RESEARCH ON MISSED OPPORTUNITIES IN CANCER DIAGNOSIS IN THE US:

DEFINING, MEASURING AND REDUCING

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VA HEALTH CARE Defining EXCELLENCE in the 21st Century

Baylor College of Medicine

Multidisciplinary Team

Using health information technology and sociotechnical approaches to understand and reduce diagnostic errors

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Objectives

- Lessons from early research on missed opportunities in cancer diagnosis
- Building a robust conceptual foundation for defining, measuring and reducing missed opportunities
- Ongoing work on intervening to reduce missed opportunities in cancer diagnosis

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Over a Decade Ago…

- ‘Diagnostic error’ literature emerged mostly from US malpractice claims
- Delayed cancer diagnosis topped the list
- Key Questions:
  - Was the diagnosis missed by someone?
  - Was the delay preventable?
  - Could we have diagnosed the cancer earlier?

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JOURNAL OF CLINICAL ONCOLOGY

REVIEW ARTICLE

Errors in Cancer Diagnosis: Current Understanding and Future Directions

Hardeep Singh, Saurabh Sethi, Martin Raber, and Laura A. Petersen

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Care and Utilizat
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clinical encounter and patient follow-up

s are likely the most harmful and expensive types of diagnostic errors. We
o understand the prevalence, origins, and prevention of errors in cancer
ommon cancers for which early diagnosis offers clear benefit (melanoma
t, colon, and lung).

Metho
We sea e Library and PubMed from 1966 until April 2007 for publications that met our revie anually searched references of key publications. Our search yielded 110 studies, o e prospective studies and the remaining were retrospective studies.

Results
Errors in can were not uncommon in autopsy studies and were associated with significant harm se in malpractice claims. Literature on prevalence was scant. For each type of cancer, fied preventable errors according to their origins in patient-physician encounters in the ting, diagnostic test or procedure performance, pathologic confirmation of diagnosis, follow- patient or test result, or patient-related delays.

Conclusion
The literature reflects a nced knowledge of contributory factors and prevention for diagnostic errors related to the perfo nance of procedures and imaging tests and emerging understanding of pathology errors. However, prospective studies are few, as are studies of diagnostic errors arising from the clinical encounter and patient follow-up. Future research should examine further the system and cognitive problems that lead to the many contributory factors we identified, and

Early Work

- Evaluated evidence of 'errors' in *consecutive* tumor registry cases in an *integrated* system

- Detailed review of *comprehensive* EHR to evaluate diagnostic process in the patient's journey across the continuum of care
  - Data available from primary care, specialty (secondary) care, ER, hospital, diagnostics (lab/imaging/pathology), procedures

Colorectal cancer

- Endoscopic evaluation not initiated despite presence of one or more clues that warranted a diagnostic workup (provider related)
  - Two reviewers agreed on presence of at least one missed opportunity in 161/513 (31%) patients ($\kappa = 0.75$)
  - Missed anemia striking

nature publishing group ORIGINAL CONTRIBUTIONS

Missed Opportunities to Initiate Endoscopic Evaluation for Colorectal Cancer Diagnosis

Hardeep Singh, MD, MPH[1], Kuang Daci, MD[2], Laura A. Petersen, MD, MPH[1], Clyde Collins, MD[2], Nancy J. Petersen, MS[1], Anila Shethia, MBA[1] and Hashem B. El-Serag, MD, MPH[3]

OBJECTIVES: Delayed diagnosis of colorectal cancer (CRC) is among the most common reasons for ambulatory diagnostic malpractice claims in the United States. Our objective was to describe missed opportunities to diagnose CRC before endoscopic referral, in terms of patient characteristics, nature of clinical clues, and types of diagnostic-process breakdowns involved.

METHODS: We conducted a retrospective cohort study of consecutive, newly diagnosed cases of CRC between February 1999 and June 2007 at a tertiary health-care system in Texas. Two reviewers independently evaluated the electronic record of each patient using a standardized pretested data collection instrument. Missed opportunities were defined as care episodes in which endoscopic evaluation was not initiated despite the presence of one or more clues that warrant a diagnostic workup for CRC. Predictors of missed opportunities were evaluated in logistic regression. The types of breakdowns involved in the diagnostic process were also determined and described.

RESULTS: Of the 513 patients with CRC who met the inclusion criteria, both reviewers agreed on the presence of at least one missed opportunity in 161 patients. Among these patients there was a mean of 4.2 missed opportunities and 5.3 clues. The most common clues were suspected or confirmed iron deficiency anemia, positive fecal occult blood test, and hematochezia. The odds of a missed opportunity were increased in patients older than 75 years (odds ratio (OR)=2.3; 95% confidence interval (CI) 1.3–4.1) or with iron deficiency anemia (OR=2.2; 95% CI 1.3–3.6), whereas the odds of a missed opportunity were lower in patients with abnormal flexible sigmoidoscopy (OR=0.06; 95% CI 0.01–0.51), or imaging suspicious for CRC (OR=0.3; 95% CI 0.1–0.9). Anemia was the clue associated with the longest time to endoscopic referral (median=393 days). Most process breakdowns occurred in the provider–patient clinical encounter and in the follow-up of patients or abnormal diagnostic test results.

CONCLUSIONS: Missed opportunities to initiate workup for CRC are common despite the presence of many clues suggestive of CRC diagnosis. Future interventions are needed to reduce the process breakdowns identified.

