



Client Risk Solutions | Going Beyond Insurance

Failures in Test Result Management: **The Good, the Bad and Diagnostic Errors**



Part III in a Series

October 2017

Abstract

PURPOSE: The purpose of this analysis is to use medical group assessment data to determine key liability risks that may result in patient harm. This is the **third** resource paper in a multi-part series with review and analysis of the findings. The data covers the period of 2013-2016 using information extracted from an American International Group (AIG) scored assessment tool. Questions were developed based on the potential for system defects. Clients used the results to guide redesign of processes and operations to mitigate risks. Domain scores proved useful in analyzing trends, setting priorities for consultation, and creation of new client resources.

RESULTS: Low scores in the risk domain **Tracking Systems for Follow-up Care** domain for indicate under-developed processes and operations in the prevention of errors that could lead to patient harm. Poor tracking of patients' test results often result in **diagnostic errors**. Data has been used to identify risk management issues, develop new resources and implement meaningful recommendations in addressing risk exposures specific to medical groups.

Please refer to the first paper titled “Medical Group Risk: Decluttering Design with Data” to review methods and results for all risk domains within the medical group assessment tool.

Introduction

Out of the Shadows of Inpatient

Diagnostic error is one of the most important areas in the patient safety movement but has been underrepresented in studies and analysis.¹ Much attention paid to inpatient patient safety errors such as surgical errors and medication errors have captured the public's attention. Studies suggest that we are unlikely to find one "magic bullet" to address diagnostic errors, especially when one considers that a multifaceted approach is needed to understand system and cognitive issues to adequately address diagnostic error.²

While it is very difficult to quantify the number of diagnostic errors and cost related to ambulatory settings, current research estimates 12 million U.S. adults (approximately 1 in 20 adults)³ who receive outpatient care will experience a diagnostic error and about half of those errors have the potential to lead to severe harm.⁴ Further, in large studies of outpatient malpractice claims, diagnostic errors emerge as the most common category⁵. Some healthcare analysts estimate that about 40% of all medical malpractice ambulatory claims are related to diagnostic error⁶. Additionally, diagnostic errors are the leading type of paid medical malpractice claims and are almost twice as likely to have resulted in the patient's death compared to other claims.⁷

Gaining Traction

The recent National Academy of Medicine Report (Formerly Institute of Medicine), "Improving Diagnosis in Health Care" (2015) has garnered public attention in its conclusions that most people will likely experience at *least* one diagnostic error in their lifetime. Additionally, we will know someone who will experience a missed or delayed diagnosis, often with devastating consequences.⁸

¹ Wachter, R. (2010, September) Why diagnostic errors don't get any respect-and what can be done about the Health Affairs 2009. Retrieved: <http://content.healthaffairs.org/content/29/9/1605.full>. Doi: 10.1377/hlthaff.2009.0513

² Singh, HI, et al The global burden of diagnostic errors in primary care, August 2016. BMJ Quality and Safety Online First. Accessed <https://psnet.ahrq.gov/resources/resource/30209/the-global-burden-of-diagnostic-errors-in-primary-care>.

³ Singh, H., Meyer, Thomas, E.J. (2014) April. The frequency of diagnostic errors in outpatient care: estimations from three large observational studies involving US adult populations. Accessed: <https://psnet.ahrq.gov/resources/resource/27899/the-frequency-of-diagnostic-errors-in-outpatient-care-estimations-from-three-large-observational-studies-involving-us-adult-populations>

⁴ Singh, HI, et al (2016) The global burden of diagnostic errors in primary care BMJ Quality and Safety Online First. Access: <https://psnet.ahrq.gov/resources/resource/30209/the-global-burden-of-diagnostic-errors-in-primary-care>

⁵ Ibid

⁶ Singh, H., & Graber, M. (2010, July). Reducing diagnostic error through medical home-based primary care reform. *JAMA*, v.304, No.4. Accessed <http://qualitysafety.bmj.com/content/qhc/early/2016/08/16/bmjqs-2016-005401.full.pdf>

