Published in final edited form as:

JAMA. 2010 July 28; 304(4): 463–464. doi:10.1001/jama.2010.1035.

Reducing Diagnostic Error through Medical Home-Based Primary Care Reform

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If implemented correctly, the patient-centered medical home (PCMH) can potentially address many current safety concerns in primary care. One highly relevant but underemphasized safety concern is diagnostic error (i.e., missed, delayed, or wrong diagnosis),¹ possibly the leading type of error in primary care. Diagnostic errors are the single largest contributor to ambulatory malpractice claims (40% in some studies) and cost approximately \$300,000 per claim on average.² The Joint Principles endorsed by major US primary care organizations envision practice changes to improve coordination, communication, and continuity of care, deficits of which are associated with diagnostic errors. Also integral to the PCMH concept are electronic health records (EHRs), which, despite their current limitations, can enhance access to data and advanced decision support to reduce diagnostic error.³ However, PCMH models, as currently envisioned, do not address other fundamental and deeply rooted systems and cognitive problems that cause diagnostic error.⁴ For instance, the Department of Veterans Affairs (VA) uses an advanced EHR and has a relatively unique integrated model of care that resembles PCMH, yet diagnostic errors persist in this system.^{5,6}

The effectiveness of medical homes depends in large part on their ability to deliver timely and reliable diagnosis, one of the core functions of primary care. In this commentary, we use Vincent's framework for analyzing risk and safety in clinical medicine,⁷ as well as insights from our own work, to recommend five "rights" for reducing diagnostic errors in future PCMHs within and outside the VA system.

1) Right Teamwork

Thirty million additional patients in the US will soon enter already strained primary care panels. This reality, combined with additional PCMH-related practice reforms, will make delegation of existing physician tasks to other members of the home-team both inevitable and potentially beneficial. Delegation, if handled appropriately, could mitigate diagnostic errors related to patient follow-up. For example, team members could monitor test results, referrals, and appointments for high-risk patients to ensure appropriate follow-up and

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The views expressed in this article are those of the authors and do not necessarily represent the views of the Department of Veterans Affairs or the National Institutes of Health.

Conflicts of Interest

None

prevent diagnostic delays. Task delegation may also facilitate diagnosis by creating additional opportunities for data gathering, a common breakdown in the diagnostic process,⁵ and by making available more non-face-to-face clinical time for providers.

If delegation is not done correctly, however, it will increase diagnostic errors, especially those related to hand-offs. Despite the PCMH model's emphasis on team-based care, little is known about how team members can function effectively in the highly distributed medical home context. Innovative models of medical team training, such as crew-resource management, are emerging and could become essential to PCMH implementation. Meanwhile, the potential for ambiguous responsibility in team-based care must be offset by continued emphasis on individual accountability and ownership of patients.

2) Right Information Management

Breakdowns in information management, including communication and coordination of care, are among the leading causes of diagnostic error in outpatients.^{5,6,8} Despite PCMH models' emphasis on technology to facilitate information management, the real-world effectiveness of these interventions warrants scrutiny, and the many non-technological breakdowns that contribute to error must also be addressed. For instance, EHRs aid in the transmission of critical information but do not guarantee that providers will respond appropriately.⁶ PCMH models must therefore emphasize reliability not only in the transmission of information but also in completion of required follow-up actions by the recipient. Related problems include the communication breakdowns that develop at the generalist-subspecialist interface. Despite facilitated electronic referrals, we found that unclear responsibility for patient follow-up between PCPs and subspecialists contributed to a significant number of breakdowns in care.⁹

If information management problems are not addressed, they are likely to worsen in the PCMH era. Clinical information accessible through health information exchanges and integrated EHRs will be invaluable to medical homes. However, we have found that providers continue to miss diagnostic information even when it is clearly documented in integrated EHRs,^{5,6,8} and one likely contributing factor is the overwhelming volume of alerts, reminders, and other diagnostic information in the EHR. Better techniques to summarize and present data are needed to enable providers to find the proverbial "needle in the haystack" in the midst of voluminous data. EHRs must be optimized to provide the *right* information rather than *all* the information. Furthermore, comparative effectiveness studies should be undertaken to evaluate which EHRs are more "effective" in reducing diagnostic error in medical homes.

3) Right Measurement and Monitoring

Reducing diagnostic error will require performance monitoring strategies that go beyond the rudimentary and largely ineffective peer review systems that are currently used to assess providers' competence.¹⁰ Refined metrics of processes and outcomes should address not only compliance with preventive measures but also key indicators of diagnostic performance (e.g., appropriate management of diagnostic test results). These monitoring processes could be accompanied by feedback on specific prevention strategies to improve common breakdowns in the diagnostic process, such as history and physical exam skills and test ordering. Equally critical is the capacity for robust internal reporting systems to identify errors made in practice and generate feedback to providers. Agreements established between local emergency departments and inpatient providers may promote mutual reporting of errors made by one party and detected by the other. Finally, new methods are needed to detect diagnostic errors proactively. One way to achieve this is through electronic

surveillance and monitoring techniques using the “trigger” approach,⁵ followed by feedback to providers.

4) Right Patient Empowerment

Preventing diagnostic errors is the primary responsibility of providers and healthcare systems. However, because these errors are so pervasive, providers must also enlist patients as key partners in prevention and detection. Although current PCMH models already emphasize patient engagement in chronic disease management, future models should envision strategies to utilize patients as final safety-nets to prevent or detect errors. Encouraging “activating” questions (e.g., How do I make sure I hear about all my test results? Do I need another opinion? How and when should I get back to you if I’m not better?) should become part and parcel of the PCMH commitment to reducing these errors. Information technology interventions, such as automatically generated summaries or “action plans” for upcoming visits and secure messaging for delivery of test results and reminders, could bolster these empowerment strategies.

5) Right Safety Culture

The current conversation on PCMH is understandably focused on reimbursement and chronic disease care. However, if PCMH is to truly transform primary care, then patient safety must be a central, organizing principle, and not just an afterthought. From a practical standpoint, this necessitates an appropriate infrastructure and skill set to ensure effective implementation of the four rights described above. Safety innovations from high-reliability organizations and industries have already reaped benefits in hospital settings and may be applied in new ways to improve the diagnostic process in the medical home. In particular, the application of systems and human factors engineering to reduce inefficiencies and error-prone conditions may reduce or eliminate risk factors for diagnostic delays. Cognitive scientists, informaticians, and human factors and systems engineers must collaborate to address the challenges inherent in adopting this new model of care.

In summary, diagnostic error reduction requires major transformational changes in healthcare delivery, and the PCMH model offers an unprecedented opportunity to address these errors. The outcome of this difficult task could depend on how our proposed rights are engineered into this enterprise.

Acknowledgments

Funding

Dr. Singh is supported by an NIH K23 career development award (K23CA125585), the VA National Center of Patient Safety, Agency for Health Care Research and Quality and in part by the Houston VA HSR&D Center of Excellence (HFP90-020). Dr Graber is supported by AHRQ grant 1R1 3HS018321-01. These sources had no role in the preparation, review, or approval of the manuscript.

We would like to thank Annie Bradford PhD for assistance with medical writing for which she received no compensation

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