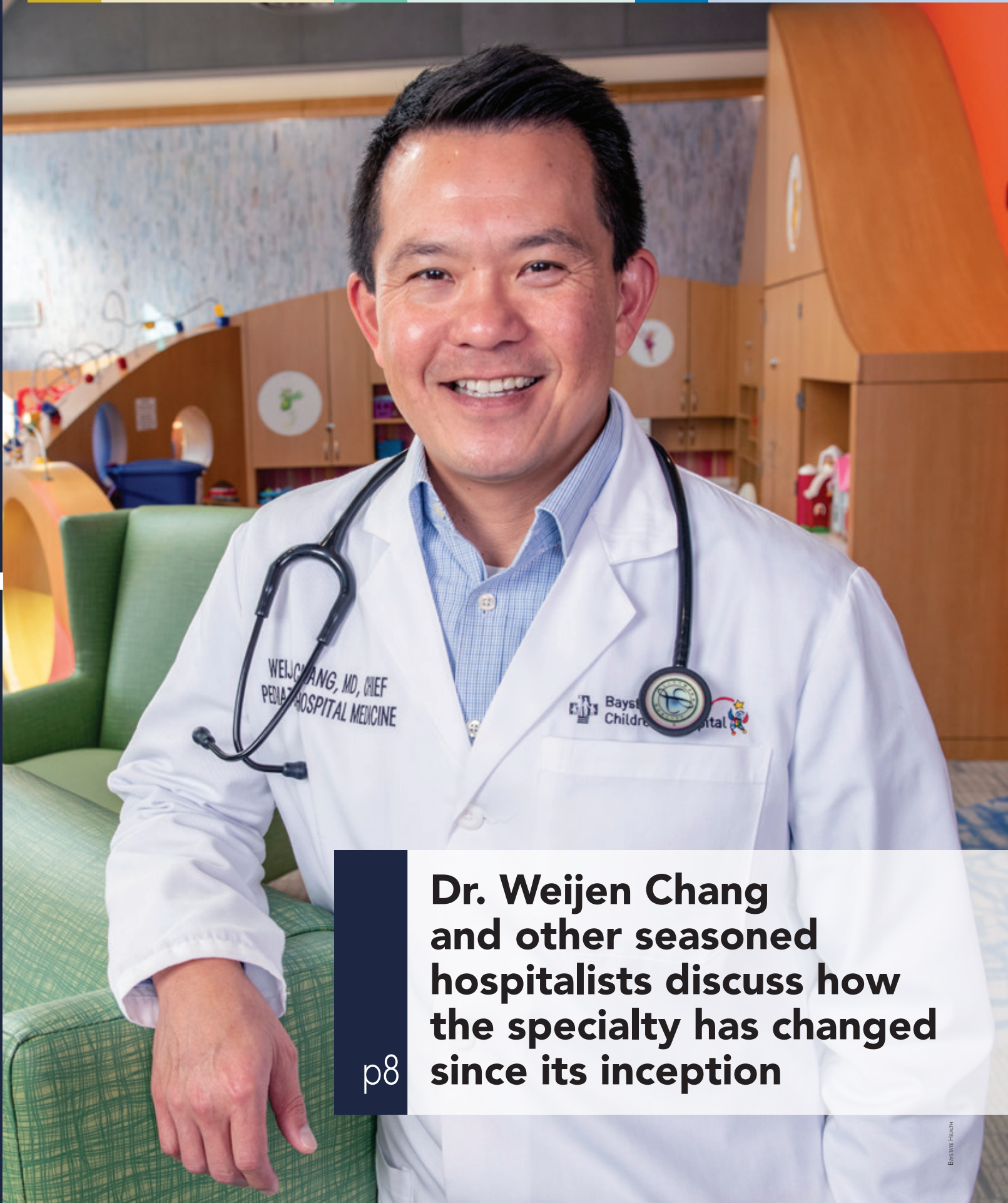


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Come on In (Patient)!

By **Jeremy Gentile, DO, FACP, FHM**



A 38-year-old woman with a history of recurrent urinary tract infections (UTIs) is admitted to the emergency department-run observation unit at a local community hospital for a severe UTI and is started on ceftriaxone. She continues to have fevers associated with nausea and occasional vomiting 24 hours into her observation stay. A CT scan of her abdomen and pelvis demonstrates pyelonephritis. Urine culture is positive for *Escherichia coli*. The observation physician calls the inpatient physician to discuss the case, as she feels uncomfortable discharging the patient home. She has concerns about antibiotic resistance given the patient's ongoing fevers and her history of recurrent UTIs treated with numerous antibiotics, as well as concerns regarding adherence to oral antibiotics given her ongoing issues with vomiting. As the inpatient hospitalist physician, you evaluate the patient's chart, review her labs, look at her CT imaging and ECG yourself, and after a discussion of the expected patient course, decide that admission is appropriate. When you see the patient, she has a temperature of 38.4° C and occasional rigors. You are concerned about ongoing infection and possible bacteremia, so you place an admission order and perform the admission history and physical.

What level of billing does this qualify for?

This would qualify as a level 3 admission (99223). This patient has a severe, complicated UTI which is acutely life-threatening given her ongoing fevers, rigors, and vomiting. This could be documented as a concern for bacteremia or as an inability to tolerate sufficient oral intake. Both would represent acutely life-threatening complications of her condition regardless of the presence of other complications that may be present (acute kidney injury, electrolyte distur-

bances, liver injury, etc.). Thus, with sufficient documentation, this would count as high complexity under "number and complexity of problems addressed." Deciding to admit the patient (having at least a substantial contribution to the discussion or having final decision-making ability) can be documented and counted as a high risk under "risk of complications and/or morbidity or mortality of patient management." This is possible because patients in observation are considered outpatients and not actually admitted. This same decision could also be documented for patients being admitted from any outpatient space, including the catheterization lab, endoscopy suite, or emergency department.

Tip

Patients with an acutely decompensated chronic medical condition or acute threat to life will often meet the criteria for level-3, initial, inpatient billing (99223) if you document the discussion and the decision to admit the patient inpatient. The documentation of this discussion should be sufficiently robust to determine that you were the final decision maker, why the patient is being admitted, and what clinical criteria you are using to make that determination. ■

Dr. Gentile is an internal medicine hospitalist, section chief for acute care medicine, and associate program director for internal medicine at Corewell Health Western Michigan, and an assistant professor in the department of medicine at Michigan State University College of Human Medicine, all in Grand Rapids, Mich.

From JHM

The *Journal of Hospital Medicine* Editor's Pick this month is *The Promise and Peril of Generative Artificial Intelligence for Daily Hospitalist Practice*, by Adam Rodman, MD, MPH and Zahir Kanjee, MD, MPH.

In this article, the authors review early potential uses for large language model artificial intelligence for the care of hospitalized patients and the possible issues to consider before hospitalists include this technology in their clinical care.

Scan the QR code to read the full article. ■



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Hospitalists are charged with treating individuals at their most vulnerable moments, when being respected as a whole person is crucial to advancing patients' healing and wellness. Within our workforce, diversity is a strength in all its forms, which helps us learn about the human experience, grow as leaders, and ultimately create a respectful environment for all regardless of age, race, religion, national origin, gender identity, sexual orientation, socioeconomic status, appearance, or ability. To this end, the Society of Hospital Medicine will work to eliminate health disparities for our patients and foster inclusive and equitable cultures across our care teams and institutions with the goal of moving medicine and humanity forward.

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Hospital Medicine Now and in the Future: Ad Astra Per Aspera

By Eric E. Howell, MD, MHM

Ad Astra Per Aspera is an ancient Latin motto used by numerous organizations and often quoted in works of art, including television. In fact, TV is where I was reacquainted with it just this year, but more on that later. The literal translation is “to the stars through difficulty”, but it’s an inspirational motto, and I prefer my own slightly broader interpretation of “reaching the stars is hard.”

To me, this motto perfectly sums up what it means to be a hospitalist today, and what it will mean for us in the future: getting where we are today was through hard work, and continuing to reach for those even brighter stars will take effort in the future. My professional path as a hospitalist was not always easy, but it was worth it. Ad Astra Per Aspera.

Hospital medicine has reached the stars, by any measure

Measured by sheer numbers alone, hospitalists have reached the stars; we have grown into one of the largest specialties. SHM members and staff evaluated Medicare data and published in the *Journal of Hospital Medicine* that there were 44,000 adult hospitalists in 2019.¹ SHM reevaluated the Medicare data from 2021 (the most recent data available) and found the number of adult hospitalists had grown by 4,000 in those two years, to 48,000! For context, that number is about as large as or larger than emergency medicine (49,000), OB/GYN (43,500), and anesthesia (43,000), when using the most recent Association of American Medical Colleges data. Based on our data, it seems likely that with a growth rate of 4,000 between 2019 and 2021, there are likely more than 50,000 adult hospitalists today.

For those hospitalists who are pediatricians, pediatric hospitalists are not in Medicare billing data and SHM will have to find another measurement process.

It is not just the large number of hospitalists who have propelled our specialty to the stars. What we have done is as impressive as our sheer size. Even before the pandemic, we were improving efficiency, focusing on quality, and reshaping medical education. Much of my own mid-career work was on quality and quality improvement. But the pandemic, as difficult as it was, really proved the value of hospitalists. When the house of medicine was (figuratively) on fire, hospitalists ran into that building and saved lives. I reviewed state-level data, as well as data available from the Institute for Health Metrics and Evaluation at the time; hospi-

talists took care of the vast majority of the 7 million COVID-19 patients who were hospitalized. If our institutions’ clinical response to the COVID-19 pandemic could be likened to a four-legged table, nurses, intensivists, and emergency medicine physicians would be three of those four legs, but that stout fourth leg, supporting our nation’s hospitals, consisted of hospitalists.

Not only were hospitalists essential for the clinical care directly provided to millions of patients, but many of us, myself included, were responsible for operationalizing the COVID-19 clinical infrastructure on the wards. The pandemic was terrible, and I hope I don’t see another, yet it would have been significantly worse without hospitalists’ skill and determination. The pandemic solidified our place among the medical stars. Ad Astra Per Aspera.

We have reached the stars. But the future is full of difficult problems that need solving. Together, we can make the path to solutions easier.

Some difficult challenges remain for our specialty:

- How do we address workload?
- What are the limits to our ever-expanding clinical roles?
- Are there real solutions to mitigate burnout?
- What about the important role of research to our specialty to explore those workload and patient care questions we are trying to understand?
- How can we address the challenge of limited funding for hospitalist researchers?

At SHM, we’re partnering with our hospitalist members to try and develop tools, find answers, and chart a path forward together. Two examples of successful co-development include the State of Hospital Medicine (SoHM) report and the Hospital Medicine Workforce Experience Report.

The SoHM report is an every-other-year report on important aspects like pay, scheduling, PTO, hospital financial support, plus other operational aspects helpful to running a clinical hospital medicine program. One tidbit of information is that the average salary for adult hospitalists is now \$323.5k, and \$259k for pediatric hospitalists! We’re getting ready to launch the 2025 State of Hospital Medicine Survey next month and would appreciate you participating and sharing your insight.

The Hospital Medicine Workforce Experience Report was developed in collaboration with our membership to gather information on the clinical experience, workload perceptions, and factors contributing to and mitigating burn-

out. Interestingly, the report shows hospitalist burnout has decreased from a pandemic high of 60% plus to the current 45%. Better, but still clearly with a lot of work left to do. Ad Astra Per Aspera. One factor that was found to help mitigate burnout was hospitalist leadership. Respondents reported burnout at a much lower rate (26.5%) when they strongly agreed with the statement “my supervisor, manager, or clinical leaders seriously considers staff suggestions for improving provider well-being,” compared to those who responded that they strongly disagreed with that statement (78.6% reported burnout).

We’re working with our academic hospitalist colleagues to explore how hospitalists can access more of the federal grant funding. I was intrigued by a recent article by Vaughn et al., reporting that hospitalists cared for many COVID-19 patients, but rarely disseminated new COVID-19 knowledge.² That struck a chord with me: We do make the world a better place but need to communicate that work through scholarship and get credit for the novel work we do.

The future of hospital medicine

The sky’s the limit (but no one said it would be easy)!

The future is bright for our field: Our specialty is growing, we are making our part of the world a better place, we have the ability to shape our future, and we are finding solutions to complex problems together. We have a lot of work left to do: mitigating burnout, preparing ourselves to be leaders at the bedside and beyond, and advancing the science of our field are just a few of the challenges that remain.

It’s no secret I am a huge Star Trek fan. Like many forms of fiction, it can highlight the human condition and offer inspirational solutions, like working together to solve complex problems. Ad Astra Per Aspera was the title of a recent Star Trek episode, and it reminded me of hospital medicine: professionals dedicated to excellence and collaboration, overcoming difficult obstacles. Ad Astra Per Aspera: reaching the stars is hard. I hope that together, we can make it Ad Astra (with a little less) Per Aspera. ■

References

1. Lapps J, et al. Growth trends of the adult hospitalist workforce between 2012 and 2019. *J Hosp Med*. 2022;17(11):888-892.
2. Bonk N, et al. COVID-19-related publications by hospitalists in the United States. *Cureus*. 2023;15(2):e35553. doi: 10.7759/cureus.35553.

The Hospitalist Editorial Board Applications Open

If you’re an SHM member interested in sharing your expertise with readers of *The Hospitalist*, consider applying for the editorial board. Board members develop content, recommend sources, and may write

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We seek diverse candidates who are passionate about hospital medicine and engaged in SHM. Trainees in adult or pediatric hospital

medicine, including med-peds, are encouraged to apply. Members serve two-year terms, while trainees serve one-year terms. The deadline for submissions is January 15, 2025. Scan the QR code for more information and to apply. ■



NYU-Grossman School of Medicine Medical Research Reviews

By Evan Siau, MD, MPH, FACP, Sean Breslin, MD, Kristen Carroll, MD, Brianna Knoll, MD, MBA, Erin Geraghty, MD, Ian Larson, MD, Omar Moussa, MD, and Benjamin Verplanke, MD, FACP, FHM

NYU-Grossman School of Medicine, New York

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By Evan Siau, MD, MPH, FACP

1 Higher Rates of Major Hemorrhage with Rivaroxaban and Warfarin Compared to Apixaban in Patients with Cirrhosis and Nonvalvular AF

CLINICAL QUESTION: How effective and safe are apixaban versus rivaroxaban versus warfarin in patients with cirrhosis and nonvalvular atrial fibrillation (AF)?

