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ACEP'S RESPONSE TO A FLAWED 'STUDY' IN *NEJM*

NEJM UNBALANCED OVER BALANCE BILLING

by RYAN STANTON MD, FACEP *and* ACEP PRESIDENT REBECCA PARKER, MD, FACEP

In November, The *New England Journal of Medicine (NEJM)* published an article of great concern for all emergency physicians as it has the potential to damage and disparage America's safety net with biased and self-serving data.

"Out-of-Network Emergency-Physician Bills—An Unwelcome Surprise" attacks emergency

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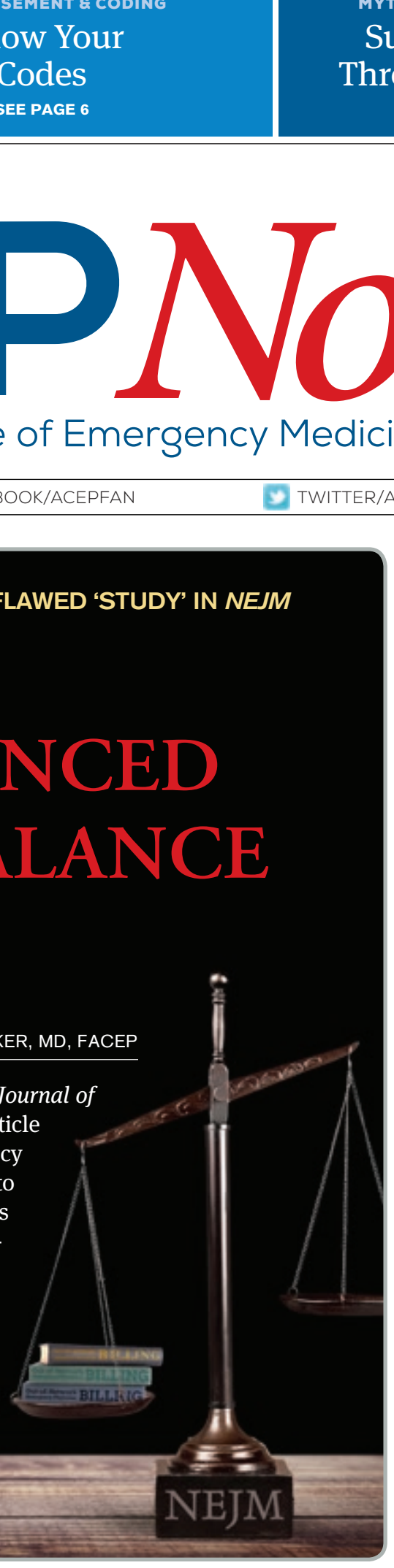

ILLUSTRATION:CHRIS WHISSEN; PHOTOS: SHUTTERSTOCK.COM

SKEPTICS' GUIDE TO EMERGENCY MEDICINE

NPO IS A NO-GO

NPO status andprocedural sedation in the emergency department

by KEN MILNE, MD

The Case

An 8-year-old boy falls while playing ice hockey. He has an isolated distal radius fracture that needs a closed reduction. The patient had been eating a bag of chips one hour ago, and you wonder if you need to wait before performing procedural sedation.

Background

Procedural sedation is a common practice in the emergency department. The American Society of Anesthesiologists 2011 Practice Guidelines recommend fasting from the intake of clear liquids for at least two hours, fasting from the intake of a light meal for at least six hours, and fasting from the intake of fried or fatty foods or meat for eight or more hours.[1] They do acknowledge that these guidelines may not apply to emergency care.

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The ACEP 2013 Clinical Policy on procedural sedation and analgesia in the emergency department recommends not delaying procedural sedation in adults or pediatric emergency department patients based on fasting time (Level B).[2] This is because "pre-procedural fasting for any duration has not demonstrated a reduction in the risk of emesis or aspiration when

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SPEAKING UP ABOUT PHYSICIAN SUICIDE

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Thank You!

ACEP would like to recognize the following emergency medicine residency programs for membership excellence. At least 80 percent of their 2016 Graduated Class joined the College for their first year of practice.

Albany Medical Center

Allegheny General Hospital

Carilion Clinic – Virginia Tech Carilion

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Eisenhower Medical Center

Florida Hospital Medical Center

Geisinger Medical Center

Georgetown University Hospital

Kaweah Delta Health Care District

Kingman Regional Medical Center

Memorial Hospital, York, Pennsylvania

New York Medical College Metropolitan

Ohio Valley Medical Center

OUCOM/Southern Ohio Medical Center

Rowan University School of Osteopathic Medicine/Inspira

Rutgers Robert Wood Johnson

St. Joseph Health Center

St. Vincent Mercy Medical Center

UNECOM/Kent Hospital

University of Arizona College of Medicine at South Campus

University of California San Francisco Medical Center

University of Nevada Las Vegas

University of Oklahoma College of Medicine/Tulsa

University of Rochester

University of Tennessee College of Medicine, Chattanooga

University of Texas at Austin Dell Medical School

University of Texas Southwestern Medical Center

University of Virginia Health System

Wake Forest University

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Virginia Commonwealth University

100% membership shown in bold

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Want to Be Part of ACEP Leadership? Now Is the Time

THE ACEP NOMINATING COMMITTEE is accepting nominations until March 1, 2017, for the national ACEP Board of Directors, Council speaker, and Council vice speaker positions. A true measure of a leader is knowing when it is time to accept the challenge of leadership. One must carefully consider their education, life experiences, and potential to determine when they are ready to lead. If you know you are ready to lead, don't wait for a phone call to determine your interest in seeking nomination! Take the initiative to contact your component body president or section chair to express your interest in nomination, and ask that a letter of support be submitted on your behalf. Visit **www.acep.org/LeadershipNominations** for criteria and submission guidelines.

Diversity in Recent Leadership Positions

Leon L. Haley Jr., MD, MHSA, FACEP, CPE, became dean of the College of Medicine and vice president for health affairs this month at the University of Florida–Jacksonville. Prior to his appointment, Dr. Haley served as executive associate dean for Emory University at Grady and chief medical officer for the Emory Medical Care Foundation in Atlanta. Dr. Haley has held many positions in emergency medicine leadership and will be the first African-American emergency physician to become a dean of a major university campus.

Marcus L. Martin, MD, FACEP, was honored in December 2016 when the University of Virginia's Board of Visitors named the first endowed professorship in the department of emergency medicine the Marcus L. Martin Distinguished Professorship of Emergency Medicine in the School of Medicine. Dr. Martin is a professor and past chair (1996–2006) of the department of emergency medicine at the university. He was the first African-American to head a clinical department at the university.

Lynne D. Richardson, MD, FACEP, was elected, in October 2016, to the National Academy of Medicine. Election to the academy is considered one of the highest honors in the fields of health and medicine and recognizes individuals who have demonstrated outstanding professional achievement and commitment to service. Dr. Richardson currently is the department vice chair and professor of emergency medicine at the Icahn School of Medicine at Mount Sinai in New York City.

Submitted by Sheryl Heron, MD, MPH. Look for more with these and other EM leaders in upcoming issues of ACEP Now.

WANT TO SHARE THE NEWS ABOUT AN ACEP MEMBER'S RECENT APPOINTMENT, AWARD, OR ACHIEVEMENT?

Send an announcement within 30 days of the event to communications@acep.org. Announcements may be edited for space and clarity.

ACEP Financial Snapshot

ANNUAL FINANCIAL REPORT FOR THE 2015–2016 FISCAL YEAR

BY WILLIAM JAQUIS, MD, FACEP

ACEP is a membership organization, and the members have a right to know its financial status. Therefore, we provide this Annual Report, and though brief, the following is a fair and accurate representation of the status of the College for the 2015–2016 fiscal year (July 1, 2015 through June 30, 2016).

Membership continues to grow. As of June 30, 2016, the College had 35,658 members, of whom 23,294 were active (regular) and 11,214 were candidate members. This represents a 4.7 percent overall increase in growth in the last year.

The majority of the College's assets are in cash and investments. Current liabilities are mainly deferred revenue, or advance payments for products or services that are to be delivered in the future. Equity stands as $18,062,000, which has grown by $1,106,000 since last fiscal year. One unique and helpful way to look at equity is to base it on membership. Our active (regular) members are the most easily defined and stable group, so this was chosen as our base. Equity per active member is $901, an increase of $97 over last year.

This buildup in equity has allowed the College to reinvest in its members. The new headquarters opened in September, giving the College a new home for staff and our members as they attend meetings. It also continues to be developed as a location to showcase and store our history. Our finances will also allow us to further develop other benefits for our members such as our qualified clinical data registry, CEDR, as well as address current and future reimbursement and operational issues that are of great importance to our members.

Revenue for the fiscal year was more than $35 million, with the majority coming from three activities: dues, ACEP15, and *Annals of Emergency Medicine*. When looking at expenses by line of service, the majority is spent on education and member services. For the year, the net income was $2,215,000, of which 75 percent went to equity and 25 percent to staff bonuses.

In short, the College is strong financially, and membership and equity continue to grow. The construction of the new building and investments in quality initiatives have continued, and our equity is strong enough to fund the current and future needs of our members.

DR. JAQUIS is ACEP's current Vice President and its immediate past Secretary-Treasurer.

BALANCE SHEET	
ASSETS	
Cash, Equivalents, Investments	$24,028,000
Fixed Assets	$13,602,000
Line of Credit	$0
Deposits	$12,000
Other	$2,888,000
Total Assets	$40,530,000
LIABILITIES	
Accounts Payable and Accruals	$5,759,000
Due to Chapters	$2,250,000
Deferred Revenue	$13,957,000
Total Liabilities	$22,468,000
Member Equity	$18,062,000
Total Liabilities and Equity	**$40,530,000**
INCOME STATEMENT	
Revenue	
Dues and Membership	$15,491,000
Products	$15,527,000
Other	$4,797,000
Total Revenue	$35,815,000
EXPENSES AND LOSSES	
Education and Membership	$16,353,000
Public Affairs	$6,611,000
Policy and Administration	$7,052,000
Leadership	$3,584,000
Total Expenses	$33,600,000
NET FROM OPERATIONS	**$2,215,000**
Bonus Award	$562,000
Contribution to Equity	$1,653,000
Unrealized Gain or Loss	–$548,000
NET CHANGE IN EQUITY	**$1,105,000**

THIS BUILDUP IN EQUITY HAS ALLOWED THE COLLEGE TO REINVEST IN ITS MEMBERS. THE NEW HEADQUARTERS OPENED IN SEPTEMBER, GIVING THE COLLEGE A NEW HOME FOR STAFF AND OUR MEMBERS AS THEY ATTEND MEETINGS.

