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The Hospitalist

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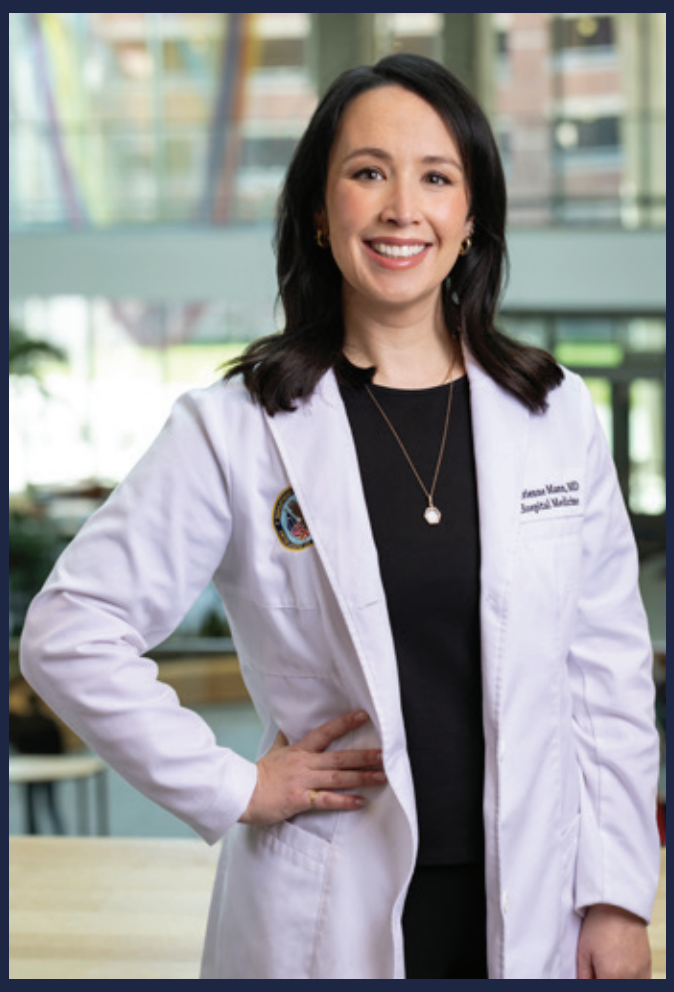

IN THE LITERATURE

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PEDIATRICS

Top 10 PHM articles of 2024

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IN THE NEXT ISSUE...

Seasoned hospitalists reflect on healthcare

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THE Hospitalist

PHM 2024: Health Equity, Advocacy, AI and An Astronaut

By Anika Kumar, MD, FAAP, FHM

Dr. Kumar is a pediatric hospitalist at Cleveland Clinic Children's and an assistant professor at Cleveland Clinic Lerner College of Medicine of Case Western Reserve University. She is the pediatric editor for The Hospitalist, and a member of SHM's Pediatrics Special Interest Group's executive committee.

The 2024 Annual Pediatric Hospital Medicine Conference's theme was "How We PHM," uniting more than 1,200 pediatric hospitalists who attended the conference in Minneapolis in August. According to Nancy Chen, MD, FAAP, FHM, clinical associate professor of pediatrics at the University of Arizona and the PHM Planning Committee's SHM co-chair, the goal for the conference was to highlight the field's diversity and our common goal to provide care for hospitalized children. The planning committee selected plenary topics highlighting key areas in the field of pediatric hospital medicine

The highlight of the conference for many attendees, myself included, was Marine Corps Lieutenant Colonel Jasmin Moghbeli's plenary. The NASA astronaut and mother of twins shared her journey to becoming an astronaut. She told the audience about her first year in astronaut training, reminding many in the audience of their intern year of residency training. She shared how she decided to pursue her career as an astronaut while also being a wife and mother. She discussed teamwork and trust, by sharing glimpses into her time on the International Space Station, and her approach to uncertainty in her profession. Many in the audience were able to relate to her stories of teamwork, work-life balance or integration, resiliency, and addressing uncertainty. (Read more about Astronaut Jasmin's plenary in Dr. Rachel Peterson's session summary on page 18).

The opening plenary highlighted health equity and focused on leveraging the audiences' voices to address racism in pediatrics. Dr. Tiffani Johnson, associate professor of pediatrics and pediatric emergency medicine physician at the University of California in Davis, Calif., shared examples of health disparities in pediatrics and solutions for hospitalists to mitigate biases and minimize inequities in daily care. She also addressed hospitalist leaders and shared frameworks on how to ensure the pediatric hospital medicine workforce mimicked the patient population we serve, an evidence-based solution to providing equitable care.

Advocacy is another important topic in pediatrics and pediatric hospital medicine. Dr. Annie Andrews, clinical professor of pediatrics at George Washington University in Washington, and pediatric hospitalist at Children's National Hospital in Washington, shared her path to advocacy as a gun violence researcher. She inspired the audience to tell stories as an advocacy tool. Dr. Andrews, along with other PHM advocacy leaders, also presented a standing-room-only workshop on how to advance individual advocacy.

The closing plenary focused on the near future of medicine—artificial intelligence. Dr. Anthony Chang, the chief intelligence and innovations officer and pediatric cardiologist at Children's Hospital of Orange County in Orange, Calif., shared his passion for innovation and bringing artificial intelligence to clinical practice. His discussion of data science and its role in research shined a light on the work that many pediatric hospitalists are doing using the Pediatric Health Information System® database.

The conference plenaries highlighted distinct foci within pediatric hospital medicine, suggesting "How We PHM" may vary. However, our goal is the same. Whether we are understanding pediatric health disparities, advocating for improved care for children, or researching how to provide evidence-based care, we are all united in improving care for hospitalized children.

For more PHM session recaps, visit the-hospitalist.org and click on Pediatrics. ■

THE Hospitalist®

November 2024
Volume 28 | No. 11

Veklury®
remdesivir 100 MG FOR INJECTION

LEADING THE WAY

THE ONLY COVID-19 ANTIVIRAL WITH
OUTCOMES ACROSS 3 KEY TREATMENT GOALS:

DISEASE PROGRESSION, RECOVERY TIME, AND READMISSION[1-3]

INDICATION

VEKLURY is indicated for the treatment of COVID-19 in adults and pediatric patients (birth to <18 years of age weighing ≥1.5 kg), 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.

THE ONLY NIH RECOMMENDED COVID-19 TREATMENT OPTION
included for adult patients hospitalized for COVID-19[4]

- Not requiring supplemental O_2 and
- Requiring low- or high-flow O_2

Turn the page for details

IMPORTANT SAFETY INFORMATION

Contraindication

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

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

VEKLURY® REDUCED DISEASE PROGRESSION AND RECOVERY TIME, AND DEMONSTRATED READMISSION OUTCOMES ACROSS A BROAD RANGE OF COVID-19 SEVERITY[1-3]

Disease progression[2]

10% **Absolute reduction in incidence of new mechanical ventilation or ECMO with VEKLURY in ACTT-1** (13%, n=402) vs placebo (23%, n=364) in patients who did not receive either at baseline (95% CI, -15 to -4)

Recovery time[1,2]

5 **Days shorter recovery time with VEKLURY in the ACTT-1 overall study population**

Median 10 days with VEKLURY vs 15 days with placebo; recovery rate ratio: 1.29 (95% CI, 1.12 to 1.49), $P < 0.001$

Adverse reaction frequency was comparable between VEKLURY and placebo–any 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%).[1]

ACTT-1 study design: a randomized, double-blind, placebo-controlled, phase 3 clinical trial in hospitalized adult 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. Disease progression was a secondary endpoint. Recovery was defined as patients who were no longer hospitalized or hospitalized but no longer required ongoing COVID-19 medical care.[1,2]

Real-world readmission data[3]

40% reduced likelihood of 30-day, COVID-19–related readmission was observed with VEKLURY; aOR: 0.60 (95% CI, 0.58 to 0.62), $P < 0.0001$

- In the overall cohort, 10,396 out of 191,816 (5.4%) non-VEKLURY patients compared to 7,453 out of 248,785 (3%) VEKLURY patients

27% reduced likelihood of 30-day, all-cause readmission was observed with VEKLURY; aOR: 0.73 (95% CI, 0.72 to 0.75), $P < 0.0001$

- In the overall cohort, 17,437 out of 191,816 (9.1%) non-VEKLURY patients compared to 15,780 out of 248,785 (6.3%) VEKLURY patients

A large, real-world, retrospective observational study examined 30-day COVID-19–related‡ and all-cause§ readmission to the same hospital after being discharged alive from the index hospitalization for COVID-19 in adult patients (≥18 years of age) who were treated with VEKLURY vs those not treated with VEKLURY across variant periods: pre-Delta, Delta, and Omicron, from 5/2020-4/2022. Data were examined using multivariate logistic regression.‖

- **Data Source:** PINC AI™ Healthcare Database
- This study was sponsored by Gilead Sciences, Inc.
- The study included index patients on room air, low- and high-flow supplemental oxygen, and IMV/ECMO
- VEKLURY-treated patients received at least 1 dose of VEKLURY during the index COVID-19 hospitalization¶

Study population and select characteristics[3]

- **440,601 patients** with a primary diagnosis of COVID-19 and who were discharged alive
- **248,785 VEKLURY patients** were compared to **191,816 non-VEKLURY patients**

Compared to nonreadmitted patients, readmitted patients:

- **Were older:** median 71 years vs 63 years
- **Had more comorbidities:** CCI ≥4: 36% vs 16%
- **Were more likely to have NSOc** (42% vs 39%) and **less likely to be on low-flow oxygen** (40% vs 42%)
- **Were less likely to be treated with VEKLURY:** 48% vs 57%
- **Were more likely to have received corticosteroid monotherapy during index hospitalization:** 38% vs 29%

Compared to non-VEKLURY patients, VEKLURY patients:

- **Were younger:** median 62 years vs 64 years
- **Were more likely to have received some level of supplemental oxygen support (any supplemental oxygen support, 1-NSOc):** 70% vs 48%

Study considerations[3]

Real-world studies should be interpreted based on the type and size of the source datasets and the methodologies used to mitigate potential confounding bias. Real-world data should be considered in the context of all available data. Results may differ between studies.

Strengths: This large study population enabled subgroup analyses across variant periods and supplemental oxygen requirements and considered a well-defined cohort of patients hospitalized for COVID-19.

Limitations: There exists a potential for residual confounding due to unmeasured variables, including differences in groups that could not be accounted for. The database did not capture data relating to time from symptom onset, infecting viral lineages, and prehospital care such as other treatments. Some patients who received supplemental oxygen could be misclassified as NSOc due to the absence of billing charges for supplemental oxygen.

*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).
‡Defined as a readmission with a primary or secondary discharge diagnosis of COVID-19.
§Defined as readmission to the same hospital within 30 days of being discharged alive from the hospitalization for COVID-19.
‖The model adjusted for age, corticosteroid use, variant era, Charlson Comorbidity Index, maximum oxygenation requirements, and ICU admission during COVID-19 hospitalization.
¶Refer to the VEKLURY Prescribing Information for dosing and administration recommendations.

