north of Rochester. There he keeps half a dozen goats to clear away the brush. He also cultivates trees that he sells online and operates a pick-your-own blueberry operation. (Handley started out studying plant biology until he realized he wasn't cut out for lab work and decided to become a physician instead.) "I love to explore and see what there is to do in the world," he says. – KIM KISER

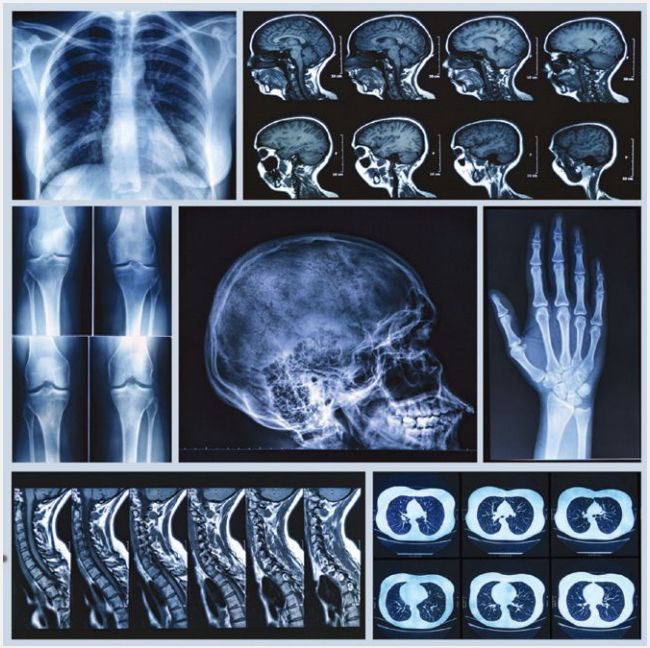
Legal pot, lower opioid death rate

With Minnesota's medical cannabis program poised to launch in July and the state still struggling to combat prescription opioid misuse, this research may be of interest.

University of Pennsylvania researchers have shown that states where medical cannabis is legal have lower opioid overdose death rates. The states where medical marijuana is available have a mean annual opioid overdose mortality rate that is nearly 25 percent lower than the rate in states that do not allow medical cannabis. Moreover, the researchers found that the association between medical cannabis being legal and overdoses from analgesic opioids strengthened over time. That is, there were fewer overdose deaths five years after enactment of legalization than during the first year.

An article on the study, "Medical cannabis laws and opioid analgesic overdose mortality in the United States, 1999-2010," was published in the October 2014 issue of *JAMA Internal Medicine.*

In an invited commentary about the study published in the same issue, Marie J. Hayes, PhD, and Mark S. Brown, MD, of Maine, wrote: "The striking implication is that medical marijuana laws, when implemented, may represent a promising approach for stemming runaway rates of nonintentional opioid analgesic-related deaths. If true, this finding upsets the applecart of conventional wisdom regarding the public health implications of marijuana legalization and medicinal usefulness."



Unnecessary imaging in EDs

A new study suggests overuse of imaging is widespread in hospital emergency departments. The survey of 435 emergency physicians explored their perceptions about the care that is provided in their own hospitals. More than 85 percent said patients in their EDs had received too many imaging tests, and 97 percent said they had ordered at least some medically unnecessary advanced imaging.

Why does this occur? The respondents indicated that fear of missing a diagnosis and of litigation are to blame. When asked which of a list of solutions were "extremely" or "very" likely to reduce unnecessary testing, 79 percent selected malpractice reform and 70 percent increased patient involvement through education. Fewer thought shared decision-making and providing physicians with feedback about test-ordering metrics (56 percent and 50 percent, respectively) would make a difference.

The study, "Emergency physician perceptions of medically unnecessary advanced diagnostic imaging," was published in the March 23, 2015, issue of *Academic Emergency Medicine.*

Exploring the final frontier

Former HCMC emergency medicine resident Kjell Lindgren, MD, will leave for the International Space Station later this month.

As you're reading this, Kjell Lindgren is preparing for his first mission in space. The physician-astronaut is a member of the Soyuz 43 crew, a three-person team that will be joining astronauts already on the International Space Station at the end of this month. He is the only physician on the team.

"This is a dream come true," says Lindgren, who admits he wanted to be an astronaut before he ever thought about becoming a physician. But he saw medicine as a more practical calling. So after earning his undergraduate degree at the Air Force Academy in Colorado Springs and getting a master's degree in cardiovascular physiology at Colorado State University, where he focused on the effects of microgravity on the body, he went to medical school at the University of Colorado.

Lindgren came to Minnesota to do a residency in emergency medicine at Hennepin County Medical Center (HCMC)—he was in the class of 2005. A mentor at the University of Colorado, Michael Yaron, had trained at Hennepin and recommended it. "I went out there and fell in love with the city and people in the program. It was No. 1 on my list when I applied to residencies," he says. He then did a post-doc fellowship and earned a master's degree (both in health informatics) at the University of Minnesota before doing another residency in aerospace medicine at the University of Texas Medical Branch in Galveston.

Last fall, Lindgren returned to Minnesota to speak to EMS medical directors as well as students and staff from HCMC. We caught up with him while his boots were still on the ground to learn how his experience in emergency medicine has helped shape his work as an astronaut.

Why did you decide to pursue emergency medicine as a specialty?

As an undergraduate, I got an EMT certification just to see if I could work in that environment, if I could work around people who were ill or who had suffered trauma. I rode on ambulances and volunteered in the ER in Colorado Springs and other places. I found I really enjoyed serving the community.

So even at the beginning of medical school, I wanted to do emergency medicine. I tried to keep an open mind when going through rotations, but I always came back to emergency medicine.

How does your experience in emergency medicine help you in your work as an astronaut?

There are a lot of things about medicine in general and emergency medicine specifically that translate well into the work I'm

doing now. First you have to work well with people, work well on a team. It's not a one-person show. In space, you have to rely on others. And there's a lot of knowledge you have to soak up and a lot of procedural work. In space, you're in what we call an "operational environment." Decisions have to be made quickly, sometimes with incomplete information, and the consequences of your actions can carry a lot of weight. That applies in the ER, too.

What will you be working on?

There's a study out of Colorado State University looking at telomeres and the effect being in space has on cell aging. We'll be looking at viral latency within the human body, how our immune systems change in space. We're also looking at bacterial virulence in space—what happens to the bacteria that are part of the normal human biome and how and why they change in space.

By the time I arrive, several of my colleagues will be two months into a year-long mission on the space station. They will provide the scientific community with information on the effects on living in weightlessness for an entire year. That will be important as we think about doing long-duration space flights to Mars or beyond.

What will you do during your downtime?

We'll spend two hours a day exercising to maintain bone, muscle and cardiovascular health. We have a little free time in the evening when we can take photos and exchange email with friends and family.

How important is exercise in that environment?

It's something we use as a countermeasure to the changes that occur in the body. If we did nothing, our muscles would atrophy, our cardiovascular system would become deconditioned, our bones would weaken. We have a whole suite of exercises we do, so when we return to Earth we'll have close to the same strength and bone health that we had before we left.

We have exercise machines at the space station—a cycle ergometer, essentially an exercise bike; we have a treadmill; and we have a resistance exercise device. It's not a weight machine, since weight doesn't exist. But it's essentially a universal gym. Resistance is provided by evacuated cylinders. With all those things taken together, studies indicate that astronauts are coming back in better shape now than ever.

What are you most looking forward to?

I'm excited to see what life is like in space. The human body, the human psyche are so adaptable. The fact that we can live off the planet is remarkable. I'm excited to experience that and am looking forward to being able to look back on the Earth. One of my friends is up there now. Every time he sends a picture, he says it doesn't come close to reality. To take that in first-hand will be amazing. – KIM KISER

Arrested development

In March 2015, the director of clinical affairs for Advanced Circulatory Systems, Inc., got a letter from the Food and Drug Administration's Office of Device Evaluation that included the phrase every medical device manufacturer hopes to hear: "We are pleased to inform you …"

The FDA was giving full approval for the Roseville, Minnesota, company's ResQCPR system. Designed for use during cardiopulmonary resuscitation, the system consists of two parts. One is the suction-cup-like ResQPump that allows responders to both pull up on and push down on the chest while administering CPR. The other, the ResQPOD, impedes airflow during the decompression phase of CPR. Used together, the two components generate two to three times more blood flow to the brain and heart muscle than conventional CPR.

PHOTO COURTESY ZOLL MEDICAL.

Keith Lurie, MD, has been working to improve CPR techniques since the 1980s. His ResQCPR system recently received FDA approval.

> "We have the highest survival rate of any state in the country for cardiac arrest."
>
> – Keith Lurie, MD

The letter was good news for the company, which in January was purchased by Massachusetts-based ZOLL Medical Corp. For its founder, Keith Lurie, MD, the FDA's blessing was a very long time in coming. "For about 20 years, we've been trying to get approval for one part of this device combination," says the professor of emergency and internal medicine at the University of Minnesota.

Actually, Lurie has been working to improve CPR even longer. He started his quest in the late 1980s, when he cared for a patient whose family members had used a toilet plunger to resuscitate him. He published a letter to the editor about it in *JAMA* in 1990 that bore the slightly humorous title "CPR: the P stands for plumber's helper."

Lurie, however, saw serious potential in the idea. If you could pull up on the chest with a suction device, you'd create negative pressure in the chest and draw air into the lungs and venous blood back to the heart, allowing it to refill more efficiently. He began experimenting. By 1992, he reported that "active compression-decompression," as he called it, enabled better circulation than conventional CPR. Lurie was on to something.

By the mid '90s, Lurie and Mike Sweeney, MD, an anesthesiologist at the University of Minnesota, were suggesting that impeding inspiration during CPR yielded further benefit. In 1997, Lurie started Advanced Circulatory Systems "against my better judgment, as I really did not want to become a businessman," he told an interviewer in 2010. By 2000, the American Heart Association and the European Resuscitation Council had revised their CPR guidelines, recommending use of inspira-

tory impedance and active compression-decompression devices.

It wasn't until 2011 that the devices were fully appreciated. That year, the *Lancet* published results of the ResQTrial, showing the system improved survival in patients with nontraumatic cardiac arrest from a cardiac-related cause by 50 percent and 33 percent for all causes of nontraumatic cardiac arrest. It had met medicine's gold standard—the randomized clinical trial.

New directions

Lurie and his colleagues at the university have now turned their attention to two new areas that he hopes will further improve outcomes for patients in cardiac arrest. One is gaining a better understanding of what happens when blood is reintroduced to the circulatory system during CPR. "It can cause injury unless you do it smartly," he says, noting that the research on this being led by Demetris Yannopoulos, MD, at the university is still at the animal-testing stage.

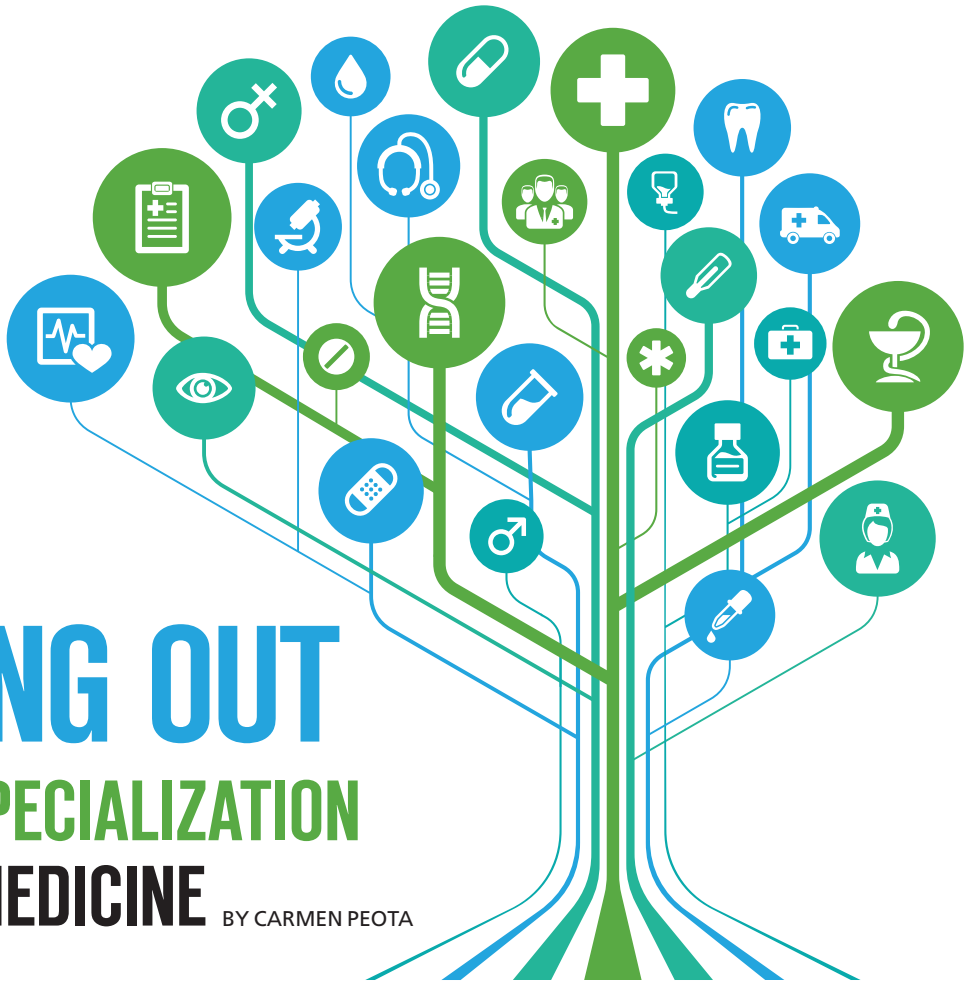
The other is another tweak to CPR—elevating the head of the patient in cardiac arrest by 30 degrees. "If we elevate the head a little bit during CPR, there's a tremendous increase in blood flow to the brain because we drain the venous blood out of the brain each time you decompress the chest," he explains. "This lowers intracranial pressure immediately, thus reducing resistance to forward blood flow." Lurie says researchers at the university hope to start a clinical trial within a year. But he acknowledges it could be many years before this enhancement to CPR is adopted.

Although getting FDA approval for the ResQ system was a lengthy process, Lurie is pleased with the progress. One sign is that in three Twin Cities hospitals new resuscitation devices and techniques are allowing teams to keep blood flowing in patients in cardiac arrest while their arteries are being fixed in the cath lab. "As a result of all this activity over the last 20 years in Minnesota, we have the highest survival rates of any state in the country for cardiac arrest. That's pretty exciting progress from our perspective." – CARMEN PEOTA

MN Resuscitation Consortium

An outgrowth of the research on CPR by Keith Lurie and others in Minnesota is the MN Resuscitation Consortium. Directed by Lurie protégé and colleague Demetris Yannopoulos, MD, the 3-year-old consortium seeks to improve survival from sudden cardiac death in Minnesota by 50 percent by coordinating bystander, prehospital and hospital initiatives.

Education is a major focus of the consortium, and it regularly sponsors "resuscitation academies." The next one will be held June 29-30 at the Variety Club Research Center in Minneapolis. For more information, go to www.mrc.umn.edu/mnresuscitationacademy/index.htm.



BRANCHING OUT

A LOOK AT SUBSPECIALIZATION IN EMERGENCY MEDICINE

BY CARMEN PEOTA

When he's teaching emergency medicine residents about airway management, Jeffrey Ho shows them how it's done under optimal conditions. "We teach in a room with good light, with the patient at the correct height, where there's access to resources and nurses," he says. But as the medical director of emergency medical services (EMS) for Hennepin County Medical Center (HCMC) knows, the conditions in which prehospital responders work are never like that. So when he teaches airway management to his EMS fellows, Ho shows how it can be done on the floor, outside, alone and with portable equipment.

