



**COALITION  
TO IMPROVE DIAGNOSIS**

**CDC Engages Laboratory Professionals to Improve Diagnosis and Patient Safety**

The Centers for Disease Control and Prevention (CDC) is engaged in many efforts with the laboratory community and other partners to reduce diagnostic errors, both domestically and internationally. CDC’s [Division of Laboratory Systems \(DLS\)](#) works to strengthen the nation’s clinical and public health laboratory system by continually improving quality and safety, informatics and data science, and workforce competency. DLS played a crucial role in the development of the 2015 Institute of Medicine report, *Improving Diagnosis in Health Care*,<sup>1</sup> and has actively participated on the Steering Committee of the Coalition to Improve Diagnosis.

CDC provides technical and scientific expertise to support the [Clinical Laboratory Improvement Amendments \(CLIA\)](#) program, in partnership with the Centers for Medicare & Medicaid Services and the Food and Drug Administration. CLIA governs US laboratory testing performed to diagnose, prevent, or treat disease or assess human health. As part of this, CDC manages and supports the Clinical Laboratory Improvement Advisory Committee that provides recommendations for improving laboratory practice quality and safety. DLS’

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**SOCIETY to  
IMPROVE  
DIAGNOSIS in  
MEDICINE**

**The Evolution of Diagnostic Teamwork**

*By Susan Carr*

As human enterprise—business, government, academia, law, healthcare—grows more complex, so do the teams that do the work. Teams that tackle “wicked” problems and complicated initiatives often include diverse membership representing specialized, disparate skills and knowledge.<sup>1</sup> These cross-industry and multidisciplinary teams, including those that work on diagnosis, offer advantages but also challenges that must be addressed if the team is to be successful.

Multidisciplinary teams are common in healthcare. They confront challenges similar to those faced by cross-industry teams working on global product launches, international security problems, and other large-scale projects.<sup>2</sup> What is currently understood about how teams work across industries may apply to healthcare in general and to small, local teams, such as physicians and other healthcare professionals working with patients and families to diagnose individual health problems.

Themes familiar from improvement work in healthcare, including organizational culture, leadership, and psychological safety can contribute to or hinder the success of teams.

**Teamwork in Diagnosis**

“More effective teamwork”<sup>3(p8)</sup> is first among 8 goals identified by the National Academy of Medicine (NAM) in its foundational report, *Improving Diagnosis in Health Care*. To reach that goal, NAM calls on healthcare organizations to ensure that clinicians and staff members across specialties and professions are able to work together in all aspects of the diagnostic process. They also must partner with patients and families.

Traditionally, physicians have been solo practitioners in diagnosis.<sup>4</sup> However, even in cases that do not seemingly require testing or input from specialists, physicians never act alone. At a minimum, the patient (or an advocate for those who are not able to contribute actively) participates by describing symptoms, giving personal history, and simply by being present in the clinical encounter.

*Even in cases that do not seemingly require input from specialists or testing, physicians never act alone.*

Even that model, often described as “patient engagement”—and by no means universally practiced—is also evolving. Mark L. Graber, MD, president of the Society to Improve Diagnosis in Medicine (SIDM), points out that NAM, SIDM, and others are beginning to ask patients to go

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# The Evolution of Diagnostic Teamwork

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beyond providing accurate health information and participate in the process itself:

*We ask the patients' help in accepting and managing the uncertainty inherent in diagnosis. ...*

*We need and want them to help monitor the diagnostic process to help ensure the diagnosis is correct, and get back in touch if symptoms are progressing, or changing, or not responding as expected to treatment (email communication, September 2017)*

For difficult or uncommon cases, diagnostic teams can quickly blossom from a membership of two to a large, multidisciplinary team. In addition to patients and medical diagnosticians—radiologists, pathologists, cardiologists, physician assistants, advance practice nurses—many healthcare professionals participate in diagnosis, including nurses, radiology technologists, pharmacists, medical librarians, social workers, physical therapists, nutritionists, and others.<sup>4,5,6</sup>

Some of that diversity reflects the fact that health professions are becoming more specialized. Paradoxically, the trend toward clinical knowledge that is narrow and deep makes multidisciplinary teamwork both more necessary and harder to accomplish.<sup>5</sup> Not only are there simply more people involved, highly specialized groups tend to develop distinct professional cultures that can make it difficult to successfully “reach across the aisle” to colleagues who seem to inhabit a strange land and speak a different language.

