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When Measuring Is More Important than Measurement: The Importance of Measuring Diagnostic Errors in Health Care

Diagnostic errors are unacceptably prevalent and harmful,[1,2] yet they have received little attention in the field of patient safety.[3] Reasons for this include the lack of widespread awareness of the problem, the myriad and complex factors leading to diagnostic error, and the lack of clearly defined and generalizable measurement strategies for assessing the diagnostic process and its outcomes.[4] Furthermore, the diagnostic process reflects one of the core tasks of physicians, making diagnostic errors a sensitive topic to discuss, necessitating an open, nonpunitive safety culture.[5]

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More than 20 years ago, the publication of *To Err is Human*[6] started a culture change, and since the publication of the National Academies of Sciences, Engineering, and Medicine report on Improving Diagnosis in Health Care in 2015,[7] attention to diagnostic errors has increased. Increasing diagnostic safety is now, finally, considered a patient safety priority. Consequently, there has been significant progress in diagnostic safety in the last few years, including in the field of pediatrics. Specifically, there is better understanding of the incidence of diagnostic errors, curricular interventions to improve diagnosis education, and implementation of strategies to define and evaluate uncertainty in clinical medicine.[8-10]

In this volume of *The Journal*, Perry et al describe another important step forward in improving diagnosis in pediatric practice, not only for the initiative described, but also for the implications for the field.[11] In this editorial, we discuss the importance of the Diagnostic Error Index (DEI), describe its strengths and limitations, and make suggestions to further develop the DEI.

The Diagnostic Error Index

Perry et al describe a rigorous and impressive quality improvement (QI) project to develop an effective and efficient measure for diagnostic error.[11] In their large tertiary care children's hospital, the project team formed a multidisciplinary QI team representing different health care professionals, the Chief Medical Information Officer, and representatives of QI services. Pragmatically, they chose 5 existing data sources from which to identify potential diagnostic errors. Subsequently, the project team discussed those potential diagnostic errors and determined which could be confirmed. The DEI is defined as the number of confirmed diagnostic errors in 1 month.[11]

Drawing upon already reported diagnostic errors through a variety of existing systems makes the DEI efficient for use in

DEI	Diagnostic Error Index
QI	Quality improvement

0022-3476/$ - see front matter.
https://doi.org/10.1016/j.jpeds.2020.12.076

practice, as well as more likely to overcome a common initial barrier in data-driven QI and patient safety work. Data are often criticized and questioned well before they are believed, especially when the data paint the health system and/or provider in a less than positive light. The diversity of data sources has another key advantage: different sources identify different types of errors and complement each other.[12,13] Simply said, the more data sources, the better the reflection of the diagnostic errors that occur. The DEI could benefit from adding even more data sources. Specifically, future iterations should include intentional collection of patient-reported diagnostic errors and other data sources that robustly represent the patient and family perspective about the diagnostic process.[14]

The pragmatic approach also results in a disadvantage. Some of the existing data sources in the DEI lack a denominator, which prevents population-based assessment of diagnostic errors.[15] Related to this, the risk of hindsight bias (ie, flawed judgement when an outcome is known) and the lack of a double-blind evaluation limit the potential prospective use of the DEI to evaluate the effect of interventions. Consequently, the effects of interventions cannot be measured based on the DEI in its current form. In addition, we recommend using an established tool to determine whether a diagnostic error occurred. Diagnostic errors are complex to measure and often have a low interrater reliability even with multiple raters.[1] Compared with those record review measures, the DEI has many more representatives of a variety of different specialties, but nevertheless, the use of an established measure for diagnostic errors (eg, SAFER Dx) can contribute to a more reliable measurement.[16]

The Importance of Measuring

Even more important than the measure developed by Perry et al, however, is the fact that they are measuring diagnostic errors - and talking about it. The initiation of a large multidisciplinary QI group to work on improving diagnostic safety is an intervention in itself. This intervention requires institutional courage and commitment, as shining a light on diagnostic errors exposes an uncomfortable reality: diagnostic errors are common and harmful. This innovation contributes to a safer culture by its very existence. The culture of a healthcare organization is crucial to the ability to improve patient safety, or to impeding this improvement.[5]

There are 3 distinct yet related components of a patient safety culture: just culture, reporting culture, and learning culture.[17,18] Just culture is a culture of trust, with shared ideas of what is acceptable and what is not. A just culture does not hold individuals accountable for system failings. A reporting culture encourages the reporting of errors and near misses and is aimed at improving safety. This is especially important when addressing diagnostic errors, because most traditional adverse event reporting systems do not capture diagnostic errors, and many diagnostic errors are ripe learning opportunities but may not lead to harm. A learning culture focuses on learning from errors and near misses. Studies have suggested that the diagnostic process is one from which much rich learning can be gleaned, but this must be intentional and does not happen without significant institutional investment and individual commitment.[19] These 3 components are related to one another: a just culture is a prerequisite for a reporting culture, which in turn is needed to create learning opportunities for a learning culture. The DEI addresses all 3 of the cultural aspects. The fact that many different levels of hierarchy participate in the QI team contributes to the just culture aspect.

The DEI is not perfect, but it is useful and important. There is a debate about the role of metrics in health care overall and the field of diagnostic quality and safety specifically. Overreliance and overfocus on metrics can have adverse effects on health care providers, commoditize patient outcomes, and lead to strategies that "game the system" more than they actually improve health care outcomes.[20] The fact that the authors publicly developed, refined, and published the DEI reflects a deep and forward-facing institutional commitment to improving diagnostic safety. Not only are researchers and clinicians engaged in this important work, but the leadership of the institution is courageously engaged in their support of the work. To put it differently, the act of measuring may be more important than the measure itself.

It is tempting for health systems to not even begin focusing on diagnostic safety and quality due to the lack of validated measures, or to fail to commit resources to improving diagnosis because of the lack of publicly reported, financially impactful measures. However, taking the first steps of measuring—as a measurement is conceived of, developed, and refined—is fundamental to moving the field forward. Researchers and health system leaders must take these first steps together in beginning to measure something so important to patients and their families. The measures will not be perfect, but we must not let the pursuit of—and wait for—perfection to become the enemy of doing something good.

Next Steps

By developing the DEI, the researchers set an example for other healthcare institutions to start using the DEI. This allows for further development and evaluation of the DEI. Future iterations of the DEI should allow for prospective evaluation of interventions to improve diagnostic performance.[21] A first step could be to have separate scores for the data sources with and without an available denominator. The data sources without a denominator would still provide important insights into the burden and contributing factors of diagnostic errors and can provide lessons for improving the diagnostic process. The data sources with an available denominator could serve as an ongoing measure for diagnostic error reduction. Another

advancement would be to explore the possibilities of a blinded review process by the QI team or at least an evaluation that examines the extent to which nonblinded evaluation affects outcomes. Hindsight and outcome bias have been shown to have a large effect on the evaluation of previous diagnostic errors.[22] Therefore, it is possible that the QI team unintentionally confirmed fewer diagnostic errors after implementation of an intervention.

In conclusion, the DEI is an important step toward reducing diagnostic errors and provides a great example for other health care institutions. ■

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