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# the Hospitalist




## p13 Dr. Murphy says collaborative conversations are key to hospital at home programs

Katie Gauer



IN THE NEXT ISSUE...

**Women in HM, burnout, and part two of ITL and hospital at home**

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# PHM Board Certification Process

## The unintended consequences

**By Thomas B. Mike, MD, Behnoosh Afghani, MD, Gabrielle Fisher, MD, and Richard Vo, MD**

Pediatric Hospital Medicine (PHM) was designated a subspecialty by the American Board of Medical Specialties in 2016, with certification through the American Board of Pediatrics (ABP). While this recognition was a significant milestone, many hospitalists within the PHM community are concerned that the current certification process excludes competent individuals from our field and will have unintended consequences for physicians and the children we serve.

### The narrow path to certification

With the introduction of PHM certification came a practice pathway whereby pediatric hospitalists could achieve certification without fellowship, provided they met a strict set of criteria set forth by the ABP. Although some modest concessions were made to these criteria in response to concerns by the community regarding gender bias and the impact of the COVID-19 pandemic, the criteria remained so strict that numerous experienced hospitalists remained ineligible. The reasons an experienced hospitalist may not have qualified for the practice pathway are myriad and often deeply personal, including family responsibilities, health issues, and non-clinical duties.

Starting with the graduating residency classes of 2020, the practice pathway was closed altogether, requiring all physicians joining our field to participate in a two-year fellowship to become certified in PHM. Despite this requirement, the current PHM fellowship infrastructure is insufficient to accommodate a significant proportion of the candidates applying for positions; one-third of applicants did not match in the most recent cycle.[1] The dearth of fellowship positions has left numerous physicians unmatched and unable to become certified in PHM.

Board-ineligible physicians face an uncertain future with only a few options: find a job with the hope of matching into a PHM fellowship in a subsequent cycle, work as a non-certified hospitalist, or forsake our field entirely.[2]

### Consequences for the individual

One concern raised by board-ineligible trainees, early-career physicians, and experienced clinicians is whether they will be treated as second-class hospitalists compared to their board-certified peers.[2,3] Board eligibility has started to become a requirement for employment at a growing number of institutions, limiting the opportunities available for career mobility and advancement, particularly in university-based settings. Dividing our workforce based on certification status without alternative avenues to obtain it devalues the individual and excludes qualified physicians from institutions and geographic locations where they would otherwise thrive as clinicians.

The closure of the practice pathway may cause additional harm to certain vulnerable individuals and limit the diversity of our field. Family responsibilities and medical school debt are disproportionately carried by women and minorities, respectively, and are both negatively associated with pursuing a subspecialty fellowship.[4-6] Placing barriers in the way of groups that have historically been underrepresented could undo some of the progress PHM has made toward diversity, equity, and inclusion.

Just a few years ago, a physician could join our field and prove their competence through dedication to their patients and diligence in the craft. The vast majority of our field and leadership followed this career path. With the introduction of certification, the practice pathway rightly recognized the value of the clinician's hands-on experience caring for hospitalized children. Now that the practice pathway is closed, many hospitalists with significant clinical experience (including during the height of the COVID-19 pandemic) feel they are being told that their skills and years of personal sacrifice do not matter.

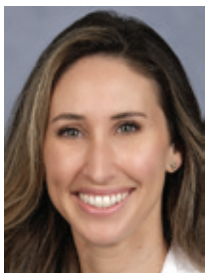
### Consequences for the workforce

To ensure children can continue to receive the care they need, we need to promote a resilient, diverse workforce and ensure future generations of physicians are well-trained. While many of the recent closures of inpatient pediatric units across the country are rooted in market forces exacerbated by the pandemic, we must recognize that any action that weakens our workforce has the potential to accelerate this trend. This could have an disproportionate effect on underserved pediatric populations.

The number of PHM fellowship positions available each year, although growing, is insufficient to


Dr. Mike


Dr. Afghani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*Dr. Mike is a pediatric hospitalist at Akron Children's Hospital and Wooster Community Hospital, and a clinical assistant professor of pediatrics at Northeast Ohio Medical University in Rootstown, Ohio. Dr. Afghani is a professor of pediatrics and chief of the University of California Irvine School of Medicine pediatric hospitalist division, and she practices pediatric hospital medicine at Children's Hospital of Orange County in Orange County, Calif. She is also a pediatric infectious disease specialist and the founding director of several medical education programs. Dr. Fisher is a pediatric hospitalist at Holtz Children's Hospital and assistant professor of clinical pediatrics at the University of Miami Miller School of Medicine in Miami. Dr. Vo is a rural community pediatric hospitalist at Campbell County Memorial Hospital in Gillette, Wyo.*

train the number of pediatric hospitalists needed to maintain our workforce.[7] If PHM board certification in its current form becomes a minimum standard for employment, staffing shortages may develop. Rural and community hospitals would likely be affected first, although university sites may not be spared if nocturnist coverage continues to expand and more physicians leave medicine.[8,9] Alternatively, if PHM moves toward having certified hospitalists at university-based centers with non-certified hospitalists limited to community settings, a "two-tiered" PHM hierarchy would be almost inevitable.[3]

Mandating extended training in PHM may negatively affect trainees' exposure to our field. Spurred by our field's push toward a fellowship requirement to practice PHM, the Accreditation Council for Graduate Medical Education is contemplating reducing the time pediatric and family medicine residents spend on pediatric wards. Fewer residents will be available to care for patients in the near term. This gap will need to be filled by additional pediatric hospitalists, although the PHM board certification process may, actually, be discouraging residents from choosing PHM as a career.[10]

## Solutions

We each know someone affected by the board certification process. These affected individuals are our colleagues, mentees, and friends, and they deserve to have their voices heard. We should monitor the impact of board certification on our workforce and proactively seek solutions that strengthen our discipline. An expanded practice pathway can and should coexist with fellowships to allow competent pediatric hospitalists from different backgrounds to practice in hospitals with diverse needs. Although this would be a departure from the precedent set by prior developing specialties, we believe bold action is needed to overcome the unprecedented challenges facing health care today. ■

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# Wake Forest School of Medicine Research Reviews

By William C. Lippert, MD, MPH, Caitlyn Langford, PA-C, MMS, MA, Suma Menon, MBBS, Nicolas Haller, PA-C, MMS, Leah Snipe, MD, and Parag Anilkumar Chevli, MBBS, MS

*Wake Forest School of Medicine, Winston-Salem, N.C.*

## IN THIS ISSUE



**By William C. Lippert, MD, MPH**

## 1 The risk for intestinal necrosis with SPS is very low

**CLINICAL QUESTION:** What is the risk of intestinal necrosis with sodium polystyrene (SPS) for the treatment of hyperkalemia?

Dr. Lippert

**BACKGROUND:** SPS is a medication that has been available for the treatment of hyperkalemia since the 1950s. It is a cation exchange resin that works in the colonic lumen by exchanging potassium for sodium leading to an increase in potassium loss in the stool. Reports of severe gastrointestinal side effects, including intestinal necrosis, have been reported with SPS since the 1970s. This concern has led to the development and approval by the U.S. Food and Drug Administration of two new cation-exchangers for the treatment of hyperkalemia. However, more recent studies examining SPS have shown mixed results on its association with intestinal necrosis.

**STUDY DESIGN:** Meta-analysis

**SETTING:** Literature search of Cochrane Library, Embase, Medline, Google Scholar, PubMed, Scopus, and Web of Science Core Collection databases

**SYNOPSIS:** The authors identified six studies (five observational and one randomized, controlled trial) with a total of 26,716 participants that compared SPS treatment with controls. The prevalence of intestinal ischemia in patients treated with SPS was 0.1% (95% confidence interval 0.03%-0.17%). The pooled odds ratio of intestinal necrosis was 1.43 (95% confidence interval 0.39-5.20). Two of the six studies reported rates of intestinal necrosis using survival analysis and had a pooled hazard ratio for intestinal necrosis of 2.00 (95% confidence interval, 0.45-8.78). Overall, there was moderate-high statistical significance for the meta-analysis of intestinal necrosis ($Q=18.82$; $P<0.01$; $I^2=67.8\%$). And, due to concerns with the risk of bias, inconsistency, imprecision, effect size, and direction of confounding in the individual studies, the strength of evidence for associations between SPS and intestinal necrosis was very low.

**BOTTOM LINE:** The overall risk of intestinal necrosis with SPS is quite low, therefore SPS may be used safely as opposed to the newer, costly cation-exchange resins that are currently on the market for the treatment of hyperkalemia.

**CITATION:** Holleck JL, et al. Risk of intestinal necrosis with sodium polystyrene sulfonate: a systematic review and meta-analysis. *J Hosp Med*. 2021;16(8):489-494. doi:10.12788/jhm.3655

*Dr. Lippert is an assistant professor of internal medicine at Wake Forest School of Medicine, Winston-Salem, N.C.*

**By Caitlyn Langford, PA-C, MMS, MA**

## 2 Initiation of pulmonary rehabilitation after admission for COPD exacerbation decreases rehospitalizations

**CLINICAL QUESTION:** Does the initiation of pulmonary rehabilitation after hospitalization for a chronic obstructive pulmonary disease (COPD) exacerbation impact rehospitalizations?

Ms. Langford

**BACKGROUND:** COPD exacerbations account for about half of annual health care costs for COPD in general. Previous meta-analyses and randomized controlled trials have shown that pulmonary rehabilitation (PR) after a COPD exacerbation can reduce the risk of readmission and death. These studies were limited by small sample sizes, variability, and limited generalizability so this study aimed to determine the association between initiation of PR and rehospitalization with a more diverse population and clinical settings.

**STUDY DESIGN:** Retrospective observational cohort study

**SETTING:** 4,446 US hospitals in 2014

**SYNOPSIS:** 197,376 Medicare beneficiaries aged >66 years that were hospitalized for a COPD exacerbation and who survived >30 days post-discharge were included. The initiation of PR within 90 days of discharge when compared to no initiation of PR (or the initiation of PR >90 days post-discharge) was associated with a lower all-cause readmission rate at one year (56.4% versus 64.6%) and a lower mean number of rehospitalizations (1.2 versus 1.5; $P<0.001$). Also, in the cohort who received PR within 90 days after discharge, the mean cumulative number of rehospitalizations at one year for any reason was lower in comparison to the cohort who did not receive PR (0.95 versus 1.15 readmissions). The number of days spent in the hospital was also lower in the cohort who received PR within 90 days of discharge versus those in the cohort who did not receive PR (7.9 versus 11.7 days).

**BOTTOM LINE:** In routine practice, the initiation of PR within 90 days after discharge from a hospitalization for COPD exacerbation leads to a lower risk of rehospitalization.

**CITATION:** Stefan MS, et al. Association between initiation of pulmonary rehabilitation and rehospitalizations in patients hospitalized with chronic obstructive pulmonary disease. *Am J Respir Crit Care Med*. 2021;204(9):1015-1023. doi:10.1164/rccm.202012-4389OC

*Ms. Langford is a physician assistant at Atrium Health Wake Forest Baptist, Winston-Salem, N.C.*

**By Suma Menon, MBBS**

## 3 Tranexamic acid minimized perioperative bleeding in patients undergoing noncardiac surgery

**CLINICAL QUESTION:** Does tranexamic acid reduce the incidence of life-threatening perioperative bleeding in patients undergoing noncardiac surgery without increasing the risk of major cardiovascular adverse events?

Dr. Menon

**BACKGROUND:** Large surgical trials have shown that tranexamic acid reduces the incidence and severity of perioperative bleeding in patients undergoing a cesarean section or cardiac surgery. Other, smaller trials have suggested similar findings with tranexamic acid in patients undergoing orthopedic surgery as well. But, there are limited data on the

use of tranexamic acid in patients undergoing non-orthopedic, noncardiac surgeries. And, there are no large trials to show whether the use of tranexamic acid would increase the risk of thrombotic events or major cardiovascular complications after noncardiac surgery.

