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## CDC Calls on Clinicians, Public Health Departments to Help End Vaping-Related Injuries

**T**he cases keep pouring in. By late September, more than 800 lung injuries associated with vaping have been reported to the CDC. Public health authorities say they are expecting many more as investigators scramble to discover what precisely is causing damage.

The cases have been identified in 46 states and one territory, and there is no question that the issue is of high concern. At least 12 deaths have been confirmed so far, and many patients are spending serious time on breathing tubes in hospital ICUs.

While it is not clear yet what is causing this sudden uptick in lung illnesses related to vaping, frontline providers are urged to be on the alert for breathing problems, coughing, or chest pain, particularly in younger patients. Less commonly, patients with these lung problems report nausea, vomiting, diarrhea, fatigue, fever, abdominal pain,

or even seizures. Roughly half of the cases identified are in patients younger than age 25, and 16% are in patients younger than age 18. Nearly three-quarters of the identified cases have been male.<sup>1</sup>

What is common to all these lung injury cases is the use of vaping devices or e-cigarettes. Many affected patients have reported using tetrahydrocannabinol (THC), the high-inducing ingredient in marijuana, in these vaping devices.

The CDC warns it is unsafe to use any tobacco product, particularly for young people. The agency also

notes that nicotine can inflict damage on the developing adolescent brain. Further, public health agencies are calling on clinicians as well as state and local health departments to work with them to put a stop to this outbreak. Among the first to sound the alarm about vaping was Children's Hospital of

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Wisconsin (CHW) in Milwaukee. On July 25, CHW reported to the Wisconsin Department of Health Services that it had hospitalized eight teenagers with seriously damaged lungs, explains **Michael Meyer**, MD, the director of CHW's pediatric ICU.

"That announcement was meant to inform the public, but also other clinicians of what was occurring," he says. "A cluster of patients with similarly severe symptoms presented in a short amount of time, causing concern from the doctors. After bronchoscopies were done, it became apparent that each of the patients had damage to their lungs. The connection was made that each of them reported vaping prior to becoming ill."

Some patients needed to be intubated and spent several days in the ICU, Meyer notes.

"Treatment varied depending on the severity of symptoms. Thankfully, [the patients] have all responded well to high-dose steroids," he reports. "Follow-up care involves continued work with our pulmonary clinic and

includes counseling to help these teens stop vaping."

Clinicians also continue working with patients to ensure they are using the proper amount of steroid medication for home recovery. Meyer observes that it is too soon to know what the long-term effects from vaping will be.

"Internally, our teams are well aware of the symptoms and treatments for these patients. Importantly, they know the questions to ask regarding medical history that can help get to the bottom of what is causing their illness," he says.

For instance, in the ED, while there is no change in the emergency management of these types of cases, there is a heightened awareness to obtain a history for vaping, Meyer explains. This is important because since these first cases came to light, CHW has continued to see, on average, one new case per week that clinicians suspect is related to vaping.

What are the primary tipoffs that vaping could be at the root of a patient's problems? The most common presentation is shortness

## EXECUTIVE SUMMARY

Hundreds of patients with vaping-related lung injuries have been identified, and public health experts expect more in the weeks ahead as investigators scramble to identify precisely what is causing the injuries. As of late September, more than 800 lung injuries associated with vaping have been reported, including 12 patients who died and many others who spent several days in the ICU on breathing tubes.

- For the more than 370 cases for which complete data is available, roughly half are patients younger than age 25, and 16% are younger than age 18. Nearly three-quarters of identified cases have been male.
- Frontline providers should look for breathing problems, coughing, or chest pain, particularly in younger patients. Less common symptoms include nausea, vomiting, diarrhea, fatigue, fever, or abdominal pain.
- Experts note that at least 30% of high school students are using vaping products, although some may be reluctant to share this information with clinicians.

of breath, coughing, and wheezing, explains **Pushan Jani**, MD, an assistant professor of pulmonary and sleep medicine at McGovern Medical School at UTHealth in Houston. Many patients will experience milder symptoms at first and often will not take them seriously, Jani observes.

“Sometimes, depending on what kind of vaping products were used and what kind of vaping [devices] were used, patients can develop severe lung inflammation,” he says. “That lung inflammation can lead to acute respiratory failure, which may require endotracheal intubation and being on a mechanical ventilator.”

The rapidly increasing number of cases, and the severity of the illness involved, concerns both public health authorities and clinicians. Roughly one-third of the early vaping-related cases that were first reported out of the Midwest required breathing tubes and ICU-level care, Jani notes.