NEJM UNBALANCED OVER BALANCE BILLING

CONTINUED FROM PAGE 1

physician balance billing practices.[1] Unfortunately, what the authors failed to mention is the data biases of the study, the essential difference of emergency medicine from other specialties, the underlying reasons for balance billing, and the motivation behind the study.

ACEP leaders and our members have pushed back hard on this flawed "study." A media release was picked up by several news sources across the United States, multiple letters to the editor were sent to various influential publications, and we used the social media megaphone to provide facts that underscore our mission and refute the inflammatory assumptions of the *NEJM* piece. ACEP also submitted a letter to the editor to *NEJM* and requested an in-person meeting with the *NEJM* editorial board. This request, to date, has been declined.

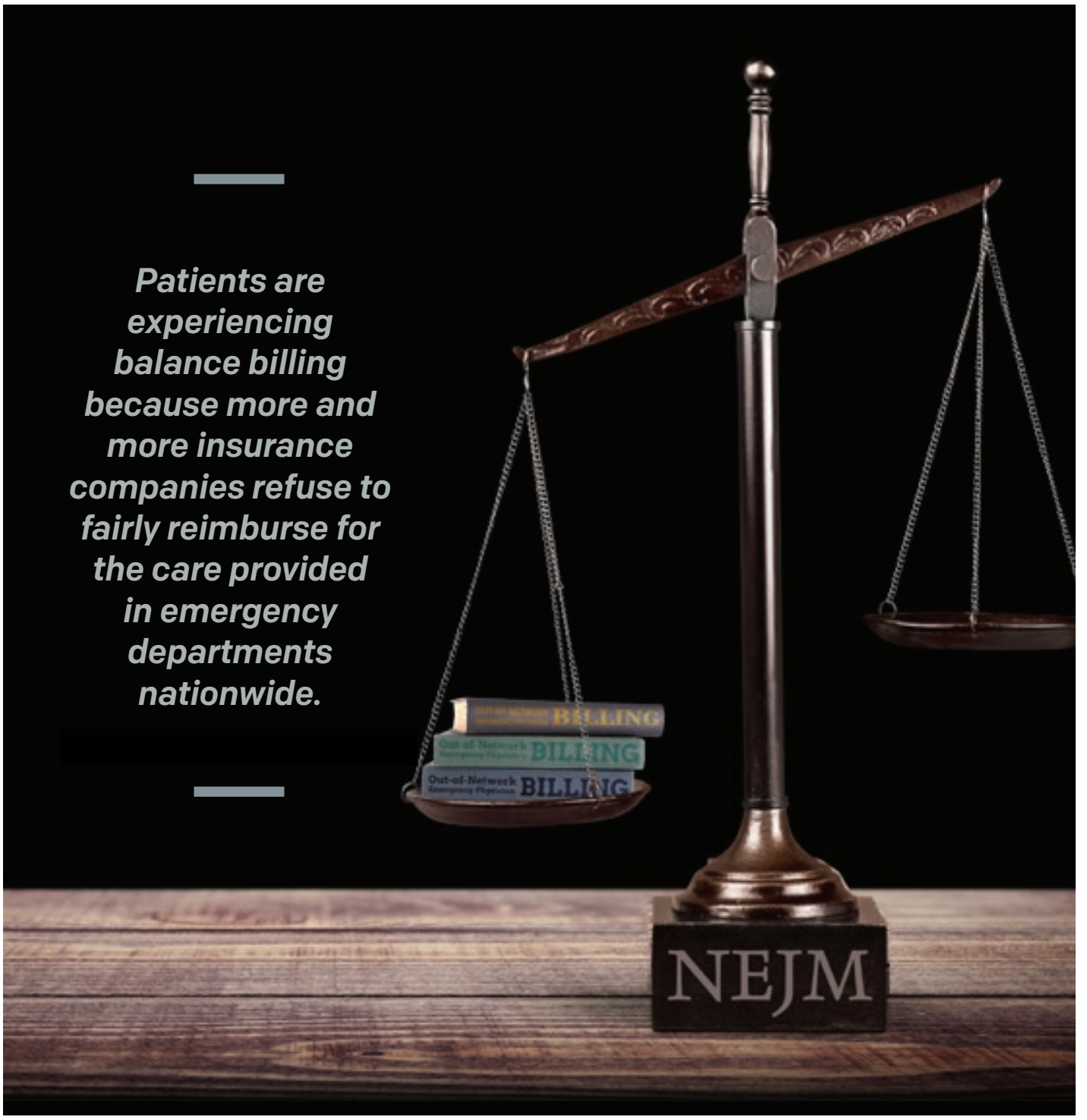
The study published by *NEJM* relies on a limited amount of data from a single commercial insurer representing fewer than 2 percent of the total US emergency patient visits, hardly representative of the US emergency patient population. It did not account for details such as deductibles and co-pays, making erroneous assumptions about patients' financial responsibilities. Finally, the data were unavailable for review and include atrocious claims, such as balance bills of more than $19,000, without substantiating evidence or sources. These limitations, apparent biases, were not discussed by the authors or *NEJM*.

The authors also tried to lump emergency medicine into the result of medical practices. Emergency medicine isn't a choice. Emergency departments and emergency physicians don't choose who they treat. We see anyone at any time without consideration of coverage or ability to pay, a federal mandate known as EMTALA. We provide the best care possible to every patient.

The issue isn't whether emergency physicians try to contract with insurance companies—it is that insurance companies have no interest in contracting with emergency physicians. It isn't in their best interest to take on the responsibilities of the uncompensated care we provide. Why would an insurance company be interested in "negotiating a fair price" for a service that is mandated and having a portion of the economic impact successfully shifted to someone else?

As you know, our patients are experiencing balance billing because more and more insurance companies refuse to fairly reimburse for the care provided in emergency departments nationwide. Emergency care is mandated by federal law, and insurance companies know this. This is why there is no interest by the insurance companies to get emergency physicians "in network."

An increasing number of patients are seeking emergency care for various reasons, and these patients deserve to be supported by the insurance companies they are paying for coverage. There is a surprise emergency care coverage gap in the patients' insurance policy, a gap that patients often do not know about due to a lack of transparency by their insurer. An unfair burden is being placed on patients as the insurance companies continue to raise rates and decrease or refuse coverage, all while emergency departments are fighting to keep the doors open and beds staffed.



Here are some other stats that the study failed to include about emergency medicine:

- No-pay (uninsured) patients average 15.4 percent of ED visits (323,400 visits out of 2.1 million). Their payments average $23.35 per visit, with 98.1 percent of the charge written off as bad debt or free care.
- Low-pay (Medicaid and managed Medicaid) patients average 31.4 percent of ED visits (659,400 visits out of 2.1 million). Their payments average $58.71, a fraction of the physician's hourly compensation cost, including malpractice insurance and billing overhead.
- So a total of 46.8 percent of the patient mix (uninsured and Medicaid) are no- to low-pay but are regularly treated under EMTALA without regard to any ability to pay, de facto free care to almost half of all the emergency department's patients.

Finally, the article's authors declared financial conflicts of interest, receiving grant money from the National Institute for Health Care Management, an organization led by the nation's insurance companies representing $190 million in revenue, within the last three years. This group's mission is to advance the interests of the for-profit insurance industry. Data are important, but publishing studies from a for-profit industry motivated to deflect blame while boosting profits is unfortunate. Such financial conflicts of interest and intellectual bias cannot be reconciled and most certainly biased the outcome of the study, the manuscript, and the authors' conclusions.

Emergency physicians deliver high-quality care and take care of all patients 24-7-365. We will continue to spread the true story of emergency physicians and their patients. We will aggressively implore *NEJM* to fully vet health policy articles and to refrain from publishing erroneous and bias data with inflammatory rhetoric under the guise of high-quality, methodologically sound, peer-reviewed literature published in a reputable journal.

References

1. Cooper Z, Scott Morton F. Out-of-network emergency-physician bills—an unwelcome surprise. N Engl J Med. 2016;375(20):1915-1918.

Dr. Stanton is a full-time practicing emergency physician with Central Emergency Physicians in Lexington, Kentucky; host of ACEP Frontline and Everyday Medicine podcasts; and past president of Kentucky ACEP.

Dr. Parker is President of ACEP; an attending emergency physician with West Suburban Medical Center in Oak Park, Illinois; senior vice president of Envision Healthcare; and president of Team Parker LLC, a consulting group. Dr. Parker is also a clinical assistant professor at the Texas Tech El Paso department of emergency medicine.

Know Your Codes

2017 EMERGENCY DEPARTMENT CODING AND REIMBURSEMENT UPDATE

BY MICHAEL A. GRANOVSKY, MD, FACEP, CPC, AND DAVID A. MCKENZIE, CAE

Physicians will see a small $0.08 increase to the Medicare payment per RVU in 2017.

The 2017 Medicare physician fee schedule was released on Nov. 2, 2016, with mostly good news for emergency medicine. As anticipated, there were minimal changes to the ED evaluation and management (E/M) codes, critical care, and observation service values in 2017. Table 52 of the final rule lists the estimated impact by specialty based on changes to the work, practice expense, and professional liability insurance relative value units (RVUs) for 2017. Most of the specialties listed, including emergency medicine, had an estimated impact of 0 percent in overall revenue being changed. There were a few winners, such as anesthesiology, family practice, internal medicine, and geriatrics, with a 1 percent increase, which is likely due to changes in the coordination of care codes for the primary care specialties. The losers in 2017 were gastroenterology, interventional radiology, and pathology, with 1 percent decreases; urology, with a 2 percent decrease; and independent lab, with a 5 percent decrease. Keep in mind that rounding can play a big role in whether you are plus or minus 1 percent or end up with an estimated zero change.

