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For patients hospitalized with COVID-19,¹

HELP REDUCE DISEASE PROGRESSION AND SHORTEN RECOVERY TIME^{1,2}

INDICATION

VEKLURY is indicated for the treatment of COVID-19 in adults and pediatric patients (≥28 days old and weighing ≥3 kg) with positive results of SARS-CoV-2 viral testing, who are:

- Hospitalized, or
- Not hospitalized, have mild-to-moderate COVID-19, and are at high risk for progression to severe COVID-19, including hospitalization or death.

IMPORTANT SAFETY INFORMATION

Contraindication

- VEKLURY is contraindicated in patients with a history of clinically significant hypersensitivity reactions to VEKLURY or any of its components.

Warnings and precautions

- **Hypersensitivity, including infusion-related and anaphylactic reactions:** Hypersensitivity, including infusion-related and anaphylactic reactions, has been observed during and following administration of VEKLURY; most reactions occurred within 1 hour. Monitor patients during infusion and observe for at least 1 hour after infusion is complete for signs and symptoms of hypersensitivity as clinically appropriate. Symptoms may include hypotension, hypertension, tachycardia, bradycardia, hypoxia, fever, dyspnea, wheezing, angioedema, rash, nausea, diaphoresis, and shivering. Slower infusion rates (maximum infusion time of up to 120 minutes) can potentially prevent these reactions. If a severe infusion-related hypersensitivity reaction occurs, immediately discontinue VEKLURY and initiate appropriate treatment (see Contraindications).
- **Increased risk of transaminase elevations:** Transaminase elevations have been observed in healthy volunteers and in patients with COVID-19 who received VEKLURY; these elevations have also been reported as a clinical feature of COVID-19. Perform hepatic laboratory testing in all patients (see Dosage and administration). Consider discontinuing VEKLURY if ALT levels increase to >10x ULN. Discontinue VEKLURY if ALT elevation is accompanied by signs or symptoms of liver inflammation.
- **Risk of reduced antiviral activity when coadministered with chloroquine or hydroxychloroquine:** Coadministration of VEKLURY with chloroquine phosphate or hydroxychloroquine sulfate is not recommended based on data from cell culture experiments, demonstrating potential antagonism, which may lead to a decrease in the antiviral activity of VEKLURY.

Adverse reactions

- The most common adverse reaction (≥5% all grades) was nausea.
- The most common lab abnormalities (≥5% all grades) were increases in ALT and AST.

Drug interactions

- Drug interaction trials of VEKLURY and other concomitant medications have not been conducted in humans.

Dosage and administration

- **Dosage:**
 - For adults and pediatric patients weighing ≥40 kg: 200 mg on Day 1, followed by once-daily maintenance doses of 100 mg from Day 2, administered only via intravenous infusion.
 - For pediatric patients ≥28 days old and weighing ≥3 kg to <40 kg: 5 mg/kg on Day 1, followed by once-daily maintenance doses of 2.5 mg/kg from Day 2, administered only via intravenous infusion.

ECMO=extracorporeal membrane oxygenation.



In the ACTT-1 overall study population, patients experienced

5 DAYS SHORTER RECOVERY TIME WITH VEKLURY¹

Median 10 days with VEKLURY vs 15 days with placebo; recovery rate ratio: 1.29 (95% CI, 1.12 to 1.49), $p < 0.001$ ^{1,2}

- Recovery was defined as patients who were no longer hospitalized or hospitalized but no longer required ongoing COVID-19 medical care

Significantly greater likelihood of improvement in clinical status, a key secondary endpoint¹

- Patients were 54% more likely to have improved clinical status on Day 15 vs placebo; odds ratio for improvement: 1.54 (95% CI, 1.25 to 1.91)

Helped reduce progression to more severe disease, an additional secondary endpoint¹⁻³

- 7% absolute reduction in incidence of new noninvasive ventilation or high-flow oxygen with VEKLURY (17%, $n=307$) vs placebo (24%, $n=266$) in patients who did not receive either at baseline (95% CI, -14 to -1)
- 10% absolute reduction in incidence of new mechanical ventilation or ECMO with VEKLURY (13%, $n=402$) vs placebo (23%, $n=364$) in patients who did not receive either at baseline (95% CI, -15 to -4)

Adverse reaction frequency was comparable between VEKLURY and placebo¹

- All adverse reactions (ARs), Grades ≥ 3 : 41 (8%) with VEKLURY vs 46 (9%) with placebo; serious ARs: 2 (0.4%)* vs 3 (0.6%); ARs leading to treatment discontinuation: 11 (2%)+ vs 15 (3%)

ACTT-1 was a randomized, double-blind, placebo-controlled, phase 3 clinical trial in hospitalized patients with confirmed SARS-CoV-2 infection and mild, moderate, or severe COVID-19. Patients received VEKLURY ($n=541$) or placebo ($n=521$) for up to 10 days. The primary endpoint was time to recovery within 29 days after randomization. Secondary endpoints included clinical status of patients on Day 15 as assessed on an 8-point ordinal scale and incidence of new high-flow oxygen requirement or new mechanical ventilation or ECMO.¹

*Seizure ($n=1$), infusion-related reaction ($n=1$).

+Seizure ($n=1$), infusion-related reaction ($n=1$), transaminases increased ($n=3$), ALT increased and AST increased ($n=1$), GFR decreased ($n=2$), acute kidney injury ($n=3$).

IMPORTANT SAFETY INFORMATION (cont'd)

Dosage and administration (cont'd)

• Treatment duration:

- For patients who are hospitalized and require invasive mechanical ventilation and/or ECMO, the recommended total treatment duration is 10 days. VEKLURY should be initiated as soon as possible after diagnosis of symptomatic COVID-19.
- For patients who are hospitalized and do not require invasive mechanical ventilation and/or ECMO, the recommended treatment duration is 5 days. If a patient does not demonstrate clinical improvement, treatment may be extended up to 5 additional days, for a total treatment duration of up to 10 days.
- For patients who are not hospitalized, diagnosed with mild-to-moderate COVID-19, and are at high risk for progression to severe COVID-19, including hospitalization or death, the recommended total treatment duration is 3 days. VEKLURY should be initiated as soon as possible after diagnosis of symptomatic COVID-19 and within 7 days of symptom onset.

- **Testing prior to and during treatment:** Perform eGFR, hepatic laboratory, and prothrombin time testing prior to initiating VEKLURY and during use as clinically appropriate.

- **Renal impairment:** VEKLURY is not recommended in individuals with eGFR < 30 mL/min.

• Dose preparation and administration:

- There are two different formulations of VEKLURY: VEKLURY for injection (supplied as 100 mg lyophilized powder in vial), the only approved dosage form of VEKLURY for pediatric patients weighing 3 kg to < 40 kg; and VEKLURY injection (supplied as 100 mg/20 mL [5 mg/mL] solution in vial). See full Prescribing Information.
- Administration should take place under conditions where management of severe hypersensitivity reactions, such as anaphylaxis, is possible.

Pregnancy and lactation

- **Pregnancy:** A pregnancy registry has been established. There are insufficient human data on the use of VEKLURY during pregnancy. COVID-19 is associated with adverse maternal and fetal outcomes, including preeclampsia, eclampsia, preterm birth, premature rupture of membranes, venous thromboembolic disease, and fetal death.
- **Lactation:** It is not known whether VEKLURY can pass into breast milk. Breastfeeding individuals with COVID-19 should follow practices according to clinical guidelines to avoid exposing the infant to COVID-19.

Please see Brief Summary of full Prescribing Information on the following page.

References: 1. Veklury. Prescribing Information. Gilead Sciences, Inc.; 2022. 2. Beigel JH, Tomashek KM, Dodd LE, et al; ACTT-1 Study Group. Remdesivir for the treatment of COVID-19—final report. *N Engl J Med*. 2020;383(19):1813-1826. doi:10.1056/NEJMoa2007764 3. Beigel JH, Tomashek KM, Dodd LE, et al; ACTT-1 Study Group. Remdesivir for the treatment of COVID-19—final report. Supplementary appendix. *N Engl J Med*. 2020;383(19):1813-1826. Accessed May 24, 2022. https://www.nejm.org/doi/suppl/10.1056/NEJMoa2007764/suppl_file/nejm2007764_appendix.pdf



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VEKLURY® (remdesivir)

Brief summary of full Prescribing Information. Please see full Prescribing Information. Rx Only.

INDICATIONS AND USAGE

VEKLURY is indicated for the treatment of COVID-19 in adults and pediatric patients (≥28 days old and weighing ≥3 kg), with positive results of SARS-CoV-2 viral testing, who are:

- Hospitalized, or
- Not hospitalized, with mild-to-moderate COVID-19, and at high risk for progression to severe COVID-19, including hospitalization or death.

DOSAGE AND ADMINISTRATION *[Also see **Warnings and Precautions, Adverse Reactions, and Use in Specific Populations**]:*

Testing Before Initiation and During Treatment: Perform eGFR, hepatic laboratory, and prothrombin time testing prior to initiating VEKLURY and during use as clinically appropriate.

Recommended Dosage in Adults and Pediatric Patients ≥28 Days Old and Weighing ≥3 kg:

- For adults and pediatric patients weighing ≥40 kg: 200 mg on Day 1, followed by once-daily maintenance doses of 100 mg from Day 2, administered only via intravenous infusion.
- For pediatric patients ≥28 days old and weighing ≥3 kg: 5 mg/kg on Day 1, followed by once-daily maintenance doses of 2.5 mg/kg from Day 2, administered only via intravenous infusion.

Treatment Duration:

- For patients who are hospitalized and require invasive mechanical ventilation and/or ECMO, the recommended total treatment duration is 10 days. VEKLURY should be initiated as soon as possible after diagnosis of symptomatic COVID-19.
- For patients who are hospitalized and do not require invasive mechanical ventilation and/or ECMO, the recommended treatment duration is 5 days. If a patient does not demonstrate clinical improvement, treatment may be extended up to 5 additional days, for a total treatment duration of up to 10 days.
- For patients who are not hospitalized, diagnosed with mild-to-moderate COVID-19, and at high risk for progression to severe COVID-19, including hospitalization or death, the recommended total treatment duration is 3 days. VEKLURY should be initiated as soon as possible after diagnosis of symptomatic COVID-19 and within 7 days of symptom onset.

Renal Impairment: VEKLURY is not recommended in individuals with eGFR <30 mL/min.

Dose Preparation and Administration *[See full **Prescribing Information** for complete instructions on dose preparation, administration, and storage]:*

VEKLURY must be prepared and administered under supervision of a healthcare provider and must be administered via intravenous infusion only, over 30 to 120 minutes. Do not administer the prepared diluted solution simultaneously with any other medication.

- VEKLURY for injection (supplied as 100 mg lyophilized powder in vial) must be reconstituted with Sterile Water for Injection prior to diluting in a 100 mL or 250 mL 0.9% sodium chloride infusion bag.
- Care should be taken during admixture to prevent inadvertent microbial contamination; there is no preservative or bacteriostatic agent present in these products.

Dosage Preparation and Administration in Pediatric Patients ≥28 Days of Age and Weighing 3 kg to <40 kg:

The only approved dosage form of VEKLURY for pediatric patients ≥28 days of age and weighing 3 kg to <40 kg is VEKLURY for injection (supplied as 100 mg lyophilized powder in vial). Carefully follow the product-specific preparation instructions.

CONTRAINDICATIONS *[Also see **Warnings and Precautions**]:*

VEKLURY is contraindicated in patients with a history of clinically significant hypersensitivity reactions to VEKLURY or any of its components.

WARNINGS AND PRECAUTIONS *[Also see **Contraindications, Dosage and Administration, Adverse Reactions, and Drug Interactions**]:*

Hypersensitivity, Including Infusion-related and Anaphylactic Reactions: Hypersensitivity, including infusion-related and anaphylactic reactions, has been observed during and following administration of VEKLURY; most reactions occurred within 1 hour. Monitor patients during infusion and observe for at least 1 hour after infusion is complete for signs and symptoms of hypersensitivity as clinically appropriate. Symptoms may include hypotension, hypertension, tachycardia, bradycardia, hypoxia, fever, dyspnea, wheezing, angioedema, rash, nausea, diaphoresis, and shivering. Slower infusion rates (maximum infusion time ≤120 minutes) can potentially prevent these signs and symptoms. If a severe infusion-related hypersensitivity reaction occurs, immediately discontinue VEKLURY and initiate appropriate treatment.

Increased Risk of Transaminase Elevations: Transaminase elevations have been observed in healthy volunteers and in patients with COVID-19 who received VEKLURY; the transaminase elevations were mild to moderate (Grades 1-2) in severity and resolved upon discontinuation. Because transaminase elevations have been reported as a clinical feature of COVID-19, and the incidence was similar in patients receiving placebo versus VEKLURY in clinical trials, discerning the contribution of VEKLURY to transaminase elevations in patients with COVID-19 can be challenging. Perform hepatic laboratory testing in all patients.

- Consider discontinuing VEKLURY if ALT levels increase to >10x ULN.
- Discontinue VEKLURY if ALT elevation is accompanied by signs or symptoms of liver inflammation.

Risk of Reduced Antiviral Activity When Coadministered With Chloroquine or Hydroxychloroquine: Coadministration of VEKLURY with chloroquine phosphate or hydroxychloroquine sulfate is not recommended based on data from cell culture experiments, demonstrating potential antagonism which may lead to a decrease in the antiviral activity of VEKLURY.