Back in the mid-1990s, when Ho was the first fellow in HCMC's EMS program (today, he heads it) and EMS was not yet a formal subspecialty of emergency medicine, it was already becoming clear that there was a separate body of knowledge pertaining to EMS. It gained official subspecialty status in 2010.

EMS is of several emergency medicine subspecialties to be formally recognized by by the American Board of Emergency Medicine (ABEM) in recent years. (See box for full list.) A number of others are seeking that status. As the specialty, which emerged in the 1970s, is "hitting its stride," Ho says, it would appear emergency medicine is branching out.

"Subspecialties tend to emerge when there are a sufficient number of passionate physicians attempting to meet a specific patient care need," says Earl Reisdorff, MD, executive director of the American Board of Emergency Medicine (ABEM). He points out that pediatric emergency medicine, the oldest of the emergency medicine subspecialties (it dates back to 1991), emerged when sick and injured children were beginning to be treated at children's hospitals rather than at general hospitals and there was awareness of the special knowledge and equipment needed to treat them. The newest subspecialty, pain medicine, was created after emergency physicians recognized that pain was the chief complaint of more than 70 percent of the patients they saw.

Physicians at an academic medical center then begin offering training in the area of need, and that evolves into a fellowship. As the body of knowledge grows, so does the number of people with that knowledge, who work to gain approval for their subspecialty from the American Board of Medical Specialties (ABMS). Then appropriate specialty boards (in the case of most emergency medicine subspecialties, the ABEM) begin offering certification and fellowship programs become accredited.

Gaining that recognition is not only good for the physicians who want to become board-certified, it's also good for the field itself. "Once a subspecialty is recognized by the ABMS and a certification opportunity exists, the subspecialty area tends to become a more sophisticated field of medical knowledge and practice," Reisdorff says, "and research in the field tends to more rapidly evolve."

All this is occurring in Minnesota, where there are now fellowships both in well-established subspecialties and in fields that are still evolving. Here's a look at a few.

INTERNATIONAL EMERGENCY MEDICINE

The international emergency medicine fellowships at Regions Hospital and HCMC are designed to help trainees gain the ethical framework for working in other countries as well as skills for clinical practice. During their two years, fellows also earn a master's degree. What that degree is in is up to the individual—as long as it relates to emergency medicine and global health, says Amy Walsh, MD, program director at Regions Hospital.

As the first fellow in that program in 2012, Walsh, who wants to develop emergency systems in countries that don't have them, did hers in international development through the University of Minnesota's Humphrey Institute. Most international fellows earn a master's in public health.

Walsh is now working on her program's curriculum, hoping to ensure that it can remain flexible enough to allow fellows to follow their interests yet still meet standards that she and 30 or so other directors of similar programs are trying to establish. "I think if it's standardized more, it's going to be a lot easier to go down the path toward board certification," she says.

PEDIATRIC EMERGENCY MEDICINE

Most of those looking to subspecialize in pediatric emergency medicine come not from the ranks of emergency medicine but from pediatrics, according to Robert Sicoli, MD, emergency services co-medical director for Children's Hospitals and Clinics of Minnesota, which with Regions Hospital offers one of the nation's 60-plus fellowship programs.

The need for specialized pediatric training is twofold. The types of illnesses and injuries affecting children differ from those affecting adults, Sicoli says. "We're not going to see a lot of cardiovascular disease. On the other hand, we see many diseases that are primarily diseases of childhood." In addition, the equipment used on children is much different than that used on adults, and medications are prescribed based on the weight of the child in kilograms.

The fellows at Children's spend three years learning about pediatric emergency medical services, toxicology, ultrasound, advanced airway skills and sedation. They also have significant time for research.

UNDERSEA AND HYPERBARIC MEDICINE

It may seem incongruous that one of the nation's few fellowship programs in undersea and hyperbaric medicine is located about 1,500 miles from the nearest ocean, but that's the case. Hennepin County Medical Center has had a hyperbaric chamber since 1964 and offered a fellowship in the emergency medicine subspecialty since 2008.

The two-year program trains emergency physicians to use hyperbaric (100 percent oxygen) treatments for a long list of conditions including diabetic ulcers, radiation injuries, nonhealing wounds and acute traumatic ischemia. It also equips them to handle problems related to being underwater. Program coordinator Mary Hirschboeck says fellows sometimes attend conferences near a coast to get more training in the undersea part of their subspecialty. "We're competing with San Diego and Miami, where there's lots of diving," she notes.

AMERICAN BOARD OF EMERGENCY MEDICINE-CERTIFIED SUBSPECIALTIES*

SUBSPECIALTY	YEAR ADOPTED	NUMBER OF CURRENT DIPLOMATS
Pediatric Emergency Medicine	1991	264
Sports Medicine	1992	156
Medical Toxicology	1992	404
Undersea and Hyperbaric Medicine	2000	197
Hospice and Palliative Medicine	2006	114
Emergency Medical Services (EMS)	2010	225
Internal Medicine – Critical Care Medicine	2011	69
Anesthesiology Critical Care Medicine	2013	12
Pain Medicine	2014	5

*Additional subspecialty opportunities are available for emergency physicians. Certification is offered through other boards.

ULTRASOUND

Although ultrasound is not yet an "official" emergency medicine subspecialty, HCMC's emergency ultrasound fellowship is in demand. "We have a strong ultrasound training program here, and we have had multiple fellows in it for the last several years," Ho says.

The role of ultrasound in the ER has expanded with the advent of portable ultrasound equipment. It is now used to diagnose problems ranging from internal bleeding from gunshot wounds to gallstones. "It's not accredited yet," Ho says of HCMC's fellowship, "but I think it's on its way."

EMERGENCY MEDICAL SERVICES

The goal of the AGCME-accredited fellowships at HCMC and Regions Hospital is to prepare physicians to be medical directors of EMS agencies. To accomplish that, fellows work with those agencies. They teach, do research, provide medical oversight and get involved in disciplinary processes—"all the things that go along with running an EMS service," says HCMC's Ho. They also get hands-on experience caring for patients away from the hospital, teach paramedics, write academic papers, and receive specialized training in such things as patient extrication.

The need for physicians with this background is not necessarily new. "As long as there have been 911 ambulance service providers, the call for physicians trained in EMS work and who have knowledge of EMS principles has always been there." Ho says. "Now that this has evolved into a new subspecialty, the demand for subspecialty training and certification is going to go up."

QUALITY AND PATIENT SAFETY

A growing need for education about quality and patient safety in all specialties is what prompted Andrew Zinkel, MD, to start the nation's first emergency medicine fellowship focused on those topics at Regions Hospital. "I had a background in quality improvement and patient safety and residents interested in more advanced learning on the topic, so I decided to create a fellowship program that would educate fellows more deeply about the field," he says.

Zinkel, associate medical director of quality for HealthPartners, says only some of what is covered is specific to emergency medicine. "Ninety percent is generalizable to all of medicine," he explains, adding that it prepares trainees for academic or administrative positions in health plans or hospitals. So far, one fellow has graduated from the one-year program; another is midway through the two-year version which includes an MBA.

MEDICAL TOXICOLOGY

Minnesota's medical toxicology fellowship is based at Regions Hospital but is a collaborative effort involving HCMC and Hennepin Regional Poison Center. The ACGME-accredited fellowship trains physicians to handle emergencies ranging from spider bites to drug overdoses to chemical exposures caused by industrial accidents.

A special few

Although the number of emergency medicine *subspecialties* is increasing, the number of emergency medicine *subspecialists* is still quite small. Only 4.3 percent of American Board of Emergency Medicine (ABEM) diplomats hold a subspecialty certificate, according to Earl Reisdorff, MD, executive director of the ABEM. He adds that all of the emergency medicine subspecialties are in demand.

One thing sets emergency medicine physicians apart when it comes to subspecializing: They tend to maintain a general practice in an emergency department. "In this way, the general population's needs are met and there is no siphoning of important resources away from safety net services provided in the emergency department," Reisdorff says. "In addition, unlike some specialties, where subspecialization results in higher physician wages and health care costs, this tends not to be the case for emergency medicine subspecialties." –CP

CRITICAL CARE MEDICINE

In 2011, the ABEM began offering certification in internal medicine-critical care medicine. In 2013, it certifed anesthesiology critical care medicine. The route to these subspecialties is similar for emergency medicine physicians. They can do an internal medicine–sponsored critical care medicine fellowship or an anesthesiology-sponsored critical care medicine fellowship.

Emergency medicine and critical care overlap to some extent. Both require expertise in resuscitation and handling critically ill or crashing patients, for example. Physicians dually trained in emergency medicine and critical care usually end up practicing both disciplines following fellowship training. And that meets a big need, according to Reisdorff, who notes there's a shortage of critical care specialists. "By allowing emergency physicians access to advanced fellowship training and certification, more intensivists can be trained, and the quality and cost of care to critically ill and injured patients improves." **MM**

Carmen Peota is one of the editors of *Minnesota Medicine*.

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Working the night shift

Strategies for minimizing the negative effects

BY SUZY FRISCH

Emergency medicine physician Rachel Dahms remembers well the exhaustion she felt during residency—working long strings of nights, being on call and trying to stay on top of cases with a fatigued brain and body. More than a decade later, she still recalls not being able to remember where she parked after working 28 hours straight. "The thought of walking through the ramp to find my car—it just put me over the edge," she says. "You hit a wall and you can't cope."

Dahms still works her share of nights at Regions Hospital in St. Paul, where she is assistant residency director for emergency medicine. But she now has strategies for getting through the shifts. She shares those tips with her colleagues and the hospital's emergency medicine residents, as she also tries to educate them about the importance of sleep.

Research shows working nights can affect sleep quality, heart health and metabolic stability, while boosting the risk of cancer, diabetes and depression. In addition, a growing body of evidence shows that shift work and sleep deficits can lead to poorer clinical performance and increase the risk that health care workers will make errors. One study from Harvard published in the *Joint Commission Journal on Quality and Patient Safety* in 2007 even likened being sleep-deprived to being intoxicated.

"Sleep deprivation makes you feel slow, and it causes all sort of problems from stomach upsets to heartburn, and an increased susceptibility to getting sick," notes Dahms. "When you're truly tired, you also have a decreased ability to express yourself and deal with frustration, and it's harder to pay attention to detail or commit things to memory."

Hours in the ER

About 15 million Americans have jobs requiring them to work evenings, nights or irregular hours, according to the Centers for Disease Control and Prevention. About 40,000 of them are physicians who work in the nation's emergency rooms.

To help them cope, emergency medicine departments and physician groups are finding they have to be smarter about scheduling. Many groups and departments now allow doctors who would rather work nights to take a big chunk of those shifts, sparing others who prefer working mostly days.

Cullen Hegarty, MD, a Regions Hospital emergency medicine physician and emergency medicine residency program director, is one of those who prefers the night shift. He and two other colleagues cover most of them during the year. Other physicians work six to eight nights each quarter. He says Regions offers incentives to those willing to work nights. "They put an incentive behind it, like we'll pay you more or decrease your hours to do nights, so that the rest of the group doesn't have to do as many," Hegarty says.

The situation is similar at Mayo Clinic, where three or four physicians regularly work nights, according to Jim Colletti, MD, program director of its emergency medicine residency program. Hennepin County Medical Center (HCMC) in Minneapolis also has a handful of physicians who work nights exclusively, by choice.

"Everyone knows working nights is part of the gig, but not everyone likes them," says Marc Martel, MD, an emergency medicine physician at HCMC and associate professor of emergency medicine at the University of Minnesota. Martel says he prefers working nights for several reasons: "We get to pick our schedule

a lot of the time. That works with my kids' schedule and it works with my life." In addition, he enjoys caring for patients challenged by psychosocial issues such as homelessness, mental illness and chemical dependency, and many of those patients show up in the ER at night.

Staying on schedule

Regions and HCMC allow their emergency physicians to set parameters around their preferences—for example, they might have 36 hours off after working a night shift or only work two night shifts in a row.

Some hospitals reduce the number of night shifts physicians are required to take as they get older. This acknowledges that it gets more difficult to switch between days and nights as people age. When Regions emergency physicians turn 50, the proportion of night shifts they work shrinks gradually (over five years) until they no longer have to work any, Hegarty says. At HCMC, however, there's no such requirement.

Individuals have their own strategies. Hegarty, who prefers working three to four nights in a row rather than one night among a string of days, says as he heads into the first night, he wakes up early that morning to ensure that he can get in a solid nap before work. When his stretch of night shifts is over, he sleeps for a bit after work that morning, then tries to go to bed at a regular time that night. "That helps me reset back to my day schedule," he explains.

Martel usually prepares for his night shifts by staying up late the night before and waking up early that morning to create a sleep deficit. He might do administrative work or attend a meeting at the university in the morning. Then before his shift he'll sleep about six hours, wake up, exercise and eat breakfast (including coffee) before going to work.

Residential treatment

Of course, all residency programs have been required to abide by work-hour limits since 2011. Minnesota's emergency medicine residency programs have applied the new rules variously. Colletti says residents at Mayo do not work more than 10 hours at a time in the ED and have eight to 10 hours between shifts. At Regions, residents now have at least eight to 10 hours off between shifts and one full day off each week.

HCMC prevents residents from working more than 10 hours at a time in the ED, then gives them the corresponding amount of time off after their shift. The hospital aims to cluster residents' night shifts in three- to five-day blocks, so they aren't switching back and forth between days and nights. Residents also cannot work more than five days straight; after five days (or nights), they get two consecutive days off, Martel says.

Emergency medicine residency programs now provide training on how to maintain healthy sleep habits when working nights. Residents at Mayo are taught to load up on sleep before an anticipated night shift. They are also encouraged to avoid heavy meals, wrap up exercise at least three hours before they need to sleep, and sleep in a cool, dark and quiet environment, Colletti notes.

Dahms teaches residents at Regions how to nap correctly, as some naps are more effective than others. She either recommends a short (less than 20-minute) nap to prevent them from entering deeper sleep cycles or a 90-minute nap to get them through one full sleep cycle. Waking up in the middle of deep sleep makes people feel even groggier than they did before they napped.

She also suggests that if they drink coffee, tea or other caffeinated beverages to do so at the beginning or during the middle of a shift. They should stop caffeine intake about three hours before the end of a shift, unless they plan to stay awake when they get off work and sleep right before their next shift. She also tells residents to wear sunglasses when going home to prevent the sun from telling their bodies that it's time to wake up.

Dahms says residents often ask about using medications to help them stay awake or sleep. She recommends using them strategically, such as when they are having major, recurring problems with falling asleep or staying awake, and that they take them under the direction of a physician. "It's not just sleep deprivation from doing shift work. Some night shift workers have trouble with insomnia and excessive sleepiness," she says. "Sometimes when it's your body's time to sleep, you can't get to sleep."

