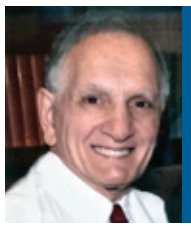


DR. CATALDO CORRADO

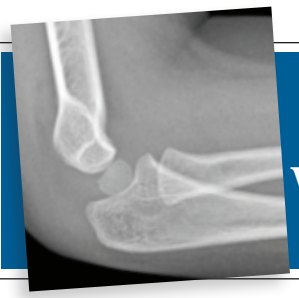
"I Was the Luckiest Guy in the World"

SEE PAGE 12

KIDS' KORNER

Stopping Febrile Seizures & Elevation for Intubation

SEE PAGE 17



CASTED

More Tests Versus More Time

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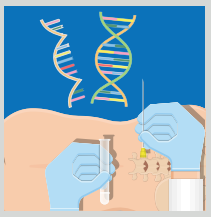

MENINGITIS

MENINGITIS TEST COULD REDUCE UNNECESSARY ADMISSIONS

SEE PAGE 11

SPECIAL OPS

FREE UP THOSE BEDS

SEE PAGE 13

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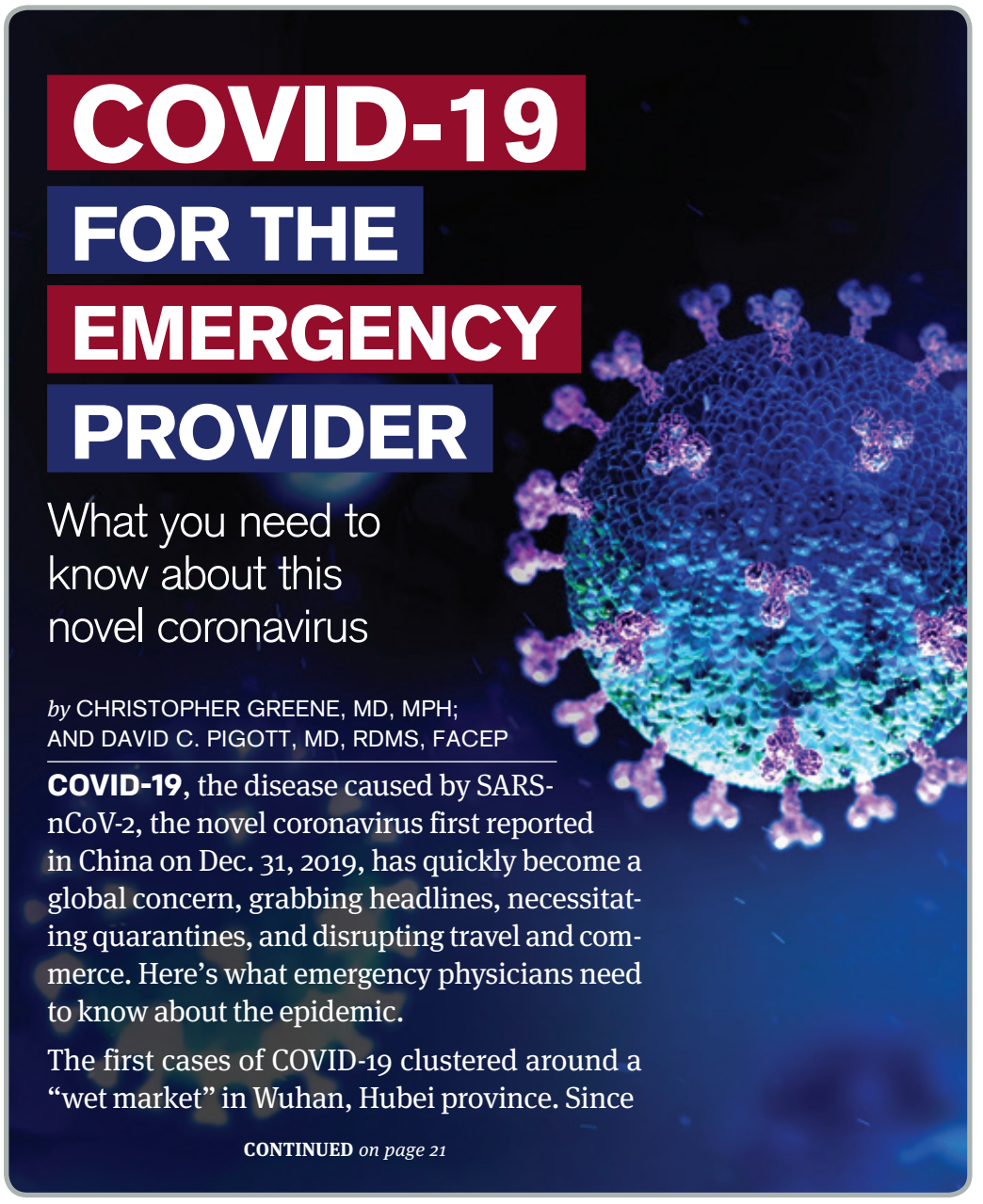

COVID-19 FOR THE EMERGENCY PROVIDER

What you need to know about this novel coronavirus

by CHRISTOPHER GREENE, MD, MPH; AND DAVID C. PIGOTT, MD, RDMS, FACEP

COVID-19, the disease caused by SARS-nCoV-2, the novel coronavirus first reported in China on Dec. 31, 2019, has quickly become a global concern, grabbing headlines, necessitating quarantines, and disrupting travel and commerce. Here's what emergency physicians need to know about the epidemic.

The first cases of COVID-19 clustered around a "wet market" in Wuhan, Hubei province. Since

CONTINUED *on page 21*

FORENSIC FACTS

TBI IN INTIMATE PARTNER VIOLENCE

Be sure not to overlook this potential consequence of intimate partner abuse

by HEATHER V. ROZZI, MD, FACEP; AND RALPH RIVIELLO, MD, MS, FACEP

The Case

A 24-year-old woman is brought to the emergency department via EMS. She was found by police after a 911 call from her neighbor, who heard shouting. The patient states that she was assaulted by her boyfriend. She does not recall all the details, but she says that she was kicked in the side of the head (see Figure 1). On further questioning, she discloses that she was also strangled and that she lost consciousness at least once during the assault (see Figure 2).

TBI in the Setting of Intimate Partner Violence

Roughly one in three women will experience intimate partner violence (IPV) at some point during their lives.[1] While IPV

CONTINUED *on page 16*

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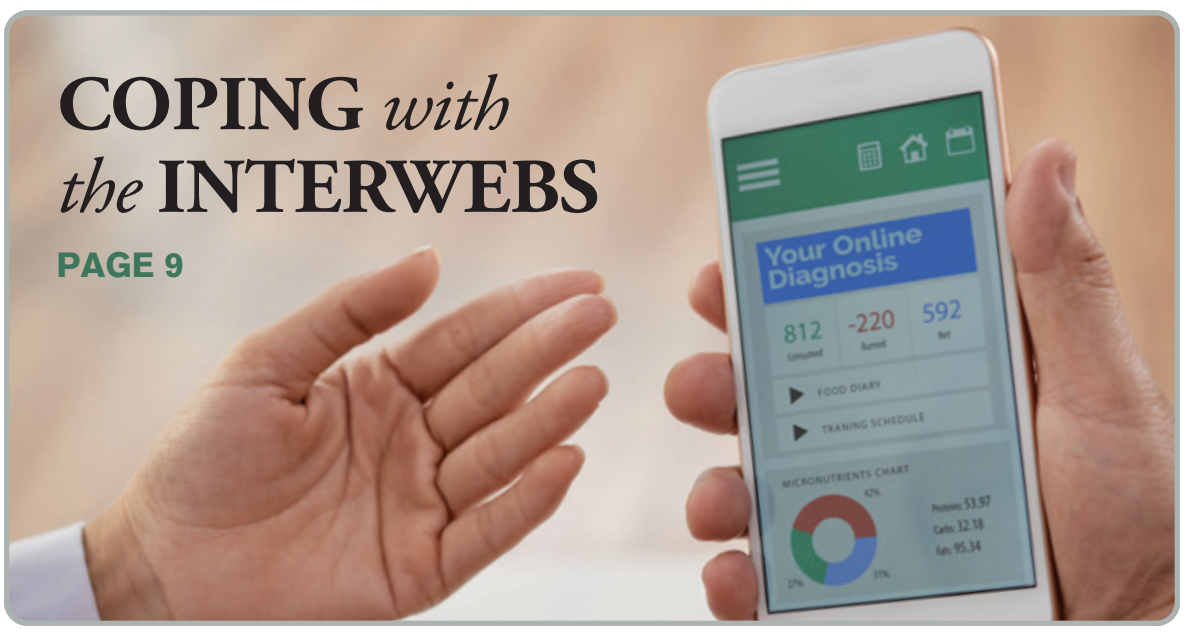

COPING *with the* INTERWEBS

PAGE 9

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NEWS FROM THE COLLEGE

UPDATES AND ALERTS FROM ACEP

ACEP Board Addresses "Doctor" Title and More

The ACEP Board of Directors met Feb. 5–6, 2020, and approved several policy statements and initiatives. To support emergency physicians in their practice, the Board strengthened a policy statement about the use of the title "doctor" in the clinical setting. "ACEP strongly opposes the use of the term 'doctor' by other professionals in the clinical setting, including those with independent practice, where there is strong potential to mislead patients into perceiving they are being treated by a physician."

A new policy statement "Use of Antitussive Medications in the Pediatric Population" was approved, as were the following revised policy statements:

- 9-1-1 Caller Good Samaritan Laws
- ACEP Recognized Certifying Bodies in Emergency Medicine
- Clinical Guidelines Affecting Emergency Medicine Practice
- Emergency Medicine Telemedicine
- Recognition of Subspecialty Boards in Emergency Medicine
- Human Trafficking
- Physician Impairment
- Retail-Based Clinics
- Support for Nursing Mothers
- Use of Patient Restraints

View the policy statements at www.acep.org/policystatements.

ACEP Supports House Ways and Means Approach to Ending Surprise Bills

On Feb. 10, 2020, ACEP announced its support of HR 5826, the Consumer Protection Against Surprise Medical Bills Act. HR 5826 recognizes one of ACEP's key advocacy points for the last two years: A mediation process with no qualifying threshold must be part of a reasonable congressional solution to surprise bills. ACEP is working with the House Committee on Ways and Means on potential revisions, advocating for the mediator to consider all information provided by physicians to help ensure the long-term sustainability of patient access to care and physician-insurer negotiations.

In mid-February, ACEP hosted a live Surprise Billing Town Hall to address member questions about the latest in the federal surprise billing debate and ACEP's ongoing advocacy efforts. Watch the Town Hall and view the full background on ACEP's surprise billing work at www.acep.org/surprise-billing.

Update on ACEP's APM Strategic Initiative

A couple of years ago, ACEP created the Acute Unscheduled Care Model (AUCM), a Medicare Alternative Payment Model (APM) specifically designed for emergency physicians. Currently, individual emergency physicians and EM groups are unable to directly participate in "Advanced APMs." The AUCM has been endorsed by the Secretary of Health and Human Services but not yet implemented by the Centers for Medicare & Medicaid Services (CMS).

As ACEP waits to see how CMS may implement the AUCM in Medicare, we are simultaneously pursuing model implementation by other payers, including Medicaid and private payers. We're providing information and resources to emergency medicine groups, state Medicaid agencies, private payers, and other stakeholders about how to structure and participate in emergency medicine–focused APMs that use the AUCM as a framework. Visit www.acep.org/APM to learn more about the payment model and its potential to improve care and reduce costs.

JACEP Open Hits the Ground Running

ACEP's new open-access journal, *JACEP Open*, published its first full issue in late February. As of mid-February, the publication had already received 149 submissions. *JACEP Open* welcomes submissions at www.editorialmanager.com/jacep. Read the journal at www.jacepopen.com.

EM Wellness Week 2020 Coming Up

Emergency Medicine Wellness Week is April 6–12, and it's a great time to assess your personal and systemic wellness practices. Visit www.acep.org/EMwellnessweek for wellness tips and specific ways to commemorate Wellness Week 2020.

Don't forget about ACEP's newest member benefit that offers all members three free counseling or wellness sessions (available 24-7 by phone or text or in person—whatever works for you) in partnership with Mines & Associates. It's strictly confidential and free with your membership. Learn more at www.acep.org/support.

Educator Award Deadline Approaching

Know an outstanding educator? Nominations are open for the National Emergency Medicine Faculty Teaching Award, Junior Faculty Teaching Award, and Excellence in Bedside Teaching Award. All educator award nominations are due April 15, 2020. Learn more at www.acep.org/teachingaward.