⁷ Institute of medicine national academies of sciences, engineering, medicine. (2015, September). Improving diagnosis in health care. Quality chasm series. Access; www.national-academies.org

⁸ Report Brief. National academies of sciences, engineering, medicine. (2015, September). Improving diagnosis in health care. Access http://www.nationalacademies.org/hmd/~media/Files/Report%20Files/2015/Improving-Diagnosis/DiagnosticError_ReportBrief.pdf

Continuing the Path Led by Two Other Landmarks

This seminal report is a continuation of the landmark National Academy of Medicine reports “To Err is Human: Building a Safer Health System”⁹ and “Crossing the Quality Chasm: A New Health System for the 21st Century”¹⁰. The first report, to “Err is Human” was a call to action, estimating that 44,000-98,000 Americans die each year from medical mistakes with the committee’s conclusions that care is not as safe as it should be. The second report provided a vision by broadly defining what is known as high-quality care and describes the gap between quality and type of care that is actually received by patients.¹¹ These reports are credited with launching the patient safety movement and catalyzed efforts to improve quality and safety in America with a steady stream of patient safety initiatives that followed the report.¹²

Also, significant guiding principles in the 2nd report continue to have an impact in healthcare systems. The principles provide one of the most useful frameworks for quality assessment that guide development of measures in both public and private sectors.¹³

Safe: Avoiding harm to patients from the care that is intended to help them.

Effective: Providing services based on scientific knowledge to all who could benefit and refraining from providing services to those not likely to benefit (avoiding underuse and misuse, respectively).

Patient-centered: Providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions.

Timely: Reducing waits and sometimes harmful delays for both those who receive and those who give care.

Efficient: Avoiding waste, including waste of equipment, supplies, ideas, and energy.

Equitable: Providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status

⁹ National Academies of Sciences, Engineering, Medicine. (1999) November. To err is human: building a safer health system. www.nationalacademies.org.

¹⁰ National Academies of Sciences, Engineering, Medicine. (2001) March. Crossing the quality chasm: a new health system for the 21st century. www.nationalacademies.org.

¹¹ Agency for Healthcare Research and Quality (AHRQ). System design. Access: <https://www.ahrq.gov/professionals/systems/system/systemdesign/index.html>

¹² Wachter, R. (2010, September) Why diagnostic errors don't get any respect-and what can be done about them. Health Affairs 2009.

Retrieved: <http://content.healthaffairs.org/content/29/9/1605.full>. Doi: 10.1377/hlthaff.2009.0513

¹³ Agency for Healthcare Research and Quality (AHRQ). The six domains of healthcare research and quality. Access: <https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/create/sixdomains.html>

The third report, “Improving Diagnosis in Health Care” will continue to support important patient safety initiatives and increase understanding of diagnostic errors. Further, the World Health Organization (WHO) formed a Safer Primary Care Expert Working Group to compile key topics for further research. This led to the development of the 2016 Technical Series on Safer Primary Care, a series of 9 monographs intended to promote good practices and system changes to improve safety.¹⁴ While international issues will differ, it speaks to important momentum on the subject of diagnostic errors.

Definition and Study of Diagnostic Error

Several studies address different categories of diagnostic errors (missed, delayed, etc.), and the IOM Committee provides a definition of diagnostic error as:¹⁵

The failure to: (a) establish an accurate and timely explanation of the patient’s health problem and (b) communicate that explanation to the patient.

Shining More Light on Complexity

Why has this important subject of diagnostic errors laid dormant in the field of patient safety? There are several reasons especially when one appreciates the complex *process* of clinical diagnosis, lack of agreement over definition, identifying number and types of diagnostic errors, and the difficulty in detection of errors in clinical practice. In this light, consider the following noted challenges in studying this topic¹⁶:

- Types of cognitive bias (see Table 1)
- Healthcare technologies that contribute to errors
- Inadequate collaboration and teamwork among clinicians
- Miscommunication amongst patients and clinicians
- Limitations on feedback to clinicians about diagnostic performance
- Lack of transparency and limitations in healthcare systems’ ability to learn from events and improve diagnosis
- Errors in triaging patient problems via telephone
- Lack of financial resources to study and address the problem¹⁷
- Attitudes and culture that encourage inaction and tolerance of error¹⁸

