Measure Dx: Implementing pathways to discover and learn from diagnostic errors

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Abstract

Diagnostic errors occur at an alarming frequency; estimates from the USA suggest that 5% of adult outpatients experience a diagnostic error each year [1], and about a quarter million harmful diagnostic errors occur each year in hospital settings [2]. Despite the frequency of these events, clinicians and healthcare organizations (HCOs) seldom learn from them [3]. One reason is that diagnostic errors are difficult to identify and analyze. Strategies to systematically detect and learn from diagnostic error remain early in development and not widely implemented. In this paper, we discuss a new resource from the US Agency for Healthcare Research and Quality—Measure Dx—that synthesizes knowledge from researchers at the leading edge of diagnostic safety measurement to provide pragmatic guidance on how HCOs can identify and analyze diagnostic errors for the purposes of learning and improvement.

Overcoming obstacles to measurement

Measure Dx addresses several barriers to measurement of diagnostic errors. For instance, lack of consensus around an operational definition of diagnostic error has slowed improvement efforts. The resource adapts prior definitions [3, 6] to define and operationalize ‘diagnostic safety events’ and addresses methodological barriers by providing valid, pragmatic tools and guidance on how to perform diagnostic safety analysis and classify contributing factors. These tools may be applied to different types of diagnoses (e.g. cancer and cardiovascular) and settings (e.g. hospital, primary care and emergency care).

Another obstacle to measurement is uncertainty about where and how to get started. Considering which diagnoses to focus on, how to identify at-risk diagnostic processes and which factors most significantly led to missed or delayed diagnosis can all be overwhelming. As noted above, aiming for universal capture of these events is unrealistic. Rather, the goal is to overcome inertia and begin to identify diagnostic safety events by sampling possible events from data sources that are readily available. Figure 1 presents an overview of several data sources that can be used to identify events for further analysis. Although the primary goal of these activities is not an event count per se, events can be tracked quantitatively over time for improvement efforts using even a small number of discrete data sources [7].
Recent work at several US HCOs shows it is feasible to use systematic approaches to detect and analyze diagnostic errors and learn from these missed opportunities. Measure Dx incorporates several of these real-world cases and lessons learned, along with research on emerging measurement strategies [8], into a modular resource that can be used by healthcare entities from smaller practices to entire health systems. The resource helps create a shared understanding of the task and a plan to identify and systematically collect data from events for shared learning and discovery. We recently field-tested Measure Dx in collaboration with 12 clinician-led quality and safety improvement teams at HCOs across the US. Feedback from these teams was used to refine Measure Dx prior to its release (available for free at: https://www.ahrq.gov/patient-safety/settings/measure-dx.html).

To implement Measure Dx, we recommend that HCOs form a diagnostic safety team, including at a minimum a quality and safety professional and a clinician whose scope of practice includes diagnosis. This allows a focus on both cognitive (e.g., clinical reasoning and assessment) and systems aspects of analysis. However, to ensure synergy, Measure Dx should be integrated within existing patient safety structures. We recommend that anyone using these strategies for the first time begin with a small scope of work. As diagnostic safety activities mature, teams can explore multiple data sources synchronously and may shift their event detection and analysis strategy toward those that have the greatest yield for actionable intelligence. In line with the goals of a learning health system, this effort is expected to be cyclical, or iterative, over time and should inform development of solutions. Throughout the process, psychological safety is imperative. Missed, delayed and wrong diagnoses must be framed as learning opportunities.

**Figure 1** Four Strategies to Identify Diagnostic Safety and Learning Opportunities

**Measure Dx content**

Measure Dx can enable HCOs and clinicians to make progress in the complex area of diagnostic safety measurement. Many of the data sources and analytic techniques described in this resource are generalizable across various settings and countries. The resource could be useful to any HCO that has some existing infrastructure for safety and is interested in discovering improvement opportunities from the analysis of diagnostic errors. Wider adoption of Measure Dx, along with the implementation of solutions that result, can advance new frontiers in reducing preventable diagnostic harm to patients.

**Funding**

This work was supported by the Agency for Healthcare Research and Quality (AHRQ), US Department of Health and Human Services [contract number HHSP233201500022I/75P00119F37006]. The authors are solely responsible for this manuscript’s contents, findings and conclusions, which do not necessarily represent the views of AHRQ. Readers should not interpret any statement in this product as an official position of AHRQ or the US Department of Health and Human Services.

Dr. Singh is also funded in part by the Houston Veterans Administration (VA) Health Services Research and Development (HSR&D) Center for Innovations in Quality, Effectiveness and Safety (CIN-13-413), the VA HSR&D Service (IIR17-127 and the Presidential Early Career Award for Scientists and Engineers USA 14-274) and the Agency for Healthcare Research and Quality (R01HS27363).

**Author contribution**

A.B. and H.S. drafted the manuscript. M.S. revised the draft manuscript. All authors contributed substantively to the content of the manuscript and had an opportunity to review and approve the final submitted version.
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