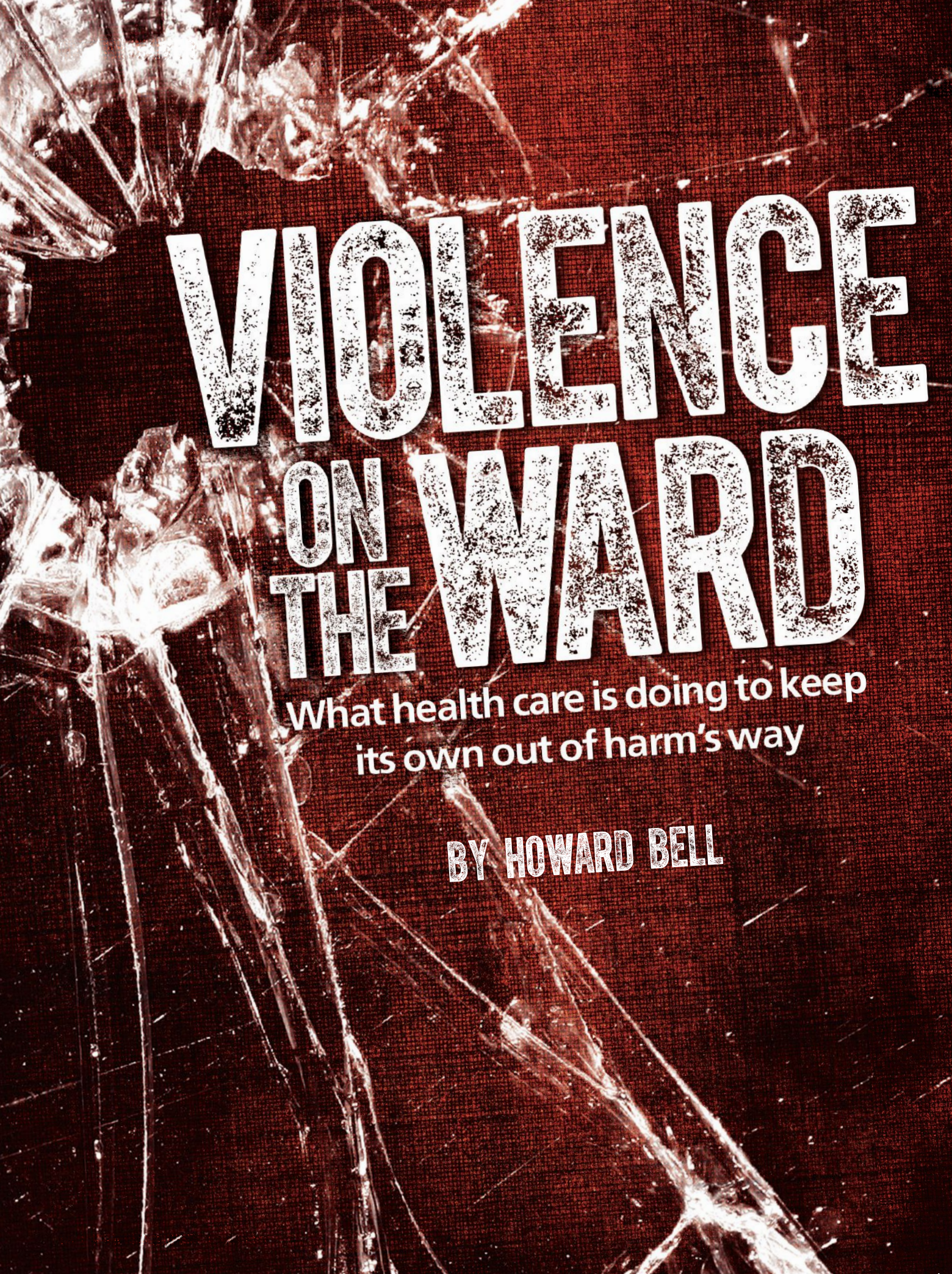
Colletti says faculty at Mayo are told that if they notice a resident is showing signs of fatigue (see box) they should bring in back-up coverage to the emergency department and encourage the resident to use Mayo's reimbursed round-trip taxi service to get home.

"The tricky thing is that being sleep-deprived affects your judgment and you don't notice that you're tired or making mistakes until someone points it out to you," Dahms says. "Having that extra awareness of what happens when you're sleep-deprived, knowing that it's a reality, it helps people be more aware when it's happening to them." **MM**

Suzy Frisch is a Twin Cities freelance writer.

Signs of fatigue

- Falling asleep during conferences
- Having to check your work repeatedly
- Feeling irritable with colleagues, allied staff and patients
- Having difficulty focusing
- Feeling apathetic


VIOLENCE
ON THE WARD
What health care is doing to keep its own out of harm's way
BY HOWARD BELL

ST. CLOUD HOSPITAL NURSING DIRECTOR JOY PLAMANN HAD AN ENOUGH-IS-ENOUGH MOMENT IN 2010.

It happened after a six-week stretch that started with an agitated patient verbally assaulting several nurses and then throwing a computer monitor into the paging system, causing $10,000 in damage. Then a chemotherapy patient, delirious and agitated, threatened to harm another patient and repeatedly tried to enter that patient's room. After a third patient threw a lamp through a window, spraying glass toward staff, Plamann decided she needed to act.

She sought help from mental health unit staff, who were experienced in de-escalating situations in which a patient or visitor becomes aggressive. "I learned mental health had gotten a lot of requests for help," she says. "Staff were being assaulted all over the hospital." Years earlier, Plamann herself had been trapped in a room with an angry patient who was verbally abusing her and about to physically assault her. "I escaped by being faster than he was," she says, "and using a duck-and-dodge move I learned in junior high basketball."

With backing from administration, Plamann helped create the hospital's Aggressive Incident Prevention Committee in December of 2010. The group, which included doctors, nurses, and staff from mental health, administration and security, started by collecting stories. "We heard an explosion of examples of verbal and physical abuse from every nursing unit, in dialysis, even the lab," she says. "Some staff had been injured seriously, and the risk was growing. We needed procedures for reporting these incidents and preventing them."

The committee identified 96 ways to do that. Most have been implemented. Since then, the number of severe incidents of violence at the hospital has fallen, thanks to greater staff awareness of the problem and training in how to de-escalate aggressive behavior. CentraCare Health, which includes St. Cloud Hospital, is now a national leader in patient-visitor violence prevention. Staff members have spoken at conferences nationwide.

Many of the strategies put forth by the committee found their way into a "road map" created by the Prevention of Violence in Healthcare Workgroup—a statewide effort involving the MMA, Minnesota Department of Health, Minnesota Hospital Association (MHA), Minnesota Nurses Association, Care Providers and LeadingAge of Minnesota—to help facilities identify and correct weaknesses in their violence-prevention programs.

More than 100 Minnesota hospitals, clinics and long-term care facilities have now signed a pledge to make workplace violence prevention a top priority. Each of the facilities has or is in the process of establishing violent incident reporting procedures, training staff in violence de-escalation, screening patients for risk of becoming violent and creating a zero-tolerance culture that encourages staff to report incidents. Many are using tools and resources made available by the workgroup.

A dangerous occupation

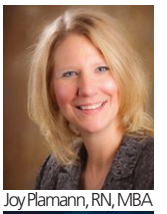
Workplace violence is a real concern for health care workers. According to the Occupational Safety and Health Administration, 48 percent of all nonfatal workplace assaults occur in health care and social service settings—mostly hospitals.

Health care workers miss work because of serious injuries intentionally caused by others at a rate that's four times higher than the U.S. rate overall. Most victims are nurses. In a 2010 survey of nurses in general hospital units across the country, 95 percent said they'd experienced patient-visitor violence. Forty-two percent said they'd experienced it in the past month, 14 percent in the past week. The problem is growing. In Minnesota, worker's compensation indemnity claims by health care workers injured because of assaults by patients or visitors rose from 134 in 2008 to 299 in 2014. Indemnity claims account for only about a fifth of compensable claims but represent the ones with the most severe injuries.

Most often, patient-visitor violence takes the form of verbal assaults—threats, intimidation and any use of language that makes staff and other patients feel fearful and unsafe. Too often, though, incidents escalate into physical assaults. During a recent series of six webinars on preventing workplace violence sponsored by the Department of Health, MHA and MMA, staff from hospitals and clinics around the state shared stories about being choked, groped, kicked, punched, slapped, scratched, bit, spit on, and attacked with objects, weapons or body fluids. One patient at a Duluth hospital ripped a toilet off a wall, smashed it and used the shards to attack staff. A medical/surgical nurse at an Allina hospital had just returned to work after having abdominal surgery when an elderly patient with dementia and a history of violence that was unknown to the nurses struck her in the abdomen, leading to a second surgery, months of pain and work restrictions. Last November, a 68-year-old patient at St. John's Hospital in Maplewood went on a rampage brandishing a metal bar, hitting four nurses and causing a collapsed lung, broken wrist and multiple cuts, bruises and abrasions.

Emergency departments, psychiatric units, medical/surgical units and ICUs are the most violent places in a hospital, according to a 2008 literature review. Seventy-eight percent of emergency physicians who responded to a 2011 national survey about violence in the ED out of West Virginia University said they'd been victims of or had witnessed a significant act of physical violence toward staff in the past year.

Harm caused by verbal and physical abuse may linger for months, even years. Victims miss work, require modified duty, and suffer PTSD and burnout at rates higher than those of others. They're more likely to experience compassion fatigue that includes lingering distrust, resentment or anger toward all patients, an insensitivity to patient needs and a diminished ability to provide good care.


Joy Plamann, RN, MBA


Jeffrey Ho, MD


Joseph Mercuri, MD

Not taking it anymore

The first step toward preventing violence in hospitals and clinics is changing staff attitudes about patient-visitor aggression, says Jeffrey Ho, MD, director of Hennepin County Medical Center's (HCMC) emergency medical services who teaches about prevention at hospitals around the state. "It's historically been under-reported because health care workers often feel violence is just part of the job. We need to realize that our work puts us at risk and that there are steps we can take to protect ourselves, Step 1 being to recognize that violence of any kind is not acceptable," he says.

This seemingly obvious point is often an "ah-ha moment" for the nurses and doctors Ho talks to. "I've had people say to me that no one's ever told them that the abuse is not OK, that I need to think about my safety and how to protect myself."

Plamann says getting staff to buy in to this zero-tolerance mindset was a crucial part of St. Cloud's violence-prevention initiative. "Years ago, staff might not have even recognized a violent event for what it was because they thought it was just part of their job. Now we're all eager to protect each other and create a safer working environment. It's been a major cultural shift."

VIOLENCE PREVENTION RESOURCES

Six violence-prevention webinars are available for viewing on the MMA's web site: www.mnmed.org/Member-Services/Education/Webinars-Non-CME.

The Minnesota Department of Health offers an extensive violence-prevention toolkit at www.health.state.mn.us/patientsafety/preventionofviolence/

Such culture change takes time, warns Ho, who says he still encounters health care workers who don't want to report violent incidents. A nurse at Allina's Buffalo Hospital, for example, declined to report a patient who sexually harassed her because she didn't want to get the patient in trouble. "She accepted it as part of her job," says Margaret Binsfeld, RN, BSN, the hospital's emergency department nursing manager.

Getting buy-in from administration is crucial to creating a culture of nonviolence, as they provide the money and means to develop policies and procedures. That might include setting up an incident reporting protocol, training staff to assess risk and de-escalate situations, and helping them recover emotionally if they are victimized. "The violence problem won't be solved," Ho says, "unless administrations throughout health care see that this is a serious problem, a common problem and a costly problem that affects quality of care."

Seeing the signs

Doctors and nurses have been trained to recognize the signs of disease, but not the warning signs of violence. Many incidents that escalate do so because staff failed to see them coming, Ho says. Warning signs include a past episode of violence or aggression toward a health care worker, drug or alcohol impairment, dementia or delirium, psychotic symptoms, hostility, impulsivity, making demands and violating personal boundaries. In some cases, there are no warning signs. Patients who may be "recreational fighters," for example, simply enjoy confrontation and seek it out.

Comments such as "There'll be hell to pay if you don't…," "You'd better hurry, or else…" or "What do I have to do to get you people to listen?" might precede aggression. Many physically violent assailants have a mental illness, Ho says, although that's not always the case. "Unfortunately, some of the fatal incidents are caused by someone who follows a spouse or partner to the hospital or clinic to do them harm."

Most hospitals now flag the patient's electronic health record if they've been aggressive in the past or show potential for violence to give staff a heads-up. St. Cloud Hospital takes it a step further and has security proactively make rounds on every flagged patient.

> "VIOLENCE HAS BEEN UNDER-REPORTED BECAUSE HEALTH CARE WORKERS OFTEN FEEL IT IS JUST PART OF THE JOB."
>
> –JEFFREY HO, MD

St. Cloud also screens all of its inpatients using the Broset tool. It identifies signs including confusion, irritability, boisterous behavior, physical or verbal threats, and attacks on objects such as kicking a wall. If a patient exhibits three or more of these, there is a one in three chance he or she will become violent within the next 24 hours. For that reason, patients exhibiting two or more such behaviors are reassessed every 12 hours. "A risk-screening protocol is one of the first things a hospital should implement in their violence-prevention program," says Joseph Mercuri, MD, a hospitalist and member of St. Cloud Hospital's violence-prevention committee.

The art of de-escalation

Ho, who has been physically assaulted twice, says both times he quickly neutralized the perpetrator using methods he learned as a Meeker County deputy sheriff, a job he does on his days off. He knows others who haven't been able to do that. "I have three colleagues elsewhere in Minnesota who have been permanently disabled from an assault and can no longer work because they have major orthopedic or traumatic brain injuries."

Ho says fewer incidents progress beyond verbal threats when staff are trained to de-escalate a situation. "The first thing to realize is that escalation takes two people," he says. "What are you doing or saying that's making the situation worse?" It might be body language or tone of voice.

Finding out why the assailant is upset is crucial. "You have to connect with them," Plamann says. "That's the art of de-escalation." She tells the story of an older patient on the medical unit who grew hostile and threatening, swearing loudly and refusing treatment. With security posted outside, the charge nurse entered his room to find out why he was upset. In a firm-but-empathetic tone she explained that it was not OK to swear and threaten the nurses. Then, she asked a simple question—What can we do to make you feel better about what's going on here? The patient opened up and told her that there were too many interruptions disturbing his sleep. He went on to tell her that he was upset because he was ill and had lost control of his life and his independence. Through tears, the patient apologized. He had no further outbursts. "The charge nurse de-escalated the situation by listening and acknowledging why he was upset," Plamann says. "She also drew a line for what's acceptable behavior, but did so in an empathetic, coaching way. And she solved his problem by asking that his care be clustered so he'd be interrupted less."

Ho says it's especially important for staff in the emergency department to understand why patients may be upset. "They may be having the worst day of their lives. They may be there against their will because they've broken the law," he says.

The importance of training

Many Minnesota hospitals and some clinics now require staff to complete several hours of classroom training in violence prevention. Mayo Health System's Southwestern Minnesota Region, which includes six hospitals and 30 clinics, uses a training package offered by the Milwaukee-based Crisis Prevention Institute that

can be customized for specific areas of hospitals and clinics. Refresher modules are even more customized. "The training makes employees more aware of the causes of violence and more confident in how to respond to it," says Stephen Daniel, regional security manager for the southwestern region.

At St. Cloud Hospital, staff can take a course that includes what Mercuri calls "ultimate role-playing that can be disturbing to watch" because participants get so emotionally involved. Staff complete refresher classes every two years and do annual online training that includes simulated events based on actual incidents involving aggressive patients at the hospital. Mercuri is currently determining how much training physicians should receive. "Historically, physicians have been exempt from training, but we need it for our own safety and to help foster the hospital's no-tolerance culture."

Ho says training is partly about getting staff into the habit of being mindful about danger. "It's what in law enforcement we call 'situational awareness.' You've got to come to work every day with your game face on. Leave other worries and distractions at the door. Always have an escape route in mind, and learn to recognize the signs of potential trouble and how to respond to them."

STRICTER ASSAULT PENALTIES WANTED

In Minnesota, physically assaulting a health care worker is a misdemeanor or gross misdemeanor, unless the victim is an emergency department worker, in which case it's treated as a felony. A bill introduced to the Minnesota House of Representatives this year would allow but not require judges to consider stricter penalties for anyone who physically assaults a health care worker, patient or visitor, and create safe patient zones around health care facilities, similar to those around schools.