Am J Gastroenterol 2009; 104:2543–2554; doi:10.1038/ajg.2009.324; published online 23 June 2009

INTRODUCTION

Delayed diagnosis of colorectal cancer (CRC) is among the most common reasons for ambulatory malpractice claims related to missed and delayed diagnosis in the United States (1,2). Several randomized controlled trials (3,4) have shown that survival in patients with CRC is significantly longer when the diagnosis is made at a more localized early stage, making a compelling case for early detection through screening programs (5). However, most patients with colorectal cancers are diagnosed after the onset of cancer-related symptoms (6) and

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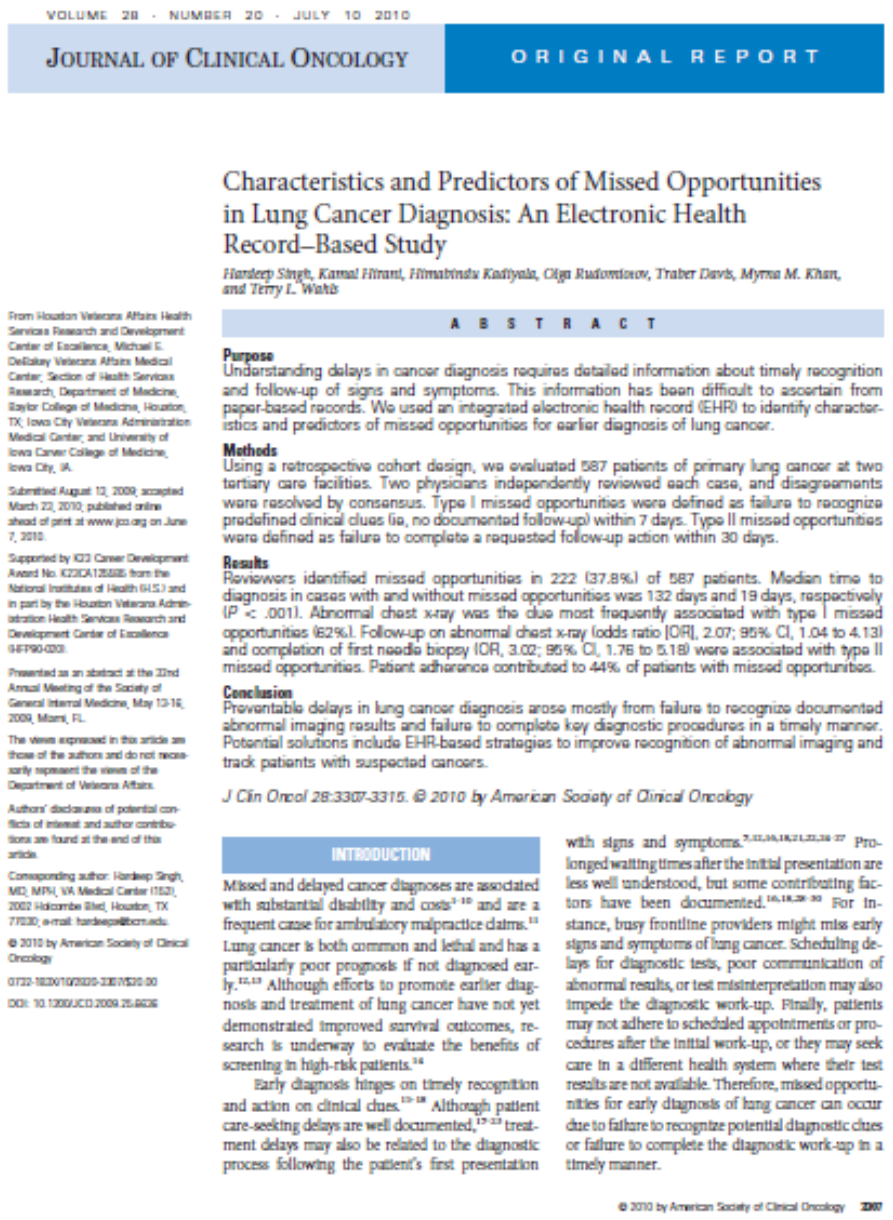
Singh et al *Am J Gastro* 2009

Lung Cancer

- 2 reviewers independently agreed on at least 1 missed opportunity in 222 (37.8%) of 587 patients ($\kappa = 0.69$)
  - Failure to act on abnormal imaging common
- Median time to diagnosis 132 days (vs. 19 days)



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JOURNAL OF CLINICAL ONCOLOGY ORIGINAL REPORT

Characteristics and Predictors of Missed Opportunities in Lung Cancer Diagnosis: An Electronic Health Record–Based Study

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Presented as an abstract at the 32nd Annual Meeting of the Society of General Internal Medicine, May 13-16, 2009, Miami, FL.

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

Authors' disclosures of potential conflicts of interest and author contributions are found at the end of this article.

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0732-183X/10/2820-3307/$20.00

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A B S T R A C T

Purpose
Understanding delays in cancer diagnosis requires detailed information about timely recognition and follow-up of signs and symptoms. This information has been difficult to ascertain from paper-based records. We used an integrated electronic health record (EHR) to identify characteristics and predictors of missed opportunities for earlier diagnosis of lung cancer.

Methods
Using a retrospective cohort design, we evaluated 587 patients of primary lung cancer at two tertiary care facilities. Two physicians independently reviewed each case, and disagreements were resolved by consensus. Type I missed opportunities were defined as failure to recognize predefined clinical clues (ie, no documented follow-up) within 7 days. Type II missed opportunities were defined as failure to complete a requested follow-up action within 30 days.