While the CDC is working to discover precisely what is causing these vaping-related illnesses and deaths, Jani believes there are multiple factors involved. For instance, he notes there is no legal regulation of vaping products. People are using and reusing vaping containers, often adding marijuana and other ingredients.

Jani suspects that various flavoring agents used commonly in vaping products may play a role in causing lung inflammation, too. “These are

edible flavoring agents, which means they have been approved for use in food, but they have not been approved for use in a smoking environment,” he says. “Nobody knows what these flavoring agents will do when they are inhaled in smoke.”

The challenge for frontline practitioners is that many patients affected by these vaping-related illnesses are teenagers who may be reluctant to disclose their vaping habits.

“When they complain of shortness of breath, they may not even tell the right story to the doctors because they are worried their parents will find out about their vaping,” Jani explains.

Some clinicians may ask why these vaping-related lung problems are only just coming to light. The answer is unclear.

“Even though vaping has been around for the last 20 years, it is relatively new that emergency physicians need to maintain a higher level of suspicion in patients who present with shortness of breath, specifically in the [teenage] group,” Jani observes.

However, it is essential to always ask teenage patients about their vaping habits. “At least 30% of high school students are using these vaping products nationwide. That is a big number when you consider that three or four out of every 10 teenagers are using these products. That is a huge thing,” Jani says. “It is important for physicians to bring the question

[regarding vaping use] up every time to ensure that teenagers understand that this is a bad habit to have.”

Further, vaping can lead users to other harmful behaviors such as cigarette smoking, cocaine use, and marijuana use, Jani observes. “Studies show that students who are exposed to e-cigarettes are at higher risk of picking up other addictions later on,” he says. “Sometimes, [teenagers] don’t know these products can be harmful to them. They are being sold as tobacco-less, harmless products, and that is not really the case ... community education, physician counseling — all of that should help us prevent more cases from happening.”

Public health messages, journal articles, and the media are elevating this issue as a medical concern so that physicians are more attuned to vaping-related lung problems when patients present with breathing problems, Jani shares. Still, he also encourages practitioners to seek out information about vaping and monitor developments as investigators try to pin down the specific causes of these lung problems. ■

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# Public Health Authorities Deploy Interagency Response to Vaping-Related Injuries

**A**s vaping-related lung injury cases continue to mount, the CDC has activated its emergency operations center to enhance an interagency response to the outbreak. In a media briefing on the urgent health concern

on Sept. 19, **Anne Schuchat**, MD, the CDC’s principal deputy director, explained that the investigation underway is complex, involving several states, hundreds of cases, and many substances and products.<sup>1</sup>

“I’d like to stress how challenging this situation is, as patients may have been exposed to a variety of products and substances, may not know the contents or sources of these products, and in some instances

may be reluctant or too ill to fully disclose all the details of interest,” she explained. “We have been working with the states and the FDA to collect information about recent e-cigarette product use among patients, and to test the substances or chemicals within vaping products used by the patients.”

While there does not yet appear to be one product or substance responsible for all of the cases, the FDA has collected more than 150 vaping product samples from several states for analysis in its forensic chemistry center, according to **Mitch Zeller**, JD, director of the FDA Center for Tobacco Products.

“FDA is analyzing these samples for the presence of a broad range of additives, pesticides, poisons, and toxins,” he explained during the Sept. 19 media briefing. “Identifying any compounds present in the samples is just one piece of the puzzle and will not necessarily answer questions about causality. That remains the focus of our ongoing work.”

Zeller noted that the FDA’s Office of Criminal Investigations has begun parallel investigative efforts to focus on what is making people sick as well as pinpointing the supply chain for these products.

The agency has established a landing page to disseminate information about the FDA’s work in this regard as well as to provide resources for the public, state health

agencies, and healthcare providers.<sup>2</sup> “Getting to the bottom of these respiratory illnesses is a top priority for all federal and state agencies involved, and we are committed to taking appropriate actions as the facts emerge,” Zeller said.

**Jennifer Layden**, MD, chief medical officer and state epidemiologist for the Illinois Department of Public Health, explained during the media briefing that her state had identified 69 cases of vaping-related lung injuries, including one patient who died from the ailment.

“We continue to get new reports of cases daily,” she said. “The patients are quite ill and are using numerous products and devices prior to becoming ill. No one product or type of products has been definitely linked with these illnesses.”

Recognizing that many young people who have used vaping products are reluctant to report these activities, Illinois has developed an online survey where users can report about their vaping habits anonymously.