Other ways to mitigate risk

Many hospitals create customized plans for handling patients they think might become physically or verbally abusive. They may cluster care to reduce interruptions or post a security officer outside the patient's room. It's important to find out what the patient's triggers are. "Maybe they don't like the lights left on," Plamann says. "Maybe they have PTSD or had a bad experience in a hospital before. Note these triggers in the medical record so you have shift-to-shift consistency in awareness and response."

At Buffalo Hospital, nurses have safety huddles at shift changes to communicate about the status of patients and visitors. They also do shift change reports at the patient's bedside and include the patient and their family in the discussions. "It helps patients and family buy into and feel part of what's happening," says Christy Secor, RN, MSN, a quality-improvement specialist. Including them can go a long way toward preventing the frustration that can lead to violent outbursts.

A patient who starts to swear or threaten staff at Mayo Health System facilities may be asked to sign a behavioral expectation contract. By signing the contract, the patient agrees to not swear, yell, intimidate or threaten staff; to respect staff's personal space and privacy; and to accept that some patients may be seen before they are because their situation is more urgent. "We have an honest, respectful conversation with them," Daniel says. "We explain that we'd like to continue providing their care, but not if they keep behaving in a threatening way toward staff. We're down-to-earth about it, and acknowledge that maybe some of the misunderstanding is our error, and for that we apologize." He says most patients agree to sign the contracts.

Some hospitals deploy behavioral emergency response teams (BERTs) that include security, mental health staff and others with additional training in de-escalating situations. St. Cloud began testing the concept last October. "We get three to four BERT calls each week," Plamann says. When the team arrives on the scene, it "huddles" with attending nurses to discuss what's happening, what's been tried to de-escalate the situation, and whether the patient has any known emotional triggers. "Sometimes it's important to have a show of force and have security enter the patient's room," Plamann says. "Other times, that aggravates the situation." Based on what the BERT learns, they create a plan that might include a medication change or some other change in the patient's care that addresses their distress. Plamann says the concept is working well so far. "Physicians are in total support of it."

Small hospitals have fewer staff and resources and may have to approach violence prevention differently. Daniel says these facilities have controlled-access doors and panic buttons employees can press if they feel threatened. If someone

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>
> –JOSEPH MERCURI, MD

on staff encounters an angry person pounding on the door, for example, they can call the charge nurse, who'll talk with the person by intercom to find out what's upsetting them and try to de-escalate the situation. "We can't turn them away at the emergency department," Daniel says. "But when there's a threat of violence, we call the police and security to be present while we treat the person."

Getting physical

Hands-on force or physical restraints are rarely needed at the hospitals and clinics where Daniel manages security. "Usually we're able to de-escalate by just talking with them. We determine what's upsetting them and explain that the nurse is just trying to help, and that we'd like to work things out without involving the police."

For safety purposes, the emergency departments at the Mayo Health System hospitals require behavioral health patients to change into a gown. Before nurses touch the patient's clothing, Daniel's security team uses hand-held metal detectors to wand over the clothes to search for blades, needles, other sharps and weapons. (They do this discreetly so as to not agitate the patient.)

Some hospitals now arm their security staff with conducted electrical weapons, commonly known as TASERs. These weapons fire electroshock darts attached by wires to batteries, causing temporary paralysis. Ho says when security began carrying them at HCMC, "violent events went way down." More often than not, the weapon's presence alone was enough to de-escalate the situation.

HCMC and other hospitals around the state stage "active shooter" drills to teach staff how to respond and stay safe. Windom Area Hospital recently held one during which staff wore protective face masks and practiced responding when an actor opened fire with an Airsoft gun.

Severity down, frequency up

Since implementing violence-prevention programs, many Minnesota hospitals and clinics have seen a reduction in the number of severe violent incidents, but not the number of incidents overall. At HCMC, for example, the total number of behavioral incident calls to security rose from 20,450 in 2008 to 37,000 in 2014.

At St. Cloud Hospital, lost work days caused by aggressive incidents plummeted 4,600 percent from 2013 to 2014; modified duty days decreased 328 percent, and hospital costs from aggressive incidents dropped 1,100 percent. "This steady, significant decline shows that our efforts are working," Plamann says. But even so, the total number of reported incidents rose from 182 in 2013 to 237 in 2014. She attributes that increase in part to the fact that more employees recognize violence and report it more often.

Mercuri, who has been verbally assaulted and has witnessed attacks on nurses, believes that because of "a coarsening of our culture," violence will continue to be an issue in health care. "We're an impatient, instant-gratification, multi-tasking, violence-in-the-media-saturated society," he says. "Life in the hospital is different than it was 20 or even 10 years ago." **MM**

Howard Bell is a medical writer and frequent contributor to *Minnesota Medicine*.

Specializing in doing nothing

Sometimes no treatment is the best treatment.

BY EMILY CHAPMAN, MD

A long time ago, as a new pediatrician, I sat with a tearful, exhausted mom, her toddler restless on her lap—gooey, flushed and in bad temper.

Surely, I could do something for her; couldn't I? No pneumonia … no otitis … darn. Resigned, I explained the nature of viruses, blah, blah, blah … and why I didn't have anything to offer her. I felt sure she thought she'd wasted her co-pay and that I'd failed her on some level by doing nothing. I apologized.

I got a little older.

At some point, I took my own son to see my partner for a rash. I knew the name of the rash; I knew he didn't need medicine; I even knew how to care for him. My partner looked at my son, looked at me, nodded wisely and said, "Yes, that's exactly what he has." And, I felt much better. I had taken my son, and my maternal instinct, to the doctor—to have nothing done. I didn't need him to do anything; I just needed to share my son's rash with someone.

And, I got even older.

A few years ago, my father fired his internist, a man I knew to be both intelligent and considered. I gave Dad a quizzical look.

"Every time I go see him for something, he gives me medicine," Dad answered, in a tone that suggested that his reasoning should have been obvious. I remembered what my med school professor had written on the board one day, "Don't ever confuse 'curing' with 'healing.'" In my own practice, I stopped apologizing for doing nothing.

And, now, I'm older still.

The American Academy of Pediatrics just published new guidelines for the management of bronchiolitis. Rather than a list of things to do, it contains a list of things *not* to do, and little more. In the hospitalist community, this was met with applause and the birth of a prideful slogan, "Nobody does Nothing like a hospitalist!"

We docs are doers. We got ahead our whole lives by doing things, tackling things, fixing things. We were that guy who came through. But the message is becoming very clear: By doing things that may not need to be done, we're hurting patients, sometimes even killing them. Our professional societies are challenging us to "Image Gently," to "Choose Wisely" or to "Safely Do Less." Learning lists of pharmaceuticals or details of radiologic studies is easy. Doing nothing is not. Nobody ever taught us how to do that.

In my experience, doing nothing takes tremendous confidence and resolve. It takes a fundamental faith that we are of inherent value to our patients—even without our tools, our medicines or our studies. It takes faith that our words, our attention and our touch are of intrinsic value. When you start to believe that you, in and of yourself, are valuable to your patients, you'll get a hell of a lot better at doing nothing. **MM**

Emily Chapman is a pediatric hospitalist at Children's Hospitals and Clinics of Minnesota.

Minnesota Medical Association

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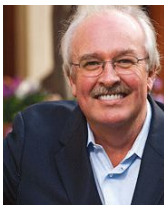

KEYNOTE:
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News Briefs

Tom Arneson, MD, of the state's Office of Medical Cannabis, addresses a crowd of physicians curious about the new law and its effect on patients.

Education event on medical cannabis attracts large crowd

More than 115 physicians, physicians-in-training and other health care workers attended (either in person or via livestreaming) a March 31 educational event on Minnesota's medical cannabis law at the University of Minnesota. The event, "Cannabis Conversation," was co-sponsored by the MMA and the Minnesota Department of Health's Office of Medical Cannabis.

The program, which featured three physicians at the forefront of the state's efforts, was designed to help physicians prepare for the legalization of medical cannabis this summer. Starting July 1, patients who are certified to have one of nine conditions will be able to purchase medical cannabis from state-approved distribution centers.

"Minnesota's program is distinctive," Tom Arneson, MD, research manager of the Office of Medical Cannabis told the audience. "It doesn't allow smokable or whole-plant marijuana—only liquids, oils, tinctures or vaporized forms; there's also a commitment to learning from the experience through a registry, reports and observation program."

Because it is a Schedule 1 drug, cannabis cannot be prescribed. In some states where medical cannabis has been legalized, physicians must make an assertion that patients may benefit from it in order for the patient to access the drug. However, in Minnesota, the role of physicians (and physician assistants and advanced practice registered nurses) is only to certify that a patient has one of the qualifying conditions.

"The law doesn't say physicians can't talk to patients about the types of cannabis and the benefits and risk. But it says their only formal role is to certify that a patient has a certain disease or disability," Arneson said. Pharmacists at the eight distribution centers in the state will work with patients to determine which products and doses to try for their condition.

In addition to Arneson's presentation, Kyle Kingsley, MD, founder of Minnesota Medical Solutions, and Andrew Bachman, MD, founder of LeafLine Labs, the two manufacturing and distribution companies in the state, described their operations and processes.

Tax scammers prey on Minnesota physicians again

For the second year in a row, tax scammers are targeting physicians.

Reports of fraudulent federal income tax returns being filed using physician names, addresses and Social Security numbers have been made in Minnesota and other states. Victims have been unable to file their taxes electronically because a return has already been filed.

If you have been a victim of this scam, you can find help on the IRS website or by calling 800-908-4490.

Futurist to speak at 2015 Annual Conference

Futurist Ian Morrison is the first speaker to sign on for this year's Annual Conference, which takes place September 25-26 at the DoubleTree by Hilton in St. Louis Park. Morrison is an internationally known author, consultant and futurist who specializes in long-term forecasting with a particular emphasis on health care and the changing business environment. He has worked with more than 100 Fortune 500 companies. Recent clients include Mayo Clinic and Kaiser Permanente. Morrison is the author of *Leading Change in Health Care: Building a Viable System for Today*

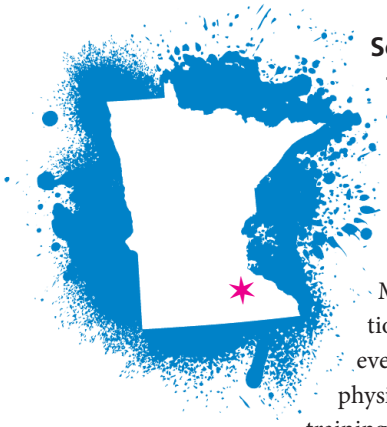
At the Capitol

MMA Legislative Priority	Status at the Capitol
Prior authorization	Bills have been introduced in both the Senate (SF 934) and the House (HF 1060). SF 934 has made it through the committee process, but HF 1060 has not moved. The bill could be included in omnibus bill.
Reinstate Medicaid payments	Bills (SF 1576 and HF 1729) have been introduced and are working their way through the Capitol.
Primary care loan forgiveness	Bills (SF 3 and HF 211) have been introduced and are working their way through the Capitol.
Interstate licensure	Bills (SF 253 and HF 321) have been introduced and are progressing through the Capitol.
Reducing nicotine's harm	A House bill (HF 1253) that would place more restrictions on e-cigarettes was introduced in early March. It doesn't appear that it will move this session.
Provider tax repeal	No legislation has been proposed so far that would derail the scheduled repeal.

and Tomorrow and *Healthcare in the New Millennium: Vision, Values and Leadership*.

MMA leadership nominations due May 16

The MMA is now accepting nominations for its 2015-16 memberwide election. Nominations for leadership positions from members and component medical societies will be accepted through May 16. The open offices include: president-elect, two MMA Board of Trustees positions, three AMA delegate positions and one AMA alternate delegate position. The nominees for the MMA Board of Trustees must be members from the Northeast and Southwest Trustee districts (one will be elected from each district). The nominating committee will meet in late May and July to recommend a slate of candidates for each position. Ballots will be electronically distributed on August 11 to all members who have provided the MMA with an email address. The election will be open for 30 days. Results will be announced before or at the MMA Annual Conference. If you are interested in submitting a nomination or have questions, please contact George Lohmer at glohmer@mnmed.org or 612-362-3746.



Social event planned for Rochester-area physicians

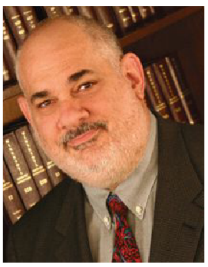
The MMA, Zumbro Valley Medical Society (ZVMS), MMA Young Physician Section and MMA Medical Student Section are hosting a free social event for Rochester-area physicians and physicians-in-training from 5 to 8 p.m. on May 7 at the Cambria Gallery on 400 South Broadway in Rochester. The event is a celebration of medicine, a thank you to members and a welcome to new and prospective members. Hors d'oeuvres and drinks will be served. To register, visit www.mnmed.org/RochesterSocial. Sponsors include the US Air Force, US Army, Limb Lab, Cambria, Clements and Home Federal.

On the calendar

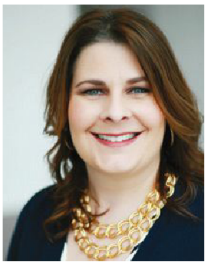
Event	Date	Location
Preconference Hippocrates Cafe	Sept. 24	DoubleTree by Hilton, St. Louis Park
Annual Conference	Sept. 25-26	DoubleTree by Hilton, St. Louis Park

Check the MMA's website (www.mnmed.org/events) for more information and to register.

Donald Jacobs, MD



Robert Meiches, MD



Kathleen Baumbach

Brian Strub

Terry Ruane

Mandy Rubenstein

MMA in Action

MMA President **Donald Jacobs**, MD, and MMA CEO **Robert Meiches**, MD, met with the new CentraCare CEO Kenneth Holmen, MD, in mid-April.

Kathleen Baumbach and **Brian Strub**, managers of physician outreach, attended the 2015 Match Day program at the University of Minnesota Medical School, Twin Cities campus, in March.

In late March, Strub participated in career day at the Hmong College Prep Academy in St Paul. He shared information on the MMA's medical student section and discussed the training required to become a physician.

The MMA's Medical Student Section presented "Working Effectively with Medical Interpreters" to students at the University of Minnesota Medical School, Duluth campus in mid-April.

Strub, Baumbach, **Terry Ruane**, MMA director of membership, marketing and communications, **Mandy Rubenstein**, manager of physician outreach, **Barbara Daiker**, MMA manager of quality, **Evelyn Clark**, MMA manager of grass roots and political engagement, and **Juliana Milhofer**, MMA policy analyst, attended the Minnesota Academy of Family Physicians' 2015 Spring Refresher conference in Minneapolis April 16-17.

Daiker also served as co-chair of the Minnesota Department of Health's Committee on Healthcare Information Exchange, which held a joint meeting with the Standards and Interoperability Committee in March.

In mid-March, **Dave Renner**, CAE, MMA director of state and federal legislation, gave a legislative update for OB/GYN physicians in Edina.

Jaime Olson, MMA manager of CME, Ruane and Baumbach attended a workshop, "ER/LA Opioid REMS: Achieving Safe Use While Improving Patient Care," in Hutchinson in early April.

VIEWPOINT

Argument that prior authorization saves money rings hollow

Douglas Wood, MD
MMA Board Chair

During the Senate hearings on the prior authorization (PA) bill authored by Sen. Melisa Franzen (DFL-Edina), representatives from the health plans and pharmacy benefit managers argued that without PA, prescription drug prices would skyrocket. The truth, however, is that PA has failed to stem prescription drug spending.

In its December 2014 publication *Healthcare Spending Index*, Truven Health Analytics showed that prescription drug spending grew at a rate of almost 3 percent during 2013 and the first half of 2014. The report attributed the increase to the price of drugs, especially biologic drugs. By the way, this increase is in sharp contrast to spending for physician and hospital services, which grew less than 1.5 percent during the same period.

