

The Path To Diagnostic Excellence And Patient Safety: Fostering Team Collaboration

**Zainah Nasser AlQahtani¹, Hala Faleh Alqruaini², Faisal Meshari Alnifaie³,
Mohammed Abdullah Alsugairan⁴, Ahmed Mohammed Al-Ghamdi⁵, Hashem
Musaad Alzahrani⁶, Waleed Saeed Almalki⁷, Firas Saad Almugarry⁸,
Abdulrahman Alshaya⁹, Abdulmohsen Mohammed Abdulmohsen Aloutaibi¹⁰**

¹ Family medicine, Alsulimaniah Primary Health Center second cluster Riyadh, Saudi Arabia

² Healthcare Information Technologist, King Abdulaziz Medical City, Riyadh, Saudi Arabia

³ Health Information Technician, King Abdulaziz Medical City, Riyadh, Saudi Arabia,
alnefaifa@MNGHA.MED.SA

⁴ Medical Record, NGHA, Dirab PHC, Saudi Arabia

⁵ Health services administration, King Abdulaziz Medical City Riyadh, Ministry of National Guard,
algamdiah@ngha.med.sa

⁶ Health Administration Technician, NGCSC, Saudi Arabia

⁷ Health information technician, almalekiwa@mngaha.med.sa

⁸ Health Information Technician, King Abdulaziz Medical City, Riyadh, Saudi Arabia, fagosh@hotmail.com

⁹ Health information Technician, King Abdulaziz Medical City, Riyadh, Saudi Arabia

¹⁰ Pharmacy Technician, King Abdulaziz Medical City, Riyadh, Saudi Arabia

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Abstract

Diagnostic errors represent a significant and complex challenge in healthcare, contributing to substantial preventable patient harm. This article argues that achieving diagnostic excellence and enhancing patient safety requires moving beyond individual clinician effort to embrace system-level, collaborative approaches. It explores the integral role of learning health systems (LHS) as a framework for continuous improvement, aligning science, informatics, and culture to embed best practices in care. The article examines several innovative collaborative models designed to reduce diagnostic error, including the Safer Dx Learning Lab for structured researcher-clinician partnerships, the researcher-in-residence model for co-producing knowledge, and diagnostic performance feedback programs that facilitate peer-to-peer learning. Key barriers to collaboration are addressed, such as punitive safety cultures and clinician burnout, alongside critical success factors like strong leadership, robust data infrastructure, and effective communication that fosters psychological safety. The piece concludes that diagnostic safety is a "team sport," and by investing in these collaborative models and overcoming implementation challenges, healthcare organizations can create a sustainable pathway to diagnostic excellence and significantly improved patient outcomes.

Introduction

Diagnostic errors remain a significant challenge in healthcare systems worldwide, affecting millions of patients annually and contributing substantially to preventable harm (Singh et al., 2022). Despite their prevalence and impact, diagnostic errors have historically received less attention than other patient safety concerns—what Wachter (2010) termed "no respect" in healthcare quality and safety initiatives. The complexity of diagnosis—an evolving process influenced by disease progression, clinical data interpretation, and healthcare system factors—makes defining and measuring diagnostic errors particularly challenging (Zwaan & Singh, 2015).

Recent years have witnessed growing recognition that improving diagnostic safety requires more than individual clinician effort; it demands system-level approaches and collaborative

models that leverage the collective expertise of diverse stakeholders. This article explores how fostering team collaboration can create a pathway to diagnostic excellence and enhanced patient safety within learning health systems. By examining innovative collaborative frameworks, implementation challenges, and success factors, this article provides a roadmap for healthcare organizations seeking to reduce diagnostic harm through intentional collaborative practices.

The Complexity of Diagnostic Error

Diagnostic errors are notoriously difficult to define and measure. As Zwaan and Singh (2015) explain, diagnoses evolve over time, with diseases progressing through stages of biochemical onset, symptom development, and ultimate resolution or progression. This evolution creates inherent challenges in determining precisely when a diagnostic error occurs. Additionally, the balance between underdiagnosis and overdiagnosis further complicates assessment, as efforts to reduce missed diagnoses may inadvertently increase unnecessary testing and potential harm from overdiagnosis.