“Identifying differences among people who vape and have become ill and those who have not may help us to advance this investigation,” Layden said.

Layden also noted that the state has simplified the reporting form for clinicians and hospitals, and urged them to continue to their efforts to

report suspect cases to public health. “This partnership between clinicians and public health has, and will continue to be, critically important,” she said. “We don’t know if there is a single exposure that’s the problem or multiple, so I think the variety of hypotheses are being considered. At this point, it’s a national outbreak, and there may be problematic source material or modifications that are occurring in different places. We really need to use caution at this time in terms of our consumer recommendations and have an open mind in terms of the investigation.”

The CDC has established guidance for healthcare providers regarding how to recognize and respond to suspected cases of vaping-related lung illnesses. Plenty of information and education can be accessed online at: <http://bit.ly/2n7r9q1>. ■

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# ED-Based ICU Delivers Improved Outcomes, Reductions in Admissions to Inpatient ICUs

As demand for critical care increases, EDs often find themselves overwhelmed with patients requiring ICU-level care, but no empty beds. The result is a boarding problem and potentially worse outcomes for patients. Studies have shown that critically ill patients who wait longer than six hours in the ED for an ICU bed record longer inpatient stays and higher mortality rates. Yet in the United States, data show that roughly one-third of ED patients destined for an inpatient ICU bed fall into this group.

To address this problem, the University of Michigan Health System decided to pioneer a new model of care designed to accelerate critical care to ED patients requiring ICU-level services. The Emergency Critical Care Center (EC3) opened in February 2015 at the University of Michigan Medical Center (UMMC). Now, recent data show that not only has EC3 succeeded in improving outcomes for patients, it also has reduced inpatient ICU admissions and provided a rich educational experience for the emergency physicians, nurses, and other healthcare personnel who train to work there.<sup>1</sup>

While operating such a unit likely is resource- and cost-prohibitive for many hospitals, EC3 administrators note that it offers a scalable roadmap for other EDs that struggle to manage the increasing volume of patients who present with critical care needs.

Equipped with five resuscitation trauma bays and nine patient rooms within 7,800 square feet of space, the EC3 sits adjacent to the main adult ED, a busy department that handles about 75,000 patients per year. Furthermore, while physicians

and nurses who staff the EC3 all have received some training in critical care medicine, they must be able to float between the EC3 and the ED as needed.

Patients who eventually go to the EC3 always are seen in the ED first, explains **Benjamin Bassin, MD**, EC3's director of operations and assistant professor of emergency medicine at the University of Michigan Medical School. "Most of our residents will go on to work at places that don't have an ED-ICU," explains Bassin, who co-authored the recent study about EC3. "We don't want to dilute their experience of learning to take care of

critically ill patients and the initial resuscitation/stabilization phase."

While the EC3 will take any critically ill patient, a decision on whether a patient requires that level of care typically is made after about two hours. "That generally gives [the resident and the emergency medicine attending physician] the time to do all the diagnostics, the initial stabilizing procedures, imaging, and workups to get an idea of what is happening and what the trajectory is for the patient," Bassin shares. "At that point, the primary ED attending [physician] and the resident managing the patient will then consult with the EC3 attending

## EXECUTIVE SUMMARY

As demand for critical care increases, EDs can become backlogged with patients awaiting space in an inpatient ICU. However, studies show that an excessive wait negatively affects outcomes. To solve this problem, the University of Michigan Health System pioneered a new model of care that involved placing an ICU within their flagship adult ED. Called the Emergency Critical Care Center (EC3), the approach has not only accelerated ICU-level care to critically ill patients who present to the ED, it also has reduced ED-based admissions to inpatient ICUs.

- First opened in February 2015, the EC3 is equipped with five resuscitation trauma bays and nine patient rooms within 7,800 square feet of space. It is staffed by six nurses and three providers.
- All patients are seen and assessed in the ED first. Generally, staff decide within two hours if patients need care in the EC3. Staff in the EC3 manage critically ill patients for the first six to 12 hours of their care.
- Data show that risk-adjusted 30-day mortality rates decreased from 2.13% in emergency patients presenting to the ED before implementation of the EC3 to 1.83% in patients who presented to the ED after implementation. This translates into an additional life saved every 36 hours, according to investigators. Analysts also found that ED-based admissions to an inpatient ICU declined from 3.2% before implementation of the EC3 to 2.7% after implementation.
- Investigators note that while an ED-based ICU probably is not affordable for many medical centers, the approach can be scaled to suit hospitals with different sizes and needs.

physician. Then, they will together decide if the patient is appropriate for the EC3.”

