

THE Hospitalist

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Pediatric hospitalists take center stage



CREDIT: SUSAN URMY, VANDERBILT UNIVERSITY MEDICAL CENTER

Dr. Kris Rehm (in red sweater) and colleagues at Monroe Carell Jr. Children's Hospital at Vanderbilt in Nashville.

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Hospitalist Movers and Shakers

By Matt Pesyna

Steven Pantilat, MD, MHM, has been named the first chief of the newly established division of palliative medicine at University of California, San Francisco Health. Dr. Pantilat's new role commenced on May 1st, with the division launch anticipated for July 1st.



Dr. Pantilat

Dr. Pantilat began his career as a hospital medicine specialist, joining UCSF's hospitalist group – and later the division of hospital medicine – after earning his medical degree from the university. He was instrumental in the formation of UCSF Health's palliative care program and became its director in 1999. Prior to the creation of the division, the internationally renowned palliative care program had featured groups within the hospital medicine, general internal medicine, and geriatrics divisions.

Dr. Pantilat is a Master of the Society of Hospital Medicine and a former president of the society (2005-2006).

Paul J. Goebel, MD, an internal medicine hospitalist at Saint Agnes Medical Center, Fresno, Calif., has been selected as the hospital's Champion in Care award recipient. This honor is presented an-



Dr. Goebel

nually to a Saint Agnes physician who shows team spirit and a strong willingness to collaborate with the Center's nurses and clinical staff in providing high-level patient care.

Gary J. Carver, MD, recently was named the chief medical officer at Coshocton (Ohio) Regional Medical Center. Dr. Carver has been the hospital's director of hospital medicine since 2013 and will continue in that role in addition to his duties as CMO.

In his new position, Dr. Carver joins Coshocton Medical Center's senior leadership team, providing medical oversight, as well as clinical direction and leadership as the facility seeks accreditation, quality improvement, and service line development.

Lisa Shah, MD, has been hired by Sound Physicians as the group's chief innovation officer. Dr. Shah had been working as senior vice president of Evolent Health's clinical operations and network. With Sound Physicians, Dr. Shah will lead clinical innovation and transformation for the nationwide organization of physicians providing emergency medical, critical care, and hospital medicine services at more than 180 hospitals.

Dr. Shah will be tasked with developing innovative care models, tech-centered clinical workflows, and telemedicine strategies. She brings a robust hospital medicine background, having served in a 2-year Hospitalist Scholars Fellowship at the University of Chicago, while simultaneously earning a master's degree in public health.

Business Moves

The University of Mississippi Medical Center Children's of Mississippi, Hattiesburg, branch is joining forces with Memorial Hospital at Gulfport (Miss.) to provide care throughout southern Mississippi.

The highlight of the merger is the acquisition of six pediatric clinics into the UMMC family, with UMMC assuming control of the pediatric hospitalist program at each of the locations. The acquired clinics all have been branded as Children's of Mississippi as of March 26th.

Sound Physicians' parent company **Fresenius Medical Care**, which has held a controlling interest in Sound since 2014, has sold that interest to Germany-based Summit Partners for a reported \$2.15 billion. The acquisition is expected to be finalized later this calendar year.

The Ob Hospitalist Group, Greenville, S.C., the nation's largest Ob/Gyn hospitalist organization, recently announced the rollout of its CARE (Clinician Assistance, Recovery, and Encourage) program. CARE uses peer support to assist clinicians facing psychological and emotional impacts from adverse Ob events.

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The Hospital Leader

What the (HM) world needs now

Practice compassion to rise to the challenges of HM

By Tracy Cardin, ACNP-BC, SFHM

If you are in the business of health care – whether as a direct care provider who is doing their best in an increasingly complex system with an increasingly complex panel of patients; a hospital medicine group leader who is trying to keep a group afloat and lead people through this rocky terrain; or a hospital system leader or chief medical officer dealing with the arcane and ever-changing landscape – there is one universal truth: This business is hard.

You can call it “challenging.” You can say there are “opportunities for improvement.” You can put all kinds of sugar on top, but at times, it is a bitter drink to swallow.

So why, as hospitalists, do we keep doing this?

I always joke that I’m going to open a “fro-yo” stand on the beach, but of course, I never do. And that constancy is one huge reason why I love hospitalists. We are always trying to decode, unlock, and solve some of these seemingly unsolvable

When the CEO of your hospital tells you that the already tiny margin of the hospital is shrinking, and she has to cut a service you feel is indispensable, reflect her pain. Believe me – she feels it.

To practice compassion in hospital medicine is to accept that medicine is hard on everyone. It’s not “us”



Ms. Cardin

versus “them.” It’s not just “us” that hurts and “them” that are immune. We all struggle.

We need – I need – to acknowledge the pain this profession often elicits. It can be burnout,

resentment, overarching grief, or incredible frustration with broken systems and sometimes broken people. When we deny it, when we try to shove those feelings deep down, then people – good people who feel these things – perceive they are flawed or somehow not cut out for this profession. So they end up leaving. Or imploding.

Instead, if we practice compas-

If we practice compassion for ourselves and each other, we may find strength and restoration in these relationships with others. We will normalize these very normal responses to the challenges we face every day. And we may then survive all these “opportunities for improvement.”

problems. But at the same time, this plethora of constant change and instability at all kinds of levels can be a bit, well, impossible.

How do we do it every day? You can change jobs, change patient panels, and change medical systems, but no matter what, you will be confronted on some level with a gap of clearly defined solutions to your “challenges.”

One thing in my arsenal of coping, beyond my fro-yo fantasy, is simply this: compassion. When one of your providers comes to you and is complaining about their workload, don’t tell them about how you used to see three times as many patients at your last job. Instead, put your hand on their shoulder, look them in the eye, and say “It is hard. It is.”

sion for ourselves and each other, we may find strength and restoration in these relationships with others. We will normalize these very normal responses to the challenges we face every day. And we may then survive all these “opportunities for improvement.”

I challenge everyone to practice this simple compassionate meditation. It will take less than five minutes. As you lay in bed at night, your mind racing, concentrate on feeling compassion for four different people. Start with the person you don’t know well, such as the person who works at the dry cleaner. Breathe deeply. Pick a sentence – a gift to give. I always think, “I wish you happy and healthy, wealthy and wise.” Do this for

three or four deep breaths.

Next, using this same technique, choose someone that is hard to feel compassion for – perhaps that difficult family member, or the co-worker that gets under your skin.

Then feel that compassion. Breathe deeply – for yourself, with all your human frailties. You don’t have to be perfect to be loved or lovable. Feel that.

Finally, take a deep breath, feel your chest opening, expanding. Feel that compassion for the whole world – the whole crummy mixed-up world that’s just doing its best. The world needs our compassion, too.

While you were at HM18, I hope

you were able to look into the eyes of the others you see. These are your fellow hospitalists. People who feel your joys, your frustrations. Some of those eyes will be bright and excited; others will be worn and tired. But revel in this shared and universal knowledge.

It is hard. But with compassion and understanding, we can make it a bit better. For all of us.

Read the full post at hospitalleader.org.

Ms. Cardin, ACNP-BC, SFHM is the associate director of clinical integration at Adfinitas Health and also serves on SHM’s Board of Directors.

Also in *The Hospital Leader*

- How Can Hospitalists Improve Their HCAHPS Scores? by Leslie Flores, MHA, SFHM
- “Harper’s Index” of Hospital Medicine 2018 by Jordan Messler, MD, SFHM
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Benefits, drawbacks when hospitalists expand roles

Hospitalists can't 'fill all the cracks' in primary care

By Thomas R. Collins

As vice chair of the hospital medicine service at Northwell Health, Nick Fitterman, MD, FACP, SFHM, oversees 16 HM groups at 15 hospitals in New York. He says the duties of his hospitalist staff, like those of most U.S. hospitalists, are similar to what they have traditionally been – clinical care on the wards, teaching, comanagement of surgery, quality improvement, committee work, and research. But he has noticed a trend of late: rapid expansion of the hospitalist's role.

Speaking at an education session at HM18 in Orlando, Dr. Fitterman said the role of the hospitalist is growing to include tasks that might not be as common, but are becoming more familiar all the time: working at infusion centers, caring for patients in skilled nursing facilities, specializing in electronic health record use, colocating in psychiatric hospitals, even being deployed to natural disasters. His list went on, and it was much longer than the list of traditional hospitalist responsibilities.

"Where do we draw the line and say, 'Wait a minute, our primary site is going to suffer if we continue to get spread this thin, can we really do it all?'" Dr. Fitterman said. As the number of hats hospitalists wear grows ever bigger, he said more thought must be placed into how expansion happens.

The preop clinic

Efren Manjarrez, MD, SFHM, former chief of hospital medicine at the University of Miami, told a cautionary tale about a preoperative clinic staffed by hospitalists that appeared to provide a financial benefit to a hospital – helping to avoid costly last-minute cancellations of surgeries – but that ultimately was shuttered. The hospital, he said, loses \$8,000-\$10,000 for each case that gets canceled on the same day.

"Think about that just for a minute," Dr. Manjarrez said. "If 100 cases are canceled during the year at the last minute, that's a lot of money."

A preoperative clinic seemed like a worthwhile role for hospitalists – the program was started in Miami

by the same doctor who initiated a similar program at Cleveland Clinic. "Surgical cases are what support the hospital [financially], and we're here to help them along," Dr. Manjarrez said. "The purpose of hospitalists is to make sure that patients are medically optimized."