Veklury® remdesivir 100 MG FOR INJECTION | LEADING THE WAY

IMPORTANT SAFETY INFORMATION (cont'd)

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.

Dosage and administration

— Administration should take place under conditions where management of severe hypersensitivity reactions, such as anaphylaxis, is possible.

- **Treatment duration:**
  - — For patients who **are hospitalized**, 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 hospitalized and require invasive mechanical ventilation and/or ECMO, the recommended total treatment duration is 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 for outpatient use.
- **Testing prior to and during treatment:** Perform hepatic laboratory and prothrombin time testing prior to initiating VEKLURY and during use as clinically appropriate.
- **Renal impairment:** No dosage adjustment of VEKLURY is recommended in patients with any degree of renal impairment, including patients on dialysis. VEKLURY may be administered without regard to the timing of dialysis.

Pregnancy and lactation

- **Pregnancy:** A pregnancy registry has been established for VEKLURY. Available clinical trial data for VEKLURY in pregnant women have not identified a drug-associated risk of major birth defects, miscarriage, or adverse maternal or fetal outcomes following second- and third-trimester exposure. There are insufficient data to evaluate the risk of VEKLURY exposure during the first trimester. Maternal and fetal risks are associated with untreated COVID-19 in pregnancy.
- **Lactation:** VEKLURY can pass into breast 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 an underlying maternal condition. 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 last page.

Learn more at vekluryhcp.com

aOR=adjusted odds ratio; CCI=Charlson Comorbidity Index; ECMO=extracorporeal membrane oxygenation; IMV=invasive mechanical ventilation; NSOc=no supplemental oxygen charges.

PINC AI™ is a trademark of Premier, Inc. (formerly Premier Healthcare Database).

References: 1. VEKLURY. Prescribing Information. Gilead Sciences, Inc.; 2024. **2.** Beigel JH, Tomashek KM, Dodd LE, et al; ACTT-1 Study Group Members. Remdesivir for the treatment of COVID-19 — final report. *N Engl J Med*. 2020;383(19):1813-1826. doi:10.1056/NEJMoa2007764 **3.** Mozaffari E, Chandak A, Gottlieb RL, et al. Treatment of patients hospitalized for COVID-19 with remdesivir is associated with lower likelihood of 30-day readmission: a retrospective observational study. *J Comp Eff Res*. 2024;13(4):e230131. doi:10.57264/cer-2023-0131. **4.** National Institutes of Health. Coronavirus Disease 2019 (COVID-19) Treatment Guidelines. Updated February 29, 2024. Accessed March 25, 2024. https://www.covid19treatmentguidelines.nih.gov

GILEAD

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 (birth to <18 years of age weighing ≥1.5 kg), 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.

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: No dosage adjustment of VEKLURY is recommended in patients with any degree of renal impairment, including patients on dialysis. VEKLURY may be administered without regard to the timing of dialysis.

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, one Phase 3 study in 279 non-hospitalized adult and pediatric subjects (12 years of age and older weighing at least 40 kg) with mild to moderate 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). Study GS-US-540-9012 included non-hospitalized subjects, who were symptomatic for COVID-19 for ≤7 days, had confirmed SARS-CoV-2 infection, and had at least one risk factor for progression to hospitalization treated with VEKLURY (n=279; 276 adults and 3 pediatric subjects 12 years of age and older weighing at least 40 kg) for 3 days.

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.

Remdesivir and its metabolites are in vitro substrates and/or inhibitors of certain drug metabolizing enzymes and transporters. Based on a drug interaction study conducted with VEKLURY, no clinically significant drug interactions are expected with inducers of cytochrome P450 (CYP) 3A4 or inhibitors of Organic Anion Transporting Polypeptides (OATP) 1B1/1B3, and P-glycoprotein (P-gp).

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

Pregnancy

Risk Summary: A pregnancy registry has been established for VEKLURY. Available clinical trial data for VEKLURY in pregnant women have not identified a drug-associated risk of major birth defects, miscarriage, or adverse maternal or fetal outcomes following second- and third-trimester exposure. There are insufficient data to evaluate the risk of VEKLURY exposure during the first trimester. Maternal and fetal risks are associated with untreated COVID-19 in 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

Risk Summary: A published case report describes the presence of remdesivir and active metabolite GS-441524 in human milk. Available data (n=11) from pharmacovigilance reports do not indicate adverse effects on breastfed infants from exposure to remdesivir and its metabolite through breastmilk. There are no available data on the effects of remdesivir 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

No dosage adjustment of VEKLURY is recommended for patients with any degree of renal impairment, including those on dialysis.

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.

214787-GS-017

GILEAD

In the Literature

University of California San Diego Medical Research Reviews

By Bryan Huang, MD, CHCQM-PHYADV, FHM, Dana Toy, MD, David Taylor, MD, Jenna Klubnick, MD, MS, Marcella Katsnelson, DO, Yuri Shindo, MD, Adrià Jiménez Bacardí, MD, MS, and Maryann T. Ally, MD, MPH, FACP, CHCQM-PHYADV, FHM

University of California San Diego

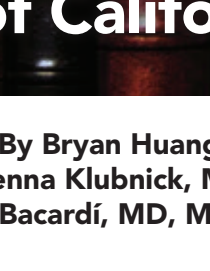
IN THIS ISSUE

By Bryan Huang, MD, CHCQM-PHYADV, FHM

1 Diagnostic Errors in Patients who Died in the Hospital or were Transferred to an ICU

CLINICAL QUESTION: How often do diagnostic errors occur among hospitalized patients who die or are transferred to an intensive care unit (ICU), and how often do diagnostic errors contribute to patient harm?

BACKGROUND: Diagnostic errors have long been known to contribute to adverse events in hospitalized patients; however, few prior studies have rigorously used structured approaches to screen for diagnostic errors.



Dr. Huang

STUDY DESIGN: Retrospective cohort study

SETTING: 29 academic medical centers in the U.S.

SYNOPSIS: A random sample of 2,428 hospitalized adult patients who died or were transferred to an ICU was identified. Records for these patients were each reviewed by two trained clinicians to determine whether a diagnostic error occurred, and if so, whether patient harm occurred. A diagnostic error was defined as a missed opportunity to make a correct or timely diagnosis based on the available evidence. Of these patients, 550 (23.0%; 95% CI, 20.9% to 25.3%) experienced a diagnostic error. 436 patients (17.8%; 95% CI, 15.9% to 19.8%) had errors contributing to temporary or permanent harm or death.

Diagnostic errors were most often associated with problems with assessment (e.g., recognizing complications or revisiting the differential diagnosis) and problems with testing (e.g., choosing the correct test, ordering the test in a timely manner, or correctly interpreting results). Given the high prevalence of diagnostic errors in this cohort, problems with assessment and testing are important targets for future patient safety improvement interventions.

The rate of diagnostic errors reported in this study is likely higher than in the general hospitalized population as the study selected patients who deteriorated—all patients required ICU transfer or died. Another limitation of the study is detection bias, as reviewers were limited to what was documented in the medical record, which likely under-detects errors in thought processes and gaps in team communication.

BOTTOM LINE: Diagnostic errors in hospitalized patients who died or were transferred to an ICU occurred commonly and were associated with patient harm.

CITATION: Auerbach AD, Lee TM, et al. Diagnostic errors in hospitalized adults who died or were transferred to intensive care. *JAMA Int Med* 2024;184(2):164-73.

Dr. Huang is a hospitalist and physician advisor in the division of hospital medicine and a clinical professor of medicine at the University of California in San Diego.

By Dana Toy, MD

2 Early Switch to Oral Antimicrobial Therapy for *Staphylococcus aureus* Bacteremia

CLINICAL QUESTION: Is an early switch to oral antimicrobial therapy in low-risk *Staphylococcus aureus* bloodstream infection non-inferior to standard intravenous antimicrobial therapy?

Dr. Toy

BACKGROUND: *S aureus* bloodstream infections are typically treated with at least 14 days of intravenous antimicrobials. A switch to oral antimicrobial therapy may reduce hospital length of stay and infusion-related complications.

STUDY DESIGN: International, open-label, randomized, controlled, non-inferiority trial

SETTING: 31 tertiary care hospitals in Germany, France, Netherlands, and Spain

SYNOPSIS: 213 patients were randomized to switch to oral therapy after five to seven days of intravenous antimicrobial therapy (n=108) or continue intravenous therapy (n=105). Patients with complicated bloodstream infections (such as deep-seated infections affecting another organ, like empyema and endocarditis), non-removable foreign devices, severe comorbidity, or injection drug users were excluded. The primary endpoint was the occurrence of any complication related to *S aureus* bloodstream infection, such as relapsing bloodstream infection, deep-seated infection, and mortality attributable to infection within 90 days. In the oral switch group, 13% (n=14) met the primary endpoint versus 12% (n=13) in the intravenous group. Hospital length of stay after the first positive blood culture was shorter in the oral switch group with a median of 12 days versus 16 days in the intravenous group. The incidence of *Clostridioides difficile* infection was similar. Limitations of this trial included: challenges associated with assigning patients to the low-risk category, few participants with methicillin resistant *S aureus* infection (n=16), and slow recruitment that led to early trial termination and performance of interim analysis.

BOTTOM LINE: For low-risk patients with *S aureus* bloodstream infection, switching to oral antimicrobial therapy after five to seven days of intravenous antimicrobial therapy was non-inferior to the standard 14 days of intravenous therapy.

CITATION: Kaasch AJ, López-Cortés LE, et al. Efficacy and safety of an early oral switch in low-risk *Staphylococcus aureus* bloodstream infection (SABATO): an international, open-label, parallel-group, randomised, controlled, non-inferiority trial. *Lancet Infect Dis*. 2024:S1473-3099(23)00756-9.

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By David Taylor, MD

3 GLP-1 RA Use is Associated with Increased Residual Gastric Contents in Appropriately Fasted Patients Before Elective Procedures

CLINICAL QUESTION: Does Glucagon-like Peptide-1 Receptor Agonist (GLP-1 RA) use lead to an increased risk of aspiration in patients undergoing anesthesia for elective procedures?

Dr. Taylor

BACKGROUND: GLP-1 RA use has skyrocketed in the U.S., expanding from use as an agent for diabetes to new indications including weight loss. Due to concerns for increased risk of pulmonary aspiration during anesthesia, the American Society of Anesthesiologists recommends patients who receive weekly dosing of these medications to hold them at least one week prior to elective procedures.

STUDY DESIGN: Cross-sectional study

SETTING: Single center at the University of Texas Health Science Center at Houston

SYNOPSIS: Participants screened from 953 patients presenting for elective procedures with anesthesia were enrolled into control and exposure groups of 62 patients each. Patients were excluded if they did not have normal gastric anatomy, were pregnant, had recent trauma (within one month), or were unable to lie in the right lateral decubitus position. The exposure group included patients using weekly semaglutide, dulaglutide, or tirzepatide. Each patient completed gastric ultrasonography with an anesthesiologist to assess the primary outcome of increased residual gastric content, defined as the presence of solids, thick liquids, or more than 1.5 mL/kg of clear liquids. Images were independently assessed by a second blinded anesthesiologist, and discrepancies were settled by a third blinded anesthesiologist. Adjusted for confounding variables, the GLP-1 RA group was associated with a 30.5% higher prevalence of increased residual gastric content (95% CI, 9.9 to 51.2%). This suggests patients undergoing elective procedures should be screened for recent use of GLP-1 RA and consider discussing with anesthesiology if these procedures should be delayed.