Results
Reviewers identified missed opportunities in 222 (37.8%) of 587 patients. Median time to diagnosis in cases with and without missed opportunities was 132 days and 19 days, respectively ($P < .001$). Abnormal chest x-ray was the clue most frequently associated with type I missed opportunities (62%). Follow-up on abnormal chest x-ray (odds ratio [OR], 2.07; 95% CI, 1.04 to 4.13) and completion of first needle biopsy (OR, 3.02; 95% CI, 1.76 to 5.18) were associated with type II missed opportunities. Patient adherence contributed to 44% of patients with missed opportunities.

Conclusion
Preventable delays in lung cancer diagnosis arose mostly from failure to recognize documented abnormal imaging results and failure to complete key diagnostic procedures in a timely manner. Potential solutions include EHR-based strategies to improve recognition of abnormal imaging and track patients with suspected cancers.

J Clin Oncol 28:3307-3315. © 2010 by American Society of Clinical Oncology

INTRODUCTION

Missed and delayed cancer diagnoses are associated with substantial disability and costs[1-10] and are a frequent cause for ambulatory malpractice claims.[11] Lung cancer is both common and lethal and has a particularly poor prognosis if not diagnosed early.[12,13] Although efforts to promote earlier diagnosis and treatment of lung cancer have not yet demonstrated improved survival outcomes, research is underway to evaluate the benefits of screening in high-risk patients.[14]

Early diagnosis hinges on timely recognition and action on clinical clues.[15-18] Although patient care-seeking delays are well documented,[17-23] treatment delays may also be related to the diagnostic process following the patient's first presentation with signs and symptoms.[5,11,16,18,21,22,24-27] Prolonged waiting times after the initial presentation are less well understood, but some contributing factors have been documented.[16,18,28-30] For instance, busy frontline providers might miss early signs and symptoms of lung cancer. Scheduling delays for diagnostic tests, poor communication of abnormal results, or test misinterpretation may also impede the diagnostic work-up. Finally, patients may not adhere to scheduled appointments or procedures after the initial work-up, or they may seek care in a different health system where their test results are not available. Therefore, missed opportunities for early diagnosis of lung cancer can occur due to failure to recognize potential diagnostic clues or failure to complete the diagnostic work-up in a timely manner.

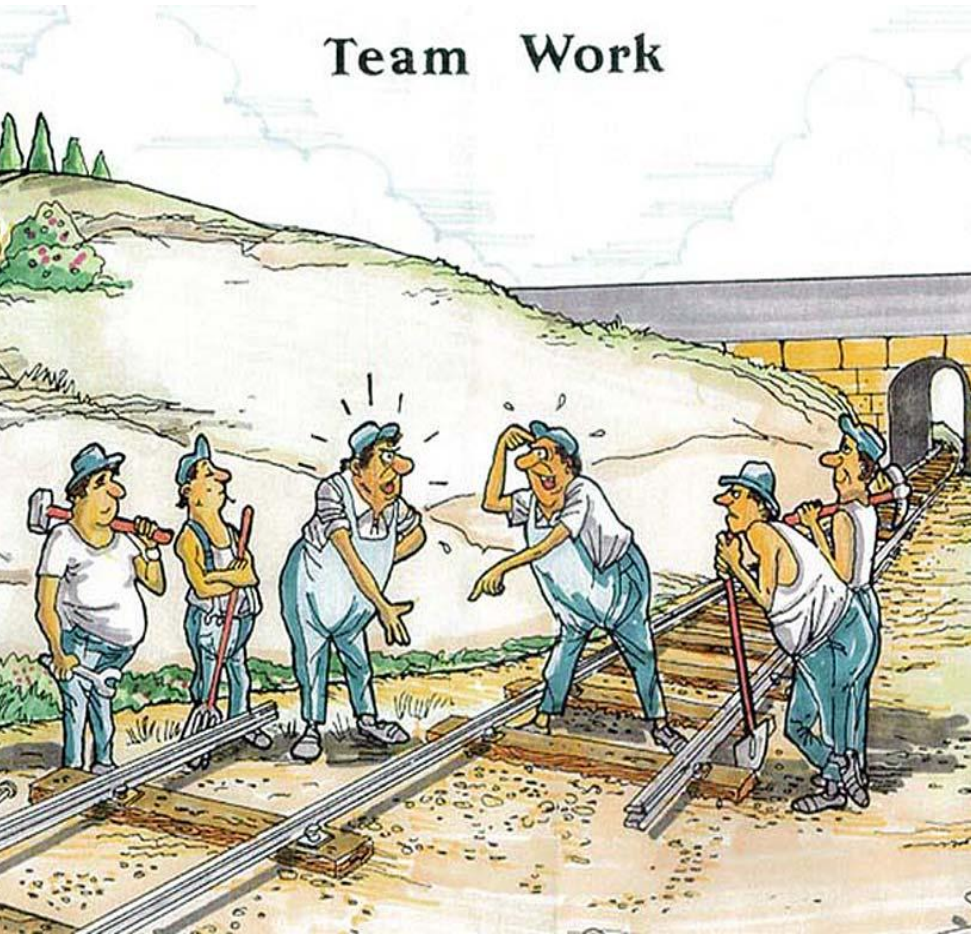
Singh et al JCO 2010

Test Results Follow-up in EHRs

- Evaluation of 1,163 outpatient abnormal lab & 1,196 abnormal imaging test result alerts
  - 7% abnormal labs lacked timely follow-up at 30 days
  - 8% abnormal imaging lacked timely follow-up
- Abnormal results lost to follow-up despite being read

Singh et al *Am J Med 2010* & Singh et al *Archives of Int Med 2009*

Teamwork & Responsibility!