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What other clinicians are saying:

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"It's obvious that the program was developed by a practicing EM clinician"

Contributors:

Benjamin Tanner, PA-C

- Practicing EM since 2014
- Fluent in Spanish
- Feel free to contact with questions: tannerb@gmail.com or 480.310.3985

Carmen Vega, Certified Medical Interpreter

- Native Spanish speaker
- Working as medical interpreter in the ED since 2010

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RESIDENCY SPOTLIGHT

VIRGINIA COMMONWEALTH UNIVERSITY EMERGENCY MEDICINE RESIDENCY

Twitter:
@VCUEM

Location:
Richmond, Virginia

Year founded:
1999

Number of residents/program length:
37 emergency medicine, three-year program; 10 internal medicine–emergency medicine, five-year program

VIRGINIA COMMONWEALTH UNIVERSITY EMERGENCY MEDICINE RESIDENCY

SECRET WEAPONS (MEDICAL)

Safety-net hospital with high-acuity patients and leading clinical discovery. Busy level 1 adult and pediatric center with almost 4,000 trauma resuscitations a year. The only burn center in Virginia. Focused training in toxicology, emergency medical services, the clinical decision unit, and pediatric emergency medicine.

SECRET WEAPONS (NONMEDICAL)

Awesome annual retreat at Pocahontas State Park, where our residents spend several days off-site engaging in educational and professional activities, including a hands-on theme education (eg, sports medicine, disaster, wilderness medicine) run by faculty. The 2019 theme was MedWAR (Medical Wilderness Adventure Race), and our team came in third at EMRA's annual MedWAR competition at ACEP19.

—Joel Moll, MD, residency program director

TRIVIA

Richmond has been named one of the "Most Fun Cities in America" (Business Insider, September 2017), one of "19 US Cities with an Unexpectedly International Food Scene" (Fodor's, January 2018), and number one in "The World's Top 10 Beer Destinations for 2018" (VinePair, January 2018).

THE BREAK ROOM

Psychology of Money

I read with interest Dr. Milne's recent column on paying patients $100 not to get a CT (January 2020). There is actually robust data in psychology research using money as a quantitative measure for participant motivation. Money crosses cultural barriers and bypasses subconscious biases in a way questionnaires cannot. For example, when we say loss aversion is twice as powerful as motivation to gain, that comes from research where participants would have to be very likely to gain $10 before they would be willing to give up $5. This was landmark research because it is not intuitive—if you had asked these participants to answer it in a survey, they probably would have given the intuitive answer. But money changed the way the participants actually behaved.

The use of money in this study was likely to gauge participant motivation—not to suggest that we should pay people to forgo testing.

Greg Neyman, MD

2020 Course Topics

- Unusual Antibiotic Side Effects
- MRI vs. CT in the ED Setting
- Challenges of Managing Pediatric UTIs
- Emerging Issues in Anticoagulation
- Chest X-Ray, Ultrasonography, or CT?
- Headache – ACEP 2019 Guidelines
- LPs in Febrile Infants 29-60 Days Old?
- Suicidal Risk: Assessment and Intervention
- Cardiovascular Pearls, 2019
- DKA and Hyperglycemia Update
- Sore Throat: Still Trying to Get It Right
- Sexual / Racial / Ethnic Disparities in the ED
- ACS & PE – ACEP 2019 Guidelines
- Psychiatric Patients: Medical Evaluation
- Challenges of Atrial Fibrillation - Part 1
- Challenges of Atrial Fibrillation - Part 2
- Otitis Media Doesn't Cause Fever
- Sepsis 2019: Hot Off the Press
- Pearls from *Risk Management Monthly*
- Pearls from *ED Leadership Monthly*
- Urologic Imaging Guidelines
- Pediatric Vomiting and Diarrhea
- Trauma 2019: Hot Off the Press
- Myths in Emergency Medicine
- Myths in EMS Care
- ATS / IDSA Updated Pneumonia Guidelines
- Visual Diagnosis Challenges - Part 1
- Visual Diagnosis Challenges - Part 2
- Important Recent EM Literature - Part 1*
- Important Recent EM Literature - Part 2*
- ED Staffing and Operations Forum*
- Diagnostic and Therapeutic Controversies*

*Topics listed with an asterisk (*) are 90-minute faculty panel discussions; all other topics are 30 minutes.

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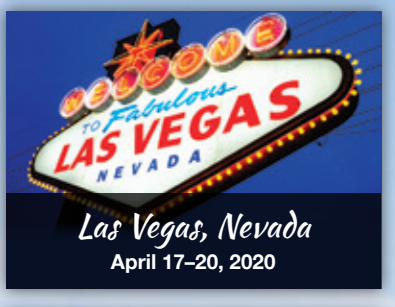

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ACEP4U: Taking ALTO to the Finish Line

THROUGH ACEP ADVOCACY, EM-DEVELOPED ALTERNATIVES TO OPIOIDS PROGRAM GETS CONGRESSIONAL BACKING

by RYAN MCBRIDE

In December 2019, Congress authorized funding for the Alternatives to Opioids (ALTO) in the Emergency Department program—the final step in the legislative process needed to set the ALTO grant program in motion and another significant victory for ACEP's federal advocacy efforts.

Background

The ALTO program was originally developed by ACEP President-Elect Mark Rosenberg, DO, MBA, FACEP, and Alexis LaPietra, DO, FACEP, and their team at St. Joseph's University Medical Center in New Jersey in 2016. Intended to address issues of variation and overprescribing of opioids, ALTO is an evidence-based, multidisciplinary acute pain management program that helps treat painful conditions for patients in the emergency department without using opioids and also helps other patients who may have an opioid use disorder (OUD). In just one year after implementing the program, opioid prescriptions in the St. Joseph's emergency department fell by 46 percent, and after two years, opioid prescriptions were down by 82 percent.

ACEP's federal advocacy efforts to help expand the reach of the ALTO program began in 2017, and the path from introduction to authorization and appropriations was extraordinarily rapid by legislative standards. ACEP's Washington, D.C., staff worked with Rep. Bill Pascrell (D-NJ) and Rep. David McKinley (R-WV), as well as Sen. Cory Booker (D-NJ), Sen. Shelley Moore Capito (R-WV), Sen. Michael Bennet (D-CO), and Sen. Cory Gardner (R-CO) to develop legislation that would establish a federal grant program to provide $10 million per year to help other emergency departments implement their own ALTO protocols.

On March 7, 2018, the Alternatives to Opioids in the Emergency Department Act was introduced in both the House and Senate (HR 5197/S 2516)—fortunately timed, as all of Congress' attention was squarely focused on the nation's opioid epidemic. ACEP received an invitation to testify about the ALTO program's success before a House Committee on Energy & Commerce hearing on March 22, 2018, and Dr. Rosenberg testified on ACEP's behalf. ACEP members advocated for ALTO during the annual Leadership & Advocacy Conference, and the bill was included among a number of other opioid-related bills that were marked up in the Energy & Commerce Health Subcommittee in April and the full committee in May. ALTO received a voice (unanimous) vote on the House floor in June, and it was then merged into the SUPPORT for Patients and Communities Act (HR 6), which was ultimately signed into law on Oct. 24, 2018. The ACEP-developed ALTO legislation went from introduction to enactment in a mere eight months.

Finding Funding

Securing funding for ALTO would prove to be a trickier prospect, however, as the annual congressional appropriations process has all but broken down in recent years. Due to bitter partisan battles and a variety of other factors, Congress has largely been unable to pass all 12 annual appropriations bills, instead relying on a patchwork of omnibus and "minibus" (ie, collection of a few bills) funding packages backfilled by a series of temporary stopgap measures known as continuing resolutions (CRs) to keep the government funded at existing levels. In fact, the process has broken down so severely that legislators have sometimes failed to pass even CRs to keep the government running, leading to several notable government shutdowns, including the longest shutdown in U.S. history (35 days) at the end of 2018 that bled into early 2019. A further challenge was that funding for the ALTO program was dependent on the success of the Labor, Health and Human Services, Education, and Related Agencies (L/HHS) appropriations bill, a package often subject to major partisan squabbles and "poison pill" amendments inserted to make a bill less effective and that stall progress.

ACEP continued working with legislators, including ALTO's original sponsor Rep. Pascrell, to secure funding for the program in the L/HHS bill. In June 2019, Rep. Pascrell offered an amendment to the fiscal year (FY) 2020 L/HHS package on the House floor to fund ALTO at its full $10 million, and it passed with overwhelming bipartisan support in a 382-32 vote. In September 2019, the Senate L/HHS bill included funding for ALTO, albeit at a lower $4 million level. Despite the disparate funding levels, the inclusion of ALTO in both the House and Senate bills was a critical step to help provide momentum for its inclusion in any final appropriations package.

Unfortunately, the appropriations process once again ground to a halt in fall 2019. Negotiations fell apart over abortion-related amendments and President Donald Trump's border wall budget requests; meanwhile, a potential veto threat from the president that would sink any potential compromise loomed over the negotiations. Even at the beginning of December, serious doubts that a spending package agreement was even possible remained, and the likelihood of another short-term CR (meaning flat funding levels and little chance for any new programs to be funded) appeared high.

Million-Dollar Miracle

However, appropriators tried to iron out their differences, and ACEP continued to advocate for ALTO's inclusion in any possible year-end funding package. On Dec. 16, in what was nothing short of a congressional miracle, appropriators unveiled a $1.4 trillion spending agreement consisting of a four-bill minibus and a larger eight-bill package to provide stable government funding for all departments throughout FY 2020. Included in the package was another ACEP legislative advocacy win: $5 million in funding for the ALTO program in FY 2020. Though less than the $10 million originally authorized, this critical funding will help emergency departments throughout the country establish and implement their own ALTO protocols to continue the fight against the country's opioid epidemic.

In January 2020, the Substance Abuse and Mental Health Services Administration announced the grant opportunity for the ALTO demonstration program, with an anticipated 10 awards to be distributed in the initial round. Applications are due March 17 and are available at www.samhsa.gov/grants/grant-announcements/ti-20-005.

Work Continues

In just two years, ALTO went from legislative concept to reality, with strong ACEP advocacy involved every step of the way. Still, our work isn't done. As of this writing, ACEP is already working with our legislative champions on the ALTO appropriations request for FY 2021 budget, with the hope of securing the full $10 million to help further extend the reach of this important program.

MR. MCBRIDE is a senior congressional lobbyist in the public affairs department at ACEP.

RELATED RESOURCES

If you're interested in learning more about ALTO and ACEP's extensive resources related to opioids, visit www.acep.org/opioids.

NEW FOR 2020: ACEP is launching a Pain and Addiction Care in the ED (PACED) accreditation program—the nation's only EM-specific program to help you be part of the solution. Learn more at www.acep.org/paced.

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By the Numbers

MENTAL HEALTH VISITS INCREASING

OF 139 MILLION U.S. ED VISITS IN 2017

4.8 MILLION VISITS had a primary diagnosis of mental disorder.

2.3 MILLION VISITS had a mental health provider see the patient in the ED.

ABOUT 594,000 VISITS resulted in hospital admission to the mental health or detoxification unit.

ABOUT 1,135,000 VISITS resulted in transfer to a hospital with psychiatric capability.

NOTE: The Centers for Disease Control and Prevention underestimates total ED visits. A more comprehensive estimation comes from the National Emergency Department Inventory (NEDI)-USA database, which is maintained by the Emergency Medicine Network at Massachusetts General Hospital in Boston and contains data on all U.S. emergency departments open since 2001. According to NEDI-USA, there were 5,417 emergency departments and 158,719,684 ED visits in 2017.

Compiled by James Augustine, MD, FACEP, clinical professor of emergency medicine at Wright State University in Dayton, Ohio; vice president of the Emergency Department Benchmarking Alliance; and chair of the National Clinical Governance Board for US Acute Care Solutions.

Visit **ACEPNow.com** for the sources of these statistics.

CHANGING THE CONVERSATION AROUND EM'S VALUE

EMF-funded researcher Dr. Laura Burke is demonstrating the true value of emergency care

The mission of the Emergency Medicine Foundation (EMF) is to invest in innovative clinical and health policy research projects that improve the practice of emergency medicine and patient care. Last year alone, the EMF awarded nearly $1 million in grants to emergency medicine researchers. This ongoing article series will introduce some EMF-funded researchers and the contributions their research is making to the field of emergency medicine.

This month, we meet Laura G. Burke, MD, MPH, FACEP, a health services researcher who received a 2018–2019 EMF/ACEP Value of Emergency Care Grant for $150,000 for her project "Trends in the Cost and Quality of Emergency Care." Dr. Burke is a physician in the department of emergency medicine at Beth Israel Deaconess Medical Center and assistant professor of medicine at Harvard Medical School in Boston.

EMF: Tell us about your EMF grant project.

LB: I'm a health services researcher, and it's been frustrating that a lot of the emergency medicine perspective is missing from the narrative around the value of care. There's been a lot of focus on how emergency care is expensive, that care is becoming more intense, and that costs are rising. That is true, but it's because we're doing more for patients in the emergency department, and that has a lot of benefits for patients and the health care system.

With this grant, I was able to look at three issues. First, how have outcomes for people using the ED changed over time? We know care has become more intense, but are patients having better health outcomes? The answer is yes. We looked at 21 million ED visits among Medicare beneficiaries, and we found that their mortality on the day of the ED visit and out to 30 days is improving over time, so thousands of lives have been saved by improvements in emergency care. This was true across hospitals, but it was particularly great for those patients who are the sickest and the most complex. They seem to see the greatest reductions in mortality, suggesting that the changes in the care that we're providing are actually leading to better health outcomes. That paper is coming out soon.