BOTTOM LINE: Use of weekly GLP-1 RA prior to elective procedures under anesthesia in patients who have fasted is associated with increased residual gastric contents on ultrasound, however, further research is needed to determine how this correlates with pulmonary aspiration events.

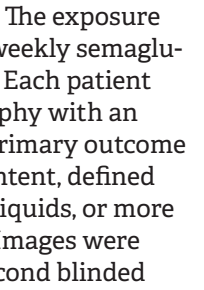
CITATION: Sen S, Potnuru PP, et al. Glucagon-like peptide-1 receptor agonist use and residual gastric content before anesthesia. *JAMA Surg*. 2024:e240111. doi: 10.1001/jamasurg.2024.0111.

Dr. Taylor is a faculty hospitalist in the division of hospital medicine at the University of California in San Diego.

By Jenna Klubnick, MD, MS

4 Opioid Prescribing and Outcomes in Patients with SCD Post-2016 CDC Guideline

CLINICAL QUESTION: Did the 2016 U.S. Centers for Disease Control and Prevention (CDC) guideline for prescribing opioids for chronic pain change opioid prescribing practices and vaso-occlusive crisis (VOC)-related hospital visits in patients with sickle cell disease (SCD)?



Dr. Klubnick

BACKGROUND: In March 2016, the CDC released the Guideline for Prescribing Opioids for Chronic Pain, which was designed to increase safety and offer guidance regarding the treatment of chronic pain not related to cancer, palliative care, or end-of-life care. This has decreased opioid prescribing among the overall population of the U.S. However, SCD-specific guidelines recommend the use of opioid therapy when non-opioid analgesia has not been effective, and the CDC guideline did not specifically omit patients with SCD.

STUDY DESIGN: Retrospective cohort study

SETTING: U.S. patients enrolled in Merative MarketScan Commercial Database (which is made of deidentified patient-level data from insured American patients)

SYNOPSIS: This study used an interrupted time series to examine the change in opioid prescription patterns and VOC-related hospital care in 14,979 patients with SCD before and after March 2016 CDC guidelines for prescribing opioids for chronic pain were implemented. The trend of each measured domain from January 2011 through February 2016 was compared with the trend from March 2016 through December 2019.

The study showed that there was a decrease in the four domains of opioid prescriptions measured after March 2016; dispensing rate per 100 persons (slope -0.001 to -0.004), days supplied per prescription (slope 0.031 to -0.015), total morphine milligram equivalents per person (slope 73.74 to 67.23), mean daily morphine milligram equivalents per person (slope 4.13 to -5.97). Additionally, there was a concomitant increase in VOC-related emergency department visits (slope -0.008 to 0.034) and VOC-related hospitalizations (slope -0.098 to 0.059). These changes were found to be present for both adult and pediatric patients, with the changes present to a greater degree in the adult patient group.

BOTTOM LINE: There was a decrease in opioid prescribing for patients with SCD and an increase in VOC-related hospitalizations after the release of the CDC Guidelines for Prescribing Opioids for Chronic Pain in March 2016. This may reflect an unintended negative outcome for patients with SCD. Patients with SCD may benefit from disease-specific exemptions from guidelines related to opioid prescribing in the future.

CITATION: Kang HA, Wang B, et al. Opioid prescribing and outcomes in patients with sickle cell disease post–2016 CDC guideline. *JAMA Intern Med*. 2024;184(5):510-518. doi:10.1001/jamainternmed.2023.8538

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By Marcella Katsnelson, DO

5 Incidence of Colorectal Cancer in Patients Diagnosed with PLA

CLINICAL QUESTION: Is there an association between pyogenic liver abscess (PLA) and subsequent incidence of diagnosed colorectal cancer (CRC) and if so, should early screening for colorectal cancer be recommended for all patients after a diagnosis of PLA?

Dr. Katsnelson

BACKGROUND: It is postulated that CRC can compromise the mucosal barrier and allow for bacterial invasion into the portal system; therefore, certain infectious diseases, such as streptococcal or anaerobic bacteremia and pyogenic liver abscess may have an association with the incidence of CRC. Data from Southeast Asia suggests that patients with PLA have higher rates of asymptomatic CRC (seven-fold higher compared with patients without PLA). Despite this, no professional guidelines exist to recommend CRC screening for all patients diagnosed with PLA.

STUDY DESIGN: A patient-level, matched, retrospective, cohort study

SETTING: 127 Veterans Affairs (VA) hospitals

SYNOPSIS: 8,286 patients with PLA and 23,201 patient-level matched controls were compared from 127 VA hospitals between 2003 and 2020. PLA was classified as either cryptogenic or secondary when the patient had known risk factors or diagnosis code of cholangitis or cholecystitis within 30 days of PLA diagnosis. Most patients were male (96.5%) and white (68%). Over a 10-year follow-up period, the primary outcome assessed was CRC diagnosis. After analysis, a statistically significantly higher proportion of all patients with cryptogenic PLA were diagnosed with CRC compared to controls (1.9% versus 0.8%, P <0.001) within three years of incidence of PLA (HR, 2.51; 95% CI, 1.93 to 3.26 at one year; and HR, 1.41; 95% CI, 1.05 to 1.89 at three years). Limitations of this study included the inability to control for risk factors including smoking or CRC family history, along with limitations on extrapolation of the data given the VA population of the study.

BOTTOM LINE: It may be beneficial for patients with cryptogenic PLA to be screened for colorectal cancer within three years of incidence of PLA, especially in patients who have not been screened previously according to guidelines.

CITATION: Suzuki H, Kidder I, et al. Incidence of colorectal cancer in patients diagnosed with pyogenic liver abscess. *JAMA Netw Open*. 2023;6(12):e2348218. doi:10.1001/jamanetworkopen.2023.48218

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By Yuri Shindo, MD

6 Early Switch from Intravenous to Oral Antibiotics for Uncomplicated Gram-Negative Bacteremia

CLINICAL QUESTION: Is there a mortality difference between early transition to oral antibiotics versus prolonged intravenous antibiotics in uncomplicated gram-negative bacteremia?

Dr. Shindo

BACKGROUND: Although there are national guidelines regarding the duration of antibiotic therapy for gram-negative bacteremia, the optimal route of administration and timing for transitioning from intravenous to oral antibiotic therapy remains unclear.

STUDY DESIGN: Cohort study using a target trial emulation framework

SETTING: Four hospitals in Copenhagen, Denmark

SYNOPSIS: This study enrolled 914 hospitalized adults (median age, 74.5 years) with uncomplicated gram-negative bacteremia. Individuals were assigned to early oral step-down therapy, defined as a transition to oral antibiotic therapy within four days of blood culture (n=433), or prolonged intravenous antibiotics, defined as a minimum of five days of intravenous antibiotic treatment (n=481). Antibiotic treatment in both groups was maintained for seven to 14 days.

The primary outcome, 90-day all-cause mortality risk, was comparable among the group with early oral step-down therapy (9.1% versus 11.7%), corresponding to a risk difference of -2.5% (95% CI, -5.7% to 0.7%) and a relative risk of 0.78 (95% CI, 0.60 to 1.10). Limitations included the observational nature of this study, the exclusion of immunocompromised patients, and the paucity of multitherapy-resistant organisms represented in the trial.

BOTTOM LINE: Transitioning to oral antibiotics within four days after initial blood culture may be an effective alternative to prolonged parenteral antibiotic treatment for uncomplicated gram-negative bacteremia.

CITATION: Tingsgård S, Bastrup Israelsen S, et al. Early switch from intravenous to oral antibiotics for patients with uncomplicated gram-negative bacteremia. *JAMA Netw Open*. 2024;7(1):e2352314.

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By Adrià Jiménez Bacardí, MD, MS

7 Diagnostic Stewardship in CAP with Syndromic Molecular Testing

CLINICAL QUESTION: Does syndromic polymerase chain reaction (PCR)-based testing of lower respiratory tract samples in patients hospitalized with community-acquired pneumonia (CAP) lead to faster pathogen-directed treatment?

BACKGROUND: CAP is a leading cause of hospital admissions and mortality, yet most patients do not receive a microbiological diagnosis and targeted treatment. Culture-based methods can have low yields and are insufficient to influence early decisions on antimicrobial therapy. Rapid syndromic PCR-based panels can potentially facilitate pathogen-directed treatment, but limited evidence currently supports their routine use.

STUDY DESIGN: Parallel-arm, single-blinded, single-center, randomized, clinical superiority trial

SETTING: Emergency department of a large tertiary care hospital in Bergen, Norway

SYNOPSIS: Patients with suspected CAP were randomized into receiving syndromic PCR testing plus standard-of-care microbiological diagnostics or standard microbiological diagnostics alone. The study included 374 patients, with 187 randomized to each arm. Both arms showed similar patient characteristics. Patients were 40.9% female with a median age of 72 years. CAP was diagnosed in 208 patients, and 200 patients (97 in the intervention arm versus 103 in the standard arm) provided a lower respiratory tract sample. The two primary outcomes were provision of pathogen-directed treatment, and time to pathogen-directed treatment. At 48 hours, patients were more likely to receive pathogen-directed treatment in the intervention arm (35.3% versus 13.4%; OR, 3.53; 95% CI, 2.13 to 6.02; *P* <.001). Patients were also more likely to receive earlier pathogen-directed treatment in the intervention arm (mean difference, −9.4 hours; 95% CI, −12.7 to −6.0 hours; *P* <.001). Among those diagnosed with CAP, patients in the intervention arm were also more likely to receive pathogen-directed treatment at 48 hours (47.4% versus 15.5%, OR, 4.9; 95% CI, 2.57 to 9.77; *P* <.001) and received earlier pathogen-directed treatment (mean difference, −12.3 hours; 95% CI, −17.3 to −7.3 hours; *P* <.001). No differences were found in length of stay or clinical outcomes. The main limitation was that the trial was stopped early for efficacy.

BOTTOM LINE: Early PCR testing of lower respiratory tract samples for patients hospitalized with suspected CAP hastens more targeted microbial treatment.

CITATION: Markussen DL, Serigstad S, et al. Diagnostic stewardship in community-acquired pneumonia with syndromic molecular testing: a randomized clinical trial. *JAMA Netw Open*. 2024;7(3):e240830. doi:10.1001/jamanetworkopen.2024.0830

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By Maryann T. Ally, MD, MPH, FACP, CHCQM-PHYADV, FHM

8 Cefepime-taniborbactam Use in Complicated UTI

CLINICAL QUESTION: Is cefepime-taniborbactam effective in treating complicated urinary tract infections (UTIs)?