Dr. Manjarrez

The preop program concept, used in U.S. medicine since the 1990s, was originally started by anesthesiologists, but they may not always be the best fit to staff such programs.

"Anesthesiologists do not manage all beta-blockers," Dr. Manjarrez said. "They don't manage ACE inhibitors by mouth. They don't manage all oral diabetes agents, and they sure as heck don't manage pills that are anti-coagulants. That's the domain of internal medicine. And as patients have become more complex, that's where hospitalists who [work in] preop clinics have stepped in."

Studies have found that hospitalists staffing preop clinics have improved quality metrics and some clinical outcomes, including lowering cancellation rates and more appropriate use of beta-blockers, he said.

In the Miami program described by Dr. Manjarrez, hospitalists in the preop clinic at first saw only patients who'd been financially cleared as able to pay. But ultimately, a tiered system was developed, and hospitalists saw only patients who were higher risk – those with COPD or stroke patients, for example – without regard to ability to pay.

"The hospital would have to make up any financial deficit at the very end," Dr. Manjarrez said. This meant there were no longer efficient 5-minute encounters with patients. Instead, visits lasted about 45 minutes, so fewer patients were seen.

The program was successful, in that the same-day cancellation rate for surgeries dropped to less than 0.1% – fewer than 1 in 1,000 – with the preop clinic up and running, Dr. Manjarrez explained. Still, the hospital decided to end the program. "The hospital no longer wanted to reimburse us," he said.

A takeaway from this experience for Dr. Manjarrez was that hospitalists need to do a better job of showing the financial benefits in their expanding roles, if they want them to endure.

"At the end of the day, hospitalists do provide value in preoperative clinics," he said. "But unfortunately, we're not doing a great job of publishing our data and showing our value."

At-home care

At Brigham and Women's Hospital in Boston, hospitalists have demonstrated good results with a program to provide care at home rather than in the hospital.

David Levine, MD, MPH, MA, clinician and investigator at Brigham and Women's and an instructor in medicine at Harvard Medical School, said that the structure of inpatient care has generally not changed much



Dr. Levine

over decades, despite advances in technology.

"We round on them once a day – if they're lucky, twice," he said. "The medicines have changed and imaging has changed, but we really haven't changed the structure of how we take care of acutely ill adults for almost a hundred years."

Hospitalizing patients brings unintended consequences. Twenty percent of older adults will become delirious during their stay, 1 out of 3 will lose a level of functional status in the hospital that they'll never regain, and 1 out of 10 hospitalized patients will experience an adverse event, like an infection or a medication error.

Brigham and Women's program of at-home care involves "admitting" patients to their homes after being treated in the emergency department. The goal is to reduce costs by 20%, while maintaining quality and safety and improving patients' quality of life and experience.

Researchers are studying their results. They randomized patients, after the ED determined they required admission, either to admission to

the hospital or to their home. The decision on whether to admit was made before the study investigators became involved with the patients, Dr. Levine said.

The program is also intended to improve access to hospitals. Brigham and Women's is often over 100% capacity in the general medical ward.

Patients in the study needed to live within a 5-mile radius of either Brigham and Women's Hospital, or Brigham and Women's Faulkner Hospital, a nearby community hospital. A physician and a registered nurse form the core team; they assess patient needs and ratchet care either up or down, perhaps adding a home health aide or social worker.

The home care team takes advantage of technology: Portable equipment allows a basic metabolic panel to be performed on the spot – for example, a hemoglobin and hematocrit can be produced within 2 minutes. Also, portable ultrasounds and x-rays are used. Doctors keep a "tackle box" of urgent medications such as antibiotics and diuretics.

"We showed a direct cost reduction taking care of patients at home," Dr. Levine said. There was also a reduction in utilization of care and an increase in patient activity, with patients taking about 1,800 steps at home, compared with 180 in the hospital. There were no significant changes in safety, quality, or patient experience, he said.

Postdischarge clinics

Lauren Doctoroff, MD, FHM – a hospitalist at Beth Israel Deaconess Medical Center in Boston and assistant professor of medicine at Harvard Medical School – explained another hospitalist-staffed project meant to improve access to care: her center's postdischarge clinic, which was started in 2009 but is no longer operating.

The clinic tackled the problem of what to do with patients when you discharge them, Dr. Doctoroff said, and its goal was to foster more cooperation between hospitalists and the faculty primary care practice, as well as to improve postdischarge access for patients from that practice.

A dedicated group of hospitalists staffed the clinics, handling medica-

tion reconciliation, symptom management, pending tests, and other services the patients were supposed to be getting after discharge, Dr. Doctoroff said.

"We greatly improved access so that when you came to see us you generally saw a hospitalist a week before you would have seen your primary care doctor," she said. "And that was mostly because we created open access in a clinic that did not have open access. So if a doctor discharging a patient really thought that the patient needed to be seen after discharge, they would often see us."

Hospitalists considering starting such a clinic have several key questions to consider, Dr. Doctoroff said.

"You need to focus on who the patient population is, the clinic structure, how you plan to staff the clinic, and what your outcomes are – mainly how you will measure performance," she said.

Dr. Doctoroff said hospitalists are good for this role because "we're very comfortable with patients who

are complicated, and we are very adept at accessing information from the hospitalization. I think, as a hospitalist who spent 5 years seeing patients in a discharge clinic, it greatly enhances my understanding of patients and their challenges at discharge."

The clinic was closed, she said, in part because it was largely an extension of primary care, and the patient volume wasn't big enough to justify continuing it.

"Postdischarge clinics are, in a very narrow sense, a bit of a Band-Aid for a really dysfunctional primary care system," Dr. Doctoroff said. "Ideally, if all you're doing is providing a postdischarge physician visit, then you really want primary care to be able to do that in order to reengage with their patient. I think this is because postdischarge clinics are construed in a very narrow way to address the simple need to see a patient after discharge. And this may lead to the failure of these clinics, or make them easy to replace. Also, often what patients really need is more than just a physician visit, so a discharge clinic may need to be designed to provide an enhanced array of services."

Dr. Fitterman said that these sto-



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ries show that not all role expansion in hospital medicine is good role expansion. The experiences described by Dr. Manjarrez, Dr. Levine, and Dr. Doctoroff demonstrate the challenges hospitalists face as they attempt expansions into new roles, he said.

"We can't be expected to fill all the cracks in primary care," Dr. Fitterman said. "As a country we need to really prop up primary care. This all can't come under the roof of hospital medicine. We need to be part of a patient-centered medical home – but we are not *the* patient-centered medical home."

He said the experience with the preop clinic described by Dr. Manjarrez also shows the need for buy-in from hospital or health system administration.

"While most of us are employed by hospitals and want to help meet their needs, we have to be more cautious. We have to look, I think, with a more critical eye, for the value; it may not always be in the dollars coming back in," he said. "It might be in cost avoidance, such as reducing readmissions, or reducing same-day cancellations in an OR. Unless the C-suite appreciates that value, such programs will be short lived."



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MDR *Candida auris* is on the move

CDC notes 257 confirmed, 30 probable cases in U.S.

By Michele G. Sullivan

MDedge News

REPORTING FROM ECCMID 2018 / MADRID / The anticipated global emergence of multidrug-resistant *Candida auris* is now an established fact, but a case study presented at the European Society of Clinical Microbiology and Infectious Diseases annual congress demonstrates just how devastating an outbreak can be to a medical facility and its surgical ICU patients.

The dangerous invasive infection is spreading through Asia, Europe, and the Americas, causing potentially fatal candidemias and proving devilishly difficult to eradicate in health care facilities once it becomes established.

Several multidrug-resistant (MDR) *C. auris* outbreaks were reported at the ECCMID meeting. Most troubling: a continuing outbreak in a hospital in Valencia, Spain, in which 17 patients have died – a 41% fatality rate among those who developed a fulminant *C. auris* candidemia, Javier Pemán, MD, said at the meeting. The strain appeared to be a clonal population not previously identified in published reports.

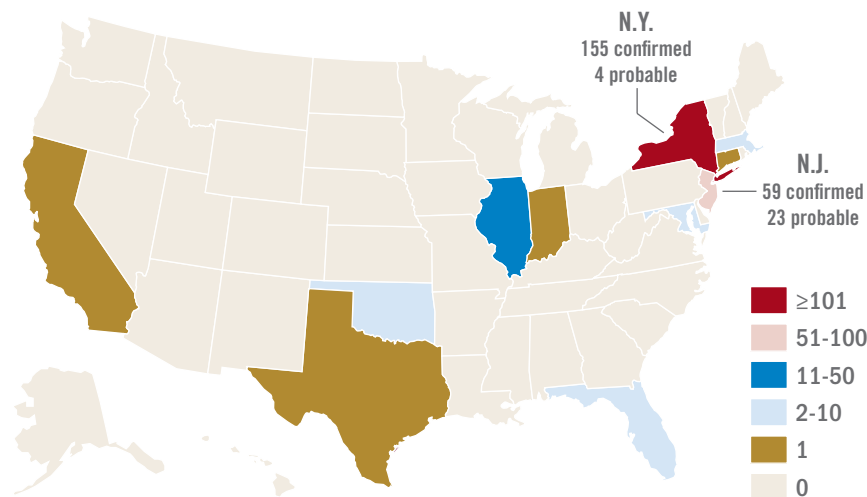
“*C. auris* is hard to remove from the hospital environment,” once it becomes established, said Dr. Pemán of La Fe University and Polytechnic Hospital, Valencia. “When an outbreak lasts for months, as ours has, it is difficult, but necessary, to maintain control measures, identify it early in the lab, and isolate and treat patients early with combination therapy.”