ORIGINAL INVESTIGATION

HEALTH CARE REFORM

Timely Follow-up of Abnormal Diagnostic Imaging Test Results in an Outpatient Setting

Are Electronic Medical Records Achieving Their Potential?

Hardeep Singh, MD, MPH; Eric J. Thomas, MD, MPH; Shrinidi Mani, BA; Dean Sittig, PhD; Harvinder Arora, MD, MPH; Donna Espadas, BS; Myrna M. Khan, PhD, MBA; Laura A. Petersen, MD, MPH

Background: Given the fragmentation of outpatient care, timely follow-up of abnormal diagnostic imaging results remains a challenge. We hypothesized that an electronic medical record (EMR) that facilitates the transmission and availability of critical imaging results through either automated notification (alerting) or direct access to the primary report would eliminate this problem.

Methods: We studied critical imaging alert notifications in the outpatient setting of a tertiary care Department of Veterans Affairs facility from November 2007 to June 2008. Tracking software determined whether the alert was acknowledged (ie, health care practitioner/provider [HCP] opened the message for viewing) within 2 weeks of transmission; acknowledged alerts were considered read. We reviewed medical records and contacted HCPs to determine timely follow-up actions (eg, ordering a follow-up test or consultation) within 4 weeks of transmission. Multivariable logistic regression models accounting for clustering effect by HCPs analyzed predictors for 2 outcomes: lack of acknowledgment and lack of timely follow-up.

Results: Of 123 638 studies (including radiographs, computed tomographic scans, ultrasonograms, magnetic resonance images, and mammograms), 1196 images (0.97%) generated alerts; 217 (18.1%) of these were unacknowledged. Alerts had a higher risk of being unacknowledged when the ordering HCPs were trainees (odds ratio [OR], 5.58; 95% confidence interval [CI], 2.86-10.89) and when dual-alert (>1 HCP alerted) as opposed to single-alert communication was used (OR, 2.02; 95% CI, 1.22-3.36). Timely follow-up was lacking in 92 (7.7% of all alerts) and was similar for acknowledged and unacknowledged alerts (7.3% vs 9.7%; $P=.22$). Risk for lack of timely follow-up was higher with dual-alert communication (OR,1.99; 95% CI, 1.06-3.48) but lower when additional verbal communication was used by the radiologist (OR, 0.12; 95% CI, 0.04-0.38). Nearly all abnormal results lacking timely follow-up at 4 weeks were eventually found to have measurable clinical impact in terms of further diagnostic testing or treatment.

Conclusions: Critical imaging results may not receive timely follow-up actions even when HCPs receive and read results in an advanced, integrated electronic medical record system. A multidisciplinary approach is needed to improve patient safety in this area.

Arch Intern Med. 2009;169(17):1578-1586

COMMUNICATION BREAKdown is consistently identified as a preventable factor in studies of adverse events[1-6] and a significant contributor to outpatient diagnostic errors from a lack of follow-up of abnormal test results.[7-12] The volume of outpatient care and nature of high-risk transitions between health care practitioners/providers (HCPs), settings, and systems of care makes timely communication particularly challenging.[13] For example, a patient referred for diagnostic workup for respiratory symptoms by a primary care need to be communicated rapidly and effectively to the treating HCPs to ensure adequate follow-up.

Electronic communication using alerts (computerized notifications of critical information such as abnormal diagnostic test results) can facilitate transmission and potentially a response and follow-up action by the ordering HCP—an advantage over paper-based reporting.[14] For instance, the electronic medical record (EMR) used by the Department of Veterans Affairs (VA) mostly relies on a notification system (the "View Alert" window) to alert clinicians about critical test results, whereas only in

By MICHELLE CASTILLO / CBS NEWS / March 5, 2013, 1:16 PM

Too many electronic health record alerts may be leading doctors to skip them

Your doctor may be more likely to ignore your test results if they come electronically.

A new study published in the JAMA Internal Medicine on Mar. 4 revealed that doctors receive about 63 electronic health record (EHR)-based alerts each day, which are supposed to let them know about abnormal patient results. And, almost one-third of the doctors surveyed -- about 30 percent --| admitted that they had missed some results because of too many alerts.

"If you're getting 100 emails a day, you are bound to miss a few. I study this area and I still sometimes miss emails. We have good intentions, but sometimes getting too many can be a problem," Dr. Hardeep Singh, chief of health policy, quality, and informatics at the Michael E. DeBakey Veterans Affairs Medical Center, in Houston, told TIME.

Other Factors Contributing to Missed Opportunities

Premature closure

Affective bias

Faulty synthesis

Overconfidence

Process failure

Unintended consequence of policy

Sample mix-up

Faulty data gathering

Failure to detect physical finding

Perception error

Misinterpretation of test

Wrong estimate of pretest probability

Failure to follow-up abnormal test

Inadequate follow-up

Limited access

Communication failure

Failed heuristic

Language barrier

Knowledge deficit

Faulty triggering

Uninformed patient

Original Investigation

Physicians' Diagnostic Accuracy, Confidence, and Resource Requests

A Vignette Study

Ashley N. D. Meyer, PhD; Velma L. Payne, PhD, MBA; Derek W. Meeks, MD; Radha Rao, MD; Hardeep Singh, MD, MPH

JAMA Intern Med. 2013;173(21):1952-1959. doi:10.1001/jamainternmed.2013.10081
Published online August 26, 2013.

