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Diagnostic disparities and strategies for enhancing diagnostic equity in hospital medicine

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INTRODUCTION

An estimated 800,000 patients each year experience serious harm because of a delayed, missed or incorrect diagnosis, a substantial proportion within hospital medicine.¹⁻³ These diagnostic adverse events disproportionately affect patients of marginalized populations based on race, ethnicity, language, sexual orientation, gender identity, age, ability, socioeconomic status, geography, and a multitude of other factors. A number of traditional acute care diagnoses, including cardiac ischemia and pediatric appendicitis, and comorbidities frequently seen in hospitalized patients are known to have diagnostic disparities based on race and/or ethnicity.⁴⁻⁷ Disparities in diagnosis have long been tolerated within medicine, but as the diagnostic safety field evolves, hospitalists should understand causes of disproportionate missed and delayed diagnoses and identify potential interventions.

Hospitalization represents only one part of a diagnostic journey. Nonetheless, health equity and the influence of social determinants of health are within the locus of control of hospitalists and their hospital partners, and governing bodies agree. The Centers for Medicare and Medicaid Services (CMS) has incorporated health-equity measures into the Hospital Inpatient Quality Reporting 2023 program including commitment to health equity and collection, analysis, and action upon health-related social needs. Although these are not directly related to diagnosis, hospital diagnostic metrics are in development, and potential future accountability for diagnostic equity cannot be dismissed.

In this piece, we aim to create a framework for understanding and evaluating inequity within hospital-based diagnosis and to describe key strategies for beginning the work to achieve equity within diagnosis.

FRAMEWORK FOR INEQUITY IN HOSPITAL-BASED DIAGNOSIS

Healthcare equity is the equitable experience and care within the healthcare system and is a component of achieving the ultimate aim of health equity, an equal opportunity for all people to be as healthy as possible. A lack of equitable outcomes in diagnosis is a product of inequities throughout the diagnostic process. The National Academies "Improving Diagnosis in Healthcare" described the approach to the diagnosis—beginning with access or engagement with care before entering an iterative process of information gathering, interpretation and integration, and concluding with transitions of care with treatment/outcome.⁸ We have modified this image in Figure 1 to demonstrate potential inequities within this process shares alignment with other proposed models for evaluating inequity.⁹ This approach allows structural, institutional, and interpersonal biases to be analyzed.

Patient engagement with the healthcare system

Patient engagement with acute care may be impacted by insurance status, transportation availability, and hospital geographic distribution.¹⁰ Once at the hospital, vulnerable populations may have differential access to advanced diagnostic capabilities as hospitals that care for a large number of minority patients often have less funding, resources, and lower quality of care.^{11,12} Even within a given well-resourced hospital, minority patients may experience less access to specialized care. One single center study identified that Black and