My recent experience with PA also suggests that the process does little to reduce spending on prescription drugs. In the last two months, I have had to obtain PA for digoxin, furosemide, metoprolol succinate, prednisone and rituximab. The first four of these are generically available medicines and the prescriptions were all approved; thus, no savings.

In the case of rituximab, which I prescribed for a patient with a rare condition causing obstruction of the ureter, inferior vena cava and iliac artery, PA has added to the costs incurred by both the patient and the insurer. It is understandable that because rituximab is a biologic agent, it might be subject to PA. But when the medicine was not approved, it led to a long appeals process (the original prescription was written on January 28) that is still going on. The patient has hired an attorney to try to expedite an appeals hearing. In the meantime, the insurer is bearing the costs of ureteral stenting and will likely incur other costs, as the patient may need a procedure to protect circulation and avoid other complications. Thus, there are really no savings related to this, and a patient is forced to bear additional and unreasonable expenses. Most important, the patient is not getting a drug that could help.

The adverse effect of PA on access to appropriate medicines and patient health was described in a peer-reviewed study published in *Health Affairs* as "massive experiments on vulnerable populations." Another review published in the *Journal of Managed Care Pharmacy* concluded that PA policies might appear to reduce drug-related costs, but that there was "little evidence that they improve clinical or humanistic outcomes."

PA does nothing to solve the problem of rapidly increasing medication prices and little to curb overall spending on drugs. It is time to lay aside policies that cause harm to people because they restrict access to needed medicine and unnecessarily intrude on the patient-physician relationship. Once we do that, we can work constructively on sustainable efforts to truly gain control of rapidly rising spending on prescription drugs.

My recent experience with PA suggests that the process does little to reduce spending on prescription drugs.

The Avera Marshall Decision

What the Supreme Court's ruling means for hospitals and physicians

BY MARGO STRUTHERS, JD, AND TERESA KNOEDLER, JD

On December 31, 2014, the Minnesota Supreme Court issued an important ruling relating to physician autonomy and medical practice in hospitals in the state. The ruling was made in a case that began in 2012, when the medical staff of Avera Marshall Regional Medical Center, its chief of staff and chief of staff-elect sued the hospital over its failure to comply with certain provisions in the medical staff bylaws relating to quality of care and medical staff self-governance.

Within days after the lawsuit was filed, the hospital's board adopted extensive and controversial amendments to the bylaws. These amendments shifted significant responsibility for matters relating to quality of care away from the medical staff's executive committee and officers and onto hospital employees, including a nonphysician administrator. They also stripped the medical staff of its right to self-govern. A significant majority of the medical staff voted to reject the changes. Nevertheless, the hospital unilaterally rescinded the existing bylaws and imposed the revised bylaws.

In the lawsuit, the hospital argued that it had the right to unilaterally change the bylaws, that bylaws were not a contract and that the medical staff did not have legal capacity to sue the hospital. The hospital prevailed in the lower courts.

In 2013, the medical staff asked the Supreme Court to consider several issues, including—Was a medical staff permitted by law to commence a lawsuit? And did medical staff bylaws constitute a contract? The Supreme Court ruled that the individual members of the medical staff did indeed have a contractual relationship with the hospital and that the medical staff could sue the hospital. Although the Supreme Court ruling did not fully resolve the dispute between Avera Marshall Regional Medical Center and its medical staff, it was a positive decision for physicians and their patients.

Jane Willett, DO, and Steven Meister, MD, MBA, were the two physicians at the center of the lawsuit against Avera Marshall Regional Medical Center.

PHOTO BY STEVE WEWERKA

The Supreme Court's ruling

In making its ruling, the Minnesota Supreme Court reversed two lower courts' decisions and held that medical staff bylaws were an enforceable contract between Avera Marshall Regional Medical Center and the members of its medical staff.[1] The Court determined that the legal requirements for the existence of a contract were met when a physician, as part of the application process, agreed to abide by the medical staff bylaws and the hospital board appointed the physician to the medical staff.[2] Under well-established general contract law, this meant the bylaws were an enforceable contract.

The Court also held that the medical staff was an unincorporated association that had the capacity to sue and be sued under Minn. Stat. §540.151. It stated: "we can only conclude that when the Legislature used the words '[w]hen two or more persons associate and act … under the common name …, they may sue in or be sued by such common name,' it intended to give such associated persons the legal capacity to sue."[3] The Court found that the Avera Marshall medical staff satisfied this definition because it "is composed of two or more physicians who associate and act together for the purpose of ensuring proper patient care at the hospital under the common name 'Medical Staff.'"[4]

Duties and rights of a medical staff

A medical staff is the group of medical professionals (physicians and sometimes advanced practice registered nurses or physician assistants) who treat patients at a hospital. Each hospital has a medical staff, and all medical professionals who admit patients to a given hospital are required to be members of the medical staff. A medical professional may only provide services at a hospital when the hospital grants them privileges to do so.

Although the duties and rights of medical staffs may vary somewhat from hospital to hospital, there is guidance on their role. The Joint Commission, in its Hospital Accreditation Standards, has described the duties of medical staffs as follows:

> The self-governing medical staff provides oversight of the quality of care, treatment and services delivered by practitioners who are credentialed and privileged through the medical staff process. The organized medical staff is also responsible for the ongoing evaluation of the competency of practitioners who are privileged, delineating the scope of privileges that will be granted to practitioners, and providing leadership in performance improvement activities within the organization.[5]

In addition, The Joint Commission states that "the primary function of the organized medical staff is to approve and amend medical staff bylaws and to provide oversight for the quality of care, treatment and services provided by practitioners with privileges."[6] These concepts appear in Minnesota's administrative rules for hospital licensure as well: "the medical staff shall be responsible to the governing body of the hospital for the clinical and scientific work of the hospital. It shall be called upon to advise regarding professional problems and policies."[7] Further, under Minnesota rules: "the medical staff shall be an organized group which shall formulate and, with the approval of the governing body, adopt bylaws, rules, regulations and policies for the proper conduct of its work."[8]

The Conditions of Participation for Hospitals, federal regulations promulgated by the Centers for Medicare and Medicaid Services, require hospitals' governing bodies to "assure that the medical staff has bylaws."[9] They also provide that the "medical staff must adopt and enforce bylaws to carry out its responsibilities,"[10] which bylaws must also be approved by the governing body.[11]

The role of the medical staff bylaws

Medical staff bylaws, as defined by The Joint Commission, "create a framework within which medical staff members can act with a reasonable degree of freedom and confidence."[12] As such, they typically describe in detail a) how the medical staff will perform its duties; b) the rights and obligations of the medical staff, as a whole and as individual members, under various circumstances (eg, appointment, reappointment and other peer-review procedures); and c) the rules for the medical staff's self-governance (eg, selection of leaders, medical staff committee structure and appointments and organization into departments or clinical services).[13] Bylaws also outline a process for amendment that, at least in Joint Commission-accredited hospitals, requires approval of both the medical staff and the hospital governing board: "Neither the organized medical staff nor the governing body may unilaterally amend the medical staff bylaws or rules and regulations."[14]

In addition, medical staff bylaws impose a framework for physician-to-physician interactions. Particularly at large hospitals, the medical staff may be composed of physicians from myriad backgrounds, who have various employment arrangements and practice in a variety of settings. Only the bylaws establish the rules for physician interaction and dispute resolution. Therefore, it is important that the rules for inter-physician relationships in the bylaws reflect the collective agreement of the medical staff.

Importance of medical staff autonomy

The various requirements for a medical staff are an acknowledgment that the physicians caring for patients in hospitals and the board and administrators responsible for running the business operations have parallel, yet distinct, perspectives and roles. Although all can agree that many of the goals, obligations and decisions made by the two groups might be in sync much of the time, there will be times when their opinions diverge. As a discrete group of medical professionals dedicated solely to the interests of patient care that makes recommendations to the board and administration based on their collective professional judgment, a medical staff creates an internal check against the fiscal demands of the hospital.

Moreover, a medical staff creates a safe environment in which physicians can address quality and patient care issues without outside financial pressures. This is important for all physicians, but it is arguably most important for employed physicians, who may otherwise face implicit pressure from their hospital employers. The existence of an autonomous medical staff allows all medical staff members—those who are employed by the hospital as well as those who are not—an equal opportunity to participate freely in expressing their professional opinions with respect to quality improvement and other patient care oversight activities. For the benefit of patient care, this freedom and associated protection should not be undermined.

The emphasis on a self-governing medical staff and duly established bylaws reflects a balance between a hospital's ultimate responsibility for its operations and the quality of care it provides and the crucial professional input reserved to and required of the medical staff. Loss of medical staff autonomy undermines that fundamental and long-effective balance.

As a part of the mandate for quality care, medical staffs are authorized to conduct peer review. This may involve coaching members, improving system quality, proposing policies and making thoughtful recommendations on privileges. Peer review can only exist, both practically and legally, within the confines of medical staff peer review privilege and confidentiality. Further, erosion of medical staff autonomy can compromise this process because without candid professional judgment, peer review may become an extension of hospital human resources departments, rather than an independent peer assessment.

In its amended complaint seeking declaratory relief and judgment dated January 27, 2012, the plaintiffs alleged, among other things, that the hospital improperly precluded the medical executive committee from exercising its authority under the bylaws and related policies to appoint phy-

sician members to a Medical Staff Quality Improvement Committee (a medical staff peer-review committee) and instead substituted nonphysician hospital board members for physician members.[15]

Implications for medical staffs and their members

Although the Court's ruling that the medical staff bylaws were an enforceable contract and that the medical staff was an unincorporated association with the capacity to sue and be sued was limited to the facts at Avera Marshall, the decision has generated much discussion among physicians and hospital administrators regarding the following:

Bylaws as an enforceable contract

The Supreme Court compared its decision on the medical staff bylaws in the *Avera Marshall* case with its decision in a 1983 case in which the Court determined that an employee handbook was an enforceable contract.[16] Accordingly, some hospitals may try to attach disclaimers to medical staff bylaws, as employers have done with handbooks, disclaiming that they are a contract. This may not be effective (except in a new hospital or a hospital whose medical staff bylaws already have a validly adopted provision that the bylaws are not a contract) because individual medical staff members will continue to have contractual rights. There may be additional reasons why such a disclaimer may not be effective. The *Avera Marshall* decision highlighted the inconsistency of a hospital being legally required to have medical staff bylaws while having no intent to be bound by them: "It is unclear how, on the one hand, Avera Marshall can be obligated to have such bylaws, yet at the same time have no intention to follow them."[17]

Hospitals also may seek to alter appointment and re-appointment applications in a way that requires physicians at the time of appointment or reappointment to agree that medical staff bylaws are not a contract, or that they can be unilaterally amended by the board. Doing so may be ineffective if it conflicts with other amendment procedures in the bylaws. Further, it would certainly conflict with the prohibition against unilateral amendments by either the organized medical staff or the governing body contained in MS.01.01.03 and may conflict with some of the regulatory requirements discussed earlier.

Because most hospitals will want at least some provisions of medical staff bylaws to be enforceable against physicians, they may propose amendments that clearly state that certain provisions are enforceable and others are not. This may be unfair and possibly unworkable.

Physicians should carefully read and consider any proposed changes to bylaws and seek counsel—separate from hospital counsel—about whether those changes are in their best interests.

Capacity to sue and be sued

This holding is likely to affect most medical staffs because of their nature and activities. It is also likely to affect other groups of people who come together and act under a common name such as various types of special interest groups or clubs that are not organized as corporations or other legal entities.

The necessary corollary to concluding that the medical staff had the capacity to bring the lawsuit under Minn. Stat. §540.151 is that the medical staff could also be sued in the name of the medical staff, rather than as individual members. A valid cause of action (eg, negligence) would still be required. Some have suggested that claims might be brought under a negligent credentialing cause of action, but it is unclear whether such a claim against a medical staff making recommendations to a hospital board would be viable.

Also, the statute contains language that appears to indicate that only the assets of the medical staff—and not the assets of individual members—are at risk: "the judgment in such cases shall accrue to the joint or common benefit of and bind the joint or common property of the associates, the same as though all had been named as parties."[18] Some have suggested that the statute is not as clear as it could be in this regard.

Because the medical staff may need its own counsel, especially if sued, consideration will need to be given to how this should be arranged and paid for. If the hospital and its medical staff have adverse interests as parties to a contract (ie, bylaws), counsel will need to be someone other than the hospital counsel.

Many medical staff bylaws provide for indemnification by the hospital of physicians engaged in peer review. Medical staff bylaws will need to be reviewed to see if existing provisions are adequate. Finally, hospitals and medical staffs may wish to explore what insurance coverage may be available to provide defense, and perhaps indemnification, in the event of a lawsuit brought against the medical staff.

All of these are important issues requiring informed consideration by medical staffs and hospitals and their respective counsel.

Conclusion

The Supreme Court's ruling reinforces the notion that medical staffs have an important role to play in promoting quality patient care. Physicians should be vigilant in assuring that medical staff bylaws protect this role and their individual rights. **MM**

Margo Struthers is a partner with Oppenheimer Wolff and Donnelly LLP. Teresa Knoedler is policy counsel for the Minnesota Medical Association.

REERENCES

1. Medical Staff of Avera Marshall Regional Medical Center et al., v. Avera Marshall, et al., 857 N.W.2d 695 (Minn. 2014).

2. Id. at 703.

3. Id. at 700.

4. Id.

5. Hospital Accreditation Standards 2014, Medical Staff Standards ("Medical Staff Standards"), MS-1.

6. Id. at MS-2.

7. Minn. R. 4640.0800, subp.1.

8. Minn. R. 4640.0800, subp.2.

9. 42C.F.R. §482.12(a)(3).

10. 42 C.F.R. §482.22(c).

11. 42 C.F.R. §482.22(c)(1).

12. Medical Staff Standards, MS-1.

13. Id. at MS-2.

14. Id., Standard MS.01.01.03.

15. Amended Complaint, January 27, 2012 ¶¶121-129.

16. Avera Marshall, 857 N.W2d at 706 n.7.

17. Id., at 705 n.4. See Minn. R. 4640.0800, subp.2.

18. Minn. Stat. §540.151.

Right care, right place, right time

Regional systems of care are the best way to ensure patients with emergent conditions have the best outcomes.

BY JOHN L. HICK, MD

A bystander calls 911 after witnessing an auto accident in rural Minnesota in which a passenger has been seriously injured. The dispatcher provides the caller with instructions on how to care for the person until the ambulance arrives. When emergency medical services personnel get to the scene, they find that the patient meets the criteria for trauma and activate a "trauma code" at the local hospital. Upon receiving that radio notification, the hospital calls in additional staff and also calls for a helicopter to transfer the patient to a tertiary care trauma center. Staff at the receiving hospital do an initial assessment and stabilize the patient. Helicopter personnel provide additional medications and interventions en route to the trauma center, where a specialty team is ready to deliver definitive care.

This story illustrates how seamlessly emergency care can be delivered when a regional system is in place. In this case, the patient received the best care possible in the shortest amount of time because all members of the medical team—from the first responders to the local hospital staff to the regional trauma center staff—knew what to do and when. In Minnesota, 95 percent of hospitals participate in our statewide trauma system, with Regional Trauma Advisory Councils providing educational and quality assurance support (and in some cases research) in their areas, and the Minnesota Department of Health providing the regulatory and data support to the system.[1]

Although we have developed regional systems of care for trauma across Minnesota, we are only part way toward having coordinated regional systems of care for other medical emergencies. Change the story above—substituting a stroke, myocardial infarction, burn, pediatric or Ebola patient for the trauma victim—and you can see the benefit of regional systems for these time-critical emergency conditions as well. To some extent, regional systems are in place, but they are only in parts of the state and some are more refined than others.