IMPORTANCE Little is known about the relationship between physicians' diagnostic accuracy and their confidence in that accuracy.

OBJECTIVE To evaluate how physicians' *diagnostic calibration*, defined as the relationship between diagnostic accuracy and confidence in that accuracy, changes with evolution of the diagnostic process and with increasing diagnostic difficulty of clinical case vignettes.

DESIGN, SETTING, AND PARTICIPANTS We recruited general internists from an online physician community and asked them to diagnose 4 previously validated case vignettes of variable difficulty (2 *easier*; 2 *more difficult*). Cases were presented in a web-based format and divided into 4 sequential phases simulating diagnosis evolution: history, physical examination

Research Reveals Lots to Fix!

- Failure to elicit key history or exam finding
- Overlooking critical information/cognitive issues
- Inadequate information systems
- Chaotic clinical settings with interruptions, inadequate time, workload and administrative burden
- Lack of measurement and feedback systems for improvement

Schiff et al Arch IM 2009; Singh et al JAMA IM 2013; Sarkar et al BMJQS 2012

Objectives

- Lessons from early research on missed opportunities in cancer diagnosis
- Building a robust conceptual foundation for defining, measuring and reducing missed opportunities
- Ongoing work on intervening to reduce missed opportunities in cancer diagnosis

Key to Reducing Missed Opportunities

You cannot improve what you cannot measure!

You cannot measure what you cannot define!

Understanding Diagnostic Process

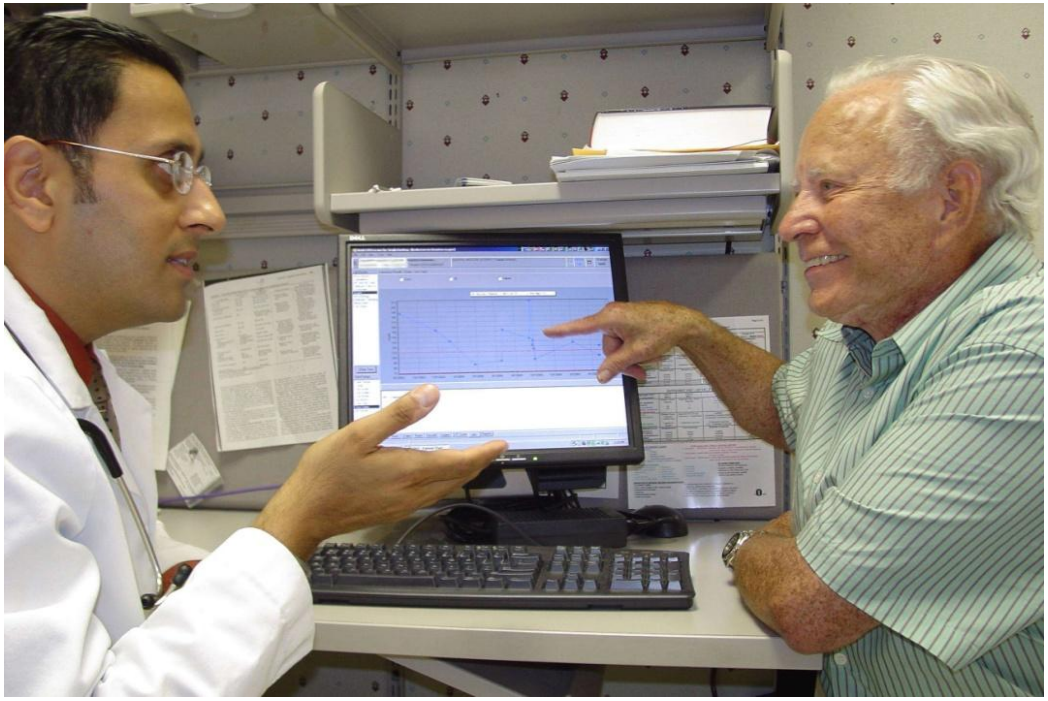
The diagnostic process involves more than just what's in the doctors head

Five "process" dimensions of diagnosis

Singh & Weingart *Adv Health Sci Educ* 2009
Singh et al System Interventions BMJQS 2010

Patient-Provider Encounter

- Problems with history, physical exam or ordering diagnostic tests for further work-up



Diagnostic Tests: Lab/Path/Imaging

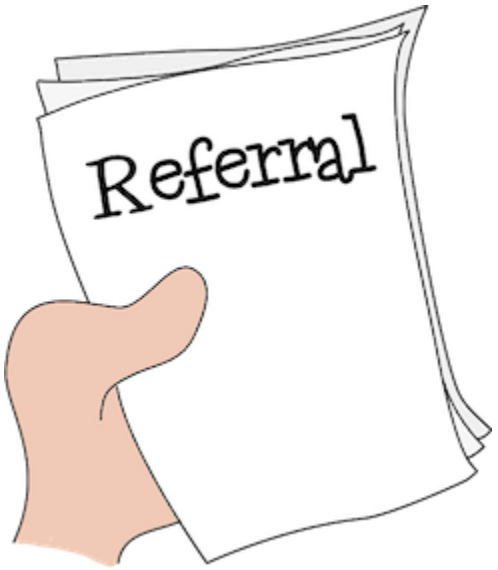
- Problems with ordered tests either not performed or performed/interpreted incorrectly