BACKGROUND: Complicated UTIs, such as acute pyelonephritis, have a significant health impact, with 600,000 hospitalizations in the U.S. each year. Given the routine use of antibiotics to treat UTIs, antibiotic resistance has become common. Adding taniborbactam to cefepime inhibits beta-lactamase activity, allowing cefepime-taniborbactam to be effective to treat *Enterobacterales* species (such as *Escherichia coli, Proteus spp, Klebsiella spp*, and *Enterobacter cloacae*) and *Pseudomonas aeruginosa* bacteria. This study compared cefepime-taniborbactam with another commonly used antibiotic, meropenem, to assess the former's safety and efficacy when treating complicated UTIs.

Dr. Ally

STUDY DESIGN: Phase 3, double-blinded, randomized trial

SETTING: 68 sites in 15 countries

SYNOPSIS: 661 adult patients with complicated UTIs were randomized and 436 were in the microbiologic intention-to-treat (microITT) group. Over a third of the patients were 65 years and older. Patients were included in this study if their urine culture grew only one gram-negative bacterial species (at least 105 colony-forming units/mL), not resistant to meropenem. Patients were excluded if they had received anti-microbial therapy prior to the trial, had a glomerular filtration rate less than 30 mL/min/1.73m², had an allergy to a beta-lactam antibiotic, were a renal transplant recipient, or had a diagnosis of prostatitis, renal or perinephric abscess, or severe hepatic impairment. Patients received cefepime-taniborbactam 2.5 g or meropenem 1 g every eight hours for seven days, with possible extension of treatment up to 14 days for patients with bacteremia (13.1% of microITT group). Oral step-down therapy was not permitted. Primary efficacy was microbiologic and clinical success when testing for cure on trial days 19 to 23. For this study, microbiologic success was defined as urine culture results of pathogen growth of ≤103 colony-forming units/mL. Clinical success was defined as the resolution of symptoms. Cefepime-taniborbactam was deemed to be superior to meropenem in microbiologic and clinical success (95% confidence interval, 3.1 to 22.2, *P*=0.009), with a composite success rate of 70.6% for patients who had received cefepime-taniborbactam compared to 58% in those who received meropenem. Cefepime-taniborbactam has the same safety profile as meropenem, with similar adverse effects, namely headache, hypertension, diarrhea, nausea, and constipation.

BOTTOM LINE: Cefepime-taniborbactam was superior to meropenem in treating complicated UTIs growing *Enterobacterales* species or *Pseudomonas aeruginosa*.

CITATION: Wagenlehner FM, Gasink LB, et al. Cefepime-taniborbactam in complicated urinary tract infection. *N Engl J Med*. 2024;390(7):611-22.

Dr. Ally is a clinical professor of medicine in the division of hospital medicine and a physician advisor at the University of California in San Diego. ■

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Breaking Barriers: Advancing Inclusion for International Medical Graduates in Hospital Medicine

By Amy Y. Yu, MD, M. Carolina Musri, MD, and Keshav Khanijow, MD

International medical graduates (IMGs) are defined by the Educational Commission for Foreign Medical Graduates as physicians who completed their medical education outside the U.S. and Canada.[1] They may or may not have U.S. citizenship, so this article will focus on those that do not. Each year, many attempt to secure residency training in the U.S., with a match rate of about 58% for IMGs without U.S. citizenship, contributing to a growing IMG workforce.[2,3] As of 2023, almost 25% of active physicians in the U.S. are IMGs, although this ratio was much higher in internal medicine (39%) and family medicine (32%).[4,5] Within hospital medicine, exact numbers are not known. Although it had its limitations, 45% of hospitalist respondents to "Today's Hospitalist Compensation and Career Survey" identified themselves as IMG.[6] Although they are a notable part of the fabric of American healthcare, IMG physicians' transition into the U.S. healthcare system is often challenged by many predictable and unpredictable factors including being accepted to university programs, visa issues, and bias from both patients and colleagues.[7-9]

Despite their contributions to the U.S. healthcare system, IMGs need a work permit and ultimately a visa sponsorship to practice medicine in the U.S. The vast majority will have had a J-1 visa during residency, which is an education exchange visa that the U.S. Department of State authorizes the Educational Commission for Foreign Medical Graduates to sponsor.[10] After residency, a J-1 visa holder will have to either return to their home country for two years to share the knowledge obtained in the U.S. or complete a three-year waiver medical job in an underserved U.S. area. After either one of those requirements is met, the IMG J-1 visa holders then become eligible to obtain new work authorization via a temporary work visa (H-1B) or an immigrant visa (also known as permanent resident status or green card). An H-1B visa is for temporary workers in specialty occupations with professional degrees, such as medicine. They last for six years and do not require the three-year waiver job nor the two-year return to home country. Although the path to an H-1B visa often involves having a J-1 visa first, a small percentage of IMGs can have their H-1B visa sponsored directly during medical residency training if the medical institution can sponsor it. A study from 2022 showed that 63.7% of internal medicine programs accepted J-1 visas, and of those, 34.5% also sponsored H-1B visas.[11]

Eventually, IMGs entering hospital medicine are candidates for employer-sponsored permanent resident status or self-sponsorship depending on their employer's policies and evidence of "extraordinary abilities," such as research. Subsequently, they can apply for U.S. citizenship after three to five years of permanent residency status, though applying for citizenship has its own set of complications with quotas from origin countries, which can lead to prolonged struggles to obtain citizenship before the promise of a permanent life in the U.S. These visa restrictions affect the ability of IMG hospitalists to visit their country of origin and have their family networks visit them, which can lead to social isolation.

Having some knowledge of childcare resources and community cultural support groups could be useful information for new IMG hospitalists in a group. Furthermore, there should be an effort to build community within the division through affinity groups and encouraging participation in division events to help combat social isolation.

Even with visa sponsorship, IMG hospitalists may face both macroaggressions and microaggressions from colleagues and patients about their ethnicity, citizenship, or accents.[12] They may, unfortunately, face xenophobic bias, with questions about their medical knowledge and ability to provide high-quality patient care

Dr. Yu

Dr. Musri

Dr. Khanijow

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efficiently in the U.S.[13] This is despite IMGs enriching their health systems with different educational backgrounds, and having knowledge of diverse belief systems, which can significantly impact patients' health and recovery. A British Medical Journal study looking at Medicare admissions from 2011 to 2014 proved this bias to be unfounded; IMG hospitalists cared for patients with more chronic conditions than average, and there was slightly lower 30-day mortality with statistical significance.[13] Verbal and physical violence against hospitalists lamentably exists, and there should be protections for all hospitalists against macroaggressions. In addition, IMG hospitalists may be disproportionately affected by them. There should be a process of behavioral contracts for patients who repeatedly use racist or xenophobic language. For offenders who continue their behavior, there should be leadership support to discuss possible administrative discharge with the hospital's risk and legal teams. There should also be an outreach to affected hospitalists to provide the opportunity to discuss their situation one-on-one with leadership, or at a division-sponsored Behavioral Challenges Conference on dealing with abusive patients, and lessons learned for the hospital medicine group.

Inclusivity also includes celebrating the heritage and holidays of the people working within the division. Especially for IMGs who may have visa restrictions on returning home for certain events, recognition of holidays within the group shows community support for the joy or sorrow a holiday may commemorate. Although an effort should be made to try and honor schedule requests for different holidays such as Rosh Hashanah, Eid-al-Fitr, Diwali, Lunar New Year, Christmas, Easter, and others, this may be difficult with existing complex scheduling structures. However, special attention could be paid by the leadership to personally acknowledge those who are working through the holiday for a morale boost. It also includes respecting other parts of one's culture such as cultural dietary restrictions including vegetarian diets, halal diets, and kosher diets, among others. During division events that feature food, an effort should be made to accommodate cultural dietary restrictions.

IMG hospitalists form a significant part of the U.S. healthcare workforce. Like their non-IMG colleagues, they have an impact on our communities by supporting patients through their most vulnerable time of hospitalization. However, being an IMG comes with an additional set of stressors that can make hospitalists feel not included in the environment, especially when it comes to issues around visas and bias. Further research into IMG physician wellness and advocacy for IMG physician colleagues are the next steps in addressing these disparities. ■

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From Abroad to Bedside: The Self-Perceived Impact of IMGs in the U.S. Healthcare System

Part I: The academic milieu surrounding IMGs, perceptions of the country of origin, migrating to the U.S.

By Nikolai Emmanuel Bayro Jablonski

Foreign medical graduates (FMGs), or international medical graduates (IMGs) represent an important section of the U.S. healthcare workforce. An IMG is a physician who received a basic medical degree from a medical school located outside the U.S. and Canada that is not accredited by a U.S. accrediting body, the Liaison Committee on Medical Education, or the American Osteopathic Association.[1] According to the American Association of Medical Colleges, in 2021, 236,940 physicians actively working in the U.S. in all specialties combined were IMGs, roughly 25% of the physician population. When analyzing the internal medicine cohort, this number increased to 39.8% of 120,336 total active internists.[2] With roughly 48,000 internal medicine specialists working in the U.S. healthcare system, a discussion regarding the role and impact of foreign medical graduates has arisen in academic circles. In this article, we provide a summary of these discussions and explore the individual experiences of four international medical graduates who currently work as hospitalists in the U.S.

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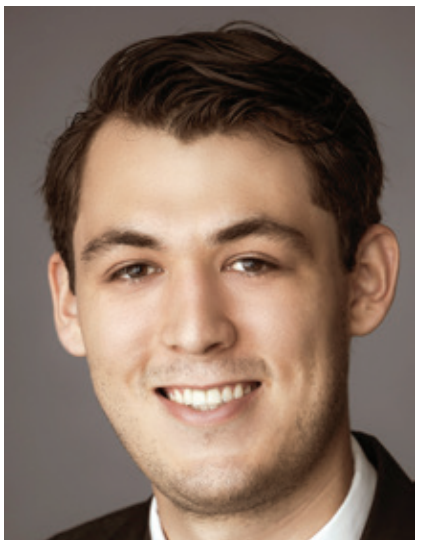

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Literature review

We performed a brief review of a convenience-based selection of the literature using MEDLINE with the keywords "International Medical Graduates", "IMG", "Foreign Medical Graduates", and "FMG". Our focus was publications studying IMGs based in the U.S., exploring their experiences as foreigners in a new country, and debating the impact of IMGs on the healthcare system.

A meta-analysis of qualitative studies performed by Al-Haddad, et al. in 2022 provides an overview of the general experiences of IMGs with migration and adaptation to new systems.[3] In this review, which included 46 individual studies, a total of 1,142 IMGs from low-, medium-, and high-income countries were interviewed. Five argumentative lines used by IMGs to describe their personal experiences were identified. These lines represent the overall journey that IMGs undertake when migrating from their country of origin, from a comparison between countries (Migration Dimension), to initial difficulties including loss, shock, and barriers of entry into the profession (A Challenging Start), followed by language barriers, cultural differences, and medical education differences (Degree of Dissonance), before getting support and resources to overcome these barriers (Leveling the Playing Field), and adapting to the new environment (Survive Then Thrive).