BACKGROUND: Apixaban, rivaroxaban, and warfarin are commonly used to prevent ischemic events in patients with nonvalvular AF. However, data comparing their safety and effectiveness specifically in patients with cirrhosis and AF remain limited.

STUDY DESIGN: Population-based, retrospective, cohort study

SETTING: Two U.S. health-insurance databases—Medicare and Optum (2013 to 2022)

SYNOPSIS: This study examined a propensity-score-matched cohort of 5,570 patients comparing rivaroxaban to apixaban. Rivaroxaban was associated with higher rates of major



Dr. Siau

hemorrhagic events, including major gastrointestinal bleeding and intracranial bleeding (86.9 versus 51.0 per 1,000 person-years), with a hazard ratio (HR) of 1.47 (confidence interval [CI], 1.11 to 1.94). In a separate cohort of 5,704 patients comparing warfarin to apixaban, warfarin was associated with higher rates of major hemorrhagic events (78.9 versus 50.6 per 1,000 person-years), with an HR of 1.38 (CI, 1.03 to 1.84), including significantly higher rates of hemorrhagic stroke (14.6 versus 5.1 per 1,000 person-years), with an HR of 2.85 (CI, 1.24 to 6.59). Rates of ischemic events and all-cause mortality did not differ significantly comparing either rivaroxaban or warfarin versus apixaban. While multiple sensitivity analyses were conducted to adjust for confounding, the observation and nonrandomized nature of the study introduced some limitations.

BOTTOM LINE: Rivaroxaban and warfarin were associated with higher rates of major hemorrhage compared to apixaban, with similar rates of ischemic events and mortality in patients with cirrhosis and nonvalvular AF.

CITATION: Simon TG, Singer DE, et al. Comparative effectiveness and safety of apixaban, rivaroxaban, and warfarin in patients with cirrhosis and atrial fibrillation: a nationwide cohort study. *Ann Intern Med.* 2024;177(8):1028-38.

2 Detectable MNPs in Carotid Artery Plaques Are Associated with a Higher Risk of Myocardial Infarction, Stroke, or Death

CLINICAL QUESTION: Do patients with carotid artery plaque containing detectable microplastics and nanoplastics (MNPs) have a higher risk of myocardial infarction, stroke, or death?

BACKGROUND: Plastic production has steadily increased, and MNPs are widely found in applications such as food packaging and water pipes. MNPs can enter the human body through ingestion, inhalation, and skin contact. Preclinical studies suggest MNPs may pose a new risk factor for cardiovascular disease. However, the clinical relevance of an MNP burden in relation to cardiovascular disease remains unclear.

STUDY DESIGN: Prospective, multicenter, observational study

SETTING: Two hospitals in Italy, with patients recruited from August 1, 2019, to July 31, 2020

SYNOPSIS: The study included 257 patients with asymptomatic high-grade carotid artery stenosis undergoing carotid endarterectomy, followed for a mean of 34 months. Of these, 150 (58.7%) had detectable MNPs. Patients with detectable MNPs in excised plaques were younger (mean age, 71 versus 73 years), more often male, and had lower rates of hypertension, diabetes, and dyslipidemia but higher rates of acute coronary syndrome, smoking, and elevated creatinine levels. The primary endpoint (myocardial infarction, stroke, or death) occurred in 30 of 150 patients with MNPs (20%) compared to 8 of 107 patients without MNPs (7.5%)—a rate of 6.1 versus 2.2 events per 100 patient-years. The adjusted hazard ratio (HR) for MNPs was 4.33 (CI, 2.00 to 10.27), and the unadjusted HR was 2.84 (CI, 1.50 to 5.40). Study limitations include its observational design, potential unmeasured confounding, and the absence of other cardiovascular risk factors, particulate matter exposure, and socioeconomic status.

BOTTOM LINE: In asymptomatic patients with high-grade carotid artery stenosis, the presence of MNPs in the carotid artery plaque is associated with a significantly higher risk of myocardial infarction, stroke, or death over a 34-month follow-up period.

CITATION: Marfella R, Prattichizzo F, et al. Microplastics and nanoplastics in atheromas and cardiovascular events. *N Engl J Med.* 2024;390(10):900-10.

Dr. Siau is a clinical assistant professor in the division of hospital medicine at NYU Grossman School of Medicine in New York.

By Sean Breslin, MD

3 Acute Cardiac Events are Common Among Adults 50 Years or Older Hospitalized with RSV and Associated with Severe Disease

CLINICAL QUESTION: How common are acute cardiac events among hospitalized older adults (50 years or older) with respiratory syncytial virus (RSV) infection and what are the associated risk factors?



Dr. Breslin

BACKGROUND: RSV is a cause of significant morbidity and mortality among adults, particularly older adults and those with chronic medical conditions, and has been associated with acute cardiac events in hospitalized patients. Despite this, more research is needed to better understand the frequency and severity of these events as well as their risk factors.

STUDY DESIGN: Cross-sectional study with detailed clinical data collection for cases identified from RSV Hospitalization Surveillance Network (RSV-NET) surveillance data

SETTING: RSV-NET surveillance data in 12 states from five RSV seasons: 2014 to 2015 through 2017 to 2018, and 2022 to 2023

SYNOPSIS: Among the 6,248 hospitalized patients, the weighted period prevalence of an acute cardiac event was 22.4% including 15.8% with acute heart failure, 7.5% with acute ischemic disease, 1.3% with hypertensive crisis, 1.1% with ventricular tachycardia, and 0.6% with cardiogenic shock. In those with prior documented cardiovascular disease, the weighted prevalence was 33.0% compared to 8.5% among those without a documented history. Similarly, the prevalence of acute ischemic heart disease was 10.2% among those with documented prior cardiovascular disease and 4.1% in those without. The risk of developing an acute cardiac event was associated with several risk factors including older age (adjusted relative risk [ARR] of 1.44 for those 85 or older), history of heart failure (ARR of 3.23), and history of diabetes (ARR of 1.18). Among these hospitalized patients with RSV, 18.6% required intensive care unit admission and 6.8% required mechanical ventilation. In multivariate models those with an acute cardiac event had higher rates of ICU admission (ARR of 1.54 [95% CI, 1.23 to 1.93]) and mechanical ventilation (ARR of 2.00 [95% CI, 1.44 to 2.79]).

BOTTOM LINE: As other respiratory viruses, acute cardiac events are common in adults 50 years or older hospitalized with RSV infection, particularly those with documented prior cardiovascular disease, and are associated with increased risk of severe outcomes.

CITATION: Woodruff RC, Melgar M, et al. Acute cardiac events in hospitalized older adults with respiratory syncytial virus infection. *JAMA Intern Med.* 2024;184(6):602-11.

Dr. Breslin is a clinical assistant professor in the division of hospital medicine at NYU Grossman School of Medicine in New York.

By Kristen Carroll, MD

4 Improving HF Outcomes in Obesity and Type 2 Diabetes: The Role of Semaglutide

CLINICAL QUESTION: Does semaglutide improve heart failure (HF) symptoms in patients with obesity-related HF and type 2 diabetes?

BACKGROUND: Obesity-related HF and type 2 diabetes are prevalent coexisting conditions that significantly impact patient morbidity and mortality. Current treatment strategies have not adequately addressed the need for effective interventions targeting both weight management and cardiovascular health in this population. Semaglutide, a GLP-1 receptor agonist, has shown promise in weight reduction and metabolic control, but its efficacy in improving HF outcomes specifically in this group required investigation.



Dr. Carroll

STUDY DESIGN: Double-blinded, randomized, controlled trial

SETTING: International, multicenter, including academic and community hospitals

SYNOPSIS: This study evaluated the effects of weekly semaglutide (2.4 mg) compared to placebo in patients with HF with preserved ejection fraction, obesity (BMI ≥ 30), and type 2 diabetes over 52 weeks. A total of 616 patients were randomly assigned to receive either treatment (semaglutide versus placebo). The primary outcomes included changes in the Kansas City Cardiomyopathy Questionnaire clinical summary score (KCCQ-CSS) and body weight. The semaglutide group experienced a significant improvement in KCCQ-CSS (mean change of 13.7 points versus 6.4 points for placebo; $P < 0.001$) and a greater reduction in body weight (-9.8% versus -3.4%; $P < 0.001$). Secondary outcomes also favored semaglutide, including improvements in functional capacity measured by the six-minute walk test and lower C-reactive protein levels. Notably, serious adverse events were less frequent in the semaglutide group (17.7%) compared to the placebo group (28.8%). The study's limitations are that it excluded patients with severe renal impairment, had an underrepresentation of non-white participants, and had an overall short duration, which may affect the long-term applicability of the results.

BOTTOM LINE: Semaglutide is associated with significant weight loss and improved cardiovascular outcomes in patients with obesity-related HF and type 2 diabetes, including reduced HF symptoms and enhanced functional capacity.

CITATION: Kosiborod MN, Petrie MC, et al. Semaglutide in patients with obesity-related heart failure and type 2 diabetes. *N Engl J Med.* 2024;390(15):1394-1407.

5 Gastrointestinal Risks Associated with GLP-1 Receptor Agonists in Patients with Obesity

CLINICAL QUESTION: What is the risk of gastrointestinal adverse events associated with glucagon-like peptide-1 (GLP-1) receptor agonists used for weight loss compared to bupropion-naltrexone?

BACKGROUND: GLP-1 receptor agonists, initially approved for diabetes management, are increasingly used off-label for weight loss. Previous studies have indicated a higher risk of gastrointestinal issues—such as gastroparesis, pancreatitis, biliary disease, and bowel obstruction—in diabetic patients. However, the risk in non-diabetic patients using these medications for weight loss is less understood. This study aims to investigate the incidence of gastrointestinal adverse events associated with

GLP-1 agonists (semaglutide and liraglutide) in a clinical setting.

STUDY DESIGN: Observational cohort study

SETTING: Analysis of a large-scale health claims database (PharMetrics Plus for Academics database—IQVIA), encompassing data from 16 million patients between 2006 and 2020

SYNOPSIS: The study analyzed a cohort of 5,411 patients, including 613 users of semaglutide, 4,144 users of liraglutide, and 654 users of bupropion-naltrexone. Patients were included if they had a diagnosis of obesity without a history of diabetes. Researchers tracked the first occurrence of gastrointestinal adverse events (identified by ICD-9 or ICD-10 codes). GLP-1 agonist users exhibited significantly higher risks of pancreatitis (adjusted HR, 9.1; 95% CI, 1.3 to 66), bowel obstruction (HR, 4.2; 95% CI, 1.0 to 17.4), and gastroparesis (HR, 3.7; 95% CI, 1.2 to 11.9) compared to bupropion-naltrexone users. However, the risk for biliary disease was not significantly increased (HR, 1.5; 95% CI, 0.9 to 2.5).

BOTTOM LINE: GLP-1 receptor agonists used for weight loss are associated with a higher risk of gastrointestinal adverse events—particularly pancreatitis, bowel obstruction, and gastroparesis—compared to bupropion-naltrexone, and although these events are relatively rare, they should still be considered in the risk-benefit assessment for patients without a history of diabetes who are considering GLP-1 agonists for weight management.

CITATION: Sodhi M, Rezaeianzadeh R, et al. Risk of gastrointestinal adverse events associated with glucagon-like peptide-1 receptor agonists for weight loss. *JAMA.* 2023;330(18):1795-7.

Dr. Carroll is a hospitalist in the division of hospital medicine at NYU Langone Tisch Hospital and an assistant professor of medicine at the NYU Grossman School of Medicine, both in New York.

By Brianna Knoll, MD, MBA

6 Recurrence of Thromboses After Distal DVT

CLINICAL QUESTION: What is the incidence of recurrence of venous thrombosis after a distal deep vein thrombosis (DVT)?



Dr. Knoll

BACKGROUND: Distal DVTs are frequently found but debate remains around whether treatment with anticoagulation is warranted and the optimal duration of anticoagulation when used.

STUDY DESIGN: Prospective cohort study

SETTING: Østfold Hospital in Norway, a primary referral center

SYNOPSIS: The study recruited 475 patients with distal DVT and treated them with anticoagulation for a median of 92 days. Patients were followed for a mean of 4.7 years and only seven patients were lost to follow up. The study found the recurrence rate of imaging-confirmed venous thrombosis to be 14.7% at five years and 27.2% at 10 years. This rate increased to 24.1% and 40.1% in those with unprovoked versus provoked initial distal DVTs. The rates of proximal DVT and pulmonary embolism (PE) were 10.1% and 16.3% overall at five and 10 years, respectively. In unprovoked cases, this increased to 19.5% and 27%, respectively. Major

bleeding while on any anticoagulation was 1.5% overall and 0.8% in the direct-oral-anticoagulation group. Two bleedings were fatal, and both were in elderly patients over 85. One limitation is that cancer patients were excluded. While the study was a prospective review and all re-scans were ordered outside of the study, the clinical significance of recurrence events was not reviewed.

BOTTOM LINE: While U.S. guidelines on anticoagulation for distal DVTs remain mixed, for high-risk individuals or those with unprovoked distal DVTs, either monitoring or anticoagulation is worth consideration

CITATION: Jørgensen CT, Tavoly M, et al. Incidence of bleeding and recurrence in isolated distal deep vein thrombosis: findings from the Venous Thrombosis Registry in Østfold Hospital. *J Thromb Haemost.* 2023;21(10):2824-32.