Conversion Factor Increases Based on Protecting Access to Medicare Act of Half Percent Update

The Medicare Access and CHIP Reauthorization Act (MACRA) mandated a 0.5 percent increase to the conversion factor for 2017. Several other factors also played a role with small negative adjustments. A negative budget neutrally adjustment factor impacted the 2017 conversion factor to offset overall increases in RVUs relative to 2016 as well as a target recapture update of -0.18 percent related to misvalued codes. The net impact is an increase of about $0.08 to the 2017 conversion factor, as shown in Table 50 from the final rule, with a published conversion factor of $35.8887.

Changes for Emergency Medicine in CPT 2017

There were no significant changes in the E/M code section and just the usual updating of the vaccine codes in the medicine section relating to tweaks to the composition or dosage information. For example, influenza codes will now be coded by dosage rather than age. The biggest change for emergency medicine is a new series of moderate (conscious) sedation codes.

The prior moderate (conscious) sedation codes (99143–99150) have been deleted and replaced with new codes (99151–99157). The new codes look similar in that there are three codes describing moderate sedation for both the scenarios where the sedation is provided in support of your own procedure and for another provider's procedure. The three codes for each of these scenarios describe one code for patients younger than age 5, one for age 5 and older, and an add-on code for additional time providing moderate sedation.

The biggest change is that the intraservice time thresholds have dropped from 30 minutes to 15 minutes. Current Procedural Terminology (CPT) instructs that for any time-based code, a unit of time is attained when the midpoint is passed unless there are code- or code range–specific instructions in the guidelines, parenthetical instructions, or code descriptors to the contrary. In 2017, there is a chart, similar to the one in the critical care code section, which lists the correct moderate sedation code to assign based on the provider situation and the total intraservice time. The CPT moderate sedation table shows that sedation services would now be reportable once the physician exceeds 10 minutes of intraservice time.

Intraservice time begins with the administration of the sedating agent; requires continuous face-to-face attention of the provider and monitoring of the patient's response to the sedation, periodic reassessments, and vital signs including oxygenation, heart rate, and blood pressure; and ends when the procedure is completed, the patient is stable, and the provider providing sedation ends personal face-to-face care of the patient.

New Modifier 95 for Synchronous Telemedicine Services

As telemedicine technology continues to improve, there has been an increasing demand for an accepted mechanism to identify and report services provided by a remote physician. The CPT editorial panel considered this issue for many years before a joint CPT and Relative Value Scale Update Committee Telehealth Services workgroup was convened to make a recommendation on how best to move forward. In 2017, CPT added modifier 95 (synchronous telemedicine services rendered via real-time interactive audio and video telecommunications system) for use in identifying services provided via telemedicine.

The modifier descriptor specifies that the service must be synchronous, meaning in real time, for correct application. The qualified provider must be using real-time audio and video telecommunications between the patient and the distant site in which the provider practices, and the totality of the information exchanged must be commensurate with the key components or other requirements to have reported the service or procedure as if the distant provider were physically present with the patient.

Additionally, the 2017 CPT book added new Appendix P, which lists codes that may be used for reporting synchronous telemedicine services when using interactive telecommunications equipment that includes, at a minimum, audio and video. The codes listed in Appendix P will now be marked with a star symbol (☆) where they appear normally in the book.

However, no ED E/M or observation codes appear in Appendix P. The codes selected for inclusion were based on a search of payer policy requiring the use of the Healthcare Common Procedure Coding System Level II synchronous modifier with CPT codes. The ED codes did not come up anywhere in those payer policies so were not included in Appendix P. ACEP is exploring how they can be added in future years with evidence that ED services are widely recommended for performance via synchronous real-time communication. ⊕

DR. GRANOVSKY is the president of Logix Health, an ED coding and billing company, and serves as the course director of ACEP's coding and reimbursement courses as well as ACEP's National Reimbursement Committee. **MR. MCKENZIE** is reimbursement director for ACEP.

ILLUSTRATION: PAUL JUESTRICH, PHOTOS: SHUTTERSTOCK.COM

"Just Follow the Money"

An update on our coverage of global budget revenue in Maryland

BY JON MARK HIRSHON, MD, MPH, PHD, FACEP, AND WILLIAM P. JAQUIS, MD, FACEP

In the 1976 movie All the President's Men *about Watergate, the informant "Deep Throat" tells Bob Woodward (played by Robert Redford) to "just follow the money" to understand what happened and why. The saying is true in health care, too.*

In January 2014, Maryland dramatically shifted the financing of health care within the state by implementing global budget revenue (GBR) for all hospitals in Maryland. As previously discussed in the April 2014 issue of *ACEP Now*, this population-based payment model caps total hospital revenue growth. The rates and hospital revenues are set by the Health Services Cost Review Commission (HSCRC) for all acute-care hospitals in Maryland. The HSCRC has been in existence since 1974 as part of Maryland's all-payer system that includes Medicare and Medicaid.

GBR was negotiated between the state of Maryland and the Centers for Medicare & Medicaid Services (CMS). The GBR essentially changes the payment system from a retroactive fee-for-service system to a prepaid global budget, which the hospitals must manage effectively.

While GBR does not currently directly impact health care providers and our fee-for-service model, it has the potential for expansion to providers in the future. If successful, this program has the potential for national dissemination by CMS and could dramatically impact how we practice emergency medicine.

GBR, which was implemented at the same time as the Affordable Care Act (ACA), has five main objectives related to population health and cost containment:

- Save Medicare $330 million over five years.
- Limit per capita yearly growth to less than 3.58 percent.
- Decrease 30-day hospital readmission rates.
- Decrease hospital-acquired conditions by 30 percent over five years.
- Keep growth of Medicare spending to less than 0.5 percent below the national average.

Initially, with Medicaid expansion and the ACA, there was a positive revenue impact

CONTINUED *on page 8*

Vermont to Launch All-Payer ACO Model

State government seeks to organize health care under all-payer model

BY ALISON HADDOCK, MD, AND HARRY J. MONROE JR.

Beginning in January 2017, Vermont will launch a voluntary all-payer accountable care organization (ACO) model for financing health care. While the program is voluntary, the state has set a goal of bringing 70 percent of all insured residents and 90 percent of all Medicare beneficiaries into the program by 2022, according to information provided by the Centers for Medicare & Medicaid Services (CMS). CMS is supporting the program with a five-year extension of the state's Medicaid waiver as well as a grant of $9.5 million. CMS has also announced that the program will qualify as an advanced alternative payment model under the Medicare Access and CHIP Reauthorization Act of 2015, the Medicare reform law that established new methods for reimbursing physicians.

In 2011, Vermont responded to the Affordable Care Act by forming the Green Mountain Care Board, with the original intention of organizing the nation's first statewide single-payer health care system. That concept proved to be too costly, and the state scrapped the idea in 2014. Instead, it is creating an all-payer model that Gov. Peter Shumlin claims will make Vermont "the first state in America to fundamentally transform our entire health care system so it is geared toward keeping people healthy, not making money." Grandstanding aside, there is no doubt that the experiment will be examined carefully by other states.

Most Americans are broadly familiar with the single-payer concept, as they have heard discussion of the health care system of Canada and other nations. However, they are likely less familiar with the idea of an all-payer system. Under a single-payer model, one entity (eg, the state) becomes essentially the sole provider of health insurance coverage—"essentially" because there will typically be a small number of individuals who seek care privately outside of the established payment system. In contrast, under an all-payer model, various governmental and private payers will continue to operate, but one entity will have

CONTINUED *on page 8*

"JUST FOLLOW THE MONEY" | CONTINUED FROM PAGE 7

for emergency providers in Maryland due to a decrease in self-pay patients and an increase in Medicaid coverage. This is consistent with what has been seen with the ACA in other states. With the advent of GBR, hospitals were now on the hook for providing care to a certain population, and there were efforts to improve resources such as increased case management and social services in the emergency department. These are positive changes, welcomed by the provider and patient community. Unlike other states, after Maryland implemented GBR, emergency department volumes have remained flat, and hospital admissions have not changed or have gone down for many hospitals.

However, with this essentially being a capitation model for hospitals, they have significant incentives to decrease expenditures. How will this occur? The less care delivered, the fewer expenses hospitals incur. The GBR model regulates revenue as well, leaving fewer options to change the bottom line by increasing services. So "just follow the money."

If hospitals decrease inpatient admissions, they will spend less on care delivery. Hospital admissions have become more focused on expense than revenue. The focus on decreasing expenses has led to fewer available beds, increased boarding, crowded emergency departments, and more nursing shortages, including an increase in absenteeism. In addition, more effort is being made to find other sources of care for patients. With the increase in case management and social services, more patients are also able to go home with prearranged services such as home health.

In the emergency department at many hospitals, there seems to be a decreased institutional emphasis on metrics such as "left without being seen." Low-acuity visits equate to higher costs than in other settings. At times, it feels like the care we used to provide in the main emergency department has been moved out to the waiting room since many of our beds are filled with admissions.

While the initial impact of the GBR model was positive, as the "easy money" disappears, more and more pressure occurs to find new and innovative means to decrease expenditures. Unlike the current fee-for-service model, in which hospitals and providers are mostly paid for care delivered (services provided), the GBR model is intended to incentivize the delivery of more care in less expensive settings. While intended to improve quality and decrease cost, the unintended consequence may be to delay care for our patients across the spectrum.

DR. HIRSHON is professor in the departments of emergency medicine and of epidemiology and public health at the University of Maryland School of Medicine in Baltimore. **DR. JAQUIS** is system chief of emergency medicine at LifeBridge Health and chief of emergency medicine and attending physician at Sinai Hospital, both in Baltimore.

ALL-PAYER ACO MODEL | CONTINUED FROM PAGE 7

responsibility for setting payment rates for all payers and health care providers that operate under the system. This facilitates the implementation of broad-based global payment programs and purportedly will improve the ability of payers to incentivize providers for high-quality care.

While this approach has not been common, Maryland implemented an all-payer program in 2014, exclusively applicable to hospital facility services. (See "Just Follow the Money" on pg. 7 for more on Maryland's program.) The implementation of global payments for hospitals in Maryland has been lauded for producing reduced readmission rates, and press reports have indicated that hospitals are generally satisfied with the program.

The implementation of global payments for hospitals in Maryland has been lauded for producing reduced readmission rates, and press reports have indicated that hospitals are generally satisfied with the program.