He and his team have relied primarily on a combination of amphotericin B and echinocandin (AMB+ECN), although, he added, the optimal dosing and treatment time aren’t known, and many *C. auris* isolates are echinocandin resistant.

MDR *C. auris* first appeared in Tokyo in 2009. It then spread to South Korea around 2011, and then appeared across Asia and Western Europe.

According to the Centers for Disease Control and Prevention, single cases have appeared in Austria, Belgium, Malaysia, Norway, and the United Arab Emirates. Canada, Colombia, France, Germany, India, Israel, Japan, Kenya, Kuwait, Oman, Pakistan, Panama, South Africa, South Korea, Spain, the United Arab

Clinical cases of MDR *Candida auris* reported in 2018



Note: As of March 31, there were 257 confirmed cases and 30 probable cases.

Source: Centers for Disease Control and Prevention

Emirates, the United Kingdom, and Venezuela have experienced multiple outbreaks.

The CDC has recorded 257 confirmed and 30 probable cases of MDR *C. auris* in the United States as of March 31, 2018. Most of these occurred in New York City and New Jersey; a number of patients had recent stays in hospitals in India, Pakistan, South Africa, the UAE, and Venezuela.

“This is a multidrug-resistant yeast that has emerged in the last decade,” said Jacques Meis, MD, of the department of medical microbiology and infectious diseases at Canisius Wilhelmina Hospital, Nijmegen, the Netherlands. “Some rare isolates are resistant to all three major antifungal classes. Unlike other *Candida* species, it seems to persist for prolonged periods in health care environments and to colonize patients’ skin. It behaves rather like resistant bacteria.”

Once established in a health care setting – often an intensive care ward – *C. auris* poses major infection controls challenges and can be very hard to identify and eradicate, said Dr. Meis.

The identification problem is well known. The 2016 CDC alert noted that “commercially available biochemical-based tests, including API strips and VITEK-2, used in many U.S. laboratories to identify fungi, cannot differentiate *C. auris* from

related species. Because of these challenges, clinical laboratories have misidentified the organism as *C. haemulonii* and *Saccharomyces cerevisiae*.”

“It’s often misidentified as other *Candida* species or as *Saccharomyces* when we investigate with biochemical methods. *C. auris* is best identified using Matrix-Assisted

Laser Desorption/Ionization time-of-flight mass spectrometry [MALDI-TOF],” said Dr. Meis.

Among the presentations at ECCMID were a report of a U.K. outbreak that

affected 70 patients in a neuroscience ICU. It was traced to axillary skin-surface temperature probes, and eradicated only after those probes were removed. More than 90% of the isolates were resistant to fluconazole, voriconazole, and posaconazole; 18% were amphotericin resistant.

Dr. Pemán described the outbreak in Valencia, which began in April 2016; the report was simultaneously published in the online journal *Mycoses* (2018 Apr 14. doi: 10.1111/myc.12781).

The index case was a 66-year-old man with hepatocellular carcinoma who underwent a liver resection at Hospital Le Fe in April 2016. During his stay in the surgical ICU (SICU), he developed a fungal infection from an unknown, highly fluconazole-resistant yeast. The

pathogen was twice misidentified, first as *C. haemulonii* and then as *S. cerevisiae*.

Three weeks later, the patient in the adjacent bed developed a similar infection. Sequencing of the internal transcribed spacer confirmed both as a *Candida* isolate – an organism previously unknown in Spain.

The SICU setup was apparently very conducive to the *C. auris* life cycle, Dr. Pemán said. It’s a relatively open ward divided into three rooms with 12 beds in each. There are no isolation beds, and dozens of workers have access to the ward every day, including clinical and cleaning staff.

“We reinforced contact precautions in colonized and infected patients and started a twice-daily environmental cleaning practice with quaternary ammonium around them,” said Dr. Pemán. They instituted a proactive hospital-wide hand hygiene campaign and spread the word about the outbreak.

The pathogen was almost unbelievably resilient, Dr. Pemán said. “In some cases, *C. auris* was recovered from walls after cleaning with cationic surface-active products ... it was not known until very recently that these products, as well as quaternary ammonium disinfectants, cannot effectively remove *C. auris* from surfaces.”

As a result of the previous measures, the outbreak slowed down during December 2016, with 2 new candidemia cases, but by February, the outbreak resumed with 50 new cases and 18 candidemias detected. Cases continued to emerge throughout 2017.

Because of its fluconazole resistance, patients with *C. auris* received a combined antifungal treatment of liposomal amphotericin B 3 mg/kg per day for 5 days, and a standard dose of echinocandin for 3 weeks. Many *C. auris* strains are echinocandin resistant, Dr. Pemán noted. This particular strain was clonal, different from any other previously reported, he said.

Hospital Le Fe continues to struggle with *C. auris*. As of March, 335 patients have tested positive for the pathogen, and 80 have developed candidemias.

“We feel we may be approaching the end of this episode, but it’s really not possible to be sure,” Dr. Pemán said.



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What to do if you encounter *Candida auris*

Closely monitor patients for treatment failure

By Raghavendra Tirupathi,
MD, FACP

C*andida auris* is an emerging, often multidrug-resistant yeast that causes invasive infections (such as bloodstream, intra-abdominal) and is transmitted in health care settings. It is difficult to diagnose using traditional yeast identification methods. *C. auris* also has been found in noninvasive body sites and can colonize a person without causing active infection and hence permitting transmission of the pathogen between patients. These sites include skin, urine, external ear, wounds, and respiratory specimens.

This fungus was first described in 2009 in an ear-discharge culture from a patient in Japan. The first clinical cases were described in South Korea in 2011. An unknown pathogen before 2009, *C. auris* caused 4%-8% of candidemia in Indian ICUs during 2011-2012 and 38% of candidemia in one Kenyan hospital during 2010-2013. It has now spread

across Asia and Europe, only to arrive in the United States in 2016.

As of March 31, 2018, 257 clinical cases of *C. auris* infection have been reported to the Centers for Disease Control and Prevention; most have occurred in New York and New Jersey. The CDC has also identified an additional 30 probable cases. Based on epidemiologic and molecular information, including whole-genome sequencing, the Centers for Disease Control and Prevention infers that most U.S. cases likely resulted from local transmission of *C. auris* following previous introduction from other countries in Asia.

The majority of infections within the United States have been in blood streams. The reported all-cause mortality from these infections has been up to 60%. Most *C. auris* isolates in the United States have been resistant to at least one antifungal, most commonly fluconazole, and patients have developed resistance to echinocandin drugs while on treatment. Amphotericin B resistance also has been seen in about 30% of isolates.

In response to global reports and a large outbreak in a specialty hospital in the United Kingdom, the CDC issued its first advisory and clinical alert to health care facilities in June 2016. It is essential for hospitalist physicians to be aware of this emerging pathogen and also of the interventions needed to curb its spread, given they are the frontline warriors in the fight against hospital-acquired infections.

The first step in controlling *C. auris* is identification. *C. auris* can be misidentified when using traditional biochemical methods. They are most commonly misidentified as *Candida haemulonii*. Currently, accurate identification for *C. auris* can be performed by Vitek MS and Matrix-Assisted Laser Desorption/Ionization time-of-flight mass spectrometry using research use-only databases. Hospitalists should be aware of the diagnostic instruments used in their hospital laboratories and their ability to detect *C. auris*. Clinical laboratories should request testing of suspect *C. auris* isolates from their state or regional public health laboratory or the CDC. Labs should also consider reviewing historical microbiology records for suspect isolates (e.g., *C. haemulonii*) to identify missed cases of *C. auris*.

All cultures positive for *Candida* should be further speciated and antifungal susceptibilities should be reported as per new Infectious Diseases Society of America guidelines for candidiasis from 2016. As many clinical laboratories do not determine the species of *Candida* from noninvasive sites, *C. auris* colonization may go unrecognized and lead to transmission. About 54% of recognized U.S. clinical cases have been identified from blood cultures. The remaining patients with positive *C. auris* cultures, including those with recent hospitalizations abroad, have had the organism isolated from other body sites, including skin wounds, urine, respiratory specimens, bile fluid, and ears. Determining the species of *Candida* for isolates from these noninvasive sites in certain situations may allow for more rapid identification of *C. auris* and allow for timely implementation of targeted infection control measures to reduce transmission.

Patients have been persistently colonized with *C. auris*, posing long-term risk of transmission. Currently, data on effective decolonization methods are lacking. Patients with



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suspected or confirmed *C. auris* infection should be placed in a single room if possible and standard and contact precautions should be initiated and thorough environmental cleaning and disinfection of the patient care area should be undertaken. Using an Environmental Protection Agency-registered antimicrobial product active against *Clostridium difficile* for routine and terminal disinfection is recommended.

Implement contact tracing and testing to identify other patients colonized with *C. auris*. Review past microbiology records (at least for the preceding 1 year) for suspect or confirmed cases of *C. auris* at the institution. Set up enhanced surveillance for *C. auris* in the laboratory setting.

Echinocandin drugs are the first-line treatment for most invasive *Candida* infections, making resistance to this class of antifungal drugs particularly concerning. As of Sept. 15, 2017, at least five patients in the United States had echinocandin-resistant isolates. In one patient, resistance to echinocandin drugs developed while being treated with echinocandins.