7 Summary of Advantages of GLP-1 Analogs in PCOS Patients

CLINICAL QUESTION: What is the role of glucagon-like peptide-1 (GLP-1) analogs in polycystic ovary syndrome (PCOS)?

BACKGROUND: GLP-1 analogs have been shown to improve outcomes in a variety of other metabolic conditions and now are being expanded to use in PCOS.

STUDY DESIGN: Review article

SETTING: Article review on international data on GLP-1 use in PCOS patients

SYNOPSIS: GLP-1s have been investigated in PCOS patients for a variety of outcomes. While we know their benefits in weight loss, GLP-1s have been found to have other independent properties that contribute to a reduction in insulin resistance, including in this population. Notably, one study highlighted that pre-diabetes remission was superior in patients on a GLP-1 and metformin and better in those on GLP-1 monotherapy when compared to metformin alone. It was also found to potentially reduce metabolic-dysfunction-associated fatty liver disease in PCOS patients and improve fertility, though further data on GLP-1 safety in pregnancy is still needed. While the paper does an excellent job reviewing articles, it does not mention its article retrieval process, nor what definition of PCOS it required for article consideration.

BOTTOM LINE: GLP-1s can provide a variety of benefits in PCOS patients as a monotherapy or in addition to metformin. Further investigation, particularly into safety in pregnancy, is warranted given possible fertility benefits.

CITATION: Szczesnowicz A, Szeliga A, et al. Do GLP-1 analogs have a place in the treatment of PCOS? New insights and promising therapies. *J Clin Med.* 2023;12(18):5915.

Dr. Knoll is a hospitalist in the division of hospital medicine at NYU Langone Tisch Hospital and an assistant professor of medicine at the NYU Grossman School of Medicine, both in New York.

By Erin Geraghty, MD

8 Gabapentinoids and Risk for Severe Exacerbation in COPD

CLINICAL QUESTION: Is gabapentinoid use associated with severe exacerbation in patients with chronic obstructive pulmonary disease (COPD)?

BACKGROUND: The U.S. Food and Drug Administration issued a warning in 2019 based on a growing number of case reports describing severe breathing complications in patients using gabapentinoids. However, it had never been studied whether gabapentinoids are associated with respiratory adverse effects.



Dr. Geraghty

STUDY DESIGN: A population-based cohort study

SETTING: Healthcare database including all Quebec residents

SYNOPSIS: This study examined a cohort of 13,504 patients with COPD and gabapentinoid use and matched them to patients with COPD without use. Across all indications (epilepsy, neuropathic pain, and other chronic pain), gabapentinoid use was associated with an increased risk for severe COPD exacerbation. Adjusted hazard ratios for severe COPD exacerbation in patients on gabapentinoids were 1.58 for the indication of epilepsy, 1.35 for neuropathic pain, and 1.49 for other chronic pain. The overall cohort had an incidence rate of 15.1 in gabapentinoid users compared to 8.3 for non-users, with an HR of 1.39. One possible confounder includes the possibility that more patients prescribed gabapentinoids were active smokers, as smokers are considered to be at higher risk for substance use disorders and so more likely prescribed gabapentinoids than opiates for pain. However, the authors did try to correct for this by matching for other markers of COPD severity including recent exacerbation, number of classes of respiratory medications prescribed, and COPD duration. Of note, race and ethnicity data was not included. Gabapentin and pregabalin did not differ.

BOTTOM LINE: In patients with COPD, gabapentinoid use is associated with severe exacerbations of COPD, which supports recent warnings from regulatory agencies.

CITATION: Rahman AA, Dell'Aniello S, et al. Gabapentinoids and risk for severe exacerbation in chronic obstructive pulmonary disease: a population-based cohort study. *Ann Intern Med.* 2024;177(2):144-54.

Dr. Geraghty is a hospitalist in the division of hospital medicine at NYU Langone Tisch Hospital and an assistant professor of medicine at the NYU Grossman School of Medicine, both in New York.

By Ian Larson, MD

9 Initiation of Medications for AUD Prior to Discharge Leads to Lower Rates of Return to Hospital

CLINICAL QUESTION: How does the initiation of medications for alcohol use disorder (AUD) at discharge affect 30-day post-discharge outcomes?

BACKGROUND: AUD is highly prevalent (affecting approximately 29 million adults) and leads to a high rate of health care utilization. Despite guideline recommendations, a majority of U.S. adults with AUD do not receive treatment with medications for AUD (MAUD). Hospitalizations offer a possible opportunity to encourage patients with AUD to engage in treatment with MAUD.



Dr. Larson

STUDY DESIGN: Retrospective cohort study

SETTING: U.S. hospitals admitting Medicare beneficiaries in 2016

SYNOPSIS: 6,794 patients enrolled in Medicare who were hospitalized for AUD in U.S. hospitals in 2016 encompassing 9,834 alcohol-related hospitalizations were included. The primary outcome was a composite of 30-day all-cause mortality or return to hospital. The exposure of interest was MAUD at discharge, which included pharmacy claims for oral naltrexone, acamprosate, or disulfiram that were filled between the day before discharge and two days after discharge. 192 hospitalizations (2.0%) resulted in MAUD initiation on discharge. 30-day all-cause mortality or return to the hospital occurred in 4,843 hospitalizations (49.3%) of which 49 (25.5%) involved MAUD on discharge and 4,794 (49.7%) did not. MAUD at discharge was associated with a 42% relative risk reduction (Incidence Rate Ratio, 0.58 [95% CI, 0.45 to 0.76]) and 18% absolute risk reduction (95% CI, -0.26 to -0.11) in 30-day all-cause mortality or return to hospital. Limitations of this study include unmeasured confounding as a byproduct of the observational study design, an inability to account for long-acting naltrexone injections administered prior to discharge, and an inability to account for non-pharmacologic interventions.

BOTTOM LINE: Initiation of naltrexone, acamprosate, or disulfiram prior to discharge or within two days of discharge leads to lower rates of 30-day post-discharge hospital return (emergency department visits and readmissions).

CITATION: Bernstein EY, Baggett TP, et al. Outcomes after initiation of medications for alcohol use disorder at hospital discharge. *JAMA Netw Open.* 2024;7(3):e243387. doi:10.1001/jamanetworkopen.2024.3387

Dr. Larson is a hospitalist in the division of hospital medicine at NYU Langone Tisch Hospital and a clinical assistant professor of medicine at the NYU Grossman School of Medicine, both in New York.

By Omar Moussa, MD

10 A Stepwise Approach to Inpatient Management of Hypertension

CLINICAL QUESTION: How should clinicians approach the management of asymptomatic hypertension in inpatients?

BACKGROUND: There are heterogeneous practices to manage asymptomatic blood pressure (BP) elevations for inpatients with elevated BP and no acute end-organ damage, with no clear data to suggest benefit.

SYNOPSIS: A stepwise approach to the management of inpatients with elevated blood pressure is proposed, with two priorities—to avoid preventable harm and adverse drug effects while improving long-term outcomes and blood pressure control. The first step is to assess for acute hypertension-mediated end-organ damage for patients with severe hypertension (180/120 mmHg or higher); these patients should be treated as a hypertensive emergency. The next step is to ensure appropriate measurement techniques prior to remeasurement. If hypertension is confirmed, the third step is to treat contributing factors associated with or exacerbating hypertension. The fourth step is medication reconciliation, with the goal of restarting antihypertensives that may be held and discontinuing unnecessary hospital med-



Dr. Moussa

ications that may be contributing to hypertension. The fifth step is to consider patient-specific factors that may be contributing, including demographics, functional status, comorbidities, and baseline BP control. Most patients do not warrant antihypertensive medication intensification in the hospital or on discharge, though initiating or titrating a single guideline-directed antihypertensive may be considered in select high-risk patients with readiness to make changes, poor baseline BP control, and/or chronic conditions that may benefit from stricter BP control. The sixth and final step is to develop a transitional care plan ensuring patient education and follow-up.

BOTTOM LINE: For inpatients with asymptomatic BP elevations, a stepwise approach to management may help avoid preventable harm and adverse drug effects while improving long-term outcomes and BP control.

CITATION: Jacobs ZG, and Anderson TS. Management of elevated blood pressure in the hospital—rethinking current practice. *JAMA Intern Med.* 2024;184(9):1117-8.

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By Benjamin Verplanke, MD, FACP, FHM

11 Defining and Measuring Those Administrative Pressures We All Feel

CLINICAL QUESTION: What are the common administrative harms hospitalists experience?

BACKGROUND: Administrative harm (AH) is a longstanding problem in health care and defined as adverse consequences of administrative decisions that directly influence patient care and outcomes, professional practice, and organizational efficiencies regardless of employment setting. These influences can result in downstream injuries that affect the culture and integrity of healthcare organizations and the broader healthcare system.



Dr. Verplanke

STUDY DESIGN: This was a qualitative study using a mixed-methods approach with a 12-question survey and semi-structured virtual focus groups

SETTING: Two hospitalist communities—members of the HOMERuN research network and the Society of Hospital Medicine Academic Leaders Special Interest Group

SYNOPSIS: This study included 41 individuals who participated in focus groups, of whom 32 (78%) responded to the brief survey. The majority (91%) of the respondents were physicians and 44% of the participants had leadership roles. The average number of years in practice was 14. After surveys and focus groups, three key themes emerged.

THEME 1: AH is pervasive and comes from all levels of leadership with a wide-reaching impact. As one can imagine there are multiple people involved in the AH. Interestingly, only 6% of participants were familiar with this term.

There was also a perception that AH contributed negatively to patients, workforce, and organizations. These included logistical issues with daily tasks, hospital initiatives like early discharge, and national initiatives including policy decisions.

THEME 2: Organizations lack mechanisms for identification, measurement, and feedback related to AH. There is a power dynamic associated with AHs and only 38% of the participants felt empowered to speak up and raise concerns. Unlike common efficiency metrics, AHs tend not to have dashboards and scorecards to show their effect and hold the decision makers accountable.

THEME 3: Organizational pressures drive AH. Organizational leaders often push for actions regardless of whether they result in the desired outcome. These decisions are sometimes made in silos where the decision maker is removed from the frontline workforce.

BOTTOM LINE: AHs were found to be pervasive, have a wide-reaching impact, and were challenging to identify and measure.

CITATION: Burden M, Astik G, et al. Identifying and measuring administrative harms experienced by hospitalists and administrative leaders. *JAMA Intern Med.* 2024;184(9):1014-23.

Dr. Verplanke is the section chief of hospital medicine at NYU Langone Health and a clinical assistant professor in the department of medicine at NYU Grossman School of Medicine, both in New York. ■

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Expanded Care Roles for AI and Lots More: Seasoned Hospitalists Share Top Changes to the Specialty

Hospitalists are popular but will need to justify their expanded role going forward, some say

By Vanessa Caceres

What have been some of the most significant changes in hospital medicine since the specialty was established? What recent highs and lows have occurred in hospital medicine or healthcare as a whole? *The Hospitalist* spoke with several experienced hospital medicine physicians to gather their perspectives. They were also asked to share their predictions for changes they expect to see in the next decade. Here are excerpts from their insights.

Weijen W. Chang, MD, FAAP, SFHM



“It’s becoming a lot harder for us to do our job. And as hospitalists, we’re being asked to extend our scope more and all sorts of things that we probably didn’t cover very much of when we first started off.”

Chief of pediatric hospital medicine and vice-chair for clinical affairs at Baystate Children’s Hospital, associate professor of pediatrics at the University of Massachusetts Medical School Baystate, both in Springfield, Mass., and physician editor for *The Hospitalist*

Dr. Chang trained in a combined internal medicine-pediatric residency program and began his career in primary care, after which he worked in both adult and children’s medicine at UC San Diego as well as at locations in New England. He currently spends more than 90% of his time in pediatrics and occasionally covers shifts in adult hospital medicine.

The biggest change he has seen in hospital medicine has been the conversion to electronic health records (EHRs), not just for its technological changes, but also in how it has changed a personal feel within medicine.

Before, “you would hang out in the doctor’s lounge and drink coffee and talk about family. It was a much more personal type of profession. Now it seems very impersonal, where your meetings are electronic. You don’t run into people as much, and most of your rounding feels somewhat isolated these days,” Dr. Chang said.

Although the pandemic accelerated this change, it was already heading in that direction, he adds.

At the same time, Dr. Chang sees some pluses to that change (such as not burning fossil fuels to get to meetings) and in the fact that health systems made it through the COVID-19 pandemic. “I don’t think that’s any small feat,” he said.

Yet as federal subsidies and support have run out, many hospital systems are now struggling, he adds.

The biggest challenge over the next decade for both adult and pediatric hospital medicine will

be workforce shortages within other specialties—and how that will have an impact on the broader responsibilities of hospitalists.

“It’s becoming a lot harder for us to do our job,” Dr. Chang said. “And as hospitalists, we’re being asked to extend our scope more and all sorts of things that we probably didn’t cover very much of when we first started off.”

The trend of hospitalist care at home also will affect the specialty, as will the continued expansion of telemedicine, Dr. Chang adds.

Gregory B. Seymann, MD



“Done well, it [AI] could make a huge improvement in the ability of the hospitalist to maximize ‘top of license’ work, spend more time at the bedside, reduce burnout rates, and create more time for systems-improvement work.”

Vice chief of hospital medicine at the University of California San Diego School of Medicine

Dr. Seymann has been a hospitalist with UC San Diego for his entire career. He was one of two physicians who founded a part-time hospital medicine program that has grown to 60+ hospitalists.

He sees the biggest change in hospital medicine as a shift from measuring the impact of hospitalists by looking only at productivity and efficiency metrics to a broader concept of hospitalists as partners in the evolution of care models to those that advance systems toward safe, patient-centered care.

Dr. Seymann also perceives some recent high points for healthcare that came out of the COVID-19 pandemic, such as the use of telehealth and remote visits. Another recent positive trend has been a focus on incorporating social determinants of health and addressing disparities within systems-improvement initiatives.