Most critically ill patients deemed to require ICU-level care will go to the EC3.

“The majority of our patients are the medically critically ill. Even if there is an available bed upstairs in the medical ICU, if we have the capacity [in the EC3] we will take the patient for the first six to 12 hours of their care,” Bassin says. “In a very short amount of time, we can deliver those early first hours of critical care to get them stabilized.”

This care may involve everything from placing patients on ventilators, inserting lines, titrating medicines, and obtaining all the needed labs and advanced imaging studies. Further, EC3 providers will engage with appropriate consultants on the case and speak with family members, Bassin adds. “We tie all of those pieces together pretty quickly,” he notes.

The result of this process is generally accelerated care for the patient, improved outcomes, and reduced inpatient ICU use, according to the study results. Looking at the electronic medical records of a cohort of ED visits between Sept. 1, 2012, and July 31, 2017, investigators compared data from before and after the EC3 was implemented.

Specifically, analysts examined 168,877 ED visits from before the EC3 opened its doors and 180,433 visits following unit implementation. They found that risk-adjusted 30-day mortality rates decreased from 2.13% before implementation of the EC3 to 1.83% after. This translates into an additional life saved every 36 hours, according to Bassin. Investigators also found that ED-based admissions to an inpatient ICU declined from 3.2% before implementation of the EC3 to 2.7% after.

In cases where patients require surgery, interventional cardiology procedures, or any other services that cannot be provided in the EC3, patients typically will bypass the unit for a service that can provide them with definitive care. For instance, trauma patients are taken directly to a trauma-burn ICU, Bassin notes. “We don’t want to get in the way of any time-sensitive intervention,” he says.

However, when there are empty beds in the EC3 and people to be seen in the ED, the unit will pull in patients from the waiting room, even if they are not critically ill. This keeps the space from sitting empty while there is demand for ED capacity, Bassin explains. “We want everybody [in the EC3] to be able to take care of general emergency medicine patients when needed,” he says.

In fact, Bassin notes that it is not unusual for the EC3 to take on patients who may not be critically ill, but nonetheless require procedures that take time to complete. For instance, if a patient has choked on a chicken bone and needs an upper endoscopy along with sedation and intubation, that patient may be cared for in the EC3. “We will pull those [types of] patients in because they are very time-intensive for the regular ED to manage,” he explains. “We are kind of an incremental resource for the ED overall.”

The number of patients in the EC3 tends to follow the traditional volume curve in the ED, Bassin states. “When the ED gets busy, we get busy because the same percentage of critically ill patients ... remains constant with some variation,” he says. “Between 11 a.m. and 11 p.m. on Monday through Friday, the EC3 is very busy. Sunday morning at 3 a.m., the ED is not very busy. [The EC3] may be less busy as well, but in general we try to stay full. We flex

our capacity [to care for] patients who may benefit from an extra set of hands.”

All 21 of the attending physicians who work in the EC3 are board-certified or trained in emergency medicine. Eight of the 21 also are board-certified in critical care medicine, Bassin notes. However, he says that all these physicians have committed to keep up with continuing education in critical care medicine. “We are also standing up for the ongoing quality review of care delivered in the EC3,” he adds.

In addition to the attending physicians, the EC3 employs physician assistants who specialize in emergency medicine and have some additional critical care training. There also are critical care fellows who rotate through the unit. Further, senior residents who are interested in critical care, both from emergency medicine and other specialties in the hospital, spend time in the EC3, Bassin observes.

Nurses who want to work in the EC3 have to work in the ED first, explains **Renee Havey**, MS, RN, CCRN, ACNS-BC, CEN, a clinical nurse specialist in adult emergency services at UMMC. “Even if we have someone who has ICU experience, they have to be oriented to the ED and work there usually about a year or a year and a half. Then, they can get trained for the EC3, but it is always with the understanding that they are an ED nurse first,” says Havey, another study co-author.

While Havey started her career as a staff nurse in the ICU, most nurses who express interest in working in the EC3 come from the emergency medicine setting. “A lot of people feel it is the next step in their professional growth in our department, to be able to critically think and manage complex situations,” she explains. “Now,

there are patients and scenarios where you are getting some of these advance lab values back and you have to act on them.”

The role requires flexibility and adaptability because situations always are changing, Havey shares. “We may not have many patients in the EC3, so the nurses will go out and help with triage in the ED,” she says. “But then we may get a bunch of [critically ill patients], and we will have to pull those nurses back to the unit. This [requires] nurses to be able to ... accept those changes and just ride with them.”