Based on these findings, CDC is concerned that echinocandin-resistant *C. auris* could become more common. Patients with *C. auris* infection should be closely monitored for treatment failure, as indicated by persistently positive clinical cultures (lasting more than 5 days). Consultation with an infectious disease specialist is highly recommended.



Managing opioid prescribing in the inpatient setting continues to be a growing issue.

View SHM's consensus statement, "Improving the Safety of Opioid Use for Acute Noncancer Pain in Hospitalized Adults" published in a recent issue of JHM for 16 recommendations on the safe use of opioids for the treatment of acute, noncancer pain in hospitalized adults.

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In the Literature

Clinician reviews of HM-centric research

By Fabrizio Canepa, MD; Jagriti Chadha, MD, MPH, FHM; Rani Chikkanna, MD; Hassan Hasanein, MD; Saurabh Parasramka, MD; Mohsin Salih, MD; Anne E. Sayers MD, FHM; and Janeesh Veedu, MD

Division of Hospital Medicine, University of Kentucky, Lexington

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9. Factor Xa inhibitors versus vitamin K antagonists for preventing embolism in AF patients

By Fabrizio Canepa, MD

1 Frailty and risk of postoperative complications

CLINICAL QUESTION: Is there an association between frailty and inpatient failure to rescue (FTR) postoperative complications after low-risk and high-risk inpatient surgery?

BACKGROUND: FTR is a quality measure defined as death after a serious, potentially preventable complication. Frailty incorporates different domains including physical performance, gait, mobility, nutritional status, mental health, and cognition. Although there are some studies linking frailty and FTR and postoperative morbidity, the degree and association with low-risk procedures is unclear.

STUDY DESIGN: Retrospective cohort study.

SETTING: More than 600 hospitals participating in the American College of Surgeons' National Surgical Quality Improvement Program database during 2005-2012.

SYNOPSIS: The cohort included 984,550 adult patients who underwent inpatient procedure for general, vascular, thoracic, cardiac, and orthopedic operations. The Risk Analysis Index (RAI) score was used to calculate frailty. The rate of major complications increased as the RAI score was higher for both low-risk and high-risk surgery. For RAI scores less than 10, the rate was 7.4%; for RAI scores 11-20, the rate was 19.8%; for RAI scores 21-30, the rate was 41.1%; and for RAI scores above 40, the rate was 53.6%. Stratifying by the number of complications, significant increases in FTR were observed across the

RAI categories for both low-risk and high-risk procedures.

Frailty assessment should be considered a part of the routine perioperative evaluation and should stimulate preoperative interventions aimed at reducing risk for postoperative complications.



Dr. Canepa

BOTTOM LINE: This large retrospective study found an association between increasing frailty and both the number of complications and FTR for both low-risk and high-risk

surgical procedures.

CITATION: Shah R et al. Association of frailty with failure to rescue after low-risk and high-risk inpatient surgery. *JAMA Surg.* 2018 Mar 21;153(5):e180214.

Dr. Canepa is a hospitalist in the division of hospital medicine at the University of Kentucky, Lexington.

By Jagriti Chadha, MD, MPH, FHM

2 Outcomes of patients with subsegmental PE with and without anticoagulation

CLINICAL QUESTION: Should patients with subsegmental pulmonary embolism be anticoagulated?

BACKGROUND: A recent CHEST clinical guideline suggests it is reasonable to withhold anticoagulation for subsegmental pulmonary embolism. This has been a topic of controversy given the lack of a systematic review.

STUDY DESIGN: Systematic review and meta-analysis.

SETTING: A comprehensive literature search was performed by a medical librarian in Ovid, MEDLINE, PubMed, Embase, the Cochrane Library, Scopus, Web of Science, ClinicalTrials.gov, and Google Scholar.

SYNOPSIS: After 1,512 papers were screened, 14 studies were included in the review and analysis. Primary outcomes were frequency of bleeding, venous thromboembolism recurrence, and death for patients with subsegmental pulmonary embolism with and without treatment. Because of a lack of precision in pooled data and high heterogeneity of outcomes, no inferences could be made about benefit or harm with either approach.

The conclusions were limited because of the small numbers, imprecision, and lack of controlled trials. There is a need for a randomized controlled trial regarding subsegmental pulmonary embolism.

BOTTOM LINE: The decision to treat or not treat a patient with subsegmental pulmonary embolism should be done based on clinical judgment and a shared decision-making model with the patient. **CITATION:** Bariteau A et al. Systematic review and meta-analysis of outcomes of patients with subsegmental pulmonary embolism with and without anticoagulation treatment. *Acad Emerg Med.* 2018 Mar 2. doi: 10.1111/acem.13399.

Dr. Chadha is an assistant professor in the division of hospital medicine at the University of Kentucky, Lexington.

By Rani Chikkanna, MD

3 Quality and safety of hospital care from the patient perspective

CLINICAL QUESTION: Can patient feedback support health services to measure and improve the quality and safety of patient care in the hospital?

BACKGROUND: Delivery of high-quality, safe care is key to earning the trust and confidence of patients. Patients can be a valuable asset in determining and evaluating the quality and safety of the care they receive. Collectively analyzing patient perceptions remains a challenge.

STUDY DESIGN: Multicenter, wait-list design, cluster-randomized controlled trial.

SETTING: Five National Health Service Trusts Hospital sites in the north of England.

SYNOPSIS: Data were collected via validated survey of inpatients; 1,155 patient incident reports were gathered from 579 patients. Patient volunteers were trained to group these reports into 14 categories. Next, clinical researchers and physicians independently reviewed all reports for presence of a patient safety incident (PSI) using a previously determined consensus definition.

One in 10 patients identified a PSI. There was variability in classifying incidents as PSIs in some categories. Of the concerns expressed by patients, 65% were not classified as PSI. Limitations included a focus on patient's concerns rather than safety, PSI estimates based on patient's feedback without clinical information, and lack of inter-rater reliability estimates.

BOTTOM LINE: Effective translation of patient experience can provide valuable insights about safety and quality of care in hospital.

CITATION: O'Hara JK et al. What can patients tell us about the quality and safety of hospital care? Findings from a UK multicentre survey study. *BMJ Qual Saf.* 2018 Mar 15. doi: 10.1136/bmjqs-2017-006974.



Dr. Chikkanna

4 Haloperidol and delirium in critically ill patients

CLINICAL QUESTION: Does prophylactic use of haloperidol increase survival in critically ill adults with high risk of delirium?

BACKGROUND: Delirium is common and associated with high mortality. Studies evaluating prophylactic use of haloperidol have been inconclusive.

STUDY DESIGN: Randomized, double-blind, placebo-controlled, multicenter, investigator-driven study.

Continued on following page

Continued from previous page

SETTING: ICUs at university hospitals and teaching and nonteaching hospitals in the Netherlands.

SYNOPSIS: 1,789 adults with mean age 66.6 years were randomized to receive either 1 or 2 mg of haloperidol or placebo. The 1-mg haloperidol group was prematurely stopped because of futility.

There was no difference in the primary outcome of survival days within a 28-day period between the 2-mg haloperidol group and the placebo group (hazard ratio, 1.003; 95% confidence interval, 0.78-1.30; $P = .93$).

Secondary outcome of survival was also the same at 90 days. No significant difference was seen in the delirium incidence, delirium- and coma-free days, and the delirium-related outcome measures.

Patients were already undergoing nonpharmacologic interventions for delirium prevention, and this likely attenuated the effects of haloperidol. The dose and duration of haloperidol used might have also been too low and short to have an effect on the outcomes considering the severity of patient illness.

BOTTOM LINE: Haloperidol has no role in prophylactic use to increase survival among critically ill patients with a high risk of delirium.

CITATION: van den Boogaard M et al. Effect of haloperidol on survival among critically ill adults with a high risk of delirium: The REDUCE randomized clinical trial. *JAMA*. 2018 Feb 20;319(7):680-90.

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By Hassan Hasanein, MD

5 Nonpharmacologic strategies for acute pain

CLINICAL QUESTION: Are nonpharmacologic pain interventions effective at reducing pain in adult patients visiting the emergency department?

BACKGROUND: Pain is a very common cause for emergency room visits. Nonpharmacologic pain management is not well studied for adult patients visiting the ED.

STUDY DESIGN: Systematic review and meta-analysis.

SETTING: Duke University, Durham, N.C.

SYNOPSIS: Among the studies considered, 56 met inclusion criteria for summary analysis. Multiple interventions were used, mostly acupuncture and physical therapy. Of the 56 studies, 23 reported significantly reduced pain, compared with

control; 24 showed no difference, compared with control; and 9 had no control group. Meta-analysis included 22 qualifying randomized, controlled trials and had a global standardized mean difference of -0.46 (95% confidence interval, -0.66 to -0.27) in favor of nonpharmacologic interventions for reducing pain.

BOTTOM LINE: Nonpharmacologic pain control approaches may be helpful for adult patients visiting the emergency room. Larger studies are needed to confirm efficacy.

CITATION: JT Sakamoto et al. Are nonpharmacologic pain interventions effective at reducing pain



Dr. Hasanein

in adult patients visiting the emergency department? A systematic review and meta analysis. *Acad Emerg Med*. 2018 Mar 15. doi: 10.1111/acem.13411.

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By Saurabh Parasramka, MD

6 Balanced crystalloid solution improves efficacy outcomes in critically sick adults

CLINICAL QUESTION: Does a balanced crystalloid solution lead to better outcomes than does normal saline when used in critically sick adults?