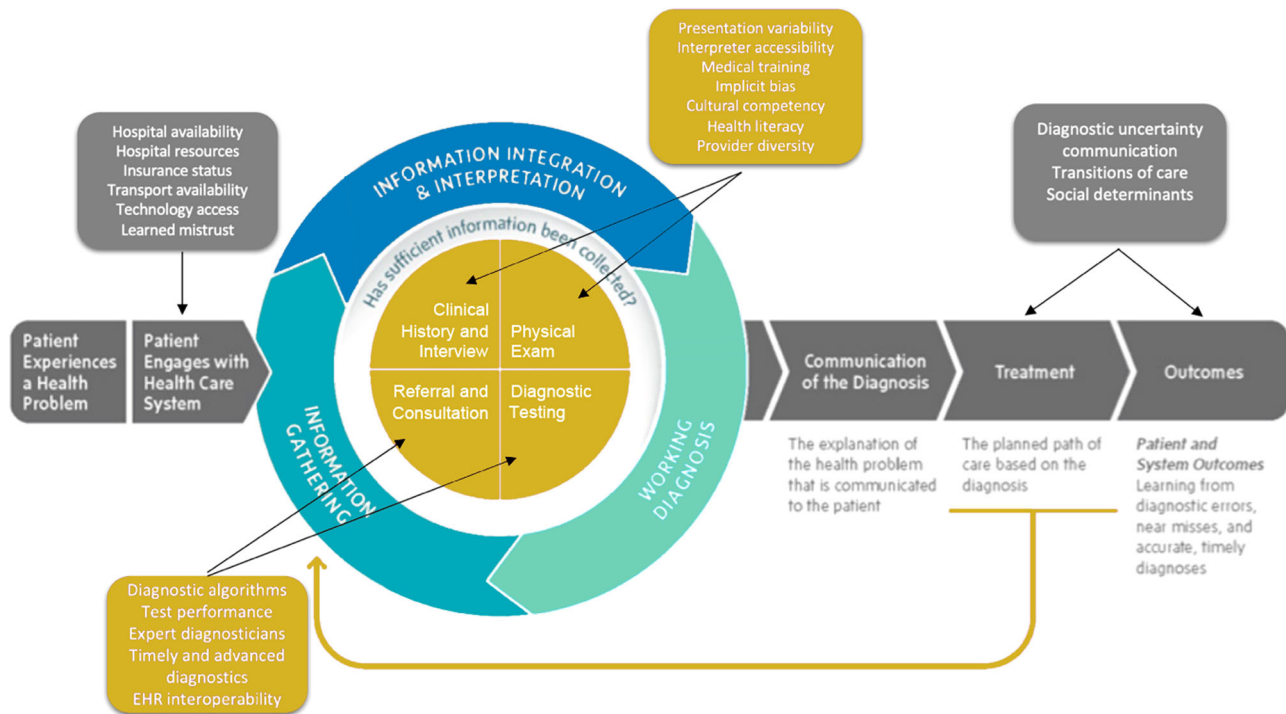


FIGURE 1 Equity considerations within the NASEM Diagnostic Process.⁸ Permission to reprint with minimal modification obtained from the National Academies (Request ID 600159424).

Latinx patients were less likely to be admitted to a cardiology service for heart failure care, despite evidence that such services are associated with lower readmission and mortality rates.¹³ Furthermore, while patients may be able to access emergency or acute care services at a given institution, ambulatory primary care or specialty services at transition of care may then be limited.

Clinical history and interview

The patient–provider encounter may be influenced by historic mistrust, lack of patient–provider racial or language concordance, differential health literacy, and provider implicit bias.¹⁴ These factors influence the collaboration needed in diagnosis to characterize symptoms, validate disease experience, and understand patient diagnostic goals.

Presentation variability and bias within medical training may negatively impact clinical reasoning. Illness scripts taught in training often reflect the centering of white male patients. Myocardial infarction, as a classic example, is less likely to present with chest pain in females and more likely to present at a younger age in Black men contributing to misdiagnosis among these populations.

Diagnostic testing and interpretation

Race, due to inaccurate causal inferences, has erroneously been utilized to influence interpretation of a multitude of diagnostic tests including kidney and lung function, thereby delaying diagnosis among

minority populations.¹⁵ These race-adjusted calculations have been discontinued at many, though not all, sites.

Diagnostic test performance may vary by race or ethnicity. Study of pulse oximetry among patients with COVID-19 demonstrated an under-estimation of hypoxemia among patients of racial and ethnic minority groups, potentially delaying diagnosis of acute hypoxemic respiratory failure.¹⁶

Communication of the diagnosis and outcomes at discharge

The handoff from the inpatient-outpatient setting is a high-risk time for medical error, and patients face disparate socioenvironmental and system barriers to ongoing disease management. Discharges with diagnostic uncertainty often include self-monitoring, pending or further testing, and early provider follow-up. The most vulnerable patients may have lower health agency, access, and resources to manage this diagnostic process as an outpatient.

EMBEDDING EQUITY: STRATEGIES FOR ADVANCING DIAGNOSTIC EQUITY

Our understanding of equity within diagnosis has been limited by the lack of measurements of diagnostic accuracy, making it difficult to determine whether outcome differences are attributable to delayed diagnosis or differential management. The diagnostic safety field is

still nascent, but hospitalists and organizations can take actionable steps to identify disparities and improve equity in diagnosis. These interventions target the health equity domains of access, quality, and transitions of care and can be implemented at both the individual hospitalist level and hospitalist leadership level.

Individual hospitalists

Practicing hospitalists should utilize strategies to achieve excellence in diagnosis, including seeking and obtaining feedback on diagnoses, recognizing diagnostic uncertainty, and utilizing team-based strategies such as diagnostic time-outs. These strategies emphasize de-biasing clinician's cognitive processes to avert errors. Combining these strategies with measures to combat implicit bias may help hospitalists avoid cognitive errors that disproportionately affect diagnosis in marginalized patients. These can include training in recognizing clinician's own implicit biases, as well as taking steps to eliminate the use of stigmatizing language in patient charts.¹⁷

Hospitalists should standardize another key patient safety step—using professional interpreters in interactions with patients with non-English language preference. The use of professional interpreters (compared to informal interpreters, such as family or untrained staff) has been shown to reduce communication errors with patients.¹⁸ While there is no definitive evidence linking professional interpreter use to improved diagnostic safety, it is plausible that the communication benefits should reduce the risk of error in history-taking and patient assessment.