The trend toward regionalization

It is clear that we need to move toward regionalization of care for an increasing number of conditions, so that *each facility* involved delivers appropriate and timely care in order to ensure the best patient outcomes. The 2010 Institute of Medicine report "Regionalizing Emergency Care" emphasized the need to expand regionalization of emergency care to diagnoses other than trauma.[2] That report called for high-functioning systems that are "regionalized, coordinated and accountable." That means facilities can manage patients locally when it is safe to do so or refer them to a specialty center when appropriate. It also means we have formal programs and oversight of them to assure access, promote quality and control cost (as opposed to an uncoordinated system that is at the whim of market forces). And it means we share data to improve quality of care and ensure that there are consequences for not meeting performance standards.

We know that taking a systematic approach to emergency care—one that assures optimal assessment and interventions at each level within a system—saves lives. The American Heart Association's "chain of survival" concept for cardiac arrest care, which has been around for years, is an example.[3] More recently, the military has proven that its Joint Theatre Trauma System, which calls for aggressive care beginning at the point of injury and progressing step-wise and rapidly through to definitive care, clearly saves lives as well.[4]

Minnesota has been on the leading edge of the movement to regionalize emergency care for some time. Some of the earliest research on the safe transfer of patients with ST-elevation myocardial infarction (STEMI) from outlying facilities to cardiac centers took place in the state.[5] Prehospital activation of catheterization laboratories by EMS units with transport to select STEMI facilities is now the norm in the metro area, and protocol-driven initial care and referral of these patients for intervention occurs in many other areas of the state.

Sixty-seven Minnesota hospitals have earned the American Heart Association's "Stroke Ready" designation, assuring that 81 percent of Minnesota's population is within 30 minutes of a stroke center; additional facilities have applied for the designation.[6,7] In urban areas, acute stroke patients are directed to designated primary or comprehensive centers for initial care. In nonurban areas, initial assessment and treatment of strokes occurs at hospitals that are designated "Acute Stroke Ready," which means staff can perform initial diagnostics and administer thrombolytic therapy if indicated. Patients are then referred to a primary or comprehensive stroke center. With effective interventions that can be initiated in outlying hospitals and augmented with endovascular interventions at the receiving stroke center,[8,9] we are better meeting the needs of patients with acute stroke.

More work to do

Although we have made a great deal of progress, our regional emergency systems differ greatly in how well they are organized and used. The Minnesota Department of Health is just now establishing coordination of the stroke care system, despite the fact that we have many verified stroke centers.

Over time, with consistent standards and data-sharing, our systems should improve. We will hone our triage and referral protocols and continue to monitor our referral patterns. Even our trauma system will continue to evolve and improve.

Minnesota's rural-urban referral pattern is relatively typical. More than 50 percent of major trauma patients present to Level 3 and Level 4 trauma centers, which are often smaller hospitals in nonmetro areas.[10] These centers must quickly recognize major trauma, provide stabilization and arrange for transfer to a higher level of care. Staff also must identify which patients can be safely managed locally (including those who require immediate surgery, in the case of Level 3 centers). Reducing over-referral is important not only to the patient and their family but also to the hospital, as every transfer is lost revenue for facilities that often operate on very thin margins.

In urban areas, we must balance having enough facilities to provide capacity with having enough cases to maintain excellence. Having five Level 1 trauma centers in downtown Boston may have seemed excessive—until bombs were detonated at the Boston Marathon.[11,12] Minnesota has eight health and medical preparedness regions, each of which has coalitions, hospital compacts and organizations that can provide coordination should a disaster occur. As we plan for disasters, we will need to use these regional structures to assure distribution of casualties as well as coordination of EMS, hospital, public health and emergency management responses.[13]

Under the same regional disaster-planning structures, we continue to advance regional planning for mass burn care and have developed resources for pediatric mass casualty care in conjunction with Minnesota's Emergency Medical Services for Children and other programs.[14] Our state trauma program also includes pediatric preparedness as a component of its mission. There are many opportunities for crossover between our regional systems, and we should leverage them to make communication and coordination more seamless and participation by facilities easier.

As our systems and technologies mature, information sharing will become easier, speeding consultations and transfer and treatment decisions. In many cases, the sharing of images for interpretation at larger centers will allow patients to stay at an outlying hospital safely or enable a receiving facility to be better prepared to intervene when the patient arrives. Virtual reality technologies including wearable "point of view" cameras and receivers will enhance emergency telemedicine capabilities.

As research further defines categories of patients that can be safely managed with minimal specialist input (eg, those with small brain contusions), we will continue to change our recommendations about who can be managed where. Also, the advent of new CPR and resuscitation techniques and technologies will have an effect on how we design our emergency response systems. Such changes likely make cardiac arrest the next focus for regional emergency care.

Thirty-five years ago, myocardial infarction mortality was 40 percent. Today it is 4 percent. Advances in cardiac care have been profound, thanks to the systematic and regionalized emergency care systems we see in most areas today. In another 35 years, will we look back at changes in ventricular fibrillation survival with the same awe? Reductions in mortality are achieved when we provide the right care in the right place at the right time. Minnesota is ahead of the curve in this regard, but it will take our collective, continued effort to continue to lead. Strong and effective medical leadership will be critical to the success of these regional systems. Physicians need to participate on oversight and site-visit teams, in education and in quality-improvement efforts. They need to be committed to and advocate for the planning, policies, data-sharing, analysis and quality improvement these systems require to be effective. **MM**

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Stenting a Moving Target

Neurological and Hemodynamic Recovery after 80 Minutes of CPR Using an Automated Chest Compression Device to Facilitate Percutaneous Coronary Intervention

BY FORUM KAMDAR, MD, VIJAY PERA, MD, AND UMA VALETI, MD

Despite significant advances in the science of resuscitation, survival to discharge after an in-hospital cardiac arrest in the catheterization laboratory remains poor. Clinicians face the challenges of performing CPR during procedures to address the cause of the arrest and the limitations of prolonged manual CPR. In this article we describe the first case of a patient presenting in cardiogenic shock caused by acute coronary syndrome secondary to bypass graft failure who developed cardiac arrest and survived 80 minutes of resuscitation in the catheterization lab, allowing for revascularization of a vein graft. The patient experienced complete neurological and hemodynamic recovery. This case demonstrates the importance of prompt high-quality, uninterrupted CPR using an automated chest compression device to facilitate early emergent revascularization of a vein graft.

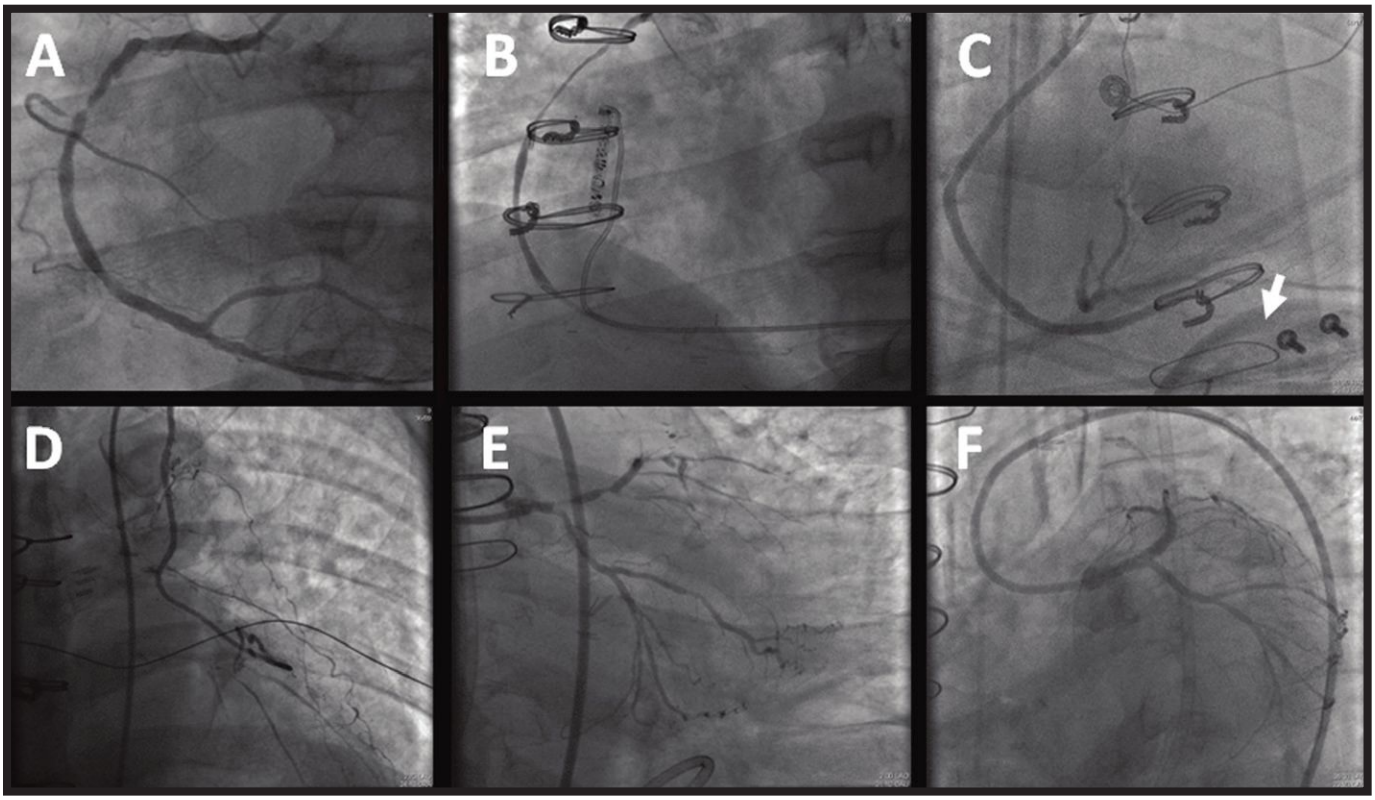
Patient outcomes as measured by survival to discharge after a cardiac arrest in the catheterization laboratory are often poor.[1] Although most patients need only cardiopulmonary resuscitation (CPR) and defibrillation to restore spontaneous circulation, cases have been described in which prolonged resuscitation efforts in the catheterization laboratory are necessary.[2] Determining how long to continue high-quality CPR if no return of spontaneous circulation occurs is very challenging for clinicians. Their decisions about when to terminate resuscitation are often driven by the knowledge that rate of survival to discharge is poor and that prolonged manual CPR can be impractical during a procedure, as staff may become fatigued and be exposed to radiation, and it may obscure the field of view. Automated CPR, in contrast, can provide the high-quality, uninterrupted compressions needed to facilitate primary percutaneous intervention.

We describe the case of a patient who presented with acute coronary syndrome and cardiogenic shock and developed cardiac arrest in the catheterization laboratory. The patient required 80 minutes of manual and automated CPR during percutaneous intervention of a vein graft and had complete neurological and hemodynamic recovery.

Case

A 62-year-old man who had received a liver transplant for hepatitis C and had recently undergone four-vessel coronary artery bypass grafting (CABG) presented to an outside hospital with severe substernal chest pain that had continued for several hours. He was transferred to our cardiac catheterization laboratory for acute coronary syndrome with cardiogenic shock within 30 minutes of presentation to the emergency room.

Upon arrival in the catheterization lab, he was tachycardic (110 bpm) and hypotensive (76/40mmHg). His electrocardiogram demonstrated sinus tachycardia with



FIGURE

Coronary angiography

A) Pre-CABG angiogram in left anterior oblique caudal projection demonstrating dominant right coronary artery with 90% proximal stenosis. **B)** Bypass angiography of the saphenous vein graft to right coronary artery in left anterior oblique cranial projection at the time of acute coronary syndrome demonstrating a long diffuse 95% lesion in the proximal and mid body of the graft with TIMI I flow distally. **C)** Right anterior oblique cranial projection of percutaneous coronary intervention of the saphenous vein graft to right coronary artery with restoration of TIMI III flow during cardiac arrest and ongoing mechanical CPR (arrow denotes LUCAS CPR device). **D)** Left anterior oblique cranial projection of left internal mammary artery, demonstrating atretic left internal mammary artery with 99% lesion at D3 touchdown. **E)** Left anterior oblique caudal projection of the native left circulation demonstrating critical calcified left main, ostial LAD and ostial circumflex lesions. **F)** Left anterior oblique caudal projection after complex bifurcation left main, left anterior descending, and circumflex intervention using peripheral bypass.

2 mm ST segment elevation in lead AvR with ST segment depressions in precordial leads and initial troponin of 7.6 ug/L.

Emergent diagnostic coronary angiography was performed. It showed an atretic left internal mammary artery graft to a small third diagonal artery with a 99% lesion at the touchdown site, complete occlusion of the vein grafts to the first marginal and first diagonal, and 95% long diffuse lesion in the proximal and mid segment of the vein graft to the right coronary artery (this was believed to be the culprit lesion). A highly calcified, critical left main, ostial left anterior descending and LCx lesions were also noted (Figure).

The patient became increasingly hypotensive and bradycardic despite initiation of dopamine infusion. He then became unresponsive. He was intubated, and manual CPR was initiated. Cardiac surgery was consulted about re-doing the CABG. Given the ongoing CPR and the fact that the patient had had CABG within three months of presentation, it was determined he was very high risk for emergent cardiac surgery. During rhythm checks, he remained in persistent ventricular tachycardia that was not responsive to defibrillation or antiarrhythmic therapy with amiodarone. The decision was made to revascularize the culprit vein graft to the right coronary artery lesion.

Manual CPR became impractical during intervention because of poor visualization and significant radiation exposure to the personnel performing the compressions. Manual chest compressions were stopped for less than one minute to set up the LUCAS automated chest compression device (Physio Control, Redmond, Washington).

Automated compression resulted in systolic augmentation of 100mmHg. An intra-aortic balloon pump was placed with synchronization to the LUCAS compressions for diastolic augmentation, and the patient was given dopamine infusion while preparing for intervention. Right anterior oblique cranial or left anterior oblique caudal projections provided the best visualization of the vein graft to the right coronary artery. During ongoing automated CPR, the vein graft to the right coronary artery was engaged with a 6F multipurpose guide and wired with a Whisper coronary wire. It was pre-dilated with a Trek noncompliant 2.5mm x 5mm balloon and successfully stented from the proximal to mid segment with three Integrity bare metal stents (3.5 x 28 mm, 3.5 x 30 mm and 3.5 x18 mm) with resto-

ration of TIMI III flow. (See video at www.minnesotamedicine.com/CPR.)

The patient underwent a total of 80 minutes of CPR (10 minutes manual and 70 minutes automated) from the initial arrest through completion of the revascularization. After successful revascularization of the vein graft to the right coronary artery, he remained in ventricular tachycardia until he was successfully defibrillated with 200J with return of spontaneous circulation and normal sinus rhythm. A cooling catheter was placed with the intent of initiating therapeutic hypothermia; however, the patient was responsive and able to follow commands immediately post-arrest. A decision was made to forgo cooling.

The patient was supported in the ICU with hemodynamic support including intra-aortic balloon pump and inotropes for 10 days. He was then brought back to the cardiac catheterization laboratory for high-risk complex bifurcation left main, left anterior descending and circumflex stenting using peripheral bypass (Figure). The patient subsequently recovered with improvement in left ventricular function from 15% to 35% by echo on discharge. Three months later, he had complete normalization of left ventricular function and no residual neurological deficits.

Discussion

This case demonstrates the importance of early emergency services response and prompt high-quality, uninterrupted CPR using an automated chest compression device in the catheterization laboratory to facilitate emergent revascularization in a patient with acute coronary syndrome and cardiac arrest in the absence of an underlying survivable rhythm.

The major advantages of using the LUCAS device are that it can provide high-quality uninterrupted CPR and it allows for adequate cineangiographic imaging to facilitate life-saving percutaneous intervention. As demonstrated in the figure, either left anterior oblique or right anterior oblique projections with caudal or cranial angulation allow for adequate coronary imaging without significant obscuration from the largely radiolucent LUCAS device.

