Improving Diagnostic Safety in Primary Care by Unlocking Digital Data

Hardeep Singh, MD, MPH

During the past two decades, retrospective “look-back” studies have revealed several common types of diagnostic process failures in patients with delayed diagnoses of cancer.1–8 Often, these breakdowns involve lapses in history taking, physical examination, test ordering, and follow-up of important clinical information. In this issue of The Joint Commission Journal on Quality and Patient Safety, Weingart et al. present strikingly similar findings from a “look-forward” review of diagnostic evaluation of rectal bleeding in primary care patients.9 Thus, both approaches confirm a pattern with important implications for public health, patient safety, and medico-legal knowledge.

Weingart et al. found diagnostic process breakdowns quite frequently, including clinicians failing to obtain an adequate family history in 38% of cases, performing an appropriate physical exam in 23%, and ordering appropriate laboratory tests in 16%. Similar breakdowns have been described in other settings. For example, in our previous work, we found key pieces of information (such as history or test results) documented in the medical record but not followed up.7,10,11 At other times, there was failure to act on red flags (such as new anemia or rectal bleeding) in the patient’s presentation.4,6,12,13 These breakdowns were associated with missed or delayed diagnosis for cancer (including colorectal cancer [CRC]) as well as common and serious non-cancerous conditions in primary care.

Diagnostic process failures in primary care are multifaceted. Primary care physicians (PCPs) now have very little time to do their cognitive work related to diagnosis and to make sense of all the patient data. Diseases common in primary care (which tend to be benign and self-limiting), as well as diseases that are uncommon (which tend to be serious and life threatening), both present with undifferentiated features early in their course and typically unfold over time and across several episodes of care.14,15 PCPs may also have limited experience with uncommon diseases, as it is impossible to master all 10,000 diagnoses on the World Health Organization’s (WHO) International Classification of Diseases, Tenth Revision (ICD-10) lists, and a non-trivial number of new disease entities are recognized every year. In many settings, PCPs act as gatekeepers to specialists and more sophisticated diagnostic testing, placing a tremendous responsibility on PCPs to carefully balance the risk of missing serious illness with the wise use of often scarce and costly referral and testing resources. However, PCPs also miss red flags of common conditions, some of which can be explained by the chaotic work environment and poor data gathering that results; thus, interventions to support PCPs’ cognitive work are essential.

How should patient safety professionals respond to these alarmingly common problems? Patient safety is not as well organized in ambulatory care, and this lack of infrastructure and resources has been a definite barrier to advancement.16 Most health care institutions are not actively measuring failures in the diagnostic process, but evidence now compels us to adopt new methods and standards in order to do so.17 In the fragmented outpatient environment, tracking a patient’s diagnostic process over time is also not easy, particularly when clear standards defining “delays” are lacking. Admittedly, even defining what constitutes a “delayed” diagnosis is challenging.16 However, with the increasing use of electronic health record (EHR) and digital data, conceptually, addressing these barriers should become more feasible. The problem is that most institutions are not using EHRs or aggregated EHR data effectively18 to improve safety, making this an opportune time for patient safety professionals to lead the way in doing so. EHRs potentially contain plenty of evidence of diagnostic process failures and can now clock the time it takes to act on a new red flag, such as follow-up colonoscopy for patients with rectal bleeding. While there are several opportunities for improvement, I outline two areas where we could begin.

First, we need to improve recognition of key red flags in EHRs by capturing essential data in a more “structured” way so the data can be used for improving care. For example, despite its importance, family history tends to be poorly documented even in the presence of EHRs and is often available only in a narrative free-text format that is poorly accessible.19,20 Capturing such critical data in the EHR in a structured fashion could enable better clinical decision support that helps busy providers recognize the need for additional workup.21 There are several patient and clinician-related barriers to be overcome, including clinician time to adequately assess and capture family history information in brief primary care encounters. But if done correctly, presence of rectal bleeding and adequately captured family history of CRC in a patient less than 50 years of age, for instance, could initiate an electronic reminder to pursue further diagnostic workup. We similarly identified the need to code certain types of laboratory and imaging test results as “abnormal” so the computer can recognize them as such.22 Patient safety professionals could begin to identify other key data elements for diagnostic safety measurement and improvement that should be coded in the EHR.
Second, once there is a wealth of coded EHR data, it should be put to some use for patient safety measurement and improvement, including identification of diagnostic process failures. In our previous work, we developed “trigger” queries—sets of rules—to electronically identify medical records of patients with potential delays in diagnostic evaluation for cancer. Using two EHR systems, including the nation’s largest EHR (that of the Department of Veterans Affairs [VA] health care system), we developed and tested these computerized triggers to identify patient records with diagnostic process breakdowns when no follow-up had occurred after a predefined period. For example, triggers selected patients with suspicious or abnormal chest x-rays or CT scans, abnormal PSA values, rectal bleeding, and positive fecal occult blood tests who had not been followed up on a timely basis. We consider these programs like finding needles in a haystack, using health information technology (IT) both as a magnet to attract “needles” and also to make the haystack smaller so needles are easier to find. When these records with potential delays are detected, this information can be communicated to the responsible clinicians. With further work funded by the VA and the Agency for Healthcare Research and Quality, we have refined these trigger tools to produce actionable information, with the ultimate goal of catching diagnostic breakdowns “in process” and reducing potential harm. In a randomized controlled trial, we found that these electronic triggers were effective in reducing time to diagnostic evaluation of colorectal and prostate cancer and improving the proportion of patients who receive follow-up as compared to usual care. Other health care organizations could now test this trigger methodology to see if it can provide specific, actionable, and concurrent information.

It is now time for patient safety professionals to harness EHR capabilities, use trigger-based monitoring and surveillance tools to reduce delays in primary care, and build “back-up systems” to catch abnormalities that might have been missed. To realize this goal, patient safety professionals need to develop close collaborations with health IT professionals, learn basic informatics concepts, or better yet, partner with experts in informatics, and become familiar with how electronic data capture can be used for meaningful safety improvements. There may be some trial and error involved, but certainly we need to begin. What good, after all, is the wealth of patient data in our EHRs if we are unable to learn from it to improve patient safety and diagnosis?

Funding. Dr. Singh is supported by the VA Health Services Research and Development Service (CRE 12-033; Presidential Early Career Award for Scientists and Engineers USA 14-274), the VA National Center for Patient Safety, the Agency for Health Care Research and Quality (R01HS022087 and R21HS023602), and the Houston VA HSR&D Center for Innovations in Quality, Effectiveness and Safety (CIN 13-413).

Disclaimer. The views expressed in this article are those of the author and do not necessarily represent the views of the Department of Veterans Affairs.

Conflicts of Interest. The author reports no conflict of interest.

REFERENCES


Hardeep Singh, MD, MPH, is Chief, Health Policy, Quality and Informatics Program, US Department of Veterans Affairs (VA) Center for Innovations in Quality, Effectiveness and Safety, Michael E. DeBakey VA Medical Center and Baylor College of Medicine, Houston. Please address correspondence to Hardeep Singh, hardeeps@bcm.edu.


