

Reexamining the Physical Exam

By Susan Carr, Senior writer, *ImproveDx*

The physical examination, once the cornerstone of diagnosis, has fallen on hard times. Advanced testing and imaging exams, readily available in most settings, often take precedence, while physicians are pressed to find enough time to do a thorough exam. The electronic health record competes with the patient for attention. And physicians note that the practice of medicine has become more technological and increasingly disembodied. These changes have devalued the physical exam in practice and medical education, in a vicious circle where technical skills play second fiddle to technology and are likely to atrophy.¹⁻⁴

Responses to this trend include reflections on the exam's value as a diagnostic tool.⁵ In a study of patients admitted via the emergency department, 80% were diagnosed correctly based on history, physical examination, and basic laboratory testing alone.⁶ Some physicians have observed that clinicians with solid bedside skills are less dependent on and "...make better use of diagnostic tests and order fewer unnecessary tests."^{5(p1385)} Regarding the value of the physical exam, Mark L. Graber, MD, co-founder and chief medical officer of the Society to Improve Diagnosis in Medicine, emphasizes:

Besides being absolutely critical in pointing to the correct diagnosis, it is an irreplaceable element of establishing an effective clinical relationship. (written communication, January 2020)

Physicians are eloquent about the ritual of human touch in medicine and the uniqueness of the physical exam in human encounters.^{7,8} And while there is reverence for the ritual and the information and connection it can provide, the physical exam is also drawing attention, especially in outpatient settings, as an encounter prone to error.⁹

The worst exam is no exam at all

In a qualitative survey of physicians across all specialties, researchers found the most common defect in physical exams was simply not performing one at all.¹⁰ The survey ($n=63$) asked for "vignettes of known...oversights"—the purpose was to gather stories, not to measure statistical prevalence. However, among the oversights reported, 63% were attributed to no physical exam having been performed. In 14%, the information gathered by physical exam was misinterpreted; 11% included cases of missing or not seeking the relevant sign; and in 12% the deficiencies classified as "other." The authors observed that physicians appear to work in an "ignorance trap,"^{10(p1324)} rarely receiving feedback about oversights related to physical exams.

They also point out that electronic medical records may overstate the number of physical exams performed and that exam deficiencies are not easy to study and remain largely unexamined.

Improving the performance of physical examinations

In response to calls to improve the training, practice, and assessment of physical exams, individuals and organizations offer new resources and guidance.

Noting that “In modern healthcare, the clinical consultation is almost completely overlooked and ignored,”^{3(p503)} UK physician Gordon Caldwell calls out circumstances that contribute to problems and poor outcomes. He suggests improving the quality of the encounter, which should usually include a physical exam, by asking that:

- Both the patient (to the best of their abilities) and clinician be prepared for the visit.
- The clinician knows the patient as a person (not just as a patient).
- The environment be as free of distractions, such as noise and interruptions, as possible.
- The clinician be rested and “refreshed.”
- There be sufficient time allowed for the consultation.
- The patient’s confidentiality and dignity be maintained.
- The patient be encouraged to bring someone along for support.³

Dr Caldwell’s quality indicators set the stage for improved clinical exams. Other guidance targets improving the physician’s actions, the role of the exam in broader practice, and the need for feedback and assessment.

A group of physicians from the United States, England, and Scotland (all founders and board members of the [Society of Bedside Medicine](#),) recently published a guide to “reinvigorating the clinical examination for the 21st century.”⁴ They advocate adopting the following six strategies in practice and for teaching medical trainees:

1. Be present with the patient.
2. Practice an evidence-based approach to the physical exam.
3. Create opportunities for intentional practice of the physical exam.
4. Recognize the power of the physical examination beyond diagnosis.
5. Use point-of-care technology to aid in diagnosis and reinforce skills.
6. Seek and provide specific feedback on physical examination skills.^{4(p907)}

The evidence-based approach in strategy #2 includes the “hypothesis-driven physical examination,”¹¹ in which physicians use pre-test probabilities to tailor physical exams for patients, much as they would when ordering labs and imaging tests.

“Intentional practice” in strategy #3 includes opportunities for training, such as Stanford’s Five-Minute Moment, a template for teaching exam skills at the bedside by combining a brief narrative with a demonstration of the physical maneuver, interpretation, and common caveats and errors.¹² The Five-Minute Moment is one component of the Stanford Medicine 25, a collection of live and virtual training opportunities focused on a core and growing set of common diseases and conditions. Led by Abraham Verghese, MD, Stanford Medicine 25 aims to help students and clinicians learn and master bedside skills. The project’s [website](#) explains:

In observing students and residents perform physical diagnosis maneuvers at the bedside, we observe that though they know the theory, their technique may prevent them from eliciting the sign reliably.