The subjectivity involved in determining diagnostic errors, particularly in hindsight, presents another challenge. Reviewers assessing potential diagnostic errors must consider both the likelihood of disease and the urgency of intervention, judgments that are unavoidably influenced by hindsight bias once the actual outcome is known (Zwaan & Singh, 2015). These complexities highlight why diagnostic errors require multifaceted approaches that extend beyond individual clinician performance to encompass system factors, team dynamics, and organizational culture.

Learning Health Systems as Frameworks for Improvement

The learning health system (LHS) concept offers a promising framework for addressing diagnostic errors through team collaboration. Ellis et al. (2022) define an LHS as one where "science, informatics, incentives, and culture are aligned for enduring continuous improvement and innovation; best practices are seamlessly embedded in the care process; patients and families are active participants in all elements; and new knowledge is captured as an integral by-product of the care experience" (p. 2).

Implementing an LHS requires alignment across multiple domains. Psek et al. (2015) identified ten foundational elements for operationalizing an LHS, including strong leadership, strategic alignment, organizational culture, technology infrastructure, and governance. Subsequent research by Psek et al. (2016) emphasized leadership perspectives on the challenges of implementing these elements, highlighting the importance of balancing learning and workflow, integrating cultural and operational silos, and designing systems that enhance rather than impede clinical care.

The integration of research and practice represents a core component of effective LHSs. Satterfield et al. (2019) described a "prospective learning health ecosystem for diagnostic excellence" that connects three academic communities: biomedical researchers, clinical diagnosticians, and learning health systems engineers. This ecosystem enables continuous learning through purposeful connections between research and practice, accelerating the translation of diagnostic innovations into clinical settings.

Collaborative Approaches to Diagnostic Excellence

The Safer Dx Learning Lab Model

A promising approach to fostering team collaboration for diagnostic excellence is the Safer Dx Learning Lab model described by Sloane et al. (2024). This model establishes a structured partnership between researchers and clinical teams to identify, prioritize, and address diagnostic safety concerns. The Learning Lab creates a collaborative space where diverse stakeholders—including clinicians, researchers, patients, and administrators—can share perspectives, analyze data, and co-develop interventions to improve diagnostic performance.

Sloane et al. (2024) documented both challenges and successes in implementing this model. Key challenges included competing organizational priorities, limited resources, stakeholder engagement, and team communication. Successful implementation required several enabling factors:

1. Executive leadership engagement and support
2. Alignment with organizational strategic priorities
3. Partnership with champions embedded within clinical environments
4. Sustainable data infrastructure for measurement
5. Continuous team communication

The Safer Dx Learning Lab exemplifies what Vincent et al. (2014) described as a framework for safety measurement and monitoring that enables clinical teams to maintain and improve safety. By creating a structured approach to collaboration, the Learning Lab helps organizations develop what Singh et al. (2020) called a "diagnostic safety program" that integrates measurement, learning, and improvement into everyday clinical operations.

Researcher-in-Residence Model

Another collaborative approach to improving diagnostic safety is the researcher-in-residence model. As described by Marshall et al. (2016), this model embeds researchers within healthcare organizations, allowing them to work alongside clinicians and managers to co-produce knowledge and translate research into practice. Vindrola-Padros et al. (2019) elaborated on the challenges and benefits of this approach, noting that it requires researchers to adopt new roles and skills while navigating organizational politics and competing priorities.

The researcher-in-residence model addresses a common barrier to improvement: the gap between research and practice. By positioning researchers as team members rather than external consultants, this approach facilitates bidirectional knowledge exchange and helps ensure that improvement efforts are both evidence-based and contextually appropriate. As Vindrola-Padros et al. (2019) observed, this model enables "situated knowledge co-production" that respects both research evidence and practitioner expertise.

Diagnostic Performance Feedback Programs

Providing clinicians with feedback on their diagnostic performance represents another collaborative approach to improvement. Meyer et al. (2021) described a program that leveraged electronic health record data to identify potential diagnostic errors and provide feedback to clinicians within a learning health system. This program included several collaborative elements:

1. An interdisciplinary committee that reviewed potential diagnostic errors
2. Structured feedback delivered by physician peers
3. Opportunities for clinicians to respond and provide context
4. Aggregation of data to identify system-level improvement opportunities

Meyer et al. (2021) found that this program was well-received by clinicians, with 93% reporting that the feedback was useful for their professional development. The program's success depended on several factors that fostered effective collaboration, including a non-punitive approach, peer-to-peer feedback, and clear communication about the program's educational purpose.