ADVERSE REACTIONS *[Also see **Warnings and Precautions**]:*

Clinical Trials Experience: The safety of VEKLURY is based on data from three Phase 3

studies in 1,313 hospitalized adult subjects with COVID-19, four Phase 1 studies in 131 healthy adults, and from patients with COVID-19 who received VEKLURY under the Emergency Use Authorization or in a compassionate use program. The NIAID ACTT-1 study was conducted in hospitalized subjects with mild, moderate, and severe COVID-19 treated with VEKLURY (n=532) for up to 10 days. Study GS-US-540-5773 (Study 5773) included subjects hospitalized with severe COVID-19 and treated with VEKLURY for 5 (n=200) or 10 days (n=197). Study GS-US-540-5774 (Study 5774) was conducted in hospitalized subjects with moderate COVID-19 and treated with VEKLURY for 5 (n=191) or 10 days (n=193).

Adverse Reactions: The most common adverse reaction (≥5% all grades) was nausea.

Less Common Adverse Reactions: Clinically significant adverse reactions reported in <2% of subjects exposed to VEKLURY in clinical trials include hypersensitivity reactions, generalized seizures, and rash.

Laboratory Abnormalities: In a Phase 1 study in healthy adults, elevations in ALT were observed in 9 of 20 subjects receiving 10 days of VEKLURY (Grade 1, n=8; Grade 2, n=1); the elevations in ALT resolved upon discontinuation. No subjects (0 of 9) who received 5 days of VEKLURY had graded increases in ALT.

Laboratory abnormalities (Grades 3 or 4) occurring in ≥3% of subjects receiving VEKLURY in Trials NIAID ACTT-1, Study 5773, and/or Study 5774, respectively, were ALT increased (3%, ≤8%, ≤3%), AST increased (6%, ≤7%, n/a), creatinine clearance decreased, Cockcroft-Gault formula (18%, ≤19%, ≤5%), creatinine increased (15%, ≤15%, n/a), eGFR decreased (18%, n/a, n/a), glucose increased (12%, ≤11%, ≤4%), hemoglobin decreased (15%, ≤8%, ≤3%), lymphocytes decreased (11%, n/a, n/a), and prothrombin time increased (9%, n/a, n/a).

DRUG INTERACTIONS *[Also see **Warnings and Precautions**]:*

Due to potential antagonism based on data from cell culture experiments, concomitant use of VEKLURY with chloroquine phosphate or hydroxychloroquine sulfate is not recommended.

Drug-drug interaction trials of VEKLURY and other concomitant medications have not been conducted in humans. Remdesivir and its metabolites are in vitro substrates and/or inhibitors of certain drug metabolizing enzymes and transporters. The clinical relevance of these in vitro assessments has not been established.

USE IN SPECIFIC POPULATIONS *[Also see **Dosage and Administration and Warnings and Precautions**]:*

Pregnancy

Risk Summary: There are insufficient human data on the use of VEKLURY during pregnancy to inform a drug-associated risk of major birth defects, miscarriage, or adverse maternal or fetal outcomes. COVID-19 is associated with adverse maternal and fetal outcomes, including preeclampsia, eclampsia, preterm birth, premature rupture of membranes, venous thromboembolic disease, and fetal death.

Lactation

Risk Summary: There are no available data on the presence of remdesivir in human milk, the effects on the breastfed infant, or the effects on milk production. In animal studies, remdesivir and metabolites have been detected in the nursing pups of mothers given remdesivir, likely due to the presence of remdesivir in milk. The developmental and health benefits of breastfeeding should be considered along with the mother's clinical need for VEKLURY and any potential adverse effects on the breastfed child from VEKLURY or from the underlying maternal condition. Breastfeeding individuals with COVID-19 should follow practices according to clinical guidelines to avoid exposing the infant to COVID-19.

Pediatric Use

The safety and effectiveness of VEKLURY for the treatment of COVID-19 have been established in pediatric patients ≥28 days old and weighing ≥3 kg. Use in this age group is supported by the following:

- Trials in adults
- An open-label trial (Study GS-US-540-5823) in 53 hospitalized pediatric subjects

Geriatric Use

Dosage adjustment is not required in patients over the age of 65 years. Appropriate caution should be exercised in the administration of VEKLURY and monitoring of elderly patients, reflecting the greater frequency of decreased hepatic, renal, or cardiac function, and of potential concomitant disease or other drug therapy.

Renal Impairment

All patients must have an eGFR determined before starting VEKLURY and while receiving VEKLURY as clinically appropriate. VEKLURY is not recommended in patients with eGFR less than 30 mL/min.

Hepatic Impairment

Perform hepatic laboratory testing in all patients before starting VEKLURY and while receiving VEKLURY as clinically appropriate.

OVERDOSAGE

There is no human experience of acute overdosage with VEKLURY. Treatment of overdose with VEKLURY should consist of general supportive measures including monitoring of vital signs and observation of the clinical status of the patient. There is no specific antidote for overdose with VEKLURY.

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Complying with the MATE Act

By Lisa Casinger

The Medication Access and Training Expansion (MATE) Act is part of the Consolidated Appropriations Act of 2023, which took effect in June 2023.

The MATE Act requires training for Drug Enforcement Administration (DEA)-registered clinicians—a one-time, eight-hour training requirement on treating and managing patients with opioid use disorder or other substance use disorders.

What does this mean for hospitalists? What do you need to do? What's the deadline? We'll answer all of these questions and more here.

- Who's required to complete this new training?
 - All DEA-registered practitioners.
- What's the deadline for completing the training?
 - The deadline for satisfying the new training requirement is the date of your next scheduled DEA registration submission (initial or renewal).
- How do you report satisfying the training requirement?
 - Beginning June 27, 2023, you'll be required to check a box on your online DEA registration form (whether it's your initial registration or your renewal)—affirming that you've completed the training.
- How often do I have to renew my DEA license?
 - Every three years.
- Does SHM offer courses that meet this new requirement?
 - Yes. SHM offers eligible courses that are available on the SHM Learning Portal. These courses are free for SHM members. Additional courses will be added in the coming months.
- I have already completed buprenorphine X-Waiver training. Does this count toward meeting

the requirement?

- Yes. Past DATA (Drug Addiction Treatment Act)-Waived training meets this requirement. In other words, if you previously held an X-Waiver, you have already met this new requirement
- Which clinicians are deemed to have already satisfied the training requirement?
 - Physicians who are board-certified in addiction medicine or addiction psychiatry.
 - Practitioners who graduated from their professional school within five years of June 27, 2023, or five years of their license renewal following June 27, 2023, and completed a curriculum that included at least eight hours of coursework regarding substance use disorder during that time.
 - Practitioners who previously took training to meet the requirements of the DATA-2000 waiver to prescribe buprenorphine can count this training towards the eight-hour training requirements.

There are a few key points to keep in mind:

- The MATE Act is a one-time requirement—you're done once you've completed the eight-hour session. This means if you've already completed eight hours of training in the required topic you don't need to complete another eight hours.
- Training is cumulative. It doesn't have to occur in one session and past trainings count. The eight required hours of training can be provided through different activity formats (e.g., live, online, enduring, etc.), do not have to be completed in one session, and can be satisfied through a combination of activities.
- Training can occur in a variety of formats, including classroom settings, seminars at professional society meetings, or virtual offerings. ■

Publishing Opportunities



If you're an SHM member interested in contributing to *The Hospitalist*, there are lots of opportunities. Scan the QR code for more information about clinical options (In the Literature, Key Clinical Questions, Interpreting Diagnostic Tests), and HM Voices.

Demystifying Performance Measures for Hospitalists

Limitations of discharge before noon

By Christopher Bartlett, MD, MPH, Housam Hegazy, MD, MBA, MLA, CPE, FACP, SFHM, and Eileen Barrett, MD, MPH, SFHM

SHM's Performance Measurement and Reporting Committee (PMRC) members debut a new column in *The Hospitalist*—"Demystifying Performance Measures." This series intends to provide members with a framework for assessing commonly used measures in performance-based compensation programs. In each article, we'll review one commonly used measure identified by the PMRC. Measure selection is based on group consensus and major measure categories from the biannual State of Hospital Medicine Report. The measures undergo comprehensive review and summary by a subset of members of the PMRC and are then approved for publication by the broader committee. SHM regularly comments on publicly reported measures under consideration or active measures reviewed regularly by the Centers for Medicare and Medicaid Services and the National Quality Forum.

Measurement programs are the reality of the majority of hospital medicine programs. Providing hospitalists perspectives in measure definitions and measure strengths and limitations equips them to build more meaningful measurement programs and engage in dialogue with executive leaders. We envision this column to empower hospitalists to communicate the "why," create a respectful and transparent environment for discussion and innovation among all team members, emphasize collaborative improvement, identify tools and resources to aid in improving performance, establish trust in the process, and think critically about the data we review and are held accountable to daily.

Each measure will be structured under the same review rubric including the following domains, as applicable: Attribution, impact factor, measurability, alignment across stakeholders, balancing measures, and evidence. The graphic below provides more details about the domains.

Wise performance-measurement strategies focus attention on clinical processes linked to improved care of patients, while also advancing the mission of health systems. Inpatient screening and treatment of substance use disorder is an example that aligns with available evidence and is likely to result in numerous downstream benefits. Characteristics of the best perfor-



mance measures are those that are patient-centered, have a direct link between measure performance and patient or system outcome, and are clearly attributable to the care provided by the hospitalist. Few measures meet these requirements, so individuals and groups need a measures-based paradigm to best inform practice. Through this discussion, we hope to help foster the development of meaningful measurement programs by hospitalists and institutional leadership.

In this first article we'll explore the strengths and limitations of discharge before noon (DCBN), a performance metric regularly used to assess hospitalists. DCBN is a common performance metric driven by hospital systems and is an example of a measure where direct attribution and impact by the hospitalist are not clear, and which has limited evidence supporting a positive impact on care.

Case

John Doe is hospitalized for a congestive heart failure (CHF) exacerbation and is now ready for discharge but has multiple needs to achieve best practices for CHF for transitioning to home. The hospitalist has seen him, provided education, and completed the discharge paperwork, medication reconciliation, and signed the discharge order. Before the patient can be discharged, there are many



Dr. Bartlett



Dr. Hegazy



Dr. Barrett

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The authors are members of SHM's Performance Measurement and Reporting Committee, which created this series to explore quality measures common in hospital medicine.

outstanding items:

- Pharmacy confirmation of medication reconciliation and delivery of medications to the patient
- Rehabilitation service's final recommendations
- CHF education by the interprofessional patient educator
- Insurance authorization and approval for home health services
- Delivery of a rolling walker and home oxygen
- Transportation home
- Final lab results

- Nursing staff to discharge him

Discussion

DCBN is one example of a frequently used measure whose clinical and operational significance can be thoughtfully debated and viewed from various perspectives. Is there a causal link between DCBN and improved patient outcomes? Does it improve hospital or emergency department (ED) overcrowding? At what time threshold should goals be set? Does DCBN matter to patients? Do certain institutional character-

istics limit DCBN’s applicability? Various concerns, such as those listed above, reflect the tenuous position DCBN holds within hospital medicine performance-measurement strategies.

DCBN was envisioned as a remedy for ED overcrowding, which has been associated with worse patient outcomes, increased length of stay (LOS), and worse patient and staff experience of care.¹ While computer modeling supports a direct cause-and-effect relationship between DCBN and hospital LOS and ED crowding, real-world evidence is mixed.² One study by Wertheimer et al.¹ correlated an 11% to 38% increase in DCBN with a 91-minute earlier average discharge time and the resulting shift in the median arrival time of patients to an inpatient unit from the ED from 5 p.m. to 4 p.m.¹ Additional studies have correlated DCBN with increased, unchanged, and decreased LOS.^{3,4,5} Improvements have been demonstrated in some institutions among surgical but not medical patient populations, and vice versa.^{5,6}

Concerns have been raised about the overreliance on DCBN as a solution to overcrowded hospitals. Hospitalists may be concerned that many requirements for discharge are beyond their control such as having care management support to arrange transportation home and durable medical equipment, available post-discharge follow-up appointments, and resourced discharge pharmacies. Patients may also feel rushed and fear they’re being discharged too soon. Focusing on DCBN as a goal may also seem counterintuitive to efforts to reduce readmissions, and insufficient attention to downstream bottlenecks that are true drivers of excess LOS leaves the impression that hospitalists need to do more. Additionally, there are concerns that adopting DCBN as a metric could lead hospitalists to keep patients who are otherwise ready for discharge in the afternoon until the following morning (although evidence is inconclusive as to whether this occurs). From an educational and professional sustainability perspective, attention to DCBN can result in concerns that safe patient care is not the hospital’s utmost priority.