Another publication explored the intercultural challenges faced by IMGs when arriving in a new country.[4] Published by Michalski, et al. this meta-analysis included 47 studies, 18 of them studying IMGs migrating to the U.S., and identified that papers dealing with IMGs usually mention topics related to communication (with patients, relatives, and other healthcare workers), the healthcare system, immigration, racism, and discrimination, as well as gender issues. Mentions of "healthcare system" and "language" were almost exclusively negatively connotated. The study identified "patient-centered care," "language," "healthcare system," and "immigration process" as the areas in which IMGs had more trouble adapting, and "shared decision-making," "lower hierarchy and loss of status," "medical education," and "separation of relatives" as being significantly different from their country of origin.

A narrative review by Ranasinghe5 highlights how, although IMGs play an active role in the full spectrum of healthcare services, 41% of practicing IMGs are in primary care disciplines and are more likely to practice in areas and specialties with a U.S. medical graduate shortage. The author concludes that IMGs take up opportunities to practice within patient populations that face difficulties secondary to an uneven distribution of the physician workforce.

Moreover, several opinion pieces have underlined the importance of IMGs in the U.S., with some specialties even being described as "IMG-dependent" by some authors. There is a growing debate regarding the ethics of a healthcare system that trains an increasing number of foreign graduates to serve its population, arguing that doing so supports a "brain-drain" from developing countries.[6-8]

This brief review highlights two distinct focuses regarding the study of the IMG experience. On the one hand, researchers seem interested in understanding the reasons behind IMGs' academic migration, the hardships they endure once in the new country, the difficulties they experience when entering the new health system, and how to improve their chances of smoother integration. On the other hand, the debate regarding the ethics of IMG training underlies their importance in the U.S. healthcare system, as well as the consequences of depleting low- or middle-income countries of healthcare professionals.

However, no publication was identified regarding the impact of the cultural exchange that IMGs bring to host institutions. Additionally, no studies were found regarding how the relationship between IMGs and their home country, their host country, and their medical practice changes due to academic migration.

With this in mind, we asked our four IMGs to talk about their experiences of migration to further delve into this multidimensional topic.

The home country

Before exploring the intricacies of medical migration to the U.S., we questioned the interviewees about their country of origin, specifically as it relates to their medical training and the overall experience of providing healthcare in that setting. When talking about their medical training in their home country, the physicians interviewed took different approaches.

Dr. Auron

Moises Auron, MD, an academic med-peds hospitalist at the Cleveland Clinic, and a professor of medicine and pediatrics at the Cleveland Clinic Lerner College of Medicine of Case Western Reserve University in Cleveland, shared how his interest in academic medicine stems from his education in Mexico. "They keep publishing, they keep presenting, and they keep teaching. It doesn't stop," he said. "That's what I learned in Mexico, both at the Salvador Zubirán Institute and at the General Hospital of Mexico City, because at the General Hospital, I also saw how the residents were sending papers and working on research projects. That was influential to me."

He said the opportunities he had as a student at the National Autonomous University of Mexico, or UNAM, were extensive, "I had a lot of mentors. At UNAM, they give you the opportunity to be an instructor of pretty much all disciplines (histology, embryology, anatomy, biochemistry, surgery,

etc.). They give you the opportunity to do research (basic, translational, clinical) and present in local, national, and international meetings, as well as publish. They give you the opportunity to do things they think will make your CV very competitive. If you are a Mexican student who is enthusiastic, motivated, and engaged, who is putting in the effort, who is well involved, who takes advantage of all the opportunities that the school has, who goes with your mentor, who stays to do things, who becomes a teaching assistant/instructor, you [will have] all the resources to be extremely competitive. Every effort—presenting at a medical meeting, doing research, has tremendous curricular value—for example, even presenting a poster at a conference as a medical student, even if it is a local conference, people have no idea the tremendous [curricular] value it has."

Similarly, Patricia Santos, MD, MBA, an assistant professor of medicine at the division of hospital medicine, and the associate chief of quality and the safety chair for the hospital medicine division and the oncology co-management service at the Albert B. Chandler Hospital at the University of Kentucky in Lexington, Ky., said going to medical school in the Philippines led her to experience first-hand the elevated cost of healthcare. "I think it's [the] exposure in my medical training [that made me resourceful]," she said. "I think it's [the] experiences, the patient experiences where you learn how to be resourceful and really try your best to think through things in terms of how to get the care that the patient needs given what you have."

In relation to the perception of the healthcare system of their country of origin, the physicians reflected on working in low-resource settings. Dr. Santos said, "In the Philippines, you really have to have a really high pre-test probability when you're considering a disease before you do all the diagnostic tests, because the patient may not be able to afford all the tests that you want."

This impacts the way physicians interact with medical information. "Since there were not enough resources [In Mexico] when I was there 20 years ago, people had to memorize more [medical information] because it depended on them [to know]," Dr. Auron said. "Despite the shortage of resources, [Mexican] physicians provided excellent medical care."

These experiences, it seems, begin early in their medical education. "I distinctly remember when I was a medical student, you know we had this patient who told us 'Oh … our medical bill is very high, would it be possible for you to tell me first if you're going to order something? We want to know how much it is going to be.' And that stuck with me," Dr. Santos said. "Because we had to take care of patients considering that there is like a cost to their care and we have to work with them to [provide them with] good care [while making sure not to] drain their resources, their financial health."


Dr. Santos

"I love hospital medicine. I think as hospitalists we're able to take care of the [hospitalized] patient as a whole. We're experts in care coordination and, being in a university hospital, we get a lot of complex patients who have several things going on with them, and it's nice to be the one to arrange all that and make sure that all the specialists are on the same page. I like our roles in patient care for sure."

—Patricia Santos, MD

The impact of migration

Our second discussion topic explored the impact that academic migration to the U.S. has on IMG hospitalists. Two of the interviewees talked about this as a positive experience, one that led them to grow both personally and professionally. Gabriel Tse, MD, faculty in the division of pediatric hospital medicine at Lucile Packard Children's Hospital, Stanford University School of Medicine in Stanford, Calif., said, "Talking about how we might approach the patient in another country helps me [understand] that there's not just one way of doing things. That's [more of a soft skill and is a] bit more difficult to express or to quantify, but I think that's also a very important thing. … I think the clinical knowledge was a value add. Just seeing different health systems and seeing different [ways] of providing clinical service is really interesting." Dr. Tse completed his pediatrics residency at the University of Toronto and his pediatric hospital medicine fellowship at Stanford University.


Dr. Tse

Dr. Auron had a similar experience. "Every hospital has different systems, they have different opportunities to manage patients, you [meet] doctors who have different [strengths], ranging from clinical experience to more academic doctors, and those who have experience with more complex patients," he said. "By exposing yourself to different systems, your management of patients is more comprehensive. The secret is that you end up going out more and studying more. You study based on the problems you are seeing, based on the things you are focusing on, and your medical management is based on the experience of the doctor who is supervising you."

Interestingly, Priya Joseph, MD, the specialty medical director for Carolinas Hospitalist Group at Atrium Health Carolinas Medical Center in Charlotte, N.C., thinks otherwise about any changes in herself after migrating to the U.S. "I think the higher training and financial independence definitely made me much more self-confident," she said. "My self-confidence significantly improved. I also … have a more wholesome approach to patients than even when I was in India, because … I'm taking care of them, so there's a greater level of accountability with patient care. When you're in training you feel like your supervisor or your attending is the one who is responsible, [and] now there's just a greater sense of responsibility that you feel. That's probably the big change. I'm not sure it's related to the migration per se. I think it's just related to having higher training and feeling self-reliant."


Dr. Joseph

Drs. Auron, Tse, Santo, and Joseph all said adapting to the U.S. healthcare system was a challenge—the administrative load, healthcare waste, and how practices around waste differ between the U.S. and other countries, were just some of the issues. Dr Joseph provided some tips on how best to navigate this process. "Number one is to be prepared to work hard and to keep your ears open because there is so much to learn and so much to absorb. Number two is to be flexible and adaptive in your environment. Don't think 'Oh, I can't do this'. Be just like a dry sponge and soak it all in. I think that's what has helped."

For IMGs, being accepted into a medical residency also implies moving to a different country, with a different culture and a different language. The IMGs commented on how living in a different setting also shaped their personal lives. "I think it was just going through so much change, you know. [By] putting oneself through challenging situations and [just] like running a marathon, it's how much you train for it that [makes you] succeed. The more you train, the more you push yourself, the more [chances you have at being] successful at completing a marathon, and I compare it to that," Dr. Joseph said. "I don't think it's the actual structure of education in India. I think it was more the experience of having gone through the discomfort of moving to another country, learning a different culture, learning how to interact with patients in a different way."

Dr. Tse had a similar experience. "There were lots of challenges in the first six months of me moving there, but I grew a lot personally. I met a lot of great people and I felt more international. I felt outside of this bubble. It was a great opportunity to grow up quickly, having gone abroad." ■

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Hospitalists Provide Insight on Working at VA Hospitals

Research, educational opportunities are two of many perks

By Karen Appold

In honor of Veterans Day, The Hospitalist asked SHM members who work for the Veterans Health Administration (VHA) to share their insights on working for the largest integrated healthcare system in the U.S.

Overwhelmingly, hospitalists cited as the greatest benefit the privilege to provide care to those who served our country. They also touted many other perks, such as research and educational opportunities, and excellent benefits.

The VHA has 1,321 healthcare facilities, including 172 VA medical centers and 1,138 outpatient sites of care of varying complexity. More than 9 million veterans are enrolled in the VA healthcare program.[1]

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Opportunities for leadership

Mel L. Anderson, MD, MACP, SFHM, completed his residency and chief residency in internal medicine at The David Grant U.S. Air Force Medical Center at Travis Air Force Base in Fairfield, Calif., and served as a faculty member there.


Dr. Anderson

"After a cross-country move, I considered private practice jobs in internal medicine but was disappointed to see the focus on the business of medicine," said Dr. Anderson, who didn't want the perception of financial gain to come between him and his patients. Because the VHA compensated employees similarly to the Department of Defense, he sought employment there. He is now employed as the national program executive director of VHA hospital medicine and interim section chief of hospital medicine at Rocky Mountain Regional VA Medical Center, a 200-bed hospital in Aurora, Colo.

Dr. Anderson has found many benefits to working for the VA. "For those who want a mission-driven profession in life, working at the VA is incredibly rewarding," he said.

Because the VA is an integrated healthcare system, leadership opportunities exist at the local, regional, and national levels. "There are opportunities to create and shape policies and practice at scale," he said.

In fact, Dr. Anderson leads 18 national hospital medicine consultants representing each of the 18 separate VA networks across the country. Each consultant meets monthly with the chiefs of hospital medicine in their network and with the other consultants. "We've created a very powerful structure over the last four years," he said. "We solve problems as a group and share promising and strong practices."

Dr. Anderson said the VA is an amazing place for medical educators to work and offers many opportunities because it has a greater proportion of teaching teams than most non-VA institutions.

Further, the VA has a research-funded infrastructure that mirrors that of the National Institutes of Health, which allows for varied and multi-faceted careers involving clinical work, teaching opportunities, and scholarly work including research. Research funding rates are higher compared to the National Institutes of Health.

Ultimately, the greatest rewards of his job are serving patients, who are often disadvantaged from a socio-economic perspective and overall comprise a highly co-morbid patient population. "On a daily basis, their heartfelt gratitude shines through," Dr. Anderson said. "It's a gift to care for this population."