Overcoming Barriers to Collaboration

Addressing Punitive Safety Cultures

A significant barrier to effective collaboration for diagnostic improvement is the perception that safety reporting is punitive. Feeser et al. (2021) documented how the phrase "I've been PSN-ed" (referring to Patient Safety Network reporting) reflected clinicians' perception that safety reporting systems were being used punitively rather than constructively. This perception creates a culture of fear that inhibits the transparent sharing of information essential for diagnostic improvement.

Overcoming this barrier requires deliberate efforts to establish psychological safety. Singh et al. (2022) emphasized the importance of a "just culture" that distinguishes between blameless errors and blameworthy acts, focusing on learning rather than punishment. This approach encourages clinicians to report diagnostic concerns without fear of unwarranted consequences, enabling more effective collaboration around improvement.

Clinician Burnout and Engagement

Clinician burnout represents another significant barrier to effective collaboration. Shanafelt and Noseworthy (2017) identified nine organizational strategies to promote engagement and reduce burnout, including acknowledging the problem, developing and implementing targeted interventions, cultivating community, using rewards and incentives strategically, aligning values and strengthening culture, promoting flexibility and work-life integration, providing resources to promote resilience and self-care, facilitating and funding organizational science, and implementing leadership development.

These strategies create conditions that support effective collaboration by ensuring that clinicians have the emotional and cognitive resources necessary for engaged participation. As Singh et al. (2020) noted, diagnostic excellence requires both individual and team capabilities that can be compromised when clinicians are experiencing burnout.

Implementation Challenges

Implementing collaborative approaches to diagnostic excellence encounters numerous challenges. Solberg et al. (2000) identified several factors that influence successful implementation, including organizational factors (leadership support, vision, resources), environmental factors (regulatory requirements, competitive pressures), and implementation strategies (education, feedback, participation). Their research emphasized the importance of attending to multiple factors simultaneously and using multiple strategies—a principle that applies directly to diagnostic improvement initiatives.

Singh et al. (2022) addressed implementation challenges specific to diagnostic safety by developing the Safer Dx Checklist, which includes ten safety recommendations for healthcare organizations:

1. Leadership prioritization of diagnostic safety
2. Creation of a "safe" environment for diagnostic error discussions
3. Clear assignment of responsibility for diagnostic safety oversight
4. Development of feedback and learning systems
5. Patient and family engagement
6. Measurement and monitoring systems
7. Processes to identify and learn from diagnostic errors
8. Integration of health IT into the diagnostic process
9. Development of methods to identify and address diagnostic vulnerabilities

10. Education and training specific to diagnosis

This checklist provides a structured approach to addressing the multifaceted challenges of improving diagnostic safety through collaboration.

Building Effective Collaborative Models

Leadership and Governance

Effective collaboration for diagnostic excellence requires strong leadership and governance structures. As Psek et al. (2016) observed, leaders must "balance learning and workflow" and "integrate cultural and operational silos" to create conditions that support collaboration. Singh et al. (2022) emphasized that leadership must prioritize diagnostic safety by establishing clear accountability, allocating resources, and creating incentives for improvement.

Governance structures should include representation from diverse stakeholders, including clinicians, researchers, patients, and administrators. These structures should establish clear processes for prioritizing improvement efforts, allocating resources, and measuring progress. As Singh et al. (2020) noted, governance for diagnostic excellence should align with broader organizational quality and safety initiatives while addressing the unique challenges of diagnostic error.

Data Infrastructure and Measurement

Robust data infrastructure is essential for effective collaboration around diagnostic excellence. Sloane et al. (2024) identified sustainable data infrastructure as a critical enabler of their Learning Lab model, noting that "data availability and organizational-level metrics were critical for identifying high-priority diagnostic safety concerns" (p. 838). Such infrastructure allows teams to identify potential diagnostic errors, track improvement efforts, and measure outcomes.

Measurement approaches should consider the challenges of defining diagnostic error identified by Zwaan and Singh (2015), including the evolving nature of diagnosis, the balance between under- and overdiagnosis, and the subjectivity of error determination. Rather than relying solely on binary classifications of error presence or absence, measurement approaches might use scales that account for uncertainty and incorporate multiple perspectives.