Recent examples<sup>7,8</sup> demonstrate the value of respect and understanding among those who participate in diagnosis, with benefits that go beyond the fortunes of individual patients:

*Drawing attention to the valuable diagnostic contributions of AHPs [allied health professionals] may help facilitate cultural change [in medicine]. ... The impact of AHPs on diagnostic accuracy should be studied across a wide range of problems.<sup>7(p57)</sup>*

## Teamwork Variables

Across industries, including healthcare, there are different kinds of teams, and the way they work is highly variable. Teamwork in the context of diagnosis has its own characteristics and has not yet received much study.<sup>3,4,7</sup> The complexity of the diagnostic process and urgent or acute circumstances may result in teams that form quickly, on

the fly,<sup>9</sup> with team members changing before a decision is reached. The availability of relevant information, from testing and individuals, also changes in real time.

Established leadership roles in medicine also affect how diagnostic teams work. The traditional focus on physicians as independent actors and their elevated status in the healthcare hierarchy can impede effective teamwork, but those dynamics are beginning to change. Physicians admittedly carry unique responsibility for the results of the diagnostic process, which is not likely to change soon. The NAM recognized that “reframing the diagnostic process as a team-based activity” could therefore “take some time and may meet some resistance.”<sup>3(p147)</sup> Even when physicians are acknowledged as leaders on diagnostic teams, they will find that the role is changing, with listening skills and personal humility now recognized as important aspects of effective team leadership.<sup>2,7,9</sup>

## Leadership and Culture

Organizational culture and leadership are chief among the factors that determine whether or not teams will function effectively. Medical residents and first-year nurses may have experienced enlightened, interdisciplinary teamwork training during their education, but the culture of a workplace that is siloed and hierarchical can quickly override the benefits of that training.<sup>10</sup>

A study of the effect of leadership style on teams performing quality improvement in healthcare found that inclusiveness improves results.<sup>5</sup> Although the study did not focus specifically on diagnosis, the issues examined—status, hierarchy, and psychological safety—are relevant for all healthcare teams that ask members to transmit information, share knowledge, and think collaboratively. In the context of the study, which took place in a neonatal intensive care unit, the authors observed that physicians, nurses, and allied health professionals each had important and distinct contributions to make as members of the care team. The personal dynamics around professional status and organizational hierarchy, however, meant that “information often [went] unshared.”<sup>5(p943),12</sup>

Leadership affects organizational culture and may help sustain patient safety improvements.<sup>13,14</sup> Most often discussed at the level of executives

*Leaders who sincerely included team members in discussion and decision-making were able to foster an environment of psychological safety.*

and boards of directors, the effect of leadership on culture also applies to clinical working groups, including diagnostic teams. In the NICU study, leaders who sincerely included team members in discussion and decision-making were able to foster an environment of psychological safety. By inviting team members with lower status in the traditional hierarchy to participate and expressing genuine appreciation for their contributions, inclusive leaders were able to positively affect team performance.<sup>5</sup> In the study, performance included “meaningful engagement in team-based quality improvement work.”<sup>5(p958)</sup> and “improving the climate for learning within cross-disciplinary teams.”<sup>5(p958)</sup> While the context is different from diagnosis, the issues involving barriers to information and knowledge exchange to support problem-solving relate closely to the challenges diagnostic teams face. The direct application of these concepts to diagnosis deserves further study.

### Teaming in a Fluid Environment

NAM also observed that the composition of teams working on diagnosis is often fluid, with members of different backgrounds and expertise interacting quickly in changeable combinations.<sup>3</sup> In these circumstances, where team members may not know each other well, an underlying culture of respect and psychological safety can help individuals feel comfortable contributing ideas, observations, and questions.