Follow-up and Tracking

- Problems with follow-up of abnormal diagnostic test results or scheduling of follow-up visits

Referrals/Specialty Consultations

- Lack of appropriate actions on requested consultation or
- Communication breakdown from consultant to referring provider



Gandhi et al JGIM 2000

Patient Behaviors/Adherence

BJC

British Journal of Cancer (2015), 1–8 | doi: 10.1038/bjc.2015.47

Keywords: neoplasm; diagnosis; missed opportunities; patient safety; general practice; system factors; errors; quality

Understanding missed opportunities for more timely diagnosis of cancer in sym

initial diagnostic assessment, test performance/interpretation and follow-up/coordination

G Lyratzo

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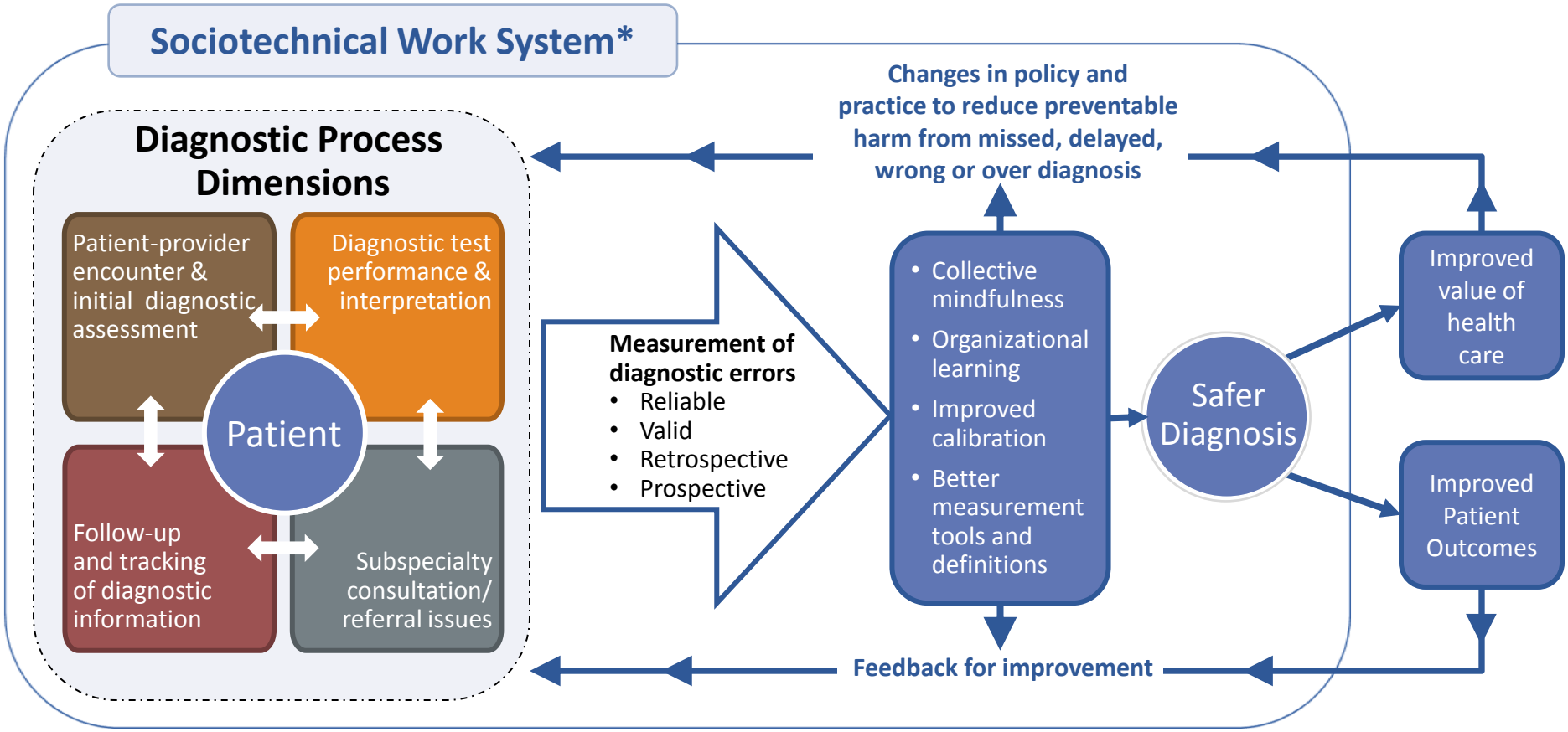
Abstract: The diagnosis of cancer is a complex, multi-step proce is paper, we highlight factors involved in missed opportunities to diagnose cancer more promptly in symptomatic s and discuss responsible mechanisms and potential strategies to shorten intervals from presentation to diagnosis. Miss opportunities are instances in which *post-hoc* judgement indicates that alternative decisions or actions could have led to mor timely diagnosis. They can occur in any of the three phases of the diagnostic process (initial diagnostic assessment; diagnostic test performance and interpretation; and diagnostic follow-up and