*Much of medical error can be avoided if we take the time to lay hands on the patient and find that clue or obvious exam sign. We teach to always exam and make sure to **never miss the low hanging fruit!***

Other resources for training include Johns Hopkins' "case-oriented report and examination skills"¹³ and activities in the [Clinical Skills Center](#) at the American College of Physicians' annual internal medicine meeting.

The expanding use of point-of-care ultrasound (POCUS) has revitalized the physical examination in recent years. Early applications have focused on using POCUS to better diagnose abdominal and thoracic conditions, but applications to aid in the examination of every organ system are rapidly emerging.

Using sensor technology to improve the physical exam

Part of the "ignorance trap" for clinicians is a lack of useful feedback about what kind of touch is most effective. The actual mechanism or "art and science" of touch—haptics—is only one element of the physical exam, but it is crucial and, until recently, unexamined.

Carla Pugh, MD, PhD, a surgeon and educator who refers to herself as a "physical exam evangelist," points out a disconnect in training physicians in manual skills:

How do you master a body of knowledge when some of the most important things you're supposed to know can't be learned in a lecture or a book?¹⁴

And when manual skills are not prioritized in education, assessment also suffers. Dr Pugh laments that medicine continues to rely solely on the text-based board examination. A number of methods are used to assess competency in hands-on skills,² but Dr Pugh finds that medicine lacks appropriate and reliable tests of haptics as used in diagnosis and treatment.

We don't have a sure-fire way of teaching [haptics], a way of measuring it and therefore we don't have a way of assuring competency.¹⁴

Dr Pugh is director of the Technology Enabled Clinical Improvement Center ([TECIC](#)) at Stanford Medicine. She keynoted the [Diagnostic Error in Medicine 12th Annual International Conference](#) (DEM2019) with a talk titled, "The Modern Physical Exam: How Can We Make It Better?"¹⁵ She is leading efforts at TECIC to improve care by using sensor technology and data-driven metrics to improve provider performance of manual skills.

In a 2018 interview, she described the moment when she recognized a gap in her own surgical training:

Before I could operate on a tumor, I needed to know how densely it was attached. A CT scan couldn't tell me — the only way I'd know was through my hands. I realized I wouldn't truly learn how to diagnose with my hands just by watching my instructors, and I wanted to find a better way.^{16(np)}

Dr Pugh, who now holds three patents, addressed that gap by developing a way to use sensors to understand and evaluate how physicians use their hands while examining patients.

In her research, as clinicians perform, for example, a simulated breast exam, sensor-enabled mannequins generate waveforms and over time create a signature profile for accurate exams. To test the technology, Dr Pugh and her research partners recruited physicians attending clinical meetings of the American Society of Breast Surgeons, the American Academy of Family Physicians, and the American College of Obstetricians and Gynecologists in 2013 and 2014. More than 500 physicians participated by searching for a suspected lesion on sensor-enabled breast models. In addition to accuracy data, the models recorded the force of the manual palpation of the breast, and Dr Pugh was able to show that increased pressure is associated with better accuracy. She found that approximately 15% of experienced clinicians did not apply enough force to find the lesion. The team pointed out in a letter to the *New England Journal of Medicine* that:

Since variations in force cannot be reliably measured by means of human observation, our findings underscore the potential for sensor technology to add value to existing, observation-based assessments of clinical performance.^{17(p785)}

Dr Pugh also gathered data on the relative accuracy of different palpation techniques in breast exams and found that clinicians who use a common technique she calls “piano fingers” to search the breast are four times less likely to find a lesion compared to their colleagues.

Responding to that data presented at DEM, a woman in the audience asked Dr Pugh if she thought patients should be prepared to ask their physicians to use the most effective techniques in breast exams. Dr Pugh chuckled and replied:

She’s trying to start a revolution! I like that! I think we should all be informed and receptive. If the patient knows about it before you [the doctor] do, I hope she’ll say something and that you’ll be receptive.

To a question about women learning the most effective technique for self-breast exam, Dr Pugh said she and her team have started talking to women’s wellness meetings and have found the response to be “absolutely overwhelming.” Women want to learn the best technique and to learn by feeling through simulation what they are searching for in self-exam.