This form of teamwork is common in other

industries and has been studied by Amy Edmondson, a leading authority on teamwork and leadership. Edmondson refers to this as “teaming” and uses an example from healthcare to describe “teamwork on the fly”:

*Think of clinicians in an emergency room, who convene quickly to solve a specific patient problem and then move on to address other cases with different colleagues, compared with a surgical team that performs the same procedure under highly controlled condition day after day.*<sup>9(p74)</sup>

Teaming increases the need for psychological safety and the potential for team learning. Techniques for successful teaming include asking authentic questions, listening carefully, admitting knowledge gaps, and openly accepting fallibility.<sup>9</sup> Team leaders who model these actions and attitudes make it easier for all team members to do the same. In this kind of teamwork, all participants are encouraged to reflect on their thought process and the effect of personal values and biases. Although it does not refer to healthcare, Edmondson offers an example that strongly suggests the technique in diagnosis of asking ‘What else might this be?’:

*A useful discipline for leaders is to force moments of reflection, asking themselves and then others, “Is this the only way to see the situation? What might I be missing?”*<sup>9(p79)</sup>

### Humility as a Leadership Skill

Overconfidence leads physicians to think and behave in ways that contribute to diagnostic error.<sup>15,16,17</sup> It also diminishes their effectiveness as team leaders.

The goal of diagnostic teams should be to discover and consider all information relevant to the patient’s case. Especially in cases that are complex or difficult, the team must rely on all members to contribute, to make sure that nothing is missed. In this way, the physician in charge must enable the team to embrace uncertainty, contribute what they see and know, and think together about the case. This role requires skills that contrast directly with behaviors associated with what has been referred to as “medical narcissism.”<sup>15,18</sup>

Although the final decision about a diagnosis may be made by an individual, most likely a physician, it is informed with information and counsel provided by a fluid team of experts the physician must count on and enable for

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guidance. The culture in which the team works is crucial:

*And ultimately, we need to understand that the change we seek is not necessarily one of team structure, but rather a change in attitudes and culture.<sup>19(p216)</sup>*

## Evolution of Teamwork and Teaming

Changes in medicine and society in general have triggered a slow evolution from traditional, hierarchical staffing and social structures among healthcare professionals to team-based care delivery. Because they are responsible for the diagnosis and outcome, physicians will continue to serve as team leaders as diagnosis shifts from being a solitary activity to one that is team-based. Most physicians are comfortable in leadership roles. However, increasing specialization, professional diversity among team members, and a proliferation of data sources create a new team culture and workflow, sometimes referred to as “teaming,” that poses new leadership challenges.<sup>1,10</sup>

Physicians and others who lead teaming efforts will find they need advanced interpersonal skills, plus a humble attitude, in order to gain maximum benefit for their patients and the long-term success of their practices and organizations.<sup>5</sup> At the same time, the diverse collection of lay people and professionals who participate in diagnostic teaming will also benefit from this new process, which creates a learning environment for all.

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## CDC Engages Laboratory Professionals to Improve Diagnosis and Patient Safety

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With thanks to  
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assistance with this article.

CLIA activities aim to advance the reliability and usefulness of clinical laboratory testing, minimize laboratory-associated errors, and facilitate appropriate test utilization, all essential to improving the diagnostic process.

In 2008, DLS established the [Clinical Laboratory Integration into Healthcare Collaborative \(CLIHC\)](#) team to improve clinical care decision-making by encouraging laboratory and healthcare professionals to work together. In 2014 and 2016, the CLIHC team published findings from a survey of laboratory professionals and clinicians that supported the need for diagnostic management teams. From the laboratory perspective, these teams serve to improve communication among healthcare professionals to assure appropriate test utilization. The CLIHC team has also developed mobile apps to support coagulation test selection and anti-coagulant drug choice and dosing.

Clinical laboratories may not have access to sufficient clinical data to assess whether the correct test is ordered. In addition, linking laboratory to clinical data provides the means to assess diagnostic utility as a tool to promote appropriate test utilization. To address these challenges, collaborative work with CDC-funded partners is providing laboratories access to de-identified patient data to inform health outcomes, patient safety, and quality improvement initiatives.

CDC's [Laboratory Medicine Best Practices \(LMBP\)](#) initiative established an evidence-based process for developing laboratory practice recommendations. These best practices support high-quality healthcare delivery and diagnostic safety. To date, 9 systematic reviews and 11 evidence-based practice recommendations have been published.

Topics include reduction of blood-culture contamination, pre-analytic practices to reduce contamination of urine cultures, and timeliness of providing targeted therapy for inpatients with bloodstream infections.

LMBP collaborates with the Agency for Healthcare Research and Quality to publicize best practice findings and recommendations in the [National Guideline Clearinghouse](#). Building upon DLS' longstanding

involvement with professional organizations developing laboratory practice guidelines, a broader initiative is underway to improve development, dissemination, and adoption of laboratory practice guidelines by applying metrics and evaluation.