BACKGROUND: Balanced crystalloids are considered more physiological, with a composition closer to plasma. Observational studies have shown lower rates of hyperchloremic acidosis, renal failure, and death with use of balanced crystalloids. In spite of this, normal saline has been the most commonly used fluid. Differences in effects on important patient-related outcomes of safety and efficacy between these two interventions remain unknown.

STUDY DESIGN: Pragmatic, unblinded, cluster-randomized, multiple-crossover trial.

SETTING: Vanderbilt University Health Center, Nashville, Tenn.

SYNOPSIS: This study comprised 15,802 adults with mean age of 58 admitted to ICU who were cluster randomized to receive either balanced crystalloid or normal saline. Primary outcome was a composite of death from any cause, renal replacement therapy, or persistent renal dysfunction at 30 days and was observed

less frequently in the balanced crystalloid group (adjusted odds ratio, 0.90; 95% confidence interval, 0.82-0.99; $P = .04$).

Since the trial was cluster randomized, prognostic imbalance between the groups caused by confounding factors was a big risk. Results could not be generalized because the study was done in a university health center. Mean fluid amount received was modest in both groups. Questions still remain about the efficacy and safety of balanced fluids, and hospitalists should weigh their decisions in light of this new information.

BOTTOM LINE: Balanced crystalloid solution decreased 30-day composite outcome of death, renal replacement therapy, or persistent renal dysfunction.

CITATION: Semler MW et al. Balanced crystalloids versus saline in critically ill adults. *N Engl J Med*. 2018 Mar 1;378(9):829-39.

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By Mohsin Salih, MD

7 Hydrocortisone plus fludrocortisone for adults with septic shock

CLINICAL QUESTION: Does hydrocortisone plus fludrocortisone improve the clinical outcomes of patients with septic shock?

BACKGROUND: Septic shock is a serious and common health problem, associated with a more than 50% mortality rate. It is characterized by a dysregulated patient response to infection, resulting in life-threatening circulatory, cellular, and metabolic abnormalities. The benefit of corticosteroid use in septic shock is still controversial.

STUDY DESIGN: Double-blinded, randomized, placebo-controlled trial.

SETTING: The study was conducted in 34 centers in France.

SYNOPSIS: All 1,241 septic shock patients received usual care. Of these patients, 614 patients received hydrocortisone and fludrocortisone (HF), while 627 patients received placebo. HF patients had a lower rate of 90-day mortality (43.0% vs. 49.1%; $P = .03$), mortality at ICU discharge (35.4% vs. 41.0%; $P = .04$), mortality at hospital discharge (39.0% vs. 45.3%; $P = .02$), and mortality at day 180



Dr. Parasramka

Short Takes

Digoxin and mortality in atrial fibrillation

Using propensity score-matched controls, post hoc subgroup analysis of the ARISTOTLE trial showed an independent dose-dependent association between serum digoxin levels and mortality in those receiving digoxin, with a 19% higher adjusted hazard of death for each increase of 0.5 ng/mL ($P = .001$). For those initiating digoxin there was an independent association with higher mortality, regardless of heart failure (adjusted hazard ratio, 1.78; 95% confidence interval, 1.37-2.31; P less than .0001).

CITATION: Lopes RD et al. Digoxin and mortality in patients with atrial fibrillation. *J Am Coll Cardiol*. 2018 Mar 13;71(10):1063-74.

(46.6% vs. 52.5%; $P = .04$). There was no significant difference between mortality at day 28 (33.7% in the HF group versus 38.9% in the placebo group; $P = .06$), ventilator-free days (11 vs. 10 days; $P = .07$), and rate of serious adverse events (53.1% vs. 58.0%; $P = .08$). The number of vasopressor-free days to day 28 was significantly higher in the HF group (17 vs. 15 days; P less than .001), as were the number of organ failure-free days (14 vs. 12 days; $P = .003$). There was more hyperglycemia in the HF group (89.1% vs. 83.1%; $P = .002$).

BOTTOM LINE: Patients with septic shock who received hydrocortisone plus fludrocortisone have a lower rate of 90-day all-cause mortality, compared with placebo.

CITATION: Annane D et al. Hydrocortisone plus fludrocortisone for adults with septic shock. *N Engl J Med*. 2018 Mar 1. 378(9):809-18.

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By Anne E. Sayers MD, FHM

8 A new antiemetic

CLINICAL QUESTION: Can aromatherapy with isopropyl alcohol confer an adjunctive and lasting benefit as an antiemetic in ED patients who do not otherwise need IV access?

BACKGROUND: Prior studies have shown a benefit of aromatherapy with isopropyl alcohol for postoperative nausea and vomiting, and it is both widely available and safe. Only one randomized, controlled study exists documenting use of aromatherapy with isopropyl alcohol in the ED, but this monitored for effects for

ED opioid overdoses

Prior studies have shown a recent increase in opioid overdose-related deaths, and this analysis of 136 million ED visits in 45 states showed a continued upward trend from July 2016 to September 2017 with average increases of 5.6% per quarter in all regions and across all demographic groups, but this increase was especially pronounced in urban areas. The authors of this analysis called for the medical community to use these data to educate providers and organize resources for the rapidly evolving opioid epidemic.

CITATION: Vivolo-Kantor AM et al. Vital signs: Trends in emergency department visits for suspected opioid overdoses – United States, July 2016–September 2017. *MMWR Morb Mortal Wkly Rep.* 2018;67:279-85.

Routine oxygen therapy in patients with acute MI with normal oxygen saturation levels has no benefit

A large meta-analysis showed no decrease in all-cause mortality, recurrent ischemia, or myocardial infarction, heart failure, and arrhythmia from using routine oxygen therapy in patients with acute myocardial infarction with normal oxygen saturation levels. This meta-analysis confirmed prior studies and supported the changing trend in recommendations to avoid supplemental oxygen in patients with peripheral oxygen saturations greater than 90%.

CITATION: Abuzaid A et al. Oxygen therapy in patients with acute myocardial infarction: A systemic review and meta-analysis. *Am J Med.* 2018 Jun;131(6):693-701.

only 10 minutes and did not compare it with other antiemetic therapies used in the emergency department.

STUDY DESIGN: Randomized, double-blinded, placebo-controlled trial.

SETTING: Single urban tertiary care center emergency department.

SYNOPSIS: The study separated 120 patients with nausea who did not otherwise need intravenous access into three treatment groups. They were assessed for improvement in nausea using a visual analog scale 30 minutes after administration of either oral ondansetron 4 mg and inhaled isopropyl alcohol, oral placebo and inhaled isopropyl alcohol, or oral ondansetron and inhaled saline. The mean decrease in nausea visual analog scale score was 30 mm (95%

confidence interval, 22-37 mm), 32 mm (95% CI, 25-39 mm), and 9 mm (95% CI, 5-14 mm), respectively. The need for rescue antiemetics was 27.5%, 25%, and 45%, respectively. This study is limited by its small size, its relatively healthy population with a predominant diagnosis of gastroenteritis, and that patients who required IV catheters were excluded; therefore, it may not be generalizable to sicker patients with alternative etiologies for nausea. Furthermore, many patients were able to distinguish isopropyl alcohol from placebo inhalant by smell so the blinding was possibly ineffective. However, since isopropyl alcohol is low risk, inexpensive, and readily available, it may be reasonable to



Dr. Sayers

consider this as a therapeutic option for some patients.

BOTTOM LINE: In ED patients who did not otherwise need intravenous access, aromatherapy with inhaled isopropyl

alcohol alone or with ondansetron was superior for nausea relief when compared with ondansetron alone.

CITATION: April MD et al. Aromatherapy versus oral ondansetron for antiemetic therapy among adult emergency department patients: A randomized controlled trial. *Ann Emerg Med.* 2018 Feb 17. doi: 10.1016/j.annemergmed.2018.01.016.

Dr. Sayers is an assistant professor in the division of hospital medicine at the University of Kentucky, Lexington.

By Janeesh Veedu, MD

Factor Xa inhibitors versus vitamin K antagonists for preventing embolism in AF patients

CLINICAL QUESTION: Do factor Xa inhibitors reduce the incidence of strokes and systemic embolic events, compared with warfarin, in people with atrial fibrillation?

BACKGROUND: Factor Xa inhibitors, called DOACs or direct-acting anticoagulants, and vitamin K antagonists (VKAs) are part of treatment guidelines for preventing stroke and systemic embolic events in people with atrial fibrillation (AF). This study assessed the effectiveness and safety of treatment with factor Xa inhibitors versus VKAs for preventing cerebral or systemic embolic events in AF.

STUDY DESIGN: Cochrane Review update.

SETTING: Data obtained from trial

registers of the Cochrane Central Register of Controlled Trials (August 2017), the Cochrane Heart Group and the Cochrane Stroke Group (September 2016), Embase (1980 to April 2017), and MEDLINE (1950 to April 2017). Authors also screened reference lists and contacted pharmaceutical companies, authors, and sponsors of relevant published trials.

SYNOPSIS: The study included 42,084 participants from 10 trials with a diagnosis of AF who were eligible for long-term anticoagulation with warfarin (target INR 2-3).