¹⁴ World Health Organization, (2016). Accessed: Safer primary care. www.who.int

¹⁵ Institute of medicine National academies of sciences, engineering, medicine. (2015, September). Improving diagnosis in health care. Quality chasm series. Access; www.national-academies.org

¹⁶ Institute of medicine National academies of sciences, engineering, and medicine. (2015, September). Improving diagnosis in health care. Quality chasm series. Access; www.national-academies.org

¹⁷ Ibid

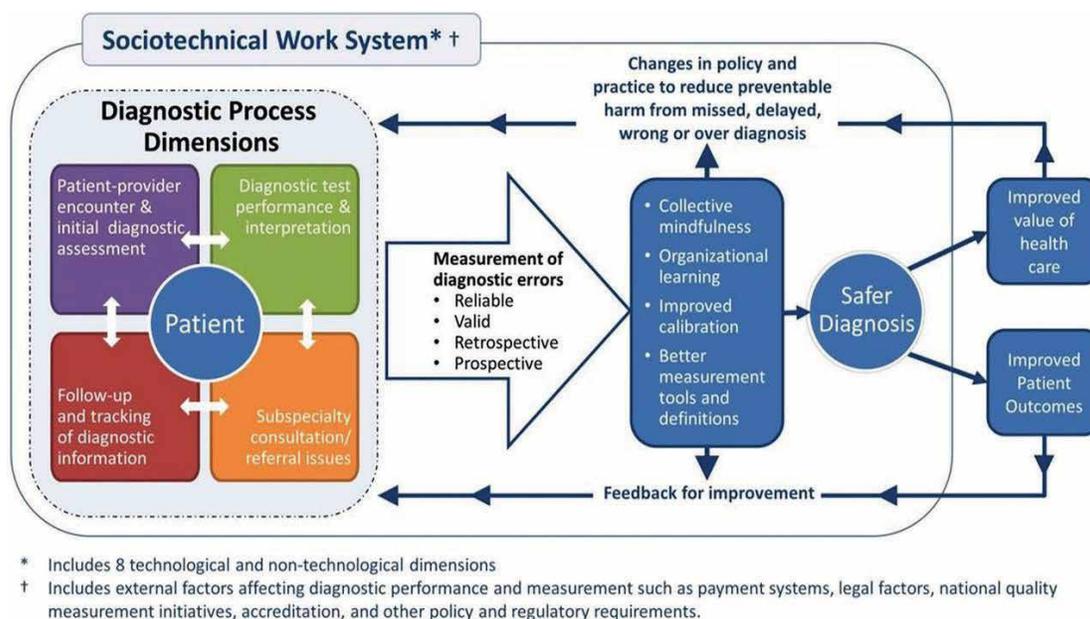
¹⁸ Ibid

- The report *To Err is Human* mentions *medication errors* seventy times, while *diagnostic errors* were mentioned only twice. The 2000 report focused primarily on quality and safety efforts having to do with medical treatment and surgical techniques not on the diagnostic process.¹⁹

A visual by researchers Hardeep Singh and Dean Sitting illustrates the complexities of the diagnostic process is seen below in Figure 1. This framework reviews portions of the diagnostic process dimensions, aspects of measurements, and changes in practices. The intent is to provide foundational evidence as encouragement to policymakers, researchers and healthcare organizations to begin the measurement and reduction of diagnostic errors.²⁰

Figure 1:

The Safer Diagnostic Framework for Measurement and Reduction of Diagnostic Errors



Cognitive Issues and Diagnostic Error

Extensive research provides a wealth of information on the cause of diagnostic error at the individual clinician level. This research has been influenced by the field of cognitive psychology which studies how individuals process information and subsequently develop plans.²¹ When applied to healthcare, we have clinicians that use heuristics (shortcuts or “rules of thumb”) to come up with a provisional diagnosis, especially when faced with patients that present with common symptoms. While heuristics are useful,