**STUDY DESIGN:** Randomized controlled trial

**SETTING:** 114 hospitals in 22 countries between June 2018 and July 2021

**SYNOPSIS:** 9,535 patients with a mean age of 69.4 years (43.9% women). Patients were primarily from Europe (39.8%), North America (31.1%), and the Asia-Pacific region (27.0%). Before and after surgery, 4,757 patients were randomly assigned to receive tranexamic acid (1 gram per dose) and 4,778 patients were randomly assigned to receive a placebo. Most patients underwent non-orthopedic, noncardiac surgery (77%). At 30 days, patients who received tranexamic acid before and after noncardiac surgery had significantly less life-threatening bleeding, major bleeding, or critical-organ bleeding compared with those who received placebo (9.1% versus 11.7%; HR, 0.76; 95% CI, 0.67-0.87; absolute difference, -2.6%; 95% CI, -3.8 to -1.4%; *P* <.0001 for superiority). The primary safety outcome (composite of vascular events including myocardial injury, non-hemorrhagic stroke, peripheral arterial thrombosis, or symptomatic proximal venous thromboembolism at 30 days) occurred in 14.2% of patients assigned to receive tranexamic acid compared with 13.9% of those assigned to receive the placebo (HR, 1.02; 95% CI, 0.92-1.14; absolute difference, 0.3%; 95% CI, -1.1 to 1.7%; *P* = 0.04 for noninferiority).

**BOTTOM LINE:** Tranexamic acid demonstrated a reduced incidence of perioperative bleeding in patients undergoing noncardiac surgeries, however professional society guidelines and more familiarity with the tranexamic acid are likely needed before its use in regular clinical practice.

**CITATION:** Devereaux PJ, et al. tranexamic acid in patients undergoing noncardiac surgery. *N Engl J Med*. 2022; 386:1986-1997. doi: 10.1056/NEJMoa2201171.

*Dr. Menon is the interim co-medical director, section of hospital medicine at Atrium Health Wake Forest Baptist and an assistant professor of internal medicine, Wake Forest School of Medicine, Winston-Salem, N.C.*


**By Nicolas Haller, PA-C, MMS**

## 4 IV fluid resuscitation at a slow rate in ICU patients did not reduce 90-day mortality

**CLINICAL QUESTION:** Is there a difference in the 90-day mortality for patients admitted to the ICU receiving a fast (999 mL/hour) versus slow (333 mL/hour) IV infusion rate?

**BACKGROUND:** IV fluid resuscitation is the standard of care for patients who are critically ill with signs of shock. IV fluids given at a high rate are thought to improve the mean arterial pressure and cardiac output more quickly than those given at a slow rate. However, IV fluids given at a high rate may also lead to more fluid entering the tissues, resulting in worsening edema and even organ failure. Current guidelines continue to recommend IV fluid resuscitation for critically ill patients, but there is no consensus on the optimal infusion rate in this patient population.


Mr. Haller

**STUDY DESIGN:** Randomized clinical trial

**SETTING:** 75 ICUs in Brazil from May 29, 2017, to March 2, 2020

**SYNOPSIS:** Inclusion criteria included any patient requiring the ICU needing at least one fluid challenge, who were not discharging the next day, and who met at least one of the following criteria: age >65 years, hypotension, sepsis, use of mechanical ventilation, noninvasive mechanical ventilation or high flow nasal cannula, early signs of acute kidney injury, liver cirrhosis, or acute liver failure. 10,520 patients were available for analysis with 5,276 patients in the slow infusion (333 mL/hour) group and 5,244 patients in the fast infusion (999 mL/hour) group. Patient characteristics were similar, as was the median sequential organ failure assessment score between the groups (4, interquartile range, 2-6; and 4, interquartile range, 2-7). The mean volume infused as boluses on day one was 1,162 + 916 mL for the slow infusion group and 1,252 + 1009 mL for the fast infusion group. 26.6% of patients in the slow infusion group died by day 90 compared with 27.0% in the fast infusion group (HR, 1.03; 95% CI: 0.96-1.11; *P* =0.46).

**BOTTOM LINE:** Infusing IV fluids at a slow rate compared to a fast rate did not change the 90-day mortality for ICU patients. However, more studies need to be conducted comparing different rates and their effects on mortality in this population.

**CITATION:** Zampieri FG, et al. Effect of slower vs faster intravenous fluid bolus rates on mortality in critically ill patients: The BaSICS randomized clinical trial. *JAMA*. 2021;326(9):830-838. doi:10.1001/jama.2021.11444

*Mr. Haller is a physician assistant at Atrium Health Wake Forest Baptist, Winston-Salem, N.C.*

**By Leah Snipe, MD**

## 5 DES reduce the risk of ISR in patients with ICAS compared to BMS

**CLINICAL QUESTION:** In patients with symptomatic high-grade intracranial atherosclerotic stenosis (ICAS), does the use of a drug-eluting stent (DES) reduce the incidence of in-stent restenosis (ISR) and stroke recurrence compared to using a bare-metal stent (BMS)?


Dr. Snipe

**BACKGROUND:** ICAS is a common cause of stroke in North America (accounting for 8-10% of strokes) and is even more common in Asia (accounting for 30-50% of strokes). In previous trials, aggressive medical management was found to be the superior first-line treatment, but intracranial stenting is growing in popularity and safety. DES is known to reduce ISR in percutaneous coronary intervention compared to BMS, but it is unknown whether it gives the same advantage in patients with symptomatic high-grade ICAS.

**STUDY DESIGN:** Prospective, multi-center, open-label randomized clinical trial with blinded endpoint assessment

**SETTING:** 16 medical centers in China from April 27, 2015, to November 16, 2018

**SYNOPSIS:** 263 patients who experienced a transient ischemic attack (TIA) or non-disabling ischemic stroke caused by ICAS in the preceding 90 days were randomized to receive either BMS (131 patients) or DES (132 patients). There were 194 men and 69 women with a median age of 58 years (IQR, 52-65). The numbers of TIAs and ischemic strokes were similar in both groups. At one year, the DES group had lower rates of ISR with OR 0.24 (95% CI, 0.11-0.52) compared to the BMS group, and this result was observed in further subgroup analyses based on age, sex, risk factors, lesion characteristics, and procedural factors. Also at one year, DES reduced the risk of ischemic stroke recurrence compared to BMS with an HR of 0.10 (95% CI, 0.01-0.80).

The rate of stroke or death within 30 days was not significantly different between DES and BMS (7.6% versus 5.3%; OR, 1.45; 95% CI, 0.54-3.94; *P*=0.46). Patients who received DES had higher rates of both intracranial hemorrhage and disabling or fatal stroke, but these differences were not statistically significant.

**BOTTOM LINE:** Compared to BMS, DES may reduce the incidence of ISR and stroke in patients with ICAS; however, it may be associated with more periprocedural complications.

**CITATION:** Jia B, et al. Comparison of drug-eluting stent with bare-metal stent in patients with symptomatic high-grade intracranial atherosclerotic stenosis: a randomized clinical trial. *JAMA Neurol*. 2022;79(2):176-184. doi:10.1001/jamaneurol.2021.4804

*Dr. Snipe is a clinical instructor at Wake Forest School of Medicine, Winston-Salem, N.C.*

**By Parag Anilkumar Chevli, MBBS, MS**

## 6 Adding a new antihypertensive medication is associated with improved blood pressure lowering

**CLINICAL QUESTION:** Which is the better strategy for treatment intensification in older patients with hypertension—maximizing the antihypertensive or adding a new antihypertensive?

Dr. Chevli

**BACKGROUND:** Randomized controlled trials suggest that half-dose dual combination antihypertensive therapy provides better blood pressure control compared with a full-dose single antihypertensive with minimal adverse effects. However, the appropriate strategy for older patients who require additional antihypertensive intensification is still unclear.

**STUDY DESIGN:** A retrospective cohort study

**SETTING:** Veterans Health Administration, between July 1, 2009, and June 30, 2013

**SYNOPSIS:** This retrospective analysis included 178,562 patients (average age 75.8 ±7.5 years, 98.1% male) with a mean systolic blood pressure >130 mm Hg and at least one antihypertensive drug not at full dose. 74.5% of patients received an increase in their antihypertensive dose as the intensification method, while adding a new antihypertensive medication was selected for 25.5% of patients. At three months, maximizing dosage was associated with a significantly higher antihypertensive medication adherence compared with adding a new medication (65% [95% CI 64.7% to 65.2%] versus 49.8% [95% CI 49.3% to 50.4%]). However, at 12 months, the addition of a new drug was associated with a 1.1 mm Hg (95% CI 0.6 to 1.6 mm Hg) larger reduction in blood pressure compared with dosage maximization. Limitations of the study include a predominantly male population and the vulnerability of the results to confounding and bias. A clinician should choose an intensification strategy depending on the patient's clinical condition, existing therapy, and preferences.

**BOTTOM LINE:** The study suggests that adding a new antihypertensive medication may lead to a slight improvement in blood pressure, but at the price of lower medication adherence.

**CITATION:** Aubert CE, et al. Adding a new medication versus maximizing dose to intensify hypertension treatment in older adults: a retrospective observational study. *Ann Intern Med*. 2021;174(12):1666-1673. doi: 10.7326/M21-1456.

*Dr. Chevli is an assistant professor of internal medicine at Wake Forest School of Medicine, Winston-Salem, N.C.* ■

Interpreting Diagnostic Tests

# The Role of Beta-D-Glucan in the Diagnosis of Invasive Fungal Infections

**By Nhi N. Vu-Ticar, MD and Adam J. Gray, MD**

### Case

A 77-year-old woman with malnutrition, who is undergoing chemotherapy for small cell lung cancer, is being treated with intravenous ceftriaxone and vancomycin through a peripherally inserted central catheter for vertebral osteomyelitis. After initial improvement on antibiotics, she develops a new fever with an increased white blood cell count of 3,400 per microliter. She is ill-appearing and septic with no overt source. Blood cultures are collected. A beta-D-glucan is 102 pg/mL.

### Key Points

- A beta-D-glucan of >80pg/mL has a sensitivity of 0.83 and specificity of 0.84 for invasive fungal infection.
- Beta-D-glucan should be used in conjunction with clinical judgment, EORTC/MSG criteria, and other clinical tests including biopsies and fluid cultures.
- False-positive results are common including in dialysis patients, with certain medications such as piperacillin-tazobactam, and in some bacterial infections including *S. pneumoniae* and *P. aeruginosa*.

**Table 1: Interpretation of Beta-D-Glucan**

| BETA-D- GLUCAN (PG/ML) | INTERPRETATION |
|---|---|
| <60 | Negative |
| 60-80 | Indeterminate |
| >80 | Positive |

### What is beta-D-glucan?

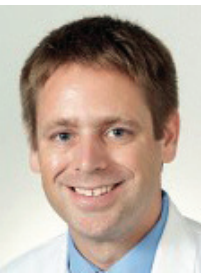
Beta-D-glucan is a polysaccharide found in the cell wall of vegetation such as barley and oats, and in the cell wall of bacteria, fungi, yeasts, and algae. The type of bonds between the glucose monomers differs between organisms. Beta-D-glucan in bacteria and algae are linear structures made of glucose monomers linked via B-(1->3) bonds. In yeast and mushrooms, the glucose monomers are linked via B-(1->3) and B-(1->6) bonds, creating a branched molecule. Commercial assays detect the common B-(1->3) component using the innate immune system of horseshoe crabs.[1]

Beta-D-glucan is commonly used as adjunct evidence to diagnose invasive fungal infections. In addition to immunodeficient diseases such as human immunodeficiency virus and hematological malignancies, the increase in immunosuppressive therapy in the medical field has increased opportunities for invasive fungal infections. Invasive fungal infections have attributable mortality of 30-40% in the U.S.[1] Blood cultures are only positive in 50% of cases of invasive candidiasis and <10% of invasive aspergillosis.[2] As a result, serum beta-D-glucan has been more frequently used to support clinical suspicion for fungal infections.