The trials directly compared dose-adjusted warfarin with factor Xa inhibitors. Median follow-up ranged from 12 weeks to 1.9 years, and composite primary endpoint was all strokes (both ischemic and hemorrhagic) and non-central nervous system embolic events. Factor Xa inhibitor significantly decreased the number of strokes and systemic embolic events, compared with dose-adjusted warfarin (odds ratio, 0.81; 95% confidence interval, 0.72-0.91), reduced the number of major bleeding events (OR, 0.92; 95% CI, 0.63-1.34), and significantly reduced the risk of intracranial hemorrhage (OR, 0.56; 95% CI, 0.45-0.70).

They also significantly reduced the number of all-cause deaths (OR, 0.88; 95% CI, 0.81-0.97). One limitation of this study is the heterogeneity and hence lower quality of evidence.

This study shows a small net clinical benefit of using factor Xa inhibitors in AF because of a reduction in strokes and systemic embolic events and also a lower risk of bleeding (including intracranial hemorrhages), compared with using warfarin.

BOTTOM LINE: Patients with AF have a lower incidence of strokes and systemic embolic events when treated with factor Xa inhibitors, compared with those treated with warfarin.

CITATION: Bruins Slot KM et al. Factor Xa inhibitors versus vitamin K antagonists for preventing cerebral or systemic embolism in patients with atrial fibrillation. *Cochrane Database Syst Rev.* 2018 Mar 6. doi: 10.1002/14651858.CD008980.pub3.

Dr. Veedu is a hospitalist and instructor in the division of hospital medicine at the University of Kentucky, Lexington.



Dr. Veedu

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Key Clinical Question

Does supplemental oxygen help COPD patients who have chronic stable moderate hypoxemia?

New study a departure from previous research

By Poonam Sharma, MD, FHM; Suchita Shah Sata, MD; Adam Wachter, MD; and Faye Farber, MD

Duke University Health System, Durham, N.C.

Clinical Case

An 85-year-old man with long-standing chronic obstructive pulmonary disease (COPD) has a witnessed aspiration event while undergoing an outpatient procedure requiring conscious sedation. He is admitted to the hospital for observation overnight. The next morning, he feels well, but his oxygen saturation dips to 85% with ambulation. He reports this is not new for him, but he vehemently does not want supplemental oxygen.



PHOTO: GETTY IMAGES/THINKSTOCK

Background

Patients with COPD and severe resting hypoxemia – arterial oxygen partial pressure less than or equal to 55 mm Hg or peripheral capillary oxygen saturation (SpO₂) less than or equal to 88% – commonly are prescribed supplemental oxygen. The evidence supporting this practice is limited to two small trials from the 1970s that showed a survival benefit of long-term oxygen therapy (LTOT) in this population,^{1,2} but these trials may not be generalizable to patients today.

For patients with COPD and mild to moderate resting hypoxemia (SpO₂, 89%-93%) or patients with exercise-in-

duced hypoxemia, LTOT has not been shown to improve survival, although it may improve symptoms of dyspnea, exercise tolerance, and other patient-reported outcomes. Given the costs, risks, and burdens associated with LTOT, a high-quality clinical trial assessing the effects of LTOT on clinically meaningful outcomes, such as survival or hospitalization, in patients with COPD and moderate hypoxemia has been long overdue.

Overview of the data

The utility of long-term treatment with supplemental oxygen in patients with stable COPD and moderate resting or exercise-induced desaturation was examined by the Long-Term Oxygen Treatment Trial (LOTT) Research Group. Results were published in the New England Journal of Medicine in October 2016 in the article, “A randomized trial of long-term oxygen for COPD with moderate desaturation.”³

The study was initially designed to test whether the use of supplemental oxygen would lead to longer time until death as compared with no supplemental oxygen in the subgroup of COPD patients with stable disease and moderate resting desaturation (defined as resting SpO₂ of 89%-93%). However, because of an enrollment of only 34 patients after 7 months, the trial was redesigned to include exercise-induced desat-

uration (defined as SpO₂ of greater than or equal to 80% for at least 5 minutes, and less than 90% for at least 10 seconds, on a 6-minute walk test) and the secondary outcome of all-cause hospitalization. Hospitalization for any cause was combined with mortality into a new composite primary outcome.

This study was a randomized, controlled trial which enrolled patients at a total of 14 regional clinical centers and their associated sites for a total of 42 centers in the United States.

The experimental arm consisted of a long-term supplemental oxygen group, and the control group did not receive long-term supplemental oxygen.

Patients were assigned to groups in a 1:1 ratio, and the study was not blinded. Patients with moderate resting desaturation were prescribed 24-hour oxygen at 2 L/min, and patients with moderate exercise-induced desaturation were prescribed oxygen at 2 L/min during exercise and sleep only. The primary outcome was a composite outcome of time until death or time until first hospitalization for any cause. There were multiple secondary outcomes, including incidence of COPD exacerbation, incidence of severe resting desaturation and severe exercise-induced desaturation, quality of life, sleep quality, depression and anxiety, adherence to regimen, 6-minute walk distance, spirometric measurements, risk of cardiovascular disease, and neurocognitive function.

Data were gathered via yearly visits, biannual telephone interviews, and questionnaires mailed at 4 months and 16 months. Adherence was assessed by inquiring about oxy-

gen use every 4 months. If patients in the supplemental oxygen group used stationary oxygen concentrators, logs of meter readings were kept as well. The necessary final sample size was calculated using a time to composite-event survival model with the use of the log-rank test statistic.

A total of 738 patients were enrolled in the trial between January 2009 and September 2015 and were followed for 1-6 years. A total of 97% of participants had at least 1 year of follow-up. Out of the 738

randomized patients, 133 (18%) had only resting desaturations, 319 (43%) had only exercise-induced desaturations, and 286 (39%) had both resting and exercise-induced desaturations. Baseline characteristics including age, sex, race, smoking status, quality of life scores, resting SpO₂, and nadir SpO₂ during the 6-minute walk test were similar

between the two groups. The only significant difference noted by the authors between the two groups was a lower BODE (body mass index, airflow obstruction, dyspnea, and exercise) index, which was lower in the group with no supplemental oxygen.

In the time-to-event analysis, there was no significant difference between the two groups in the time to death or first hospitalization (hazard ratio, 0.94; 95% confidence interval, 0.79-1.12; *P* = .52). There were no significant differences in the rates of all hospitalizations (rate ratio, 1.01; 95% CI, 0.91-1.13), COPD exacerbations (RR, 1.08; 95% CI, 0.98-1.19), and COPD-related hospitalizations (RR, 0.99; 95% CI, 0.83-1.17). There were also no differences between the experimental and control groups



Dr. Sharma



Dr. Sata



Dr. Wachter



Dr. Farber

Key Points



- Long-term oxygen therapy (LTOT) is beneficial in patients with COPD and severe resting hypoxemia (arterial oxygen partial pressure \leq 55 mm Hg or SpO₂ \leq 88%) and should be prescribed to improve survival in this population.
- Patients with COPD and mild to moderate resting hypoxemia or exercise-induced hypoxemia should not be routinely prescribed LTOT given the associated costs, risks, and burdens and the lack of evidence of benefit.

in quality of life, lung function, and 6-minute walk distance. There were no significant differences in the subgroups classified by desaturation profile, sex, race, nadir SpO₂ during the 6-minute walk test, and forced expiratory volume in 1 second.

The findings in this study show that, in the subgroup of chronic obstructive pulmonary disease patients with stable COPD and moderate resting or exercise-induced desaturation, supplemental oxygen did not affect the time to death or first hospitalization, time to death, time to first hospitalization, time to first COPD exacerbation, time to first hospitalization for a COPD exacerbation, rate of all hospitalizations, rate of all COPD exacerbations, or changes in metrics surrounding quality of life, anxiety/depression, or functional status. This supports earlier studies that demonstrated that long-term treatment with oxygen does not result in longer survival than does no long-term treatment with oxygen in patients with COPD and resting SpO₂ of more than 88%.

The results of this study are a departure from previous studies that had shown improved mortality in patients with COPD and severe desaturation who were treated with LTOT. The authors hypothesized that this may have been caused by physiological effects of oxygen saturation on pulmonary vasoconstriction, release of mediators, and ventilator drive, which occur at an O₂ saturation of 88% or less and may be more significant in patients with chronic hypoxemia. This trial also contrasted previous studies that had shown that oxygen therapy may reduce

Additional Reading



- Stoller JK et al. Oxygen therapy for patients with COPD: Current evidence and the Long-term Oxygen Treatment Trial. *Chest*. 2010 July;138:179-87.
- Qaseem A et al. Diagnosis and management of stable chronic obstructive pulmonary disease: A clinical practice guideline update from the American College of Physicians, American College of Chest Physicians, American Thoracic Society, and European Respiratory Society. *Ann Intern Med*. 2011 Aug 2;155(3):179-91.
- Ameer F et al. Ambulatory oxygen for people with chronic obstructive pulmonary disease who are not hypoxaemic at rest. *Cochrane Database Syst Rev*. 2014 Jun 24;(6):CD000238.
- Vestbo J et al. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: GOLD executive summary. *Am J Respir Crit Care Med*. 2013 Feb 15;187(4):347-65.

dyspnea in COPD patients with mild or no hypoxia because the LTOT trial showed no improvement in quality of life, anxiety, and depression measures in patients treated with long-term oxygen as compared with those treated with no oxygen.

Some limitations of the study included the absence of highly symptomatic patients or patients who the providers believed were too ill to participate, the effect of the unblinded nature of the study on outcomes

Continued on following page

Quiz



Does this patient need oxygen?