Training the nurses to work in the EC3 presents some challenges, Havey acknowledges. “A number of people want to work back there, and we can only train so many people at a given time,” she says.

Further, once nurses are fully oriented to work in the EC3, they have gained highly valuable skills and often are presented with other opportunities, so staff turnover is a continuing issue. For instance, some nurses have decided they really like working in critical care medicine, so they go on to work fulltime in an inpatient ICU, Havey notes. In other instances, nurses in the EC3 have opted to further their education and become certified registered nurse anesthetists.

While it is clear that the EC3 offers a rich educational environment for nurses, the continuing exodus of highly trained staff keeps administrators busy. “That is one challenge I am constantly faced with: keeping staff back there who are competent and can handle very critical situations while also addressing the needs of the rest of the department,” Havey says.

Despite the staffing challenges, Havey notes that the benefits the EC3 model provides are clear. “It is about getting critical care to the patient, and then also getting the patient to

a ratio of providers and nurses who can actually give them the attention they need. Those are the big things,” she says. “A lot of things we have been able to implement in the EC3 or start earlier like chlorhexidine baths or chlorhexidine oral rinses for intubated patients. All of those things add up in the long run and help patients have better outcomes.”

There also have been some unanticipated benefits from the ED-ICU format. For instance, given that the EC3 tends to see a lot of sick patients who are at the end of their lives, providers quickly began to realize that the unit was a good place to engage in goals-of-care discussions and to work with families dealing with end-of-life decisions, Bassin explains.

“Previously, those discussions would happen in a curtained resuscitation bay with very little privacy and not a great environment,” he says. “We realized once the EC3 opened that this was actually a great spot to engage in those conversations with patients and families, and then to provide the care there.”

Providers in the EC3 can place patients on morphine drips, ask palliative care teams to come to the unit, and invite clergy or social workers to become involved, Bassin observes. “We now have an end-of-life protocolized order set, and we have training around it,” he says. “We work very closely with the palliative care team ... and it actually has become quite an effective way to deliver that kind of care in a way that is not only humane for the patient, but we have also gotten a lot of [positive] feedback from families.”

In particular, by keeping all the needed resources in one place, families can avoid dealing with multiple transitions of care when they really want to spend time with loved ones, Bassin explains. “It has worked out

very well from that standpoint,” he reports.

Can a care model like the EC3 work for other hospitals and EDs? There are multiple factors to consider, according to Bassin. “Most academic medical centers do have a problem [in] that ICU capacity is at a premium and [space] is rarely available. A lot of patients coming into the ED require [the ICU] and can’t get there in a timely way,” he says. “[They’re] really struggling with those critically ill patients being boarded in the ED, and [they’re] trying to figure out a way to take care of them.”

However, while the EC3 model has been a good fit for UMMC, and interest in the model is high, Bassin acknowledges that the cost is prohibitive for many medical centers. “It is a very robust resource model, but it is not cheap,” he says. “This is a Cadillac version of [an ED-ICU], and it is not what everybody needs.”

Consequently, when ED or hospital leaders call to inquire about building their own EC3, Bassin always wants to know first what problem they are trying to solve. Then, he works with them to develop a solution that works. “You may not need [an EC3],” he says. “You may just need two extra ED beds with a dedicated nurse who has some extra critical care training and an extra ED attending physician who has some bandwidth to manage these patients for a longer period.”

While many interested callers immediately back off on the idea of building their own ED-ICU as soon as they hear about the costs and the staffing required, Bassin notes that they sometimes miss the point that the approach uses a scalable resource allocation model. “It doesn’t have to look like [the EC3], and it probably won’t look like [the EC3] at your place,” he says. “Use the guiding

principles of why it was built ... to advocate at your shop for how to get patients better care and more timely care.”

While the EC3 is sort of a hybrid unit that integrates emergency medicine and critical care, most interest in the approach comes from the emergency medicine field. It is the ED that struggles most with backlogs of critically ill patients who are waiting for an ICU bed, Bassin observes. “It is really us [in emergency medicine] trying to figure out how to deal with this patient population,” he says.

However, as more inpatient intensivists become aware of the problem, they see the value the EC3 can offer in making ICU resources available,

Bassin adds. “We can get the critical care going early on for patients [the inpatient ICUs] still may receive down the line, but [the patients] will have already had a lot of these things that need to be done in the first 24 hours. They can really start to advance their care earlier and get them out of their ICUs faster,” Bassin says.