### How to interpret beta-D-glucan

There are different beta-D-glucan assays used, with different cutoff points for optimal sensitivity and specificity depending on the assay. The three most commonly used assays are Fungitell (Associates of Cape Cod, Inc., Mass., U.S.), Fungitec-G test (Seikagaku Biobusiness, Tokyo, Japan), and Wako (Wako Pure Chemical Industries, Osaka, Japan). Fungitell is the U.S. Food and Drug Administration-approved test to be used in the U.S. and is the focus of this paper. Although testing for the same substrate, the assays use different reagents that can affect the optimal cut-off points. In general, these assays detect beta-D-glucan in the range of 0 to >7000 pg/mL. Many clinical studies have been performed to analyze the optimal cut-off points for these assays. Per a 2015 meta-analysis that included 28 different studies on the three mentioned assays, the cut-offs varied, but 60-80 pg/mL was determined to be the most reliable range for sensitivity and specificity for Fungitell assays.[3] Per Fungitell's manufacturer manual (Table 1), <60 pg/mL denotes a negative result, 60-79 pg/mL is

Dr. Vu-Ticar



Dr. Gray

*Dr. Vu-Ticar is a hospitalist at the University of Kentucky, Lexington. Dr. Gray is a hospitalist at the University of Kentucky and the Lexington Veterans Affairs Medical Center.*

## Quiz: Testing your knowledge

**A 58-year-old woman with chronic obstructive lung disease and bronchiectasis presented with fever, cough, and dyspnea. She was found to have *Pseudomonas aeruginosa* bacteremia due to pneumonia. She was empirically treated with intravenous piperacillin-tazobactam.**

**During the evening of hospital day two, she had a temperature of 101.2 degrees Fahrenheit. The night provider ordered repeat blood cultures and a beta-D-glucan. Cultures are pending and beta-D-glucan was 64 pg/mL. The following morning, she reports overall feeling much better than admission with improved cough, dyspnea, and malaise.**

**What is the most appropriate next step in treatment?**

a. Add fluconazole
b. Add micafungin
c. Add vancomycin
d. Continue piperacillin-tazobactam

***The correct answer is D.*** Beta-D-glucan returned in the indeterminate range. This patient had a clear alternative etiology of symptoms given the *Pseudomonas* pneumonia and clinical suspicion for a secondary invasive fungal infection is low. This patient also has two alternative potential causes of elevated beta-D-glucan (pseudomonas infection, piperacillin-tazobactam). Given her overall clinical improvement on appropriate antibiotic therapy, it would be appropriate to continue her piperacillin-tazobactam.

indeterminate, and ≥ 80 pg/mL is positive.[4]

It is important to keep in mind that the sensitivities and specificities can differ among different species of organisms. According to a 2011 meta-analysis published in *Clinical Infectious Diseases*,[1] beta-D-glucan typically has a sensitivity of 77% and specificity of 85% among *Aspergillus* infections compared to 81% and 60% respectively amongst *Candida* species. The sensitivity and specificity are increased in detecting *Aspergillus* infections when both beta-D-glucan and galactomannan are used together. Beta-D-glucan assays also have a strong negative predictive value and can be used to rule out invasive fungal infection (IFI) when suspicions are low. For a cut-off of 80 pg/mL, the assay has a positive predictive value of 89% and a negative predictive value of 73%.[2] Although beta-D-glucan has high positive predictive value in *Candida*, *Fusarium*, and *Aspergillus*, the cut-offs are more precise for *Candida*.

When should beta-D-glucan be used? Beta-D-glucan can be used to help identify infections with *Aspergillus, Candida, Pneumocystis jirovecii, or Fusarium*. For invasive fungal infections, it is important to use clinical judgment and criteria developed by the European Organization for Research and Treatment of Cancer/Mycoses Study Group (EORTC/MSG) as the main tools for diagnosis. The criteria provide a more standardized approach in suspected invasive fungal infections. The criteria include patient factors such as neutropenia, use of steroids, and existing immunodeficiency, in addition to laboratory data such as culture and biopsy results. When clinical suspicion is moderate to high, beta-D-glucan and galactomannan can be used as an adjunct to support the diagnosis. It is particularly helpful and more sensitive than blood cultures in deep-seated candidiasis, as blood cultures are often negative.[3] Another advantage of using beta-D-glucan is quick turnaround time, as it can take as little as one hour for the results.[5] Beta-D-glucan can also be considered for surveillance in high-risk populations such as hematologic malignancy undergoing chemotherapy for earlier detection of invasive fungal infection.[6]

When should beta-D-glucan not be used? Beta-D-glucan is not found in all fungal species and cannot be used to identify infections by *Cryptococcus, Blastomyces* (yeast form), or Zygomycetes such as *Absidia*, *Mucor*, or *Rhizopus* since these species either do not produce beta-D-glucan or produce low levels that might lead to false negatives.

Clinicians should also be wary of scenarios that might lead to false-positive results. Certain medications can falsely elevate beta-D-glucan levels, including intravenous amoxicillin-clavulanate and piperacillin-tazobactam. Infections by certain bacterial organisms can also lead to false positives including *S. pneumoniae* and *P. aeruginosa*, both of which also produce beta-D-glucan. Another clinical scenario to be aware of is dialysis patients because beta-D-glucan is commonly tested in critically ill patients susceptible to invasive fungal infections. The cellulose filters used in dialysis release beta-D-glucan substrates that can lead to false positives. Table 2 lists some common situations that can lead to false-positive beta-D-glucan results.

**Table 2: Clinical Scenarios That Can Cause False Positives in Beta-D-Glucan Assays**

| | |
|---|---|
| MEDICATIONS | IV Amoxicillin-clavulanate<br>IV Piperacillin-tazobactam<br>Lentinan<br>Crestin<br>Scleroglucan<br>Schizophyllan<br>IV immunoglobulin<br>Albumin |
| BACTERIAL INFECTIONS | *S. pneumoniae*<br>*P. aeruginosa*<br>*Alcaligenes faecalis* |
| CLINICAL INTERVENTIONS | Dialysis<br>Intraoperative gauze |

### Application to the case

In the case presented, there is clinical suspicion for fungal infection given the patient's immunodeficiency and worsening clinical condition on broad-spectrum antibiotics. Given the moderate pretest probability and the high beta-D-glucan, it would be appropriate to start antifungal therapy empirically while awaiting further diagnostic evaluation.

The patient was started on empiric micafungin. Two days later, blood cultures grew *Candida albicans* and the patient was diagnosed with catheter-associated Candidemia. Beta-D-glucan in this setting aided the decision to initiate earlier treatment of invasive fungal infection.

### Bottom line

Beta-D-glucan should be used as an adjunct to support clinical judgment, in combination with EORTC/MSG criteria and other diagnostic tests (i.e. blood cultures, biopsies), when there is suspicion of invasive fungal infection. ■

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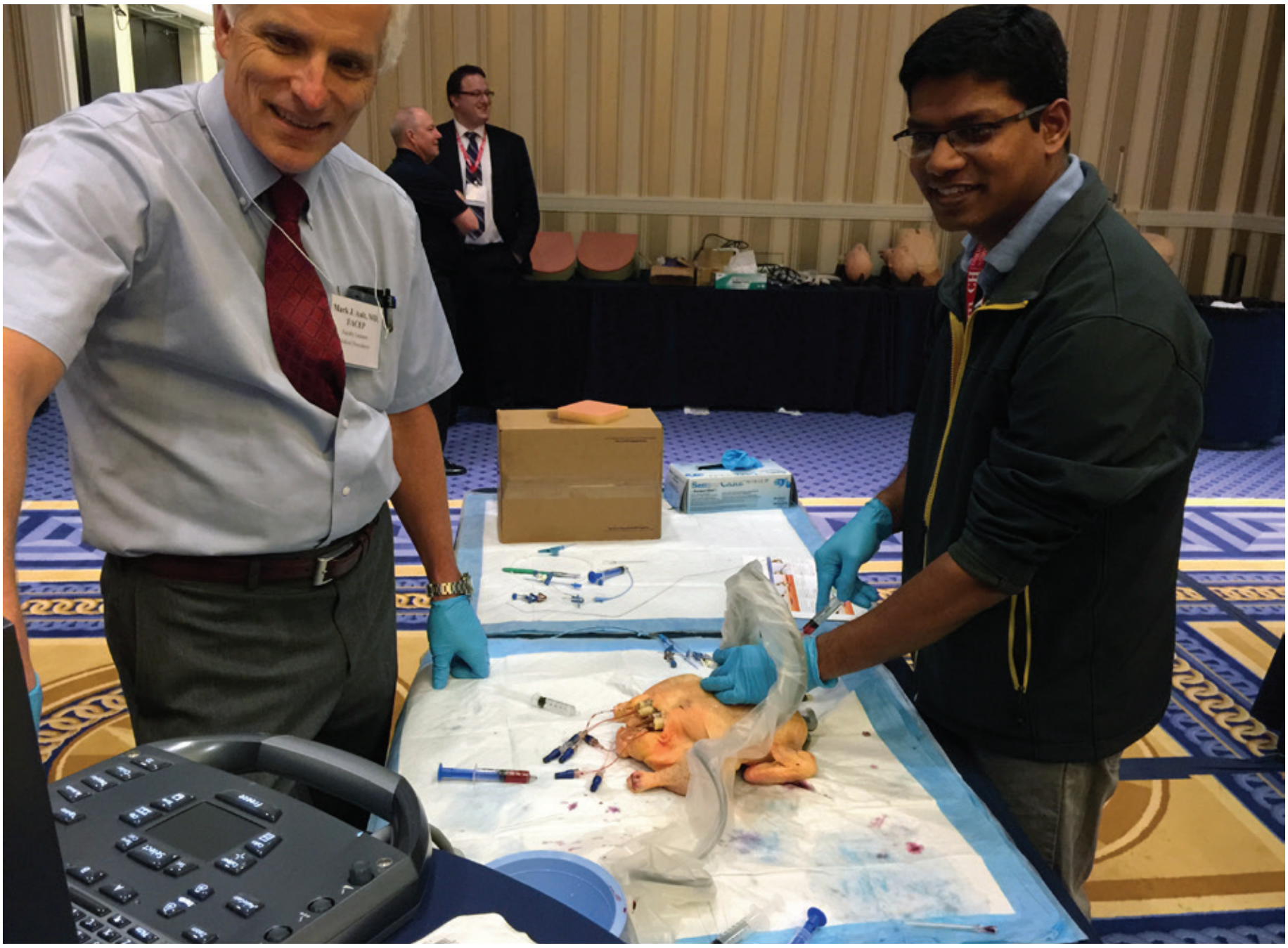


PHOTO CREDIT: DR. WEIJEN CHANG

Dr. Ault, considered a pioneer in procedural medicine, often used chickens as teaching tools in his courses.

# History and Importance of Procedural Medicine

**By Samantha C. Shapiro, MD**

Over the past 30 years, the number of procedures performed by internists has steadily declined.[1] Concordantly, the requirement to complete a minimum number of procedures during residency for board certification by the American Board of Internal Medicine was removed in 2007. As interest in performing procedures declined among internists and increased among other specialties, procedural medicine evolved into a profession all its own. Hospitalists have been at the forefront of this shift, developing medical procedure services (MPS) across the country.

It's difficult to say *exactly* when MPS first came into existence, but Mark J. Ault, MD, who passed away earlier this year, co-founded Cedars-Sinai's Outpatient Procedure Center in 1989. Dr. Ault is considered a true pioneer in the field. Hospitalist procedure services started springing up in teaching hospitals in the early 2000s,[2] just a few years after the term "hospitalist" was coined in a 1996 *New England Journal of Medicine* article.[3]

MPS include physicians and advanced practice professionals who've chosen to dedicate a significant amount of their clinical time to performing invasive procedures such as paracentesis, vascular access, and thoracentesis. In teaching hospitals, proceduralists further play an important role in training students and residents. The structure of MPS varies by institution, but their benefits are enjoyed by hospitals, trainees, and patients alike. MPS streamlines hospital care by allowing for more timely bedside procedures and improved diagnostic accuracy. Trainees enjoy direct supervision and higher rates of learner satisfaction that surpass the "see one, do one, teach one" approach of the past.[2,4] Patients enjoy safer procedures and more accurate diagnosis and treatment.