Of course, as Vermont seeks to create a more ambitious program covering a broader range of payments to providers, the challenge of structuring it correctly will be increased as payments will have to account for varying services for differing patient populations. Under the Vermont program, the state will limit per capita expenditure growth for all major payers to 3.5 percent, with Medicare growth limited to levels below those of national Medicare growth projections. Thus far, emergency physician participation in ACOs has been limited, and the impact of this new system on emergency medicine in Vermont remains unclear.

DR. HADDOCK is chair of the ACEP Vermont State Legislative/Regulatory Committee. **MR. MONROE** is director of chapter and state relations at ACEP.



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The WIRED Patient

Get to know a few devices your patients may bring to the emergency department

BY BRADLEY N. YOUNGGREN, MD, FACEP

This is Part 2 of our ongoing series on the Internet Of Medical Things (IOMT).

There are many exciting devices that will help support the practice of medicine. Perhaps even more exciting (and challenging) for the emergency physician will be attempting to stay abreast of the rapidly growing number of devices that patients can purchase directly and will be calling upon us to interpret.

Most patients have already had the opportunity to explore the first wave of basic personal monitoring with wearables like Fitbit ($99–$150). Although these devices collect basic data about exercise and health, there has been a lot of conversation surrounding the validity and utility of the data. Can you imagine a conversation between a patient and a primary care physician or emergency physician regarding these data? "Doctor, I notice that Grandma's steps per day have decreased by 50 percent over the past two weeks, which seems to be coinciding with some shortness of breath while exerting herself." Although these are basic data, they can serve as additional objective pieces of information to support a diagnosis.

We can expect a large growth in data collection in health care that interfaces with the emergency department. Data will not only come from the home but also be pushed from third parties that are generating and monitoring data for our patients. I remember the first time I received a fax from a cardiac-monitoring device company regarding an event a patient had experienced while walking in a park. It was astounding that this small portable device had recorded an event and transmitted that data to the cloud, where it was interpreted. The patient was called and directed to call 911 to get transported directly to the emergency department. I received the data regarding the dysrhythmia prior to arrival of the patient. Truly astounding.

One example of this is connected inhalers from Propeller Health. By creating a connected inhaler, patients with asthma and chronic obstructive pulmonary disease have much better objective data regarding their usage. Prior to this, at best, patients would keep usage diaries to share with providers, but more commonly, it was just a vague estimation of use. Now, definitive data on frequency of use, time of day, and weather can be acquired and correlated. One may also be able to determine geographic areas that seem to trigger an increased use of medication. Not only do these data allow the user to be more actively involved in the management of the disease, but they also create a novel way in which the patient can engage with a health care provider. As emergency physicians, we can expect to be shown the app or printouts that summarize the data captured by a connected inhaler.

AliveCor's Kardia (~$125) has been on the market now for a few years and provides a single-lead ECG when the user puts fingers from each hand on the back of an integrated mobile phone case. The Food and Drug Administration (FDA) approved machine learning algorithms that can help differentiate atrial fibrillation from normal sinus rhythm. Large data sets are available to be shared with emergency physicians upon arrival to the emergency department. Even more compelling is the Kardia wristband, which is pending FDA 510(k) clearance. This will take the technology one step further by providing passive, continuous cardiac rhythm monitoring. AliveCor claims that the device improves outcomes, reduces cost, increases workflow productivity, and deepens clinician-patient relationships. On Sept. 8, 2016, AliveCor announced a partnership with Omron that integrates blood pressure readings from Omron devices (~$65) with the Kardia app, creating a more robust data set.

A. **AliveCor's Kardia** provides an ECG when the user puts fingers from each hand on the back of the integrated mobile phone case.

B. **Proteus Digital Health's ingestible sensor** sends a recordable signal to a patch that the patient wears on the torso. These data are transmitted to the patient's mobile device and up to the cloud.

C. **Propeller Health's connected inhaler** collects data on frequency of use, time of day, weather, and geographic area to help patients and physicians manage asthma or chronic obstructive pulmonary disease.

Products like MedMinder have reported functionality that will take medication reconciliation to the next level, certainly something we may come across in the emergency department. There are alerts, texting functionality, and online reports that emergency physicians may be assessing.

Medication compliance is a huge issue in medicine. A number of entrepreneurs are attempting to tackle this by better controlling distribution of medications. There are a number of companies that have developed pill-dispensing systems, some of them attached to the pill bottle itself. Appropriate medication dosing can be accurately adhered to, ensuring that people take their medication and that people don't overdose. Products like MedMinder have reported functionality that will take medication reconciliation to the next level, certainly something we may come across in the emergency department. There are alerts, texting functionality, and online reports that emergency physicians may be assessing. A step further are digestible digital medicines with sensors embedded in pills from the company Proteus Digital Health. It has developed an ingestible sensor the size of a grain of sand that, when ingested, sends a recordable signal to a patch that the patient wears on the torso. These data are transmitted to the patient's mobile device and up to the cloud, where they sit in a portal that allows providers to access and review a patient's medication administration history. This takes medication compliance from subjective data (self-reporting) to objective data (sensor reporting), thereby optimizing adherence and patient outcomes.

Part 3: In the next article, I will touch on devices that enhance communication within the hospital and remote-monitoring technologies that are changing the way our patients can be monitored in a variety of nontraditional settings.

DR. YOUNGGREN is chief medical officer at Cue; medical advisor for Shift Labs and Blumio; medical mentor for the Highway1 hardware accelerator; and a practicing emergency physician and medical director for emergency preparedness and urgent care at Evergreen Health in Kirkland, Washington.

MYTHS IN EMERGENCY MEDICINE

Rooted in culture, based on tradition

BY KEVIN M. KLAUER, DO, EJD, FACEP

1. All Superficial Venous Thromboses Are Created Equal?

It is very easy to take the ultrasound report at face value and treat superficial venous thrombosis (SVT) as a benign entity distinctly different from deep venous thrombosis (DVT). However, that reasoning may result in missed or delayed diagnosis of DVT or inadequate treatment of at-risk patients. The belief that SVT is benign and DVT is potentially serious is an oversimplification of the disease process. The fact is that venous thrombosis is a continuum, and SVT and DVT are directly linked and not distinctly different. The key is in the location of the clot and the patient's risk profile. Emergency physicians, and patients, can be victimized by limited data on an ultrasound report. All SVTs are not created equal. It's just like real estate—location, location, location.

In an enlightening review article, Litzendorf and Satiani report that the incidence of DVT from SVT ranges from 6 percent to 40 percent (those with a history of prior DVT) and that the incidence of symptomatic pulmonary embolism (PE) associated with SVT ranges from 2 percent to 13 percent.[1] In short, an isolated distal lesser saphenous vein SVT is not the same as one at or approaching the saphenopopliteal junction or, worse, the saphenofemoral junction (see Figure 1). Despite the usual limitations of a review article, it provides some nice insight into recognition of those at risk for clot propagation and development of DVT or even PE. Nonsteroidal anti-inflammatory drugs and heat are probably fine for inconsequential SVTs. However, systemic anticoagulation (just like a DVT), repeat ultrasound to look for propagation, and investigation of risk factors (eg, prior DVT, a history of malignancy, the presence of varicosities, and hypercoagulable disorders [up to 35 percent of patients with SVT]) are important considerations with a precariously placed proximal SVT. This article provided a nice flowchart, prompting treatment options based on several factors. (Visit ACEPNow.com to view the flowchart.) Concomitant DVT is also common. Binder et al, in a prospective, observational study, noted that in 46 consecutive patients with SVT, 24 percent had concomitant DVT, with 73 percent in the affected leg, 9 percent in the contralateral leg, and 18 percent in both legs.[2]

There is no single right answer because so many variables may impact the treatment plan. However, recognizing the significance of proximal SVT, compared to other locations, and considering concomitant DVT are critical to ensuring a good outcome.

2. tPA and Intracranial Aneurysms, an Explosive Mistake?

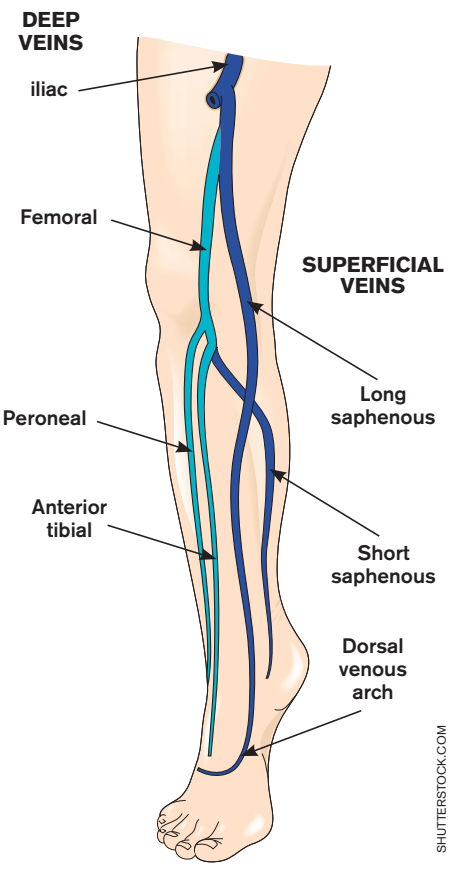
Notwithstanding the momentum toward giving more tissue plasminogen activator (tPA) to patients with ischemic stroke, safety and patient selection are of utmost importance. Controversy remains regarding the overall safety and efficacy of this treatment. However, certain assumptions about safety have been made that are not supported by the literature. "You would have to be out of your mind to give tPA to someone with a known intracranial aneurysm" seems like a reasonable statement. However, the fact of the matter is that tPA doesn't make aneurysmal rupture more likely, and most people will die with their intracranial aneurysm (ICA) and not from it. Of course, if the aneurysm has already ruptured or a sentinel bleed has occurred, tPA would be a really bad idea.

Goyal et al investigated this issue and noted some surprising findings.[3] Knowing the numbers of patients with ICA receiving tPA would be small, they created two components for their study. The first was a multicenter, prospective, observational study of 1,398 patients with acute ischemic stroke who received IV thrombolysis and also had neuroimaging, and the second was a meta-analysis combining the data from the first component with five other studies. In the first observational trial, 3 percent of patients had unruptured ICAs. There was one known case of symptomatic intracranial hemorrhage (ICH), but it was not associated with an ICA. In phase two, the meta-analysis of 120 patients, 6.7 percent experienced symptomatic ICH, and the relative risk was not impacted by the presence or absence of unruptured ICA. Although the numbers are small, they probably always will be. When it comes to tPA and ischemic stroke, proceeding with caution is always recommended. However, the presence of an ICA should be seriously considered and, of course, the patient informed of its presence, but it is not an absolute contraindication to tPA administration.