Going forward, leveraging artificial intelligence (AI) efficiently will affect hospital medicine and healthcare in a major way, Dr. Seymann says. “Done well, it could make a huge improvement in the ability of the hospitalist to maximize ‘top of license’ work, spend more time at the bedside, reduce burnout rates, and create more time for systems-improvement work,” he said. “Done poorly, it could affect safety, erode trust, affect jobs and salaries, reduce face time with patients, and dehumanize the field.”

He makes the comparison to the initial use of EHRs, which promised—and often delivered—leveraging access to data to improve care. “We saw lots of that, but also many areas where technology implementation was clunky ... Learning from those implementation mistakes for the next phase is critical,” Dr. Seymann said.

Danielle Bowen Scheurer MD, MSCR, MHM



“It needs to be abundantly clear that we provide higher-quality and lower-cost care than what would be provided without us. In short, what is our return on investment?”

Hospitalist, professor, and chief quality officer at the Medical University of South Carolina Health System in Charleston

Dr. Scheurer has been a hospitalist since 2002 and believes that the biggest change to hospital medicine has been the expansion of hospital medicine programs. “We started as rare gems in hospitals, but now, hospital medicine programs are present in almost every single hospital in the U.S.,” she said.

The expanded presence of hospital medicine programs has enabled the specialty to positively impact quality, efficiency, and cost of care.

Conversely, however, this has led to more burnout. “While not unique to hospital medicine, as the complexity and volume of patients go up, many of our teams are struggling with burnout, to the same degree as other specialties,” she said.

Over the next decade, hospital medicine will need to continue to demonstrate its value to hospitals and the healthcare industry. “It needs to be abundantly clear that we provide higher-quality and lower-cost care than what would be provided without us. In short, what is our return on investment?” she said. “We have to be able to have a positive impact on the field and ensure we are publishing our successes.”

Heather E. Nye, MD, PhD



“This shift has been exciting and has provided us with an endless stream of possibilities in the field as hospitalists

serve to bridge gaps and create solutions to complex problems in evolving healthcare systems. A hospitalist isn’t just a hospitalist anymore.”

Professor of medicine at the University of California, San Francisco, associate chief of medicine at San Francisco VA Health Care System (SFVAHCS), and director of its consult/co-management service and veterans integrated perioperative clinic

Dr. Nye has been a hospitalist since finishing her med-peds residency in 2003 and has spent all of those years with UCSF.

She sees the evolution of the hospitalist role as the biggest change within hospital medicine. “Hospital beds may be on the decline nationally, but hospitalists have differentiated into several niche areas, including post-acute care settings, perioperative medicine, palliative care, quality and patient safety, and many others,” Dr. Nye said. “This shift has been exciting and has provided us with an endless stream of possibilities in the field as hospitalists serve to bridge gaps and create solutions to complex problems in evolving healthcare systems. A hospitalist isn’t just a hospitalist anymore.”

The rapid differentiation has served as a high point for hospital medicine, which has “grown into its britches in admirable ways,” Dr. Nye said. “Hospitalists are still front-line care providers, but also service chiefs, C-suite members, and distinguished federal officers who garner respect as systems experts and innovators ... Now, our challenge is to stay relevant and remain a worthy investment for hospitals.”

Yet she advises proceeding with caution.

“While efficiency and low-cost care are grounded in sound principles, they can burden providers in unintended ways that jeopardize the ability to do what’s right for patients versus follow algorithms,” she said. “We risk being number-centered, not patient-centered, and it’s causing burnout, goal misalignment, and feelings of depersonalization.” If taken too far, it could lead ‘thinking’ (non-procedural) specialties and those that provide the ‘glue’ (such as primary care practitioners) to become overburdened and leave medicine altogether.

It’s possible that AI may help reduce the administrative burden for all physicians and increase the amount of time spent with patients in the future. “It’s hard to know all the ways it might impact our day-to-day work, but I’m hopeful that, counterintuitively, AI will return us to some of the humanistic reasons for which we entered medicine,” she said.

Daniel Rauch, MD, FAAP, SFHM



“We’re not people plugging a hole, but we are actually specialists with a skill set and a knowledge base that’s different than our peers. We have a value to add to pediatric medicine that’s important.”

Professor of pediatrics at Hackensack Meridian School of Medicine, and director, divisions of pediatric hospital medicine and general academic pediatrics at Hackensack Meridian Children’s Health in Hackensack, N.J.

Dr. Rauch has been a hospitalist for nearly 30 years. With his background in pediatrics, he believes that one of the biggest changes has been recognizing pediatric hospital medicine as a subspecialty within pediatrics. This was formally recognized in 2016, with the first certifying exam given in 2019. It was a process that he was able to help steer.

“We’re not people plugging a hole, but we are actually specialists with a skill set and a knowledge base that’s different than our peers. We have a value to add to pediatric medicine that’s important,” Dr. Rauch said. “It put us at an equal footing at the academic table with our peers and really helped us standardize training in PHM.”

Dr. Rauch points to improved treatments for children as a positive for pediatric hospital medicine in recent years, including shorter lengths of stay and treating children with certain health conditions on an outpatient basis. Work in this area continues in a variety of areas, such as for sickle cell disease, for which Hackensack has helped steer some trial work.

“The downside is the logistic challenges, so payment is a huge issue, and making sure that inpatient pediatric services are viable. We, unfortunately, as a society don’t value care for our children. We pay pediatric care differently than we do adult care and it’s put at risk care of our children in places that are closer to families’ homes and that aren’t necessarily the highest level of specialty care, but that’s not what most hospitalized children need,” Dr. Rauch said.

Over the next decade, Dr. Rauch sees a lack of understanding of the outpatient generalist’s role as a hindrance for hospitalists and other physicians. “When you don’t understand where your referrals are coming from and how patients can be managed once they leave your service, that’s a risk to care,” he said. He wants to ensure that children in all settings—be it at the hospital or as outpatients—get appropriate care.

Margaret Fang, MD, MPH, MHM



“While at the beginning of the hospitalist movement, we could clearly point to comparative advantages in quality, safety, and efficiency compared to the prior system, now that the hospitalist model has been widely adopted, we are facing new questions about our value.”

Chief of the division of hospital medicine at UCSF Health and director of research and UCSF Academic Hospital Medicine Fellowship, both in San Francisco

Dr. Fang joined UCSF as a hospitalist in 2003. Like her colleagues interviewed for this story, she marvels at the diverse roles now filled by hospitalists, from triage and admitting to overnight care, to neuro-hospitalists and OB-hospitalists.

Welcoming more internal medicine graduates to the field is a definite high point within the specialty, she says, although she also worries about the high rate of burnout. “Although some of this might have been due to the pandemic, I think it’s also a result of how much harder it feels to practice medicine these days,” she said.

In the coming decade, a major challenge will be to showcase the value of hospitalists to hospitals and healthcare systems, she explains. With financial pressures and consolidation of health systems, there will be ongoing incentives to increase hospital throughput and reduce costs. “While at the beginning of the hospitalist movement, we could clearly point to comparative advantages in quality, safety, and efficiency compared to the prior system, now that the hospitalist model has been widely adopted, we are facing new questions about our value,” Dr. Fang said. “This has led to the growth of clinical models that incorporate advanced practice professionals, the expansion of large physician staffing groups, and unionization.”

Alpesh N. Amin, MD, MBA, MACP, MHM



“The way we’ve managed certain disease states has evolved and changed. We’re getting patients out

faster than we were before. We’re getting them set up with proper therapies that they can take at home. I think there will be more and more of that kind of care delivery that will help either get patients discharged a little bit sooner or [help in] preventing readmission.”

Associate dean for clinical transformation at the University of California Irvine Health, and professor and chief, division of hospital medicine and palliative medicine, department of medicine, at the University of California in Irvine, Calif.

Dr. Amin founded the hospital medicine program at UC Irvine in 1997. In addition to being chief of hospital medicine and palliative medicine, he is associate dean for clinical transformation and served as chair of medicine at UC Irvine for the past 16 years.

Dr. Amin believes the evolution of hospitalists working in other roles, including chairs of medicine, associate or vice deans, and quality officers, points out their valuable leadership role.

Hospitalists also have been able to help identify research opportunities in the hospital from a systems approach, he adds. This comes from rich experience treating patients with different conditions and attempting to streamline care and improve it throughout the hospital.

Since the specialty began, hospitalists also have taken on a broad teaching role with residents, pharmacy students, advanced practice practitioners, nurse practitioners, and others. “The whole teaching opportunity is value-added but has challenges in terms of reimbursement,” he said. “A lot of these things are a huge value added when you look at it from an all-encompassing role that hospitalists play.”

Over the next decade, Dr. Amin believes a major issue will be treating sicker patients that hospitalists will have to care for. That will be combined with how care delivery is accomplished using AI and other tools. Care at home also will be part of the delivery-of-care model.

“The way we’ve managed certain disease states has evolved and changed. We’re getting patients out faster than we were before. We’re getting them set up with proper therapies that they can take at home. I think there will be more and more of that kind of care delivery that will help either get patients discharged a little bit sooner or [help in] preventing readmission,” he said.

He also believes that hospitalists will continue to get engaged with certain high-volume services, such as heart failure or orthopedic service. ■

Vanessa Caceres is a medical writer in Bradenton, Fla.



To Preround or Not?

Two views separated by time and experience

By Jose Negrete Manriquez, MD, Mandi Abdel Ahad, DO, Lucy Shi, MD, and Richard M. Wardrop III, MD, PhD, FAAP, MACP, SFHM

Modern hospital medicine practice is diverse and characterizable through its willingness to innovate and be inclusive of new ideas and perspectives. While hospitalists aspire to evidence-based practice, there are some topics and areas of our work that just do not fit into neat and tidy categories.

To address some of these issues in a novel way, this new forum will enable hospitalists and trainees to discuss timely and important topics related to the practice of hospital medicine across the continuum of practice. Topics are broad-ranging and relevant to today's practice of hospital medicine and therefore addressed with a lighthearted but experienced opinion rendered around chosen topics.

Just like there are two sides to every coin, here we present different perspectives on a single topic from different perspectives, hence *The Flipside*.

Recently the discussion of the benefits of including patients in prerounding were discussed in several forums.¹⁻³ While these explorations of the topic are well informed, their conclusions were by no means based on the type of evidence that guides clinical practice, but rather on a series of philosophical conjectures based on expert opinion and extrapolations from existing literature. While we agree that unstable patients should all be seen before rounds, the question remains about the utility of seeing all patients before formal rounds. In this inaugural installment of *The Flipside*, we incorporate the perspectives of trainees and hospitalists to further advance the dialogue on the topic of prerounding.

Prerounding is preferred

The siren alarm goes off, but I inadvertently hit snooze and sleep through the alarm. With no time for a coffee before leaving the house, I am now running late for my first day as a PGY-1 resident and unable to preround on all my patients. Upon arrival at the hospital, the chaos continues. The pager constantly buzzes with patients' family members calling the nursing station to ask for updates, a rapid response is called on one

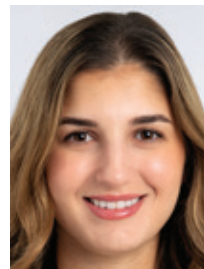


patient, and the case managers request to touch base about two morning discharges. I briefly review most charts, but due to the rush I don't have a chance to visit every patient. Because of time constraints, I'm not able to visit the patient who was going to be discharged early, missing the fact that the discharge was canceled due to financial constraints around transport. When this is discovered on bedside rounds, it's too late to engage the family in the process of assisting with transport to rehab. There is no time left to complete the proper discharge paperwork and it's delayed by an entire day. I feel terrible knowing I didn't get a chance to preround on the patient.

I meet with the supervising hospitalist staff to debrief about the morning. They help me identify that patients were not being seen and examined or spoken to until "bedside teams" rounds, which led to confusion during rounds. I decide to make it a point to preround on every patient, prepare them for the team's visit, and provide education about their care plan. At the end of the week, the morning is going swimmingly. Laboratory results are coming back on time and the team is running well. Patients are well informed, and families are updated promptly. The hospitalist is



Dr. Manriquez



Dr. Ahad



Dr. Shi



Dr. Wardrop

Dr. Manriquez is a resident physician at the University of California Davis in Davis, Calif. Dr. Ahad is a resident physician at The Cleveland Clinic in Cleveland. Dr. Shi is an assistant clinical professor and adult hospitalist at the University of California Davis. Dr. Wardrop is a professor and staff hospitalist at The Cleveland Clinic.

practically glowing with admiration and pride when the patients are actively "teaching back" what we had reviewed as the plan on prerounds. The patients express gratitude and appreciation for the good communication from the entire team. Having set prerounding as a priority and expectation for the team, the practice becomes more than just a " cursory check-in," but is rather an important opportunity to establish rapport and advance the patient care forward.

Prerounding in moderation

The siren alarm goes off at five in the morning. I throw on a pair of wrinkled unmatched scrubs, make a cup of coffee, and brush my teeth before I race to work for

my first day as a senior resident. In the hospital, the PGY-1 residents frantically print pages of information for their patients and use multicolored pens to squeeze information onto papers already flooded with labs and imaging reports. Before I can discuss the plan for the day with the PGY-1 residents, they rush off to see their patients. I decide to visit Mrs. Jones, who presented with lower extremity cellulitis and might be able to go home today. However, she's finally getting back to sleep after the nurse, phlebotomist, and PGY-1 resident, Alex, woke her, and she wraps herself under the covers as she snaps at me to go away. I race back to rounds and realize I left my coffee at home and no longer have time

to run down to the cafeteria. Alex is in the middle of presenting Mrs. Jones. The attending probes Alex on the physical exam, but he didn't know he should look at the borders for the spread of the cellulitis and isn't sure what fluctuance feels like. He seems flustered and loses his place amid all the scribbles on his paper. The attending then focuses on the management plan and Alex struggles to answer.