Automated compression devices have been studied primarily in cases of out-of-hospital cardiac arrest. The AutoPulse Aspire trial compared outcomes of 554 patients who received automated CPR with those of 517 patients who received manual CPR. There was no significant difference between the groups in terms of four-hour survival (~25%) or neurological recovery.[3] The recent multicenter LUCAS in cardiac arrest trial (LINC) evaluated a large cohort of patients in Europe who had out-of-hospital arrest. The investigators found no significant difference in survival between those who received automated or manual CPR. There was, however, a trend toward improved neurological outcomes in the group that received automated CPR.[4]

Smaller studies have focused on the use of automated CPR devices in the catheterization laboratory and have demonstrated relatively poor survival outcomes. Larsen et al. described 13 patients with cardiac arrest before arrival to the catheterization laboratory who received an average of 105 ± 60 minutes of automated compression device resuscitation in the lab during percutaneous coronary intervention.[5] Of those patients, three survived the intervention; none of them survived to discharge. In a retrospective study of 43 patients primarily with acute coronary syndrome who received automated CPR initiated in the catheterization laboratory, Wagner et al. found 26% (11/43) survived to hospital discharge with good neurological outcome. Of the patients who did survive, the average CPR time was only 16.5 minutes versus 28.2 minutes for the entire cohort.[6]

Conclusion

In this case, the use of automated high-quality uninterrupted CPR initiated in the catheterization laboratory was critical to allowing for percutaneous coronary intervention and survival with hemodynamic and neurological recovery. Working in this patient's favor was the fact that cardiac arrest took place in the catheterization laboratory after the initial diagnostic angiogram, allowing for no delay in both high-quality manual and automated compressions and percutaneous coronary intervention. Additionally, the catheterization laboratory personnel's comfort in using the automated compression device was important.

There may be a role for automated CPR in a select group of patients who arrest in a catheterization laboratory. However, further evaluation of outcomes in patients with ischemic cardiac arrest who undergo prolonged CPR in the laboratory is needed. **MM**

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About this Section

Each year, *Minnesota Medicine* highlights research and clinical work undertaken by Minnesota medical students, residents and fellows. The goal is to not only showcase the good work these medical trainees are doing but also to inform readers about pertinent topics.

This year, 22 trainees submitted brief papers describing original research or interesting cases. These were evaluated with regard to these and other questions: Did the authors provide an adequate description of the case or the problem? Was their methodology sound? Did they conduct an adequate review of relevant scientific literature? Do the findings or does the case have implications for practice or further research? The reviewers selected the following submissions for publication in this issue. Others will be published in future issues.

We thank both those who submitted their work and our reviewers Peter Kernahan, MD, PhD; Barb Elliott, PhD; Barbara Yawn, MD; and Angie Buffington, PhD.

"It Took My Breath Away"

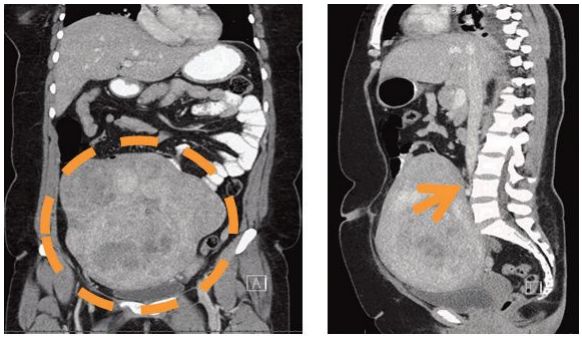
BY KAY L. INGRAHAM, MD, AND JONATHAN D. KIRSCH, MD, UNIVERSITY OF MINNESOTA INTERNAL MEDICINE DEPARTMENT

A 49-year-old previously healthy woman presented with one day of progressively worsening right-side body pain and shortness of breath. She indicated that the pain started while she was in bed the previous morning and it radiated from her right upper quadrant to her chest. It worsened with inspiration. She denied having a fever or leg swelling and having had any recent surgeries, hospitalizations or travels. She had no personal or family history of heart disease or blood clots and did not smoke tobacco or take oral contraceptives. The patient had been told she had uterine fibroids several months earlier and reported experiencing heavy menstrual periods for years.

On exam, she was tachycardic and tachypneic. Her abdomen was nontender to palpation, although she had pain in her right upper quadrant with inspiration. She had no lower extremity edema.

Because of high suspicion for venous thromboembolic disease and widespread pain, a CT scan of her chest, abdomen and pelvis was ordered. It revealed bilateral pulmonary emboli and a right-sided pleural effusion. The abdominal and pelvic CT scan revealed a 20.1 x 19.4 x 12.7 cm uterine myoma compressing the inferior vena cava and common iliac veins (Figure). Lower extremity venous Doppler ultrasound was negative for deep vein thrombosis. A complete hypercoagulability workup was also negative.

The patient was diagnosed with venous thromboembolism caused by mass effect from her large uterine myomas. She was treated with enoxaparin and scheduled for a total hysterectomy.



CT of the abdomen/pelvis revealed a 20.1 cm x 19.4 cm x 12.7 cm uterine myoma (gold circle) compressing the inferior vena cava (gold arrow) and common iliac veins.

Discussion

Venous thromboembolism is a common problem encountered by internists. It is a result of a culmination of Virchow's triad—venous stasis, vascular endothelial injury and a hypercoaguable state. Venous thromboemboli are usually classified as being caused by acquired risk factors, inherited thrombophilias or a combination of these. Acquired risk factors for venous thromboembolism include the following: immobility, hospitalization, surgery, oral contraceptive use, antiphospholipid antibody syndrome and malignancy. Inherited thrombophilias include Factor V Leiden, prothrombin, protein C and S deficiencies as well as antithrombin deficiency.

When exploring the potential causes of a venous thromboembolism, it is important to take a thorough history before reporting one as being unprovoked. The label of "unprovoked" can lead to longer anticoagulation and further unnecessary diagnostic workup. As uterine myomas are very common in women over the age of 40, it is important to recognize an enlarged uterus as a potential cause for venous thromboembolism. Definitive treatment for a venous thromboembolism in this case is a total hysterectomy. **MM**

Salmonella Lymphadenitis Mimicking Neoplastic Process in a Teen

BY ERIN DODD, JOSHUA MITCHELL, MD, SUSAN KEARNEY, MD, AND JAMES SIDMAN, MD, UNIVERSITY OF MINNESOTA MEDICAL SCHOOL, CHILDREN'S HOSPITALS AND CLINICS OF MINNESOTA

A 17-year-old female was referred to otolaryngology for evaluation of neck masses.

The masses had slowly enlarged since they were first noticed three to four months prior to presentation. The patient denied having associated systemic symptoms (fever, chills, dysphagia, weight loss, night sweats). Past medical history was significant for beta thalassemia, non-transfusional iron overload and vitamin D deficiency. The patient and her family had immigrated to the United States from a Thai refugee camp in 2010.

Physical exam showed a well-appearing young female with mild generalized pallor. Palpation revealed a 3 x 6 cm submental mass and a 4 x 7 cm mass deep to the left sternocleidomastoid muscle. Both masses were firm, nontender, nonfluctuant and fixed to nearby structures, raising concern for malignancy. The remainder of the physical examination was unremarkable.

Hematologic and iron studies were consistent with her baseline beta thalassemia. Additional laboratories (CBC, LDH, uric acid, total and direct bilirubin) were within normal limits. CT scan confirmed a large, homogenous mass in the submental space deep to mylohyoid and a second mass deep to the left sternocleidomastoid. Associated lymphadenopathy was not reactive in appearance. This presentation was most concerning for lymphoma, recrudescent tuberculosis or another primary soft-tissue malignancy such as rhabdomyosarcoma.

Excisional biopsy was performed on the submental mass the following day. Pathology revealed lymphadenitis with necrotizing and non-necrotizing granulomas with suppurative centers. Staining for acid-fast bacillus, *Bartonella* and cytomegalovirus were negative. In-situ hybridization for Epstein-Barr virus was positive in scattered lymphocytes, but not consistent with acute infection.

Interestingly, cultures from the excised mass grew 2+ presumptive *Salmonella* species.

The patient was diagnosed with *Salmonella* lymphadenitis and admitted for parenteral ceftriaxone pending *Salmonella* speciation. Blood cultures were negative for bacteremia, and a negative neutrophil oxidative burst test ruled out chronic granulomatous disease. Final cultures from the excised mass demonstrated pan-sensitive *Salmonella enterica* subsp. *enterica* I 6,7::1,5 (monophasic variant of Group C1 serotype). The patient was discharged on four weeks of oral cefuroxime according to infectious disease recommendations. She returned to the clinic at two weeks and two months post-op. Physical exam showed the lymphadenitis resolved and that she had normal neck mobility.

Discussion

Nontyphoidal *Salmonella* (NTS) species are most commonly associated with acute gastroenteritis, while lymphadenitis is a rare extraintestinal manifestation of salmonellosis. Only a handful of cases have been reported in the literature.[1-4] Although most cases are self-limited, bacteremia complicates up to 5%.[5] Focal NTS infections can occur with or without sustained bacteremia and are most prevalent and severe in immunocompromised hosts.[6-9]

Conditions resulting in iron overload, such as beta thalassemia, predispose individuals to salmonellosis by impairing their immune function.[10-12] *Salmonella* lymphadenitis is rare in immunocompetent hosts.[13] NTS *Salmonella* spp. should be on the differential as a causative pathogen of cervical lymphadenopathy in select patients with iron overload thalassemia or other immunodeficiency states. **MM**

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A Blurry Differential

Optic Neuritis Leads Down a Treacherous Slope

BY JAMES MAPELLENTZ, MD, MOLLY FANSLER, MD, JENNIFER OROZCO, MD, DAVID NASCENE, MD, MICHAEL LINDEN, MD, PHD, CHRISTOPHER MOERTEL, MD, DEPARTMENTS OF PEDIATRIC HEMATOLOGY AND ONCOLOGY, PATHOLOGY, AND RADIOLOGY, UNIVERSITY OF MINNESOTA CHILDREN'S HOSPITAL

A 14-year-old otherwise healthy female presented to her primary care physician with blurred vision. An MRI was done, but the patient's dental braces obscured the optic nerves and significant areas of the brain. She was referred to neuro-ophthalmology, where an assessment revealed visual acuity of 20/100 (left) and 20/300 (right). Visual field testing demonstrated centro scotoma (right) and centrocecal scotoma (left). Fundoscopic exam showed normal optic disc. Findings revealed Uhthoff's phenomenon—her neurological symptom worsened when her body temperature rose. She was diagnosed with bilateral retrobulbar optic neuritis and received high-dose IV steroids followed by oral steroids for six weeks. Her symptoms resolved.

Six months later while on a ski trip, the girl experienced progressively worsening slurred speech at high altitudes and was unable to ski. Because of this, the family returned home for evaluation at their local ED. She had a normal head CT and EKG with no findings on physical exam. She was diagnosed with vertigo and prescribed meclozine.

One week later, the girl presented to her primary care physician with acute onset of dysarthria, ataxia, vertigo, nausea and difficulty swallowing. Her primary care physician noted a large, hard, nontender LUQ abdominal mass, and she was admitted to our hospital.

In the hospital, review of symptoms revealed difficulty swallowing solids and a 6-pound weight loss during the preceding two months. The patient had not experienced fever or drenching night sweats. Chest/abdomen/pelvis CT revealed a 10 cm anterior mediastinal mass and diffuse lymphadenopathy with marked splenomegaly. Her dental braces were removed, and a subsequent MRI of the brain was done. It showed swollen appearance, increased T2 signal intensity in majority of pons and anterior portion of medulla, and ill-defined foci of T2 hyperintensities in left cerebellar peduncle most consistent with a brainstem encephalitis. A swallow study showed thin liquid aspiration. Labs showed leukocytosis of 27.9 with ANC of 24, anemia with hemoglobin of 9.5 g/dL with MCV of 70, reticulcyte percentage of 2.4, platelet count of 332, CRP of 76.6 mg/L, ESR of 100 mm/hr, and normal LDH, uric acid, basic metabolic and hepatic panel, and negative EBV serologic study.

Neurology was consulted and agreed that paraneoplastic process secondary to lymphoma was most likely. Lymph node biopsy revealed Hodgkin's lymphoma nodular sclerosing subtype. Paraneoplastic panel was negative. Because of the involvement of multiple lymph groups and the spleen—and because the patient's symptoms did not meet "B symptoms" criteria, her disease classification was stage 3AS bulky disease. Her neurological symptoms resolved with chemotherapy.

Discussion

This case highlights optic neuritis as the first sign of an undiagnosed lymphoma in the absence of class B symptoms. The patient's age was the sole classic finding for a lymphoma on presentation. She did not have night sweats and fevers—other classic signs of lymphoma—even at the time of her diagnosis.

This case also underscores the importance of a complete physical exam, as palpation of the abdomen led to the diagnosis. Even in the setting of incongruous symptoms, otherwise unexplained cases of optic neuritis should warrant inclusion of a possible neoplastic process on the initial differential. (The differential had included Leber's hereditary optic neuropathy, sarcoidosis, Lyme disease, systemic lupus erythematosus, neuromyelitis optica and vitamin B12 deficiency.) Physicians should be aware that if MRI is needed, orthodontists will remove and replace braces at no additional cost to the family.

In addition, this case illustrates how an incorrect diagnosis can have potentially dire consequences. Had the lymphoma been diagnosed earlier, the patient would not have received steroids, which masked the lymphoma, prolonging the disease course. When steroids are given to patients with underlying lymphoma, it alters their prognosis and place them at increased risk of relapse, thus necessitating more intensive chemotherapy. **MM**

The Relationship between Adolescent Self-Perception of Weight, Mental Health and Social-Protective Factors

BY ELIZABETH S. JARRETT, AMY L. GOWER, PHD, IRIS W. BOROWSKY, MD, PHD, UNIVERSITY OF MINNESOTA MEDICAL SCHOOL, DEPARTMENT OF PEDIATRICS

With increasing importance placed on physical appearance in our culture, body image and weight worries may negatively affect the emotional well-being of adolescents. However, researchers disagree as to how an adolescent's weight, their perception of their weight and their mental health status relate.[1,2]

The purpose of our study was to examine mental distress and social-protective factors in youths of varying weights and their perceptions of their weight.

Design/Methods

We used 2013 Minnesota Student Survey data from 122,180 students (8th, 9th and 11th graders).[3] Using self-reported information, adolescents were classified based on their perception of their weight (overweight or not overweight) and their weight status (not overweight, overweight or obese). Weight status classifications were based on BMI (kg/m^2) percentiles from age- and sex-specific CDC growth charts.

Internal mental distress was measured using a validated screener assessing somatic, depressive and anxiety symptoms; traumatic distress; and homicidal or suicidal thoughts during the past year.[4] Protective factors examined were connectedness with parents, school and friends and internal assets.

Results

Girls in all weight status groups were more likely than boys to perceive themselves as being overweight. For all weight status groups, adolescents who perceived themselves as being overweight reported significantly higher internal mental distress and lower mean levels of protective factors as compared with adolescents who did not perceive themselves as being overweight.

For example, among adolescents who were overweight, those who perceived themselves as being overweight were more likely to report high internal mental distress (45.8% of girls, 24.3% of boys) than those who did not perceive themselves as being overweight (32.0% of girls, 14.3% of boys).

The adolescents with the highest frequency of high internal mental distress were those who perceive themselves as being overweight but who are not overweight; in this group, 54.2% of girls and 33.7% of boys reported high internal mental distress.

In general, adolescents of all weights who perceived themselves to be overweight reported fewer protective factors than those who did not perceive themselves as being overweight.