## SHM and procedural medicine

SHM supports procedural training for hospitalists in myriad ways.[5] In 2019, for example, the Society published a position statement with evidenced-based recommendations on the use of point-of-care ultrasound (POCUS) for diagnosis and bedside procedures in hospital medicine.[6] SHM also partners with other organizations like the American College of Chest Physicians to offer POCUS courses, both live and online. And SHM offers a POCUS Certificate of Completion.[7]

Certification doesn't instantly equate to competency, but it's a step in the right direction. To earn SHM's certification, participants must:

- Attend the Ultrasonography: Essentials in Critical Care course at the American College of Chest Physicians headquarters
- Complete one of the online learning modules
- Attend one of several approved regional courses
- Complete an online image portfolio
- Pass a comprehensive skill and knowledge assessment

Jason Williams, MD, an associate professor of medicine at Emory University School of Medicine in Atlanta, led the popular Ultrasound-guided Procedures course at SHM Converge 2022 in Nashville, Tenn., in April, and led procedure services at the University of California, Los Angeles, and the Atlanta Veterans Affairs Medical Center.

Dr. Williams

He says once you've completed 500-1,000 ultrasound-guided procedures you see the rare complications more frequently, so you're better equipped to help other learners troubleshoot.

"The SHM POCUS certification is valuable for learners who don't have someone to mentor them at their own hospital," he said. "Workshops are good for skill foundation, but you've got to go back to your own patient population to practice. The value of the certification is the portfolio part. You need mentors to review your images so you can improve your image quality since POCUS diagnostic and procedural accuracy depend on it. That's where the image portfolio comes in. An expert faculty reviewer provides prompt feedback about how to improve image acquisition. They let you know which images are adequate for clinical decision making, and which require optimization."

SHM members can also join the POCUS Special Interest Group (SIG). This SIG, chaired by Benji Mathews, MD, FACP, chief of hospital medicine, Regions Hospital at HealthPartners and the University of Minnesota Medical School in St. Paul, Minn., and Gordon Johnson, MD, FACP, medical director of POCUS at Legacy Emanuel Medical Center in Portland, Ore., is a community of POCUS enthusiasts who are making positive contributions to hospital medicine and health care in general.

## POCUS in diagnosis

POCUS also has applications for bedside diagnosis. As POCUS has become more accessible, more and more hospitalists are integrating its use into daily practice. POCUS is a valuable tool for the assessment of central venous pressure (CVP), identification of pleural and pericardial effusions, and/or alveolar filling processes. It also may be useful for evaluating response to therapy (e.g., serial volume-status exams while diuresing patients in acute decompensated heart failure (ADHF)).

Data demonstrating the efficacy of POCUS may surprise many readers. For example, POCUS was found to be six times more sensitive at detecting elevated CVP than physical exam[8] and first-year medical students were found to be better at diagnosing ADHF with POCUS than cardiology fellows using the standard physical exam alone. [9]

Dr. Williams said, "I really see POCUS augmenting the physical exam to allow us to miss fewer common diagnoses. I used to think that a great diagnostician discovered those rare zebra cases a few times a year. But now I realize that great diagnosticians are the ones who don't miss the common things. They don't confuse ADHF with pneumonia or chronic obstructive lung disease. With POCUS, we're able to sort out normal from high CVP, and wet from dry lungs at the bedside in a matter of minutes."

## The future of procedural medicine

So where should hospitalists take procedural medicine from here? Gigi Liu, MD, MSc, an assistant professor of medicine and director of POCUS Education at the Osler internal medicine residency program at Johns Hopkins University School of Medicine in Baltimore, offered practical insight in this regard. "The future of procedural medicine is not in academic centers—it's in rural settings," she said.

Dr. Liu

"Many physicians are interested in diagnostic POCUS—national courses are selling out like crazy!—but that comes with upfront costs that hospitals might not be willing or able to cover," she said. "The way to make diagnostic POCUS a reality is by starting with an MPS. Billing for procedures is straightforward, whereas it's not for diagnostic POCUS. And MPS can cut the length of stay, offload interventional radiology, open hospital beds, and improve patient safety and satisfaction. MPS is thus attractive to hospital administrators and brings in revenue to cover initial sunk costs. Then, you use that money to push for the supplies and training needed to institute diagnostic POCUS."

Procedural medicine is here to stay, and its beneficial impact is already evident. Trailblazers like Dr. Ault empowered hospitalists interested in procedures to truly come into their own. How might MPS and diagnostic POCUS help you and your patients? It's never too late to find out. ■

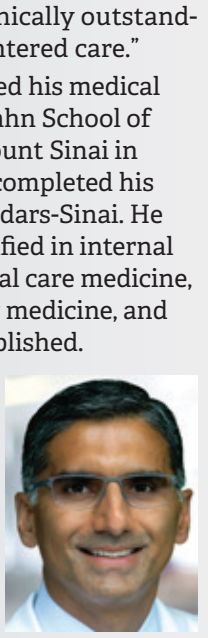
*Samantha C. Shapiro, MD, is a board-certified internist, rheumatologist, and affiliate faculty member of the Dell Medical School at the University of Texas at Austin. She received her training in internal medicine and rheumatology at Johns Hopkins University, Baltimore.*

# Celebrating the Memory of Dr. Mark Ault

Mark J. Ault, MD (June 10, 1952-February 14, 2021)

Dr. Ault was a pioneer of procedural medicine and a physician at Cedars-Sinai in Los Angeles for more than 40 years. He co-founded Cedars-Sinai's Outpatient Procedure Center in 1989 and served as its director until his passing. In 2019, he was awarded Cedars' inaugural Master Clinician Award for "outstanding leadership in advancing Cedars-Sinai's mission and providing technically outstanding, patient-centered care."

Dr. Ault earned his medical degree from Icahn School of Medicine at Mount Sinai in New York and completed his residency at Cedars-Sinai. He was board certified in internal medicine, critical care medicine, and emergency medicine, and he was well published.



Dr. Soni

"As a person, Dr. Ault was a warm and gentle soul. He was so accomplished, but so down-to-earth and always open to learning new things," said Nilam Soni, MD, MS, SFHM, FACP, professor of medicine at the Long School of Medicine at the University of Texas in San Antonio, Texas. "He was the senior person who helped develop SHM's procedural pre-course, which still runs today. He set up a unique service at Cedars that's still talked about around the country, and he was a mentor and inspiration for a lot of other internists. He showed us that you don't have to be an interventionally trained person to do these procedures safely when you have US-guidance at your disposal. He really reinvigorated the procedural aspect of internal medicine."

CEDARS-SINAI

Dr. Ault

Dr. Soni is an internationally recognized leader in POCUS. In fact, he wrote the book on it; he's the lead author of "Point-of-Care Ultrasound" (Elsevier, 2015) and has collaborated with myriad health care professionals to develop training curricula for different specialties.

Weijen Chang, MD, is a pediatric and adult hospitalist at Baystate Medical Center and Baystate Children's Hospital in Springfield, Mass. where he is an associate professor of pediatrics at the University of Massachusetts Medical School Baystate, chief of pediatric hospital medicine, and vice-chair for clinical affairs at Baystate Children's Hospital. He's also the physician editor for *The Hospitalist*. Dr. Chang met Dr. Ault as a procedural pre-course faculty member.

Dr. Chang

"Dr. Ault approached teaching in a very non-judgmental manner," he said. "He was all about getting it done, but getting it done in a way that was good for the learner as well as the patient."

Dr. Chang shared details about the course itself, adding, "The whole course was really a family endeavor. The models for central line placement were these chickens that he, his wife, and his son would bring in from the supermarket. As you can imagine, transporting 20 raw chickens with tubes sticking out of them was a bit of a project. It was such a unique experience—we all felt like we were part of the Ault family for the day. They were so enthusiastic about procedural medicine and trying to improve the quality of training and care for patients, residents, and hospitalists."

In Dr. Ault's memory, Cedars-Sinai is raising funds to support specialized training and continuing education at the institution. Contributions may be made at https://support.cedars-sinai.edu/fundraiser/3607764. ■

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# Bringing Acute-Level Care to the Patient: Some Key Steps for Hospital at Home

Quality metrics are high, but future funding is uncertain

**By Larry Beresford**

As the hospital at home concept and care model gets more attention nationally, hospitalists often provide the leadership, clinical expertise, and labor needed to get these programs off the ground. Although the model's regulatory and reimbursement foundations remain uncertain, and many established programs remain small, two decades of positive outcomes—demonstrating improved safety, shorter lengths of stay, reduced readmissions, lower costs and mortality rates, and, especially, higher patient satisfaction—would seem to demand finding a way to make it work.

"Given the clinical outcomes and patient experience metrics we see, I don't see how we could do anything but choose a path to bring more high-acuity care to the home," said Patrick Kneeland, MD, vice president of medical affairs for Denver-based DispatchHealth. "It's something we in the hospitalist community need to figure out how to do and how to advocate for."

Dr. Kneeland

Dr. Kneeland's company was created to provide medical care at home as an alternative to hospitalization, along with other alternate-site medical services, for contracting hospitals, health systems, and payers. It operates in about 40 cities nationwide. As the larger system grows more serious about patient-centered and value-based care models, home-based care provides a lens to understand patients and meet them where they are, treating their social context and social determinants of health in different ways.

"I really believe in this model. This is high acuity care in the home, fully substituting for hospital care," Dr. Kneeland said. And for the right patient population, it's better care.

## What is hospital at home?

The basic concept of hospital at home is to provide hospital-level, acute medical care to patients with acute medical needs, but to do so in their residences, with needed services—such as clinicians, nurses, medical equipment, radiology, labs, oxygen, pharmacy—delivered, in person or virtually, directly to the patient's home.

Patients have to be pretty sick to qualify for hospital at home, although the most complex, comorbid, clinically unstable hospital patients may not be the best candidates to receive care at home, given potential complications. The goal is to manage the patient's care within the same approximate length of stay as in the hospital, using portable versions of the treatments and diagnostics employed in the hospital, while offering an equivalent level of care.

Although it has a longer history and greater acceptance in Australia, Canada, the United Kingdom, and other countries with single-payer systems, the concept's introduction in this country dates back to the 1990s. A pilot project to test the model at John Hopkins Medicine in Baltimore, led by geriatrician Bruce Leff, MD, demonstrated feasibility, safety, patient satisfaction, and cost-effectiveness.[1] A larger-scale follow-up study from 2005 documented reduced lengths of stay, lower rates of complications, higher satisfaction, and significant cost savings.[2] Subsequent research continues to show positive outcomes for hospital at home programs.

## Variations on the model

DispatchHealth provides high-acuity care by sending a hospitalist physician or advanced practitioner daily to the homes of patients on service, while nurses make two patient home visits per day, often in conjunction with the hospitalist's visit, Dr. Kneeland said. Clinicians are also available for phone or virtual contacts, and a command center offers 24-hour virtual access to nurses.

Another key component of this model is its "rover"—a car equipped with about three-quarters of the medical technology found in an average emergency department, including ultrasound, X-rays, EKGs, and timely lab testing. The rover also brings the clinician to the patient's home.

In building its program, DispatchHealth has developed services both in-house and in partnership with community providers. "Our goal is to bring high-quality acute care into the homes of as many patients as we can," Dr. Kneeland said. National and regional contracts with large payers are also being pursued using value-based payment models.

By contrast, the hospital at home program at Atrium Health, a hospital system based in Charlotte, N.C., uses community paramedics to do most of the in-person visits while hospitalists see the patients virtually, says its medical director, hospitalist Stephanie Murphy, DO. Community paramedics are an evolving health care model where certified paramedics receive supplemental training and skills to provide protocolized care in non-emergent settings.

Dr. Murphy

"Because we've tied our program to our paramedics, they function more like nurses, but at a lower cost. Our virtual hospitalists deliver care to patients and round on them every day—just like in the hospital facility—and then discharge patients back to their primary care provider or the next care setting."

The program's hospitalists typically work from 7 a.m. to 7 p.m., seven days on and seven days off, like other hospitalists. Two rounders and one admitter are scheduled every day, for a caseload of 20 to 25 patients. Dr. Murphy said her target census is 30 patients, and her program already is one of the country's largest.

HealthPartners, Bloomington, Minn., estab-

lished its Home-Based Acute Care program in 2019—just ahead of the COVID-19 pandemic. It's a partnership between community paramedics and on-call hospitalists, who are available to do joint telemedicine visits in real time when the paramedic is present in the patient's home. In-person physician visits are made when necessary, said the program's director, Chrisanne K. Timpe, MD, who is also a practicing hospitalist at Regions Hospital in St. Paul, Minn.