3. Glucose: If It's High, Treat It?

Patients frequently present to the emergency department with incidentally elevated glucose levels. The question is, do we need to react to and treat every abnormality we see? The answer, in my opinion, is no. If an elevated glucose is merely an incidental finding and not a cause or contributing factor of the presenting condition or complaint, then perhaps we should resist the temptation to treat it—just note it and move on. I think we have come full circle on asymptomatic hypertension in the emergency department. Perhaps it's time to do the same with incidental hyperglycemia.

Figure 1: Deep and superficial veins.



Johnson-Clague et al evaluated 161 patients in a retrospective cohort study in an academic emergency department.[4] Diabetic adults with a glucose of greater than 200 mg/dL were treated with subcutaneous insulin. Their glucose was measured 24 hours after discharge. Whether the glucose was above or below 200 had no apparent impact on hospital length of stay.

However, not everyone agrees. A 2011 article from Munoz et al reported a reduced hospital length of stay in ED patients who received subcutaneous insulin every two hours until their glucose was below 200 mg/dL (3.8 days versus 5.3 days).[5] However, the intervention group of only 44 patients who all received insulin was compared to a historical control group in which only 35 percent received insulin. In addition, despite the difference being statistically significant (P <0.05), this is not clinically significant because the primary reason for admission was more likely the driver for length of stay than the patient's glucose level.

In a recent study by Driver et al, a retrospective cohort chart review of 422 patients was performed and included only patients who were discharged and had a glucose level of equal to or greater than 400 mg/dL at some point during their ED visit.[6] The mean arrival and discharge glucose levels were 491 mg/dL and 334 mg/dL, respectively. Seven percent (36 patients) returned for hyperglycemia and were admitted within seven days. However, after adjusting for several variables, including arrival glucose and the amount of insulin received, the discharge glucose was not associated with return ED visits or hospitalization for any reason.

Although all of these studies have limitations, we are comparing them to the physiologic argument that reducing elevated glucose must be a good thing. It's time to stop a practice that seemed to make reasonable sense but has no proven benefit.

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Breaking the Silence

Speaking up about physician suicide

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by LORI WEICHENTHAL, MD, FACEP

When I was a resident, I came home from a swing shift in May to the smell of gasoline wafting through the entryway of my home. I immediately knew something was wrong and anguish gripped me. I opened the door to the garage and turned on the light to find my fiancé dead on the floor. He had killed himself using the exhaust fumes of his motorcycle.

My fiancé's death occurred 20 years ago, but little has changed regarding the stigma and silence that surrounds suicide, especially among physicians. We have known since 1977 that, on average, the United States loses the equivalent of a large medical school class each year to suicide.[1]

A study in 2000 showed that although physicians were less likely than non-physicians to die from heart disease or cancer, they are more likely to die of suicide. This study estimated that 400 physicians die each year due to suicide, and most feel this number is grossly underestimated.[2] Female physicians are at more risk than their male colleagues, with a 2.27 times higher rate of suicide compared to the general female population, but male physicians are also at risk, with a 1.41 higher rate than their non-physician counterparts.[3]

Suicide is frequently the result of untreated or undertreated depression or another mental illness that may be complicated by substance abuse and/or dependence, with the deadly combination of knowledge of and access to lethal means. Depression is at least as common in physicians as in the general population, where the prevalence is 7 to 8 percent, and a recent study suggests that the incidence in emergency physicians may be much higher, with 18.5 percent of attendings and 47.8 percent of residents reporting symptoms of depression.[4] Prevalence of substance abuse disorders among physicians during the span of their careers is similar to that of the general population, with a rate of 10 to 12 percent.[5] With regard to knowledge and access to lethal means, there is no doubt that physicians understand the physiology of death and have more access to lethal means than the general population, as evidenced by their higher success rate at committing suicide.[3]

Compounding the problem is that physicians are often unwilling to seek help for their mental health or substance abuse problems due to the stigma surrounding these issues. Fears regarding privacy, confidentiality, and how knowledge of their problem might affect their future career often dissuade physicians from seeking help. Physicians who successfully took their own lives were less likely to have received mental health treatment when compared to a similar cohort of non-physicians.[6]

The wall of silence is slowly coming down. The tragic deaths of two newly minted resi-

CONTINUED *on page 23*

BRINGING YOU CANADA'S BRIGHTEST MINDS IN EM

EM CASES

DR. HELMAN is an emergency physician at North York General Hospital in Toronto. He is an assistant professor at the University of Toronto, Division of Emergency Medicine, and the education innovation lead at the Schwartz/Reisman Emergency Medicine Institute. He is the founder and host of Emergency Medicine Cases podcast and website (www.emergencymedicinecases.com).

Misconceptions Behind Low Back Pain Emergencies

Sorting through the sea of back pain to find those at risk for serious neurological injury

by ANTON HELMAN, MD, CCFP(EM), CAC, FCFP

When physicians pick up a chart in the emergency department and see that the chief complaint is low back pain, most have a similar reaction: not another lumbosacral sprain, not another drug-seeker, or not another patient nothing can be done for. Most often, the cause of the low back pain is benign, and many physicians feel ill-equipped with the tools needed to help these patients in any significant way.

For whatever reason, there's a tendency to be nonchalant and complacent about low back pain. That is odd because if you compare the 90 percent of low back pain comprising benign causes to chest pain, it's not very different. Only about 10 percent to 15 percent of chest pain presentations to the emergency department turn out to be serious. Yet when it comes to patients presenting to the emergency department with chest pain, we're keenly alert about ruling out myocardial infarction, pulmonary embolism, aortic dissection, etc. There are five emergent pathologies that must be considered in every patient who presents with low back pain: infection (osteomyelitis, discitis, spinal epidural abscess), fracture (traumatic or pathologic), disc herniation with cord compression, spinal metastasis with cord compression, and vascular catastrophes (ruptured abdominal aortic aneurysm [AAA], retroperitoneal bleed, spinal epidural hematoma). Some of these serious causes of low back pain are easy to miss, and more often than not, they are only diagnosed on the second, third or even fourth visit to the emergency department. So physicians need to approach all low back pain patients with a high degree of scrutiny, especially on repeat visits to the emergency department.

Pertinent Positives and Negatives in Clinical Assessment

With these five causes in mind, I ask patients about risk factors for infection such as IV drug use, spinal interventions, recent infections (eg, endocarditis, which tends to seed to the spine), any cancer history no matter how remote, trauma, or coagulopathy/anticoagulant use. Then I ask about specific symptoms of cord compression and cauda equina syndrome: saddle paresthesias (does it feel different than usual when the patient wipes after a bowel movement?), erectile dysfunction, progressive bilateral leg weakness or numbness, difficulty urinating or urinary retention, and fecal incontinence. Other red flags include constant, unrelenting severe pain that is worse on lying down, which is a red flag for infection or cancer of the spine.

On physical examination, one pearl can be garnered from simply observing the patient's posture. Patients with a known history of herniated disc and sciatica usually avoid a flexed posture as this places pressure on the nerve roots. However, if they have cauda equina syndrome or cord compression, they tend to favor a flexed posture in order to allow more room for the spinal cord in the spinal canal. This is similar to the classic posture of spinal stenosis patients, who tend to lean on their shopping carts in the grocery store. Tenderness on percussion of the spinous processes, an underutilized physical examination maneuver, is a red flag for infection and fracture.

Cognitive Forcing Strategies for Low Back Pain Presentations

I find cognitive forcing strategies helpful in picking up serious causes of low back pain. In addition to the classic cognitive forcing strategy, "if you're thinking renal colic, think leaking AAA," I use, "if you're thinking pyelonephritis, think spinal epidural abscess," and "known cancer + new back pain = spinal metastases until proven otherwise."

Cauda Equina Syndrome Is a Clinical Diagnosis, Not a Radiographic One

It is vital to understand that cauda equina syndrome is a clinical diagnosis, not a radiographic one, and that it can have an acute as well as chronic onset, with one in 1,000 patients with sciatica developing cauda equina syndrome. The diagnostic criteria are the presence of both:

- Urinary retention and/or rectal dysfunction and/or sexual dysfunction and
- Saddle or anal anesthesia or hypesthesia

Therefore, it is imperative that any patient with low back pain and neurological findings receive careful testing for saddle anesthesia, realizing that changes may be subtle and subjective; a digital rectal exam testing for tone and sensation; and a post-void residual measurement. While bladder scanners can give you a rough estimate of bladder volume, they are unreliable, and a bladder catheter measuring the urine output for 30 minutes after insertion is often recommended. A post-void residual of >100 mL should raise the suspicion for cauda equina syndrome in a patient without a history of urinary retention from another cause.

If Thinking Pyelonephritis, Ask Yourself, "Could This Be Spinal Epidural Abscess?"

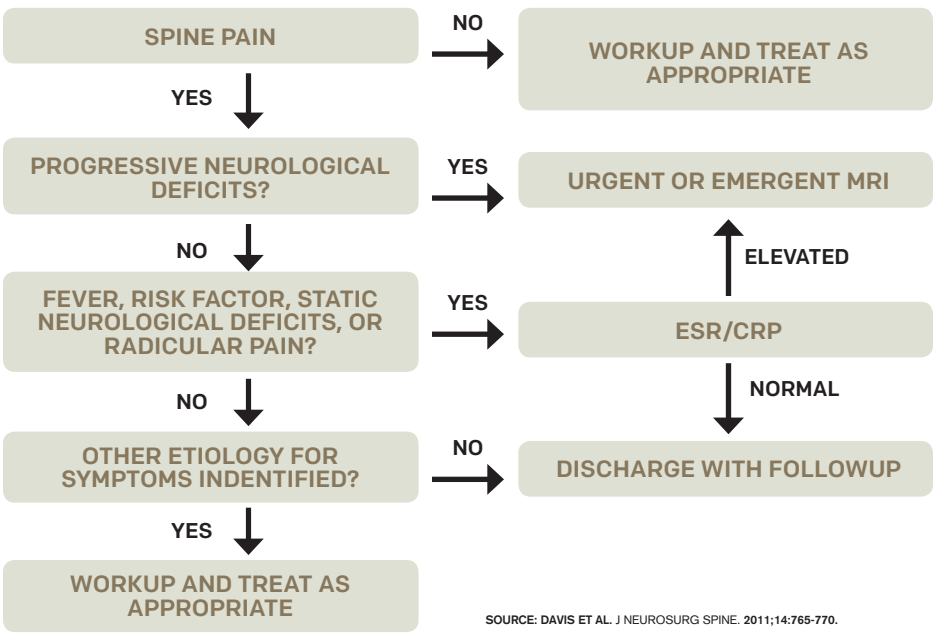
Spinal epidural abscess should be suspected in all patients with:

- Back pain or neurological deficits and fever, or
- Back pain in an immune-compromised patient, or
- A recent spinal procedure and either of the above.