The DCBN metric is largely dependent on the teamwork of many people, factors, and resources. Some of the team members who contribute to the success of this metric include but are not limited to hospitalists, consultants, nurses, patients and their families, care managers, rehabilitation services, pharmacists, environmental services associates, administrators, third-party transportation providers, post-acute care facilities, laboratory and radiology availability, durable medical equipment supply companies, health insurers, and

ATTRIBUTION	Group versus individual: consideration for best construct
	Accuracy of individual assignment in the HER
	Example: Discharge summary accountable by individual; readmissions accountable by group
ABILITY TO IMPACT	Directly influenced by the hospitalist?
	Control of/ability to affect system factors
	Example: Overall LOS given other variables
MEASURABILITY	Is the desired result clearly and reliably measurable?
	Identify the measurement time period and cadence
	Burden of data collection and source of data
	Is metric already measured?
	Can the data be validated? How difficult is validation of data?
	Will you have enough cases for valid measurement?
ALIGNMENT ACROSS STAKEHOLDERS	Priorities and requirements of public reporting programs/insurance plans
	Hospital or system priorities
	Group priorities
BALANCING MEASURES	Understand unintended consequences—can these be mitigated?
	Alternate measure to monitor impact of program measure
	Example: LOS target balanced with readmissions
EVIDENCE	Is there data to support the desired outcome or the impact of a process?
	What resources/processes are used to achieve the result?
	Can this be replicated in your group?

others. Additionally, the ability of an individual hospitalist to meet this metric will be affected by the number of patients they are caring for and the complexity of the patients on their service. That said, hospitalists can help meet this metric through the time of day they see and evaluate the patient and initiate the discharge process.

DCBN has been a performance measure at one of our institutions for several years. The institutional goal is 50% and average performance has historically been approximately 50-60%. Unfortunately, there is little to no evidence to correlate these results with meaningful decreases in LOS or ED crowding. At another of our hospitals, it is not tracked at all; at a third, only 3.5% of discharge delays were found to be due to the hospitalist’s delay in seeing the patient. A balancing measure for DCBN is LOS.

Conclusion

Akin to the viewpoint offered within Readmission Reduction as a Hospital Quality Measure by Cram et al⁷ where the authors note that excess attention to read-

missions has diminished other quality endeavors, it’s likely the undue attention to DCBN has led to improvements while also taking up bandwidth from other quality and safety endeavors that could have resulted in more meaningful benefits to patients. If we rebalance the emphasis on DCBN to resource development and validating other measures, we may see more widespread benefits to patients, hospitalists, and health care systems.

While DCBN may promote earlier discharges and reduce ED crowding, this connection is tenuous and likely dependent on the extent of adoption and whether additional throughput challenges exist that would minimize the efficacy of DCBN. Before investing in DCBN, hospital medicine groups and hospital leadership may wish to focus on existing measures that are patient-centered, have a direct link between measure performance and patient or system outcome, and are clearly attributable to the care provided by the hospitalist. Under the right circumstances—such as where hospitals and hospital medicine groups are adequately resourced for patients to have early and safe

discharges—DCBN may meet all these needs and could be adopted and monitored for effectiveness. If this metric were to be used to evaluate the performance of hospitalists, it must be individually customized to the institution and practice to better reflect individual hospitalist performance. ■

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Street Medicine on the Floors: A Promising Inpatient Model

By Elizabeth Desmarais, DO, Jacqueline Fitton, DO, Patrick Perri, MD, and James Miller, MD

Persons experiencing homelessness (PEH) can be some of the most complex patients on hospitalists' services. Chronic conditions such as hypertension, hypercholesterolemia, and diabetes are inadequately controlled in this population.^{1,2} Similarly, high rates of cancer, heart disease, chronic obstructive pulmonary disease, and geriatric syndromes, such as functional impairment, frailty, and depression, have been described.^{3,4,5,6} Lastly, homelessness is associated with high rates of acute-care utilization and hospital readmission and is an independent risk factor for mortality.^{7,8,9,10} As homelessness in the U.S. continues to increase, the effects on our patients and hospitals are likely to persist. It's important that hospitalists be equipped to provide care to this population.¹¹

The health care problems plaguing PEH are unlikely to surprise hospitalists, but clinicians may feel inadequately prepared to address these issues. Nuances in insurance coverage, access to medications, and the ability to follow up for regular outpatient appointments can complicate discharge planning and create barriers to the management of acute and chronic health problems. Additionally, patients may understandably exhibit resistance to hospitals and their staff because of stigmatizing or traumatizing interactions with the health care system.^{12,13} All of these factors can pose challenges to hospitalists that an inpatient street medicine

consult service can potentially solve.

Street medicine is a specialty focused on bridging health care gaps experienced by persons experiencing unsheltered homelessness (PEUH), sometimes known as "rough sleepers." Initially pioneered by Dr. Jim Withers and others more than 30 years ago, this approach involves providers going directly to unsheltered patients wherever they live, offering health and social services through a highly patient-centered and patient-directed care model.¹⁴

One health care system using this approach is Allegheny Health Network (AHN) in Pittsburgh. Within the Center for Inclusion Health, a team of interdisciplinary street medicine providers engages with patients in both the outpatient and inpatient domains. On the outpatient side, they go on "street rounds" to visit patients in encampments, under bridges, and inside drop-in centers. On the inpatient side, members of the street medicine team, including community health workers (often individuals with lived experience), social workers, nurses, and physicians, provide expert consultation, since many PEHs are not identified as needing care until they are hospitalized for an acute illness.

Because mortality rates for rough sleepers are typically higher than those living in homeless shelters, and because PEH may transition between sheltered and unsheltered settings, street medicine teams are uniquely structured to follow their patients across the spectrum of homelessness and health care.^{15,16}

"Street rounds" represent an



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Dr. Fitton



Dr. Perri



Dr. Miller

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important collaboration between medical professionals and non-medical street outreach teams, where outreach workers lead engagements and build trusting relationships with patients, and medical professionals integrate health care access when needed. Clinicians treat acute and chronic diseases, offer rapid access to mental health and substance use disorder treatment, and recommend navigation to higher levels of care whenever indicated. Although the team's ability to deliver health care on the streets may avoid unnecessary acute care utilization, its primary goal is to facilitate meaningful and durable access to services through reality-based, trauma-informed, and harm-reduction-focused pathways. The same clinicians who visit patients on the street can also follow them in more traditional clinic settings, or on the inpatient

consult service. This model builds trust, reduces care fragmentation, and provides an opportunity for comprehensive, wrap-around care.

When PEH are admitted to an AHN hospital, inpatient teams can place a "consult to street medicine." The street medicine team then visits the patient, offers clinical recommendations, coordinates benefits, screens for social determinants of health, connects to community-based resources, and assists with safe discharge planning. If the patient is amenable, the team negotiates a plan to follow the patient in the outpatient setting or fosters a connection to other primary care or homeless health care resources. The consult team then discusses the patient's care and post-discharge plans with the primary team and hospital staff. For example, they may suggest medication changes that prioritize the patient's preferences and unique social situation

(e.g., limiting the use of diuretics given lack of access to restrooms) or provide patient education (e.g., how to store perishable medications, such as insulin).

If patients are unable to establish stable housing before discharge or are still too unwell to be discharged to their prior place of living, patients can be referred to medical respite care. Medical respite is a post-acute care model providing a temporary surrogate home environment for patients requiring a period of continued recuperation or outpatient treatment who would otherwise be discharged home (if a safe and stable home environment existed). For example, a patient admitted with infective endocarditis and a history of injection drug use may be deemed an unsuitable candidate for home infusions of intravenous antibiotics. However, medical respite could allow them to receive these services in a lower-cost setting that enhances their likelihood of treatment completion and improved social stability with a focus on trauma-informed care and harm-reduction principles.

Street medicine programs have already been shown to benefit health care systems. Although typically rooted in the outpatient setting, at least one program

has demonstrated reductions in acute care utilization by engaging patients in the hospital setting. The street medicine program at Lehigh Valley Health Network in Allentown, Pa., noted substantial decreases in emergency department visits and admissions among their patients, ultimately leading to \$3.7 million in hospital savings in 2017.¹⁷ More data is needed to determine the potential benefits of the dual outpatient-inpatient street medicine model for both patients and the health care systems with which they interact. At a minimum, collaborating with street medicine providers can give hospitalists an additional tool in their toolkit when caring for PEH. Like other consultants with specific expertise, these teams can use their experience to provide patients with individualized resources and facilitate safer discharge planning. By partnering with street medicine providers in both the inpatient and outpatient settings, hospitalists can continue working toward equitable care for patients experiencing homeless-

ness and housing instability. ■

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Worsening Primary Care Shortages on the Horizon

By Ruth Jessen Hickman, MD

With worsening doctor shortages expected in many areas of medicine, including hospital medicine, the expected shortfall in primary care doctors is particularly sobering. A 2021 report from the Association of American Medical Colleges (AAMC) estimated that by 2034 the U.S. will have a shortage of between 18,000 and 48,000 primary care physicians (PCPs), with a shortage of non-primary care specialists between 21,000 and 77,000.¹

Lisa Kaufmann, MD, is the medical director of the Appalachian Regional Healthcare System hospitalist program and clinical inpatient faculty at the Mountain Area Health Education Center Boone family medicine residency in Boone, N.C. She pointed out that changing demographics, including an aging population and continued immigration, is a primary driver of this trend. Current estimates project that the U.S. population will grow from about 334 million in 2023 to 363 million by 2034. This growth is expected to be particularly pronounced for Americans 65 and older, a population with high health care needs.¹



Dr. Kaufmann

A large part of the physician workforce is also approaching retirement age, another component of the projected shortage. Daniel Ricotta, MD, a hospitalist and associate program director of the internal medicine residency program at Beth Israel Deaconess Medical Center and associate professor of medicine at Harvard Medical School, Boston, added, “A big aspect of our workforce shortage is that physicians are practicing fewer hours per week than they used to and practicing for fewer years than they did in the past. You’re having higher attrition rates and stable matriculation rates.” Clinician burnout, exacerbated by COVID-19, may have further worsened the situation.



Dr. Ricotta

Dr. Kaufmann said, “Physician shortages were a problem 30 years ago, and it’s just gotten worse. You have deserts where the number of health care professionals is really low, particularly in rural areas.” Demographers predict the number



of states receiving a grade of “D” or “F” for their physician shortages will increase from four in 2017 to 23 by 2030, with some of the worst physician shortage ratios in the West and South, and with many rural areas being the most strongly impacted.²

Current shortage impacts can be felt in many areas. In a 2019 poll, 35% of people said they had had trouble finding a doctor in the last two to three years.³ The Health Resources and Services Administration estimates the current need for an additional 17,000 PCPs, with about 100 million Americans living in areas without adequate numbers of health professionals.⁴ If minorities and other underserved populations used health care with the same frequency as those with fewer access barriers, the demand for primary care physicians would be even more pronounced.

Impacts

Even accounting for socioeconomic and other health care confounders, increasing the supply of primary care physicians lowers mortality rates. One 2019 study found that every 10 additional primary care physicians per 100,000 people was associated with a 51-day increase in life expectancy and decreased rates of mortality from cancer, cardiovascular disease, and respiratory illness of around 1%.⁵

“When people don’t have good access to primary care, they come to the hospital with later disease. They’re sicker, and it costs more to take care of them,” said Dr. Kaufmann. “And unless a patient has a very rare disease, the average

primary care doctor will do better with them than if they get care from a bunch of different specialists with no primary care physician conducting the orchestra of their care.”

Dr. Ricotta noted that the transition out of the hospital can be more prone to medical complications when fewer primary care resources are available. This can contribute to increased hospital readmission rates, for which hospitals may be financially penalized. Added Dr. Kaufmann, “Multiple research studies have shown that hospital readmission after eight days of discharge is typically not due to any defects in the hospital care, but more to social determinants of care and follow-up appointment access.”

Dr. Ricotta pointed out that the paradigm of hospitalist medical care became more dominant as fewer primary care physicians became able to attend to their patients in the hospital themselves. He believes that worsening shortages in primary care might further increase patient volumes for hospitalists, as fewer primary care practices will have one of their own practitioners cover patients while in the hospital. “Volumes on those services are already accelerating rapidly, and I could see that adding pressure to hospitalists. But on the other hand, it’s also one way that hospitalists might help primary care physicians.”

Pipeline to PCPs

In 2006, the AAMC recommended that first-year medical school enrollment increase by 30%, to help

combat physician shortages projected at that time. That goal was reached in 2018, with substantial increases in the number of doctors graduating from MD-granting institutions as well as osteopathic schools.⁶

However, the number of residency slots for graduating medical students has not kept pace with this growth, which has caused new problems. Dr. Kaufmann explained, “It used to be that unless there was a significant issue, a U.S. medical graduate would always match to a residency. Now that’s not always the case.”

Medicare reimburses hospitals for a substantial component of resident salaries, although most major hospitals also fund additional residency positions through clinical revenue to get sufficient physician coverage. A major driver behind the current insufficient number of residency positions is the Balanced Budget Act of 1997, which froze Medicare support of teaching hospitals’ graduate medical education funds at 1996 levels.

Dr. Ricotta pointed out that this increased difference between the number of medical student graduates and residency slots has meant that fewer graduates of international medical schools can now secure residency positions than in the past. Because of visa incentives, such graduates have been more likely to pursue primary care in rural and underserved regions than U.S. graduates.

Legislative approaches

Attempts to overturn this cap have not succeeded, but some success-

ful legislation has supported some new Medicare-supported slots. The Centers for Medicare and Medicaid Services (CMS) recently phased in 200 new Medicare-funded physician residency slots, with an additional 800 new slots to be rolled in over five years.¹ CMS gave priority for these slots to programs in current areas of physician shortage, with three-quarters of the new positions marked for primary care or mental health.⁷ (Note: The 2021 AAMC projections factor in these added positions.)