You are caring for a 72-year-old man with stable COPD who was admitted for cellulitis. He is improving clinically on appropriate antibiotics, and he has been stable on room air every time you examine him. The nurse pages you on the day of discharge – a Sunday – informing you that his oxygen saturation dropped to 88% while he was walking the halls this morning. She asks whether he needs to stay in the hospital so you can arrange home supplemental oxygen therapy. What should you do?

- A. Keep him in the hospital until you can arrange home oxygen therapy.
- B. Discharge him home Sunday but have the oxygen company go out to his house first thing on Monday.
- C. Discharge him home without supplemental oxygen therapy.
- D. Check an arterial blood gas to help decide if you should set up oxygen therapy.

The answer is C. He meets the description of stable COPD with mild to moderate exercise-induced desaturation. The LTOT trial supports our clinical decision that he would not benefit from supplemental oxygen therapy at this point.

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Continued from previous page

that were patient reported, the lack of assessment of immediate effects of oxygen on exercise performance or symptoms, possible variability in amount of oxygen delivered, and the fact that patients may have overestimated their oxygen use.

In patients with stable COPD and moderate resting or exercise-induced desaturation, long-term supplemental oxygen did not provide any benefit in regard to time until death or first hospitalization or any of the other measured outcomes.

Application of data to the case

Our patient has stable COPD and had only moderate exercise-induced desaturation. Long-term supplemental oxygen would not produce a benefit for him.

This study shows us that it would not increase his survival at this point; however, if he were to have worsening exercise-induced or new resting desaturation at some point in the future, supplemental oxygen would then be beneficial. At this point supplemental oxygen would not even affect his rate of hospitalization for COPD- or non-COPD-related reasons. Perhaps most importantly, adding oxygen therapy

would not affect his overall quality of life, including his functional status and mood.

Bottom line

The addition of supplemental oxygen is not helpful for patients with COPD who have chronic stable moderate hypoxia.

Dr. Sharma is associate medical director for clinical education in hospital medicine at Duke Regional Hospital and an assistant professor of medicine at Duke University. Dr. Sata is a medical instructor in the Duke University Hospital. Dr. Wachter is an assistant professor of medicine at Duke University. Dr. Farber is a medical instructor in the Duke University Health System in Durham, N.C.

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1. Nocturnal Oxygen Therapy Trial Group. Continuous or nocturnal oxygen therapy in hypoxemic chronic obstructive lung disease: A clinical trial. *Ann Intern Med.* 1980 Sep;93(3):391-8.
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3. Long-term oxygen treatment trial research group et al. A randomized trial of long-term oxygen for COPD with moderate desaturation. *N Engl J Med.* 2016 Oct 27;375(17):1617-27.

In-hospital mortality predictors for pneumonia patients

BY Doug Brunk

MDedge News

AT ATS 2018 / SAN DIEGO /

About one in four intubated or mechanically ventilated patients with gram-negative pneumonia die during hospitalization, results from a large retrospective cohort study found.

In a poster abstract presented at an international conference of the American Thoracic Society, researchers led by Thomas P. Lodise Jr., PharmD, noted that ventilator-associated pneumonia is one of the most common hospital-acquired infections in intensive care units and affected an estimated 9%-27% of all intubated patients. "While data are readily available surrounding mortality associated with VAP, scant data are available on outcomes associated with any type of pneumonia requiring intubation and mechanical ventilation (MV) caused by gram-negative organisms," they wrote.

In an effort to describe mortality rates and associated risk factors for intubated and MV patients diagnosed with gram-negative pneumonia, Dr. Lodise of the Albany (N.Y.) College of Pharmacy and Health Sciences and his associates conducted a retrospective cohort study of data from the Healthcare Cost and Utilization Project (HCUP) National Readmission Database (NRD). HCUP is the largest source of hospital care data in the United States, accounting for 49.3% of the total U.S. resident population and 49.1% of U.S. hospitalizations. The researchers included patients at least 18 years of age who were hospitalized with a primary or secondary diagnosis of gram-negative pneumonia between Feb. 1, 2013, and Nov. 30, 2013. They excluded index hospitalizations with a primary or secondary diagnosis of viral pneumonia, fungal pneumonia, atypical organisms, gram-positive bacterial pneumonia, or pneumonia occurring secondary to an infectious disease. They examined mortality rates descriptively and modeled them via adjusted multivariate logistic regression to evaluate the impact of baseline characteristics and comorbidities on risk of mortality. All anal-

yses incorporated sample weights to increase generalizability and allow for extrapolation to the entire U.S. population.

A total of 32,683 patients met all study criteria. Of these, 2,323 (7.1%) had a primary diagnosis and 30,360 (92.9%) had a secondary diagnosis for gram-negative pneumonia. Their mean age was 64 years, and 61.1% were male. In all, 7,928 patients (24.3%) died during hospitalization. Multivariate analysis revealed that patients with concomitant sepsis had the highest risk of mortality (odds ratio, 2.60), followed by patients aged 65 years and older (OR,

Ventilator-associated pneumonia is one of the most common hospital-acquired infections in intensive care units.

1.88) and those with any prior hospitalization within 30 days (OR, 1.34). Comorbidities upon admission with highest risk of mortality included cancer (OR, 2.45), liver disease (OR, 1.91), AIDS/HIV (OR, 1.59), renal disease (OR, 1.33), and congestive heart failure (OR, 1.15). Diabetes was found to have a decreased risk of mortality, with an OR of 0.80. "However, a majority of patients with diabetes had no complications; thus, these patients may be representative of a less severe patient population," Dr. Lodise and his associates noted in the poster.

They acknowledged certain limitations of the study, including the potential for coding errors. They also pointed out the HCUP NRD does not contain treatment-specific information, drugs administered or treatment patterns during hospitalization, the number of days patients spent in the ICU, or the number of days on ventilation, "which can influence outcomes in pneumonia patients." In addition, the study did not attempt to determine cause of death. "Death may have been due to combinations of factors separate from pneumonia," they wrote.

Bayer Healthcare Pharmaceuticals funded the study. Dr. Lodise reported having no financial disclosures.



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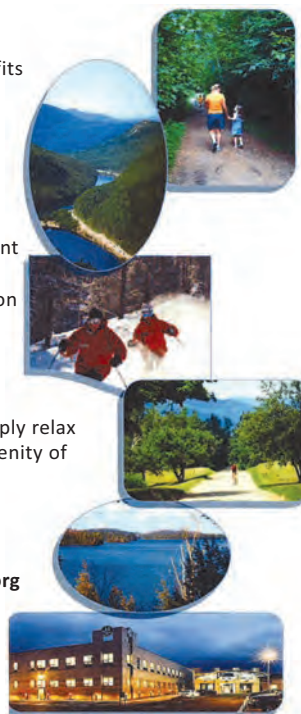
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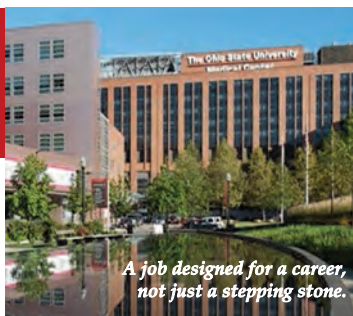


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The rapidly disappearing community pediatric inpatient unit

By Weijen Chang, MD, FACP, SFHM

Greed kills babies. Children's lives matter. Children over profit. These were the slogans proclaimed by signs carried by protesters outside of MedStar Franklin Square Medical Center in Baltimore in early May of 2018 to protest the closure of the dedicated pediatric emergency department and inpatient pediatric unit.

But administrators at Franklin Square Medical Center had made their decision long before the glue had dried on the signs. Eight doctors and 30 other staff had already lost their jobs, including the chair of pediatrics, Scott Krugman, MD.¹

And this was just another drop in a slow ooze of pediatric inpatient units based in community hospitals that have seen the ax fall on what was thought to be a vital medical resource for their communities – yet not vital enough to survive its lack of profitability. Pediatric inpatient units in community hospitals have failed to even flirt with breaking even, let alone show profitability. Many of these units are saddled with rock-bottom reimbursements offered by state Medicaid programs, the overwhelmingly prevalent payer for pediatric hospitalizations, which is compounded by the seasonality and unpredictability of pediatric inpatient volumes.

What does this mean for pediatric health in underserved and rural communities? The closure of the pediatric inpatient unit at MedStar Franklin Square Medical Center meant the loss of physicians and nurses staffing the child protection team helping the local district attorney in child abuse cases. Sometimes described as “secondary care,” community pediatric hospitalists also serve as a link between primary care providers and tertiary care subspecialists; they can serve as pediatric generalists throughout a hospital and provide newborn nursery care, delivery room resuscitations, ED consultations, procedural sedations, psychiatric unit support, surgical co-management, and informal or formal outpatient consultations.² Losing even a small inpatient pediatric unit can have a ripple effect on inpatient and outpatient pediatric services in a health system and community.

For patients and their caregivers, the loss of pediatric inpatient services in their community hospital can erect additional hurdles to appropriate health care. The need to travel longer distances can be challenging.³ For patients suffering from longer hospitalizations caused by medical complexity or chronic illnesses, traveling long distances can exacerbate the caregiver stress from attempting to care for a family at home while participating in the care of a hospitalized child. Longer travel times can also worsen family stress by increasing a caregiver's absence from home and increased nonmedical expenses and loss of wages.⁴ Comfort levels with inpatient providers can also suffer because most pediatric units in community hospitals are staffed by either community general pediatricians or very small pediatric hospitalist groups, which breeds familiarity with frequently admitted patients and their caregivers.