I feel terrible knowing I didn't get a chance to check in before rounds.

I meet with the supervising hospitalist staff to debrief about the morning. They suggest being intentional as a team about prerounding and considering what is necessary information for formal rounds. At the end of the week, we have another patient with cellulitis on our service, Mr. Lee. Instead of rushing to see our patients before formal rounds begin, I spend some time in the morning showing the PGY-1 residents a more efficient way to review the patient chart. We briefly review the latest Infectious Diseases Society of America guidelines for skin and soft tissue infections and plan what questions and physical exam maneuvers we are going to focus on for each patient. Since we didn't preround on our stable patients, the hospitalist attending meets us at Mr. Lee's bedside. Alex does an exceptional job with his presentation and reviews potential antibiotic plans based on the patient's exam. The attending sees Alex model excellent bedside manner during his physical exam and effectively demonstrate the most salient exam components for patients with cellulitis. He confidently shares the plan for the day with Mr. Lee, building his trust in his care. Having set prerounding as a time to thoughtfully consider the pertinent components of the patient's history and exam that will impact the plan, the practice becomes more than just a " cursory check-in," but is rather an important opportunity to think critically about patients and advance their care forward.

Discussion

Prerounding has long been a component of inpatient team rounding, with trainees visiting patients at the bedside before discussing their care with the attending physician during rounds. Historically, attending physicians had outpatient patient-care duties that continued while they were teaching in the hospital, necessitating interns to provide as much information as possible to inform patient care plans on rounds. However, as inpatient care has evolved, the convention and utility of prerounding have

been questioned and re-evaluated, just as other aspects of rounding including the purpose of rounds, the format of rounds, and the ideal teaching methods used on rounds have been discussed and described.⁴⁻⁶

In addition to providing optimal patient care, a core component of rounding in an effective clinical-learning environment should include helping the next generation of physicians gain the skills necessary to think critically about medical problems and care independently for patients. Some believe that prerounding helps foster autonomy and build a sense of ownership, a necessary step that helps form the professional identity of trainees. On the inpatient side, a patient's clinical picture can evolve quickly, and prerounding may allow learners to identify subtle important changes. Additionally, the ability to gather, report, and interpret patient information is a part of a critical framework used in medical education to gauge progress and entrustment decisions.^{7,8} Direct observations of patient care encounters are essential in the appraisal of trainees, but there are obviously limits to the utility of universal prerounding in the evaluation of trainees in the current model of inpatient care.

Most residents are not taught how to preround, leaving the practice to local culture and tradition. In fact, time studies have shown that in a typical workday, PGY-1 residents only spend about 13% of the time with their patients, indicating an extreme time compression in favor of activities away from the bedside.⁹ Ideal patient-physician relationships are not built from rushing through a haphazard, sleepy interview at six in the morning. Selectively removing physical prerounding on stable patients can allow residents to spend additional time before formal rounds gathering necessary chart information and intentionally thinking through each patient encounter. When they visit patients, instead of focusing on the quantity of patients they can see before formal rounds begin, they can spend more quality time with them.

Removing physical prerounding works best when paired with bedside formal rounds to allow the team to create a unified plan of care based on the patient's history and exam. It can also help to set expectations preemptively with stable patients that they may not be seen until later in the morning. During rounds, if a patient is not seen, the learner can explicitly describe the most relevant components of the encounter that will help guide their plan for the day. Residents and students can present the questions they will ask

the patient and the exam findings they are looking for with multiple potential, action plans based on what they discover during the visit. This may allow attendings to better identify a gap in diagnostic reasoning when learners are not able to clearly identify pertinent positives and negatives in the history and exam. In fact, the choices made by team members of whom "to see or not to see" may be used as an additional anchor for understanding the trainee's progression in key milestone areas such as systems-based practice, medical knowledge, professionalism, and of course, patient care.⁷

Regardless of what side of the prerounding coin you may land on, all of us agree that prerounding has incredible utility in the care of patients in the clinical learning environment. Additionally, prerounds should be patient-centered and efficient, and enhance trainee learning and thereby the quality of care we provide. While prerounding may not be a one-size-fits-all mandate or practice, understanding when and where to do so speaks further to the benefit of experience and very intentional planning in success during a busy day caring for hospitalized patients. ■

References

- Schubach A, Ricotta D, et al. To pre-round or not to pre-round. *N Engl J Med.* 2024;390(19):1824-6.
- Hartley S, Heidemann L, et al. Counterpoint: The value of including patients in prerounding. *J Hosp Med.* 2023;18(5):460-2.
- Ue F, and Kaminski M. Rebuttal: Routine prerounding with patients. *J Hosp Med.* 2023;18(5):463-4.
- Hulland O, Farnan J, et al. What's the purpose of rounds? A qualitative study examining the perceptions of faculty and students. *J Hosp Med.* 2017;12(11):892-7.
- Ricotta DN, Freed JA, et al. Things we do for no reason™: card flipping rounds. *J Hosp Med.* 2020;15(8):498-501.
- Kinnear B, DeCoursey B, et al. Things we do for no reason™: toxic quizzing in medical education. *J Hosp Med.* 2022;17(6):481-4.
- Accreditation Council for Graduate Medical Education. Internal medicine milestones. ACGME website. https://www.acgme.org/globalassets/pdfs/milestones/internalmedicine_milestones.pdf. Published July 1, 2021. Last updated November 2020. Accessed October 25, 2024.
- Rodriguez RG, and Pangaro LN. AM last page. Mapping the ACGME competencies to the RIME framework. *Acad Med.* 2012;87(12):1781.
- Rosen MA, Bertram AK, et al. Use of a real-time locating system to assess internal medicine resident location and movement in the hospital. *JAMA Netw Open.* 2022;5(6):e2215885. doi: 10.1001/jamanet-woropen.2022.15885.

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Part II From Abroad to Bedside: IMGs in the U.S. Healthcare System

Applying to U.S. medical residency, and perceptions of the U.S. healthcare system

By **Nikolai Emmanuel Bayro Jablonski**

Part I of this two-part series focused on the academic milieu surrounding international medical graduates (IMGs), the perception of the country of origin, and migrating to the U.S. This article focuses on applying to U.S. medical residency, perceptions of the U.S. healthcare system, and the overall impact of IMGs in the U.S.

We continue the discussion with Moisés Auron, MD, an academic med-peds hospitalist at the Cleveland Clinic and a professor of medicine and pediatrics at the Cleveland Clinic Lerner College of Medicine of Case Western Reserve University in Cleveland, Patricia Santos, MD, MBA, an assistant professor of medicine at the division of hospital medicine, and the associate chief of quality and the safety chair for the hospital medicine division and the oncology co-management service at the Albert B. Chandler Hospital at the University of Kentucky in

Lexington, Ky., Gabriel Tse, MD, faculty in the division of pediatric hospital medicine at Lucile Packard Children's Hospital, Stanford University School of Medicine in Stanford, Calif., and Priya Joseph, MD, the specialty medical director for Carolinas Hospitalist Group at Atrium Health Carolinas Medical Center in Charlotte, N.C.

Applying for U.S. medical residency

"I had never heard of the term 'IMG' and I didn't necessarily understand the implications of being an IMG and the potential struggle of going back to the U.S. or Canada," Dr. Tse said about his experience applying for a fellowship in the U.S. "So, it's never explicitly said, right, but I think there's this underlying assumption that by having trained



Dr. Tse

in a different health system or different country, you are a less desirable applicant and therefore a worse doctor, which is not true, [and makes being an IMG even more] challenging. But I think when I was applying to these programs, [I felt like maybe I was] an inferior applicant to these U.S. medical graduates or Canadian medical graduates."

Dr. Tse says a resignification of the term IMG could prove useful. "I wonder if there's a way [to] go back to the data, to analyze the IMGs who have been most successful and see what those specific characteristics were and build your admissions based on that. I think that would make sense, taking a data approach rather than a subjective, biased approach. A more data-driven approach seems fairer in the end."

Perception of the U.S. healthcare system

As foreigners with experience in different healthcare settings, IMGs are in a unique position to



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analyze the U.S. healthcare system. We explored this topic with our interviewees, touching on themes of medical waste and the administrative complexity of medical

assistance, as well as the focus on academics and research that U.S. training programs have.

“Now being in the system, I will say that the U.S. spends a lot on health-care,” Dr. Santos said.

“Expenses are the highest in the world, but our patient outcomes are



Dr. Santos

not any better, or even worse, than other first-world countries. There’s a lot of medical waste, we have to work on high-value care to [improve on this]. The U.S. healthcare system is good because most patients get care, but there certainly have to be some guardrails in terms of the things we can order, to [adjust to the inflation of prices while providing good medical care].”

She says that in the U.S. “we assume insurance will cover the costs of medical care, so we order whatever we need when our patients are admitted to the hospital. The burden of thinking about the patients’ financial health is not with us because there are insurance companies or [other institutions that take that role].”

“From a systems perspective, the U.S. healthcare system is completely different than any other,” Dr. Tse said. “There’s a huge amount of administrative complexity, and I think there are more conversations about money, [specifically regarding insurance policies] in the U.S. healthcare system than I appreciated when I was in the U.K. or Canada. That shocked me when I first started [my training here].”

Dr. Tse said the facts that medical institutions are well-funded from an academic perspective and that there are more research opportunities here than in Canada were the main motivators for pursuing his training in the U.S. “The U.S. has highly prestigious medical institutions, and it’s a great place to get your training, that’s what attracted me to come here for fellowship. There are a lot of opportunities here,” he said.

Dr. Auron says medical attention is more practical in the U.S. “There are certain things that, perhaps, are too practical and lack a little more detail,” he said. “There are things that in Mexico are more detailed but less practical. I was able to start combining the two things”.



Dr. Auron

Impact of IMGs on the U.S. healthcare system

The final topic explored by our interviewees was the perceived impact IMGs have on the U.S. healthcare system. Dr. Santos talked about the role IMGs have played in ensuring healthcare accessibility. “I will say that IMGs are crucial to assure that patients in underserved areas get [proper medical care],” she said. “There are some IMGs who, after training, need to fulfill their waiver, and they are assigned to underserved areas. It’s a long conversation about that system, although it has helped somehow to assure that these underserved areas have good doctors.”

Dr. Tse says his experience in multiple healthcare systems has allowed for a continued discussion of otherwise routine clinical practices. “I think the risk [of staying at a single institution] is that [you] think there’s only one way of doing things,” he said. “Because I’ve moved so much, it’s easy for me to question things and wonder, ‘Hey, I’ve never seen things done like that, like is there a reason? I find that that’s what I do quite a bit and just question ‘Why do we do things that way?’, which leads to a discussion about [the topic], and a [review of the evidence that supports that specific practice]. It’s kind of difficult to quantify, but I feel like I have a broad perspective [about medicine]. That’s what happens when you move around and see different institutions. I think that is really valuable.”

When reflecting upon their

home healthcare systems, Dr. Santos and Dr. Auron recognize high-value care as being an inherent quality to them, and something that IMGs bring with them when migrating to the U.S.

“As someone who has been in a resource-poor setting, I still am cognizant of high-value care. I still ask myself, ‘Does the patient really need another blood draw today? Does the patient need an MRI? Is my pretest probability for this diagnosis low enough that I don’t need an MRI to [confirm] that?’” Dr. Santos said. “There’s also this one experience that always stuck with me. In the Philippines, the suture kits are reusable. You usually sterilize them after usage, you don’t throw them away. In the U.S., most kits are a one-time use. So, there was one time I was opening the suture kit and there were these perfect pair of scissors I had to throw away after using them. It felt like a great waste. I think I’m more aware of just the medical waste and thinking with a mindset of high-value care in a resource-rich country like this.”

Dr. Auron agrees. “In Mexico, since we do not have all the resources, or it is expensive and patients have to pay, we are very careful when we ask for diagnostic studies and resources,” he said. “In the U.S., resources are asked for indiscriminately. High-value medicine is something that IMGs bring with them. In the U.S., it is assumed that things have to happen, that if the patient has to have an MRI, it has to happen, and that the insurance is going to pay for it. People then don’t stop themselves to think about the cost of things, and that sometimes, the patient will be the one paying for it.”

Providing high-value care and keeping costs in mind are both possible through careful balancing.

“You don’t want to be on the extreme where you don’t do things because you’re worried about resources, nor where you order everything because resources are not an issue,” Dr. Santos said. “As a physician, you have to be in that sweet spot where the patients get the care that they need, without

implying a huge waste to the healthcare system. You have to be able to practice good medicine without overdoing either side.”

Dr. Joseph reflected on the impact that migrating to the U.S. has had on her ability to cope with difficult situations. “Having moved from one medical system very focused on communicable



Dr. Joseph

diseases to another where the disease spectrum is very different, and having gone through so much change and hardships has helped me be more resilient and less likely to burn out compared to what I see with my colleagues,” she said. “There’s a lot of talk about resilience and physicians getting burned out and wanting to work fewer shifts and retire early. The pandemic played a big part in that; I think it professionally aged many of us. But being a foreign medical graduate helped me be more resilient through these last few years.”

Conclusion

Our exploration of the IMG experience in the U.S. healthcare system reveals a multifaceted narrative. IMGs bring a wealth of experience and knowledge from diverse healthcare settings, often honed in resource-limited environments. This fosters a focus on high-value care and a questioning of routine practices, potentially leading to positive systemic changes. Additionally, IMGs play a critical role in ensuring healthcare access in underserved areas. However, their journey is not without challenges, often navigating complex healthcare systems while adapting to a different culture and overcoming the perception of being “less desirable” as applicants. As the U.S. healthcare system grapples with its issues, recognizing the value proposition of IMGs and fostering a smoother integration process can lead to a more robust and culturally rich medical workforce. ■



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Interpretation of Serum Ammonia Level

By Jonathan McIntyre, MD,
Stephen Antonucci, MD,
Catherine E. Firestein, MD,
MPH, FHM, and Maryann
Ally, MD, MPH, FHM

A 77-year-old woman with a history of hepatitis C cirrhosis presents to the emergency department with 24 hours of progressive confusion and disorientation. Physical exam is notable for fluctuating levels of consciousness, disorientation to time and place, asterixis, brisk deep tendon reflexes, and a positive fluid wave. Labs were notable for AST 85 IU/L (normal, 10 to 40 IU/L), ALT 70 IU/L (normal, 7 to 56 IU/L), and total bilirubin 2.5 mg/dL (normal, 0.1 to 1.2) mg/dL. Ammonia level was elevated at 160 $\mu\text{mol/L}$ (normal, 15 to 45 $\mu\text{mol/L}$).