Dr Pugh feels it is crucial that physicians receive the feedback her technology provides. For now, the research is limited and early, but Dr Pugh feels that opportunities to understand the haptics of manual maneuvers, to adjust technique for personal preference, and improve effectiveness are limitless. She sees a day in the future when this approach could be used routinely as part of ongoing, formative assessment for quality improvement. The information is potentially disruptive, and Dr Pugh feels strongly it should not be used against clinicians. The emphasis must be on enhancing human performance for the physical exam, not on relinquishing control to technology.

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Coalition to Improve Diagnosis Welcomes Three New Organizations

Three leading organizations—two health systems and one laboratory accreditation agency—have recently committed to take action to improve diagnostic quality and safety by joining the [Coalition to Improve Diagnosis](#). Advocate Aurora Health, COLA Inc, and University Hospitals are now among the nearly 60 prominent healthcare organizations that have joined the Coalition.

“Diagnostic error is one of the most important safety problems in health care today and causes the most patient harm,” said Paul L. Epner, chief executive officer and co-founder of the Society to Improve Diagnosis in Medicine (SIDM). “Diagnosis is a complex process that involves the entire healthcare system working together effectively. That is why we need the active commitment of patients, clinicians, hospital and health systems leaders to come together to say that reducing patient harm from diagnostic error is a priority. We need to work together to identify and implement strategies that improve diagnostic quality and safety.”

Convened and led by SIDM, the Coalition to Improve Diagnosis is the only major collaboration of diverse healthcare organizations singularly focused on improving the diagnostic process. Together, they work to find solutions that enhance diagnostic quality and safety, reduce harm, and ultimately ensure better health outcomes for patients.

These three organizations have committed to [ACT for Better Diagnosis](#) by joining the Coalition and taking action to improve the diagnostic process:

[Advocate Aurora Health](#) is one of the 10 largest not-for-profit, integrated health systems in the United States, caring for nearly 3 million patients and offering more sites of care than any other health system in the Midwest. Diagnostic accuracy is a key aspect of their Patient Safety Strategic Plan. Through using tools such as the [SPADE analysis](#) and [Safer Dx](#) they aim to understand the improvement opportunities specific to the diagnostic process and develop strategies that help prevent resultant patient safety incidents.

“We are proud to join the Coalition to Improve Diagnosis as one of many ways we’re advancing our patient safety journey to achieve our goal of zero preventable patient harm.,” said Carrie E. Nelson, MD, MS, FAAFP, System Vice President Population Health & Health Outcomes at Advocate Aurora Health. “The literature is clear that diagnostic quality is at the root of some of the most serious patient safety events. Through our involvement with the Coalition, we aim to learn from and contribute to the community and knowledge base brought together under SIDM’s leadership to deliver consistent excellence in diagnostic quality.”

[COLA, Inc](#) accredits nearly 7,000 medical laboratories and provides the clinical laboratory with a program of education, consultation, and accreditation. As a national, physician-directed organization, they accredit laboratories of all types and sizes to strengthen the safety and accuracy of laboratory testing, which impacts patient experience, patient care, care management, and the interactions of the care team. As part of their efforts to improve diagnostic quality and safety, COLA has developed [Lab Testing Matters](#), an educational forum in which a multidisciplinary community of experts shares its knowledge and best practices, and a [near patient testing](#) research initiative that highlights the value of real-time laboratory information to accurate, timely diagnosis, and treatment.

“Reducing diagnostic error involves a multitude of disciplines along with patients and caregivers to form a strong, cohesive team working in concert to provide the best possible outcomes,” said Nancy Stratton, CEO at COLA. “As a physician-directed organization, we are eager to participate with Coalition members to find meaningful and practical ways to improve safety and quality in patient care and share our expertise and experience in laboratory accreditation,” she added.

[University Hospitals](#), located in Cleveland, OH, offers the region’s largest network of primary care physicians, outpatient centers and hospitals. They are in the process of developing a Center for Excellence in Diagnosis with a focus upon the rational use of diagnostic resources. The Center will focus upon optimizing health care provider diagnostic practices, engaging patients in the diagnostic process, developing guidelines for appropriate use of new and emerging diagnostic tests, and education to improve clinical diagnosis and reasoning.

"Improving quality and safety in general is a top priority at University Hospitals. We are especially focused upon improving diagnostic processes and reducing diagnostic error. Our commitment to the Coalition is a natural extension of the involvement of key system leaders in improving diagnosis," said Goutham Rao, MD, FAHA, chief clinician experience officer at University Hospitals. "We are invested in developing a center of diagnostic excellence with an emphasis upon identifying, implementing, and evaluating best diagnostic processes across a variety of settings and disciplines. The Coalition will allow us to share and learn from other members as we move forward in this new decade."