Although helpful, increasing the total number of residency slots available is insufficient for attracting more primary care physicians. In the U.S., the percentage of medical students opting to pursue medical specialties over primary care continues to increase. In the 2023 match cycle, some of the highest numbers of unfilled match positions were in specialties focused on primary care: pediatrics, internal medicine, and most pronouncedly with family medicine.⁸

One approach is funding residency positions outside of the Medicare funding system. The Teaching Health Center Graduate Medical Education Program, founded under the Affordable Care Act, aims to increase the number of physicians trained in community-based settings instead of hospitals to help expand health care access in underserved areas. More than 1,200 new family physicians have completed residency and entered the workforce since the program began in 2010.⁹ Dr. Kaufmann added, “People who have residency experience of what can be accomplished in a rural setting are much more likely to choose to practice in a rural area.”

Although additional legislation to increase the number of residency positions is needed, especially those marked for primary care, making primary care more financially attractive would also help. Dr. Ricotta thinks it is critical to support legislation that changes reimbursement models. Primary care physicians face increasing financial pressures to see greater numbers of patients in shorter visits.

Dr. Ricotta added, “The whole model of health care delivery disincentivizes people to go into primary care. Under a fee-for-service model, you get paid for doing things to patients, not preventing bad outcomes.” These financial pressures also make it more difficult for current primary care physicians to stay in practice, especially in rural areas where it is difficult to employ economies of scale.

Relatedly, advocacy efforts to reduce documentation burdens and administrative requirements might decrease physician burnout and allow more primary care physicians to continue practicing. Efforts to support physicians’

mental health, such as the Dr. Lorna Breen Health Care Provider Protection Act passed in 2021, are also key.¹⁰

Supporting and supplementing PCPs

In addition to supporting legislative efforts, doctors can advocate for high-quality primary care residency training, particularly in rural areas. In her own region, Dr. Kaufmann’s hospital created a family medicine residency program affiliated with the University of North Carolina, graduates of which will soon start practicing in the area.

Dr. Kaufmann said, “We can offer to teach, help these trainees going into very rural areas be comfortable providing a higher level of care.” She also noted that some of the doctors in remote rural areas care for very sick people so extra training from hospitalists can be very helpful.

Dr. Ricotta pointed out that hospitalists might also help reduce some of the burden on primary care physicians through post-discharge clinics, an approach that has been piloted at various sites across the country. In this model, a hospitalist staffs an outpatient office of recently discharged patients. “Some patients need follow-up care three to four days after hospitalization. Primary care physicians may not be able to accommodate that, and they don’t have inpatient medicine expertise,” he said. “Having a hospitalist as a bridge could be another way of supporting our primary care physicians.”

Given existing trends, it will be important to find ways to adapt and provide primary care with fewer physicians. Dr. Kaufmann is hopeful that we might leverage new technologies to help decrease the burden on primary care physicians. For example, appropriately implemented artificial intelligence programs might help with monotonous and time-consuming processes such as transcribing notes, hopefully improving the quality of life for physicians and potentially increasing efficiency to allow them to care for more patients.

Other primary care practitioners such as nurse practitioners and physician assistants may end up picking up even more of the primary care responsibilities. Although such professionals can give quality management much of the time, such systems may work best when these health care professionals can work closely with an overseeing physician. If this isn’t possible in person, Dr. Kaufmann pointed out that telemedicine opens up many opportunities for contributing expertise and oversight.

In general, the accelerated implementation of telemedicine due to COVID-19 offers a chance to bring

quality primary care services to people in remote regions who may otherwise lack sufficient practitioners. But such measures can only go so far to ameliorate a deficit in physicians, who only have so many hours in a day to attend to remote patients.

“Unfortunately, there is only so much that we as hospitalists can do to help with this primary care problem,” said Dr. Kaufmann. ■

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Empathy for the Rural Hospitalist

By Mark Menet, MD, MPH

In residency, we had derisive nicknames for the hospitals in the surrounding rural areas that would frequently send us patients. After we were notified of the transfer, we stayed on edge until the patient arrived, unclear of what was going to show up. At best they were sending us a difficult patient who was going to require a great deal of work; occasionally, as we paged through the photocopied progress notes and labs, we expressed more and more righteous indignation at the decisions that were made that I as a cocky intern never would have done. In the end, it tended to leave us feeling like we were just a dumping ground for the outside hospital's mistakes.

Now I'm the physician working in these areas. The memory of those nicknames drives me to do everything I possibly can to help my patients, but in the back of my mind is the knowledge that there are situations beyond my capabilities that require transfer. I understand that few hospitalists have worked in a truly rural setting and don't understand the challenges this represents. It's also easy to become myopic and forget the huge shifts that have occurred in the relationship between rural hospitals and larger referral centers over the past few years.

Rural counties in the U.S. suffer from multiple challenges that

make caring for patients more difficult. There are roughly one-third the total doctors and one-fifth the specialists per capita to provide care in rural areas compared to urban ones. On top of this, the rate of smoking is higher, and the average patient is older and has a lower per-capita income.¹ These socioeconomic factors and the dearth of resources make transfers to tertiary care centers for consultation or procedures outside of the regular skill set of a hospitalist more likely.

Working in a critical access hospital is a different world from a tertiary care center or even a standard hospital in an urban setting. A critical access hospital is limited to 25 beds that are divided among the available service lines. Usually, that means I'm the only hospitalist on service and have a single general surgeon and orthopedic surgeon to help me deal with holes that need to be made or closed (usually with certified registered nurse anesthetist, rather than anesthesiologist support during those procedures). I have unfettered access to a CT scan and ultrasound but can't get an MRI or echo on the weekends and my interventional radiology coverage is much more random than that. I can't do dialysis, and all drips and vent-setting decisions are made by me (a geriatrician). In the before times this meant I got to care for relatively sick patients (our intensive care unit usually equated

to a larger hospital's intermediate care) with no pressure to consult unnecessarily, but could reach out to those smarter than me when I recognized I was in over my head. I had the time to get to know my patients and ensure they understood what I was doing, why I was doing it, and whether this was in line with their wishes.

The COVID-19 pandemic dramatically expanded what was "possible" at these smaller hospitals. In Wisconsin, we missed the initial wave that New York and Seattle experienced, but in early 2020 the number of COVID-19 pneumonia patients requiring bilevel positive airway pressure or intubation continued to rise. At first, it was a matter of keeping the high-flow and bilevel-positive-airway-pressure patients in the intensive care unit, hoping they would improve, and transferring them once they needed intubation. Within a week or two we could no longer transfer these patients despite calling upwards of 30 hospitals across multiple states. This left us to manage multiple vented patients with a respiratory-therapist crew that was never staffed to handle this.

With a bit of hand-holding from some amazing pulmonologists and a lot of reading, we managed some remarkable recoveries, but most patients did not recover. As the incidence of COVID-19 cases declined we hoped we would return to the old way of caring for patients who are just sick enough for our



Dr. Menet

Dr. Menet is the chief hospitalist officer at Beam Healthcare in Madison, Wis.

care, and be able to hand off the patients who needed a cardiologist to perform a coronary catheterization, or a gastroenterologist to perform an endoscopic retrograde cholangiopancreatography; but now these are the patients waiting in our hospital beds while we provide the best care we can while not being able actually treat the admitting diagnosis. This has become the new norm and is unlikely to change anytime soon.

There are two main types of patients we try to transfer to a larger center. The first is a patient who has declined despite our aggressive care; the second is if a reversible

disease state requires a procedure that is unavailable at our facility. In either case, these patients arrived at the hospital appropriate for that setting but are now unable to be adequately cared for without a higher level of care. Despite my independent streak, I recognize my limitations, and when this situation presents itself, I've found a few methods that improve the chances of getting my patient transferred to receive the care they need on an expedited basis. These are not based on randomized studies or a large survey, just my experience getting thrown into the deep end and somehow keeping my head above water for the past three years:

1. **Be very nice to the triage nurse or staff.** They are doing their best and are never the person keeping your patient out of their hospital. They can also give you amazing tips, such as when discharges tend to occur, giving you the best time to call requesting one of their very rare beds.
2. **Be realistic about which patients actually need to be transferred.** I've found that I can perform a thorough workup for some pretty rare diagnoses when I have the help of a willing subspecialist to guide me. Consult with them early, and ask them which tests they would like drawn so you can at least start the workup. At the very worst you have the person's attention, at best you're starting the process that would have

had to wait until the patient got transferred.

Regardless of the information provided, I never quote the physician I discussed the case with, as these conversations exist outside of a direct relationship with the patient, and I recognize that it is MY decision to perform these tests.

3. **Maintain contact but recognize that frequent calls can lead to overuse of their triage service and keep you away from your patients.**
4. **Understand that larger institutions are also overfull and struggle to deal with their patients.** Because of this, the truly sick will trump a lack of ability to perform a procedure that is not imminently lifesaving. Explore transfers for procedures alone (returning after the procedure is complete) or exchange your critically ill patient for one waiting for placement to a skilled nursing facility or an assisted living facility.
5. **Work with your emergency department colleagues to define diagnoses that are beyond the care of your team,** so these conversations can be started with the patient before your involvement begins. We've also tried to make the transfer process as efficient as possible with daily checks on beds available in surrounding hospital systems, a list of numbers for those access centers, defining a responsible person to reach out to those sys-

tems, and a note documenting which were reached out to, and what the response was.

6. **Most importantly, be brutally honest.** Soft-selling how sick the patient is might get them to the other hospital, but now those clinicians need to provide a higher level of care than they expected. Alternatively expounding endlessly on how sick the patient is only for them to find this patient didn't need to be transferred will rapidly erode any goodwill you had and make future transfers more difficult.

Another issue that might be unknown to our city-mouse colleagues is the fact that a fair number of the patients who need to be transferred and have been placed on a waitlist, end up being admitted to our hospitalist services in the interim. This situation guarantees that I'm caring for a patient who requires something I cannot provide. It's hard to describe the helplessness you feel walking into a patient's room to tell them that while their troponin is still rising, you still don't have a bed to send them to. In this situation please be considerate of our limitations. I can't get a QuantiFERON TB gold test, so please don't expect me to have IR-guided drainage occur on the weekend. If a lumbar puncture is indicated or a central line is necessary, we will get it done; but most other invasive procedures are the reason the patient is being transferred in the first place. I am thrilled to work alongside your

team to begin any workup you recommend or to adjust my drip or vent settings per your preference, but obviously, I need to know what these are for me to carry them out. As always, communication is key here, and access to direct phone numbers, saving me the 20 minutes to contact you through your access team, would be very much appreciated.

I love the independence that comes with working in a rural setting and believe this is a core trait of those who choose to work in this setting. I don't want to transfer patients unless I have to, and most patients want to stay as close to home as possible so family and friends can visit without the intimidation of having to drive in a metro area. I relocated to a rural practice once I realized that practicing here let me make the biggest difference I could to a group of people who needed it the most. I've worked hard to provide the same level of care for my patients that would be available anywhere else in the country. When I do call and request assistance, please be patient with me, and remember that I am simply trying to do the best thing I can for my patients. Hopefully, I will do a good enough job to avoid a snarky nickname for my hospital. ■

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Career

Environmental Service Workers' Impact on Hospitalists

By Lisa Casinger

Anyone who works in a hospital knows how important environmental services (EVS) professionals are to providing a safe, functional, supportive environment for patients and staff. Like many aspects of health care, the importance of these roles became even more evident during the COVID-19 pandemic. And, just like other health care professionals, the staff in these roles experienced stress, fear, exhaustion, and burnout.

We spoke with Felicity Adjei, the shift lead for the EVS department at Franciscan Health Lafayette East in Lafayette, Ind., to learn more about her role and the effect the pandemic had on her job. She's worked at Franciscan Health for 12 years. Ms. Adjei spent her first month on the job training with a fellow employee to ensure she knew what to clean, how to clean, and how to keep herself and patients safe from the chemicals used. She also had to complete extensive Occupational Safety and Health Administration training, which has to be renewed regularly.



Ms. Adjei

Ms. Adjei's main duties include working to keep patient rooms and various areas of the hospital clean and sanitized. In addition to these duties, she's also the lead associate in her supervisor's absence, which involves delegating team members to different areas and working to make sure the team is running smoothly.

A typical day is anything but typical for Ms. Adjei. "A typical day for me is usually very busy," she said. "I work to clean and sanitize patient rooms to help turn over rooms when discharges need to be completed. Due to the large volume of rooms within the hospital, my team members and I need to ensure we are doing a complete and thorough job, as quickly as we can."

We've written numerous articles about staffing shortages and how they affect hospitalists, patient care, and hospitals—and those staffing issues affect EVS team members as well.

"The biggest challenge of my job is definitely the sheer amount of work that needs to be completed," Ms. Adjei said. "My team and I work as hard as we can, but sometimes it is just not possible to complete our daily tasks with the amount of staff that we have."

As you'd expect, the pandemic created a lot more work for Ms. Adjei and her team members. The increased number of hospitalizations meant more work and a heightened demand to turn

rooms over quicker—despite the fact that extra precautions and the use of personal protective equipment (PPE) were needed when cleaning COVID-19-designated rooms.

"Before the pandemic, shifts were already busy and required a lot of time and energy," she said. "At the height of the pandemic, the workload increased even though the number of staff did not."

Ms. Adjei's concerns and fears mirrored those shared by hospitalists during the pandemic—knowingly putting yourself in harm's way by working in that environment.

"Though I had my PPE, it was tough entering room after room that housed a patient who was suffering from a very contagious disease," she said. "However, I knew each patient deserved a clean environment to help them heal. I relied on my PPE and faith in God to protect me each day."

Despite the challenges and stress of working through the pandemic, the lingering staff shortages, and the exhaustion she feels at the end of each shift, Ms. Adjei says the most enjoyable part of her job is being able to connect with patients through faith.