Brief overview

Hyperammonemia

Encephalopathy is a common and confounding problem faced by hospitalists. The differential diagnosis of encephalopathy includes numerous and diverse etiologies such as infection, adverse effects of medications, primary central nervous system pathology, and hyperammonemia. Physicians often check the serum ammonia when evaluating a patient who presents with an altered mental status of unknown etiology. The results are typically available within a few hours and the standard capabilities of most hospital laboratories.

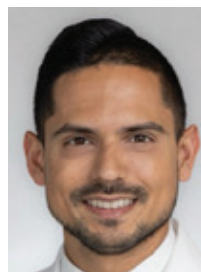
Hyperammonemia is critical to include in the differential diagnosis of patients presenting with encephalopathy. Failure to identify and treat hyperammonemia can lead to severe neurological complications and even mortality. The neurotoxic effects of elevated ammonia levels on the brain precipitate a rapidly progressing encephalopathy with potentially fatal outcomes.¹ Symptoms may range from confusion and agitation to seizures. Severely elevated ammonia levels exceeding 200 $\mu\text{mol/L}$ can induce astrocyte swelling and increased intracranial pressure, resulting in cerebral edema and



potentially cerebral herniation.¹ Management typically involves medications to reduce gut ammonia, such as osmotic laxatives (e.g., lactulose), and antibiotics such as rifaximin.² Additional therapies may involve reducing protein intake, discontinuing potential offending medications, and administering urea cycle enhancers such as L-ornithine with L-aspartate (LOLA), or urea cycle scavengers like sodium benzoate.³ In cases of severe hyperammonemia (greater than 150 to 200 $\mu\text{mol/L}$), prompt initiation of hemodialysis should be considered.

Hyperammonemia and liver disease

Approximately 2.2 million adults in the U.S. have cirrhosis, 40% with complications such as hepatic



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Key Points

- The utility of checking a serum ammonia level in hepatic disease has been debated, and current data suggests it is not necessary for the diagnosis of hepatic encephalopathy as ammonia levels are inconsistently elevated in patients with HE.
- In patients with grade 3 or 4 HE and normal or low ammonia, it is important to look for other causes of encephalopathy including infection and systemic inflammation.
- Etiologies of hyperammonemia include liver dysfunction, medications (VPA, glucocorticoids, salicylates), gastrointestinal bleeding, infection (*Mycoplasma hominis* or *Ureaplasma* species), portosystemic shunts, seizures, and urea enzyme deficiencies.

encephalopathy (HE).^{4,5} Hospital length of stay is longer for patients with HE versus those with liver diseases without HE, and it is considered a common cause for hospital readmission.⁶ Ammonia is the primary neurotoxin associated with the altered mental status of HE, however, checking ammonia serum level is considered controversial. According to the American Association of Liver Diseases, serum ammonia level does not reliably diagnose HE. While higher levels do generally correlate with the severity of HE, these levels are inconsistently elevated in venous

samples from HE patients. In one study, 69% of patients with known liver disease and no clinical evidence of HE were found to have elevated ammonia levels.⁷ An elevated serum ammonia can be used to predict the likelihood of a cirrhotic patient developing HE and can be a risk factor for future hospitalizations due to liver disease.⁸⁻¹⁰ Lastly, it is important to note that serum ammonia levels can be used to monitor the effect of ammonia-lowering medications.

Hepatic encephalopathy severity is based on a grading scale. The West Haven criteria is most often

Quiz:



1. Which of the following is the most common clinical symptom of hyperammonemia?

- Seizures
- Jaundice
- Confusion
- Diffuse maculopapular rash

Answer: C Hyperammonemia often leads to neurological symptoms such as confusion, lethargy, and irritability. Seizures may occur in severe cases, but confusion is the most common presenting symptom.

2. A 45-year-old woman with epilepsy and type 2 diabetes mellitus presents with a urinary tract infection with a urine culture growing *Proteus*. She develops confusion and lethargy. Her medication list includes insulin, acetaminophen, aspirin, and valproic acid. Which of these medications would possibly be implicated in contributing to her clinical picture?

- Insulin
- Valproic acid
- Aspirin
- Acetaminophen

Answer: B Valproic acid, commonly used to treat epilepsy and bipolar disorder, is known to induce hyperammonemia by impairing the urea cycle, leading to elevated ammonia levels in the blood. Acetaminophen, insulin, and aspirin are not typically associated with causing hyperammonemia as a side effect.

used and has four grades: Grade 1, inattention and subtle changes; Grade 2, disorientation and lethargy; Grade 3, somnolence and stupor but responsiveness to stimuli; and Grade 4, coma. There is often significant variation in ammonia levels at any grade of HE.¹¹ Low or normal serum ammonia levels can be seen in patients with cirrhosis, though not typically during more severe episodes of acute HE. However, in the most severe cases such as grade 3 or grade 4 HE, a normal or low ammonia value should cast doubt on the diagnosis of hepatic encephalopathy, as severe HE is more likely to be associated with elevated ammonia.^{7,12} This contrasts with grade 1-2 HE when ammonia levels are found to have greater variability and may be low or normal despite hepatic encephalopathy being the cause of the patient's altered mentation. In patients with grade 3 or 4 HE and normal or low ammonia, it is important to look for other causes of encephalopathy including infection and systemic inflammation, both of which can be associated with higher grade HE.¹³

On relatively rare occasions, patients with altered mental status and no known liver disease have elevated ammonia levels. The diagnosis of new-onset liver disease is still possible and must be evaluated along with other, rarer, diagnoses. It is also important to consider acute liver failure, which is typically discernible from the patient's medical history, physical examination, and additional serum laboratory assessments.

Additional etiologies of hyperammonemia

The most common cause of elevated ammonia is hepatic dysfunction, due to the liver's inability to break down ammonia into urea.²

Other etiologies of elevated ammonia levels are classified into two major categories:

- Increased ammonia production: epileptic seizures, steroid use, gastrointestinal hemorrhage, and complications after a lung transplant.
- Decreased ammonia excretion: portosystemic shunts, medications that impair ammonia metabolism, and inborn errors of metabolism such as urea cycle disorders.¹⁴

Epileptic seizures with muscle contractions can increase ammonia levels secondary to protein breakdown through increased metabolic demand or through myoglobin release from skeletal muscle when rhabdomyolysis occurs.

Glucocorticoids can increase ammonia levels through the increased breakdown of serum protein and skeletal muscle into amino acids leading to increased production of ammonia. Glucocor-

ticoids can also interfere with the nitrogen metabolism in peripheral tissues leading to ammonia accumulation.

Gastrointestinal bleeding can increase serum ammonia levels, especially in those with cirrhosis or underlying liver dysfunction. This occurs when blood proteins such as hemoglobin are rapidly catabolized and absorbed in the setting of impaired liver metabolic function. The ammonia waste products cannot be converted into urea by the liver.¹⁵

Severe hyperammonemia can also be seen as a rare but fatal cause of coma in the immediate post lung transplant period, affecting 1% to 4% of patients, due to systemic infection. *Mycoplasma hominis* or *Ureaplasma* species are known causes of hyperammonemia as they consume urea as an energy source and produce ammonia as a waste product.¹⁶

Of the secondary causes that decrease ammonia excretion, portosystemic shunts are particularly well documented.¹⁷ The liver converts ammonia into urea; however, after a transjugular intrahepatic portosystemic shunt (TIPS) procedure, the liver is bypassed as ammonia is shunted from the portal vein to the hepatic vein and into the circulation.

Common medications that can raise the ammonia level by interfering with the urea cycle include valproic acid (VPA), salicylates, and glutamine. Medication-induced hyperammonemia is often associated with chronic use or acute overdose of VPA, typically leading to plasma VPA concentrations 80 mcg/dL or higher. A study conducted in a hos-

pital setting found that approximately 20% of patients receiving VPA developed hyperammonemia; 8% were diagnosed with VPA-induced hyperammonemia with 16% being symptomatic.¹⁸

Another rare cause of hyperammonemia in adults is full or partial urea-cycle enzyme deficiencies (UCDs). UCDs occur in approximately 1 in 8,200 live births in the U.S.¹⁹ While patients with full UCDs present in the newborn period or early in childhood, those with partial deficiencies often present later due to their mild symptoms. Additionally, patients with ornithine transcarbamylase deficiency may present later in life.²⁰ In patients with only partial deficiencies, hyperammonemia may be more chronic or appear only during metabolic decompensations or periods of catabolic stress.

Application of data to original case

In our patient the elevated ammonia level was not diagnostic of HE, however, it does support the likely diagnosis of HE in the setting of asterixis, ascites, transaminitis, and encephalopathy. Other etiologies of her encephalopathy should be ruled out.

Bottom line

Hyperammonemia has a broad differential with potential morbidity and mortality. The utility of serum ammonia level in liver disease is controversial and likely of low yield due to the variability of ammonia levels in different grades of HE. ■

References

- Shakerdi L, and Ryan A. Drug-induced hyperammonemia. *J Clin Pathol*. 2023;76(8):501-509.
- Clay AS, and Hainline BE. Hyperammonemia in the ICU. *Chest*. 2007;132(4):1368-1378.
- Seethapathy H, and Fenves AZ. Pathophysiology and management of hyperammonemia in organ transplant patients. *Am J Kidney Dis*. 2019;74(3):390-398.
- Tapper EB, and Parikh ND. Diagnosis and management of cirrhosis and its complications: a review. *JAMA*. 2023;329(18):1589-1602.
- Elsaid MI, John T, et al. The health care burden of hepatic encephalopathy. *Clin Liver Dis*. 2020;24(2):263-275.
- Devarbhavi H, Asrani SK, et al. Global burden of liver disease: 2023 update. *J Hepatol*. 2023;79(2):516-537.
- Ong J, Aggarwal A, et al. Correlation between ammonia levels and the severity of hepatic encephalopathy. *Am J Med*. 2003;114(3):188-193.
- Vilstrup H, Amodio P, et al. Hepatic encephalopathy in chronic liver disease: 2014 practice guideline by the American Association for the Study of Liver Diseases and the European Association for the Study of the Liver. *Hepatology*. 2014;60(2):715-735.
- Bloch J. Why shouldn't ammonia be used in the diagnosis and management of hepatic encephalopathy? American Association of Liver Disease website. <https://www.aasld.org/liver-fellow-network/core-series/why-series/why-shouldnt-ammonia-be-used-diagnosis-and-management>. Published Sept 28, 2023. Accessed October 27, 2024.
- Patwardhan VR, Jiang ZG, et al. Serum ammonia is associated with transplant-free survival in hospitalized patients with acutely decompensated cirrhosis [corrected] [published correction appears in *Clin Spine Surg*. 2020;54(1):95. doi: 10.1097/BSD.0000000000000888]. *J Clin Gastroenterol*. 2016;50(4):345-350.
- Haj M, Rockey DC. Ammonia levels do not guide clinical management of patients with hepatic encephalopathy caused by cirrhosis. *Am J Gastroenterol*. 2020;115(5):723-728.
- Deutsch-Link S, and Moon A. The ongoing debate of serum ammonia levels in cirrhosis: the good, the bad, and the ugly. *Am J Gastroenterol*. 2023;118(1):10-13.
- Bajaj J, Lauridsen M, et al. Important unresolved questions in the management of hepatic encephalopathy: An ISHEN consensus. *Am J Gastroenterol*. 2020;115(7):989-1002.
- Elgouhari HM, and O'Shea R. What is the utility of measuring the serum ammonia level in patients with altered mental status? *Cleve Clin J Med*. 2009;76(4):252-254.
- Olde Damink SW, Dejong CH, et al. Upper gastrointestinal bleeding: an ammoniagenic and catabolic event due to the total absence of isoleucine in the haemoglobin molecule. *Med Hypotheses*. 1999;52(6):515-519.
- Lichtenstein GR, Yang YX, et al. Fatal hyperammonemia after orthotopic lung transplantation. *Ann Intern Med*. 2000;132(4):283-287.
- Watanabe A. Portal-systemic encephalopathy in non-cirrhotic patients: classification of clinical types, diagnosis and treatment. *J Gastroenterol Hepatol*. 2000;15(9):969-979.
- McMorris T, Chu A, et al. Hyperammonemia in patients receiving valproic acid in the hospital setting: A retrospective review. *Ment Health Clin*. 2021;11(4):243-247. doi:10.9740/mhc.2021.07.243
- Brusilow SW, and Maestri NE. Urea cycle disorders: diagnosis, pathophysiology, and therapy. *Adv Pediatr*. 1996;43:127-170.
- Bélanger-Quintana A, Arrieta Blanco F, et al. Recommendations for the diagnosis and therapeutic management of hyperammonemia in paediatric and adult patients. *Nutrients*. 2022;14(13):2755.

SIG Spotlight: Palliative Care

The bread-and-butter hospital work

By Richard Quinn

For Elizabeth Gundersen, MD, FAAHPM, FHM, chair of SHM's Palliative Care Special Interest Group, caring for patients at the end of their lives is a labor of love.

But, in death just like life, love needs work.