On the nursing side, Havey’s advice for ED leaders interested in developing an EC3-like model is to contact the nursing leadership in the ICUs. “Make sure you have good relationships with them,” she says. “It is very important to standardize care and make sure you are not doing things that are totally different than what happens in the inpatient ICUs

upstairs.” One way the EC3 keeps the dialogue with the critical care nurses upstairs going is by directing the nurses in the EC3 to rotate through the inpatient ICUs.

“Help them understand that you are not taking patients from them and that you are not hoarding patients,” Havey explains. “It is really about getting the critical care to the patient.” ■

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## Wisconsin ED Offers Acupuncture to Patients Presenting With Pain

As the opioid crisis continues, emergency providers are looking to nonopioid alternatives to treat pain. Acupuncture has been discussed as one potential alternative, but the lack of reimbursement for this technique has prevented most EDs from even considering it as an option.

However, armed with funding to study the potential benefits of offering acupuncture in the ED, investigators at Aurora West Allis Medical Center in West Allis, WI, have gathered data showing that acupuncture is feasible and beneficial as a nonpharmacological alternative for treating pain in the ED.

In a study that included more than 700 patients with acute pain who presented to the ED in 2017, investigators found that more than half were receptive to receiving acupuncture. Further, patients receiving acupuncture treatment reported significant declines in pain severity as well as reductions in stress, anxiety, and nausea.<sup>1</sup>

While the self-reported outcomes in this study are encouraging, the lack of any form of payer reimbursement for acupuncture continues to be a major stumbling block for EDs interested in trying the treatment. Indeed, the funding problem has prevented earlier trials of ED-based acupuncture from continuing beyond the study stage.

Nonetheless, armed with these data, investigators at Aurora West Allis Medical Center intend to push for higher-quality studies of the approach with the hope that more robust data will prove convincing to payers.

Meanwhile, with grant funding support, the ED continues offering acupuncture to appropriate patients with the enthusiastic support of the clinical staff. Further, investigators believe they have moved the ball forward with some valuable lessons on how to most effectively leverage acupuncture in a way that will not disrupt the ED flow. Originally, the ED-based acupuncture program was

created to determine if acupuncture could be a viable alternative or adjunctive treatment for pain and other disorders that bring patients to the ED. Consequently, **John Burns**, DPT, MPT, MSOM, the manager of acupuncture, traditional Chinese modalities, and mind-body therapies in the department of integrative medicine at Aurora Health Care in Milwaukee, first completed a feasibility study to determine which patients should be considered for acupuncture.

“We found that 60% of the patients are basically triaged as a 3 or above [on the Emergency Severity Index], which means ... they do not have a life-threatening condition,” he explains. “We determined that these patients would be best-suited to receive acupuncture and not disrupt the flow in the ED.”

Proponents of the approach knew they might encounter some provider pushback to the idea, considering

that acupuncture has not found its way into many EDs. Burns spent time networking in the ED before the program began.

“I was in charge of going in and shadowing physicians in the ED during my feasibility study and getting to know them. They got to know me [as well], and we talked about how this might work,” he recalls.

Burns also met with physician assistants and nurses in the ED, providing them with evidence that acupuncture could be of some benefit. For instance, he notes there have been some studies on acupuncture as a treatment for low back pain, migraine, and a few other conditions. Further, Burns notes that the American College of Physicians recommends using nonpharmacological options such as acupuncture to treat acute or subacute low back pain before providing pharmacological solutions.<sup>2</sup>

When the Aurora program started, a provider would have to approve the acupuncture option before the acupuncturist could approach the patient. However, Burns noted that this approach changed quickly.

“After the physicians started to see the benefits of [acupuncture], including pain and stress reduction, our acupuncturist was given the autonomy to follow the tracking board to see which patients he thought he could help and to [approach] them,” Burns shares. “We were surprised that over 50% of the people we encountered did agree to it. We weren’t expecting that high of a number.”

Further, since most patients still were waiting to see a provider when they were approached by the acupuncturist, the added treatment did not disrupt the ED flow.

“This plays a great role in addressing patient dissatisfaction and patient agitation that often happens

## EXECUTIVE SUMMARY

Investigators at Aurora West Allis Medical Center in West Allis, WI, recently unveiled the results of a study showing that providing acupuncture in the ED is feasible and beneficial as a nonpharmacological alternative for treating pain. Targeting patients triaged at Emergency Severity Index (ESI) level 3 and higher, researchers found that patients were largely receptive to receiving acupuncture and that the treatment was effective in easing symptoms of pain, stress, anxiety, and nausea. However, lack of reimbursement for acupuncture remains a significant barrier. Other EDs have found it difficult to sustain acupuncture programs largely because of funding difficulties.