While diabetes, IV drug use, indwelling catheters, spinal interventions, infections elsewhere (especially skin), immune suppression, and repeat ED visits are all important risk factors for spinal epidural abscess, many patients do not have any risk factors, and the classic triad of fever, back pain, and neurologic deficit is present in only 13 percent of patients.[1] Spinal epidural abscess is often missed on first ED visit. Fever is present in only 66 percent of patients, and neurologic deficits start very subtly.[2]

C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) may help in deciding whether to pursue an MRI, depending on the clinical suspicion for epidural abscess (see Figure 1). In one study, 98 percent of patients with epidural abscess had an ESR >20.[3] If suspicion is low after the history and physical, low ESR and CRP levels support not doing an MRI, and discharging the patient home with close follow-up is appropriate. ESR is also helpful for predicing prognosis in patients with spinal metastasis. If there is a high index of suspicion for cord compression, an MRI is indicated *regardless of CRP or ESR*. (Visit **www.ACEPNow.com** to see an algorithm for managing non-traumatic back pain.)

Figure 1: Decision guideline for diagnosing spinal epidural abscess.



SOURCE: DAVIS ET AL. J NEUROSURG SPINE. 2011;14:765-770.

One of the most common pitfalls in working up the patient suspected of spinal infection, and a good example of the cognitive bias of premature closure, is finding osteomyelitis on CT scan and stopping there. CT cannot rule out a concomitant epidural abscess, which requires urgent surgical decompression, because it does not show the epidural space, spinal cord, or spinal nerves adequately. Another common imaging pitfall is not imaging the entire spine when epidural abscess is being considered. Remember, if the suspicion is epidural abscess or spinal metastasis, the *entire* spine must be imaged by MRI.

So next time you see patients with low back pain in the emergency department on their third visit for the same illness, consider the big five diagnoses; employ cognitive forcing strategies; ask about risk factors and red flags; assess the posture of sciatica patients; perform a careful exam for saddle anesthesia; consider a post-void residual, CRP, and/or ESR; and obtain an MRI of the entire spine for suspected spinal infection or spinal metastases. Your patients will thank you, and you may stay out of court.

A special thanks to Dr. Walter Himmel and Dr. Brian Steinhart for their participation in the EM Cases podcast from which this article is based.

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Is It Time to Abandon Face-Mask Ventilation?

There are now better options for most ventilation needs in the emergency department

by RICHARD M. LEVITAN, MD, FACEP

Face-mask ventilation is considered a fundamental procedural skill in emergency medicine. We have historically deployed it when patients are apneic, are hypoventilating, or need assistance with oxygenation. We keep bag-mask units at the head of every bed in the emergency department.

The world of airway management has evolved since the self-inflating bag-valve mask (BVM) was first created more than 50 years ago. In elective anesthesia, the laryngeal mask airway (LMA) has entirely replaced face-mask ventilation as a strategy for airway and anesthetic management in cases with a low risk of aspiration. In fact, the laryngeal mask is now used in the majority of elective anesthesia cases worldwide. It also has a rapidly growing presence in the world of prehospital care, especially in the United Kingdom and Europe.

The tip of the laryngeal mask wedges into the upper esophagus, behind the cricoid cartilage. It provides a wedge-shaped "stopper" to the upper esophagus; it's not quite as effective as a tracheal tube in isolating the trachea from the esophagus but is far better than pushing gas by face mask into the shared upper aerodigestive tract of the pharynx.

LMA-type devices have replaced intubation and mask ventilation in elective anesthesia because they are better for both patients and operators. The laryngeal mask "sits" itself around the curve of the tongue and stays in position. The face mask requires continued downward pressure on the mask to maintain a seal. It can also be augmented by compressive head straps. The laryngeal mask can be easily used to bag a patient with one hand stabilizing the top of the device and the other squeezing the bag. This is not the case with a face mask. Holding the mask against the face works poorly, even with an "E-C grip" (using first and seconds digits ["C"] to hold the nasal bridge of the mask and the third, fourth, and fifth digits ["E"] to hold the lower mask).

Face-mask ventilation is as ergonomically smooth as walking in ski boots. The mask seals by being pushed onto the face, but this motion also pushes the mandible, base of the tongue, and epiglottis downward. And particularly in supine patients with no muscular tone, the base of the tongue, epiglottis, and mandible fall backward, causing "collapse" of the airway. Without continuous active lifting of the angle of the mandible, the airway obstructs. Conversely, the laryngeal mask seal is achieved by the same soft tissues falling backward onto the bowl of the device. It is not the inflation of a cuff that creates a mucosal seal; the newest and best laryngeal masks have, in fact, no cuffs at all. They mirror the laryngeal anatomy.

ILLUSTRATION: CHRIS WHISSEN & SHUTTERSTOCK.COM

Figure 1 (Left): Pressurization of the nasopharynx in an upright patient causes passive opening of the airway as the soft palate is pushed away from the posterior pharynx.

(Right): Face-mask ventilation in a supine patient causes the oropharynx to be pressurized. As pressure increases, air will enter the esophagus and subsequently the stomach.

The laryngeal mask is, in fact, the only gravity-enhanced ventilation device. Gravity and loss of tone defeat the face mask. Conversely, administration of propofol, which induces a deep loss of upper-airway tone, is far and away the most commonly used medication for laryngeal mask anesthesia. The loss of tone in a supine position is ideal for creating the laryngeal mask seal around the bowl of the device. The soft tissues of the upper airway (base of tongue, epiglottis, and perilaryngeal structures) collapse backward onto the bowl of the LMA as muscular tone about the mandible is abolished.

In addition to the ergonomic challenges of doing effective mask ventilation—trying to create a face seal while pressing against the face but pulling up on the mandible simultaneously—there are many physiologic reasons why mask ventilation in a flat position is bad for oxygenation and also why it has a high risk for regurgitation. As a face mask is squeezed over the mouth, the oropharynx gets pressurized (see Figure 1). The goal is to have air only go into the lungs as opposed to the collapsed esophagus. Unfortunately, as pressure increases, especially at about 20 cmHg, air will enter the esophagus and subsequently the stomach. This insufflation of the stomach then leads to regurgitation of stomach contents back up the esophagus to the perilaryngeal area of the hypopharynx (at the top of the esophagus). Regurgitation risk is dramatically increased by having the patient's stomach and head on the same level or, in an obese patient, the stomach higher than the mouth when the patient is supine. As the stomach gets insufflated, gravity promotes regurgitation of stomach contents into the upper airway.

The LMA, in contradistinction to a face mask, provides some isolation of the esophagus and larynx. The tip of an LMA-type device wedges into the upper esophagus. It's not a complete isolation like a cuffed tube in the trachea, but by "corking" the top of the esophagus, there is some protection from gas entering the esophagus. Additionally, the bowl of the LMA is sitting directly under the laryngeal inlet, so the amount of pressure needed to get oxygen into the lungs is less than what is used typically with a face mask, having to start from outside the mouth and flow around the tongue.

In addition to the ergonomic difficulties of face-mask ventilation, problems creating an effective seal, and issues delivering oxygen into the lungs at low pressure, mask ventilation in a supine position has many disadvantages in terms of oxygenation.

In a flat position, the abdominal contents push the diaphragm upward, reducing the functional residual capacity of the lungs. Additionally, the posterior lung segments collapse.

Unlike pressurization of the oropharynx, pressurization of the nasopharynx causes passive opening of the airway as the soft palate is pushed away from the posterior pharynx (see Figure 1). Combining nasal oxygen with pulling on the mandible is an incredibly easy and fast way to open the upper airway. Oxygen shoots from the nasopharynx, down into the upper airway, and into the trachea. In the patient who is upright, the diaphragm drops and the lungs expand. Through the miracle of hemoglobin, oxygen is drawn down the trachea as it gets absorbed across the alveolar capillary membrane even without positive pressure ventilation (apneic oxygenation).

I used to bag patients as my initial response to hypoxemia in the emergency setting. Now, I put Oxygen On, Pull on the mandible, and Sit the patient up (OOPS). I have done this in the setting of oversedation and narcotic overdose, which resulted in complete apnea, and oxygenation improves quickly. I sometimes augment nasal oxygen at the top of the flow meter 15+ liters with a non-rebreather to boost oxygen flow >30 lpm.

In cardiac arrest, I used to bag patients while preparing to intubate. Now, I use passive apneic oxygenation and, if necessary, place an LMA-type device to run the initial portion of the code.

My current use of mask ventilation is only when I want to deliver some positive end-expiratory pressure (PEEP; PEEP valves should be on every BVM). This is generally only used when inducing patients for intubation. I gently ventilate for a couple of breaths when I use muscle relaxants to confirm that I can bag the patient and to expand the alveoli during the onset phase of muscle relaxants. I always do so in a head-elevated position (at least ear-to-sternal notch). I am careful to use low pressure, low volumes, and low rates, except in situations of compensatory respiratory alkalosis. My use of face-mask ventilation in these settings is generally with a nasal cannula, which helps stent the airway open and augment flow. I choose to perform face-mask ventilation in this situation, as opposed to an LMA, because I am worried about the LMA device being inserted too early, which could trigger active vomiting before rapid-sequence intubation medications kick in.