Conclusion

Perceiving oneself as overweight during adolescence is a risk factor for internal mental distress and decreased social protective factors, and thus has significant implications for adolescent health and well-being. Primary care clinicians and counselors should assess weight perception in addition to weight status when caring for adolescents. **MM**

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Health Implications of a Changing Climate

BY KRISTIN K. RAAB, MPH, MLA

For the past five years, staff from the Minnesota Department of Health's Minnesota Climate and Health Program have been studying climate data and the potential health effects of climate change in the state. This year they released the "Minnesota Climate and Health Profile Report 2015," which presents a synthesis of their research. This article summarizes key points from that report.

In February, the Minnesota Department of Health's (MDH) Minnesota Climate and Health Program released "Minnesota Climate and Health Profile Report 2015." The 100-page report provides a comprehensive review of the evidence for climate change and identifies health concerns relating to it and populations at high risk for these problems.

The health department's work on climate change began in 2010 when it received funding from the Centers for Disease Control and Prevention (CDC). That funding was used to create and support the Minnesota Climate and Health Program. Currently, the CDC provides funding for 16 state and two municipal health departments to develop and test methods for adapting to present and future changes in climate.

For the past five years, Minnesota Climate and Health Program staff have been analyzing and synthesizing research and data to identify the effects of climate change on health and the populations likely to be most affected and developing adaptation strategies. In addition to releasing its 2015 report, the program has published the "Minnesota Climate Change Vulnerability Assessment 2014"; developed the Minnesota Extreme Heat Toolkit, which provides information on how to prepare for heat waves in order to prevent heat-related illnesses and deaths; formulated a strategic plan for adapting to climate change; and produced six training modules on climate change and its effect on health as well as a film, *Health and Climate,* with Twin Cities Public Television. Program staff also have helped plan and sponsor conferences; given presentations on climate change and health; and provided technical assistance to cities and counties related to climate change and mapping at-risk populations.

The scientific evidence regarding climate change and its effects on health has grown since 2010, and the "Minnesota Climate and Health Profile Report 2015" reflects this new knowledge. This article summarizes some of the key points in the report.

Evidence of Climate Change in Minnesota

Temperature

Data from the first recorded temperatures in Minnesota in 1895 to the present show that Minnesota's weather is becoming warmer. In the early 1900s, the annual average air temperature was 39.2°F. Today the average is 41.6°F.[1] The pace of warming has increased especially fast in the last few decades. From 1895 to 1959, annual average air temperatures increased at a rate of about 0.2°F per decade. In comparison, the rate of increase between 1960 and 2013 was 0.5°F per decade.[1] From 1970 to 2013, the rate of increase in annual average temperature has accelerated to 0.6°F per decade, tying Minnesota with Maine and Massachusetts as the eighth fastest-warming state in the continental United States.[2] Data from 1895 to 2013 show that nine of the 10 warmest years have occurred after 1980.[1]

Not only are annual average temperatures higher, in recent years, we have seen new record highs. On July 19, 2011, Moorhead, Minnesota, set a new all-time state record with a dew point temperature of 88°F. That produced a heat index of 134°F, which also was the highest ever recorded in Minnesota.[3] Climate change projections suggest that temperatures will continue to rise, leading to more frequent and intense heat waves.[4]

Minimum or overnight low temperatures have been rising faster than the maximum temperatures.[5] In the early 1900s, the average annual minimum air temperature was 28.2°F. The average minimum temperature is now 31.3°F.[1]

The greatest changes are occurring during certain seasons. Winter temperatures have been rising much faster than annual average temperatures. The average annual winter air temperature in the early 1900s was 8.6°F. Now the average winter air temperature is 13.7°F.[1] In addition, the pace of warming is increasing. Average annual winter temperatures, as measured from December through February, increased at a rate of 0.3°F per decade between 1895 and 1959, then at a rate of 1.1°F per decade between 1960 and 2013.[1]

Warmer temperatures have predictably led to an earlier start of spring and a longer growing season. In the Midwest, there was a nine-day increase in number of days between the date of the last spring freeze and the date of the first fall frost from 1991 to 2011 as compared with the period from 1901 to 1960.[6] Comparing the 1990 U.S. Department of Agriculture Plant Hardiness Zone Map with the 2012 map, we can see that Minnesota's plant

hardiness zones have shifted—from most of the state being primarily in Zone 3 or 4 to more of it being in Zone 4 and some parts of southern Minnesota being in Zone 5.[7] Each zone represents a 10-degree F span of average annual minimum winter temperatures, so a higher zone number reflects a higher average annual minimum winter temperature. In Zone 4, average annual minimum temperatures are between -30°F and -20°F. Because of these changes, plants that previously could not survive in Minnesota may now survive and thrive.

Precipitation

Minnesota's precipitation patterns are changing. From 1895 to 1959, the state saw a slight decrease in average annual precipitation (about -1.5 inches per century). From 1960 to 2013, average annual precipitation has been increasing at a rate of 3.5 inches per century.[1]

In addition to changes in average annual precipitation are changes in the character of Minnesota's precipitation events. From 1958 through 2007, the number of very heavy events (defined as the heaviest 1% of all daily events) increased by 31% in the Midwest.[8] Another study found a 71% increase in the number of storms discharging at least 3 inches of precipitation between 2001 and 2010 as compared with the number between 1961 and 1990.[9] Since 2000, there have been five "super storm" events in Minnesota that have produced 7 or more inches of rainfall within 48 hours.[10]

Precipitation delivered in heavier, localized storms leads to flooding and, conversely, longer dry spells between events. In 2012, 75 Minnesota counties were declared primary or continuous disaster areas for drought, and 15 counties and three tribal reservations were declared disaster areas for flooding. Eight counties received disaster declarations for both.[11,12]

In summary, Minnesota is seeing summers with more extreme heat, warmer winters (on average), increased localized and heavy precipitation, and longer dry spells.

The Impact of Climate Change on Health

More heat events may lead to more cases of heat-related illnesses. Heat waves directly affect health by causing heat exhaustion, heat stroke and even death. During the summer of 2011, the heat index in the Twin Cities reached 105°F or greater on six days. That same summer there were 1,255 emergency department visits and three deaths directly related to the heat.[13,14] Heat also can exacerbate symptoms related to cardiovascular disease, respiratory diseases, diabetes and other conditions.[15] One study demonstrated an association between short-term increases in cardiovascular-related hospital admissions and elevated air temperatures.[16] With more heat waves predicted in the future, Minnesota can expect more visits to emergency departments for heat-related illnesses and illnesses exacerbated by heat.

Warmer weather also may lead to more cases of tick-borne diseases. Although many factors influence a person's risk of developing a vector-borne disease, climate is an important variable.[17] Higher temperatures have been linked to the earlier emergence of blacklegged ticks and their spread to new geographical areas.[18] Blacklegged ticks carry the pathogens that cause Lyme disease, human anaplasmois and babesiosis.

Lyme disease is the No. 1 vector-borne disease in Minnesota. The number of cases has been steadily increasing since 1982, when the state began collecting information on people diagnosed with the condition.[19] The median number of 1,065 Lyme disease cases reported annually from 2005 through 2013 is considerably higher than the median number of 463 cases reported annually from 1996 through 2004.[20] In 2013, there were more than 1,400 confirmed cases of Lyme disease in Minnesota.[20] Given Minnesota's changing climate, it is likely that the incidence of tick-borne diseases will continue to increase.

A longer growing season corresponds with a lengthening pollen season. From 1995 to 2013, Minneapolis experienced a 21-day increase in the length of the ragweed season.[21] Consequently, those with allergies may be affected for a longer period of time than in the past.[22] Some suggest a link between increases in air temperature and carbon dioxide in the atmosphere and increased pollen production. Thus, in addition to a longer pollen-production season, certain trees and plants may produce larger quantities of pollen than they do now.[23]

Increased precipitation may lead to more flooding, which can affect health both directly and indirectly. From 1996 to 2013, flash floods caused 13 deaths.[24] Flooding also can lead to respiratory problems arising from exposure to mold in wet basements; mental health problems arising from injuries or property loss; and disease outbreaks related to contaminated drinking water.

Final Thoughts

The evidence is clear. Climate change is already occurring and has implications for health.

Across the country, physicians are already noticing changing health trends. In a survey by the American Thoracic Society,[25] 77% of respondents said they had seen an increase in chronic disease severity related to air pollution; 58% said they had seen an increase in the number of allergic reactions resulting from exposure to plants or mold; and 57% said they had seen an increase in the number of injuries related to severe weather.[25]

In the coming years, physicians likely will see more patients with heat-related illnesses, vector-borne diseases, allergies and flood-related illnesses. They may see changes in the types of illnesses and injuries patients present with, and their patient load may increase. Awareness that our climate is changing and that there will be corresponding health implications is the first step toward preparing for them. Physicians can play a key role in ensuring that clinics, emergency rooms and hospitals are preparing for and responding to the

effects of these changes. The Minnesota Department of Health will continue working to ensure that the medical and public health communities are well-equipped to face the new realities. **MM**

Kristin Raab is director of the Minnesota Climate and Health Program at the Minnesota Department of Health.

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For more information

To learn more about the health implications of climate change and what can be done, go to www.health.state.mn.us/divs/climatechange/index.html.

To read "Minnesota Climate and Health Profile Report 2015," go to www.health.state.mn.us/divs/climatechange/docs/mnprofile2015.pdf.

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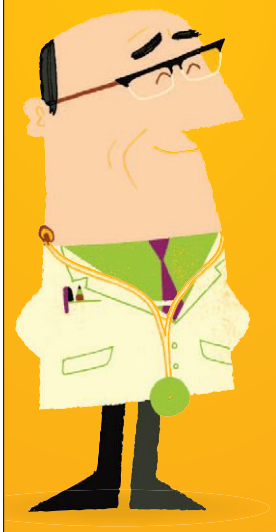

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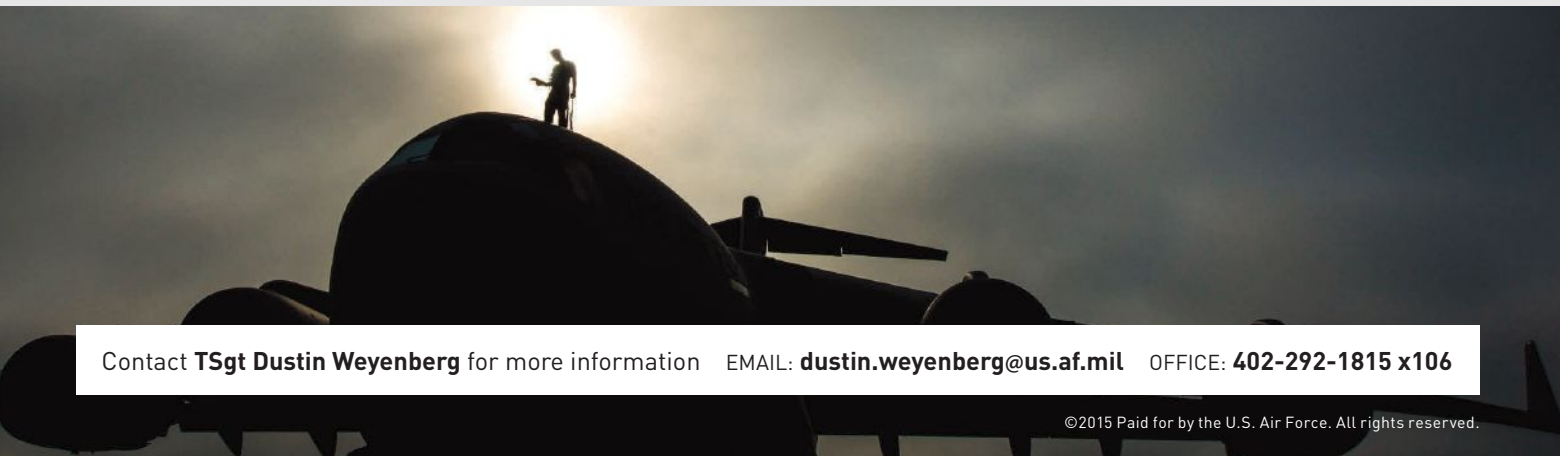

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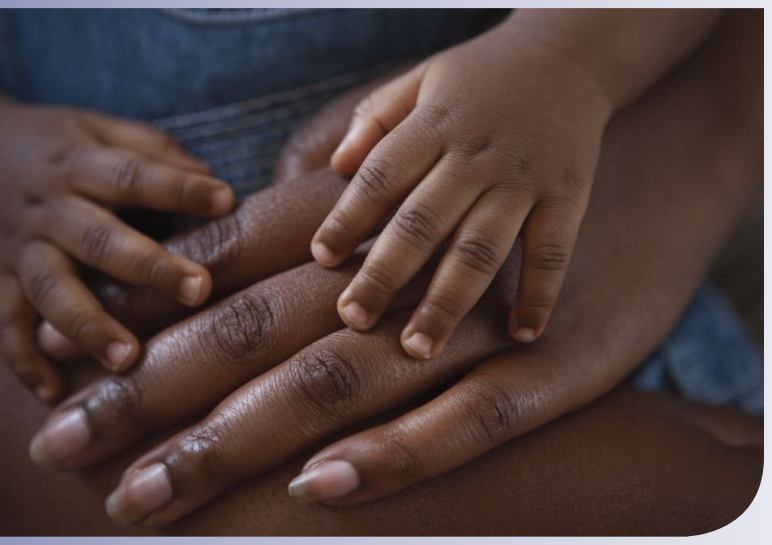


Communication 101

BY MARILYN ASCHOFF MELLOR, MD

August, a sauna
and
the lure of a pool too much
for the preschool girl

floating
face down when found

frantic bystander breaths
before her eyes spark
her ebony skin rescue-charged

but in the ER
no response to simple questions
her gaze drifting

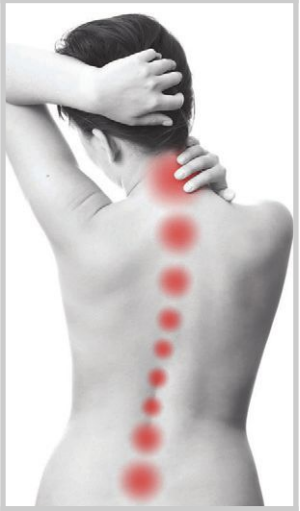
my worry rising (neurons undone?)
until
her mother sweeps
in

nun-like garments
and simple hijab,
torrents of words
foreign

to me
the girl's face washed
in understanding,
her answers and my spirit
flowing
open spillways.

Marilyn Aschoff Mellor is a retired pediatric emergency room physician.

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VIDEO 3: "How to Choose an Opioid: Practical Pharmacology" **Charles Reznikoff**, MD, Division of Addiction Medicine, Hennepin County Medical Center, Assistant Professor of Medicine, University of Minnesota Medical School

VIDEO 4: "A Differential Diagnosis for 'Pain" **Charles Reznikoff**, MD, Division of Addiction Medicine, Hennepin County Medical Center, Assistant Professor of Medicine, University of Minnesota Medical School

VIDEO 5: "What is Buprenorphine?" **Charles Reznikoff**, MD, Division of Addiction Medicine, Hennepin County Medical Center, Assistant Professor of Medicine, University of Minnesota Medical School

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VIDEO 3: "Pain Psychology, Mental Status Exam, and Non-Opioid Options for High Risk Patients"
Charles Reznikoff, MD, Division of Addiction Medicine, Hennepin County Medical Center, Assistant Professor of Medicine, University of Minnesota Medical School. **Adeya Richmond**, PhD, LP, Senior Clinical Psychologist, Psychology Department, Hennepin County Medical Center. **Sebastian Ksionski**, MD, Pain Program/CMC Director, Hennepin County Medical Center

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