"I love being able to pray with patients and remind them that they are not alone," she said. ■



Unit Medical Directors—Liaisons Between Physicians and Nurses

By Karen Appold

A variety of health care professionals contribute to caring for patients on hospital units. “Maintaining communication and optimizing processes among these multidisciplinary team members is critical to providing the best care possible,” said Vanessa McFadden, MD, PhD, a unit-based, hospital-medicine, medical director in the department of pediatrics at Medical College of Wisconsin in Milwaukee, a free-standing children’s hospital with about 300 beds.



Dr. McFadden

To achieve optimum care, some medical centers have hospitalists or other physicians serve in what’s called a “unit medical director” position.

“These individuals help set high-value, patient-centered-care goals with nursing leadership, and then



Dr. McGillen

act as liaisons and peer mentors to their provider colleagues to realize these goals,” said Brian McGillen, MD, a hospitalist and associate professor of medicine in the division of hospital medicine at Penn State Milton S. Hershey Medical Center in Hershey, Pa., an academic facility with 485 beds. “These physicians complete the provider-nurse leadership dyad—a hallmark of accountable care units in hospitals—and are responsible for driving organizational value at the nursing unit level.”

Responsibilities for practitioners in this role include strategic planning with nursing leadership, coaching, understanding concepts of quality/process improvement, utilization management, and clinical documentation. “Having an understanding of organizational performance metrics—and the drivers behind them—is imperative,” Dr. McGillen said.

Each physician-nurse dyad is responsible for a single geographic area; it can be an entire floor or sometimes part of a floor, depending on the number of patients. “Together they review all reported



Dr. Held

safety events to identify potential root causes, escalate potential system flaws, and propose and implement interventions,” said Justin Held, MD, SFHM, vice chair of inpatient clinical affairs in internal medicine at the University of Cincinnati, a 500-bed urban academic hospital.

Benefits abound

Having a designated point of contact whom staff can feel comfortable approaching helps bridge gaps between different team members. “Successful unit medical directors can understand different points of view and develop solutions that benefit all stakeholders,” said Tyler Chapman, DO, medical director of acute care services in the division of hospital medicine at Penn State Milton S. Hershey Medical Center in Hershey, Pa.



Dr. Chapman

By being on staff themselves, unit medical directors can learn what other staff members truly care about, what motivates them, and why they entered their fields. “This helps to maintain morale as

projects can be tailored to align with these fundamentals and values,” said Jennifer Zagursky, MD, FHM, who serves as a unit medical director and is also a hospitalist and associate division chief of hospital medicine at the University of Rochester Medical Center in Rochester, N.Y., an academic hospital with more than 880 beds.



Dr. Zagursky

“Unit medical directors experience firsthand what works well and what could be improved, which makes hospitalists perfect for this type of role,” Dr. McGillen said.

Anupama Goyal, MD, MPH, MBA, a medical director of a 48-bed medical-surgical unit at Michigan Medicine, an academic hospital with 550 beds in Ann Arbor, Mich., has found that disconnects between nurses and physicians happen frequently because of their different workflows and locations.



Dr. Goyal

“Physicians aren’t regionalized to medical units at our hospital while nurses are unit-based, so they communicate with providers using secure chat in electronic medical records or paging,” Dr. Goyal said. “However, physicians aren’t logged into electronic medical records while they’re seeing patients on multiple units and floors. Therefore, they don’t always receive nurses’ messages in real-time, so communication gaps can occur.”

These gaps can cause delays in patient care, patient dissatisfaction, and patient-safety events. Dr. Goyal works with nurses and providers to find optimal ways to bridge these gaps and promote nurse and physician bedside rounding practices.

Helping hospitalists

Ideally, unit medical directors alleviate some of the burden that falls on hospitalists so they can focus on patient care, Dr. McFadden said. These personnel can also address issues across multiple disciplines in real-time, as well as facilitate the development of processes to hopefully prevent future issues.

At Penn State Milton S. Hershey Medical Center, unit medical directors not only participate in direct patient care but also attend regular meetings with hospitalists. “They actively identify systemic and operational areas of improvement and then serve as leaders of change,” Dr. Chapman said.

Unit medical directors also function as peer advisors and educators, and can be important resources in helping hospitalists, especially newer ones, understand hospital-based practices, overcome barriers to care, and serve as sounding boards to discuss difficult clinical conundrums, Dr. McGillen said.

Improving patient experiences

Many of Dr. Zagursky’s projects are designed around improving quality and safety, such as determining how to deliver the best care in the most efficient and effective manner. Some of her initiatives have involved antibiotic stewardship, e.g., decreasing the risk of *Clostridioides difficile* infection; medication administration, by altering the timing to decrease interruptions and maximize effectiveness; and changing the times when vital signs are checked to decrease unnecessary nocturnal awakenings and decrease the potential for delirium.

“Our unit is fortunate to have a dedicated physical therapist and pharmacist, so we’ve undertaken projects to deprescribe unnecessary medications and improve patient mobility,” Dr. Zagursky said. An added benefit of these projects is a decrease in nurse burden.

By getting to know nurses’

strong suits, Dr. Zagursky’s unit was able to start a program for adult patients with eating disorders who needed medical stabilization. “Previously, these patients had to be processed through the emergency department and then placed on a floor that may not be as experienced,” she said. “Now these patients can be directly admitted to our unit and cared for by staff who understand their disease and can hopefully provide care that decreases the mental and psychological stressors that come with healing.”

Dr. Held develops and implements standard work protocols that keep patients safe. “We don’t want patients to fall and injure themselves or develop infections from a urinary catheter that wasn’t necessary or a central line that should have been removed sooner,” he said. “These efforts also reduce the costs of care and return patients to their regular lives as soon as possible.”

Adding a unit medical director

When looking to add this position, an institution should first determine what value the role will bring. Be as specific as possible. Keep data, with particular attention to unit performance relative to organizational targets, so that this value can be shown to organizational stakeholders over time, Dr. McGillen advised. An understanding of the time requirements is needed, so that appropriate time allocation can be sought up front.

Clearly defined roles and responsibilities allow for easy and efficient delegation to the appropriate medical director, without duplicating efforts. “Our team of unit-based medical directors work to support each other by efficiently updating the group about what is happening on each unit and what action items are needed from the whole group,” Dr. McFadden said. “Having clear processes regarding how those updates happen is critical to the success of a medical director’s team.”

Credentials and skills

Other than being a practitioner, no additional credentials, such as having an MBA degree, are needed to serve as a unit medical director. However, having an understanding of health systems science (HSS) is vital to successfully serve in these roles, Dr. McGillen said.

HSS encompasses many of the extraclinical facets of health care delivery that impact patients. Beyond quality, safety, and value, HSS also incorporates social determinants of health, population health management, leadership and teaming, medical ethics, clinical information technology, and systems thinking, Dr. McGillen said. The latter is a necessary skill set and an approach to examining prob-

lems more holistically regarding a health care system’s complexity and how its various components interface.

“Unit medical director roles exist at the intersection of many of these domains; a systems thinker is better equipped to deal with the various issues that might arise on a daily basis,” Dr. McGillen continued.

Coupled with this is the need for a growth mindset—a hallmark of a systems thinker—and a desire to improve constantly, along with the ability to handle conflict, navigate difficult conversations, and coach colleagues to allow for optimal performance of one’s unit, Dr. McGillen said.

Unit medical directors should also be well respected by their unit’s peers and staff, Dr. Zagursky said. They should be able to work well with others, acknowledge their own shortcomings, and be able to have productive, professional, disagreement discussions.

Preventing role creep

Although having a formal contract for a unit-medical-director role isn’t necessary, it’s important to have a clear-cut job description, Dr. McGillen said. Having the ability to advocate for one’s own compensation in case the job description changes is also a necessary skill.

Be sure to have a sound reporting structure as well. “Before stepping into this role, make sure you know who you will report to and be sure that they’re looking out for your development,” Dr. McGillen said.

“Unit directors must be comfortable with delineating work and recruiting others to own certain projects because team members will often look to unit medical directors for help in leading new endeavors,” Dr. Chapman said. “It’s impossible to lead every initiative, as this can result in inefficiencies and burnout.”

Dr. Zagursky recommends keeping a log of your projects and how much time you spend on each of them. If possible, take this a step further and place projects and time under each category of the role’s responsibilities. “Then, when you’re asked to do something that doesn’t neatly fit, it’s a good cue that you need to have a discussion with your boss,” she said. “The person who assigned you this role should expect that you will meet once or twice annually to review what you’re doing and how the role is evolving.” ■

Karen Appold is an award-winning journalist based in Lehigh Valley, Pa. She has more than 25 years of editorial experience, including as a newspaper reporter and newspaper and magazine editor.



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What are Common Pitfalls in Measuring the QTc in Hospitalized Adult Patients?

By Nicholas Bianchina, MD, Zaven Sargsyan, MD, Matthew Zipse, MD, and Juan N. Lessing, MD

Case

Ms. S. is a 60-year-old woman admitted with gastroenteritis and hypovolemia in the setting of three days of nausea and diarrhea. She was also found to have atrial fibrillation with rapid ventricular response. Her tachycardia improved after intravenous fluids. The following morning, nausea prompted her nurse to request antiemetic medications. You inspect the admission electrocardiogram (ECG) (Figure 1). Are QT-prolonging antiemetics safe to administer?

In this review, we provide background and practical guidance regarding QT interval (QTc) interpretation for the internist caring for hospitalized adults.



Dr. Bianchina



Dr. Sargsyan



Dr. Zipse



Dr. Lessing

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Brief overview

Accurate measurement of the QTc is important in clinical practice given the risk of torsades de pointes (TdP) with QT prolongation. TdP occurs when an ectopic ventricular beat arises during repolarization of the previous heartbeat (called the R-on-T phenomenon). The more prolonged the repolarization phase (QTc), the more likely the R-on-T phenomenon is to occur. Rate-corrected QTc prolongation is defined as >450 milliseconds (ms) in men and >460 ms in women and is most concerning when >500 ms. With each 10-ms increase in QTc, the risk of TdP increases by 5 to 7%.¹ Frequent causes of acquired QTc prolongation include medications, electrolyte abnormalities, cirrhosis, and structural heart disease—all common risk factors in patients admitted to the hospital.^{2,3}

What is the best method to measure the QTc?

The QTc is measured from the beginning of the QRS complex to

the end of the T-wave. Leads II and V5 are best to measure QTc.⁴ Since the QTc is affected by heart rate, this interval needs to be corrected for rate variations. One correction method is the Bazett formula, which derives corrected QTc by dividing the QTc by the square root of the preceding R-R interval.⁵

A commonly taught shortcut to screen for the presence of QT prolongation is to visually estimate whether the QTc is more than half the length of the R-R interval; however, various studies have demonstrated this method is unreliable and can miss significant prolongation, particularly in the setting of bradycardia (<60 beats per minute)⁶ (Figure 2).

In this example, a visual estimation about whether the QT is less than half of the R-R interval may be reassuring to many, but the QT is severely prolonged (~550 ms).

When is the computer's reported QTc unreliable?

The computer's measurement may be inaccurate if there are abnormalities in the T wave wherein its return to baseline is hard to determine. This can occur with flattened or biphasic T waves or in the presence of U waves. Additionally, if a noisy background or poorly recorded leads are present, the computer's averaging of multiple leads may lead to falsely elevated or shortened QTc lengths.⁷ In these scenarios, manual calculation of the QTc is best.

Approach to the QTc in tachycardic rhythms

In patients with sinus tachycardia, the current standardized methods for QT analysis may not be as accurate. Studies have demonstrated that the Bazett formula loses accuracy at faster heart rates, while other formulas such as the Fridericia and Framingham per-

Table 1: QTc Formulas

Bazett	$QTcB = QT / RR^{1/2}$
Fridericia	$QTcFri = QT / RR^{1/3}$
Framingham	$QTcFra = QT + 0.154(1 - RR)$

form better.⁸

For patients with sinus tachycardias, the Framingham or Fridericia formulas are recommended for QTc analysis (Table 1).

Approach to QTc in atrial fibrillation

As an irregular rhythm, atrial fibrillation induces variability in the QT and R-R intervals, posing a challenge for QTc assessment. In 2017, the American Heart Association (AHA) reported multiple potential methods to evaluate QTc in atrial fibrillation, including:

- Average between the longest and the shortest QTc during a 10-second ECG
- Average of all QTcs available during a 10-second ECG⁹

Small population studies have attempted to examine which approach for measuring QTc in atrial fibrillation most correlates with QTc length after conversion to sinus rhythm, but they've been inconclusive.¹⁰

The process of averaging QTc measurement across a 10-second strip may be cumbersome. In our view, a more practical approach to QTc assessment in atrial fibrillation is to identify the longest RR interval and measure the subsequent QTc (which represents the corresponding repolarization phase).

Approach to the QTc measurement in the setting of prolonged QRS duration

The QTc captures both ventricular depolarization (the QRS complex) and ventricular repolarization (the ST segment and T-wave). Thus, prolongation of the QRS, whether caused by bundle branch block, interventricular conduction delay, or ventricular pacing, will prolong the QTc. However, the risk of TdP relates only to prolonged repolarization, and QT-prolonging medications may be safe if the prolonged QT is accounted for entirely by the prolonged QRS. For this reason, additional adjustments have been proposed for this scenario.

The AHA recommends measuring the JT interval as an alternative to the QTc, but this approach has not been widely studied¹¹ (Figure 3).