CDC develops [educational programs and training](#) for laboratory professionals and healthcare providers. For example, CDC published MMWR recommendations outlining good laboratory practices for [molecular and biochemical genetic testing as well as newborn screening](#). Online courses and related materials are available for laboratory professionals, clinicians, and the public to enhance knowledge of quality testing and patient safety. In addition, CDC developed the [Strategies for Improving Rapid Influenza Testing and Treatment in Ambulatory Settings program](#) for clinicians to improve diagnostic competency using rapid influenza testing protocols.

CDC is committed to improving population health through DLS' role, working with clinical and public health laboratories to improve the quality of testing, promote appropriate test utilization, and reduce diagnostic errors.

To learn more about the ways DLS engages the laboratory community to improve diagnosis, visit [www.cdc.gov/labsystems](http://www.cdc.gov/labsystems).

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The *Coalition to Improve Diagnosis*, comprised of leading healthcare organizations, has been established to bring awareness, attention, and action to the problem of diagnostic error. SIDM established and leads the Coalition. To learn more, and to view a list of the Coalition's 31 members, visit [www.DxCoalition.org](http://www.DxCoalition.org).

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# Grants Fund New Projects in Diagnostic Safety, Application of Data, and Patient Partners in Research

By Lorie Slass  
Director, Communication  
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SIDM

Over the last 3 months, the Society to Improve Diagnosis in Medicine (SIDM) has received more than \$2 million in support from funders for a diverse set of projects that will further SIDM's mission to create a world where no patients are harmed from diagnostic error.

In July, SIDM announced two grants from the [Gordon and Betty Moore Foundation](#) (GBMF) totaling \$1.7 million. The first grant, for SIDM and the [Institute for Healthcare Improvement](#) (IHI), which recently merged with the National Patient Safety Foundation, will fund a review of existing and proposed processes and tools to mitigate diagnostic delays and inaccuracies. As

part of the grant, six healthcare organizations will be selected to trial specific interventions in their own healthcare systems. SIDM and IHI will help evaluate each project, discuss each organization's plans to continue the use of the intervention, and consider next steps with respect to replication and dissemination. Organizations selected to pilot interventions include MedStar Health, Nationwide Children's Hospital, Northwell Health, Tufts Medical Center, University of Michigan Department of Emergency Medicine, and University of California, San Francisco Medical Center.

The second grant will address the gap in the use of data to guide quality improvement efforts around diagnosis. The project will explore the concept of an information technology platform that could collect, assess, and report important data on diagnosis and ultimately:

- serve as a means of measuring the public health burden of diagnostic errors;
- allow individual institutions to benchmark their diagnostic performance against peers;

- guide local quality improvement efforts, and eventually, scientifically-sound, uniform public reporting; and
- provide the research data needed to evaluate progress in reducing diagnostic errors and delays.

Other support, announced in August, was for a Eugene Washington PCORI Engagement Award from the Patient-Centered Outcomes Research Institute (PCORI). The award of \$250,000 will fund the development of an 18-month project: Patients Improving Research in Diagnosis. SIDM will work with Project Patient Care and the MedStar Institute for Quality and Safety to develop and evaluate a curriculum to train "patient partners" to participate in the design, execution, and dissemination of research to improve diagnosis. The project will culminate in the development of a new Academy for Patient Partners.

"Though many programs have prepared patients for participation in research design and execution directed towards treatment choices, no programs currently focus on the unique requirements of research in the process of diagnosis and the choices that patients face during that process," said Sue Sheridan, SIDM board member and noted patient safety expert. "There is currently no established curriculum or training program to help patients become full partners in research efforts to eliminate the risk of diagnostic error that harms them."

Patient partners will be recruited from organizations representing patients and other leading healthcare organizations. Each patient partner will be assigned to a research mentor who will facilitate their engagement in research activities, evaluate the effectiveness of the program, and plan for its sustainability.

The SIDM annual conference, Diagnostic Error in Medicine, also received support from the Agency for Healthcare Research and Quality (for 2017-2019) and the Mont Fund.

*For more information about these and other SIDM programs, please email [info@improvediagnosis.org](mailto:info@improvediagnosis.org).*

The Society to Improve Diagnosis in Medicine recognizes corporate members and organizations that support the society and its mission of attaining better outcomes through better diagnosis.

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