After we established that health outcomes seem to be improving, we next turned to cost. There's been a lot of focus on the cost of an individual ED visit. Often, what policymakers aren't considering is that an ED visit is more expensive than a doctor's visit but a lot less expensive than a hospitalization. By doing a bit more work in the ED, we can save patients an $8,000 hospital stay. When you look at total cost of care and not just the ED component, we're actually saving the health care system money in a lot of circumstances.

We looked at that same pool of Medicare beneficiaries and the fact that their admission rate is going down. We're actually sending more patients home from the ED over time. When you look at just the ED visit, yes, their costs are going up. But when you look at total spending at 30 and 90 days, it's actually going down. And that's because we're using less of the expensive hospital-based care and more outpatient care, which is both more desirable for most patients and less costly. The overall value of emergency care is improving. By doing more in the ED and spending a little bit more up front, we can actually reduce overall spending to the health care system.

The final piece we looked at is how best to measure quality and outcomes. Mortality is a very important outcome, but it's not the only one. We developed a measure called "healthy days at home" with the Medicare Payment Advisory Commission. It looks at the total time a patient spends alive and out of health care or facility-based health care settings. We found that, over time, EDs are allowing patients to spend more time with their families. They have more healthy days at home because they're dying less often and they're spending less time in facility-based health care. This was particularly exciting for me because early literature had suggested this might be true.

It was great to have the time and the space to pursue these research ideas and really use data to show how emergency medicine is improving overall outcomes and costs for patients using the ED.

EMF: Why did you choose this research topic?

LB: This research topic builds upon work I had done previously. I love topics that take a commonly held view in health services research and look at it to see if it's actually a myth.

My colleagues and I had done some work previously showing that emergency care had become more intense and that admission rates were declining, but we weren't able to say yet if this was leading to better patient outcomes or lower costs. Building on work that suggested that the narrative around emergency medicine was a bit shortsighted and misguided led us to consider these questions.

EMF: What do you view as the most significant impact of your EMF research grant?

LB: We're hoping to change the narrative around emergency care. Emergency physicians understand that we're doing more work in the ED but that it has real benefits for patients. A lot of cost discussions miss the bigger picture. The fact that the ED can actually save money for the broader health care system is an idea that has filtered out to other specialties but hasn't been generally understood or accepted. I'd like that to be part of the broader health policy narrative. I want to change the conversation to make sure that policies that impact emergency medicine really recognize the value that emergency medicine provides and understand the entire picture of the acute care delivery landscape.

EMF: How did your EMF grant help advance your career in emergency medicine?

LB: This grant has been instrumental in giving me the time and funding to work on projects I think are of major policy importance. We have a paper accepted at a major peer-reviewed journal coming out soon. I'm very excited about that, and I'm hoping to get the rest of our research out there to show that the work that emergency physicians are doing is having an impact. The grant helped me have the time to learn about this topic area, improve my research skills, and meet other health services researchers both inside emergency medicine and beyond.

The EMF grantee workshop helped me meet high-quality and impactful mentors who have given me ideas for moving forward. It has created a community of fellow emergency medicine researchers that I know will be useful in advancing my career in the short- and the long-term as well. I have a number of additional grants and projects in progress that have built upon the work that I've done with my EMF grants.

EMF: Do you have a message for the donors and supporters at EMF?

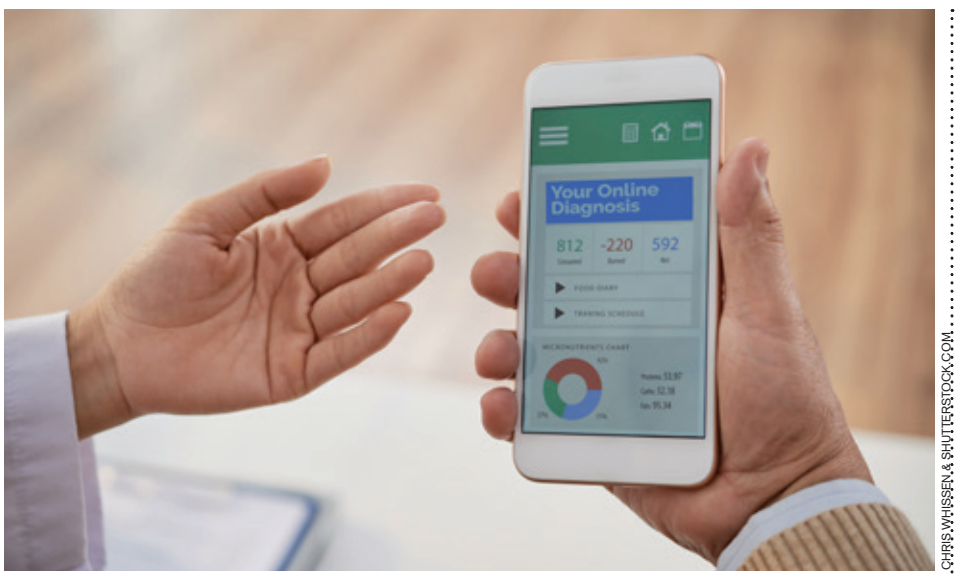
LB: Thank you so much for your support of this organization. It is really critical because a lot of these ideas and topics don't fit with traditional funding mechanisms. Having a source of funding to delve into the topics that really impact emergency medicine is crucial for the advancement of our specialty.

I'm incredibly appreciative of EMF's support, and I would encourage other researchers to apply for this grant. I'm grateful to have the support and to be able to work with this terrific community of physicians and scientists.

Coping *with the* Interwebs

From Dr. Google to Yelp reviews, it pays to be proactive and cautious with online information

by DENNIS HUGHES, DO, FACEP; AND JENNIFER ROBERTSON, MD, MSEd



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Your patients are online. You are online. How many of these scenarios ring true?

- "I did an internet search, and I think I may have dengue fever."
- "Did you see that Facebook post on that crazy case last night in the emergency department?"
- "I saw that Yelp review about you. Ouch."
- "How did that patient get my personal email?"

The internet can be a great tool, but it can also complicate our practice and have far-reaching consequences if we aren't careful with the information we share. Here are some tips for managing the internet's influence on our patient interactions and professional reputations.

First, let's take a look at how we can best respond to our patients' online self-education.

Dr. Google

Dealing with patients (or their family members) who come to the emergency department prepared with their own diagnosis based on an internet search can be challenging. Layperson misinterpretation and self-diagnosis can start things off on the wrong foot, especially if it feels like patients have an agenda or think they can replace us with an internet search. If improperly handled, this can immediately introduce distrust into the physician-patient relationship. We need to respond to their questions and theories, but it is crucial to do so without putting them down or alienating them. How can this be achieved?

1. **Understand patients' motivations.** Patients who look up information online may actually be interested in learning and want to hear the physician's thought process. This also gives the physician the opportunity to apply the information to patients' specific issues.
2. **Encourage patients.** While this may sound counterintuitive, encourage and congratulate patients for taking an interest in their health. Being receptive toward patients' own online research may help improve their sense of empowerment. In addition, belittling patients and using sarcasm, while immensely personally gratifying, will not earn you any points or improve your ability to personally connect to patients and their families. Remind patients that most of the information they find online is general in scope and that putting their symptoms, clinical examination, and other information you obtain into an appropriate context and possible diagnosis is the goal.
3. **Consider creating your own online expert content.** Patients tend to trust information more when content is easy to read, well-organized, and from authors with medical credentials or other signifiers of authority.
4. **Refer patients to reliable online resources.** If patients are going to head to the internet to self-diagnose, the best thing providers can do is direct them to websites they know give credible medical information. Sites you may consider referring patients to include Mayo Clinic (www.mayoclinic.org/patient-care-and-health-information), Centers for Disease Control and Prevention (www.cdc.gov), National Institutes of Health (www.nih.gov/health-information), and the American Academy of Family Physicians (familydoctor.org).

Next, we'll talk about how physicians can manage their own internet and social media presences in ways that can improve (and not damage) their careers.

CONTINUED *on page 10*

Maintaining Online Professionalism for Physicians

Certainly, the internet and social media can be leveraged for good, improving patient safety and communication and aiding in the dissemination of educational content. Many physicians are now masters of the internet, using social media as a platform to raise awareness of issues in health care and advocate for patients. Others use it to effectively promote their medical practices.

However, improper or naive use of social media can also result in unintended consequences. Avoiding misuse may help physicians circumvent potential personal, professional, or even legal consequences that could unintentionally result.

Here are some facets to consider.

1. **Utilize ethical principles.** Physicians should consistently be ethical when preserving the patient-physician relationship. This includes ensuring confidentiality, privacy, and respect for persons in online settings and communications. The pervasive social media craze sometimes carries people to the extreme, resulting in "crossing the line"—both in terms of good taste and confidentiality. First and foremost, do not disclose protected health information (PHI), including any individually identifiable information such as demographic data. Any information or images posted to a social site immediately leave your control, even if subsequently deleted. Once in public, an embarrassing or legally encumbering item can reappear at any (unexpected and unwanted) time.

   PHI/HIPAA-protected information includes:
   - Names
   - All geographical identifiers smaller than a state
   - Dates (other than year)
   - Patient demographics
   - License, device, or vehicle identifiers
   - URLs, which can contain identifying information such as names or birthdates
   - Internet Protocol (IP) address numbers
   - Biometric identifiers
   - Full-face photographic images and any comparable images

   Images are a particularly challenging area. Even with meticulous removal of all patient identifiers, patients can put two and two together about a seemingly sterilized posting and recognize themselves or others. In addition to obtaining detailed informed consent to use patient vignettes and images, stay attuned to contextual issues when posting in a public forum. Assume that perception is reality.
2. **Separate spheres.** It is ideal that physicians keep online professional and social spheres separate. (The American Medical Association strongly recommends this as well.)[1]
3. **Maintain professional use of email.** Email or any other electronic communications between physicians and patients should only be utilized in an established physician relationship and with patient consent. Documentation of any electronic communication should also be kept in patients' medical records.
4. **Remember the permanency of online activity.** Physicians, residents, and students should be aware that online activity can be permanent and that any online activity may have implications for their future professional lives. Employers have turned away job applicants simply due to their problematic digital behaviors.

Managing Your Own Online Profile

One way physicians can avoid dealing with a negative fallout of misinformation is by periodically performing a self-audit to assess the accuracy of online information about themselves. Checking your own online profile can be enlightening. There are a number of consumer-facing sites that provide the public information about you—your education, training, any legal cases, and ratings (eg, Healthgrades, WebMD, Yelp, *US News & World Report*, etc.).

Negative online reviews can be stressful. Difficult as it sounds, ignoring them is often the correct strategy, as they represent a minority (hopefully) of postings. Realize that the simple act of refuting inaccuracies in patient posts runs the risk of a HIPPA violation. Remember that a posted opinion is just that—an opinion. As hard as it may be, it is better to let the unhappy person vent than to lose sleep or become embroiled in a dispute that might then escalate and become a legal issue.

Final Reminders

1. Be ethical.
2. Keep your professional and personal internet accounts as separate as possible (and always professional).
3. Avoid giving medical advice electronically unless a patient-physician relationship exists.
4. Periodically monitor your online profile.
5. Be aware that anything you post follows you and can affect your future professional life.

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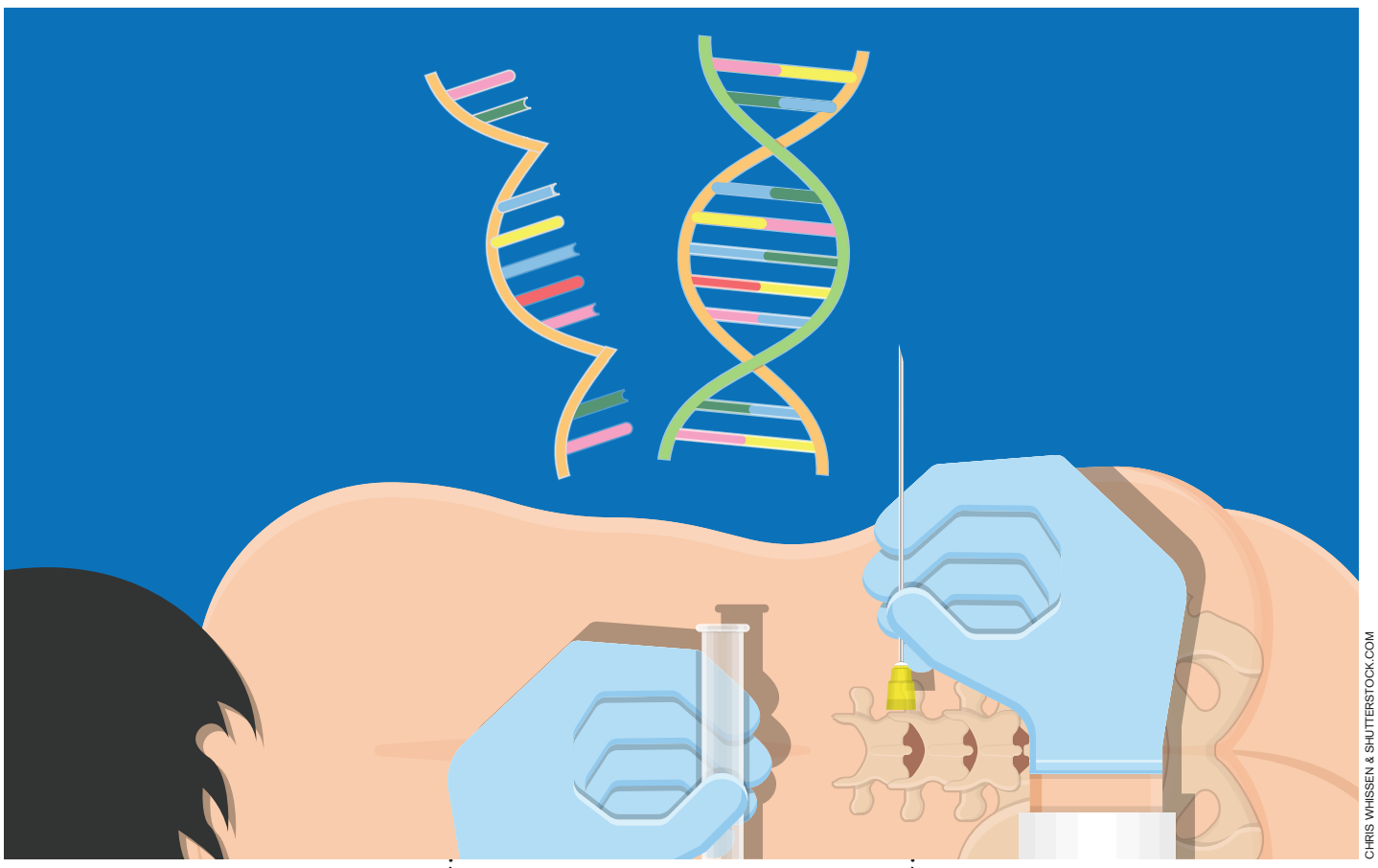
Meningitis Test Could Reduce Unnecessary Admissions