A great fit all around

As a hospitalist interested in medical education, Alex Chinn (@ajchinn), MD, staff physician in the department of hospital medicine at Lt. Col. Luke Weathers, Jr. VA Medical Center in Memphis, Tenn., has found working at a VA hospital to be a great fit for him. He previously worked at a university-affiliated community hospital.


Dr. Chinn

In comparing the two positions, his daily routine at the VA is similar to what he experienced at his previous job. "As an integrated health system, VA patients receive most of their care within our facility or community-based clinics," Dr. Chinn said. "I have access to primary care records and can easily reach patients' other providers." When a service isn't available, an office arranges community referrals.

Although they collaborate, each VA medical center develops its hospitalist program and schedule separately, so variation exists between facilities. Hospitalists spend the majority of clinical time doing inpatient care at Dr. Chinn's institution, but also staff the consultation service in the intensive psychiatric unit and the perioperative assessment clinics a few weeks per year. These other services have been great opportunities for Dr. Chinn to maintain his additional patient-care skill sets. He appreciates having time for non-clinical duties such as training and committee appointments built into his work schedule.

Being able to focus on doing the right thing for patients without worrying about their ability to pay for or access is refreshing. "I think most of us pursued medicine because we wanted to help people; the VA's resources allow me to fulfill that goal," Dr. Chinn said.

Excellent benefits allow for work-life balance. In fact, Dr. Chinn's section chief builds clinical schedules around time-off requests. "I can take time off when I want to, without having to trade clinical time with my colleagues or work an unbearably long stretch," he said.

Federal employee benefits are great, he continued. In addition to leave, VA hospitalists have access to a variety of insurance programs and retirement vehicles, as well as a pension plan.

"I love our patients and working with learners," Dr. Chinn said. "It's an honor to care for the men and women who sacrificed for our country, and I enjoy getting to know them. Helping to train the next generation of physicians is also rewarding. Although I worked with learners at my previous job, I have much more time to get to know my teams and help them achieve their goals here."

An abundance of benefits

Craig G. Gunderson (@gunderson_craig), MD, SFHM, a hospitalist at VA Connecticut Healthcare System in West Haven, Conn., and deputy executive director of the national hospital medicine program at the VA central office, chose to work at the VA because it was the closest position he could find to true general medicine.


Dr. Gunderson

"I couldn't imagine turning my back on the intense inpatient training I had just completed, and the VA job allowed me to be an inpatient attending for two months per year," said Dr. Gunderson, who originally worked in primary care. After six years of 100% clinical care, he jumped at the opportunity to be an academic hospitalist when the first hospitalist jobs were created at the West Haven VA Hospital, a 109-bed hospital, in 2010.

The biggest difference between VA and non-VA hospitalist jobs is the availability of non-clinical opportunities, said Dr. Gunderson, including medical education, research, and administration. About half of VAs have hospitalists involved in facility leadership, including chiefs of staff and chiefs of medicine. Many VA hospitalists have non-clinical academic time for research, committee work, and quality improvement.

Regarding staffing models, some VAs use traditional seven-on, seven-off systems which fit well with VA pay periods. Other hospitalists work a certain number of two-week blocks per year, typically 32 to 40 weeks annually with the remaining being academic time.

Many opportunities for collaboration on a national level exist because more than 100 VA medical centers with thousands of hospitalist colleagues are located across the U.S., Dr. Gunderson said. Everyone uses the same electronic

health record, has the same national database, uses the same email, and can message each other instantly on Microsoft Teams.

As VA employees, hospitalists have many perks, Dr. Gunderson said. Aside from the previously mentioned benefits, the salaries are federally mandated to be competitive with local community standards, the VA provides malpractice insurance, and VA physicians have statutory immunity from individual malpractice liability and can't be sued in civil court for malpractice.

VA care is excellent and well-resourced, Dr. Gunderson continued. Studies and systematic reviews have consistently shown that VA care is superior to non-VA care in various quality measures, including outcome measures currently reported by the Centers for Medicare & Medicaid Services as well as various process measures such as cancer screening and vaccination rates.[2,3]

"Ultimately, the best reason to work at the VA is the patients," Dr. Gunderson said. "The veterans are genuinely grateful for the care they receive. Some are from marginalized parts of society, and it's gratifying to provide them with great care."

Focusing on excellent patient care

Adrienne Mann, MD, a hospitalist at the Rocky Mountain Regional VA Medical Center, (an 80-bed urban, academic hospital), and associate professor of medicine at the University of Colorado School of Medicine in Aurora, completed both medical school and residency training at the University of Colorado.

Dr. Mann

"As a trainee, I experienced impactful teaching and educational experiences at the VA," she said. The clinicians and educators in hospital medicine prioritized outstanding patient care, education, and service. When I was asked to join the group, it was a no-brainer to do so."

Because the group spends a lot of time teaching, the work schedule is structured in one- or two-week blocks to allow for as much continuity as possible with residents and patients while also prioritizing flexibility for non-clinical activities.

In her 10 years at the VA, Dr. Mann has been grateful for the chance to do what is best for her patients and learners with few exceptions. "For patients, we have access to incredible resources for mental health, housing, rehabilitation, and specialty care that aren't available outside the VA."

Working within the VA system allows for nearly seamless transitions from outpatient to inpatient care. "I can always get in touch with a patient's primary care physician or specialist to ensure transitions are as safe and smooth as possible," she said. "I rarely spend time on the phone with insurance companies—instead, I have more time at the bedside or to engage with my team's chalk talks."

For learners, a group of academic clinicians is committed to creating an exceptional and supportive learning environment for learners of all levels. "Our group encourages us to engage meaningfully in order to bring up the next generation of physicians and we're empowered to construct learning environments and experiences that will challenge and prepare them to be future healthcare leaders."

Dr. Mann's team of clinicians, educators, and leaders inspire her to continue to grow and learn. "I'm often blown away by all that they do, and I get to align with them in our shared values of service, outstanding patient care, lifelong learning, and meaningful interpersonal connections," she said.

An outstanding educational opportunity

During his internal medicine/pediatrics residency and chief residency year, Paul M. Shaniuk (@pshaniuk), MD, director of inpatient medical services in the department of acute care internal medicine at the VA Northeast Ohio Healthcare System in Cleveland, an academic VA hospital with approximately 180 acute-care beds, had rotations at a VA. "I was drawn to the enriching educational environment," he said. "My clinical rotations were challenging and rewarding, and the faculty were kind, supportive, and innovative."

Dr. Shaniuk

Dr. Shaniuk was thrilled to land a job at a VA after residency. "Working with veterans is deeply meaningful," he said. "Providing high-quality healthcare to those who served our country is a privilege; I take pride in being able to give back to veterans."

"The VHA is a mission-based organization, trying not just to live by the I-CARE values (integrity, commitment, advocacy, respect, and excellence), but also to fulfill President Lincoln's promise to 'care for those who have borne the battle.' Our North Star in everything we do is to care for veterans."

One difference between working at a VA compared to community hospitals is that some patients have service-connected conditions, so Dr. Shaniuk has learned about the health consequences of Agent Orange exposure and post-traumatic stress disorder, for example.

Balancing the academic mission with the essential work of patient care can be a challenge, although not one unique to the VA, Dr. Shaniuk said. VA academic physicians have the advantage of leveraging relationships with local medical schools and graduate-medical-education programs to open doors for academic career growth. A difference related to patient care is that the physician payment system is based on hours or salary, rather than a strict relative value units (RVU) requirement.

Many tangible benefits to working within the federal healthcare system exist, Dr. Shaniuk said. Patients have access to affordable medications and resources that they might not have otherwise. "I rarely need to negotiate with insurance companies, which allows me to focus more directly on patient care," he said.

The VA's ability to negotiate with pharmaceutical companies to ensure access to affordable medications is an amazing benefit. "I can skip the prior authorization process in most instances and work directly with pharmacy colleagues," Dr. Shaniuk said. In addition, the VA works hard to ensure that patients' social determinants of health are factored into their care.

The perfect place for research

Like many physicians, Charlie Wray (@Wray-Charles), DO, MS, SFHM, associate professor at the University of California, San Francisco, and the San Francisco VA Health Care System, a 200-bed veterans' hospital, completed much of his residency training at a VA hospital.

Dr. Wray

"This early exposure to the VA healthcare system was extremely influential in my decision to pursue a career at the VA," Dr. Wray said. "VA providers work with unique and special patient populations—the men and women who served in our nation's military."

As a young health services researcher, Dr. Wray immediately recognized additional benefits to working as a scientist in the country's largest integrated healthcare system. He had access to clinical, social, and systems data, most of which wasn't available elsewhere. "All of these perks made the decision to start my career as a VA hospitalist a no-brainer," he said.

"The VA offers an incredible number of opportunities regardless of your extra-clinical pursuits," Dr. Wray said. "I split my time as a hospitalist and health services researcher; the VA is unparalleled when it comes to accessing data for my research."

Another difference between community and academic hospitals compared to VA hospitals is that the VA offers care beyond a veteran's physical ailments and works to improve veterans' lives beyond a clinic or hospital. For example, they provide iPads to veterans who live far away so they can engage with practitioners through telehealth. "As a provider, it's extremely rewarding and gratifying to have your healthcare system go above and beyond what other systems do," he said.

The biggest challenge of working at a VA hospital is getting used to government bureaucracies, Dr. Wray said. "At first, the hoops you have to jump through to get something done can be frustrating," he said. "Over time, though, you get a better feel for how the system works and how to expedite certain things so patients can get the care they need."

Many VA hospitals are affiliated with teaching institutions, which opens up opportunities to teach and educate future physicians. Leadership and administrative pathways are available as well. "With a little bit of mentorship and guidance, you can easily carve out a career that's right for you at the VA," Dr. Wray added. "The opportunities to grow beyond clinical medicine are unrivaled."

Dr. Wray feels fortunate that his hospital is affiliated with a teaching center (University of California, San Francisco) which allows him to practice and teach medical students and residents. "The combination of having smart, energetic learners along with the opportunity to care for veterans makes the San Francisco VA a special place to practice medicine," he said.

Dr. Wray's colleagues add to the enjoyment of his job. "They are some of the brightest, most kind individuals I've ever worked with," he said. "Their humility, kindness, and hard work make my daily life at the VA wonderful." ■

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 a newspaper and magazine editor.

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SIG Spotlight: Hospital Medicine Innovation and Entrepreneurship

Sharing the pearls and pitfalls of bringing an idea to fruition

By Richard Quinn

Medical schools teach a lot of material in a short time, and residencies and fellowships help round out the training that makes hospitalists good at what they do. But nowhere in that learning curve do doctors or others get training on how to secure private equity funding, how to manage start-up burn rates, or how to commercialize an idea for a medical device.

That's why Thomas Barrett, MD, MCR, FACP, SFHM, launched the Hospital Medicine Innovation and Entrepreneurship Special Interest Group (SIG) in February 2023. Dr. Barrett, a hospitalist in the VA Portland Healthcare System and an associate professor in the division of hospital medicine at Oregon Health and Science University in Portland, has spent the past four years working on SHM's annual "Shark Tank"-style competition at Converge.