The role of face-mask ventilation in emergency situations is rapidly diminishing. I believe the first response to hypoxia should always be Os up the nose, either a standard nasal cannula combined with a non-rebreather to get flows >30 lpm or special high-flow, warm, humidified nasal cannula systems. Sit the patient upright as much as possible and pull on the mandible. In cardiac arrest, passive oxygenation and an LMA-type device should be used preferentially over bagging a patient in a flat position. If you have to use a face mask to provide PEEP (ie, BVM with a PEEP valve or continuous positive airway pressure mask), always do so in an upright position.

BRINGING DATA TO THE BEDSIDE

BENCHMARKING ALLIANCE

DR. AUGUSTINE is chair of the National Clinical Governance Board of US Acute Care Solutions in Canton, Ohio; clinical professor of emergency medicine at Wright State University in Dayton, Ohio; vice president of the Emergency Department Benchmarking Alliance; and on the ACEP Board of Directors.

Looking Back to Move Ahead in Emergency Services

CDC and EDBA review important trends in the emergency department over the years

by JAMES J. AUGUSTINE, MD, FACEP

Emergency physicians and emergency department leaders face an important time in determining how to serve the needs of their communities in a changing health system. The trends that have driven the growth of emergency care have not been altered by government or payer policies to date. The National Hospital Ambulatory Medical Care Survey (NHAMCS) by the Centers for Disease Control and Prevention (CDC) has detailed a continual increase in ED visits since at least 1992, as have data from the Emergency Department Benchmarking Alliance (EDBA), and it is confirmed in the operations reports for most of the 5,000 or so emergency departments in the country.

The 1992 NHAMCS Emergency Department Summary estimated that 89.8 million ED visits were made, or about 357 visits per 1,000 population. Injuries in those years were the cause of about 40 percent of the visits. In 2012, visits had grown to 131 million, which calculates to 424 visits per 1,000 population.[1] Injuries accounted for 28 percent of ED visits, with the highest injury rates in persons age 75 and older. Continuing a 2.4 percent growth rate means that 150 million persons visited American emergency departments in calendar year 2016.

Most important in predicting ED utilization, staffing, design, and processes are the types of patients visiting the emergency department. The ED population is aging, which is consistent with the demographics of the country. Those persons age 75 and older in 1992 had 558 visits per 1,000 population. In 2011, that number increased to 682 visits per 1,000 population. Similarly, in those persons ages 65 to 74, the utilization increased from 314 to 369. These are the fastest-growing demographics in the country and will continue to grow for the next 20 years.

The EDBA has worked collaboratively with the CDC in producing useful data reports, which are needed for future planning. The EDBA hosted three summits that developed the definitions for the industry, the latest being published and used in the annual EDBA survey.[2] EDBA trends in the last 12 years are summarized in Table 1.

The EDBA data show a reduction in the mix of young patients (defined as under age 18), from about 22 percent to about 16 percent over the last 10 years. Ambulance transportation is a stable source of about 16 percent of ED patients, with patients arriving in this manner being admitted around 39 percent of the time. For the sicker or seriously injured patients arriving in the emergency department, the admission rate over the last 10 years is stable between 16 percent and 18 percent.

Table 1: Critical Trends in 12 years of the EDBA Data Survey

YEAR	% OF PATIENTS UNDER AGE 18	% OF INPATIENTS PROCESSED THROUGH THE ED	NUMBER OF CT PROCEDURES PER 100 PATIENTS SEEN IN THE ED	NUMBER OF ECGS PER 100 PATIENTS SEEN IN THE ED
2015	16.9%	66%	20	26
2014	16.5%	65%	20	26
2013	19.9%	68%	20	26
2012	21.5%	68%	20	26
2011	20.8%	67%	22	26
2010	21.3%	66%	22	23
2009	22.1%	65%	21	23
2008	21.5%	64%	22	22
2007	22.1%	62%	22	20
2006	20.5%	61%	22	19
2005	20.1%	61%	18	18
2004	22.5%	58%	not studied	17

The increasing age and medical complexity of ED patients result in measurable trends in the utilization of diagnostic testing that mirror those in the CDC reports. The use of CT scanning appears to have reached a high of 22 procedures per 100 patients, but MRI and other special imaging procedures like ultrasound are used at an increasing rate. The other diagnostic tool that is increasing in ED use is the 12-lead ECG. From 2004 to 2015, ECG utilization increased from 17 uses per 100 patients to 26 uses. This trend is likely to continue.

There is a continuing growth in the percentage of overall hospital admissions through the ED. The EDBA data survey over the last five years finds that between 65 percent and 68 percent of hospital inpatients are processed through the emergency department. This reflects the role of the emergency department as the "front door" to the inpatient unit.

The increasing age and medical complexity of ED patients result in measurable trends in the utilization of diagnostic testing that mirror those in the CDC reports.

There is a tremendous effort by many ED leaders to increase the flow of patients. ED providers have the greatest control over the flow of patients who are evaluated, treated, and released for outpatient follow-up. This represents more than 80 percent of the patients seen in American emergency departments. Despite increasing volumes and increasing age and acuity of patients over the past 11 years, the flow of patients has improved. For all patients, the door-to-provider time has decreased from more than 40 minutes to about 28 minutes (the 2012 NHAMCS study reports this number is 22 minutes). Overall median length of stay for the complete spectrum of ED patients has decreased about 15 minutes, from about 190 minutes to about 175 minutes. Patients treated and released from the emergency department have been processed an average of 10 minutes faster than 11 years ago, from 160 minutes to about 150 minutes. The flow improvements in the setting of increased volume have resulted in an overall reduction in ED patient walkaways, from more than 3 percent to about 2.6 percent.

The data from the CDC and from the EDBA indicate that the emergency department is an important and valuable component of the health system, providing unscheduled care to an increasing number of patients over the last 24 years.

Summary Talking Points from NHMACS and EDBA Data

- The CDC NHAMCS study started in 1992 documents that American emergency departments are seeing about 2.4 percent more visits every year.
- More patients arrive with medical illnesses rather than injuries.
- More patients are elderly and arrive by EMS.
- Despite increasing volumes and acuity, ED flow improvement has occurred.
- There is a continued increase in the use of ECGs, MRI scans, and ultrasound in the diagnostic workup of ED patients.
- The admission rate is stable over the last decade, at about 16 percent to 18 percent, and those patients represent about two-thirds of inpatient admissions to American hospitals.

References

1. National Hospital Ambulatory Medical Care Survey: 2012 Emergency Department Summary Tables. CDC website. Available at: http://www.cdc.gov/nchs/data/ahcd/nhamcs_emergency/2012_ed_web_tables.pdf.

2. Wiler JL, Welch S, Pines J, et al. Emergency department performance measures update: proceedings of the 2014 Emergency Department Benchmarking Alliance consensus summit. *Acad Emerg Med.* 2015;22(5):542-553.

DOGMA FEELS RIGHT UNTIL YOU STEP IN IT

SKEPTICS' GUIDE TO EMERGENCY MEDICINE

DR. MILNE is chief of emergency medicine and chief of staff at South Huron Hospital, Ontario, Canada. He is on the Best Evidence in Emergency Medicine faculty and is creator of the knowledge translation project the Skeptics' Guide to Emergency Medicine (www.TheSGEM.com).

SKEPTICS' GUIDE TO EMERGENCY MEDICINE | CONTINUED FROM PAGE 1

administering procedural sedation and analgesia."

Clinical Question

Does procedural sedation of a pediatric emergency department patient need to be delayed based on nil per os (NPO) status?

Reference

Beach ML, Cohen DM, Gallagher SM, et al. Major adverse events and relationship to nil per os status in pediatric sedation/anesthesia outside the operating room: a report of the pediatric sedation research consortium. Anesthesiology. 2016;124(1):80-88.

- **Population:** All pediatric patients undergoing procedural sedation at one of the 42 Pediatric Sedation Research Consortium (PSRC) sites. Procedural sedation/anesthesia was defined as "any pharmacologic intervention made to facilitate an invasive procedure or test in a pediatric-age patient outside of the operating room environment."
- **Intervention:** NPO to solids for at least eight hours, non-clear fluids for at least six hours, and clear fluids for at least two hours.

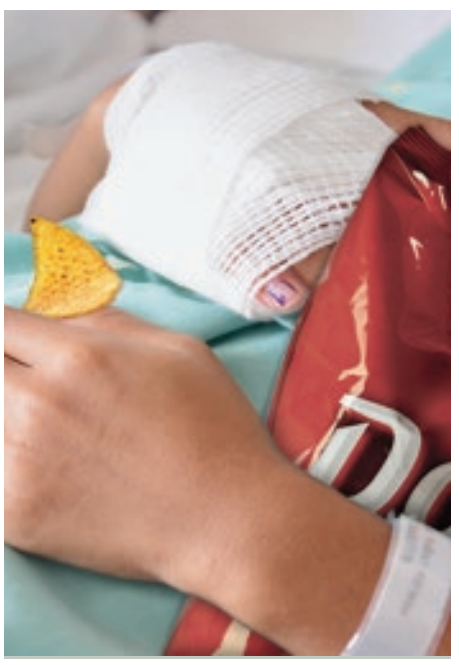

ILLUSTRATION: PAUL JUESTRICH; PHOTOS: SHUTTERSTOCK.COM

- **Comparison:** Patients who failed to meet the above NPO criteria.
- **Outcome:** Two primary outcomes:
  - Rate of aspiration. Defined as an event where emesis was noted or food material was found in the oropharyngeal cavity and associated with any of the following: new cough, wheeze, increase in respiratory effort, change in chest radiograph indicative of aspiration, or new need for oxygen therapy after recovery from sedation.
  - Occurrence of a major adverse event. Defined as aspiration, death, cardiac arrest, or uoonplanned admission to a hospital.

Authors' Conclusions:

"The analysis suggests that aspiration is uncommon. NPO status for liquids and solids is not an independent predictor of major complications or aspiration in this sedation/anesthesia data set."

Key Results

There were 139,142 procedural sedation/anesthesia encounters identified in the data set. NPO status was known for 107,947 patients, including 25,401 (24 percent) who were not NPO. They observed 75 major complications that included 62 unplanned admissions, 10 aspirations, three cardiac arrests, and no deaths.

- **Primary outcome:** No statistical association between NPO status and major complications or aspiration was shown.