¹⁹ Wachter, R. (2010, September) Why diagnostic errors don't get any respect-and what can be done about them. *Health Affairs* 2009. Retrieved: <http://content.healthaffairs.org/content/29/9/1605.full>. Doi: 10.1377/hlthaff.2009.0513

²⁰ Singh, H., Meyer, Sitting, D. (2015) Advancing the science of measurement of diagnostic errors in healthcare: the safer dx framework. Accessed: <https://psnet.ahrq.gov/resources/resource/28658/advancing-the-science-of-measurement-of-diagnostic-errors-in-healthcare-the-safer-dx-framework>

²¹ AHRQ Patient safety primer on diagnostic errors. (2004, August) access: <https://psnet.ahrq.gov>

researchers have used categories that originate in cognitive psychology to discuss several types of errors that clinicians commonly make because of the incorrect application of heuristics. Table 2 outlines the cognitive bias examples taken from emergency medicine. However, the principles can be applied to outpatient healthcare settings such as internal medicine, gastroenterology, etc.²²

Table 1: Cognitive Bias

Cognitive Bias	Description	Error
Availability heuristic	Diagnosis of current patient biased by experience with past cases	A patient with crushing chest pain was incorrectly treated for a myocardial infarction, despite indications that an aortic dissection was present.
Anchoring heuristic (premature closure)	Relying on initial diagnostic impression, despite subsequent information to the contrary	Repeated positive blood cultures with <i>Corynebacterium</i> were dismissed as contaminants; the patient was eventually diagnosed with <i>Corynebacterium</i> endocarditis.
Framing effects	Diagnostic decision-making unduly biased by subtle cues and collateral information	A heroin-addicted patient with abdominal pain was treated for opiate withdrawal , but proved to have a bowel perforation.

Assessment Findings

While cognitive errors play the biggest part in diagnostic error, risk management staff can do much to address risk exposures toward improving test result tracking linked to diagnostic error. The focus of our assessment data was system failures in tracking tests and specialty referrals. One would assume that computerized systems have eliminated tracking challenges, but the OPA data reveals that this assumption is unfortunately false. Many improvements are needed in setting up viable processes and procedures within office settings to avoid missing a returned result, a patient not understanding the importance of getting that test, or losing a patient to follow-up either through appointment scheduling or referral tracking.

²² AHRQ. Patient Safety Primer on Diagnostic Errors, updated 2017; accessed <https://psnet.ahrq.gov>

Staff Engagement

Clients reported that they did not have input as to the design features of electronic systems until after the implementation phase. Additionally, system repairs/changes that initially appeared easy often became complex during the implementation phase because of unanticipated EHR limitations. In fact, what many physicians identify as the “low-hanging fruit” or easy fixes became much more complex once teams worked collaboratively to develop and implement electronic solutions. Thus, lessons learned included making sure that both clinical and non-clinical staffs were involved in redesign features from the planning to implementation phases.

Additionally, findings revealed that for various sites, several different types of obstacles created long delays in redesign of electronic functionality such as poor teamwork, lack of funding for IT changes, or inadequate leadership support from their healthcare organization. Not surprisingly, many of our clients paired electronic test tracking with paper tracking systems, fully admitting to doing “double work” but did so out of fear of losing patients to follow-up. Further, organizational motivation to make the necessary changes may be absent until a serious or tragic diagnostic error claim is filed. Certainly, the importance of clinician leadership cannot be underestimated in comprehending the scope of the problem and the need to help champion the efforts to prevent system failures that would lead to an allegation of missed or delayed diagnosis.

Clinician Leadership and Organizational Support

To illustrate, one of our primary care physicians shared a story with us about a “near miss” of a patient that had relocated to his community shortly after receiving a mammogram in a different state. The patient moved before receiving her results and was seen in his office for a complaint of a chronic cough and a request for refills on asthma medication. In the course of history taking, the patient referenced the date of her past mammogram and the physician asked the office staff to request the out-of-state mammography results. The office was transitioning from a paper system to an EHR and staff procedures included new scanning procedures for out-of-network health information placement in the patient’s chart. The mammography report was scanned into the wrong area of the patient’s chart without email notification for physician review.