- The study included more than 700 patients with acute pain who presented to the ED in 2017. More than half were receptive to receiving acupuncture.
- The acupuncturist received the autonomy to approach patients deemed appropriate for the treatment before a provider saw those patients.
- Specifically, the program targets patients who are triaged at ESI level 3 or above, a group that includes roughly 60% of patients who present to this ED.
- Abbott Northwestern Hospital in Minneapolis also used to offer acupuncture in the ED, but the program faced some challenges, including the lack of a dependable revenue stream.

when patients want help now,” Burns observes. “With the big problems of physician and nurse burnout, this is another way to help take stress off of those providers.”

**Michael Urban, MD, FACER, FAAEM**, director of emergency services at Aurora West Allis Medical Center, says the acupuncture program has greatly benefited patients.

“Our data show that patients receiving ED acupuncture [here] had a 50% reduction in their pain levels. Acupuncture also decreased nausea and anxiety levels by two-thirds. Equally important is that acupuncture is an alternative to opioids for pain relief,” he explains. “Along with other nonopioid-based pain reduction methods, it is terrific to be able to provide this effective acupuncture treatment to our patients, which supports our efforts to markedly limit opioid use.”

Urban acknowledges that he and several other members of the staff were skeptical about the utility of

acupuncture in the ED. Now, most are big supporters.

“One of the first patients I cared for who received acupuncture was a gentleman with chronic back pain. After his acupuncture treatment, he waved me into the room where I expected he was going to ask me what in the world we were doing and criticize our new offering,” Urban shares. Instead, the patient said he had not felt this good and relaxed in years. “I have been a believer since [that case], and many of our ED staff members have had similar experiences.”

Burns notes there is a strong case to be made that acupuncture is well suited to emergency medicine.

“We need to address acute pain better. What could be a better place to address acute pain than the ED?” he offers. “With regard to the opioid crisis, more than 100 people a day are dying from overdosing on narcotics.”

Abbott Northwestern Hospital in Minneapolis used to offer acupuncture in the ED, too. An observational,

retrospective study, completed in 2016, showed that the treatment was both well-received by patients and effective in alleviating pain and anxiety.<sup>3</sup> However, the program encountered some challenges.

“The biggest barrier that we had was the hours of availability. We didn’t offer [acupuncture] 24/7, but rather Monday through Friday, 40 hours a week,” explains **Jennifer McAnnany**, MBA, BAN, RN, director of patient care in emergency services at the hospital. “It was challenging for staff to know and remember if the acupuncturist was working on a given day.”

The acupuncturist involved with the program, **Adam Reinstein**, recalls one effective tactic for gaining acceptance of the treatment among staff.

“I would shadow the staff and work around them. If someone said they had a headache, I would give them some acupuncture,” he says. “I gave a lot of experiential treatment so that people would know what it was like. Several of the nurses would go and start getting courses of acupuncture once I introduced them to it.”

Ultimately, the ED-based acupuncture program could not be sustained.

“We used acupuncture for pain, nausea, and anxiety, and it worked

very well for migraines,” McAnnany notes. “Patients and staff found value, but it is an expensive service to offer with no revenue generation.”

Looking back, Reinstein suggests the program might have been more successful if clearly defined goals had been established at the outset. “When you work in a hospital system, everyone wants to measure everything. If they don’t have a good sense of what you are doing, why you are doing it, and how effective is, it is very hard to convince the people who pay the bills to support it,” he says. “Starting the process isn’t [difficult]. It is just coming up with a consistent strategy ... that is the thing we lacked: really trying to figure out what our goal was.”

Urban, who still offers acupuncture in his ED, offers some recommendations for other emergency medicine professionals interested in providing the service. First, he notes it is important to keep an open mind.

“Although many of us had doubts about how acupuncture would work in the ED, I’m glad we allowed a trial to occur,” he says. “What our patients tell us supports what the data show: acupuncture works to decrease acute pain, nausea, and anxiety.”

Further, considering the success of an acupuncture program will depend on patients’ openness to it,

Urban suggests sharing information with them about how it has helped other patients. “I tell my patients that acupuncture has not helped every patient, but it significantly helps at least half of them,” he says. “Many patients are afraid of needles, but most patients actually find the process painless.”