Rapid molecular testing transforms ED meningitis diagnosis and treatment

by DAVID A. TALAN, MD

Disclosure: *Dr. Talan is a paid consultant for BioFire Diagnostics and has advised on the development of new assays and collaborative research on meningitis and septic arthritis.*



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Back in the 1980s, texts stated that the administration of antibiotics should not be delayed beyond 30 minutes in cases of suspected bacterial meningitis. Doctors who weren't fast enough were being sued.

This never seemed practical or possible. In fact, my very first research study from that time assessed time from triage to antibiotics for 122 ED patients admitted for presumed bacterial meningitis.[1]

We found that the median time to the first dose of antibiotics was three hours and that only one patient received antibiotics within 30 minutes. We also found that diagnosis was not always obvious based on so-called classic symptoms. The reality was that patients presented with a range of complaints compatible with not only meningitis but also other diagnoses. The process of sorting that out could take time. "Delays" came not from laziness or lunch breaks but from the necessity of a proper diagnostic investigation.

Decades later, the diagnostic pathway for meningitis has changed little. The only significant change is the ability to obtain a prelumbar puncture (LP) CT of the brain nearly instantaneously. This lessens the angst of deferring antibiotics until the post-CT LP is completed, allowing for unambiguous bacterial identification and susceptibly testing.

However, we've recently seen an advance in the diagnostic pathway for meningitis as more hospital labs offer rapid molecular testing of the cerebrospinal fluid (CSF) for emergency department use. The BioFire FilmArray Meningitis/Encephalitis Panel detects nucleic acids from common bacterial and viral pathogens with a high degree of accuracy, providing results within one to two hours (see Table 1).[2] Currently, the BioFire CSF assay is the only FDA–approved molecular test available that detects a full range of pathogens.

There are several test features that will improve management of ED patients with suspected meningitis.

Confident Diagnoses Reduces Hospital Admissions

Viral meningitis is far more common than bacterial meningitis. Because of the imperfect accuracy of standard CSF results in discriminating bacterial versus viral causes (particularly for patients pretreated with antibiotics), patients with a low likelihood of bacterial meningitis are often hospitalized for observation while awaiting final CSF culture results. The BioFire assay can confirm viral meningitis—most commonly due to enterovirus (EV) or other viruses. This can allow confident ED discharge. (Little-known fact: As many as 30 percent of patients found to have EV meningitis by molecular testing have normal CSF parameters.) Human herpesvirus-6 (roseola), the most common viral cause of childhood febrile seizures, is also included in the assay. The panel does not test for all possible viral pathogens (eg, flu, HIV), which account for a small number of cases.

Ruling in viral causes is one thing, but what about ruling out bacterial ones? Even when the test does not affirmatively identify a virus, in a clinically stable, non-immunocompromised patient presenting with acute symptoms, a negative CSF molecular panel should be reassuring enough to permit ED discharge, provided the patient received no prior antibiotics and has low-risk CSF parameter findings. The BioFire assay has near-perfect sensitivity to rule out typical bacterial meningitis pathogens. Of course, there are also noninfectious causes of meningitis to consider (eg, cancer, lupus, medication reactions, etc.) and symptoms of viral meningitis can last weeks. Patients should have close primary care follow-up to make sure that subacute but nonemergent problems do not go undiagnosed.

Test Can Remain Positive After Antibiotic Pretreatment

Whether you get anxious while awaiting head CT results and slip in a dose of ceftriaxone or have a patient who has taken oral antibiotics, bacterial DNA can still be detected in many (not all) cases by the BioFire assay, even though some bacteria may not grow on traditional media.[3] Although antibiotic susceptibilities are not currently available, rapid bacterial identification, sometimes even in the face of prior antibiotics, allows more targeted treatment and, in the case of meningococcal infection, public health notification and close-contact prophylaxis or, alternatively, reassurance to the staff.

The BioFire assay has limitations. First, it does not test for some common causes of encephalitis, like West Nile or the emerging Eastern equine encephalitis virus. As with other polymerase chain reaction assays, the test may be negative in early herpes simplex virus encephalitis. Second, while false negatives are rare for typical bacteria in non-pretreated patients, false positives occasionally occur, such as with pneumococcus, which is thought to be due to specimen contamination during specimen handling (your sterile technique counts). As with any test, the result should be correlated with all available epidemiological, clinical, and lab data. Third, caution should be exercised in patients with subacute symptoms since, for example, tuberculosis and fungi other than *Cryptococcus* are not included in the panel. Caution should also be exercised in immunocompromised patients, for whom the risk of misdiagnosis is higher and a greater range of pathogens must be considered. For example, the current standard cryptococcal antigen test appears to be more sensitive for this pathogen than the BioFire test. Fourth, the assay does not test for staphylococcal species and gram-negative pathogens that are sometimes seen in neurosurgery-related infections. Finally, the test is an additional expense—the manufacturer's charge is $130 per cartridge after purchase of the FilmArray system (which can also run stat respiratory, pneumonia, gastrointestinal, and blood panels) for about $50,000. It is best targeted for stat use *after* standard CSF test results are back and diagnostic uncertainly remains.

Table1: BioFire Film Array Meningitis/Encephalitis Panel

BACTERIA
Escherichia coli K1
Haemophilus influenzae
Listeria monocytogenes
Neisseria meningitidis
Streptococcus agalactiae
Streptococcus pneumoniae
VIRUSES
Cytomegalovirus
Enterovirus
Herpes simplex virus 1
Herpes simplex virus 2
Human herpesvirus 6
Human parechovirus
Varicella zoster virus
YEAST
Cryptococcus neoformans/gattii

Acknowledgement: *Dr. Talan thanks his residents, Dr. Randy Lee and Dr. Cameron Harrison, for their review and suggestions on this article.*

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"I Was the Luckiest Guy in the World"

Emergency physician reflects on 53-year career at Uniontown Hospital

by JORDAN GRANTHAM

Cataldo Corrado Jr., MD, FACEP, was the youngest of eight children. Named after his father, a family physician in Uniontown, Pennsylvania, and affectionately dubbed "Little Doc" by his family and friends, the youngest Corrado was drawn to medicine from the start.

After returning from being drafted into military service, he accepted the first emergency medicine position at Pittsburgh Hospital in Pennsylvania. When his mother passed away, he took an emergency medicine job back in Uniontown to be closer to his father. He intended it to be a temporary stop. Instead, it became a legendary 53-year run that saw Dr. Corrado create a rural emergency department that handles 50,000 patients per year while also developing a local EMS system to serve Fayette County, Pennsylvania.

He finally "hung up his cleats" in September 2019 at age 82, feeling wholly content with what he jokes is the "shortest résumé in the world." A few months after his retirement, he took time to reflect on his impactful career and what he learned along the way.

JG: What has it been like to watch the evolution of the profession into what it is today?

CC: I remember when we first started in emergency medicine, we were nothing but a triage. Did the patient need to be admitted or not, and that was the only decision you made. But now, we do major work-ups in the emergency department, we do major interventions in the emergency department, and, of course, I came in up an era where there were no CAT scans, no ultrasound, no MRIs. It was pretty primitive. It has been really remarkable the progress we've made in all of medicine but mostly in emergency medicine. I think we've made more progress than any other specialty.

JG: Do you remember what it felt like to suddenly have that new resource or technology?

CC: Sure—I remember CAT scans. We had no way of taking care of people with intracerebral bleeds. We didn't know whether they had an intracerebral bleed or stroke or a tumor. In regard to patients with abdominal pain, we had no definitive way to diagnose a ruptured abdominal aortic aneurysm. I remember most of the time, if it was the right scenario and you could feel a pulsatile mass, it was probably an aneurysm. But we had no way of proving that. And then they went to the operating room,

and we hoped we were right. Now, you can do a CAT scan or an ultrasound in a few seconds and make a diagnosis.

Ultrasound has been even more influential in the emergency department. I'm only sad that I wasn't very facile at using the ultrasound. I envy some of the younger emergency physicians coming out of residency who are very good with ultrasound because that made a big difference. You can make a lot more diagnoses right at the bedside. That's even a bigger change, although certainly CAT scans and MRIs, especially in the field of trauma, that was a big change to the good.

And, of course, the use of computerized records, too. I'm a big fan of computerized records. I know a lot of people don't like them. They do slow you down, but the EMR is very helpful. It's given us so much information that we didn't have before. I remember we used to have to go through pages and pages of old charts to figure out something, where it's so much easier now.

JG: Was it hard, when you had been in the profession for so long, for it to be continually evolving?

CC: Oh, yeah—I enjoyed learning. [The advances] were all exciting to me. There have been so many good changes, and they were not hard to adapt to. Actually, I often wondered, "How did I practice without them? Without MRI? Without ultrasound?"

JG: Many physicians struggle with burnout. You had such a long tenure. How did you stay fresh and enthused and maintain it for so long?

CC: I don't have any secrets. Just keep reading and learning new things. Everything is just so exciting! In fact, [reading and learning is] the one thing I miss. I had wonderful support from my family, especially my wife. When I couldn't go to a social function, she was the one helping everyone understand why I couldn't be there. She was probably the most helpful thing. And she enjoyed emergency medicine. She's not a physician, but she was excited about all of my stories. I think keeping up with your family life as much as you can and, at the same time, reading and learning new techniques are the most important things to fend off burnout.

My wife made everyone understand why I couldn't be at a particular function, and she understood herself. My children also understood and were extremely supportive. That was the most important thing. I still found time to ski, ice skate, roller skate with my kids. And I was team physician for my kids' high school football team. There were lots of times where we missed important things we would have liked to have gone to, but that's part of the business of emergency medicine. Yes, it's true that we have so many times we have to work weekends and have to work night shifts, have to work on holidays. But at the same time, we're not on call, and when we come home, we're home.

JG: What advice do you give to young physicians who are just starting their careers?

CC: My only advice is, remember you have it better than anyone else. I think emergency medicine is the perfect specialty. That's always my advice. I know they want more big things, especially coming out of residency, but they have to realize, and I tell them, "You're the most important thing to the person you're taking care of. That person is so thankful you are there and that they have someone to turn to at any time. Even if it may sound like a silly thing to you, to them, it's not." I think that's the great part about emergency medicine. We're there for those people who have nowhere to go, and some of them can't get to their doctor for weeks and weeks, and at least we can help them out and solve their problem. Even though their problem may seem minor to us, it's not to them. It's major for them.

This interview has been edited for length. Read our full interview with Dr. Corrado at www.acepnow.com.

MS. GRANTHAM is ACEP's communications manager.

ACEP Updating Wellness Guidebook with Advice on Structural and Systemic Wellness Issues

by RITA A. MANFREDI, MD, FACEP

For many years physicians and hospital administrators erroneously thought that everyone was responsible for his or her own wellbeing. As a result, many prior wellness books or apps focused on individual factors such as physical exercise, diet, meditation, yoga, or mindfulness. Research has shown that systemic factors, not personal factors, contribute the most to our wellness as emergency physicians. While personal wellness practices are essential, more important are the system, institutional, or departmental factors. These will all be discussed in ACEP's updated electronic wellness guidebook, which will be available in early 2021.

We know how important teamwork is in the emergency department, so the guidebook will focus on how to create a culture of cooperation. New and relevant topics will include emergency medicine leadership and C-suite responsiveness to systems issues; camaraderie, empathy, and connection; reducing the impact of shame; the impact of wellness officers; and wellness programs that really work.