The organizations behind the Coalition represent clinicians, patients, health systems, researchers, and testing professionals—all acknowledging that improvement will require sustained work over several years with all stakeholders involved.

Dozens of DEM2019 Attendees Visit Capitol Hill

This past November, more than 70 attendees at the [Diagnostic Error in Medicine 12th Annual International Conference](#) (DEM2019) met with Capitol Hill representatives from their home state delegations to educate them about the harm caused by diagnostic error and the need to support research and other approaches to improving diagnostic quality and safety.

The Diagnostic Quality Hill Day took place on the last day of the conference and began with a training session that covered the essentials on how to have effective meetings with busy legislators and/or their staff, including a presentation modeling how to concisely and powerfully present the key facts and compelling statistics that demonstrate the importance governmental action to improve diagnostic quality.

The groups then went to the Capitol to conduct more than 60 meetings with staff or members of Congress. For example, attendees from the Chicago area met with Representatives Jan Schakowsky (D-IL) and Danny Davis (R-IL), while the Philadelphia contingent met with Representative Brian Fitzpatrick (R-PA) and Alaska participants discussed diagnostic quality with Senator Lisa Murkowski (R-AK).

“This is the first time the Society to Improve Diagnosis in Medicine (SIDM) brought leaders committed to improving diagnosis to meet directly with members of Congress,” said Leslie Tucker, senior policy

advisor at SIDM. “We hope that by increasing awareness of the problem and suggesting areas of opportunity, we can motivate Congress to consider public policies that better support and improve diagnostic quality and safety.”

Staffers and legislators were provided information about the human and financial harms from diagnostic error and discussed ideas to drive improvements in diagnostic quality and safety through investments in research, quality measure development, improvements in electronic health records, and development of healthcare payment models that value diagnosis.

The Diagnostic Quality Hill Day was part of the programming at SIDM’s DEM2019 conference. Over 500 attendees convened at the Hyatt Regency Washington on Capitol Hill for the conference, breaking attendance records for all previous Diagnostic Error in Medicine conferences. The DEM2019 theme was *Shaping Policy, Improving Practice*, focusing on ways that patients, health professionals, researchers, and health leaders alike can help design and promote new policies to improve diagnostic quality and safety. Planning is underway for the 2020 conference, which will take place in Minneapolis, MN, with the theme of *Transforming Education and Practice*. Look for a new hashtag/abbreviation for this year’s conference: [SIDM2020](#).

Applications Open for 2020 Fellowship in Diagnostic Excellence

The Society to Improve Diagnosis in Medicine has opened the application period for the 2020-2021 [Fellowship in Diagnostic Excellence](#). The fellowship is designed to enhance the learners’ knowledge and skills in diagnostic quality and safety. The program matches fellows with experienced mentors and recognized leaders in the field of diagnostic error, connects them with the diagnostic error community, and helps them develop and implement their own projects.

The one-year SIDM fellowship begins on July 1, 2020, and will provide professional career development through:

- A personal mentor in the learner’s area of focus within diagnostic quality and safety
- Networking within the diagnostic medicine field
- A structured curriculum of webinars on topics related to diagnostic quality and safety
- Opportunities for disseminating scholarship at SIDM’s annual Diagnostic Error in Medicine conference and through peer-reviewed publications, such as the SIDM journal, [Diagnosis](#).

The overarching goals of the fellowship align with the eight core goals for reducing diagnostic error that are outlined in the 2015 National Academy of Medicine report [Improving Diagnosis in Health Care](#). **All fellows** benefit from the curriculum, project mentorship, integration with the SIDM community, and financial support to attend the annual Diagnostic Error in Medicine conference.

The Fellowship in Diagnostic Excellence offers options for learners, according to their interests:

- 1) For individuals who are looking to supplement their current position in the health professions with training in diagnostic quality and safety.

2) For individuals in an advanced fellowship and/or degree-bearing program who are developing a scholarly focus on diagnostic quality and safety. This opportunity includes a salary stipend for the scholarly work (akin to grant funding in fellowships).

Funding for the fellowship program is provided by the Gordon and Betty Moore Foundation. The application period is now open and closes on **March 2, 2020**. Learners may apply now and visit <http://www.improvediagnosis.org/sidmfellowship> for more information. Applicants may also contact fellowship@improvediagnosis.org with questions.



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