Given that QRS duration may confound the underlying QTc calculation, additional methods for analysis such as the use of the JT segment have been proposed.

Another approach is subtracting 50 ms from the QTc to adjust for the prolonged QRS. One small study attempted to validate this in patients with intermittent pacing, showing that it correlated well to the QTc during normal QRS conduction. However, this approach has not been tested in larger

Key Points

- QTc analysis may be inaccurately reported by the computer with abnormalities of the T wave, noisy background, or poorly recorded leads.
- Careful analysis of QTc should be used in irregular heart rhythms, tachycardia, and prolonged QRS duration.
- To analyze QTc risk in atrial fibrillation, measurement of QTc after the longest R-R interval is appropriate.
- Framingham or Fridericia formulas for QTc measurement are best used for sinus tachycardias.

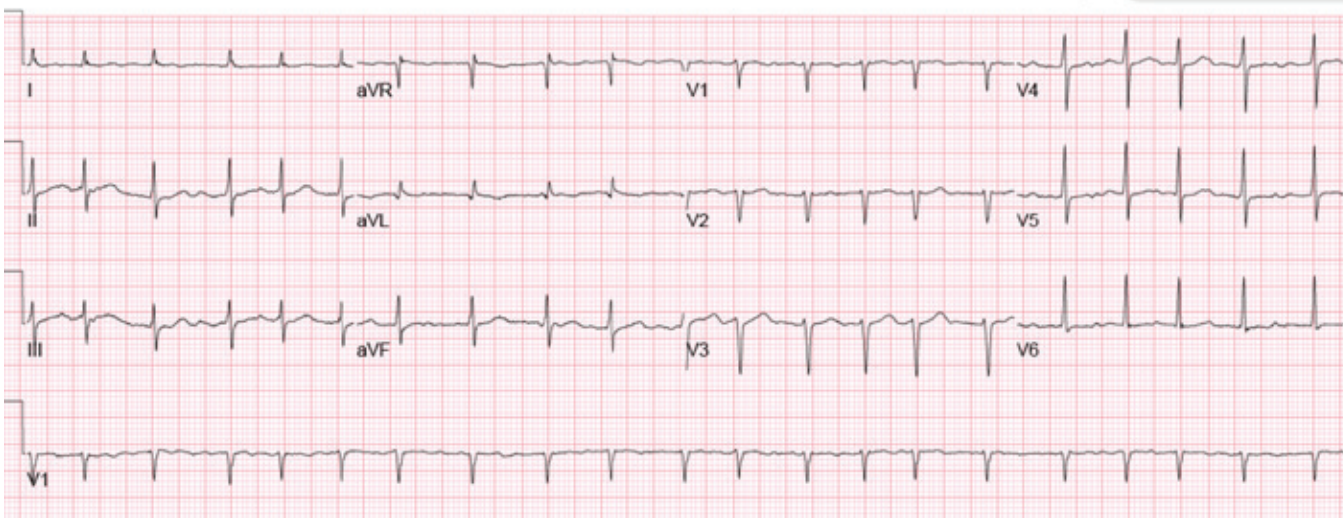


Figure 1: Initial ECG

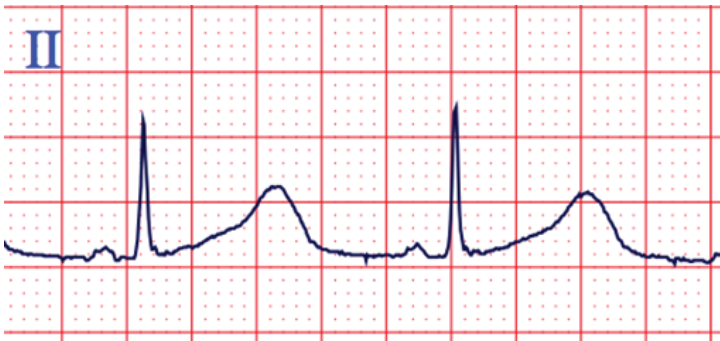
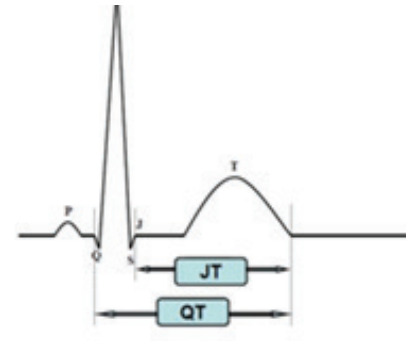


Figure 2: Pitfalls with half R-R interval

Figure 3: JT Interval¹²

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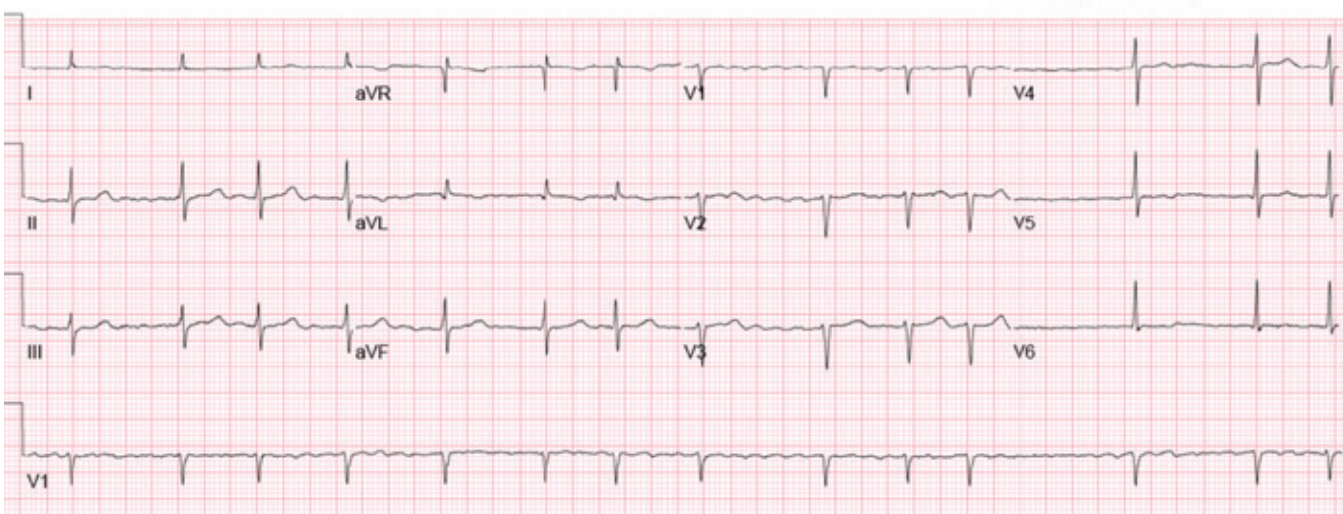


Figure 4: ECG at End of Case

Quiz:

A 67-year-old woman is admitted to the hospital with cystitis. You are evaluating antibiotics and consider ciprofloxacin. Given this medication's risk of QT prolongation, you obtain an ECG which shows QTc at 520 ms in the presence of a chronic right bundle branch block. How do you account for a prolonged QRS when estimating the risk of TdP?

- There is no method for correction and a different antibiotic should be chosen.
- Subtract the patient's QRS prolongation above 120 ms from the QT, then correct for heart rate.
- Repeat ECGs and use the average of the two reported QTc values.
- For patients with prolonged QRS duration, the risk of TdP is low regardless of QTc.

Correct option: B. The patient's QTc is artificially prolonged in the presence of underlying QRS prolongation (in this case, a right bundle branch block). Additional analysis can be done to account for this.

$$QTc = [QT - (QRSduration - 120)] / R-R/2$$

There is no data to suggest there is a lower risk of TdP in those with baseline prolonged QRS duration (answer choice D). Similarly, given the patient's right bundle branch block is chronic, repeat ECGs would not be expected to change the underlying QTc and therefore not expected to change the average (answer choice C).

populations or patients with other reasons for QRS prolongation and will underestimate repolarization time and risk of TdP in patients with QRS durations that are only minimally prolonged.¹³

We recommend another commonly used approach for adjusting the QTc that removes the amount of QT prolongation accounted for by QRS prolongation before correcting for heart rate:

$$\text{Adjusted QTc} = [QT - (QRSduration - 120)] / R-R/2$$

Given that no consensus guidelines exist on this topic, caution and close monitoring are warranted when prescribing QT-prolonging medications in such patients.

Approach to QTc monitoring on cardiac telemetry

Telemetry monitoring may not be as accurate at QTc measurement as a standard 12-lead ECG. No large-scale studies exist examining the accuracy of telemetry and thus it is not recommended to utilize telemetry methods for QTc analysis.

Back to the case

The patient's initial tachycardia and atrial fibrillation made QTc analysis more difficult. Now that the tachycardia had resolved, a repeat ECG was performed. The ECG demonstrated the following (Figure 4).

The longest R-R interval appears at the end of the ECG strip with a QT length of around 200 ms, and the patient is thus eligible for anti-emetic therapy.

Bottom line

Accurate QTc measurement is relevant and important to hospital medicine practice, especially given the risk of QTc prolongation and TdP with numerous commonly administered inpatient medications. Tachycardia, atrial fibrillation, and prolonged QRS duration make QTc measurement challenging. A practical approach to QTc measurement is needed for clinical decision making. ■

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The Value of Cultural Exchange in Health Care: Reflections on My First Haitian COVID-19 Patient

By Patrick Desamours, MSPA, PA-C, MBA, CHCQM, SFHM

"Home is where you are expected to be understood." – Franz Wright

On a Tuesday in February 2002, a happy little boy left home for school. Two hours later, he started feeling unwell, and his parents were called to pick him up. The next day, he insisted on going back to school, even though he was still unwell, and his parents allowed him. He got worse and was picked up early again and taken to the hospital. Heartbreakingly, he passed away the next day, on Thursday morning. That little boy was my younger brother, and he was only 12 years old.

I was devastated and could not process what had happened. He was young, full of life and energy, and smart! In fact, I believe he was the smartest in our family at that time. I wanted to know and understand what had happened to him. I knew death could be unpredictable, but what happened to my little brother did not seem unpredictable. No one could answer my question in a way that made sense. I even doubted that the older people around me fully understood what had happened, and so began my curiosity about the art of medicine. Curiosity met my passion for service, and I became a physician assistant.

In my nine years of practicing medicine, I have come to understand health disparities and how different cultures do not trust modern medicine due to their personal experiences. When COVID-19 hit us by surprise, there were a lot of discussions in our health care system on how to fight this deadly virus. We knew nothing about the virus, we were scared, and people were dying exponentially.

I was working as a hospitalist physician assistant (PA) and director of advanced practice providers (APPs) at Adventist White Oak Medical Center in Maryland until June 2020. We held several strategic meetings on how to protect our staff, patients, families, and the community. I remember vividly one particular meeting, where we were discussing how to contact the families of patients dying in the hospital so they could know the cause of death. By having this important piece of information, we hoped they would have closure and take precautionary measures to protect themselves and their extended families and friends.

As families were not able to visit loved ones in the hospital, we communicated with them via tele-



phone. Families needed to know if they were exposed or at risk. We contacted families to get exposure history and counseled them about quarantine and isolation depending on whether test results were positive. At the time, it was taking more than three days to get test results back, and in some instances, it took that long to let families know that their loved ones had passed away from COVID-19. At the meeting, they asked for volunteers, but most people were hesitant to take up such a task. Almost instantly, I was reminded of my little brother's death and what it would have meant to me if someone had told me the cause of his death. Without hesitation, I signed up for the undesirable task.

The very first patient's family I called happened to be Haitian. When I started talking, they were reserved and did not want to answer questions. They were very skeptical. I was able to speak to them in our native language, Haitian Creole. In the midst of this ordeal, they kindly expressed their gratitude.

The following week, we had a complicated patient who ended up in the intensive care unit. Three days later, the patient's clinical

status declined and he was downgraded to a lower level of care, with a plan for palliative care and hospice. While speaking to one of my physician colleagues about the case, I learned that the patient had been confused for over three weeks. My colleague mentioned that the patient was Haitian, and I asked him if it was okay for me to assume the patient's care. He gladly transferred the patient to my service.

Upon entering the room, I greeted the patient with "Bonjour," which means good morning, with familiar Haitian intonation. He perked up and adjusted himself on the bed and gave me a bright smile. He asked to speak to his family. The patient felt that everyone there thought he was crazy. He was confused about why he couldn't see his family. We had a great conversation, and I called his family. From there, the patient's overall clinical status started improving significantly. The cultural connection clearly had a great impact on the patient's care, and I felt the priceless value of this connection.

Who would have thought that, 20 years after the death of my brother, I would end up in Mary-



Mr. Desamours

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land caring for a fellow Haitian? This cultural connection is something I will cherish forever. It reminds me never to forget why I am in medicine, and to encourage others to remember why they are doing what they are doing today. As a physician, physician assistant, nurse practitioner, or health care leader, you have one of the most stressful jobs. However, do not let this discourage you. Instead, remember how you are impacting lives every day.

As immigrants, many of us have come to this country and worked tirelessly to achieve our dreams, facing obstacles along the way. We are dedicated to serving the community we now call home, but we also feel a strong desire to give back to our countries of origin. Whenever we have the opportunity to serve people who share our values and culture, it brings satisfaction that words cannot express.