"I do a lot of teaching, and I do a lot of teaching to medical students about what palliative care is," said Dr. Gundersen, associate professor of hospice and palliative medicine at the University of Colorado School of Medicine in Aurora. "I was explaining it one day to a group of medical students, and I said, oh, well, we really try to see the patient as a person, try to keep them at the center of their care and understand what their goals are and what is valuable to them, and we focus on communication and symptom management and improving their quality of life. And this one medical student looked at me and said, 'I don't get it.' And I explained it again, and he said, 'I don't get it. Isn't that all medicine?' And I said, 'Yeah, it should be.'"

Dr. Gundersen's path to palliative care came before medical education focused more on communication and caring for patients with serious illnesses.

"We didn't get a lot of training about pain or other symptom management," she said. "And so, of course, when we're out practicing, we're learning on the job, so to speak. And, when you are having conversations with patients and families about the fact that they're seriously ill, or about the fact that they're dying, those are some of the hardest conversations out there.

"And if you've not been trained in it, it's not going to be easy for you. You're going to flounder and it's going to feel hard. And because of that, this becomes an area that's tough to embrace."



Dr. Gundersen

That, however, is a big part of the SIG's beauty, to Dr. Gundersen.

"Our hope is that we can impart these skills to every hospitalist," she said. "And believe me, I see a lot of hospitalists who do a wonderful job taking care of patients who are seriously ill or near the end of life. I'm not saying that palliative medicine-trained people are the only ones who can do this well. But there are other physicians who I see struggling with it.

"So, I agree wholeheartedly that we offer something that benefits all comers. We talk about 'primary palliative care' skills as skills that every hospitalist should have. And not just for the patients, but I think if you're a hospitalist and you feel more comfortable and skilled in these settings, taking care of seriously ill patients and patients at the end of life, it helps you feel good about the care you're providing, too."

Dr. Gundersen notes that unlike some more diagnostic or treatment skills—what's the best anticoagulant to use, or what tests should be ordered—palliative care is often more about a framework than specific advice.

"We're presenting a scaffolding," she said. "People talk about the art and science of medicine, and this is one of those cases because even, for instance, with communication, we have useful phrases to use and useful approaches for these conversations, but you can say something to one patient or one family member that lands really well, and then you can say the same thing to a different patient or family, and it lands really poorly. The patient or family member might get upset or angry. Part of this is also learning how to be flexible and fluid in these situations. I feel that's a skill in and of itself, as well."

Another skill set in palliative care

that is a bit nonintuitive to healthcare—where mistakes can be deadly—is recognizing and verbalizing missteps.

"I always tell people when you're learning these primary palliative care skills, part of it is having the skills, and part of it is having a certain orientation," Dr. Gundersen said. "Where you are willing to show up as a human and connect with patients on a very human level. So, it's not uncommon for us, during our conversations with patients and families, to stop mid-sentence, and say something like, you know what, this isn't coming out of my mouth the right way. Let me start over."

Dr. Gundersen believes that the future of palliative care for hospitalists is well-positioned. The SIG will be holding elections for new leaders, and the past year has seen a series of webinars that helped provide resources. She also routinely promotes the annual mini track at SHM's Converge as another chance for all hospital medicine practitioners to learn more about the specialty.

"This is just good medicine," Dr. Gundersen said. "Serious illness care is just good medicine. This, to me, is bread-and-butter hospitalist work, because that is the nature of our roles. We are meeting patients in the hospital at a time when they are the most vulnerable, and there's no way to separate this from our daily work." ■

Richard Quinn is a freelance writer in New Jersey.





Chapter Spotlight: Long Island

Introducing the next generation to hospital medicine

By Richard Quinn

For some early career hospitalists, it can take years to realize the value of networking. Some practitioners in their first years on the job can get caught up in the day-to-day work and not appreciate the insights and importance of talking to the people who did that job before them.

Not Rasan Cherala, MD, and not the SHM Long Island Chapter he now leads as president.

“As a trainee and a new budding hospitalist, having that ability to network with other people who have been through similar experiences that I’ve been through is important,” he said. “But also as someone who has a large interest in getting into the administrative aspect of hospital medicine, it has been a great opportunity to meet with other leaders in hospital medicine both locally and on a national level.”

Dr. Cherala, an attending hospitalist at Stony Brook Medicine in Stony Brook, N.Y., sees attracting younger hospitalists to the chapter as “the driving focus.”



Dr. Cherala

“This year we’ve instituted both a medical student liaison and a medical resident liaison, which are kind of newer positions than what we’ve had in the past, with the idea of targeting that younger population,” he said.

“We’ve actually had a number of medical students and residents come to our last hospitalist meeting...it’s interesting because a lot of them know about different subspecialties, but they had no clue what hospital medicine was. I think it’s a great introduction to them to know exactly what being a hospitalist means.”

But whether it’s residents or relative veterans, the sales pitch of teamwork and networking is what Dr. Cherala touts as the chapter’s value.

“Oftentimes, hospitalists at each of (our local) health systems are siloed,” he said. “And their experience is limited to the health system that they work in. It can feel like the problems you deal with on a day-to-day basis are unique to your institution. But it’s very common to see those challenges across different hospital systems, and having access to the ideas and other interventions that hospitalists are doing at other institutions can give you a broader perspective in dealing with those issues.”

Take burnout, perhaps the pre-eminent issue facing a generation

of hospital staffers who have spent years dealing with the COVID-19 pandemic and its wake.

“When you’re starting out as a new hospitalist, or even as a more experienced hospitalist, the field is demanding. You have increasingly sicker patients. Our hospital volumes are going up. I think being able to connect with both your patients and your surrounding community of hospitalists helps prevent you from burning out.”

Collaboration doesn’t end with Long Island hospitalists or hospitals, though. Dr. Cherala is also working with the nearby New York City chapter.

“For us, the challenge is bringing people together from a wider geographic spread,” he said. “Because I think a lot of people don’t realize you can drive three hours on Long Island from the tip to the city.”

Some people live much closer to the city, and some people live far out east. We have been working to have our chapter meetings in different locations across the island to kind of allow for people from both ends of the island to come and be present and part of the chapter.”

One facet of that collaboration is a poster competition, always one of the more popular annual features of a chapter. The resident and medical student abstract

competition was held at the end of November.

“It is something we’ve been working on a lot with the New York City chapter to push for, I think, both as an experience to continue this outreach toward medical students and residents, but also to give them a little bit broader exposure to what happens at Converge and on the national level of SHM,” Dr. Cherala said. “That’s a large initiative that we’re working on currently that we’re all pretty excited about.”

Dr. Cherala’s approach to cultivating younger members, participants from multiple health systems, and participants from the widest possible geographic swath is to have a more “unified” chapter in five years.

“A more unified membership where we have that inter-hospital network collaboration,” he said. “And where we have regular attendance of both hospital leaders and hospitalists from all those different hospital systems.”

“I think, traditionally, in the past, there has been an alternating leadership between one health system and the other. And I think part of the value of having an SHM Long Island chapter is having people from all of those different systems together.” ■

Richard Quinn is a freelance writer in New Jersey.

When Should I Transfuse My Adult Hospitalized Patient Who Has Anemia?

A 2024 update to a 2017 article

By Rebecca Berger, MD, Hemal N. Sampat, MD, and Farrin A. Manian, MD, MPH

Case

An 82-year-old woman with chronic lymphocytic leukemia complicated by anemia of chronic disease (baseline hemoglobin [Hgb] 9-10 g/dL) and a history of non-ST elevation myocardial infarction two months prior, presents to the emergency department (ED) after a mechanical fall resulting in right femoral neck fracture. She reports significant hip pain but has no chest pain, shortness of breath, or dizziness. Her pulse is 95 beats per minute, her blood pressure is 140/80 mmHg, and her respiratory rate is 14 breaths per minute. A complete blood count reveals a hemoglobin level of 7.4 g/dL. She has normal troponins and an electrocardiogram without ischemic changes. The orthopedic surgeon is planning to perform open reduction and internal fixation for her femoral neck fracture. You are consulted for preoperative evaluation. Should you recommend a transfusion of packed red blood cells (pRBCs)?

Overview

Hospitalists frequently are asked whether their hospitalized patients would benefit from a transfusion of packed red blood cells. In patients who are hemodynamically unstable or symptomatic, transfusion should be guided by these clinical criteria. However, in patients who are stable and asymptomatic, the decision to recommend transfusion requires understanding the best available evidence and updated guidelines, while incorporating patient preferences.

In 2017, we wrote in *The Hospitalist* about the decision on when to transfuse an inpatient with anemia based on the clinical practice guidelines from the American Association of Blood Banks (AABB). The 2016 guidelines supported

restrictive transfusion strategies over liberal ones, with a hemoglobin threshold of 7 g/dL for hemodynamically stable hospitalized adult patients, including critically ill patients, and a threshold of 8 g/dL for patients undergoing orthopedic surgery, cardiac surgery, and those with preexisting cardiovascular disease (strong recommendation, moderate quality evidence). Patients with acute coronary syndrome, severe thrombocytopenia, and chronic transfusion-dependent anemia were excluded from the 2016 recommendations due to insufficient data.

In 2023, a panel of international experts published updated AABB international guidelines on transfusion thresholds for hospitalized adults. The authors performed a meta-analysis of 45 randomized



Dr. Berger



Dr. Sampat



Dr. Manian

Dr. Berger is a hospitalist at New York-Presbyterian/Weill Cornell in New York. Dr. Sampat is a hospitalist at Massachusetts General Hospital in Boston. Dr. Manian is a hospitalist and chair of the department of medicine at Mercy Hospital in St. Louis.

controlled trials (RCTs) of adults, enrolling 20,599 participants, each comparing restrictive transfusion thresholds (Hgb 7-8 g/dL) to liberal transfusion thresholds (Hgb 9-10 g/dL). Among the 30 trials that evaluated mortality as an outcome, the pooled relative risk was 1.00 (95% CI, 0.86 to 1.16), suggesting no difference in mortality outcomes between restrictive and liberal transfusion strategies (also noting that patients in restrictive strategy groups were 32.4% less likely to receive a transfusion). Pooled analyses also found no apparent differences in morbidity outcomes between the two strategies.

Given the potential risks of blood transfusions and the fact that blood is a limited resource, the authors began with the premise that restrictive transfusion strategies should be favored if they do not adversely impact patient outcomes. Therefore, the 2023 guidelines again favor restrictive transfusion strategies, a recommendation supported by moderate quality evidence.

The panel recommends different transfusion thresholds for different patient populations as follows:

- Hgb <7 g/dL for hemodynamically stable hospitalized adult patients (strong recommendation, moderate certainty evidence)
- Hgb <7 g/dL for patients with hematologic and oncologic disorders (conditional recommendation, low certainty evidence)
- Hgb <7.5 g/dL for patients undergoing cardiac surgery
- Hgb <8 g/dL for patients undergoing orthopedic surgery
- Hgb <8 g/dL for patients with pre-existing cardiovascular disease

In this article, we review the

data supporting the new recommendation for patients with hematologic and oncologic disorders and the data to support the higher transfusion thresholds for patients undergoing orthopedic surgery. We also review the mixed data around transfusion thresholds for patients with acute coronary syndrome and acute myocardial infarction, leading the panel again to not recommend for or against a liberal or restrictive transfusion threshold for patients with acute myocardial infarction.

Application to the case

Patients with hematologic and oncologic disorders

One of the most notable updates to the 2023 AABB guidelines is a new recommendation supporting a transfusion threshold of Hgb <7 for patients with hematologic and oncologic disorders, though this is a conditional recommendation based on low certainty evidence. The prior 2016 AABB guidelines excluded this group from the recommendations due to limited evidence.

Small feasibility studies demonstrated that studying transfusion in patients with acute leukemia or stem cell transplantation was feasible and that restrictive transfusion strategies did not increase bleeding events in patients with acute leukemia. In 2020, investigators published a randomized, open-label, phase III noninferiority trial that randomized 300 patients with hematologic malignancies undergoing hematopoietic stem cell transplantation to restrictive (Hgb <7 g/dL) or liberal (Hgb <9 g/dL) RBC transfusion strategy. Patients randomized to the restrictive strategy scored higher on

Key Points

- The 2023 AABB guidelines recommend RBC transfusion for stable general medical inpatients to a hemoglobin level of 7 g/dL.
- Patients with hematologic and oncologic disorders should also be transfused to goal hemoglobin <7 g/dL, though with low certainty evidence supporting this recommendation.
- Higher hemoglobin transfusion thresholds are recommended for patients undergoing orthopedic surgery (Hgb <8 g/dL), patients with pre-existing cardiovascular disease (Hgb <8 g/dL), and patients undergoing cardiac surgery (Hgb <7.5 g/dL) as the safety of lower thresholds has not been adequately studied in these patient populations.
- Patients with hemodynamic instability, active blood loss, or symptoms of anemia should be transfused based on clinical criteria, and not absolute hemoglobin levels.
- There is no specific transfusion threshold recommended for patients with acute coronary syndrome.

health-related quality of life assessment (difference of 1.6 points; 95% CI, -2.5 to 5.6 points), with no significant differences in clinical outcomes such as transplant-related mortality, length of stay, ICU admissions, or acute graft-versus-host disease. The investigators concluded that the restrictive transfusion strategy was non-inferior to the liberal one while requiring fewer RBC units transfused (mean 2.73 units [standard deviation, 4.81 units] versus 5.02 units [standard deviation, 6.13 units]; $P=.0004$).

Despite the strength of the above study, it did not include overall mortality as an outcome and therefore could not be included in the pooled mortality estimates. Only two trials reported mortality outcomes from transfusion studies of patients with hematologic malignancies, with 149 total participants. These smaller sample sizes led to wider confidence intervals, with the upper limit of the confidence interval for 30-day mortality at 6.2%, raising concern about the possibility of increased death in the restrictive transfusion group. Among the three RCTs

that enrolled 448 participants with any hematologic or oncologic condition (not only patients with hematologic malignancy), bleeding risk also appeared to be similar in the two groups regardless of transfusion strategy.