Communication and Team Dynamics

Effective communication represents a foundational element of successful collaboration. Sloane et al. (2024) identified communication as both a challenge and a critical success factor in their Learning Lab implementation, noting the importance of "consistent and intentional communication across all team members" (p. 839). This communication should include regular team meetings, clear documentation of decisions and actions, and mechanisms for addressing conflicts or misunderstandings.

Team dynamics should promote psychological safety, encouraging all members to contribute their perspectives without fear of judgment or reprisal. Meyer et al. (2021) emphasized the importance of a non-punitive approach to diagnostic feedback, noting that this approach facilitated open discussion and learning. Building these dynamics requires intentional effort, including team-building activities, clear role definitions, and processes for addressing interpersonal challenges.

Patient and Family Engagement

Patients and families represent essential collaborators in diagnostic excellence initiatives. Singh et al. (2022) included patient and family engagement as one of their ten safety recommendations, noting that "patients and families can provide valuable insights about diagnostic breakdowns and should be engaged as diagnostic safety partners" (p. 585). This

engagement might include participation in governance structures, contribution to improvement initiatives, and feedback on diagnostic experiences.

Effective patient engagement requires addressing barriers such as medical jargon, power dynamics, and logistical challenges. Organizations should provide training and support for both patients and clinicians to facilitate productive collaboration. As Ellis et al. (2022) observed, patient engagement represents a core component of learning health systems, ensuring that improvement efforts address the needs and perspectives of those most affected by diagnostic errors.

Case Examples of Successful Collaboration

Geisinger's Safer Dx Learning Lab

Sloane et al. (2024) described the implementation of a Safer Dx Learning Lab at Geisinger, a large integrated health system. This implementation included several collaborative elements:

1. A multidisciplinary team including researchers, clinicians, and administrators
2. Regular "learning sessions" to review data and develop improvement strategies
3. Integration with existing quality improvement infrastructure
4. Alignment with organizational strategic priorities

Key successes included the development of a standardized approach to measuring diagnostic safety, identification of high-priority improvement opportunities, and implementation of targeted interventions. The authors attributed these successes to strong leadership support, clear alignment with organizational priorities, and effective team communication.

The Veterans Health Administration's Diagnostic Performance Feedback Program

Meyer et al. (2021) described a diagnostic performance feedback program implemented within the Veterans Health Administration. This program established a structured process for identifying potential diagnostic errors, reviewing them with an interdisciplinary committee, and providing feedback to clinicians. The program's collaborative elements included:

1. Peer-to-peer feedback delivered by respected colleagues
2. Opportunities for clinicians to provide context and perspective
3. Aggregation of data to identify system-level improvement opportunities
4. Integration with existing quality improvement infrastructure

The program achieved high levels of clinician acceptance and engagement, with most participants reporting that the feedback was valuable for their professional development. The authors attributed this success to the program's non-punitive approach, peer-to-peer delivery method, and clear communication about its educational purpose.

Conclusion

Diagnostic excellence requires collaborative approaches that leverage the diverse perspectives and expertise of multiple stakeholders. Learning health systems provide a framework for this collaboration, enabling continuous improvement through the integration of research, practice, and patient engagement. Models such as the Safer Dx Learning Lab, researcher-in-residence, and diagnostic performance feedback programs offer structured approaches to fostering the team collaboration essential for diagnostic excellence.

Implementing these collaborative approaches requires addressing significant challenges, including punitive safety cultures, clinician burnout, and implementation barriers. Success depends on strong leadership, robust data infrastructure, effective communication, and

meaningful patient engagement. By investing in these foundational elements, healthcare organizations can create conditions that support the team collaboration necessary for diagnostic excellence and enhanced patient safety.

The path to diagnostic excellence is not straightforward or simple. It requires sustained commitment, resources, and a willingness to embrace the complexity of diagnosis. However, by fostering team collaboration within learning health systems, healthcare organizations can make significant progress toward reducing diagnostic errors and improving patient outcomes. As Singh et al. (2022) observed, "Diagnostic safety is a team sport" (p. 589)—a recognition that the path to excellence lies in our collective ability to work together effectively toward a shared goal of better diagnosis for all patients.

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