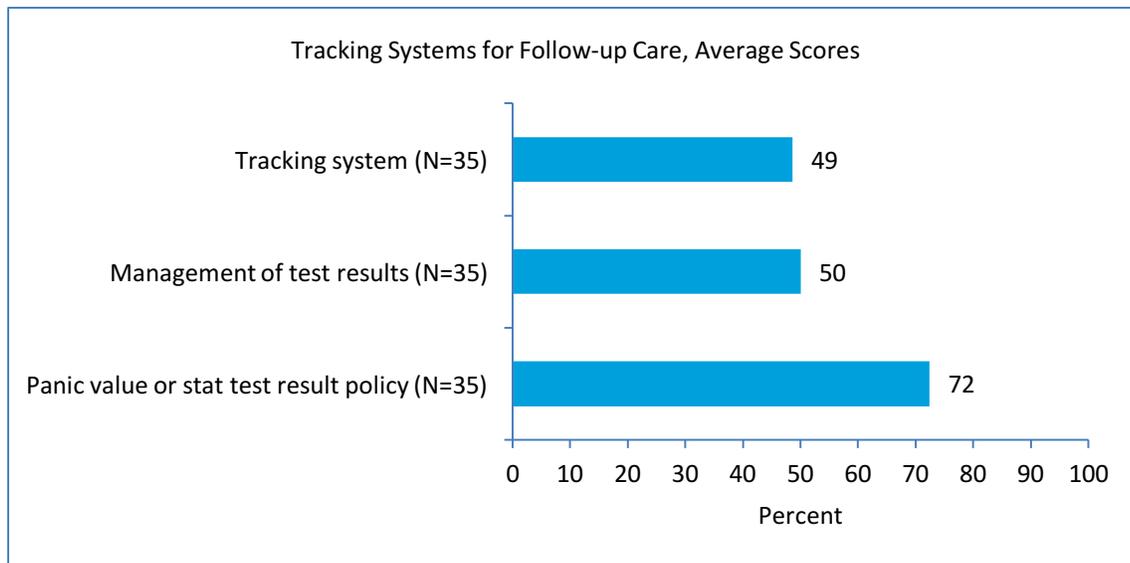
The patient returned a month later with complaints of a cough and sore throat. The physician reviewed his prior notes and realized he had not reviewed the mammography report. The physician made several electronic clicks and received help from a medical assistant to locate the report scanned into their newly implemented EHR. The mammography report findings indicated that a lesion required follow-up. The physician said that while there wasn’t subsequent patient harm (the lesion turned out to be benign), lessons learned pointed to the need to improve their office procedures. All clinical and non-clinical staff worked on re-designing electronic tracking procedures. Also, the involved physician stated that monitoring of the effectiveness of their tracking system is a standing agenda item for discussion at their staff meetings. The physician encourages narratives of potential missed or delayed diagnoses for discussions on the part of both clinical and non-clinical staff.

It is not uncommon to have a situation as this example reported in medical malpractice claims resulting from missed or delay allegations of cancer diagnoses or lack of treatment plans that lead to physical and/or emotional harm. Other examples of system failures leading to diagnostic error allegations include:

- A radiological study that revealed a large kidney mass in a 55 year old female patient was never scanned into an EHR. When the patient returned some 23 months later, a subsequent physician that treated the patient learned of the lost report. The patient died a few months later and the details of the claim revealed that this large practice's transition from a paper system to the electronic system created a number of problems, including reports scanned into the wrong patient records, scanned health information into to the wrong practice location's fax machines, or reports which never reached the physician's EHR inbox for review. A settlement payment in the amount of \$650,000 was awarded to the deceased patient's family.
- A common example of a serious error is a lost report of a significant finding, such as a large mass in the kidney or lung. The paper version is never scanned into or transferred into the electronic record and the patient never receives treatment
- Prior to seeing her first 8 am patient, a clinic physician finds an International Normalized Ratio (INR) result sitting in the fax machine down the hall from her office for a patient she had seen in clinic during the late afternoon the prior day. Concerned about the critical value, the physician calls this patient, and finds out that the patient presented to the emergency room in the early morning with complaints of chest pain and shortness of breath. A bilateral pulmonary embolism was diagnosed. The physician believes that if she had known about the INR sooner, she could have intervened to prevent the patient from being hospitalized. Subsequent to this incident, the physician works with the office staff and IT vendor to find out why there were two system failures: no stat call from the lab and no stat alert in their newly implemented EHR.