Foundation for Rigorous Measurement

- Few valid and reliable data sources
- Missed opportunity measurement must reflect real-world practice
  - more than just what's in "the doctors head"
  - Sociotechnical health care system, team members, and patients, all inevitably influence clinicians' thought processes

Singh *BMJQS* 2013; Sarkar et al *BMJQS* 2012

Safer Dx Framework for Measurement & Reduction



* Includes 8 technological and non-technological dimensions

Singh & Sittig *BMJQS* 2015

Objectives

- Lessons from early research on missed opportunities in cancer diagnosis
- Building a robust conceptual foundation for defining, measuring and reducing missed opportunities
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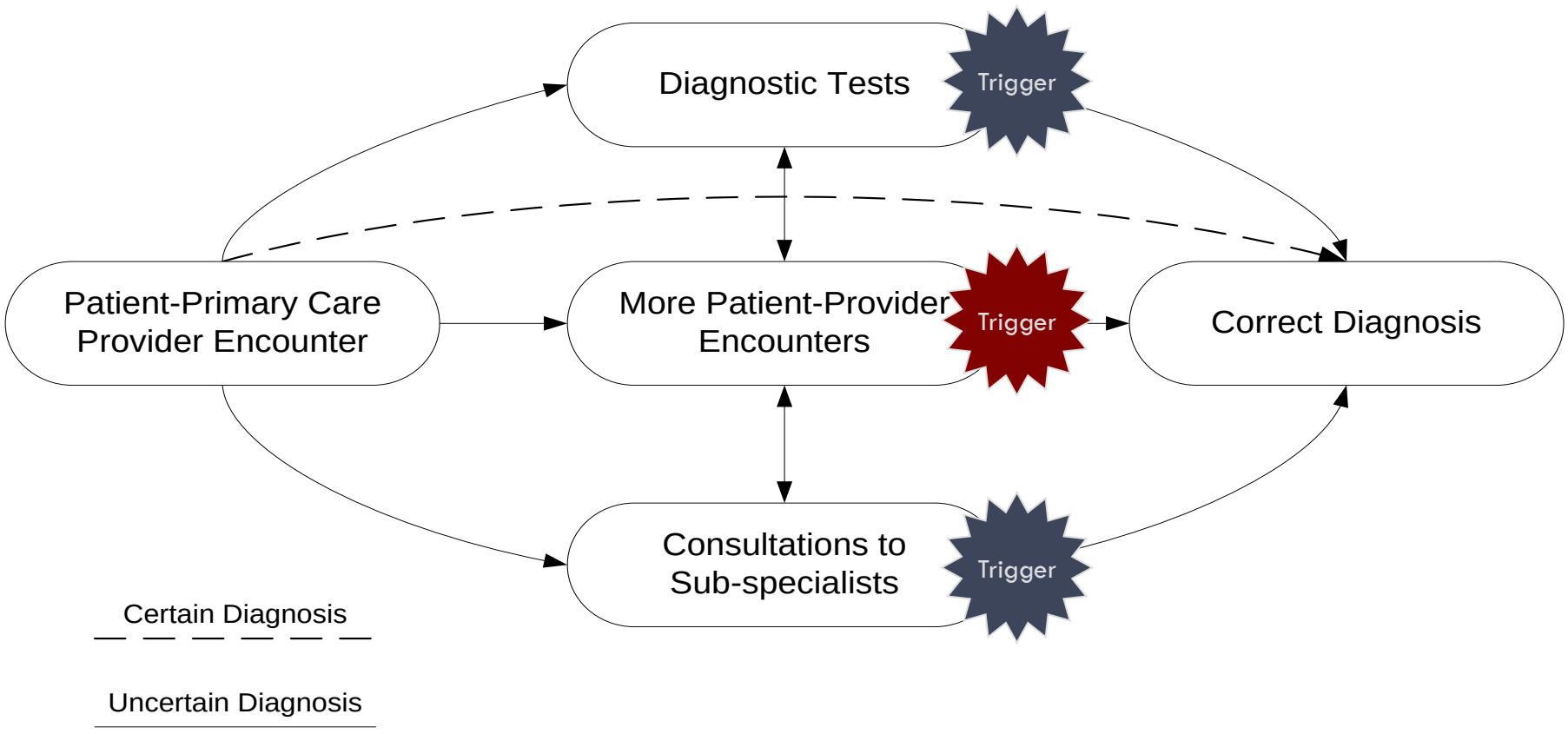
‘Trigger’-based Measurements



Why Triggers Are a First Step?

- Algorithms to select high-risk patient records for further reviews to look for missed opportunities
  - Picking up 'needles in a haystack' by making the haystack smaller

- Not risk assessment/decision support tools *during* consultation but 'back-up' support system *after* the patient-doctor encounter
  - Application retrospective or prospective surveillance

Murphy et al *BMJQS* 2013
Singh & Thomas *AHRQ Special Report* 2009

Retrospective Return-Visit Triggers

- Triggers based on patterns of patients' unexpected return visits after initial GP visit
- Queries applied in EHR repository to identify high-risk visits among 212,165 total visits
- 1957 chart reviews confirmed 190 diagnostic errors, including cancer
- Possible retrospective triggers in UK setting: multiple consultations, significant event audits post ED presentation

Singh et al *BMJQS 2011;* Singh et al. *JAMA IM 2013*

BJC

British Journal of Cancer (2015), 1–7 | doi: 10.1038/bjc.2015.45

Keywords: colorectal cancer; primary care; diagnosis; electronic medical records

Preliminary results of a feasibility study of the use of information technology for identification of suspected colorectal cancer in primary care: the CREDIBLE study