Dr. Timpe

"We are now investing in a remote patient-monitoring system that will help us rapidly expand our census," she said. "I believe that with telemedicine we'll be able to leverage a lot more so hospitalists can more fully utilize their medical decision-making abilities."

The Mount Sinai hospital at home program in New York City admits patients from five hospitals in the Mount Sinai health system, said its program director, hospitalist Joanna Mecca, MD. Given its broad geographical coverage area, most of its provider visits are virtual, but these can be performed in person if needed. Mount Sinai has been experimenting with the model since 2014 when the Icahn School of Medicine at Mount Sinai received a $9.6 million grant from the Centers for Medicare and Medicaid Services (CMS) to establish its Mobile Acute Care Team.[3] The three-year CMS Health Care Innovation Award enabled Mount Sinai physicians in its Visiting Doctors Program to conduct more than 6,000 visits to patients in Manhattan.[3]


Dr. Mecca

The program also partners with Contessa Health and provides admitted patients with a tablet computer and equipment like a Bluetooth stethoscope. A phlebotomist provides home visits seven days a week. Mount Sinai has a pool of nurses who specifically work with the hospital at home program, allowing familiarity with the program and providing acute-level care in the home. Common admitting diagnoses include pneumonia, urinary tract infections, cellulitis, asthma, chronic obstructive pulmonary disease, and heart failure.

## Getting a program off the ground

Hospital at home programs require a lot of groundwork, with a sharp learning curve to develop the essential clinical and logistical expertise. It can take a year or more of development before seeing patients. An important first step in launching hospital at home, said Dr. Murphy, is to get buy-in and engagement from senior hospital leadership. "Make it a collaborative conversation." Look at areas of need within the facility. Does it struggle with capacity, not enough nurses, or poor patient satisfaction?

Also important is close alignment with the hospital's compliance and legal departments, so they are comfortable with the program. How it works and which patients are being targeted should also be communicated to hospitalists, emergency department staff, primary care physicians, and other potential referrers.

Choose the right patients to admit. Appropriate patients are acutely ill and in need of many of the monitoring and treatment techniques of an acute hospital. But those patients who are the most complex medically and frequent users of health care resources may be harder to manage at home. The program needs protocols defining the patients it plans to enroll. Experience—what worked well or didn't—can help to refine these protocols. Reviewing cases and identifying gaps in service might guide future admissions.

The patient should also be on board with a hospital at home referral. "You need patient buy-in in a whole different way," said Dr. Timpe. "Some patients prefer being at the hospital. If you find yourself trying to talk the patient into the program, walk away. The patient has to believe in it."

Engage the right clinical staff. "Find doctors who are committed to patient-centered care, not just as a platitude, and for whom providing care to patients in their own homes is exciting and energizing," Dr. Kneeland said. The skill set includes clinical skills in managing common acute conditions, working with portable technology, handling nuances of decision making, and comfort with improvising in response to changing conditions on the ground.

Manage the supply chain. Find partners in the community who have worked out the logistics of the various services and technologies, including medication delivery or timely processing of blood gases, troponins, and other lab results. Know your community resources and who you can partner with, Dr. Timpe said. "Don't reinvent work that's already being done." How will you offer respiratory, physical, and occupational therapy? How will the service interface with the hospital's electronic health record?

## Regulatory uncertainties

Although hospital at home has been studied for more than two decades, with growing interest by some private health plans, before the COVID-19 Pandemic, Medicare regulations requiring a minimum threshold of 24-hour nursing staff on-site in acute settings precluded Medicare coverage for hospital at home. In March of 2020, CMS issued a national public health emergency declaration in response to the challenges of COVID-19, announcing Hospitals Without Walls and a broad array of other regulatory flexibilities.[4]

In November of that year, the government announced, as part of a larger plan to enhance hospital capacity amid COVID-19 surges, a waiver program to permit Acute Hospital at Home programs to bill Medicare for a list of 60 acute diagnoses.[5]

At least 140 waivers have been granted to individual hospitals that have appropriate screening protocols and that assess both medical and non-medical factors for patients, who can be admitted from either the emergency department or an inpatient hospital bed. Daily visits by clinicians and twice-daily visits by nurses or other professionals are required. Diagnostic-related groupings and payment bundles are paid the same for acute care whether in a facility or at home. What's not known is whether the emergency waiver—and thus access to Medicare/Medicaid coverage for this service—will end when COVID-19 emergency provisions are withdrawn.


Dr. Palabindala

Some, but not all, private health payers have also shown interest in hospital at home, especially for Medicare Advantage populations under value-based payment models. One of these is Optum Care, said Raman Palabindala, MD, FACP, MBA, SFHM, its Pacific Northwest regional medical director. Dr. Palabindala told The Hospitalist that in his current role he facilitates collaborations with companies like DispatchHealth, Contessa Health, and Medically Home as vendors for delivering hospital services at home to health network patients at a lower cost.

"We as payers want to work with experienced players," he explained. "We wonder why individual hospitals would choose to devote the resources to building a hospital at home program that might only serve a small number of patients," instead of partnering with those that have more experience in developing these programs, he said. "Are hospitals the right people to do it? I'm not sure it makes sense unless it's a big system."

National third-party vendors are building partnerships with hospitals and have developed supply chains and mastered how to manage the service, Dr. Palabindala said. "This is where the payer's expertise comes in. Like it or not, payers drive health care strategy. Health systems and hospitals need to look at the big picture, and to be aware of payer dynamics and the mindset of value-based purchasing."

## A natural fit

But for individual hospitalists, their skill set will continue to make them a natural fit for staffing hospital at home programs—once they learn to appreciate the differences in providing care in the patient's home.

"I've been blown away by how impactful it can be to enter someone's home, and the shift in power dynamics," Dr. Kneeland said. "We learn things about their social context, their lifestyle, their preferences. It's a different way of thinking about interdisciplinary care and effective communication. You need to reconcile your evidence-based care plan with the realities of the patient's life. Talking about their goals of care is on a whole different footing," he said.

"What we've seen in the last two years—with hospitals bursting at the seams—is a glimpse of the future," Dr. Timpe said. "I believe in the role of the medical provider in the home. It has probably made me a better hospitalist. Now, when I'm in the hospital, I see my patients in a different way because of what I've seen in patients' homes."

Next month: See part two of our series on hospital at home, focusing on the hospitalist's role in this new model. ■

*Larry Beresford is a freelance medical journalist based in Oakland, Calif., a specialist in hospice and palliative care, and a long-time contributor to* The Hospitalist.

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GETTY IMAGES

# SHM's 2022 Hill Day a Success

It's been two years since members of SHM's Public Policy Committee (PPC) participated in Hill Day—the annual visit to Washington, D.C. to meet with legislators and advocate on behalf of SHM members and their patients. On May 10, 2022, about 20 members of the committee took to the Hill where they met with nearly 40 staffers and legislators from the committee members' states.

"It was nice to be back on the Hill," said Rick Hilger, MD, SFHM, the utilization management medical director and hospitalist at HealthPartners in Minneapolis, and SHM's PPC chair. "It's been two years since our last Hill Day and there were a lot of new faces."

The COVID-19 pandemic kept the committee away since 2019 and provided some obstacles for this year's meetings—but the PPC was not deterred. Because of the ongoing pandemic, the U.S. Capitol and congressional office buildings remain closed to the public. This made arranging meetings between PPC members and congressional staffers even more challenging as staffers had to meet members at predetermined locations and escort them into the building.

"There's always a bit of uncertainty when scheduling and arranging meetings," said SHM's chief legal officer, Josh Boswell. "But this year it was especially challenging. There were inconsistencies in meeting policies—some were remote, some weren't, and some became remote at the last minute—and on COVID-19 policies. But the PPC members were amazing and took it all in stride."

During these meetings, PPC members discussed the central role hospitalists played and still are playing in the COVID-19 pandemic, the effect the pandemic has had on hospitalists, Medicare physician fee schedule payment cuts,

SHM members spent the day educating and advising legislators on the issue important to hospitalists and health care. Front, L to R—Sarah Johnson Conway, MD, Ann Sheehy, MD, SFHM, Marta Almli, MD, JD, and Suparna Dutta, MD, MPH, FHM and Back, Brad Flansbaum, DO, MPH, MHM.

and continuing workforce shortage concerns, and the need to extend several regulatory flexibilities provided throughout the pandemic.

"It was a very productive day. We had an important story to tell," Dr. Hilger said. "Not just about the last two years, but about how we come out of this global pandemic and try to become a stronger, more sustainable health care system."

Several members also met with Wendell Primus, the senior policy advisor on budget and health issues in Speaker Nancy Pelosi's office. Former PPC chair, Ann Sheehy, MD, MS associate professor of medicine and chief of the division of hospital medicine in the department of medicine at the University of Wisconsin-Madison, and Robert Wood Johnson Foundation Health Policy Fellow, helped facilitate the meeting. In her role as a fellow, Dr. Sheehy partici-

pates in the federal health policy process in congressional and executive branch offices and works on regulatory and legislative issues related to public health.

"There isn't a whole lot of freestanding health care legislation getting done right now," said Mr. Boswell. "So instead of discussing a particular resolution or bill during the meetings, our goal was to plant seeds on things like prior authorization, opioid use (the X-waiver), and how those issues might relate to other issues."

According to committee members, congressional offices were receptive to their concerns and found the meetings informative. And, while these topics are important, education is always a key factor in any advocacy meeting. Educating legislators about what hospitalists do, who they are, and how and why their roles in hospitals matter and make a difference are keys to helping them learn and understand why hospitalists' voices matter.

Within a couple of days after the PPC's Hill Day, the MAT Act, H.R. 7666, Restoring Hope for Mental Health and Well-Being Act of 2022, which addresses the X-waiver—got added to a mental health package. And, while a lot of people have been working on this issue across the country, SHM has been heavily involved with it, both with members and professionally. The large, bipartisan mental health package was passed by a vote of 402-20 in June.

As part of the process, attendees follow up with the staffers or legislators they met with during Hill Day and remind them of the issues they discussed, provide requested information, and offer their expertise on the issues. For example,

Dan Duzan, MD, SFHM and Melinda Johnson, MD, SFHM.

one Senate office asked if they could coordinate with the physician member to provide similar education to district offices across the state. And a Florida legislator agreed to cosponsor the Improving Access to Medicare Coverage Act and is looking into supporting extending Public Health Emergency waiver around the hospital at home programs as a result of this year's meetings.

Despite these wins and the success of Hill Day, advocacy is a long game—it's showing up, repeating your message, informing legislators, and respectfully presenting your issues. Mr. Boswell said after being off the Hill for two years it "felt like starting over in educating staffers and legislators about hospitalists and the issues important to them."

"I think it was a reset day," Dr. Hilger said. "The staff we met with were sharp and hospital medicine has been around for more than two decades, but there are still people who don't know what a hospitalist is. Some of the staff we spoke with were surprised to discover that all the things they've been reading about for the last two years about frontline workers—that's us. That's us and nurses, and care management, emergency departments, and critical care—all our colleagues. But hospital medicine was right in the middle of it all."

Dr. Hilger, who's been on the PPC since 2012 and attended about seven or eight Hill Days, said it was the right time and the right place to remind everyone of who hospitalists are and how critical they are to a functioning, productive, high-quality, health care system. "There were some eye-opening moments in those meetings," he said.

Though education is always part of advocacy meetings, the agenda is fluid and depends on what legislators are focusing on at the time. Planning Hill Day starts with SHM staff working with PPC members to prioritize the legislative issues, which are then informed by what is most relevant on the Hill at any given time. For example, addressing issues around observation status has historically been a big legislative issue with SHM, but if the Hill is currently focused on prior authorization and the opioid crisis, the PPC will shift into highlighting SHM-supported legislation that's relevant to that ongoing discussion.

"It was a good opportunity to give feedback to the people in positions of making health care policies," Dr. Hilger said. "We also thanked them for the COVID-19 waivers—specifically telemedicine and prior authorization waivers—those were extremely helpful during our surges. We explained what we've learned and told them how the future could be if we take these learnings and realize that we if remove unnecessary obstacles in the health care system, we can provide our patients with highly-efficient, lower-cost, quality care without the hurdles."