Assessment Results

Because of the concern over liability claims linked to failures in tracking tests crucial in clinical diagnoses, several questions were included in the assessment data to capture this information. The following data view in Figure 3 indicates potential risk exposures that may be linked to diagnostic error claims:

Figure 3: AIG Assessment Results for Diagnostic Test Tracking Systems

There are several questions with answer selections under each of the subsections in the Figure titled *Tracking Systems for Follow-up Care, Management of Test Results and Panic value/stat test result policy*. Here is a sample of some of the questions:

Q10.2 - Tracking system

With respect to your tracking or tickler system (select all that apply):

- Physician review of all diagnostic tests and physician verification indicated by means of signature or initials (hard copy or electronic) on the test form
- Our tracking system identifies test results that have not been received, including all abnormal tests that require future follow-up (e.g., blood work, PSA, mammograms, pap smears, follow-up x-rays, etc.)
- Our tracking system identifies consults that were ordered/recommended to the patient, but for which we have not received a report
- Our tracking system identifies patients who have failed to follow-up on tests or consults within a specific period of time. This includes all abnormal tests that require future follow-up (e.g., blood work, PSA, mammograms, pap smears, follow-up x-rays, etc.)
- None of the above

Positive Influences of Healthcare Technology

The good news about one aspect of healthcare technology is that we believe automation for panic value alerts may contribute to better communication functions reflected in the higher score of 72%. Many clinicians enthusiastically reported their implementation of smart phone and lab alert integration with EHRs, referred to as “push alerts.” Several medical offices had arrangements with labs for auto-messaging of stat values. This meant that results were simultaneously received by clinicians and medical office personnel via smart phones and email. It is interesting to note that a study published in the *Annals of Emergency Medicine* supported our assumption about realizing effectiveness and efficiency in delivery of test results via smartphones (push alerts) in office settings. While the study is for emergency settings there is promise in the application of the findings to outpatient settings. The study revealed lab results displayed for troponin levels received on physician smartphones meant patients spent 26 minutes less waiting time to be discharged.²³ The findings were compared with those physicians that received results through the hospital EHR. Patients who present to the ED with chest pain have blood drawn to test for troponin levels, which if elevated, indicate a heart attack.

Challenges of Healthcare Technology

The scores under *Tracking System* and *Management of Test Results* are particularly low reflected by **49%** and **50%**, respectively. While challenges in these areas were expected, our assumptions projected a 65-70% range similar to the stat value results at **72%**. We attribute these low scores to factors of EHR designs that are not effective in tracking and supporting test results as well as follow-up appointments. Prior to analysis of aggregate assessment results, we were aware of patient safety reports of EHR limitations, and client frustrations with implementation. However, we did not anticipate the depth of the problems discovered during onsite discussions with clients for this section of the assessment.

Additionally, the OPA findings are reflective of the *Improving Diagnosis Report* concern that health technologies are not “...effectively facilitating the diagnostic process and may even be contributing to errors.”²⁴

Transitioning from Paper to Electronic Systems

Clients shared with us that some of the best practices they maintained in a paper environment were never translated properly into an electronic work flow. For example, physicians and staff noted that old paper tracking systems had a central repository to track results, making it easier to track patients needing a follow-up appointment, pending lab work or consultation reports from subspecialists. Since several current EHR designs do not allow for a central area or repository, each individual patient’s record must be launched to see what is outstanding for each patient. Here is a summary of issues concerning health IT problems that clients shared with us:

²³ Aikta Verma, MD, MHSc, et al. May 2015. University of Toronto in Ontario, Canada, Push-Alert Notification of Troponin Results to Physician Smartphones Reduces the Time to Discharge Emergency Department Patients: A Randomized Controlled Trial. *Annals of emergency medicine*.. doi: 10.1016/j.annemergmed.2017.03.021

²⁴ Institute of medicine National academies of sciences, engineering, medicine. (2015, September). Improving diagnosis in health care. Quality chasm series. Access; www.national-academies.org

- Lack of ability in sorting low to high priority lab work within the EHR
- Inundation of all patient information both relevant and irrelevant automatically transmitted stored in the clinician's electronic inbox
- Delays in diagnostic test orders reaching clinicians when paper test results were returned to a fax machine
- Lack of a central repository of pending diagnostic tests and referrals for all patients; in many EHR designs, clinicians must open each individual patient record to see outstanding diagnostic tests. Some clinicians kept handwritten logs or spreadsheets as tracking logs to avoid having patients lost to follow-up
- Lack of staff resources or IT Vendor resources to quickly amend or redesign aspects of the EHR to address improving test result tracking components
- Elimination of support staff to help identify gaps in communication with patients and physicians for follow-up care when moving to form a paper environment to an electronic environment
- Lack of ability of clinicians to electronically assign access to their patient population for backup clinicians to cover for clinicians on vacation or leaves of absence
- Poor integration of lab work processed outside of integrated health systems problems such as 1) delays in reaching the clinician 2) storage of scanned information in areas of the chart that were not routinely reviewed
- Stand- alone lab interfaces not completely integrated with EHRs requiring tracking of lab work outside the EHR

Recommendations for Health Information Technology

The difficulty in addressing the above issues stem from an inability to customize solutions that would apply universally to all types of EHRs. However, based on review of potential errors in clinical flow and diagnostic management, some of the following immediate approaches can be implemented to lower the chances of errors:

- **Central Repository:** Establish a work team of clinicians, support staff and administration to work with IT in developing a diagnostic interface that provides a central repository that clearly notes stages of ordered, pending and notification. Each stage of clinic workflow needs to be identified along with clinician and non-clinician roles.
- **Support Staff:** Develop support staff roles to help clinicians in handling administrative management for the flow of diagnostic test results and appointment scheduling with patients.
- **Cancelled but not Rescheduled:** Appointments should be tracked by the appointment scheduler so that patients are not lost to follow-up
- **Prioritized/Organized Electronic Inbox:** Implement IT enhancements that allow for prioritization of information that is color coded for fast resolution on the part of clinicians
- **Scanned information:** Identify the most effective ways to organize procedures re: scanned information for clinician review
- **Patient Engagement:** (a)Continue to promote patients' access to lab results but do not rely on that as a means to remove the medical office's responsibility of notifying patients of test results (b) Prior to patient's exiting the exam room, hand the patient a bright colored slip of paper with the printed

medical office phone # and a statement to call the office if they do not receive their test results
(c) Identify ways to involve patients and families more comprehensively in the diagnosis and treatment process such as: asking patients to repeat back instructions for lab work, and discuss the reason/potential diagnosis at the conclusion of their office visit

- **Clinician Back-up:** Implement easy electronic methods of assigning patients to back-up clinicians during vacations and leaves of absence
- **Audits:** Electronically audit turnaround time for review of lab work, patient notification and follow-up.

Finally, CRS has designed specific services and resources to address problems related to test tracking, follow-up appointments and consultant referrals for clients. These resources include: focused assessment on test result management, analysis of clinic work flow and improvement methodologies for clients. No doubt this important topic requires much more urgent attention and devotion to address preventable errors.

About the Author

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Margaret Ramirez, Director Project Management and Strategic Initiatives, AIG Client Risk Solutions|Healthcare, has developed risk and risk management programs for over 20 years nationwide. Ms. Ramirez is responsible for a number of strategic initiatives and projects for healthcare clients and has particular expertise in the delivery of services to large medical group clients.

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