The updated guidebook will also include personal photography and artwork from emergency physicians, each piece with an accompanying wellness narrative. A special resident section will focus on respect, bullying, and escaping exhaustion, among other topics. There will also be an audio section to showcase ACEP Scientific Assembly Wellness Story Booth podcasts.

Web-based and easily accessible, the wellness guidebook will have pertinent selections for emergency physicians at every career stage. We invite you to invest in yourself. Watch for more on ACEP's new wellness guidebook soon—and check out our current guidebook, "Being Well in Emergency Medicine: ACEP's Guide to Investing in Yourself," at www.acep.org/life-as-a-physician/wellness.

DR. MANFREDI is immediate past Chair of the ACEP Wellbeing Committee and associate clinical professor in the department of emergency medicine at The George Washington University School of Medicine in Washington, D.C.

TIPS FOR BETTER PERFORMANCE

SPECIAL OPs

DR. WELCH is a practicing emergency physician with Utah Emergency Physicians and a research fellow at the Intermountain Institute for Health Care Delivery Research. She has written numerous articles and three books on ED quality, safety, and efficiency. She is a consultant with Quality Matters Consulting, and her expertise is in ED operations.

Free Up Those Beds

A Pennsylvania ED re-engineers patient flow to reduce its boarding burden

PHOTO: HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA

The HUP emergency department operations leadership team.

by SHARI WELCH, MD, FACEP

The Hospital of the University of Pennsylvania (HUP) was the nation's first teaching hospital at the nation's first medical school, now called the Perelman School of Medicine at the University of Pennsylvania in Philadelphia. HUP had one of the earliest operating theaters, where surgeries were performed on sunny days between 11 a.m. and 2 p.m.—sunny days because there was no electricity. Some of the first anesthesia was delivered (whiskey and opium) to facilitate early surgical endeavors. Today, HUP remains prestigious, frequently rated among the top hospitals in the country and serving as a regional and national referral center.

And yet recently, the emergency department at HUP was struggling, as many hospitals do, with high boarding burdens. In 2018, the boarding burden exceeded 10,000 hours per month, translating into 16 lost beds in the 41-room emergency department, which was fielding 62,000 visits per year. Like many academic medical centers, HUP treats high-acuity patients.

High boarding times were associated with unacceptable waits and walkaway rates. In 2019, the new chair of emergency medicine and his ED operations leadership team (representing nurses, advanced practice providers, and physicians) decided an overhaul was needed. With support from HUP executive leadership, the ED operations team decided to dismantle the old processes and implement a package of innovations that were dramatic and complementary (see Figure 1).

Figure 1: ED Improvement Change Package

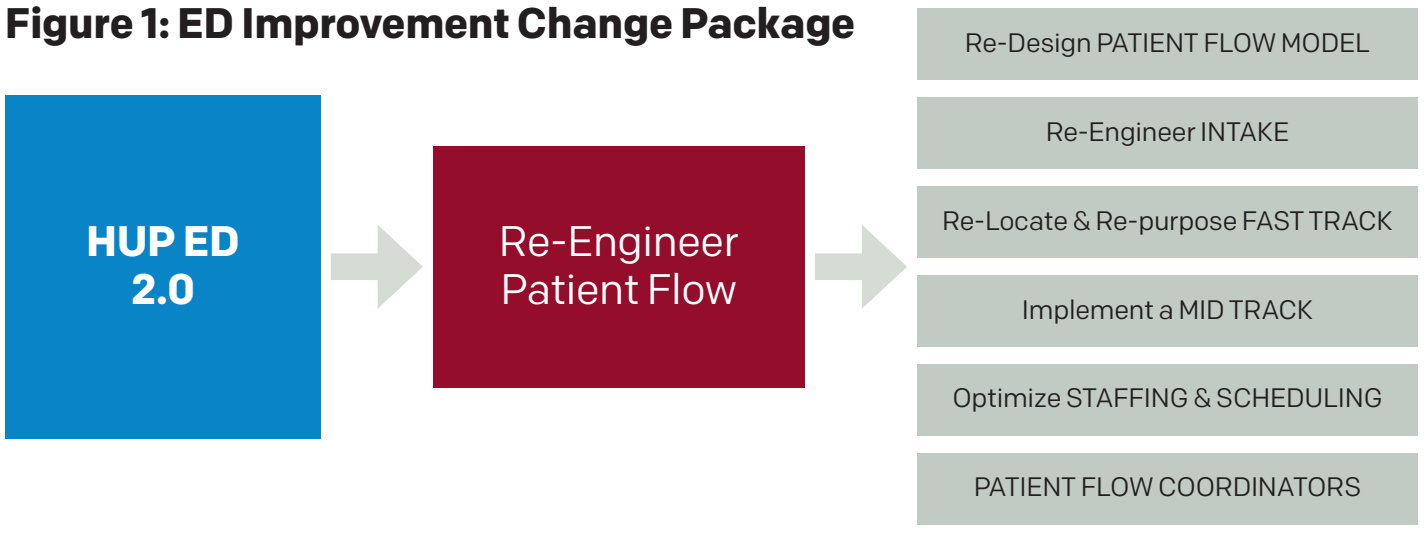
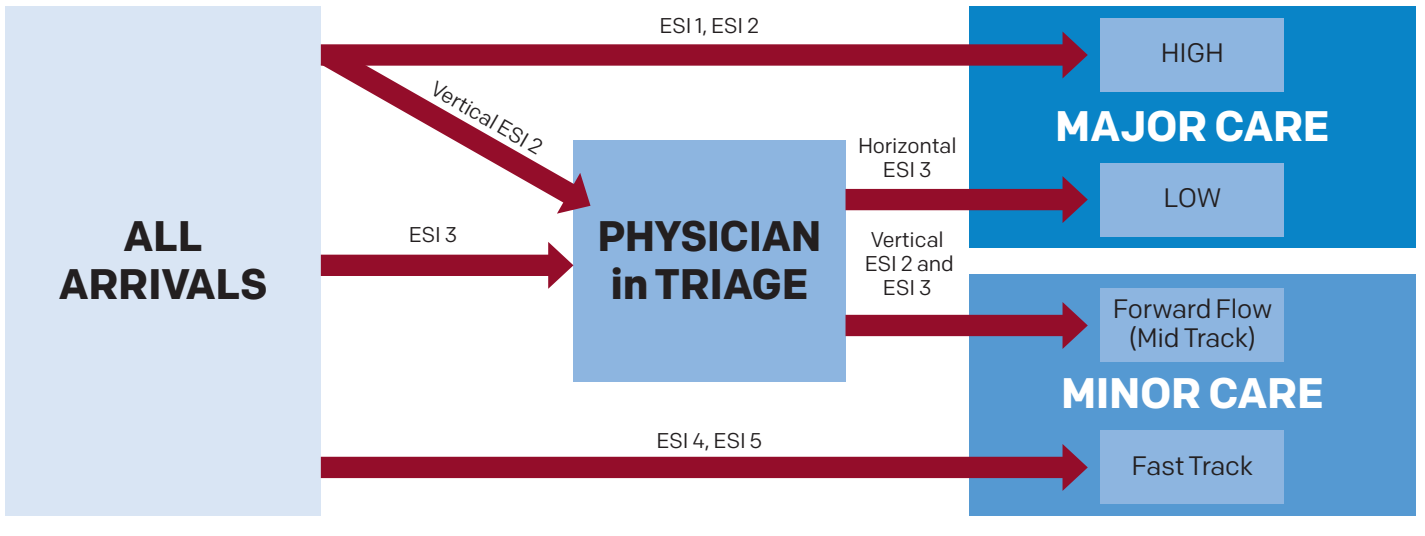


Figure 2: HUP ED 2.0 FLOW MODEL



Building a Better Flow

Because it was getting harder to populate a fast track and there were high volumes of intermediate-acuity patients, the ED leaders designed a custom flow model that allowed patients who could remain vertical to go to a mid-track-plus area known as Forward Flow. Unlike other mid-track models around the country, which see exclusively Emergency Severity Index (ESI) 3 patients, HUP developed inclusion criteria that allowed many ESI 2 patients to be treated safely in a lounge-like chair. For example, low-risk chest pain patients could be served in the vertical model. This allowed offloading of the ED acute care beds, the most precious real estate in the department. In fast track (only open on weekdays), advanced practice providers independently saw the lower-acuity patients.

The flow model designed for the HUP ED 2.0 Project is shown in Figure 2. This is one of the most complex streaming models we have seen, yet it perfectly adapted to the realities of the HUP emergency department. Patient segmentation allowed for the appropriate placement of patients into streams with simi-

CONTINUED *on page 14*

lar acuities and clinical intensity. Each acuity-driven zone worked to optimize its efficiency and throughput.

The HUP emergency department is a data-rich department, and it was able to manage each zone by studying zone-specific data. For each geographical zone, the leadership assessed:

1. Appropriate streaming (mean ESI and admission rate)
2. Productivity (daily volume and percent of volume)
3. Efficiency (door-to-doctor time and length of stay)

The ED operations leadership team monitored each area and developed inclusion and exclusion criteria, time and volume targets, swim lanes delineating the roles of each person in the zone, and job description sheets for each role in each zone. This operational cleanup and standardization made it easier for everyone to know what was expected within each role.

The icing on the cake for the HUP ED 2.0 Project was the development of high-flow strategies. Department leaders identified early signs (triggers) that an area was becoming overwhelmed. Designated shift leaders (such as patient-flow coordinators, charge nurses, etc.) were trained to identify problems in a zone in real time, and for each high-flow situation, there was a short-term remedy. For instance, if the physician in triage was overwhelmed, creating a bottleneck, the Forward Flow (mid-track) attending physician would float to the triage area to help that physician get caught up. If a lab technician was behind, there might be backup.

Table 1: Metrics Before and After HUP ED 2.0 Implementation

METRIC	BASELINE 2019	FIRST TWO MONTHS AFTER GO LIVE
Daily volume	168	183
Boarding minutes	342	457
Admission rate	29.9%	30.8%
Door-to-doctor time	81	25
Length of stay (LOS) overall	368	310
LOS admitted	690	741
LOS discharged	300	231
LOS fast track	169	118
LOS mid track	NA	240
Walkaway total %	8.9%	3.6%

The overarching theme in high-flow strategies is to have standardized and articulated trigger-response strategies mapped out in advance but activated in real time, deploying necessary personnel to an area to help the overwhelmed role in an overwhelmed zone.

High-flow strategies depend on physical layout, staffing models, and culture. As a result, they can be idiosyncratic to a particular emergency department. Many emergency departments attempt to manage high-flow situations with on-call arrangements, but that strategy is often not nimble enough. By the time an on-call physician or nurse is on scene, the crisis often has passed. The real-time strategies employed at HUP have been tried elsewhere but are not embedded into most emergency department operations.

The Results

The sum total of this sophisticated approach to ED operational challenges appears in Table 1. Door-to-doctor time fell by 70 percent, walkaways declined by 60 percent, and length-of-stay/discharged time dropped by more than an hour. These remarkable results were achieved despite several adverse headwinds, which included an overnight 9 percent volume increase (related to the closure of a nearby safety-net hospital), a 34 percent increase in boarding minutes (time from decision to admit to departure time), and an attending physician shortage (resulting from a 5 percent reduction in physician staffing).

HUP's ED operations team continues to optimize the new flow model. But HUP ED 2.0 demonstrates the power of a multidisciplinary effort that combines creative problem-solving with data-driven decision making.

BRINGING DATA TO THE BEDSIDE

BENCHMARKING ALLIANCE

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20 Key ED Metrics

The 20 numbers of emergency department management

by JAMES J. AUGUSTINE, MD, FACEP

There is huge value to timely data collection and sharing within an individual emergency department and between emergency departments.

Several national surveys create a statistical picture of the emergency system in America, including the National Hospital Ambulatory Medical Care Survey, which covers 1992–2016, and the annual Emergency Department Benchmarking Alliance (EDBA) survey, which has reported on ED performance measures since 1994.[1,2]

The National Emergency Department Inventory (NEDI)-USA database is maintained by the Emergency Medicine Network (EMNet) at Massachusetts General Hospital in Boston.[3] NEDI-USA contains data on all U.S. emergency departments, including hospital-affiliated satellite freestanding emergency departments (FSEDs) and autonomous FSEDs. According to NEDI-USA, there were 5,381 U.S. emergency departments that collectively managed 155,946,509 visits in 2016. Within NEDI-USA, all U.S. emergency departments can be found in the free smartphone app EMNet findERnow, including specific information such as total annual ED visit volume and whether the hospital is a verified trauma or burn center.

But creating a national picture has only a small value to emergency physicians and their patients compared to a comprehensive understanding of local needs and services. And local data has the greatest value when it is used for emergency planning, problem-solving, and solution creations at the local level. Emergency department leaders, emergency physicians, and nurse managers must have useful, well-defined data and the context to understand and utilize it. Having systems programmed to collect the data allows managers to build an understanding of the results, put the results in context and trends, and utilize the results and trends to compare their site with similar emergency departments. Data snapshots and trend lines allow hospital administrators to make good decisions to support evolving ED operations and address issues like flu surges and seasonal volume changes.