Dr. Barrett

He's also spun out two biotechnology companies—so he sees innovation from both sides of the equation.

"As many biotech companies go, the technology was not robust enough, so we couldn't really make a product," Dr. Barrett said. "It took me quite a few years to figure that out. We probably spent seven years trying to make a product after 10-plus years of doing research. But it was very educational. I had investors, etc. But I had to walk away because the technology didn't work."

Dr. Barrett, who teaches a course on biotech innovation and entrepreneurship, says that innovation is a natural outgrowth of patient care. Hospitalists and others all see the inner workings of the healthcare system and have ideas on how to improve processes, procedures, and protocols.

"We all have these ideas of how can we improve care or help our patients," he said. "So, you have to commercialize that. You have to turn your idea into a product or service that gets to the patient at the bedside."

In the world of entrepreneurship, "the valley of death" is the period of time before an idea—even the best one—makes enough money to be commercially viable.

"The thing about a lot of medicine is you have to go through the U.S. Federal Drug Administration (FDA), which makes it a very high burden," Dr. Barrett said. "And for that reason, a lot of funders don't like to fund anything that has to go through the FDA. It's kind of a niche area. So, for medical products that go through the FDA, that's years. You're in the red, you're losing money for years. You have to survive that valley of death to get to the point where you're feasible, and you get real funding and make a product."

While the SIG isn't a plug-and-play solution for every idea, it's a place to share pearls and pitfalls on how to give the best ideas the best chance at making it. First up, funding is just one piece of the puzzle.

"If you're starting a company, if you're a founder, you need to surround yourself with a team," Dr. Barrett said. "My passion is helping people form teams, so if you have an interest as a hospitalist or anyone else, it's very important to work with technology people and folks like that. You can't succeed if you don't understand how to take care of a patient. And the technology people don't get that. And certainly, as a physician, we don't have a lot of background in engineering or IT, so obviously we need them. The teams are the big thing."

Perhaps one of the best lessons the SIG teaches is the necessity of falling on one's face before figuring things out.

"In entrepreneurship, failure is absolutely needed, and you can't succeed without it," Dr. Barrett said. "In large organizations, especially, failure is an n of one and your career is over. Culturally, they are opposites. If you want to get into entrepreneurship, that's a very important difference."

Take the U.S. National Science Foundation's Innovation Corps, or I-Corps, as it's known in the industry. The program bills itself as "an immersive, entrepreneurial training program that facilitates the transformation of invention to impact".

"It's just a way to frame things like customer discovery, business model canvas, and mission model canvas," Dr. Barrett said. "The whole idea there is that you get out of the building and talk to actual customers and all these different segments to understand if the market actually wants what you have.

"And that's usually the biggest problem. There are tons of stories of people who spend five or 10 years in a lab working on this great idea. Then they finally get out and talk to people, and they find out, boy, no one wants what I'm working on. But then they hear a consistent theme, and they discover, they tell me they want this, and I can do this, so it's important to understand the whole process." ■

Richard Quinn is a freelance writer in New Jersey.

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Chapter Spotlight: Nebraska

Focusing on more than medicine

By Richard Quinn

Mohammed Zalabani, MD, FHM, had just stepped away from a directorship role and was looking for less leadership responsibility and more time with "my kids and my family and my house and my wife."

But leaders lead, and when he was asked by a former president of SHM's Nebraska chapter to get involved, what do you think happened? He joined in a lesser board seat and quickly took the reins.

Dr. Zalabani

"From there on, it was a fun experience," said Dr. Zalabani, a hospitalist at CHI Creighton Bergan Mercy Hospital in Omaha, Neb. "I enjoyed being a part of that team. I continued in that role for about three years. And then right around the end of 2023, I believe, the president asked if any of us were interested, and I voiced interest, so I became the president-elect starting this year."

The Nebraska chapter won a Platinum Award in 2023, so it seems fair to say the effort is working. Part of Dr. Zalabani's approach, in common with the chapter's executive board, is to focus on more than just medicine.

"Our themes have been more life-themed events rather than core medical educational events, if that makes sense," he said. "For instance, our first meeting was all about burnout, how to find a work-life balance, and how to find your inner self.

"For us to balance academia versus the social aspect, our next meeting is going to be … one for poster presentation. Someone gets to go to SHM Converge and submit their own abstract—that's kind of the theme we keep trying to maintain. We're not here to take away from your families, but we're here to bring some fun into your work life."

It works, as the focus on well-being "struck a lot of chords."

"Everybody felt the value of the talk itself, and I think it was very powerful from that aspect," Dr. Zalabani said. "Our attendance rate was very high. Everybody seemed to feel that this was, yes, they're talking to me. That is what I can relate to. This is what I'm going through every day. Your voice is being heard."

When he tries to sell the chapter to newcomers, Dr. Zalabani notes that he didn't know what to expect when joining himself.

"Part of being a part of it was the dinners, the talks, the meeting new people, getting to see the different hospitalists within my community that I had no way of overlapping with," he said. "That part was enjoyable. And I got to see people from my work outside of a work environment, and that was enjoyable. And then we got to go to different places and different restaurants and different events and different menus.

"The whole experience, to me, feels more like social than work, which is why I enjoyed it. It was almost a bridge from social life to work life. My goal from there was to keep that vibe going and keep that growing so it becomes more of a community rather than a job."

Dr. Zalabani says being a statewide chapter can be its own challenge, as the group has to cover the largest centers—Omaha and Lincoln—while providing options for more rural hospitalists.

"There are hurdles you run into when you go into more rural areas where there isn't as much contact because of the sheer number," he said. "We try to include them. That's why a lot of our meetings have a Zoom option, too. Virtual involvement is something else we try to do for our people who cannot physically be around.

"It's certainly more challenging than the local providers to get involved and be engaged … but we have had some initiatives in order for us to do one of our next events somewhere more rural, or midway, to try to engage those people."

Dr. Zalabani sees efficiency as the chapter's future path.

"I'm trying to get it to the point where everything is streamlined. We just held a conference, like a pure ultrasound conference," he said. "My goal is for us to find a way, in terms of also our leadership team, to each find their niche where the work is just natural because these are their skillsets.

"Say, for example, I need someone to be my venue planner. I don't even need to tell them. I'm like, hey, our next meeting is X date, so I know that person is in charge of venue and event planning. And I have another person who is responsible for the marketing and awareness and all that. That person can be that. Another could be the researcher of topics. So, my goal is to find a way for everything to be streamlined so it is as stress-free as possible."

Then, maybe, Dr. Zalabani can step down from the chapter and let the next chapter president take over.

Maybe even relax?

"Until I find my next work to do," he joked. ■

Richard Quinn is a freelance writer in New Jersey.

Lessons from an Astronaut

Recap of PHM plenary session presented by Lieutenant Colonel Jasmin Moghbeli

ANDREI ARKHAGOV - STOCK.ADOBE.COM

Summary by Rachel Peterson, MD

On May 25, 2017, a call came up on Jasmin Moghbeli's phone from a Houston, Texas number which would change the course of her life. That call was from the National Aeronautics and Space Administration (NASA), inviting Moghbeli to join their next team of astronauts. Moghbeli recalled that, after accepting the offer and hanging up, she struggled to dial the phone to tell her parents because her hands were shaking.

Moghbeli was born in Germany to Iranian parents who left during the revolution. She was raised in the U.S. She grew up loving math and science and went to undergraduate school at Massachusetts Institute of Technology, where she states she first experienced failure in a meaningful way.

She later joined the Marine Corps, where she first realized she was a woman in a man's world. This was followed by two years of Astronaut Candidate Train-

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ing, where she learned about the ins and outs of the space station and how to be an astronaut. She mentioned that her road was not an entirely smooth one toward becoming an astronaut, but she believes her journey prepared her for her experience on the International Space Station. Moghbeli shared words of wisdom with hundreds of physicians at the Pediatric Hospital Medicine Conference 2024 in Minneapolis and drew parallels between the experience of astronauts and that of hospitalists.

Managing imposter syndrome

Our life experiences shape who we are. One individual's experience is going to be completely different from another person's. When Moghbeli was younger, she thought that because her perspective was different, that meant it was wrong and so would not speak up.

Over time, she started to realize that someone with a different perspective is valuable. Moghbeli also shared that during her 199 days on the International Space Station, she worked with 21 different people from 10 different countries on one of the most diverse teams ever assembled. If you have 50 people who are all alike approach the same problem, they will be limited. But if you have 50 very different people come together, their solutions are going to be diverse because of their varied experiences and perspectives.

Key Points

- Experiencing meaningful failure can be an important step in how we are shaped and our ability to be resilient.
- Human connection is improved through one-on-one conversations and the ability to see each other and hear each other as individuals.
- Great leaders know the people they are serving, create a safe and inclusive environment, and really care about each individual on their team.

Becoming a leader

Leadership is all about people. To be a good leader, you have to know the people you are leading, what drives them, and what makes them tick. The role of a leader is to create a safe and inclusive environment for your team: to really care about each and every one of them. When you can know them, care for them, and foster a great environment, your team will do anything for you.

Moghbeli also mentioned that when she initially signed up to be an astronaut, she was single and had no kids. She realized after marrying her husband that each person has a whole community behind them supporting what they are doing. Working with your support system, and being honest with them and yourself, helps you learn what next steps you take and how to approach obstacles together.

Dealing with uncertainty

Some of the hardest times in Moghbeli's life were when she had an expectation that didn't pan out the way she expected.

Moghbeli shares that she tries to frame her mindset so she can be okay with any outcome that might arise. This can be hard to do, but Moghbeli said that she can reflect and say that there have been times when she wanted one thing that didn't work out, but the result ended up being the best thing for her. She related that this doesn't mean closing the door on her dreams but trying to be present in the moment she was in and find joy in that moment, not just the future goal.

Be great at failing

If you try to do something meaningful, at some point along the way you will fail. You have to ask yourself when you fail if that thing you are aiming for is important enough. If it is, then you have to keep trying.

Moghbeli admitted that she failed many times throughout every step of her training toward becoming an astronaut. She shared that because of each of those failures, she is now "great at failing!" That experience has now bolstered her ability to be resilient.

Recognizing and overcoming burnout

Training to be an astronaut takes hours spread out over weeks to months and you can't take a break for even a second or you may miss something vital to you or your team's survival. This resulted in many weeks of working incredibly hard before going to the International Space Station. Once she arrived, she diligently communicated with the team there and on the ground about the necessity for breaks. Moghbeli and her team took breaks when they were scheduled and used them for true rest. She said that the burnout hit hardest when they landed back on Earth. She had expected a break but a lot of tests and debriefs were needed. She states that she worked hard to set boundaries for herself. She turned down things that were important or would tell her team a future time that she could do what they were asking.