SHM members can help by joining the SHM Grassroots Networks (https://www.hospitalmedicine.org/policy--advocacy/be-an-advocate/) and sending messages to their representatives. This is extraordinarily helpful in increasing SHM's reach and getting attention paid to issues important to hospitalists. ■

Commentary

# 10 Facts for Hospitalists About Abortion

**By Krystle D. Apodaca, DNP, FHM; Laura Chambers-Kersh, MD; Suman Pal MD; Eileen Barrett, MD, MPH, SFHM**

The U.S. Supreme Court's decision to overturn Roe versus Wade is expected to result in a wave of state laws limiting access to reproductive health. This highlights why clinicians should stay current on topics at the intersection of medicine and politics. Unfortunately, however, clinicians can be a source of misinformation or disinformation, even if unintentionally. Hospitalists are not exempt from this and deserve to have available medical facts about reproductive health in order to have honest and accurate conversations about the expected consequences of limiting abortion access.

Most hospitalists are internal medicine trained, and these residencies do not require training on abortion and in general only superficially on reproductive health. Regardless of our training, we have many opportunities to learn reproductive health so we can advocate for the best care for our patients.

Here are 10 facts about abortion and reproductive health you can use when talking with patients, peers, and learners, and the references to support them.

### 1. Unintended pregnancies are common and most people seeking an abortion are using contraception.

A 2016 study identified that unintended pregnancies had fallen to the lowest known rate in the U.S. to 45% from 51%. Per the authors, the most likely cause of this change was "a change in the frequency and type of contraceptive use over time."[1] In 2014, 51% of abortion patients were using a contraceptive method in the month they became pregnant, most commonly condoms (24%) or a short-acting hormonal method (13%).[2]

### 2. Abortion is common, including among physicians, and the reasons for seeking abortion are complex and varied.

Nearly a quarter of U.S. women will have an abortion by age 45.[3] In a 2021 study surveying 3,104 physicians, there was an 11.2% abortion rate in the 1,556 who had been pregnant.[4] This is similar to the national abortion rate of 11.4% per 1,000 women in 2017.[5] A longitudinal study conducted from 2008 to 2010 of 954 women found the dominant reasons for seeking an abortion were financial, timing, partner-related, and the need to focus on other children. Most women (64%) cited multiple reasons for seeking an abortion.[6]

### 3. Most abortions occur during the first trimester.

The Morbidity and Mortality Weekly Report shows that 65.5% of abortions were performed at <8 weeks' gestation, 91% at <13 weeks' gestation, 7.7% at 14-20 weeks' gestation,

and 1.2% at >21 weeks' gestation.[7]

## 4. Legal abortions are safe.

The risk of having a major complication (one that requires further surgery, hospital admission, or blood transfusion) in the first trimester of pregnancy is <0.1% and also low in the second trimester (0.41%).[8,9] Notably, the rate of mortality related to abortion occurring anytime during pregnancy in the U.S. is similar to the mortality rate of outpatient plastic surgery procedures and the mortality rate of running a marathon.[10] Legal abortion is also much safer than childbirth, with the risk of death associated with childbirth being approximately 14 times higher than that with abortion.[11]

## 5. Pregnancy and childbirth pose a well-defined (and higher in the U.S.) health risk.

According to the Commonwealth Fund, the U.S. is ranked last among industrialized countries in maternal mortality, with a rate of 17.4 per 100,000. There are significant inequities in care during pregnancy. In a study examining the prevalence and case-fatality rates for pregnancy-related complications of pre-eclampsia, eclampsia, abruptio placenta, placenta previa, and postpartum hemorrhage, Black women had similar prevalence but two to three times higher case fatality from these complications than white women in the U.S.[12] Non-Hispanic Black people experience a 3.4 times higher maternal mortality ratio than non-Hispanic white people.[13] This disparity remained after adjustment for co-morbidities and in at least one study and was attributed to access to care.[14]

## 6. Limiting access to abortion does not stop people from seeking an abortion.

There isn't any evidence that abortion rates are lower when abortion access is restricted. According to a *Lancet* article, this suggests that some women with restricted access to abortion must take legal and physical risks to receive care.[15]

## 7. Having an abortion does not increase one's risk of cancer or mental health issues.

There is a common misperception that abortion can increase the risk for breast cancer or other cancers, but this has been extensively studied and is not evidence-based.[16] There are also similar misperceptions about mental health worsening after abortion, but this is not accurate either.[17]

## 8. Denying abortion can have negative effects on physical health, emotional health, and economic wellbeing.

According to research at the University of California, San Francisco, women who are denied an abortion and give birth experience more life-threatening complications such as eclampsia and postpartum hemorrhage than those who received an abortion. They also experienced more chronic health concerns.[18] The same research team also found that women denied abortion who gave birth experienced household poverty lasting at least four years, increased debt, increased bankruptcies, and evictions.[19] From a mental health perspective, people denied abortion experience more regret and anger, and less relief and happiness, and they also experience more adverse psychological outcomes such as anxiety and stress in the short term.[19,20]

## 9. Not all people who seek abortion care are women.

According to a study in the journal *Contraception*, approximately 862,000 abortions were performed in the U.S. in 2017, of these an estimated 462-530 were performed on transgender and gender non-binary people. Hospitalists are more patient-centered when we provide gender-affirming care.[21]

## 10. Hospitalists should embrace reproductive health, including family planning and abortion access, as part of our role.

Hospitalists care about patients, see a lot of people who can't easily access reproductive health, and personally benefit from access to reproductive health services. As with many other important interventions, hospitalization is a prime opportunity to discuss and provide treatment for reproductive health.

In conclusion, hospitalists have a role in taking care of people who may be seeking abortion and should be familiar with facts, as well as common misperceptions. These 10 facts can help hospitalists facilitate accurate conversations and advocate for patients. All hospitalists should recognize abortion as a commonly performed, safe, and often life-saving procedure. ■

### Additional Reading

- Reproductive rights. It's complicated
- Abortion bans and implications for physician-patient trust

*From the* Journal of Hospital Medicine


Dr. Apodaca


Dr. Chambers-Kersh


Dr. Pal


Dr. Barrett

*Dr. Apodaca is a nurse practitioner hospitalist at the University of New Mexico Hospital, Albuquerque, N.M. where she is also an assistant professor of medicine within the university's clinician education track. She has been integral in the development of UNM's APP program and its APP hospital medicine fellowship, which she helped to co-found. She is a member of the UNM Hospital Medicine Executive Committee and its LGTBQ Collaborative. Dr. Chambers-Kersh is an abortion-trained family medicine physician and prior employee of Planned Parenthood of the Rocky Mountains. She is currently residency faculty at a community-based program in Dayton, Ohio where she continues to practice full-spectrum including deliveries. Dr. Pal is an assistant professor in the division of hospital medicine at the University of New Mexico, Albuquerque, N.M., and associate program director (diversity, equity, and inclusion) for the internal medicine residency program. Dr. Barrett is a locum tenens internal medicine hospitalist based in Albuquerque, N.M. She is a multi-state district chair and past president of the New Mexico Chapter of the Society of Hospital Medicine, and in 2020 received her chapter's Physician of the Year Award. Dr Barrett is also an elected member of the Gold Humanism Honor Society.*

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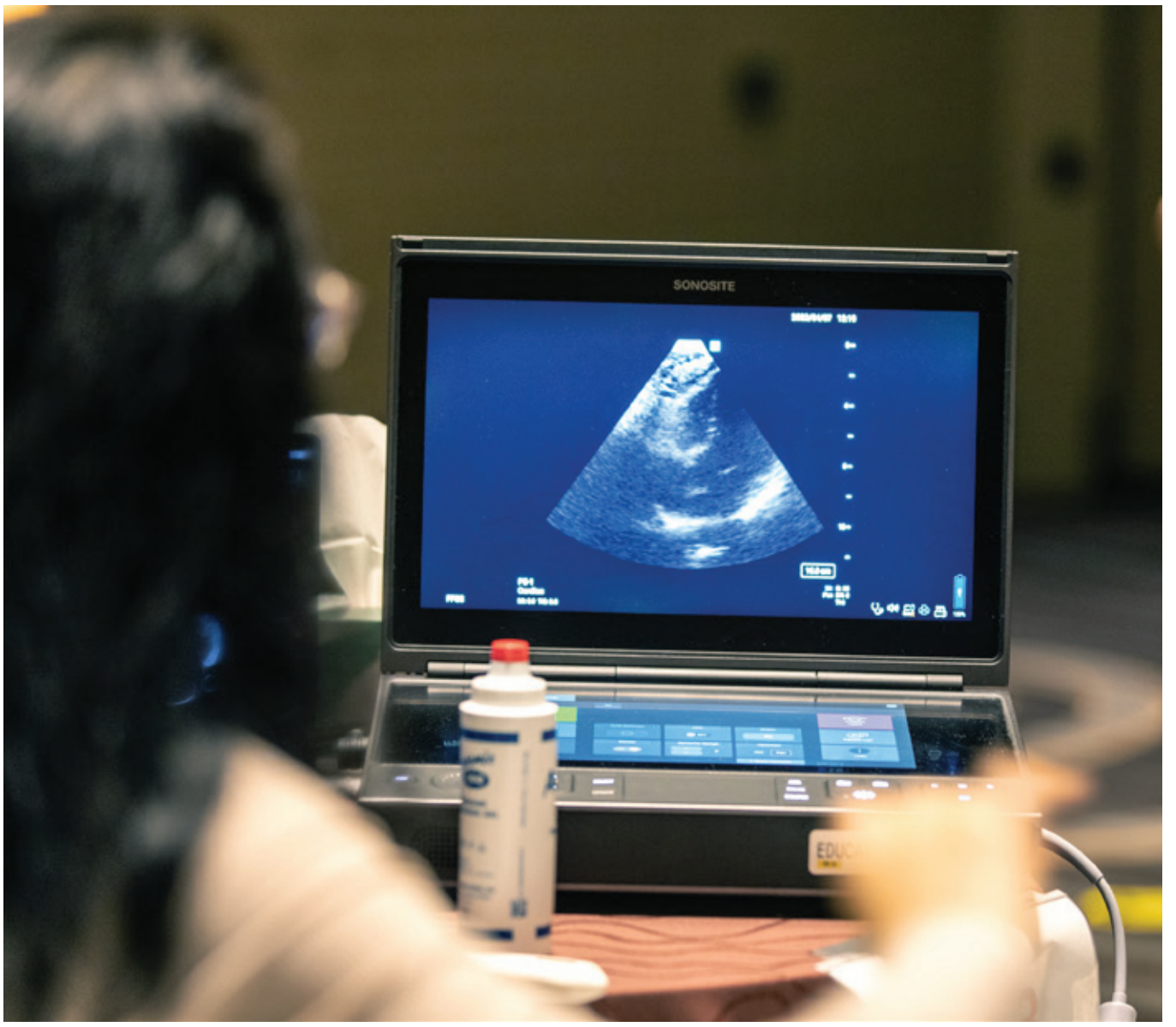
# SIG Spotlight: POCUS

**By Richard Quinn**




For a skill that is decidedly single-handed, many hands make lighter work for hospitalists focused on Point of Care Ultrasound (POCUS).

Hence the popularity of SHM's POCUS Special Interest Group (SIG), formed in 2018 and now boasts 1,141 members.

"POCUS is relatively new, so we all need to support each other by helping others learn, and network," said group co-chair Gordy Johnson MD, FACP, a hospitalist and medical director of POCUS at Legacy Emanuel Medical Center in Portland, Ore. "Networking is very important. But so is learning about how to learn, what you can do to train people, how you can learn yourself, what machines you can use, and reconciling and getting the support of other specialties."

SHM has 27 SIGs that are sponsored by SHM to "create communities of hospitalists around topics of interest, practice areas and/or care models."

However, few change on the seemingly weekly basis that the POCUS group does, given the number of hospitals increasingly incorporating ultrasound as a daily practice.

"Often specific diagnostic management questions come up that intertwine radiology, cardiology, critical care, the emergency department, and hospital medicine," said SIG co-chair Benji Mathews, MD, MBA, SFHM, whose titles include ultrasound director for hospital medicine for HealthPartners in Minneapolis-St. Paul.