It is important to recognize that language barriers can make it difficult for some patients to receive the care they need. That's why it is so crucial for clinicians to be culturally competent in order to connect with patients and make them feel included and valued. When we take the time to connect with our patients on a cultural level, we can build trust and provide the best care possible. As one of the world's most ethnically diverse and multicultural nations, the U.S. has a rich tapestry of cultures that should be celebrated and respected. Let's work together to ensure that all patients receive the care they deserve, regardless of their background. ■

The Role of the MRSA Nasal PCR in Empiric Antibiotic Selection

By Charles Derek Leiner, MD, Bahnsen Miller, MD, Patrick Fadden, MD, and Jonathan Van Name

Case

A 67-year-old man with chronic obstructive pulmonary disease (COPD) was admitted to inpatient general medicine from his nursing home for pneumonia. He reported a 10-day history of an upper respiratory viral infection with symptoms improving until two days ago. Initial evaluation revealed a temperature of 100.5° F, heart rate of 95 beats per minute, blood pressure of 147/89 mmHg, respiratory rate of 25 per minute, and O₂ saturation of 92% on room air. His white blood cell count was 14,000. Both a COVID-19 and methicillin-resistant *Staphylococcus aureus* (MRSA) nasal polymerase chain reaction (PCR) assay were negative. Chest X-ray revealed a right lower lobe opacity. Ceftriaxone and azithromycin were started to treat community-acquired pneumonia.

Brief overview

Staphylococcus aureus, and especially MRSA, are troublesome bacteria for the hospitalist. MRSA infections are associated with high mortality and morbidity risks, long treatment courses, and increased financial and physical strains on the patient.¹ To reduce risks of infection and transmission, methods for rapid detection of MRSA are vital. Real-time PCR to detect MRSA in nasal swab specimens, with results available in approximately two hours, has become the test of

choice for many institutions.² The data supporting screening with the MRSA nasal PCR to reduce nosocomial transmission is mixed, but it is now well established that MRSA nasal colonization is a risk factor for invasive MRSA infections.^{1,3} Importantly, the need for quick detection of resistant pathogens must be balanced with stewardship of empiric antibiotic use.

Overview of the data

MRSA nasal PCR in pneumonia

Recent studies have demonstrated high sensitivity and high negative predictive value (NPV) of the MRSA nasal PCR in respiratory illness.^{1,2,4} In a 2018 meta-analysis comprised of 5,163 patients diagnosed with either community-acquired pneumonia (CAP) or ventilator-associated pneumonia (VAP), the MRSA nasal PCR had a high NPV (CAP: 98.2%; VAP: 94.8%) and a low positive predictive value (PPV) (CAP: 56.8%; VAP: 35.7%) for MRSA pneumonia.⁵ A 2020 retrospective study conducted at the Veterans Affairs health system using more than 90,000 respiratory cultures also found a high NPV (96%) but low PPV (35%) for MRSA infection.⁶

Given the robust data showing an excellent NPV, a negative MRSA nasal PCR can be used to either withhold empiric anti-MRSA agents or de-escalate if those agents have already been started.⁷ Studies have shown the use of the rapid MRSA nasal screen in CAP leads to earlier de-escalation of MRSA therapy by approximately two days and reduction of vancomycin serum level monitoring and dose adjustments nearly three-fold without a statistically significant difference in in-hospital mortality.^{8,9} Earlier de-escalation may reduce hospital costs for patients while reducing adverse drug reactions and side effects of MRSA-active agents.¹⁰

A MRSA nasal PCR should only be used to guide treatment if obtained within 72 hours of presentation for pneumonia. However, a retrospective study demonstrated a persistent high NPV (94.9%) of the rapid MRSA nasal PCR up to 14 days from the time of test to confirmation of disease.⁴

It is extremely important to emphasize that a negative MRSA nasal PCR should not guide treatment in patients with recent MRSA decolonization, structural lung diseases such as cystic fibrosis and/or bronchiectasis, or severe septic shock.¹¹



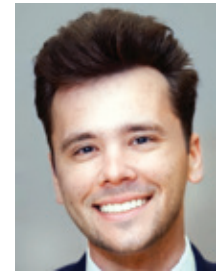
Dr. Leiner



Dr. Miller



Dr. Fadden



Mr. Van Name

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Quiz:



A 65-year-old man is admitted for community-acquired pneumonia (CAP). On hospital day two, respiratory symptoms are improving while being treated with ceftriaxone and azithromycin. As you are planning his discharge home, his MRSA nasal PCR collected on admission returns positive. Sputum cultures are still pending. What are your antibiotic recommendations?

- Continue current CAP therapy, transition to oral, and discharge as planned
- Do not discharge and start vancomycin
- Discharge with oral linezolid to cover MRSA pneumonia
- Repeat chest X-ray

Correct option: A. Sputum cultures can be followed to help direct therapy when the MRSA nasal PCR is positive. However, due to the test's low positive predictive value, the positive result should not change empiric treatment, especially when the patient is demonstrating clinical improvement.

Due to the high negative predictive value for MRSA pneumonia, a negative MRSA nasal PCR assay can prompt the de-escalation of anti-MRSA antibiotics.

Key Points

- A negative MRSA nasal PCR result can be used to de-escalate or avoid empiric anti-MRSA antibiotics for pneumonia.
- A positive MRSA nasal PCR does not diagnose or rule in MRSA pneumonia due to poor positive predictive value.
- A negative MRSA nasal PCR should not guide treatment in patients with recent MRSA decolonization, structural lung diseases such as cystic fibrosis and/or bronchiectasis, or septic shock.
- Data is limited on the use of MRSA nasal PCR to guide the treatment of non-pneumonia infections.

MRSA nasal PCR in non-pneumonia infections

The utility of MRSA nasal PCR to guide treatment in non-respiratory infections is unclear. Current studies are often limited by retrospective data, an unclear history of MRSA colonization, and a need for a culture of the suspected source of infection.

Notably, local MRSA prevalence also influences the predictive values of the MRSA nasal PCR. In one recent meta-analysis, the MRSA nasal PCR had an NPV of greater than 90% in environments where MRSA prevalence was less than 15%.¹¹ One large, multicenter, retrospective Veterans Affairs study listed the NPV for several infection locations including bloodstream (96.5%), intra-abdominal (98.6%), respiratory (96.1%), wound (93.1%), and urinary (99.2%). PPV for the entire cohort was 24.6%.⁶ MRSA prevalence in the whole cohort

was 8%. A smaller, single-center, retrospective study reported the NPV of MRSA nasal PCR as 97.5% in skin and soft tissue infections. MRSA was isolated in only 9% of the total study population while the institutional prevalence of MRSA was approximately 1 to 2.5%.¹² In contrast, a single-center study of skin and soft tissue infections in the emergency department with a MRSA prevalence of 44.8% revealed a higher PPV (85.7%) and a lower NPV (72.8%).¹³ These studies highlight the importance of MRSA prevalence when interpreting NPV, especially in clinical situations where data on treatment decisions are limited or mixed.

Due to the lack of strong evidence, a MRSA nasal PCR should not be used to determine treatment in patients with severe infections such as bacteremia. Due to low prevalence, MRSA nasal PCR does not have a role in the treat-

ment of urinary tract and community intra-abdominal infections. The same recommendation applies to non-purulent cellulitis, as MRSA is less likely to be the causative pathogen.

Application of the data to your original case

Our patient had non-severe pneumonia with a negative MRSA nasal PCR. He was appropriately started on ceftriaxone and azithromycin. He did not need empiric MRSA coverage as part of his treatment plan in light of the high NPV of the MRSA nasal PCR in pneumonia.

Bottom line

Upon admission to the hospital, a negative MRSA nasal PCR result can be used to de-escalate or avoid initiating anti-MRSA antibiotics for treating bacterial pneumonia. ■

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MRSA nasal PCR and empiric Abx

CAP
Excellent NPV (>95%)*
PPV poor (<60%)

SSTI
Data mixed and varies on local MRSA prevalence and other patient factors**

Do not use for bloodstream, urinary tract, and intra-abdominal infections.

Bottom Line: A negative MRSA nares PCR can be used to de-escalate or avoid anti-MRSA antibiotics in the treatment of bacterial pneumonia.

Additional Reading:
Metlay et al. *Am J Respir Crit Care Med*. 2019

*Use is not recommended for patients with structural lung disease, severe sepsis, or those who have recently undergone MRSA decolonization
**previous MRSA infection, colonization, treatment prior to nasal specimen collection, severity of infection

Additional Reading

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Practice Management

The Medical Writer Role: Lowering the Activation Energy for Scholarship in Hospital Medicine

By Mary Ann Kirkconnell Hall, MPH, and Jasmah Hanna, MS

Mary Ann Kirkconnell Hall:

Hospitalists face numerous demands, and those in academic medicine are also expected to write and publish their work in peer-reviewed journals, present at conferences, and give lectures and talks. We're all familiar with the "publish or perish" cliché, but almost no one goes into hospital medicine intending primarily to be a researcher. Hospitalists are smart people, and they've dedicated their careers to a specialty that isn't superficially glamorous or notably high-paying, but that virtually all of us will someday need. Hospitalists' aware-

ness of the needs and experiences of our sickest people in real time is unmatched by any other specialty.

Jasmah Hanna:

Strategic use of support staff can be a catalyst for the dissemination of this knowledge. People who've completed medical school and residency or preparation as advanced practice practitioners (APPs) have the intellectual ability to do scholarship; the limitations are time, supplemental skills (like navigating citation databases and references), and confidence. At the Emory Division of Hospital Medicine (EDHM), we've found that a medical writer can complete tasks unrelated to clinical content, teach those extra skills, cheer on

hospitalists' efforts, and increase scholarly productivity.

Help wanted: medical writer

In early 2021, EDHM identified a significant strategic goal: providing scientific and grant writing support in the form of a dedicated medical writer. With more than 270 faculty physicians, non-faculty physicians, and APPs at the time—now more than 300—caring for patients at 10 hospitals, EDHM is believed to be the nation's largest academic hospital medicine program. In the previous years, EDHM leadership observed increased interest and engagement in scholarship among our hospitalists. However, due to heavy clinical demands, it was very clear that our



Ms. Hall is the senior medical writer at Emory University's Division of Hospital Medicine in Atlanta. Ms. Hanna is the associate director of research projects at Emory University's Division of Hospital Medicine in Atlanta.

clinicians needed assistance and coaching in scientific writing and other forms of written scholarship.

In alignment with our division's goals, we believed that the medical writer role was critical to move our group from excellence to eminence academically and pivotal to increasing our research and funding portfolios, attracting talent, and helping retain our academically oriented clinicians. Also, we believed a medical writer would increase our capacity to mentor trainees academically. We envisioned this role would include writing, editing, conducting literature searches, and preparing manuscripts, grant applications, promotion packages, and award nominations. We also expected that the selected candidate would mentor less experienced faculty and promote writing services within the division. We started our quest to identify the best candidate and, with excitement, we welcomed Mary Ann Kirkconnell Hall to EDHM in November 2021.

Mary Ann Kirkconnell Hall:

What does a medical writer do, exactly? My primary tasks center on traditional scholarly productivity. In academic medicine—as in all of academia, really—manuscripts are started or even drafted and then hit delays in the publication process: collating feedback from multiple authors, responding to reviewer comments, difficulties in choosing a journal or formatting papers correctly, or just falling off the radar due to competing priorities. For teams at this stage of writing, I meet with the author(s) to determine what's holding the process up, coach them on responses (or refer them to someone else who can guide them), and then plan the next steps. As a team, we break these steps into as many easily completed, discrete tasks as we can, and make a delegation plan. I frequently serve more as a project manager than a writer/editor. Some tasks require authors' content, but a medical writer can complete many (e.g., compiling a citation manager database and using it for references so they don't have to be reordered with every revision).

Many hospitalists would like to do more scholarship but are uncertain how to start. We offer several institutional programs (like a Clinical Vignette Competition and our EDHM Research Day) where first-time scholars can present and get feedback from peers in a supportive but rigorous environment. In my position, I meet with hospitalists who have expressed interest in writing an abstract, either for a research or quality-improvement project, or regarding an interesting case, and guide them in getting started, refining their drafts, and navigating submissions.

I developed several templates to help our authors out, mostly based on existing resources, so no



one ever has to begin writing by staring down a blank document page. For example, I used the CARE Guidelines for writing case reports (<https://www.care-statement.org/>) to create templates for clinical vignette writers to “fill in the blanks,” and a separate, formatted, case report Word template for submission to journals that includes typical case report sections along with writing prompts for each.

The early success of several division faculty in using these templates to publish for the first time with case reports got others excited, and I started (and continue to offer) two-hour, in-person Clinical Vignette Boot Camps where hospitalists share their cases for discussion, learn what makes an effective vignette, and draft bullets with the main points of each section. Participants leave the workshop with a robust draft for a vignette (sometimes a completed vignette), improved confidence, and often new co-writing relationships with colleagues. Many go on later to present their work at conferences (like the SHM's annual Converge conference) and publish their work as case reports in peer-reviewed journals. I work closely with boot campers through this process, guiding them to conduct literature reviews, refine their text, and move through submission processes.

For original research and quality improvement, I play a similar supportive role. Authors and I meet for “brain download” sessions where they tell me about their project/paper/writing task. I am naturally very curious and so I ask lots of questions, and I take copious notes. After the chat, I draft bullets from the notes, organize them into a narrative to the extent possible, and format them as a manuscript. In terms of authorship, I follow the International Council of Medical Journal Editors' criteria (<https://www.icmje.org/recommendations/browse/>

roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html) to determine whether my contributions rise to the level of authorship on a case-by-case basis.