Considering the above data, the AABB panel newly recommends a transfusion threshold of Hg <7 g/dL for inpatients with hematologic and oncologic conditions, a conditional recommendation based on low certainty evidence that there appeared to be neither harm nor increased bleeding when using a restrictive transfusion strategy.

The authors note that there is insufficient evidence to recommend a transfusion threshold in transfusion-dependent patients, such as those with myelodysplastic syndromes.

Patients with ACS

The AABB 2023 guidelines do not recommend a specific transfusion threshold or strategy for patients with acute coronary syndrome (ACS) or acute myocardial infarction (AMI) due to limited data in this

population. This recommendation is unchanged from the 2016 guidelines.

Historically, anemia has been shown to be an independent predictor of major adverse cardiovascular events in patients with ACS. Retrospective studies had conflicting conclusions on transfusion in patients with ACS as to whether anemia improved or worsened outcomes. Newer data remains mixed, as a 2013 meta-analysis concluded that in patients with ACS, a restrictive transfusion is associated with lower all-cause mortality overall. However, a 2014 retrospective study found that in patients with ACS undergoing blood transfusions who were matched with patients with similar clinical profiles, blood transfusion was associated with lower in-hospital mortality, though authors noted that the matching process was challenging, and most patients could not be adequately matched. Given the above conflicting retrospective data with a lack of randomized data, the previous 2016 AABB guidelines did not recommend for or against a liberal or restrictive transfusion strategy for patients with ACS.

More recently, a larger, randomized trial attempted to contribute higher-quality data to the literature. The 2021 Randomized Trial of Transfusion Strategies in Patients with Myocardial Infarction and Anemia, or REALITY, trial randomized 668 adults with AMI and anemia (Hgb 7 to 10 g/dL) to either a restrictive (Hgb <8 g/dL) or liberal (Hgb <10 g/dL) transfusion goal. The investigators found no significant differences between the groups in major adverse cardiac events (all-cause death, stroke, recurrent MI, or emergency revascularization) at 30 days. However, in a one-year follow-up analysis, patients randomized to the restrictive transfusion group were found to have higher rates of major adverse cardiovascular events (relative risk, 1.13), no longer meeting the pre-specified non-inferiority margin. This analysis raised concern about the safety of a restrictive transfusion strategy in patients with anemia and AMI.

Based on the mixed results from the above data, in 2023 the AABB panel again chose not to recommend for or against a specific

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transfusion threshold or strategy for patients with ACS or AMI.

In November 2023, the month after the AABB guidelines were released, investigators published the Myocardial Ischemia and Transfusion (MINT) trial. MINT enrolled 3,504 adults with AMI and anemia to a restrictive (Hgb 7 or 8 g/dL, per clinician discretion) or liberal (Hgb <10 g/dL) transfusion strategy. The investigators found no statistically significant difference in recurrent MI or death at 30 days between the two groups. However, there was a trend towards worse outcomes in the restrictive transfusion arm that was not statistically significant.

It remains unclear how data from MINT will be incorporated into future meta-analyses and guidelines. However, the totality of the data suggests that the restrictive strategy favored for almost any other indication may not be as applicable to patients with ACS.

Stable CAD and CHF

The AABB guidelines recommend a hemoglobin threshold of 8 g/dL for patients with preexisting cardiovascular disease. Patients with stable coronary artery disease and congestive heart failure have never been studied in dedicated randomized controlled trials ex-

Quiz:

1. In which of the following scenarios is RBC transfusion least indicated?

- Patient with active diverticular bleed, heart rate 125 beats/minute, blood pressure 85/65 mmHg, hemoglobin 9.7 g/dL
- Patient with sepsis in the ICU, hemoglobin 6.7 g/dL
- Patient with knee osteoarthritis and stable coronary artery disease, post-op day 1 status post total knee replacement, hemoglobin 8.2 g/dL
- Patient with rheumatoid arthritis, who becomes dizzy when standing, hemoglobin 7.4 g/dL (baseline Hgb 9 g/dL)

Answer C: A patient with coronary artery disease who recently underwent orthopedic surgery should be transfused only if hemoglobin is <8 g/dL, and this patient's hemoglobin is >8g/dL. The patient in answer choice A has active blood loss, tachycardia, and hypotension, all pointing to the need for blood transfusion irrespective of an initial hemoglobin level >8.0 g/dL. The patient in answer choice B has a hemoglobin level below the general recommendation threshold of 7.0 g/dL, and the patient in choice D is symptomatic, making transfusion appropriate in both cases.

amining liberal versus restrictive transfusion goals.

In the Transfusion Requirements in Critical Care, or TRICC, trial, which studied patients with critical illness and anemia, 26% of patients had a primary or secondary diagnosis of cardiac disease (definition unclear). Subgroup analysis found no significant differences in 30-day mortality

between treatment groups, similar to that of the entire study population. A 2016 meta-analysis suggested that restrictive transfusion strategies for patients with cardiovascular disease may increase the risk of acute coronary syndrome, though not 30-day mortality. However, this meta-analysis pooled data from patients with both acute coronary syndrome and stable

cardiovascular disease and was not sufficiently powered to draw independent conclusions about patients with stable coronary artery disease. For patients with heart failure, observational studies have suggested that anemia may be a marker for poor prognosis, but the impact of transfusions is unclear.

The AABB guidelines again recommend as they did in 2016, a hemoglobin transfusion threshold of <8 g/dL for patients with preexisting cardiovascular disease. However, the panelists do not specify the definition of preexisting cardiovascular disease. Many of the cited studies reference patients with stable coronary disease and congestive heart failure, but it is unclear whether this category should also include patients with arrhythmias, valvular disease, pericardial disease, peripheral artery disease, or other cardiovascular conditions.

Patients undergoing orthopedic surgery

Based on a review of 11 RCTs of patients undergoing orthopedic surgery randomized to different transfusion thresholds and strategies, the AABB panel recommends a transfusion threshold of Hgb <8 g/dL in patients undergoing orthopedic surgery. The panelists note

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that this number was based on the thresholds studied in the included trials and not because of any belief that a transfusion threshold of <8 g/dL would be superior to a threshold of <7 g/dL.

The landmark study that established the safety of a restrictive transfusion study in patients with hip fractures was the 2011 Functional Outcomes in Cardiovascular Patients Undergoing Surgical Hip Fracture Repair, or FOCUS, trial. The investigators randomized 2018 patients 50 years of age or older who had a history of or risk factors for cardiovascular disease and anemia (Hgb <10 g/dL) after hip fracture surgery to a liberal (Hgb <10 g/dL) or restrictive (Hgb <8 g/dL at physician discretion, or symptoms of anemia), and found no difference in death or functional outcomes (inability to walk across a room without human assistance) in 60-day follow-up between the groups. A subsequent RCT enrolled 200 patients with proximal femoral fractures and anemia at a single center and randomized them to conservative (symptoms of anemia or Hgb <8 g/dL) or liberal transfusion strategy and again found no statistically significant difference in the outcomes of mortality, hospital stay, regain of mobility or complications between the two groups.

The 2015 Transfusion Requirements in Frail Elderly, or TRIFE, trial enrolled frail elderly (age ≥65 years, nursing home residents) patients with hip fractures and randomly assigned them to a restrictive (Hb <9.7 g/dL) or liberal (Hb <11.3 g/dL) RBC transfusion strategy; this trial also found no differences in measures of daily living activities or 90-day mortality. However, on per-protocol analysis, they found higher 30-day mortality in the restrictive strategy group. Therefore, unlike the other trials above, the authors conclude that specifically in nursing home residents, a more liberal RBC transfusion strategy may have the potential to increase survival.

Most recently, in 2021 investigators published the Restrictive vs Liberal Transfusion Strategy on Cardiac Patients Undergoing Surgery for Fractured NOF, or RESULT-NOF, trial, a small feasibility study of patients undergoing surgery for femoral neck fracture, which suggested a trend towards higher rates of myocardial injury in a liberal transfusion threshold, but because of the small sample size this difference was not statistically significant.

Despite the mixed data from TRIFE and the small feasibility RESULT-NOF trial, the strength and power of the FOCUS trial allowed the panelists to recommend a restrictive transfusion strategy with a hemoglobin threshold <8 g/dL for patients undergoing orthopedic surgery.

Risks and costs of blood transfusion

Transfusion of RBCs should be performed only when necessary due to its inherent risks and costs. The most common risks of blood transfusion are transfusion-associated circulatory overload, febrile reaction, and allergic reaction, occurring in approximately one in 125, 161, and 345 transfusions, respectively. Other risks, such as transfusion-related acute lung injury, anaphylactic reactions, and transmission of bloodborne pathogens, such as hepatitis B and C and Human Immunodeficiency Virus, are much rarer. Recent literature suggests there has been a narrowing between blood supply and

demand, especially exacerbated by the COVID-19 pandemic, so blood should be preserved for individuals who need it most. Therefore, when demonstrated to be safe without negatively impacting individual patient outcomes, restrictive transfusion strategies should be favored. In fact, the AABB panel proposes research into even lower transfusion thresholds, such as hemoglobin 5-6 g/dL, to further protect our blood supply.

Back to the case

An 82-year-old woman with chronic lymphocytic leukemia, recent AMI, and impending orthopedic surgery for a femoral neck fracture with a

hemoglobin of 7.4 g/dL should be offered an RBC transfusion.

Bottom line

The 2023 AABB guidelines overall favor a restrictive transfusion strategy, recommending RBC transfusion for hemoglobin <7 g/dL for the general hospitalized population, and newly extending this recommendation to patients with hematologic and oncologic disorders. However, in certain patient populations, such as patients with known cardiovascular disease and those undergoing orthopedic surgery, guidelines recommend a higher hemoglobin threshold of <8 g/dL based on available data. ■

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Laurens County Hospital – Hospital Medicine Opportunities

Prisma Health, one of the largest medical groups in the country and South Carolina’s largest private, non-profit system, is home to more than 3,000 physicians and advanced care practitioners. We’re on a journey to transform the healthcare experience and invite you to join us!

We are looking for board-certified/board-eligible Internal Medicine or experienced Family Medicine physicians to join a dedicated team of professionals at this well-established hospital.

Ideal candidates:

- IM procedures highly desired, but not required. Simulation center training & bedside training available if needed.
- Comfort managing ICU patients with critical care consultation

Opportunity highlights:

- \$325k base salary with \$30k incentive bonus
- Professional allowance
- Paid Relocation and Malpractice with tail coverage
- 7 on/7 off schedule with 1 week of time off per year
- Additional shifts paid at a premium
- Generous benefits including retirement, health, dental and vision coverage



Community: Laurens affords community where people from surrounding areas still gather downtown to shop in our unique shops on our town square, dine at our one-of-a-kind eateries, and socialize with good friends. A place where education is a priority, and we are diligently creating economic opportunities within and around our borders. Laurens has several incredible parks allowing residents a wonderful quality of living. Lauren’s Historical Downtown Square is a beautiful focal point for the essence of our city. Offering all the components for southern hospitality and the sophistication of the larger cities, Laurens is a great place to settle.

Health System: Prisma Health is a progressive and highly integrated academic health care delivery system committed to medical excellence through clinical care, education, and research. With nearly 30,000 team members, 18 hospitals, 2,984 beds and more than 300 physician practice sites, Prisma Health serves more than 1.2 million unique patients annually. Its goal is to improve the health of all South Carolinians by enhancing clinical quality, the patient experience and access to affordable care, as well as conducting clinical research and training the next generation of medical professionals. We are a Public Service Loan Forgiveness qualified employer.

Submit CV to Natasha Durham, Physician Recruiter:
 Natasha.Durham@prismahealth.org
 View positions online @ Careers.prismahealth.org/providers



Inspire health. Serve with compassion. Be the difference.

Hospital Medicine Rounding and Nocturnist Opportunities – Columbia, SC

Prisma Health, one of the largest medical groups in the country and South Carolina’s largest private, non-profit system, is home to more than 3,000 physicians and advanced care practitioners. We’re on a journey to transform the healthcare experience and invite you to join us!

We are seeking board-certified/board-eligible Internal Medicine or Family Medicine Day Rounding and Nocturnist physicians to practice in beautiful Columbia, South Carolina.

This is an employed position within a well-established medicine service that is expanding due to increasing volume and the need for additional practice coverage. The group provides hospitalist coverage at Prisma Health Richland and Prisma Health Baptist Parkridge; Joint Commission-accredited medical centers, that offers state-of-the-art medicine.

Opportunity highlights:

- Competitive compensation package
- Manageable patient census
- Emphasis on quality care
- Professional allowance
- Paid Relocation and Malpractice with tail coverage
- 7 on/7 off schedule with 1 week of time off per year
- Additional shifts paid at a premium
- Generous benefits including retirement, health, dental and vision coverage

Prisma Health is a progressive and highly integrated academic health care delivery system committed to medical excellence through clinical care, education, and research. With nearly 30,000 team members, 18 hospitals, 2,984 beds and more than 300 physician practice sites, Prisma Health serves more than 1.2 million unique patients annually. Its goal is to improve the health of all South Carolinians by enhancing clinical quality, the patient experience and access to affordable care, as well as conducting clinical research and training the next generation of medical professionals.

Columbia, SC is the state capitol with a thriving economy and downtown revitalization. We are home to the University of South Carolina which affords rich cultural and sports entertainment options. Columbia is ideally located approximately 2 hours from the beaches of South Carolina and the Blue Ridge mountains.

****We are a Public Service Loan Forgiveness (PSLF) Program Qualified Employer! ****

Submit CV to Natasha Durham, Physician Recruiter:
 Natasha.Durham@prismahealth.org
 View positions online @ Careers.prismahealth.org/providers



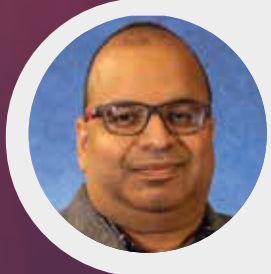
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