“Goals valued by hospital administrators are pursued on a daily basis by community pediatric hospitalists.”

ers. This familiarity can be lacking in large academic centers.⁵

What is driving pediatric inpatient unit closures? On a macroeconomic scale, pediatric hospitalizations have been dropping yearly, driven down by immunizations, antibiotic stewardship, and improved access to outpatient care. In 2006, there were 6.6 million hospitalizations for children aged 17 years and younger,⁶ but by 2012 this had dropped to 5.9 million hospitalizations.⁷ In the same age group, the rate of hospitalization from the ED dropped from 4.4% in 2006 to 3.2% in 2015.⁸

On a hospital level, the presence of multiple small pediatric units in a region may not make sense from a cost standpoint, and a larger, merged unit may provide higher quality because of its higher volumes. On a state and local level, alternative payment models have been implemented with the best of intentions but have led administrators at community general hospitals to look at pediatric units as the lowest-hanging money-losing fruit in

their efforts to survive a brave new world of hospital payment.

The most extreme model is in Maryland: Since 2014, acute care hospitals have been able to receive only a fixed amount of revenue from all payers, including Medicare, Medicaid, and commercial insurers.⁹ Known as an all-payer global budget, it incentivizes lowering unnecessary costs of care, such as readmissions, but also encourages cauterization of cost centers hemorrhaging money – such as inpatient pediatrics. Even the venerable Johns Hopkins Children's Center has seen its profitability pale in comparison to Johns Hopkins All Children's Hospital in St. Petersburg, Fla., which is the second most-profitable hospital in the Hopkins system, edged out only by Sibley Memorial Hospital – which also sports an out-of-state location in the District of Columbia.¹⁰

But all hope is not lost for your local pediatric inpatient unit. In regions where a more favorable (to hospitals) payer mix exists, large pediatric hospitals are still engaged in turf battles with local competitors to grab market share. In these regions, community pediatric units have survived by partnering with large pediatric institutions, either through affiliations or wholesale transplantation of the larger pediatric institution's providers, nurses, and EHRs into essentially what is a leased floor. In addition, large pediatric institutions that participate in capitated models such as accountable care organizations have paradoxically found it financially favorable to direct “bread-and-butter” pediatric hospitalizations to community pediatric units, which often provide the same care at a lower cost.

Utilizing community inpatient pediatric units was “initially a means of expanding their market share and ‘downstream’ revenue from transfers, but more commonly now [is] a way of alleviating the costs associated with admitting low to moderate acuity patients to the main tertiary sites,” said Francisco Alvarez, MD, associate chief of Regional Pediatric Hospital Medicine Programs at Lucile Packard Children's Hospital in Palo Alto, Calif. “The cost of care provided by pediatric hospitals has always been higher than the average cost for nonpediatric hospitals in regard to caring for pediatric patients due to their highly skilled specialties and services. These



Dr. Chang is a pediatric hospitalist at Baystate Children's Hospital in Springfield, Mass., and is the pediatric editor of The Hospitalist.

have become more scrutinized by private and government insurance plans and, in some cases, have led to lower reimbursements and a lower or deficient net revenue for certain patient populations.”

For community pediatric hospitalists, the shifting sands of reimbursement on which pediatric inpatient care is built can be a motion illness-inducing experience. In addition to concerns over community health care, job security, and population health, care provided in community hospitals can often be subtly undercut by tertiary and quaternary care pediatric hospitals.

“The focus of pediatric residency programs in freestanding children's hospitals has created a situation where new pediatricians have less opportunity to develop respect for community pediatric hospital medicine,” said Beth Natt, MD, director of pediatric hospital medicine in the Regional Programs at Connecticut Children's Medical Center, Hartford. “We are the nameless ‘OSH,’ the place that gets ‘Monday-morning quarterbacked’ in resident morning reports without having a voice at the table. Add this to residents learning ‘only’ protocolized care as opposed to a spectrum of appropriate care, and we create a culture of ‘wrong and right’ with the backward nonprotocol-driven community docs looking like they are practicing medicine in the Wild West.”

What's a community pediatric hospitalist to do, faced with an uncertain future and diminishing

Continued on following page

SHM: My home as a pediatric hospitalist

By Kris Rehm, MD, SFHM

As I began my career in pediatric hospital medicine at the Monroe Carell Jr. Children's Hospital at Vanderbilt in Nashville, Tenn., I knew that I wanted a way to continue my education and to network with other hospitalists with interests in academics and pediatrics.

In 2010, I decided to attend a pre-course to the Society of Hospital Medicine's annual conference that focused on academic hospital medicine, and my career has never been the same! I am thrilled to say I have found my professional home in SHM.

Here's a quick list of the reasons SHM has been such a warm, welcoming home for me. I've highlighted the few options that stood out to me, but rest assured there is so much more from which to choose:

- Leadership opportunities in our Pediatrics Special Interest Group.
- Representation on the Annual Conference Committee to select pediatric-specific content as well as workshops on leadership, education, patient experience, and quality improvement.
- The Academic Hospitalist Academy, first as a pre-course before the SHM annual conference, and now as its own amazing meeting for academic pediatric hospital medicine providers.
- SHM's Leadership Academy, a wonderful opportunity to learn leadership skills and network with other leaders. This year, it is in Vancouver!
- Participation in quality improvement initiatives like Pedi-BOOST, a care transitions program that specializes in pediatric patients.

- Travel to Abu Dhabi and the Middle East Update in Hospital Medicine this March – being able to spread the latest trends in hospital medicine in the USA is one of the best experiences I have had with SHM!

Another reason SHM truly made me feel welcomed was the opportunity to attend the Pediatric Hospital Medicine (PHM) meeting. Each July, SHM helps to put on the largest gathering of pediatric hospital medicine providers. This year, it will be held in Atlanta from July 19 to 22.

This meeting is organized and supported by SHM, the American Academy of Pediatrics (AAP), and the Academic Pediatric Association (APA), and offers spectacular content in many tracks, including quality improvement, education, research, and the incredibly popular "Top Articles" presentation at lunch on Saturday. This session provides teaching materials that can span the year for Journal Clubs and resident and student education. The abstracts and poster sessions are top-notch and provide an opportunity for young and experienced providers to share their work.

The fourth annual Knowledge Café will be a highlight for me as well, as it allows collaboration and networking experiences in hot topics for early career hospitalists. How to strive for work/life balance, how to get the most out of your first meeting, and techniques for talking with your boss about difficult issues are some of the topics we plan to cover this year.

On top of this, networking and participation on various committees and work groups afforded me the opportunity to join the SHM Board of Directors in May of 2017. Having com-

pleted my first year on the Board, I have an even deeper appreciation for the progressive thinking of our leadership team and the amazing work that the staff of SHM does behind the scenes to help us maximize our memberships. I love the continuous process improvement that is happening with every Board meeting.

As a member of the Board, it's important to keep tabs on the pulse of SHM members and their evolving needs. One way I have really enjoyed getting to learn about our membership is by attending local chapter meetings. I recently traveled to West Virginia and Connecticut, both of which have active, engaged chapters working to improve care in their local communities – it was so inspiring to have the opportunity to represent the organization, and I look forward to more meetings just like this. For our local chapter in Nashville, I have the honor of picking the venue for our meetings, which keeps me on my toes as I look for the latest hot spots in an incredibly happening city!

Last summer, the benefits of membership in SHM and my career choice of hospital medicine took on a whole new meaning. In July, just before PHM 2017, a meeting that I was lucky enough to chair, my husband started to feel the pain of a recurrent kidney stone as he was traveling with our four sons and their three friends. Can you imagine being on an airplane with seven elementary school-age boys when the worst pain EVER strikes?

I was home in Nashville thinking, "Who can I call to help him in Minneapolis?" My first thought was of fellow members of SHM with whom I've developed friendships over the



Dr. Rehm is associate professor, pediatrics, and director, division of pediatric outreach medicine at Vanderbilt University and Monroe Carell Jr. Children's Hospital at Vanderbilt, both in Nashville, Tenn. She is also a member of the SHM board of directors.

years – other hospitalists like you and me. Many people came to mind, all of whom practice hospital medicine! A huge thank-you to our friend Shaun Frost, MD, SFHM, FACP, who rescued my husband, drove him to a local ED, AND took the seven boys out for lunch. I truly have never been so grateful!

My task for you is simple: Engage with the Society of Hospital Medicine! Come to a meeting, join a special interest group, connect with your local chapter, and make friends who can support you through your career – and, as evidenced by my husband's experience – even in your personal life. It's truly a special organization, and I can't wait to share some experiences just like these with you.

Continued from previous page

respect? Continuing to partner with local pediatric providers, community leaders, and local health care advocacy groups will help to enmesh inpatient providers in the fabric of a community's health care. But making the value case to hospital administrators is critical for community pediatric hospitalists, as adult hospitalists realized soon after the inception of the hospitalist field.

Goals valued by hospital administrators are pursued on a daily basis by community pediatric hospitalists, and these successes need to be brought to light. Achieving value and quality metrics, pursuing high-value care, reducing readmis-

sion rates, championing EHRs, and improving documentation are goals that community pediatric hospitalists and hospital administrators can work toward together.¹¹

"What are we going to do to take care of kids in their own communities?" Dr. Krugman asked. "It's going to be an increasing challenge over the next decade due to the consolidation of children's hospitals and low payments, especially for hospitals that are adult focused. Unless we find a way to pay for pediatric care as a country."

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