Brain downloads are also useful for promotional materials, letters of support, nominations for awards, and other tasks that require less clinical knowledge or writing skill and more organizational narrative shaping (and the time to do it). I help our faculty format their CVs and proofread their personal statements and portfolios, and sometimes I even get to do fun things like helping people draft biosketches.

As EDHM's scholarship footprint grows, we are exploring new internal and external funding opportunities; this is an area where a medical writer with experience in proposal writing and evaluation can really help. Grant writing is like most other writing projects in terms of timing and logistics, but I help our EDHM authors focus on organization, research design, and creating a compelling narrative that demonstrates a causal pathway from intervention to intended outcomes. I also provide an eagle eye for compliance with grant or proposal requirements.

No position in hospital medicine is exempt from a little scut work, even a medical writer's. I assist with copyediting and proofreading, reference formatting, drafting correspondence with journal editors, and crosswalking drafts with journals' submission requirements. While these tasks are important and necessary, they are not a good time investment for a hospitalist to spend hours on when a medical writer can do them quickly, thoroughly, and with little opportunity cost.

Given EDHM's size and complexity, I could not do my job without support from my supervisor, Jasmah Hanna, EDHM's associ-

ate director of research projects. Even before I was hired, EDHM's scholarly productivity had begun to grow. While this is due in the near term to Ms. Hanna's strategic efforts, in the longer term, it is also due to our division director Dr. Dan Hunt's belief in investing in the professional development of the hospitalists in our division, and support from Emory University School of Medicine's administration and leadership.

Tips for hiring a medical writer

For a medical writer, training in scientific writing is not negotiable. Understanding academic writing conventions is necessary, as is knowledge of review processes, abstracts, and manuscript structure, and the importance of framing the novelty and utility of your work to persuade readers to invest their time in it.

Medical writers often function as writing project managers, so organization and “soft” people skills are paramount. Previous experience in applying for funding, either through grants or contracts, helps—not just in compliance and technical writing skills, but also in thinking about what the funder is seeking and how to showcase the organization's capacity to deliver. Teaching and coaching skills are essential too: you must give people the skills to do this work themselves, lest you simply serve as a glorified stenographer.

Content knowledge is useful but not imperative. Medical writers don't have to be MDs, DOs, PhDs, PAs, or NPs, as long as they have the skills to help those who are tell their research stories. Since most publication, literature researching, and funding processes are analogous across fields related to biomedicine, consider seeking candidates outside of medicine, from fields like public health, allied health, and other biosciences. ■



SIG Spotlight: Med-Peds

By Richard Quinn

Hospitalists trained in both pediatric and adult medicine don't always feel grounded as a comrade among either cadre of caregivers. Consider SHM's Med-Peds Special Interest Group (SIG) that sense of belonging, according to the SIG's leaders.

"Med-Peds, because we live in two arenas, has struggled to find its home," said SIG vice chair Rachel Peterson, MD, @MPAcad-Hosp, assistant professor of clinical medicine and pediatrics and a hospitalist at Indiana University School of Medicine in Indianapolis. "I would advocate for anybody out there who might identify with a med-peds hospitalist...sometimes it's hard to find your home at the institution you work at. The goal of the med-peds SIG has always been to be a home away from home."



Dr. Peterson

Each of SHM's SIGs fosters a community for like-minded hospitalists and associated practitioners. But perhaps none cater to a group as unique within a hospital's walls as med-peds.

"When I first started my job and currently, I'm the only person at my institution who does it," said SIG Chair David Fish, MD, SFHM, assistant professor of medicine and pediatrics at UMass Chan Medical School, Worcester, Mass. "So I was looking for a community of similar providers that would help me with career development and provide guidance for scholarly activities, as well as a



Dr. Fish

group to be able to bounce ideas off of as I decided what kind of physician I wanted to be in the field of hospital medicine."

From there, med-peds by training are often well suited to deal with medically complex patients.

"The med-peds hospitalist takes on a lot of the skillsets that complement each other well," Dr. Fish said. "Sometimes managing the complexity of patients while also having a very patient- and family-centric approach makes it so we have that unique perspective that not only contributes to patient care but also leadership, in terms of helping align the priorities of an institution and a system."

In many ways, Drs. Fish and Peterson look first to mentor early-career hospitalists, especially at institutions where they have no veteran med-peds doctor to serve as that sounding board. For Dr. Peterson, that desire to serve is the culmination of what the SIG meant to her when she joined four years ago.

"I was so happy to find a group where hospitalists were dealing with the same questions I was dealing with when I started as a med-peds hospitalist," Dr. Peterson said. "I, like Dr. Fish, have a unique niche at my institution. While there are a few other people who do something similar, I have had to create my own path to care for the patient populations I wanted to. So, to see others who were also navigating their career paths, and doing that in different ways that brought them joy, it just made sense to join the SIG."

"It's been important for my career development to have that opportunity, to have that sounding board," Dr. Fish said. To "learn areas where I can be a resource to my own institution, as well as on a bigger scale. Having that community of providers that have a lot of similarities both in their backgrounds, as well as in where their interests lie, has been really crucial to...

making me into the physician I am today."

Over the last few years, Drs. Fish and Peterson say med-peds proved their worth. One example is the Pediatric Overflow Planning Contingency Response Network (POPCoRN), launched in the pandemic's early days by two physicians training in internal medicine and pediatrics. The idea was a collaboration that helped pediatric-focused institutions admit adult patients diagnosed with COVID-19 and other medical issues more commonly seen in adult populations.

That's the kind of innovative, team-focused, and interdepartmental thinking that typifies a med-peds hospitalist. And there's more where that came from, says Dr. Peterson.

"I think our work and our SIG's work is to not just help with education, but also to help normalize the fact that we do have these young adults who are aging out of pediatric hospitals," she said. "They're coming into adult health systems, and their care needs to look different. It's important that hospital leaders pay attention to the care they provide...they say 20% of patients account for 80% of the cost. This is a portion of that population."

The dual nature of med-peds backgrounds means that the subspecialty's practitioners work with SHM, the American Academy of Pediatrics, and the National Med-Peds Resident Association. Like in hospitals themselves, that sort of cross-community outreach is just another angle that helps define the uniqueness of med-peds.

"We try to make sure we're a bridge and not a silo because we know what it's like to work in silos," Dr. Peterson said. "We find beauty and value in the flexibility and agility that med-peds people bring, and we want to continue to build on that with the work we do as a SIG." ■

Richard Quinn is a freelance writer in New Jersey.



Chapter Spotlight: Utah

By Richard Quinn

For many SHM chapters nationwide, leadership through the COVID-19 pandemic paved the way for chapter growth and progress post-pandemic.

But what if a chapter used 2020 not as a bridge to success, but as a pivot?

Well, then they'd be the Utah chapter led by president Linda Venner, MD, FACP, FHM, who ran unopposed to lead the Beehive State chapter. She was sworn in at Converge 2020, along with a new slate of chapter officers who have sought to put the chapter on a new path.



Dr. Venner

"We developed a chapter motto with our new leaders," said Dr. Venner, a hospitalist with Intermountain Healthcare in Salt Lake City. "It was, 'Moving forward with a wildly inclusive culture and a can-do attitude.' And that's really how we shaped our new chapter. We knew we could tackle anything. When it came to membership drives or putting together high-quality and high-value talks for our hospitalist physicians, APPs, hospitalist coordinator nurses, and managers. We thought the whole culture of hospitalist medicine should be invited to our meetings."

Well, it worked.

Last year, Utah earned both a Chapter Exemplary Award and a Platinum Chapter Excellence Award. The path to those honorariums, like it usually is, is paved with hard work.

"After a few months of getting our professional footing, we hit the ground running as an SHM leadership team," Dr. Venner said. "We expanded our team, and we learned quickly how to use our leadership team to work efficiently together to

put on successful events."

Dr. Venner adds that setting formal meetings was a key idea, as was taking advantage of the resources, workflows, and expertise already available at the national level.

"Our action item list is ginormous, and we do it with joy and purpose," Dr. Venner said. "And we really lean very heavily on our national SHM leader-mentors, and our district chairs, to help us navigate relationships with exhibitors and work with the SHM strategy team to get (continuing medical education programs) together."

Dr. Venner says she owes a debt of gratitude to the prior leadership of the Utah chapter.

"Hospitalists stepped up like no other time in the history of hospital medicine and came together and managed through the COVID-19 pandemic in innovative and collaborative and fresh ways with a can-do attitude," she said. "The pandemic really cemented the bond of hospitalists really across the nation. I would say, as we came out of COVID-19, we wanted to connect. We were inspired by each other."

And that wave of motivation is how the new leadership board came to be. The chapter's president-elect is Chelsey Wells, MD; Mike Pirozzi, MD, is the outreach coordinator; Matt Fabiszak, DO, is the secretary. Dr. Venner also moved quickly to add four new board positions: treasurer Monique Mahlum MD, FHM; advanced practice practitioner director Krystal Porter; and two membership directors, Michelle Regruto MD, and Anne Perry, MD.

Dr. Venner is just as proud of her new leadership board as she is complimentary of its predecessors.

"We were not just adjusting to our SHM leadership roles, but each of us also had new, elevated professional roles," she said. "And we were emerging from the crucible of the COVID-19

pandemic with new, stronger shape and structure for caring for patients, and a new ability to pivot while maintaining clinical excellence. And we expanded our professional relationships across the state, independent of healthcare systems and hospitals.

"We are hospitalists, all in and all together. But we also re-casted our humanity, and a clear understanding of our fallibility. We came out with a desire to connect, to share joy and purpose, and to pick each other up. In this spirit, we defined our mission."

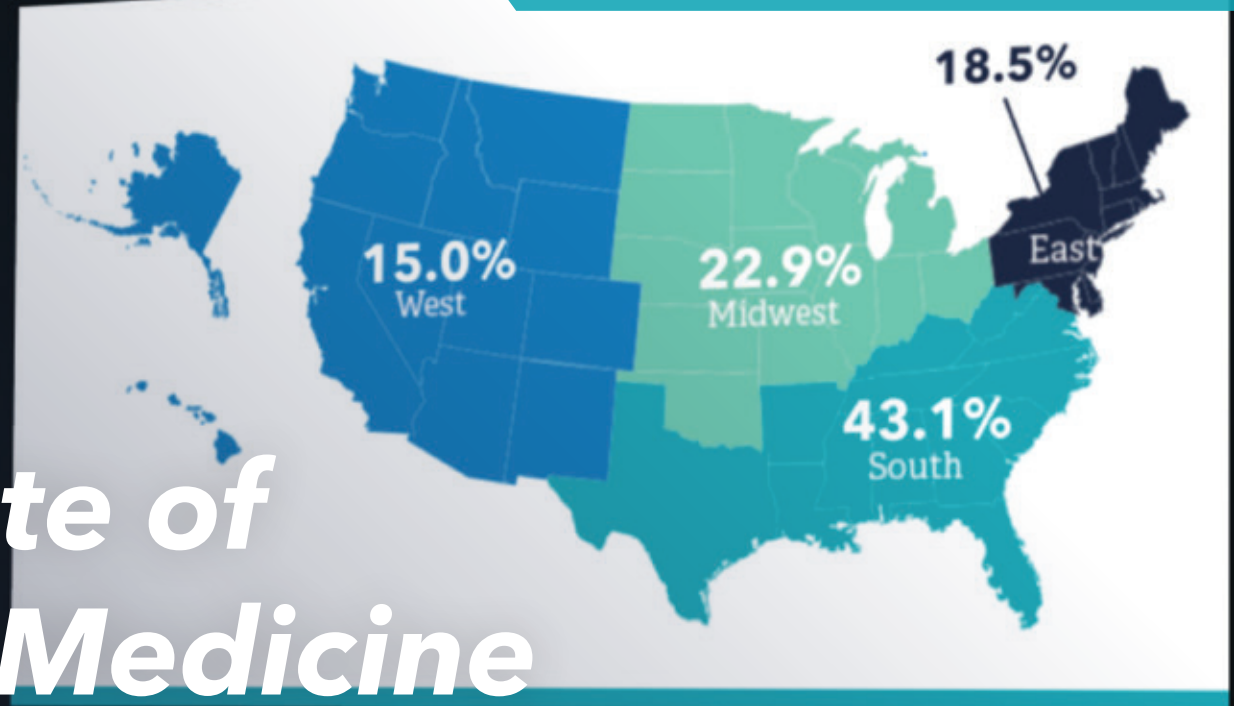
Moving forward, Dr. Venner wants to boost membership and drive engagement. She defines that as engagement with new and diverse members—with diversity meaning geography, job title, in-person versus virtual, professionals versus students, and race and ethnicity, among other things. The chapter has worked with Black Physicians of Utah, is organizing a regional meeting in concert with Civic Health Month, and is hosting a speaker to promote VOT-ER, a movement to offer voter registration via routine health care maintenance.

All of the initiatives are aimed at giving hospitalists and others in the hospital medicine sphere a sense of connection and community.

"Hospitalists and hospitalist groups have a commitment to their patients, they have a commitment to their hospital, and they have a commitment to each other," Dr. Venner said. "That really is sort of the tie that binds. But there are bigger themes that affect all hospitalists. Around their own financial planning, their own well-being, and also learning. The things we share in common are our clinical learning and how we apply that within our hospitals. That's not hospital-to-hospital specific...there's a value to having a community and making face-to-face connections." ■

Richard Quinn is a freelance writer in New Jersey.

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