EBM Commentary

1. Association versus causation: A prospective observational study like this can be used to identify associations between NPO status and aspiration and major adverse events. However, it would take a randomized controlled trial to investigate causation.
2. Precision of the results: Because there were only a few events, the 95 percent confidence intervals around the point estimate were wide.
3. External validity: High-performance sedation teams provided the procedural sedation in this study. You may not have these teams in your community hospital. In addition, the majority of these elective procedural sedations were classified as routine, not emergency, and only a minority of the sedations were provided by an emergency physician.

Bottom Line

Not delaying procedural sedation in pediatric emergency department patients based on their NPO status is reasonable.

Case Resolution

You have an informed discussion with the parents regarding their son's injury and the risks of sedation. You proceed with the sedation and perform a closed fracture reduction with no complications.

Thank you to Dr. Robert Edmonds, an emergency medicine staff physician at Langley Air Force Base. (Note: The views and opinions of this article are not the official position of the United States Air Force or Langley Air Force Base.)

Remember to be skeptical of anything you learn, even if you heard it on the Skeptics' Guide to Emergency Medicine.

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1. Godwin SA, Burton JH, Gerardo CJ, et al. Clinical policy: procedural sedation and analgesia in the emergency department. *Ann Emerg Med.* 2014;63(2):247-58.e18.

RESOURCES FOR FURTHER READING

- **Peri-procedural fasting. Life in the Fast Lane website. Available at: http://lifeinthefastlane.com/ccc/peri-procedural-fasting. Accessed Dec. 19, 2016.**
- **NPO for sedation. PEMBlog website. Available at: http://pemcincinnati.com/blog/briefs-npo. Accessed Dec. 19, 2016.**
- **ACEP procedural sedation update for 2013. EMCrit website. Available at: http://emcrit.org/practicalevidence/acep-procedural-sedation-update-2013. Accessed Dec. 19, 2016.**

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CODING WIZARD

NAVIGATE THE CPT MAZE, OPTIMIZING YOUR REIMBURSEMENT

Editor's Note: *Cutting through the red tape to make certain that you get paid for every dollar you earn has become more difficult than ever, particularly in our current climate of health care reform and ICD-10 transition. The ACEP Coding and Nomenclature Committee has partnered with* **ACEP Now** *to provide you with practical, impactful tips to help you navigate through this coding and reimbursement maze.*

SCRIBES AND DOCUMENTATION

by **HAMILTON LEMPERT, MD, FACEP, CEDC**

Question: Do I have to document anything if I'm using a scribe?

Answer: All information obtained from a patient and recorded by a scribe must be done in the presence of a physician or advance practice provider (APP). Scribes work side by side with clinicians, documenting the service provided in real time or immediately afterward. Two separate attestations are required when using a scribe. The first is by the scribe, indicating that they are scribing for a particular clinician. The second, by the clinician, is more involved and should indicate that the scribe's documentation accurately reflects the service(s) provided by the clinician. As always, it is important for the clinician to review the records for completeness and accuracy. Lastly, clinicians need to either recite to the scribe or document themselves the medical decision making and emergency department course. Much more information about scribe usage (including who can act as a scribe, Centers for Medicare & Medicaid Services and Joint Commission rules about scribes, and sample attestations) can be found at www.acep.org/Physician-Resources/Practice-Resources/Administration/Financial-Issues-/-Reimbursement/Scribe-FAQ/.

Brought to you by the ACEP Coding and Nomenclature Committee.

DR. LEMPERT is chief medical officer, coding policy, at TeamHealth, based in Knoxville, Tennessee.

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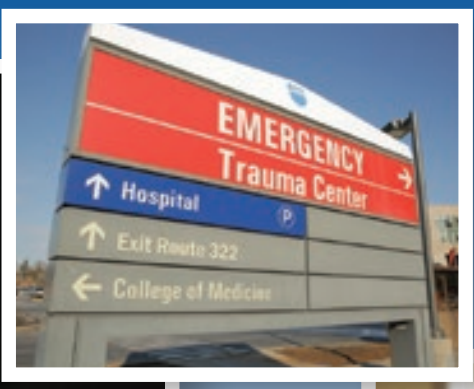

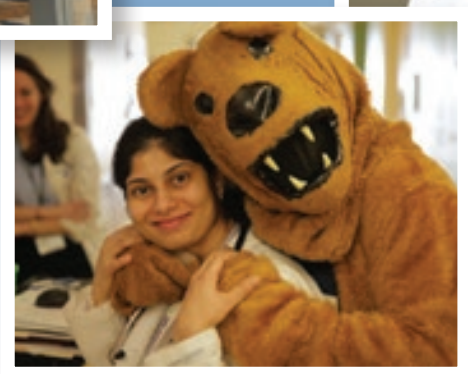

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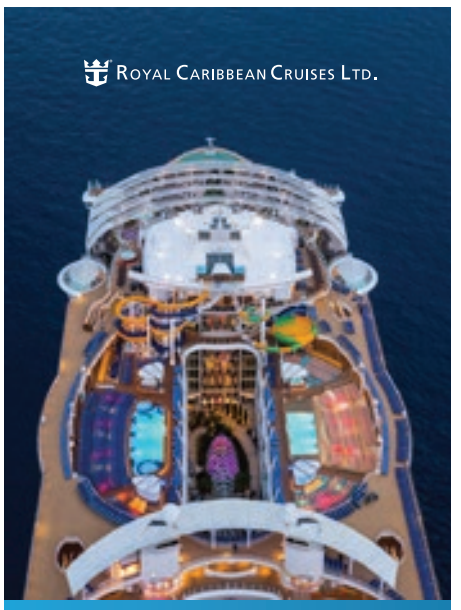

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WELLNESS | CONTINUED FROM PAGE 12

dents in New York City in 2014, both of whom jumped off of buildings within one week of each other, has brought attention from ACEP, the Accreditation Council for Graduate Medical Education (ACGME), the Society for Academic Emergency Medicine (SAEM), the Council of Emergency Medicine Residency Directors (CORD), and other national organizations to this problem. In 2015, ACGME held its first-ever symposium on physician wellness, and ACEP, SAEM, and CORD have also introduced wellness initiatives, including ACEP's Emergency Medicine Wellness Week.

What will it really take to reduce the rate of physician suicide? Many suggest a three-pronged approach:

1. Destigmatize seeking help through education, with a change in culture and policies that makes it easier for physicians to access mental health care when it is needed.
2. Inform the medical community of how to recognize the signs of depression and burnout and the knowledge of how to refer colleagues who need help.
3. Research to understand and change the factors related to the practice of medicine that create higher rates of burnout and depression in physicians.

These are not easy tasks but are necessary to help avoid the loss of precious physician lives.

As the push continues on a global level, the question remains, is there more that we can do in our own shops to help our colleagues and friends? Keeping with the three-pronged approach, here are some suggestions:

1. Although it is not always possible to know when someone is contemplating suicide, some common warning signs include:
   - Talking about their own death or being preoccupied with death/dying
   - Obtaining the means to take their own life
   - Withdrawing from social contact
   - Feeling trapped or hopeless
   - Increased use of drugs or alcohol
   - Engaging in risky or self-destructive activities
   - Giving away belongings or getting affairs in order without a logical reason
   - Saying good-bye to people as if they will not see them again
2. If you suspect someone you know may be contemplating suicide, be willing to ask the difficult questions and to listen. You are not responsible for preventing someone from taking their life, but your intervention may help. Examples of questions to ask include:
   - How are you coping with what is happening in your life?
   - Do you ever feel like giving up?
   - Have you thought about harming yourself?
   - Have you ever attempted to harm yourself before?
   - Do you have access to a means to harm yourself?
3. If someone shares with you that they are contemplating suicide:
   - Encourage them to seek help; be aware of local resources including your institution's well-being committee
   - Provide them with the National Suicide Prevention Lifeline at 800-273-8255
   - Offer to help them in seeking assistance and support
   - Remind them that things will get better
   - Encourage them to avoid alcohol and drug use
   - Remove dangerous items from the person's access, if possible

For more information about suicide and suicide prevention, go to **www.suicidology.org, www.afsp.org, www.survivorsofsuicide.com, and www.acgme.org,** which has developed a new set of resources particularly for physicians in training.

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- Efficacy could not be established in patients with serious influenza requiring hospitalization.

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Warnings and Precautions

- Rare cases of serious skin reactions, including erythema multiforme, have been reported with Rapivab in clinical studies and in postmarketing experience. Cases of anaphylaxis and Stevens-Johnson syndrome have been reported in postmarketing experience with Rapivab. Discontinue Rapivab and institute appropriate treatment if anaphylaxis or a serious skin reaction occurs or is suspected. The use of Rapivab is contraindicated in patients with known serious hypersensitivity or anaphylaxis to Rapivab.
- Patients with influenza may be at an increased risk of hallucinations, delirium, and abnormal behavior early in their illness. There have been postmarketing reports (from Japan) of delirium and abnormal behavior leading to injury in patients with influenza who were receiving neuraminidase inhibitors, including Rapivab. Because these events were reported voluntarily during clinical practice, estimates of frequency cannot be made, but they appear to be uncommon. These events were reported primarily among pediatric patients. The contribution of Rapivab to these events has not been established. Patients with influenza should be closely monitored for signs of abnormal behavior.
- Serious bacterial infections may begin with influenza-like symptoms or may coexist with or occur as complications during the course of influenza. Rapivab has not been shown to prevent such complications.

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Concurrent use with Live Attenuated Influenza Vaccine

Antiviral drugs may inhibit viral replication of a live attenuated influenza vaccine (LAIV). The concurrent use of Rapivab with LAIV intranasal has not been evaluated. Because of the potential for interference between these two products, avoid use of Rapivab within 2 weeks after or 48 hours before administration of LAIV unless medically indicated.

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch or call 1-800-FDA-1088.

References: 1. Rapivab [package insert]. Durham, NC: BioCryst Pharmaceuticals, Inc; 2014. **2.** Kohno S, Kida H, Mizuguchi M, Shimada J; S-021812 Clinical Study Group. Efficacy and safety of intravenous peramivir for treatment of seasonal influenza virus infection. *Antimicrob Agents Chemother.* 2010;54(11):4568-4574. doi:10.1128/AAC.00474-10.

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