Using a well-constructed set of site data, ED leaders can identify effective processes and initiate a system for continuous process improvement. A comprehensive view of the emergency department has about 20 operating statistics. ED leaders collect these numbers from the hospital operating and financial systems—and increasingly from digital management systems in the emergency department.

The 20 ED performance measures (see Table 1) are the basis for effective department discussions and leadership. In short, they help answer these questions:

- Who are the patients?
- How effective are ED processes?
- What diagnostic services and treatments are needed for quality care?
- What are the outcomes for patients, ED staff, and the hospital?

All elements serve as the basis for continuous process improvements.

Using Your Data to Improve Your ED

The first, and most important, use of data is to inform the ED staff about the patients they serve and the key performance indicators for that emergency department. Table 2 is a sample staff information chart. These "patient per day" measures are the basis for effective ED management and should be posted in the staff lounge and bathroom (the most important communication site in most emergency departments). Smart ED leaders also understand what measures change on certain days (Monday in most emergency departments) and will recognize that staffing and operational changes are needed for days where predictable patient surges will occur.

The personnel and financial descriptors of acuity and the ED service are often shared at department meetings but not on a public chart. Those ultimately reflect on the longevity of ED managers. If ED staff and patient satisfaction are not high, a new group of managers may be analyzing the measures at future staff meetings.

The 20 numbers concept is used in other industries. The performance literature from other industries can be applied to some ED operations, but administrative decisions that affect ED performance must be driven by the demand for high-quality care and patient safety. The 20 numbers provide data to measure the successful execution of the emergency care mission.

Table 1: ED Performance Management Measures

1.	Patients per day (the most important driver of ED operations)
2.	Percentage of pediatric patients, defined as under age 18
3.	Percentage of high-acuity patients, defined as physician CPT code level 99284, 99285, and 99291
4.	Percentage of patients arriving by EMS
5.	Percentage of EMS patients admitted
6.	Median time from door to doctor
7.	Median length of stay for all patients
8.	Median length of stay for treat-and-release patients
9.	Median length of stay for admitted patients
10.	Median "boarding time" (decision to admit until admitted patient leaves the ED)
11.	Percentage of patients who leave before treatment complete (an important and inclusive term, counting any patient who leaves at any time in the ED process)
12.	Number of ECGs per 100 patients seen
13.	Number of images per 100 patients seen
	a. CT scans
	b. MRI scans
	c. Ultrasound studies
14.	Percentage of patients placed in an inpatient unit, either full admission or observation
15.	Percentage of total hospital admissions processed through the ED
16.	Percentage of patients transferred to another hospital
17.	Patient experience-of-care scores
18.	ED staff satisfaction, measured by personnel turnover rate
19.	Revenue per patient for the ED
20.	For ED patients who are admitted, the financial contribution to hospital per patient

Table 2: A Day in Our ED

140	Patients to be seen
17	Are under age 18
30	Are seen in and dispositioned from the fast track or greeting area
105	Are high-acuity
25	Arrive by EMS; of those, 11 are admitted
2	Are seen and then transferred to another hospital
172 minutes	The average length of stay for all patients
290 minutes	The average length of stay for patients being admitted, of which **120 minutes** is boarding time
90	Are administered medications
3	Need some form of restraint, and seven need mental health management
43	Have an ECG performed
115	Imaging procedures will be done, of which 60 are plain films, 36 are CT scans, two are MRIs, and 10 are ultrasounds
30	Are placed in an inpatient unit, either full admission or observation, representing 70 percent of the 43 patients placed in inpatient units in a day
4	Will be transferred
1,125	Orders will be entered via computerized physician order entry (CPOE)—eight orders per patient
22%	Of the hospital's total CPOE orders each day come from the ED
87%	Patient experience score for the year to date
1%	Left before treatment complete rate for the year to date

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Note: The definitions of these data points are in the literature.[2] The process for analysis of these data is summarized in an article by Shari Welch, MD, FACEP, and in ongoing Benchmarking and Special Ops articles in *ACEP Now*.[4]

is often associated with traumatic brain injury (TBI), TBI often goes unrecognized and undiagnosed among its victims. Various studies have found the prevalence of TBI in this population to range between 30 and 75 percent. If true, more TBIs are caused by IPV than by sport-related head injuries.[2–4] Even mild TBI may cause chronic disability without appropriate rehabilitation. Therefore, emergency physicians are in a unique position to prevent long-term sequelae by diagnosing TBI and providing appropriate referrals.

There is a lack of research regarding TBI in the context of IPV, and findings regarding brain injury from other contexts like sports and military trauma cannot necessarily be generalized. Most patients studied in the existing TBI literature are young, male, and otherwise healthy. In sports, due to increased awareness of the sequelae of TBI, particularly in repeated brain injuries, athletes are encouraged not to return to play until symptoms have resolved. Victims of IPV, on the other hand, may suffer repeat episodes of TBI within a similar time frame, as they are at high risk of multiple violent encounters. Also, while strangulation causing anoxic brain injury is uncommon among other patients at risk of TBI, it is disturbingly common among victims of IPV.[5]

These patients may experience headaches, dizziness, memory issues, sleep problems, poor judgment, and emotional lability. Often these symptoms are incorrectly chalked up to substance abuse, mental illness, or the psychological trauma of IPV. However, more recent studies have shown changes in brain network organization to be correlated with TBI. Abuse severity appears to positively correlate with brain injury and to negatively correlate with cognitive function.[3]

Lack of appropriate screening, diagnosis, and rehabilitation for TBI can lead to poor health outcomes. The resulting cognitive changes can cause problems with employment, caregiving, and compliance with medical care. Mothers who have a TBI are more likely to be perpetrators of child abuse, with one study showing a rate three times higher than that of the general population.[6] The cognitive challenges caused by brain injury may also make it difficult for victims to leave their abusers. Thus, IPV-related TBI can perpetuate the cycle of family violence.

Because many emergency physicians often do not routinely ask about TBI or strangulation, victims of IPV are often discharged from the emergency department without adequate information about lasting symptoms and without appropriate follow-up. Patients should be matched with community-based resources while in the emergency department, if possible. Neurology follow-up is also advised.

Case Conclusion

A head CT scan does not show any acute traumatic intracranial abnormalities. A neck CT angiogram shows no evidence of tracheal or vascular injury. Immediate and follow-up social services are offered in the emergency department. Upon discharge, the patient is referred to a local concussion clinic that specializes in victims of IPV.

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KEY POINTS

- Traumatic brain injury (TBI) is common in victims of intimate partner violence (IPV).
- Strangulation often accompanies TBI in IPV.
- Patients may suffer repeated TBI over short periods of time, similar to athletes.
- Patients may experience chronic, long-term sequelae of their TBI.
- Emergency medicine clinicians should have a high index of suspicion for TBI in IPV victims and refer them to specialized clinics.

Figure 1(ABOVE): Bruising on the side of the patient's head.

Figure 2(LEFT): Bruising around the patient's throat and jaw.

BRANDI CASTRO AND TAMI HARTLAUB

Q&A ABOUT OUR LITTLEST PATIENTS

KIDS KORNER

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by LANDON JONES, MD, AND RICHARD M. CANTOR, MD, FAAP, FACEP

The best questions often stem from the inquisitive learner. As educators, we love, and are always humbled by, those moments when we get to say, "I don't know." For some of these questions, you may already know the answers. For others, you may never have thought to ask the question. For all, questions, comments, concerns, and critiques are encouraged. Welcome to the Kids Korner.

Stopping Febrile Seizures

Question 1: What does recent literature say about antipyretics and febrile seizure recurrence?

How often have you had to explain that it's not the fever that actually caused the febrile seizure? Regarding subsequent recurrences of febrile seizures, a 2017 Cochrane systematic review included two studies evaluating the administration of prophylactic antipyretics—either ibuprofen alone or diclofenac followed by acetaminophen or ibuprofen—compared to placebo.[1] The authors found that antipyretics did not lower the recurrence of febrile seizures when measured over a 24-month period. A prior systematic review and meta-analysis by Rosenbloom et al arrived at a similar conclusion.[2]

The first double-blind, randomized, controlled trial by van Stuijvenberg et al in this Cochrane review included 230 children ages 1 to 4 years, compared ibuprofen 5 mg/kg to placebo, and assessed recurrent febrile seizures over a two-year period.[3] Whenever children developed a fever over the next two years, the parents were instructed to administer ibuprofen every six hours until the child was fever-free for 24 hours. The primary outcome was a first recurrence of febrile seizure. In the ibuprofen group compared to placebo, the febrile seizure recurrence was 32 percent versus 39 percent, respectively (recurrence risk 0.9; 95% CI, 0.6–1.5). While there was no significant reduction in recurrence, it is important to note that the dosage of ibuprofen used was lower (5 mg/kg rather than 10 mg/kg) than is typically used for antipyresis.

The second double-blind randomized, controlled trial in this same review was by Strengell et al.[4] The authors evaluated 231 children ages 4 months to 4 years from five hospitals who had their first febrile seizure. Children received rectal diclofenac (1.5 mg/kg) or placebo at presentation, followed by either acetaminophen (15 mg/kg), ibuprofen (10 mg/kg), or

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placebo every eight hours until the fever resolved. They also received the same antipyretic—or placebo—for subsequent febrile illnesses over the next two years. The acetaminophen and ibuprofen dosing in this study is consistent with current routine antipyretic dosing. In this study, febrile seizures recurred in 23.5 percent of children who received placebo only versus 23.4 percent in children who received antipyretics (P=0.99; 95% CI, –12.8 to 17.6).

Since these systematic reviews, a more recent randomized prospective study of 423 children ages 6 months to 6 years by Murata et al evaluated febrile seizure recurrence during one febrile illness only (ie, not across multiple illnesses).[5] Exclusion criteria included children with two or more febrile seizures during the febrile illness, status epilepticus, or structural or metabolic disorders; children presenting with diarrhea (due to rectal delivery of the drugs in this study); and children who had received benzodiazepines or antihistamines. Children were randomized to: 1) rectal acetaminophen (10 mg/kg) followed by the same dose of rectal acetaminophen every six hours for the next 24 hours for persistent fever >38° C or 2) no antipyretics for 24 hours. In this study, febrile seizure recurrence was 9.1 percent (20 of 219) in children who received rectal acetaminophen versus 23.5 percent (48 of 204) who received no antipyresis (P< 0.001), suggesting that rectal acetaminophen at 10 mg/kg decreased recurrent febrile seizures in the same febrile episode. Of note, this study was performed in Japan, where the authors report a febrile seizure incidence of 7 to 11 percent with recurrences in approximately 15 percent of children during the same febrile illness. This incidence rate, the authors note, is higher than the more commonly reported 2 to 5 percent.

Conclusion

Febrile seizure recurrence in subsequent febrile illnesses does not appear to be affected by antipyretic usage. Newer literature in a high-incidence population—while only a single study—suggests that rectal acetaminophen may decrease recurrent febrile seizures during the same febrile illness.

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Elevation for Intubation

Question 2: During pediatric intubations, how much does a shoulder roll (or equivalent) help intubation success?

We admit that we've made the mistake of complicating a pediatric intubation by not using a shoulder roll (or an equivalent means of elevating a child's shoulders). But how much does it really matter? Two separate studies in 2019 alone re-emphasize the importance.

A study by Koylu Gencay et al prospectively randomized 96 elective surgery pediatric patients younger than 2 years of age to intubation with a C-MAC Miller video laryngoscope either with or without a folded towel under the shoulder to better align the oral-pharyngeal and laryngeal axes.[1] The primary outcome was the percent of glottis opening (POGO). Secondary outcomes included time to intubation and number of intubation attempts. POGO scores were assessed by a party blinded to presence/absence of shoulder elevation by a towel.

Of 48 total patients with a towel (Group 1), the POGO score was 100 percent in 37 children and 90 percent in the other 11. For the 48 children without a towel (Group 2), the POGO was 100 percent in 26 children, 90 percent for 16 children, and 80 percent in the remaining

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six children. The differences were statistically significant (P=0.004). The time to intubation was also significantly faster in the group with a towel (24.83 ± 3.82 seconds versus 31.67 ± 11.91 seconds). A single child in the group without a towel required a second attempt at intubation.

Another article by Ahn et al prospectively evaluated children younger than 36 months of age requiring intubation who were undergoing elective surgery. Exclusion criteria included head/neck malformations, possible lung aspiration, current/recent upper respiratory infection, emergency surgery, and hemodynamic instability. Primary outcomes were POGO, mouth opening, and laryngoscopy handling score (LHS). LHS consisted of an assessment of mouth opening, teeth contact, sternum contact, and resistance to laryngoscope advancement. Outcomes were measured before and after a procedural assistant performed a maneuver called hand-assisted elevation and caudal traction of the shoulder (HA-ECTS)—a maneuver nearly identical to placement of a shoulder roll.