"POCUS overlaps in multiple different arenas," he continued. "From a quality assurance standpoint, it's important to have interdepartmental collaboration. We encourage growing programs to collaborate with other POCUS users within their institutions so they may align where needed, troubleshoot early, and move conversations forward."

At the same time, Dr. Mathews acknowledged that achieving a high degree of interdepartmental cooperation on POCUS remains difficult for some.

"Many pitfalls stem from 'turf battles' that are often due to the lack of understanding of the scope and purpose of ultrasound between departments," he said. "Often, POCUS cases brought to specialists are 'near misses' or 'errors' and that lead[s] to availability bias and a representativeness heuristic—thinking that all POCUS users are more likely to acquire, interpret, and integrate suboptimal exams. A diverse interdepartmental team that listens and supports each other can help mitigate these pitfalls."

Dr. Johnson noted that—given the growing popularity of POCUS—there's often a lack of standardization within hospitals in addressing training, competency, and quality assurance. The POCUS SIG gives hospitalists an online community of fellow practitioners to be at the forefront of those conversations and assist in discussion with administration and other specialties, he said.

"Our group, in particular, is very supportive of each other," Dr. Johnson said. POCUS "is a relatively new technology, and as we've all been learning this, we know the struggles that everyone has had. So, we want to minimize those struggles for those who are launching their own programs now. The general philosophy is that everyone rises together."

Dr. Mathews believes that the ever-evolving nature of hospital medicine dovetails perfectly with the ever-innovating field of POCUS. A rotating quarterly series of webinars, journal clubs, and clinical case series, supplemented with social media engagement, helps keep members involved, as do events at the annual SHM Converge meeting.

"These special interest groups are where you can network with an amazing group of people who are innovators keeping up to date with the changing technology and devices, and the evolving training needs and education paradigms, and staying current regarding best implementation strategies," he said.

"So, this varied group of novice to advanced learners, trainers, educators, and administrators can come into this rich POCUS community and receive on-the-go feedback. Rather than go to a one-and-done webinar, they become engaged in a community that helps provide practical tips and individualized resources. That's the beauty of the SIG."

Drs. Johnson and Mathews especially take pride in catering to early-career hospitalists and early-in-their-POCUS-career physicians.

"We try to level the hierarchy a little bit," Dr. Mathews said. So whether they're seasoned veterans or novices in ultrasound it's all about "working together to gain valuable insights on how to grow together."

Dr. Johnson notes that this type of career diversity is just one way the SIG attempts to reach out to as many constituent hospitalists as possible. "Dr. Mathews really pushed us early on to have broad diversity—geographic, academic versus community, gender, ethnicity, and urban versus rural—in the leadership so that we span the whole country," Dr. Johnson said.

Diversity "provides a consortium of different perspectives, and we are pretty intentional on that," Dr. Mathews said. "Diversity and equity need to be a forethought, not an afterthought. Unless we have a mix of ideas, we won't grow in a way that's truly representative and forward-thinking."

Drs. Mathews and Johnson are eager to grow membership in the SIG and the potential to do so is within reach. There's a larger pool of potentially interested doctors thanks to the increase in additional ultrasound training at medical schools and residences. And there's increased incentive thanks to SHM's Principles of Point-of-Care Ultrasound continuing medical education series. The series meets the online learning module requirement for the SHM-CHEST Point-of-Care Ultrasound Certificate of Completion program and is developed in collaboration with the American College of Chest Physicians.

Participation in "our certificate of completion pathway is also growing," Dr. Mathews said. "You can see people are taking a lot of courses, and some of our seeds of networking are gaining roots. This has been a remarkable and exciting journey with POCUS and we're so glad to share this with others." ■

*Richard Quinn is a freelance writer in New Jersey.*

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# Chapter Spotlight: Nashville

**By Richard Quinn**

Like the sound Nashville is famous for, the local chapter of SHM doesn't succeed by resting on its greatest hits.

Founded in 2017 and now 233 members strong, the group is already looking to make improvements.

Take the name itself: Nashville.

The chapter isn't just bound by city limits and has broached initial discussions to maybe rebrand as the Middle Tennessee chapter so more practitioners feel like the group is tailored to them.

"We have people in super small hospitals, where there's literally one hospitalist working at a time, to people in systems that have well in excess of 50 hospitalists," said chapter president Bradley Bullock, MD, a hospitalist in Brentwood, Tenn. "It runs a big gamut, and it's been a challenge for us. We have not engaged the more rural hospitals as much and we're working hard to do that."

There are nearly 70 chapters nationally, with geographically large states like Tennessee having multiple chapters to represent different regions (for those looking for a trivia answer, the Volunteer State has four chapters).

But only the Nashville bastion was home turf for April's SHM Converge, the specialty's first in-person conference since the start of the pandemic.

In fact, Dr. Bullock is now hoping to use the local momentum from Converge to draw new members. Discussions have been held about hosting a district-wide meeting in Asheville, N.C., which would give local practitioners a chance to travel and mingle with leaders from across the District 4 region (which covers Tennessee, Virginia, and the Carolinas).

Another outreach is that the next meeting will be held in the city's southern suburb of Franklin, a nod at reaching more rural hospitalists outside the downtown district.

"I think it's really important to try to get them engaged, help them make connections, and bring them into the fold so they can also participate in what we're doing," Dr. Bullock said.

He adds that during the past few years, as hospitalists and others in health care routinely shared ad-hoc best practices during the COVID-19 pandemic, the value of routine feedback only crystallized.

"With COVID-19, there was good communication among a lot of the hospital systems about what we were doing, because things were coming at us so fast it was difficult to react," Dr. Bullock said. "I don't know how some of the small hospitals kept up to date, and certainly (being involved in the chapter) would be a very valuable resource to have.

"They could pick up the phone or shoot an email to somebody and say, 'Hey, how are you dealing with this?' If we can grow some of those connections, there are thousands of questions like that that come up over the course of a year."

Another point of pride for Dr. Bullock is that last year the chapter held a series of in-person and virtual events that delved into clinical and non-clinical topics. And despite the omicron wave in November 2021, the chapter still held its fourth annual poster competition and awarded the winner free access to SHM Converge (which didn't even cost bus fare).

"We were pretty proud of the fact that we were able to continue meeting," Dr. Bullock said. "We thought it was really important to keep the events going. As it is, we're all busy. And we're all involved at different hospitals. And it's so easy for us to drift apart if we're not making a conscious effort to stay connected. So we thought the virtual events were really important."

Part of addressing non-clinical issues includes HM practitioners doing a better job at being patients and realizing that the stresses of the job need to be addressed.

"One of the things we learned with COVID-19, whether we wanted to or not, was that we're vulnerable," Dr. Bullock said. "We are not immune to the stress that comes from this job. And I think recognizing that illustrates why it is so important not to just deal with the technical aspects of practicing medicine, but the human aspects of practicing medicine.

"How do we take care of ourselves? How do we take care of one another? How do we make it okay to not be okay and to need to ask for help? And acknowledging this vulnerability can have positive benefits when it comes to clinical situations, as well as personal situations."

Dr. Bullock sounds excited when he talks about the value of SHM's chapter, and he's hoping that infectiousness helps recruit new members.

"I hope we can spread the word to get more people on board because I think there are great benefits there," he said. "And, hopefully, as we come out of COVID-19 and we can have more in-person events, and if people have learned about some of their vulnerabilities through the pandemic, maybe it will be the spark that really gets things going." ■

*Richard Quinn is a freelance writer in New Jersey.*

Key Cinical Question

# How to Treat Heart Failure: New Updates

By Ingrid Pinzon, MD, FACP, CHCQM-PHYADV, FHM

**Case**

**A 76-year-old man with a medical history of congestive heart failure (CHF) with left ventricular ejection fraction of 30%, hypertension, dyslipidemia, and recent hospitalization for CHF exacerbation comes to the emergency department (ED) complaining of dyspnea, orthopnea, and progressively worsening edema in the lower extremities. His current medications include furosemide 40 mg PO daily, lisinopril 20 mg PO daily, and Coreg 25 mg PO daily. The patient wants to know what to do to avoid coming to the ED frequently.**

## Heart failure in the hospital

There are three important goals to achieve in our patients during hospitalization due to CHF.

The first goal is decongestion, regardless of the ejection fraction (EF). The second goal is the initiation of recommended long-term therapies. In patients with heart failure (HF) with reduced EF, there is a controversy between stepwise treatment versus shotgun treatment. The third goal is the continuity of care once the patient is discharged, with a transition goal of preventing re-congestion regardless of the EF.

The hallmarks of HF hospitalization with any EF are symptoms and signs of congestion; treatment; and response to intravenous (IV) diuretics. The principal symptoms of HF with preserved EF are dyspnea on exertion, orthopnea, abdominal discomfort, and edema. The patient can also experience trouble concentrating and exertional fatigue. Most symptoms and hospitalizations are due to congestion. Once the patient is hospitalized, the focus in all HF with any EF is to relieve the congestion, with preservation of adequate perfusion and blood pressure. Once the patient is stabilized, the next step is to evaluate for a guideline-directed medical therapy (GDMT), including a diuretic plan, for long-term disease modification. The use of a diuretic treats most symptoms. The neurohormonal systems are highly activated, which means that neurohormonal antagonists are very effective to decrease hospitalization.

The key is the initial bedside evaluation for hemodynamic profiles, i.e., congestion versus low perfusion, and their combinations: cold and dry, cold and wet, warm and dry, and warm and wet (see Table). The recommendations are to evaluate the severity of the congestion and adequacy of perfusion as well as the common precipitating factors and the overall patient trajectory to guide an appropriate therapy.

One important recommendation is to check the blood pressure manually, which will give us an accurate narrow pulse pressure. A proportional pulse pressure <25% of SBP suggests low stroke volume unless the patient is very tachycardic. Beware of overestimation of blood pressure by automated cuffs when the pulse is irregular (patients with atrial fibrillation or frequent premature ventricular contractions). Evidence of low perfusion includes narrow pulse pressure and cool extremities, a patient who seems to be sleepy or obtunded, and labs that can show elevated lactic acid (>2.0 mmol/L) and hyponatremia.

About 85 to 90% of HF hospitalizations are patients with a profile of warm and wet. The predominant symptoms are orthopnea, edema, and jugular vein distention (JVD) on physical exam, showing us the patient is congested (wet), and has a normal pulse pressure (systolic blood pressure minus diastolic blood pressure/systolic blood pressure, normally about 30%) with warm skin, showing an adequately perfused patient (warm).

The degree of congestion for a patient with HF on admission predicts the hospital length of stay but does not predict outcomes such as readmission or death after discharge. The risks of readmission or death after discharge depend on the success of decongestion achieved in the hospital.

## Medical treatment

The decongestion strategy includes recommendations for diuretics in hospitalized patients. Patients with HF admitted with evidence of significant fluid overload should be treated promptly with an IV loop diuretic to improve symptoms and reduce mortality.

Therapy with diuretics and other GDMTs should be titrated to resolve clinical evidence of congestion and reduce symptoms and the risk of rehospitalization.

When therapy with diuretics is inadequate to relieve symptoms and signs of congestion, it is reasonable to intensify the diuretic regimen, using either a higher dose of IV loop diuretics or the addition of a second diuretic.

The right dose of the diuretic is the dose that works for the patient. In diuretic-naïve patients, the dose is usually 40 mg IV daily. In patients who are receiving diuretics as outpatients, the starting dose as an inpatient is the total doses of diuretics per day, given IV at least twice per day. If the patient is on a high dose and also metolazone, the metolazone can be added to the loop diuretic during inpatient treatment.

### Key Points for Bedside HF Evaluation

- The two-minute bedside assessment of hemodynamic profile includes right-side signs: orthopnea, elevated jugular vein distention, edema (25%, more often in older patients), pulsatile hepatomegaly, and ascites.
- On physical exam, determine presence of rales (which are rare in chronic HF), louder S3, increasing mitral and tricuspid regurgitation murmurs, and labs showing elevated BNP/NT-proBNP higher than the patient's baseline.
- Manually check blood pressure; this gives an accurate narrow pulse pressure. A proportional pulse pressure <25% of systolic blood pressure (SBP) suggests low stroke volume unless the patient is very tachycardic.
- Beware of overestimation of blood pressure by automated cuff when the pulse is irregular (typically in patients with atrial fibrillation or frequent premature ventricular contractions). Evidence indicating low perfusion includes narrow pulse pressure; cool extremities; a patient who seems to be sleepy or obtunded; and labs that show elevated lactic acid >2.0 and hyponatremia.