E Kidney[1], L Berkman[1], A Macherianakis[1], D Morton[2], G Dowswell[1], W Hamilton[3], R Ryan[1], H Awbery[1], S Greenfield[1] and T Marshall[*,1]

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Creating a Trigger-Based 'Safety Net'

- Triggers look for follow-up actions on clues (or red flags) to detect delays prospectively
  - Basic version: + hemoccult or microcytic anemia with no subsequent colonoscopy in 60 days OR suspicious chest-x ray with no follow-up CT scan in 30 days
- Searched large EHR repositories at 2 sites for patients with delays in diagnostic evaluation for colorectal and prostate cancer (n=300,000 patients over a year)
  - 1564 trigger positive: Positive Predictive Value = 58%-70%
  - Estimated1048 instances of delayed or missed follow-up of abnormal findings and 47 high-grade cancers found

Murphy et al *BMJQS* 2013

BMJ Quality & Safety

The international journal of healthcare improvement

ORIGINAL RESEARCH

Electronic health record-based triggers to detect potential delays in cancer diagnosis

Daniel R Murphy,[1,2] Archana Laxmisan,[1,2] Brian A Reis,[1,2] Eric J Thomas,[3] Adol Esquivel,[4] Samuel N Forjuoh,[5] Rohan Parikh,[6] Myrna M Khan,[1,2] Hardeep Singh[1,2]

ABSTRACT

Background Delayed diagnosis of cancer can lead to patient harm, and strategies are needed to proactively and efficiently detect such delays in care. We aimed to develop and evaluate 'trigger' algorithms to electronically flag medical records of patients with potential delays in prostate and colorectal cancer (CRC) diagnosis.

Methods We mined retrospective data from two large integrated health systems with comprehensive electronic health records (EHR) to iteratively develop triggers. Data mining algorithms identified all patient records with specific demographics and a lack of appropriate follow-up of abnormal clinical findings suspicious for cancer.

BACKGROUND

Identifying and preventing delays in cancer diagnosis have proved elusive and challenging to overcome.[1 2] For certain cancers, delays are common and lead to poor outcomes and increased malpractice litigation.[3–8] While root causes of such delays are multifactorial,[2 9–11] many delays arise when abnormal cancer screening results or other 'red flags' are missed by providers.[3 5 12–21] These

Evaluating An Intervention

- Prospective trigger application + confirmatory manual review of triggered records + communication of this information to GPs
- Cluster RCT of 72 GPs from 2 sites
- 3 types of triggers (colorectal, prostate, lung) applied to total 118,400 patients
- Of 10,673 with abnormal finding, trigger flagged 1256 (11.8%) as high-risk

Murphy et al Under Review

RCT Results

- Reduced delays in diagnostic evaluation of colorectal and prostate cancer
  - Lower times to diagnostic evaluation for CRC (median 104 vs. 200 days; n=557; $p<0.001$) and prostate (40% received evaluation at 144 vs. 192 days; n=157;$p<0.001$)
- No effect for the lung trigger (median 65 vs. 93 days; n=19;$p=0.59$)
- More diagnostic evaluation by final review (73.4% vs. 52.2%; RR 1.41; 95% CI, 1.25-1.58)

Murphy et al Under Review

Time for Surveillance & Safety Net?

- Creating 'intelligence' related to diagnostic safety needs resource and time investment
  - Institutions/practices have too many competing priorities
  - Will it give bang for the buck outside of research?
  - Contacting GPs
- Unintended consequences need to be monitored
  - More (or unnecessary) testing/treatment could occur

Bridges to Real-World Implementation

- Creating system-wide approaches for measurement and reduction in a large VA network of 7 hospitals
  - How do we integrate "near real-time" surveillance information and feedback about missed opportunities into PCP practices?
- Revised national VA policy to standardize and improve test results follow-up

http://www.hsrd.research.va.gov/research/abstracts.cfm?Project_ID=2141701900

OPEN ACCESS

The patient is in: patient involvement strategies for diagnostic error mitigation

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ABSTRACT

Although healthcare quality and patient safety have longstanding international attention, the target of reducing diagnostic errors has only recently gained prominence, even though numerous patients, families and professional caregivers have suffered from diagnostic mishaps for a long time. Similarly, patients have always been involved in their own care to some extent, but only recently have patients sought more opportunities for engagement and participation in healthcare improvements. This paper brings these two promising trends together, analysing strategies for patient involvement in reducing diagnostic errors in an individual's own care, in

problems that patients could potentially mitigate under some circumstances, but certainly not all. For example, in a retrospective study of patients who experienced delays in diagnosis for colorectal cancer, about one-third experienced an average of 5.3 diagnostic process breakdowns, including missed appointments for diagnostic tests without apparent provider awareness.[21] Among 587 patients diagnosed with lung cancer, patients with missed opportunities experienced a significantly longer median time to diagnosis than controls (132 vs 19 days, respectively; $p<0.001$).[22] Patient non-

Potentially Useful Next Steps for UK, Others

- Use robust systems-based conceptual models to define/measure/reduce missed opportunities
- Use 'deep dive' methodologies to create better understanding of process breakdowns in 'real-world' practice
- Leverage health IT to create *and evaluate* a trigger-based safety-net system
- Engage patients as active partners in diagnosis

Thank you…

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