In 37 children ages 0–36 months, the median POGO score was significantly better (30 percent versus 60 percent) after performing HA-ECTS. LHS was also significantly easier after HA-ECTS (P<0.001). Subgroup analysis of 18 children ages 0–12 months demonstrated an easy (nine patients), moderate (five patients), and difficult (four patients) LHS prior to HA-ECTS. After HA-ECTS, laryngoscope handling in all 18 children became easier. LHS scores in older children (ages 12–36 months) did not reach statistical significance (P=0.08) after HA-ECTS.

Conclusion

During endotracheal intubation in children, shoulder elevation to align the oral-pharyngeal and tracheal axes significantly improves visualization and time to intubation.

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More Tests Versus More Time

ED management of suspected occult fractures

by ARUN SAYAL, MD, CCFP(EM)

When assessing a patient with a suspected radiographically occult fracture, there are two options for the emergency physician: *more tests* or *more time*.

More tests equates to additional X-ray views or advanced imaging (CT or MRI).

More time means treating the patient for the suspected diagnosis and arranging for a serial assessment.

I will discuss three cases and explore the ED management options.

Case 1: Occult Scaphoid Fracture

A 26-year-old female fell on an outstretched hand and has isolated wrist pain, tender snuff box, and scaphoid tubercle. X-rays of the wrist with scaphoid views are normal.

Diagnosis: suspected occult scaphoid fracture.

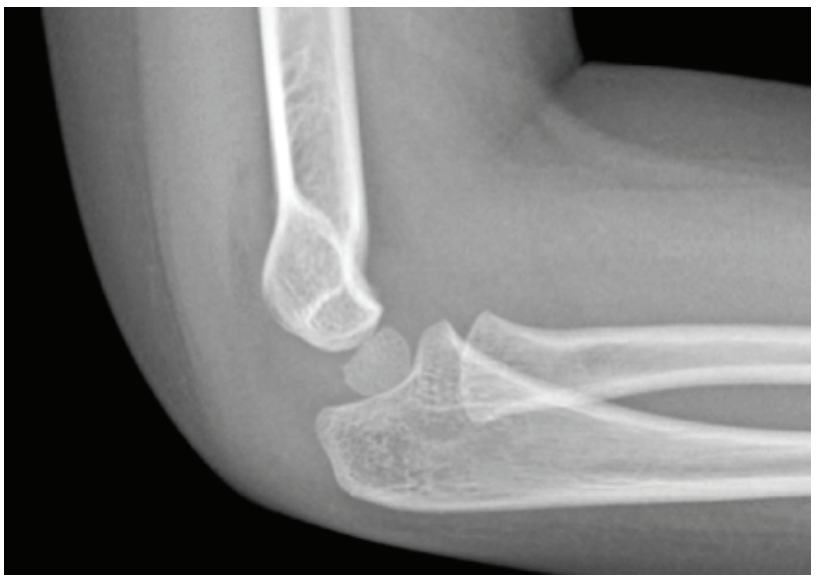
Follow-up studies have shown that 75 to 80 percent of patients with an ED diagnosis of a "suspected scaphoid fracture" do not have a fracture.[1,2] There is concern that many patients are unnecessarily immobilized and require a low-yield follow-up appointment. These concerns have led some emergency departments to institute a wrist CT protocol during the initial visit in an attempt to definitively rule in or rule out a scaphoid fracture. A meta-analysis showed the sensitivity and specificity of CT for occult scaphoid fractures were 0.72 (95% CI, 0.36–0.92) and 0.99 (95% CI, 0.71–1.00), respectively.[3] Even the CT may not definitively rule out a fracture and may be falsely reassuring. Additionally, if a patient's radial-sided wrist pain comes from a partial scapholunate ligament (SLL) injury, the CT may be normal. If a patient subsequently falls during SLL healing (which may take weeks to months), the second force may convert a partial tear to a complete one, requiring operative management.

MRI is often considered the best advanced imaging option, as it shows the bone and soft tissues. A meta-analysis reported the sensitivity and specificity of MRI for occult scaphoid fractures were 0.88 (95% CI, 0.64–0.97) and 1.00 (95% CI, 0.38–1.00), respectively.[3] Another smaller study showed early MRI missed 20 percent of radiographically occult scaphoid fractures.[4] Therefore, normal MRI may not definitively rule out a fracture either. Additionally, high cost and low access prevent MRI from playing a role as an advanced imaging option for suspected occult scaphoid fractures during ED visits.

A bone scan may be considered due to a high sensitivity, though this modality is fading from common use. The sensitivity and specificity of bone scan for occult scaphoid fractures were 0.99 (95% CI, 0.69–1.00) and 0.86 (95% CI, 0.73–0.94), respectively, but there are many downsides to this imaging modality in the emergency department.[3] For fracture detection, a bone scan generally requires 48 to 72 hours after injury to become reliably positive (though modern bone scans may need less time). Given its high sensitivity, a negative bone scan at 48 to 72 hours essentially rules out a fracture, but as with CT, a normal bone scan does not rule out a SLL tear. Unfortunately, a positive bone scan is hampered by low specificity. False positives can be generated by any condition that increases metabolic activity in bone, such as a bone contusion, infection, inflammation, degenerative joint disease, and tumors. Additionally, bone scans are associated with significant ionizing radiation (equivalent to 50 chest X-rays). Bone scans are fairly time-consuming and only available during certain working hours, and they require isotope availability. Bone scans miss important information including fracture pattern and/or precise location, making prognosis for that fracture difficult to assess. Therefore, a positive bone scan is often followed by a form of 3-D imaging (typically CT). As a result, radionuclide bone scans for suspected scaphoid fractures in the emergency department are largely impractical.

Similarly, ultrasound (US) is of limited value for occult fracture confirmation. Certainly, US may be helpful with some soft tissue injuries. It is less helpful in fractures. The sensitivity and specificity of ultrasound in diagnosing radiographically occult scaphoid fracture ranged from 77.8 to 100 percent and from 71.4 to 100 percent, respectively, with pooled estimates of 85.6 percent (95% CI, 73.9–92.6%) and 83.3 percent (95% CI, 72.0–90.6%), respectively.[5]

While there are suggestions in the literature that US may be an option for suspected scaphoid fractures, it is not considered sensitive enough to reliably alter ED management decisions.[3,4]



ARUN SAYAL

A 3-year-old girl fell while running. An X-ray the day of the fall (**ABOVE**) showed no fracture, but her arm was splinted for possible occult fracture. A follow-up X-ray at three weeks (**RIGHT**) confirmed the fracture (arrows).

Case 2: Occult Lateral Tibial Plateau Fracture

A 78-year-old male presents with valgus stress to left knee, immediate pain, non-weight-bearing, and swelling within an hour. On exam, the knee is swollen, there is tenderness along the lateral joint line, the ligaments are stable, and soft tissues are intact. X-rays of the knee (four views) show effusion only.

Diagnosis: suspected occult lateral tibial plateau fracture.

Valgus stress with immediate pain, rapid swelling (implying acute hemarthrosis), and non-weight-bearing suggest a lateral tibial plateau fracture, especially in older patients with osteoporosis. On exam, the swollen knee, lateral joint line pain, and inability to bear weight are consistent with a likely tibial plateau injury. Even in the face of normal X-rays, the high clinical suspicion should make one pause and consider occult fracture. Such fractures are at risk of displacing if the diagnosis is missed in the emergency department and the patient is allowed to weight-bear.[6]

More tests? Or "treat and more time?" The option for treat and more time means immobilization, crutches, and non-weight-bearing. In many older patients, this proposition is very risky, so the push would be for advanced imaging (a CT scan) as soon as can be reasonably arranged. The patient should be kept non-weight-bearing until the diagnosis is clarified. A younger patient with a similar assessment may be more likely to manage crutches. Therefore, the option of immobilization, crutches, strict non-weight-bearing, and close follow-up (ideally within a week) may be more reasonable, depending on your local resources and preferences.

Case 3: Occult Hip Fracture

A 74-year-old female slips and falls. She has pain to the right hip and is non-weight-bearing. There is no limb-shortening or external rotation. She has a tender right hip and significant decreased range of motion (passive and active). X-rays of the hip and anteroposterior pelvis are normal.

Diagnosis: suspected occult hip (neck of femur) fracture.

The incidence of radiographically occult hip fracture (neck of the femur) is estimated to be between 5 and 10 percent—and more likely in elderly patients.

A few important warnings about ED patients with hip fractures. The "classic" patient with a hip fracture has fallen and cannot walk, and their leg is short and externally rotated. Shortening and external rotation indicate a displaced fracture. However, an undisplaced hip fracture will not have the classic short and externally rotated presentation—it will have symmetric alignment to the contralateral leg. While most patients with a hip fracture are unable to walk, a minority of patients with an impacted, undisplaced hip fracture may be able to, albeit with a painful limp. In some cases, history (or lack thereof) can mislead us; hip fractures can occur without falling. In patients with an osteoporotic (weak), arthritic (stiff) hip, a vigorous twist can produce enough torque to cause a fracture. Not realizing this can be a diagnostic pitfall.

Often, an occult hip fracture needs surgical management. Delay in diagnosis increases morbidity as diagnostic delay is associated with greater displacement and more extensive surgery.[3] Even mortality increases with delay to surgery.[7] A 13 percent increase in the risk of mortality for every day of delay in surgery has been reported.[8] Ideally, patients with a hip fracture should be operated on within 24 to 28 hours. However, the decision to operate cannot be made until the diagnosis is confirmed.

This case highlights that a greater imperative exists to diagnose these injuries, requiring more tests on the index visit. However, if the clinical setting is such that advanced imaging is not available, then bed rest and non-weight-bearing are mandated until a diagnosis is confirmed. Ideally, arrangements for advanced imaging should be made.

Two additional points: Older patients with osteoarthritis can have marginal osteophytes. On CT, these marginal osteophytes can simulate fractures in their periphery. Osteoporosis can also accentuate lucencies and nutrient vessels, again mimicking fractures and leading to false positive reads.

Analysis

In determining a management strategy (more tests versus more time), three main factors should be considered for patients with a suspected occult fracture:

1. Diagnosis in question
2. Patient in question
3. Available resources

Diagnostic Factors

For some occult fractures, the plan of immediate immobilization and delaying diagnostic confirmation is reasonable since this strategy would not adversely affect outcome. However, diagnostic delay of other radiographically occult fractures can be harmful.[9] Suspected scaphoid fractures with negative X-rays are the classic example. Suspected distal radius fractures can be approached similarly. Most pediatric cases of suspected occult fractures can be managed this way.

Suspected occult hip fractures, tibial plateau fractures, and cervical spine fractures, however, require immediate further evaluation, as they are more likely to displace if missed in the emergency department and not managed appropriately.[9] These displacements can lead to more extensive surgery or surgery that may have been avoided altogether.[9] In these cases, the need for advanced imaging during the index visit is evident.

Patient Factors

Patient factors also play a role. Because of the tendency to displace with weight-bearing, patients with suspected tibial plateau fractures should be kept non-weight-bearing until confirmed or reassessed. For older patients, the strategy to immobilize, provide crutches, and require no weight-bearing can be a dangerous combination; fall risks are high. But younger patients may safely tolerate this approach, permitting immobilization and delayed advanced imaging in many instances. Patient factors around compliance and availability for follow-up should also influence our choice between more tests and more time.

Imaging Modalities

Advanced imaging for occult fractures in the emergency department generally refers to CT and MRI. Each has respective pros and cons.

A CT scan generally has high sensitivity for detecting fractures, and especially with 3-D reconstruction, it is an excellent tool for assessing bony alignment. CT provides little value for soft tissue injuries.

Musculoskeletal CT scans expose patients to ionizing radiation, but that exposure is far less than chest, abdomen, and pelvic protocols. A wrist CT is equivalent to the radiation of just 1.5–3 chest X-rays.[10,11] A chest CT is equivalent to around 70; an abdomen/pelvis CT is equivalent to up to 100.[12]

MRI has advantages over CT. In addition to high sensitivity for fractures, MRIs can assess soft tissue structures—and without any radiation. However, high cost, long scan and radiology reading times, and poorer availability limit its role in the emergency department for occult fractures.

Bone scans and ultrasound in assessing suspected occult fractures are discussed above.

As a final consideration, the ED workup and treatment can vary from hospital to hospital based on local orthopedic preferences. Knowing how your local orthopedic surgeons prefer to manage the spectrum of suspected occult fractures from the outset optimally aligns initial ED care with the follow-up care patients will receive.

Summary

When considering advanced imaging, we are guided by the post-test probability for fracture; knowing the limits of plain films; understanding the complications of the suspected injury; the pros, cons, and indications for advanced imaging; and the proper ED treatment. Combining these helps optimize care.

"X-ray normal" is not a diagnosis. While most ED patients with negative extremity X-rays do not have a fracture, a few will. As clinicians, we see normal X-rays routinely on every shift. We should neither be falsely reassured by them nor unduly afraid of them. Combining the patient's history with risk factors and the physical exam will determine our proper level of concern.

If significant concern for a fracture remains after negative X-rays, the ideal ED management strategy depends on the diagnosis, the patient, and available resources.

Worrisome diagnoses in less physically robust patients tend to require more urgent diagnostic confirmation. However, in many cases, sturdy patients with a suspected occult fracture can be safely and appropriately managed with an ED plan to treat for the fracture and arrangement of close follow-up.