Improving peace and unity on earth

Actual human connection is so important. Moghbeli shared her perspective that social media results in people acting differently than they would if those individuals were sitting down together. Unity is a problem that can't be solved at a mass level. It must be solved via individual human connections. Moghbeli described how, when "don't ask, don't tell" was repealed, many individuals learned new things about team members they had worked with for years. But because of the relationships that Marines had built, it wasn't hard for them to come together and support each other, because they knew and cared about one another. Moghbeli said that a similar approach can be used to address doubters. Engaging with large groups isn't worth the effort, but true learning and change come in those one-on-one conversations you have. Space is one of the only places where many nations come together—a testament to what we can do when we work cooperatively. When you look down at the Earth from the International Space Station, you realize what a gift our planet is and how connected we all are. Now, when Moghbeli walks around outside, she notices the trees, the flowers, the sky, and the birds with a new set of eyes.

"We have a pretty spectacular view from down here too," she said. ■

Top 10 Articles of PHM Literature, 2024

As presented at the Pediatric Hospital Medicine conference

By Lyubina Yankova, MD, Vignesh Doraiswamy, MD, and Eric Zwemer, MD

Every year at the Pediatric Hospital Medicine (PHM) conference, the top 10 publications from the PHM literature are selected and presented. This year, we aimed to cover a variety of domains including community PHM, quality improvement, health equity, medical education, newborn hospital medicine, and general PHM. Our selection criteria were based on a previously published top 10 selection process which filtered articles based on the following four questions[1]:

1. Is it research?
2. Is it relevant to pediatrics?
3. Is it relevant to hospital medicine?
4. Is it potentially impactful and/or practice-changing

Using systematic review software,[2] we broadly screened 11,589 abstracts from 21 journals from August 1, 2023, to July 1, 2024, screened 289 abstracts, and reviewed 124 full-text articles to select the final papers. The remaining top 10 were chosen by three-person agreement to cover the wide diversity of scholarship within the PHM field.

In this update, we summarize four of the top 10 articles in depth presented at the PHM 2024 conference in Minneapolis.

Discontinuation of car seat tolerance screening and post-discharge adverse outcomes in infants born preterm

Braun D, Kaempf JW, et al.
J Pediatr. 2023;261:113577.
doi:10.1016/j.jpeds.2023.113577

Background: Car seat tolerance tests were initially recommended by the American Academy of Pediatrics as a practical method for assessing safety in the transportation of preterm infants.[3] However, the evidence behind this recommendation was at the time, and is currently, lacking. In the Kaiser Permanente Southern California system, car seat tests were discontinued in 2016. They aimed to measure the rate of adverse post-discharge events after this discontinuation.

Findings: This was a retrospective cohort study of 41,264 infants born at less than 37 weeks gestational age in the Kaiser system between January 2010 and December 2021. Their primary outcome measure was a composite score of deaths, 911-triggered transports, and hospital admissions for a brief resolved unexplained event, respiratory disorder, or apnea within 30 days of discharge. This included infants who were admitted to the neonatal intensive care unit (50% of them). The composite outcome was present in 1.04% of infants before the discontinuation of testing and 1.06% afterward (adjusted odds ratio=0.94 [0.72 to 1.22], *P*=0.63).

Practice implications: Car seat tests do not accomplish what we hoped. They do not pick up future clinically significant respiratory events, and therefore their routine use for preterm infants is questionable. Discontinuation of routine car-seat tolerance testing for preterm infants may also potentially decrease the length of stay.

Ultrasound-assisted lumbar punctures in children: an updated systematic review with meta-analysis

Cwiek A, Kolodziej M.
Hosp Pediatr. 2024;14(3):209-215.

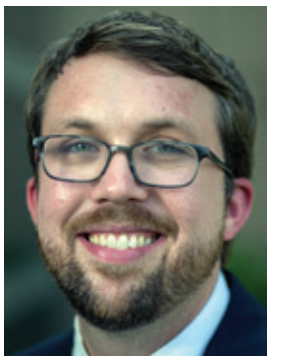
Background: Lumbar punctures (LPs) are a common procedure in the inpatient pediatric setting. Failure to obtain sufficient and atraumatic cerebrospinal fluid frequently results in diagnostic ambiguity and usually the need to reattempt the procedure.[4] Point of care ultrasound (POCUS) provides an opportunity for greater accuracy in obtaining LPs.[5] This review aimed to compare the success rate of standard methods of performing LPs with POCUS-assisted LPs.

Findings: This was a systematic review with meta-analysis of seven randomized controlled trials comparing standard versus POCUS-assisted LPs. Their primary outcome was the first-attempt success rate. Included studies took place in four different countries, with sample sizes ranging from 26 to 166, median age from 24 days to 8.5 years, and sonographer experience from medical students to attendings. The definition of successful LP differed among studies. The rates of first-attempt success, traumatic LP, and failure were as follows for POCUS-assisted versus standard: 72.0% versus 59.6%; 11.9% versus 22.7%; and 6.7% versus 14.9%, respectively. The mean time of procedure duration was similar.

Practice implications: POCUS-assisted LPs improve the first attempt success rate while also decreasing the rates of failure and traumatic procedures, without significantly increasing the duration of the procedure. The future incorporation of POCUS for LPs as the standard of care has the potential to limit pain and the need for repeat procedures in all pediatric patients.

Dr. Yankova

Dr. Doraiswamy



Dr. Zwemer

Dr. Yankova is a second-year pediatric hospital medicine fellow at Yale Children's Hospital in New Haven, Conn. Dr. Doraiswamy is a pediatric hospitalist, medicine hospitalist, and assistant professor at Nationwide Children's Hospital and The Ohio State University Wexner Medical Center in Columbus, Ohio, associate program director for the med-peds residency program, and the director of the med-peds track for the PHM fellowship. Dr. Zwemer is a pediatric hospitalist and professor at the University of North Carolina (UNC) Children's Hospital in Chapel Hill, N.C., and associate chair for faculty affairs in education and associate program director for the UNC pediatrics residency.

Midline compared with peripheral intravenous catheters for therapy of 4 days or longer in pediatric patients: a randomized clinical trial

Kleidon TM, Gibson V, et al.
JAMA Pediatr. 2023;177(11):1132-1140.

Background: Midline catheters (MC) are longer peripheral intravenous catheters (PIVC) that terminate in the axillary vein, never entering the thoracic cavity. In adults, MCs are shown to prevent the need for central catheters, reduce catheter-associated bloodstream infections, and have a longer dwell time and lower failure rate compared to PIVCs.[6] In this study, a randomized clinical trial was performed to compare performance characteristics between MCs and PIVCs in pediatric patients.

Findings: A randomized clinical trial was performed at one hospital in Australia from July 2020 to May 2022. 127 patients (2 to 13 years of age) with a known need for at least four days of IV therapy were included, with 65 randomized to receive a PIVC and 62 to an MC. The primary outcome measured was all-cause device failure rate, defined as cessation of function prior to completion of the intravenous medication course. PIVCs failed 46.2% of the time compared to 16.1% in the MC group (odds ratio, 0.22; 95% confidence interval, 0.1 to 0.52; *P* <0.001). MCs were also associated with fewer insertion attempts, an increased dwell time, greater parent and patient satisfaction, and lower healthcare costs.

Practice implications: This article highlights the superiority of MCs compared to PIVCs in dwell time and failure rate. Although there continues to be more emerging evidence for shorter intravenous courses of antibiotics, there remains a need for sustainable access for medication administration and laboratory draws while patients remain in the hospital.[7] MCs provide an opportunity to decrease resource utilization and limit pain and anxiety for patients while maintaining a safety profile that reduces the frequency of infections when compared to peripherally inserted central catheters.[8]

Pediatric utilization of methicillin-resistant staphylococcus aureus nasal swabs for antimicrobial stewardship

Braga S, Rajapakse N, et al.
Pediatr Infect Dis J.
2023;42(12):e466-e469.

Background: With the increase in community prevalence of methicillin-resistant *Staphylococcus aureus* (MRSA), it is no longer enough to rely on risk factors when determining antibiotic coverage for both community and hospital-acquired infections.[9] In adults, MRSA nasal swabs have shown a high negative predictive value (NPV) for MRSA pneumonia; however, this had previously not been studied in children.[10] This study aimed to measure the performance characteristics of MRSA nasal swabs for pediatric infections.

Findings: In this single-center, retrospective, cohort study of 172 pediatric patients hospitalized for presumed infections, MRSA nasal swab cultures were obtained along with a culture of the infection site. MRSA positivity for nasal swabs and infection site cultures were both about 6%. The NPV for all infections was 95% (95% confidence interval, 90% to 98%) and was above 90% individually for skin and soft tissue infections, bone and joint infections, and lower respiratory tract infections.

Practice implications: MRSA

nasal swabs have a high NPV for MRSA infections, particularly lower respiratory tract infections. A negative MRSA nasal swab can help inform the decision to de-escalate MRSA-specific antibiotics.

Remaining top-10 articles

Allan JM, Black E, et al. Gender communication differences on a pediatric provider listserv. *Hosp Pediatr*. 2024;14(7):514-519.

This qualitative study found that hospitalists perceived to identify as women contribute disproportionately fewer posts to the American Academy of Pediatrics Section on Hospital Medicine listserv than men. Overall, almost 10% of posts were coded as adversarial. The study provides an opportunity for improvement in reestablishing the listserv as a safe space.

Byrd C, Noelck M, et al. Multicenter quality collaborative to reduce overuse of high-flow nasal cannula in bronchiolitis. *Pediatrics*. 2024;153(5):e2023063509. doi: 10.1542/peds.2023-063509.

This multicenter quality improvement study provided toolkits for two methods in decreasing high-flow nasal cannula (HFNC) use: a pause before starting or an HFNC holiday, once initiated. The pause resulted in a relative reduction of HFNC use of 32% and the holiday method reduced its use by 28%, with no increase in length of stay or clinical deterioration events in either method.

Cahill C, Jegatheesan P, et al. Implementing higher phototherapy thresholds for jaundice in healthy infants 35 plus weeks. *Hosp Pediatr*. 2023;13(9):857-864.

This quality improvement study decreased the rate of phototherapy using higher thresholds for the light level. Balancing measures such as readmission rate and rate of infants reaching critical levels of bilirubin were unaffected.

Carozza RB, Mohanty D, et al. Paroxysmal sympathetic hyperactivity: development of a pediatric clinical practice guideline. *Hosp Pediatr*. 2023;13(12):e402-e410.

This is the first guideline published for the approach to paroxysmal sympathetic hyperactivity symptoms, suggesting a focus on nonpharmacologic approaches first and targeted pharmacotherapy to the patient's predominant symptoms.

Carroll AR, Johnson JA, et al. Health literacy-informed communication to reduce discharge medication errors in hospitalized children: a randomized clinical trial. *JAMA Netw Open*. 2024;7(1):e2350969. doi: 10.1001/jamanetworkopen.2023.50969.

This randomized clinical trial compared standard medication administration counseling at discharge with a health-literacy-informed toolkit that improved medication administration errors by caregivers. The toolkit included pictograms, teach-back, and demonstration with show-back.

Mahoney D, Pavitt S, et al. We've got a new one-exploring the resident-fellow new admission interaction and opportunities for enhancing motivation. *Acad Pediatr*. 2024;24(4):692-699.

In this qualitative study, resident and fellow focus groups described an optimal interaction surrounding the admission process that promoted intrinsic motivation and patient safety. Takeaways can be applied to other supervisor-learner relationships as well. ■

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