Finally, patients tend to be more receptive to acupuncture if you share with them that the treatment is part of an effort to decrease the use of addictive opioid medications, Urban explains. “I have had several patients who are recovering opioid addicts thank me for providing other options for their pain control,” he says. ■

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## In Pediatric Emergencies, Strong Correlation Between Readiness, Mortality

A new study is raising serious concerns about EDs that are not considered “pediatric ready” to manage emergencies involving children.

Investigators say critically ill children brought to these centers are three times more likely to die when compared with children in similar

condition who are taken to hospitals with EDs that are well equipped to care for this age group.<sup>1</sup>

Investigators noted their findings provide the first evidence from multiple states that links the pediatric readiness of hospital EDs to care for critically ill or injured children with

outcomes. **Jennifer Marin**, MD, MSc, emergency physician at UPMC Children’s Hospital of Pittsburgh and study co-author, notes that the definition of pediatric readiness is based on survey work from the National Pediatric Readiness Project (NPRP). (*Editor’s Note: Take the readiness*

survey here: <http://bit.ly/2nQ9rYu>.)

“The comprehensive 2013 survey of pediatric readiness among U.S. EDs was based on compliance with the 2009 national guidelines for pediatric care in the emergency department,” she explains. “Specific areas on which hospitals were measured in the survey included coordination of patient care, physician/nurse staffing and training, quality improvement activities, patient safety initiatives, policies and procedures, and the availability of pediatric equipment.” Hospitals received a pediatric readiness score from 0 to 100, with higher numbers indicating better preparedness to care for pediatric patients, Marin adds.

For the new study, investigators collected data from 426 hospitals in Florida, Iowa, Massachusetts, Nebraska, and New York relating to more than 20,000 pediatric patients who were brought to the ED. The investigators compared patient outcomes with the pediatric readiness of the specific hospital’s ED.

Based on pediatric readiness scores, the hospitals were divided into four groups. Those on the low end scored between 29.6 and 59; this group’s mortality rate for critically ill children was 11.1%. Conversely, hospitals at the high end scored between 88.2 and 99.9. This group’s mortality rate for critically ill children was 3.4%.

There are several steps that are important for EDs to take to properly care for children, according to Marin. These include making sure that weight-based measurements of all pediatric patients are in kilograms, instituting child-sized equipment protocols specific to pediatric patients, and putting plans in place to ensure rapid transfer to definitive care when applicable.

“All of these, as well as other components of pediatric readiness, should

be overseen by a pediatric emergency care coordinator [PECC], a physician or nurse who is, in effect, a pediatric champion,” Marin observes. “In the NPRP survey, the presence of a PECC was shown to increase the likelihood of having all the recommended components for pediatric readiness.”

One of the criticisms of the pediatric readiness concept has been the lack of data showing that higher scores translate to better outcomes. The new findings are an important addition to the evidence base in this regard, Marin observes. “Specifically,

we found a reduction in mortality for critically ill children treated at hospitals with a higher readiness score,” she says. “Although continued work is needed, including longitudinal analyses of their outcomes as they relate to a hospital’s readiness, this should provide hospitals with evidence to optimize their ability to provide emergency care for children.” ■

## REFERENCE

1. Ames SG, Davis BS, Marin JR, et al. Emergency department pediatric readiness and mortality in critically ill children. *Pediatrics* 2019;144(3).

## CME/CE QUESTIONS

1. **According to public health authorities, roughly half of vaping-related lung injury cases identified as of late September are in patients younger than age:**
  - a. 15.
  - b. 20.
  - c. 25.
  - d. 30.
2. **Recognizing that many young people who have used vaping products are reluctant to report these activities, Illinois officials have developed:**
  - a. an online survey where users can report about their vaping habits anonymously.
  - b. a special investigative team to visit with victims and their families.
  - c. an emergency phone number people can use to report their experiences with vaping without disclosing their names.
  - d. a close working relationship with high school guidance counselors who may be able to offer added insight on vaping use.
3. **Patients who eventually go to the Emergency Critical Care Unit (EC3) at the University of Michigan Medical Center always are first seen:**
  - a. by a nurse trained to work in the EC3.
  - b. by a resident physician in the ED.
  - c. by an inpatient ICU specialist.
  - d. by a hospitalist who communicates regularly with the ED.
4. **According to the results of a feasibility study, who would be best-suited to receive acupuncture and not disrupt the flow in the ED?**
  - a. Those who present with abdominal or lower back pain.
  - b. Those who present with migraine headaches or anxiety.
  - c. Those who are triaged as a 3 or above on the Emergency Severity Index.
  - d. Those who are most receptive to alternative medicine therapies.



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