Hospitalist leadership

As with all patient safety problems, diagnostic errors are primarily driven by systematic and institutional failures rather than individual clinician's errors. Hospitalist leadership should implement strategies to identify and address upstream issues that may contribute to diagnostic inequities. These strategies include improving the diversity of the hospitalist workforce, integrating equity principles into diagnostic safety efforts, advocating for individual patients and populations at risk for diagnostic error, and thoughtfully integrating novel diagnostic technologies to address (and not worsen) biases.

Hospital medicine, similar to the entire medical profession, lacks diversity. Among hospitalist group leaders, 63.9% identified as White or Asian and only 4.7% identified as Black.¹⁹ While recent data on the overall demographics of the hospitalist workforce is lacking, it is likely that the composition of most hospitalist groups differs from the patient population they serve. Patients perceive improved communication and patient experience when cared for by demographically concordant clinicians.²⁰ Hospitalist leaders should examine their hiring practices to prioritize recruitment of physicians and advanced practice providers from historically underrepresented groups and

those who have additional skills (such as language fluency) that can aid in providing culturally concordant care.

Most hospitalist groups already maintain robust quality improvement and patient safety programs, and it is imperative that existing quality and safety metrics be stratified to evaluate for disparities. Although existing metrics may not be explicitly diagnosis-focused, these metrics may offer diagnostic quality revelations. One single center retrospective cohort study identified increased sepsis mortality among patients with non-English language preference, prompting further institutional investigation into whether that outcome resulted from delayed diagnosis or management gaps.²¹ As the diagnostic safety field advances, novel diagnostic metrics represent an opportunity to create new measures that are proactive, translatable, and allow for comparison. For example, a site with racial gaps in cardiovascular outcomes could ensure equitable access to advanced diagnostics by measuring the rate at which Black patients receive appropriate coronary computed tomographic angiography or functional stress testing for intermediate-risk acute chest pain relative to their white counterparts. A site interested in exploring implicit bias impact on inappropriate diagnostic utilization may evaluate disparate use of urinary toxicology by race/ethnicity.²²

Interventions to improve diagnostic quality should be designed with the most vulnerable populations in mind and engaged.²³ Too often, patient safety programs are designed for the majority without considering the needs of marginalized populations. The principle of targeted universalism should be used to develop programs that seek to improve care for all patients while designing focused interventions for the highest need patients.²⁴ As a starting point, hospitalists should integrate equity principles into diagnostic error reviews, ensuring that potential inequities are captured as part of the review process and used to inform improvement efforts.²⁵ Hospitalist patient safety leaders should partner with patient and family advisory councils to ensure they reflect the diversity of the patient population and that they are effectively integrated into diagnostic safety programs.

Decision support systems, based on artificial intelligence, are likely to be a major source of innovation in diagnostic safety. Hospitalists, particularly those with informatics experience, will likely be the point people for integrating AI-based diagnostic aids into routine practice. While these tools hold great promise for improving diagnostic accuracy, early data has also demonstrated the potential for AI to perpetuate biases toward marginalized patients.²⁶ As AI becomes more widely used within health care, it will be critical for hospitalist leaders to understand the benefits and risks inherent in AI-based diagnostic decision support and to ensure that there is a plan for ongoing monitoring of disparate impact on diverse populations, to avoid perpetuating or even worsening diagnostic disparities.

Finally, both individual hospitalists and hospitalist leaders must advocate for diagnostic equity. At the individual patient and clinician level, the need to ensure an accurate diagnosis may conflict with other priorities (such as hospital throughput). Hospitalist leaders should use data from adverse event reviews and information from frontline clinicians to advocate with organizational leadership to ensure all patients have equal access to diagnostics and ensure that patients who are

diagnostically challenging can receive timely consultation or referral to a tertiary or quaternary facility when necessary.

CONCLUSION

Diagnostic accuracy among hospitalized adults impacts vulnerable patient populations disparately due to factors related to access to care, patient–provider interaction, diagnostic testing, and transitions of care. Although evidence is still emerging and high-quality research is needed, there are concrete steps that individual hospitalists and organizations can take to address cognitive and structural biases that may lead to diagnostic errors. As diagnosticians on the frontline of healthcare delivery, hospitalists can and should be leaders in improving equity in diagnosis.

CONFLICT OF INTEREST STATEMENT

Drs. Katie E. Raffel and Sumant R. Ranji have received payments for their contributions to articles on UpToDate. Dr. Esteban F. Gershanik has stock or equity ownership in Amgen Inc, Eli Lilly and Company, Johnson & Johnson, and Pfizer Inc.

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