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SECURE Act

How it will affect emergency physicians

by JAMES M. DAHLE, MD, FACEP

Q. I hear that Congress just passed the SECURE Act. What does that mean for doctors?

A. Most years, Congress passes a few rules that affect your taxes and retirement accounts. After the major changes that went into effect in early 2018, the changes this year (the SECURE Act) seem pretty minor. But part of your annual "continuing financial education" should be getting up to speed on changes like these. Let's briefly go through them one by one.

IRA Changes

There were five small changes to individual retirement arrangements (IRAs), although some of them also apply to 401(k)s.

The first change is that IRA owners can now delay taking required minimum distributions (RMDs) to age 72 instead of age 70½. This gives people one to two more years before they have to take money out of their IRAs and 401(k)s or else pay a penalty of 50 percent of what they should have taken out. This is a pretty minor change since 80 percent of people don't even wait until age 70 to start tapping their IRAs.

The second change is that inherited IRAs can no longer be stretched indefinitely. Now you must withdraw all of the money from an inherited IRA within 10 years. Of course, you don't have to take anything out for the first nine, which still allows compound interest to continue for almost a decade without interference from taxes. However, if you have large IRAs and "stretch IRAs" were a major part of your family wealth transference and estate plan, this could have a major impact on how much your heirs actually receive over decades. If you have a trust as the beneficiary of your IRA, you need to discuss this with your estate planning attorney now.

The third change affecting IRAs is that you can now contribute to them after age 70 if you are still working.

The fourth change is a new exception to the 10 percent penalty for withdrawing money from your retirement accounts prior to age 59½—the birth or adoption of a child now allows you to withdraw $5,000 from your IRA penalty-free. This is added to a long list of exceptions such as disability, a first home, medical expenses, and even early retirement via the substantially equal periodic payments rule.

The fifth change is that you can now use a stipend, such as a graduate student or military stipend, to contribute to an IRA (hopefully a Roth IRA at that income level).

401(k) Changes

There were also a number of changes that affect employer retirement plans such as 401(k)s. The first of these is that annuities are now a bit more attractive to include in a retirement plan than previously. Your employer now has a "fiduciary safe harbor," making it harder to sue them for including lousy annuities in their plan. Also, if the annuity option is removed from the plan by the employer, you no longer need to liquidate the annuity—you can roll it out of the plan "in-kind," meaning you can move it to an IRA instead of selling it. It is probably still not a great idea to buy one of these, particularly inside a retirement plan.

The second change is a tax credit of up to $5,000 for establishing a retirement plan for a small business. Employers are even allowed to start a plan after the end of the calendar year, as long as the plan only accepts employer contributions. That could allow a lot of procrastinating independent contractor physicians to still make profit-sharing contributions for the previous year.

A third change is that employers can automatically enroll you at a contribution level of up to 15 percent of your income, an increase from the prior limit of 10 percent. This will help people save more money than they otherwise would. Studies show that opt-out plans are much more effective than opt-in plans. There is even another $500 tax credit for employers that add an automatic enrollment option.

A fourth change is that part-time workers are now more likely to qualify for a 401(k)—although it will likely be several years before that benefit really kicks in. Someone who works at least 500 hours a year for three consecutive years (or 1,000 hours in one year) now must be covered.

A fifth change makes things easier for multi-employer plans, allowing multiple small employers to band together for some economies of scale, lowering the costs of running the plan.

529 Change

529s can now be used to pay off student loans, at least up to $10,000 per student. This could potentially allow you to make a 529 contribution, get a state tax deduction or credit for it, and then immediately withdraw the money and pay off student loans.

Kiddie Tax Change

For one brief year, the kiddie tax brackets (ie, the tax on unearned income for minors above $2,200) was equal to the trust tax brackets. It now reverts to previous law where it is equal to the parents' tax bracket.

These changes are all relatively minor. The most important thing is simply to know what "the rules" are so you can "play the game" to the best of your ability.

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then, more than 110,000 cases have been reported in more than 80 countries, though the majority of them are in China.[1]

The first reported U.S. COVID-19 cases have largely followed the early distribution models based on air traffic from Hubei province, clustering in major transport hubs like Los Angeles, New York, and Chicago.[1,2] What we know of the epidemiology, pathophysiology, and best approaches to management of COVID-19 relies heavily on what we've learned from past outbreaks. As public health and infectious disease specialists scramble to understand a novel viral disease with international implications, emergency and other frontline health care providers need accurate information to prepare their departments for the possibility of encountering patients infected with the virus.

Background and Public Health

If all of this seems reminiscent of the 2003 SARS coronavirus outbreak, that's because it is. Both outbreaks started with small outbreaks of a severe respiratory disease within fairly isolated Chinese populations, which then escalated rapidly to involve large numbers of patients throughout the region, eventually spreading to far-flung nations along busy commerce and tourism aviation routes.[3]

The initial Chinese government response to SARS was characterized by efforts to minimize its severity and to avoid public scrutiny. This strategy resulted in a delayed international response and further spread of the disease.[3] Despite controversy surrounding potential suppression of early reports of a novel coronavirus in late December 2019, the Chinese public health response to COVID-19 stands in stark contrast with the SARS outbreak.[4] Rather than months of suppression, the decision to report the virus to World Health Organization authorities within days enabled an early, robust international response and facilitated genetic sequencing of the virus, potentially fast-tracking efforts to discover effective antiviral therapies and vaccines.[5]

Table 1: CDC Guidelines for Identifying Persons Under Investigation[19]

EXPOSURE		SYMPTOMS
Close contact* with laboratory confirmed COVID-19 patient within 14 days of symptom onset	AND	Fever** OR lower respiratory illness (LRI)***
History of travel from affected areas within 14 days of onset	AND	Fever AND LRI requiring hospitalization***
No source of exposure has been identified	AND	Fever AND severe acute LRI requiring hospitalization AND without alternative diagnosis

* Close contact defined as being within six feet of a confirmed case for prolonged period or having direct contact with infectious secretions of a COVID-19 case. ** Observed or subjective. *** CDC cites cough and shortness of breath as examples.

Specific efforts to contain the disease and decrease its spread implemented during both the SARS outbreak and the current COVID-19 outbreak include instituting quarantines, closing borders, restricting air and sea travel, and closing local markets thought to contribute to animal-human disease transmission.[6,7]

Vaccine development in the setting of an outbreak of a highly infectious viral pathogen can be a valuable step in minimizing spread of the disease. In the SARS outbreak, no viable vaccine was available, and although an S-protein-based vaccine to SARS coronavirus has shown efficacy in animal models, no coronavirus vaccine has been released for human use.[8] Challenges in the development of attenuated coronavirus vaccines include the use of highly concentrated native coronavirus by laboratory workers, which potentially can lead to inadvertent transmission of disease to those working on vaccine development.[9] Similar difficulties in developing a vaccine to the current coronavirus can be anticipated, although clinical trials are already under way.

Clinical Management

Among the most daunting tasks for the ED provider evaluating possible COVID-19 patients is triage. Current Centers for Disease Control and Prevention (CDC) guidelines for determining whether a patient should appropriately be considered a "person under investigation" (PUI) are listed in Table 1.

Note that these are guidelines designed as a national public health response to an outbreak. They do not always translate smoothly into a busy ED triage system. At our institution, the rule-out COVID-19 triage process is based on recommendations by Koenig during the MERS coronavirus outbreak, summarized as "Identify, Isolate, and Inform."[10]

Identification should ideally occur prior to or during triage. At our institution, the electronic medical record requires the triage nurse to ask every patient about recent international

CONTINUED *on page 22*

travel. A positive screen prompts further automated questions regarding travel to China or other areas with many cases and whether the patient has had cough, shortness of breath, or fever. Of note, during previous outbreaks of MERS coronavirus and Ebola virus, we determined that broader regional terms like "the Arabian Peninsula" or "West Africa" were not familiar to all staff and sometimes led to both over- and under-triage. We now limit the triage form to specific countries relevant to a current outbreak.

If the patient screens positive for both travel to an affected area and any of the aforementioned symptoms, they need some kind of isolation. A surgical mask is applied, and a provider is notified. In most cases, the provider notifies the infectious disease team, who can help determine whether the patient meets CDC PUI inclusion criteria and can inform the local department of public health and the CDC.

Infection Prevention

After a potential PUI is identified and a surgical mask has been placed on the patient, the CDC states that they be moved to an airborne infection isolation room (AIIR).[11,12] In facilities that have limited availability of an appropriate bed, any private room with a closed door may be temporized until an AIIR is available. Patients undergoing observation by state departments of health may contact emergency departments prior to their arrival so that an AIIR might be available sooner. However, advance warning is not always possible. Facilities without AIIRs should transfer PUIs to facilities that do.

Protecting health care providers is a top priority. Attention to guideline-based patient isolation and infection prevention are the primary ways that frontline providers can protect themselves. The first case series of 138 patients infected with coronavirus noted that 29 percent of patients were medical staff, suggesting a high rate of nosocomial infections.[13] Recent reports suggest that this is inhibiting the ability of some Chinese hospitals to maintain staffing and care for patients.[14]

Personal protective equipment (PPE) should be worn at all times when caring for a PUI. PPE guidelines for COVID-19 are based on recommendations for previous MERS and SARS coronavirus outbreaks (these differ from Ebola virus recommendations). The components are listed in Table 2.

Entry into patient rooms should be limited as much as possible. Procedures producing aerosolized patient secretions (open suctioning, induction of sputum) should be avoided. Health care providers at highest risk are those who are improperly trained in infection control, inconsistently use PPE, or perform high-risk procedures (eg, endotracheal intubation).[12]

Table 2. Personal Protective Equipment for COVID-19[20]

COMPONENT	COMMENTS
Gowns	Consider level 3 or 4 liquid barrier performance* (eg, surgical gown)
Gloves	Consider wearing two pairs of gloves so a top layer can be discarded if visibly soiled Consider using appropriate sanitizing solution or sanitizing wipe to disinfect gloves prior to removal to reduce risk of cross-contamination
Eye protection	Goggles or disposable face shield that protects eyes AND the sides of the face
Face mask	Fitted N95 mask OR power air-purifying respirator

*American National Standards Institute/Association for the Advancement of Medical Instrumentation recognizes four levels of liquid protection. Yellow contact gowns are level 1 and not intended for protection against long, fluid-intense procedures or body fluids at pressure.

Diagnosis and Clinical Features

In the first case series of infected patients with COVID-19, nearly all (98 to 100 percent) had fever, and leukopenia was associated with ICU admission, acute respiratory distress syndrome (ARDS), and death.[13] A retrospective review of chest CT performed in confirmed cases showed a high incidence of multilobar ground glass opacities (86 percent) with or without consolidation.[15] This is comparable with radiographic findings in MERS coronavirus and SARS coronavirus infections.

Current data suggest a case fatality rate of about 2 to 4 percent, although that number is likely to drop as milder cases will be more likely to be diagnosed as testing becomes more common. So far, 26 percent of infected patients

have required critical care.[13] While this may seem relatively benign, especially when compared to a 60 percent case fatality rate with Ebola virus, it is worth noting that the 1918 influenza pandemic had a similar case fatality rate (5 percent). The primary difference at this stage between the two is the dispersion globally of the disease.[16]

COVID-19 cases are definitively diagnosed by a positive real-time polymerase chain reaction (rt-PCR) isolation of viral RNA from respiratory secretions. This is theoretically possible from any upper or lower respiratory samples (nasopharyngeal swabs, sputum, bronchoalveolar lavage, nasopharyngeal wash, or aspirate), and it should be performed in any person meeting criteria for a PUI.[17] Samples should be collected, handled, and shipped under the guidance of state or regional public health departments to appropriate reference laboratories capable of performing the specific SARS-nCoV-2 rt-PCR.

Management

The foundation of COVID-19 management is supportive care and minimizing transmission. At this time, there is no evidence-based pathogen-specific treatment available. Neuraminidase inhibitors (oseltamivir, peramivir, zanamivir), ganciclovir, acyclovir, and ribavirin are considered ineffective against coronavirus and likely have no role in management.[18] Drugs considered possibly effective and currently being offered under "compassionate use" standards in multiple countries include remdesivir, lopinavir/ritonavir, interferon beta, convalescent plasma, and monoclonal antibodies.[18] Extracorporeal membrane oxygenation (ECMO) has been used in multiple cases in China, although candidacy guidelines do not exist.[18] Use of any of these approaches should be in communication with CDC personnel and infectious disease specialists. While antibacterial therapy is unlikely to benefit most patients with COVID-19, most patients in Chinese case series with acute respiratory distress syndrome (ARDS) or septic shock received empiric broad-spectrum antibacterial therapy. The rate of bacterial superinfection is unknown. Additionally, about 40 percent of patients with ARDS received steroid therapy, reflecting the ongoing controversy of steroid use in ARDS.[13]

Conclusion

As China reels from the COVID-19 outbreak, the world prepares to limit its spread. Emergency providers are on the front line of any infectious outbreak and should maintain a working knowledge of the features of infection, recommendations for isolation and health care provider protection, and the local and national public health infrastructure for reporting PUIs.

Note: Visit ACEPNow.com for the references for this article and COVID-19 updates.

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