Dr. Pinzon

*Dr. Pinzon is the medical director of care coordination and clinical documentation improvement, and assistant professor of hospital medicine at Emory Johns Creek Hospital in Johns Creek, Ga.*

## Escalation of the loop diuretic during hospitalization

- If the diuretic dose is working but you want more total output, increase the frequency.
- If the diuretic dose is not effective, double the dose.
- If diuretic dose is at >200 mg IV, consider adding metolazone. Another possibility to consider is bolus plus diuretic infusion.

Try to avoid low-dose dopamine or dobutamine, although these can be added if the reversible condition is likely to improve. Dopamine or dobutamine can trigger atrial fibrillation or accelerated rate, ventricular arrhythmia, and ischemia. These medications are not effective in HF with preserved EF, and most importantly, these medications are hard to wean a patient from in advanced HF with low EF.

It is important to remember that any residual congestion increases the risk of readmission, and any degree of residual congestion predicts death. If we have to send patients out wet, we should expect to see them again.[1]

Not every patient can get dry, especially patients with dominant right ventricular failure, patients

**Table. The two-minute bedside assessment of the hemodynamic profile**

| PROFILE | PATIENT PRESENTATION | PREDOMINANT SIGNS AND SYMPTOMS |
|---|---|---|
| Warm and wet | • Patient is congested (wet)<br>• Patient has a normal pulse pressure (systolic blood pressure [SBP] minus diastolic blood pressure [DBP] = normally about 30%) with warm skin, showing adequate perfusion. | Orthopnea, paroxysmal nocturnal dyspnea (PND), peripheral edema, positive JVD, hepatomegaly, pulmonary congestion with rales on lungs on physical exam. |
| Warm and dry | • Patient is not congested<br>• Skin is warm | |
| Cold and wet | • Patient is congested<br>• Skin is cold<br>• Narrow pulse pressure | Orthopnea, PND, peripheral edema, positive JVD, hepatomegaly, pulmonary congestion with rales on lungs on physical exam.<br>Pattern characterized by a narrow pulse pressure and cold extremities, which suggest poor perfusion.<br>These patients may have a history of poor tolerance of angiotensin-converting enzyme inhibitors (ACEi) and beta-blockers due to hypotension. |
| Cold and dry | • Patient is not congested<br>• Skin is cold<br>• Narrow pulse pressure | Signs of low perfusion: Cold extremities, low urine output, altered mental status, inadequate response to intravenous (IV) diuretic, prerenal azotemia. |

with cardiorenal syndrome with very high blood urea nitrogen, patients with edema related to low oncotic pressure or compromised venous and lymphatic drainage, patients with consistently unrecorded high fluid intake or the salt cheater, and those patients who are approaching the end of the journey. For patients requiring diuretic treatment during hospitalization for HF, the discharge regimen should include a plan for adjustment of diuretics to decrease rehospitalizations.

## What is new for heart failure in the hospital?

In patients with HF with reduced EF, the current practice is multiple GDMTs for long-term disease modification, including a diuretic plan. After stabilization, the focus is on enhancing the GDMT. Begin with angiotensin-converting enzyme inhibitors and/or angiotensin receptor blockers, then beta-blockers. The next step is to add mineralocorticoid antagonists for selected patients with good renal function and potassium excretion. Another addition to the treatment of HF is the sodium-glucose cotransporter-2 (SGLT2) inhibitors.

## Practical use of Entresto

Sacubitril/valsartan (Entresto) is a combination angiotensin receptor/neprilysin inhibitor (ARNi), the first in its class. It simultaneously inhibits neutral endopeptidase and the renin-angiotensin system. If the patient is taking ACEi, this medication should be stopped for 36 to 48 hours to avoid angioedema. The starting dose is 24/26 mg unless the patient is on a high dose of ACEi or has hypertension. Do not perform more than one upwards titration in the hospital, and most importantly, make sure the patient can afford this medication. There is an unexplained quality of life improvement for some patients, and this could be associated with an effect on endorphin metabolism. The most common side effects are dizziness, unexpected renal dysfunction, and documented 25% incidence of hypotensive events if the baseline SBP is ≤110. ARNi is not a recommended therapy in patients with an SBP <100, HF class IV, and/or advanced HF.[2]

## Recommendations for the use of renin-angiotensin system inhibitor (RASI: ACEis and ARBs) and ARNi

- In patients with previous or current symptoms of chronic heart failure with reduced ejection fraction (HFrEF), in whom ARNi is not feasible, treatment with an ACEi or ARB provides high economic value.
- ARNi is recommended for patients with HFrEF and New York Heart Association (NYHA) class II to III symptoms, as this medication reduces morbidity and mortality.
- In patients with previous or current symptoms of chronic HFrEF, the use of ACEi is beneficial to reduce morbidity and mortality when the use of ARNi is not feasible.
- In patients with previous or current symptoms of chronic HFrEF, who are intolerant to ACEi because of cough or angioedema, and when the use of ARNi is not feasible, the use of ARB is recommended to reduce morbidity and mortality.
- In patients with chronic symptomatic HFrEF NYHA class II or III who tolerate an ACEi or ARB, replacement by an ARNi is recommended to further reduce morbidity and mortality.
- ARNi should not be administered concomitantly with ACEi or within 36 hours of the last dose of an ACEi. ARNi and ACEi should not be administered to patients with any history of angioedema.[3]

## Recommendations for the use of SGLT2 inhibitor for heart failure with reduced EF

In patients with symptomatic chronic HFrEF, SGLT2 inhibitors (SGLT2i) are recommended to reduce hospitalization for HF and cardiovascular mortality, irrespective of the presence of type 2 diabetes.[3]

## New clinical trial for recommendations for the use of ivabradine

Ivabradine is a new therapeutic agent that selectively inhibits the pacemaker current, *If*, in the sinoatrial node, providing heart

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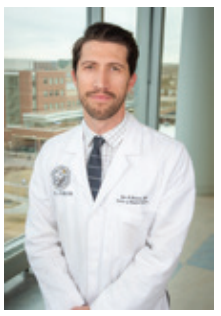

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rate reduction. Ivabradine can be beneficial to reduce HF hospitalization for patients with symptomatic HF NYHA class II-III, stable chronic HFrEF with a left ventricular EF (LVEF) less than or equal to 35%, who are receiving guideline-directed evaluation and management including a beta-blocker at the maximum tolerated dose, and who are in sinus rhythm with a heart rate of 70 bpm or greater at rest.[3,4]

Vericiguat is recommended for patients with HF NYHA Class II-IV, LVEF <45%, recent HF hospitalization or IV diuretics, and elevated BNP levels.[4,5]

Digoxin is a purified glycoside extracted from digitalis lanata and was discovered in 1785 by William Withering. The Digitalis Investigation Group trial[6] showed a decrease in hospitalization rate in patients with advanced heart failure. The trial consistently showed an increase in hospitalization rate after digoxin was stopped. Digoxin is the only medication you can use in decompensated HFrEF to decrease heart rate with atrial fibrillation. It is helpful to initiate when weaning from low-dose IV inotropes. Digoxin may support treatment when trying to initiate HF therapies with borderline blood pressure. You should halve the dose when amiodarone is started. Safety levels are 0.07 to 0.10 nanograms/mL.

## Integration of care: transitions and team-based approaches

In patients with high-risk HF, particularly those with recurrent hospitalizations for HFrEF, referral to a multidisciplinary HF disease management program is recommended to reduce the risk of hospitalization.

In patients hospitalized with worsening HF, patient-centered discharge instruction with a clear plan for transitional care should be provided before hospital discharge. In patients being discharged after hospitalization for worsening HF, an early follow-up, generally within 7 days of hospital discharge, is reasonable to optimize care and reduce rehospitalization.

Re-evaluate long-term treatment and summarize patient and family education. Prescribe activity and exercise, and consider HF exercise rehab referral and a discharge follow-up appointment in 7-14 days. Hand-off goes to outpatient providers, with early follow-up caller and home health visits and triage to return to the ED.

## Application of the Data to Our Case

In general, for our patient, the provider should re-evaluate long-term treatment plans. Lisinopril can be discontinued and Entresto can be added as a new medication, and the provider can consider adding SGLT2 inhibitors to reduce hospitalization and cardiovascular mortality during hospitalization. Providers should prescribe activity and exercise and consider HF exercise rehab referral and a discharge follow-up appointment in 7-14 days. During the hand-off, transition patients to their outpatient providers with early follow-up calls and home health visits, and triage to return to the ED if needed.

## Bottom line

Establish a diagnosis of HFrEF, address congestion, and initiate a GDMT: ARNi in NYHA II-III; ACEi or ARB in NYHA II-IV; beta-blocker, MRA, SGLT2i, and diuretics as needed.

Consider additional therapies once GDMT is optimized: Ivabradine for NYHA II-III, HFrEF, NSR with an HR greater than or equal to 70 bpm on maximally tolerated beta-blocker; Vericiguat for NYHA II-IV LVEF <45%, recent HF hospitalization or IV diuretics, elevated BNP levels; digoxin for symptomatic HFrEF; polyunsaturated fatty acids for NYHA II-IV; and potassium binders for patients with HF with hyperkalemia while taking renin-angiotensin-aldosterone system inhibitors.

In heart failure with preserved EF, almost all hospitalizations are also due to congestion, and diuretic therapy for congestion treats most symptoms. Neurohormonal antagonism has minimal impact on symptoms or hospitalization. The recommendation for treatment is diuretics and SGLT2i. ARNi can be used in symptomatic HF with LVEF ±50% (level 2B recommendation).[7]

Mid-range heart failure patients are considered those who are recovering from HFREF. LVEF is between 41 and 49%. The recommendation for these patients, especially if they have a previous LVEF <40%, is that they should remain on their full regimen, adjusting doses as necessary, to avoid volume depletion, other symptomatic hypotension, or major side effects.

If the patient is at or near target weight before the day of discharge, the focus is on the transition day from IV to PO. Most patients admitted with HF congestion need to go home with diuretics.[8] Diuretic prescription at discharge decreases readmissions and mortality. ■

## Transition Care Planning

An important component of a transitional care plan is communication with the patient and their outpatient clinicians before hospital discharge. The transition of care should clearly outline:

- Addressing any precipitating causes of worsening HF identified in the hospital
- Adjusting diuretics based on volume status (including weight) and electrolytes
- Coordination of safety laboratory checks (electrolytes) after initiation or intensification of GDMT
- Further changes to optimize GDMT, including plans for resuming medication held in the hospital; initiating new medication, and titration of GDMT to goal doses as tolerated
- Reinforcing HF education and assessing compliance with medical therapy and lifestyle modification including dietary restrictions and physical activity
- Addressing high-risk characteristics that may be associated with poor post-discharge clinical outcomes, such as comorbid conditions (e.g., renal failure, pulmonary disease, diabetes, mental health, or substance use disorder); limitation in psychosocial support, impaired health literacy, or cognitive impairment
- Additional surgical or device therapy
- Referral to cardiac rehabilitation in the future, where appropriate
- Referral to palliative care specialists and/or enrollment in hospice for selected patients

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**WHAT REVISIONS WERE MADE?**
**In March 2022, MCG Health published new Clinical Indications for Admission to LTACH, replacing the 21 ventilator-day standard with a more clinical guideline - three failed spontaneous breathing trials (SBTs).[1]**

**Who is MCG Health?**
MCG Health is a healthcare group that publishes guidelines for patient treatment and transition, based on the latest research.

**Why did the guidelines change?**
A review of the latest research revealed that SBTs are considered a best practice for evaluating clinical necessity of long-term ventilation, and that delaying discharge of ventilated patients to an LTACH may negatively influence the probability of liberation.[2,3]

**How does this change help ventilated patients?**
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Photo was taken before March 2020 when COVID-19 precautionary measures were not in place.