

LEARNING HEALTH SYSTEM FOR DIAGNOSTIC EXCELLENCE

KIM LYNGBY MIKKELSEN



Patienterstatningen
– behandlings- og lægemiddelskader

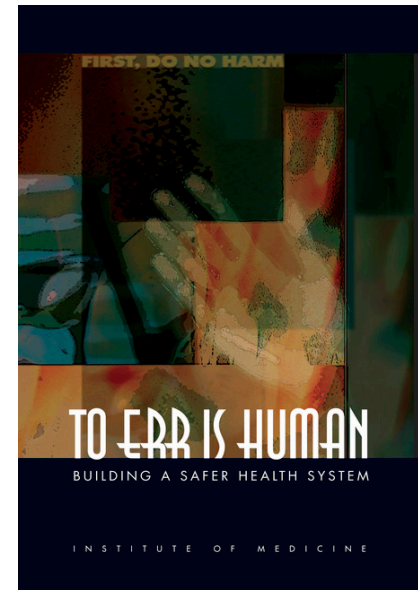


**Danish Patient
Compensation**

BACKGROUND

DIAGNOSTIC ERRORS HAVE BEEN (AND IS) A MAJOR OVERLOOKED PATIENT SAFETY PROBLEM

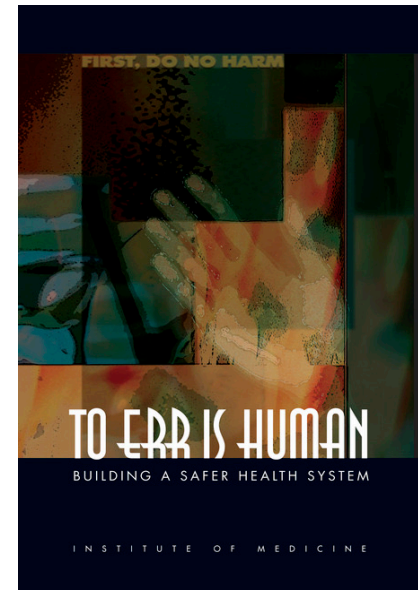
- To Err Is Human; Building a Safer Health System (2000)
 - Does not mention diagnostic errors as a separate issue!
 - Simple fault model: Commission (action) – Omission (neglect)
 - Types of errors are, for example, technical errors, medication-related, iatrogenic complications
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 - Simple error model: Commission (action) – Omission (neglect)
 - Types of errors are, for example, technical errors, medication-related, iatrogenic complications
 - But the report focused on patient safety, and that
 - ... being a patient (in the USA) is one of the most dangerous things you can be compared to being in the traffic, at work etc.!



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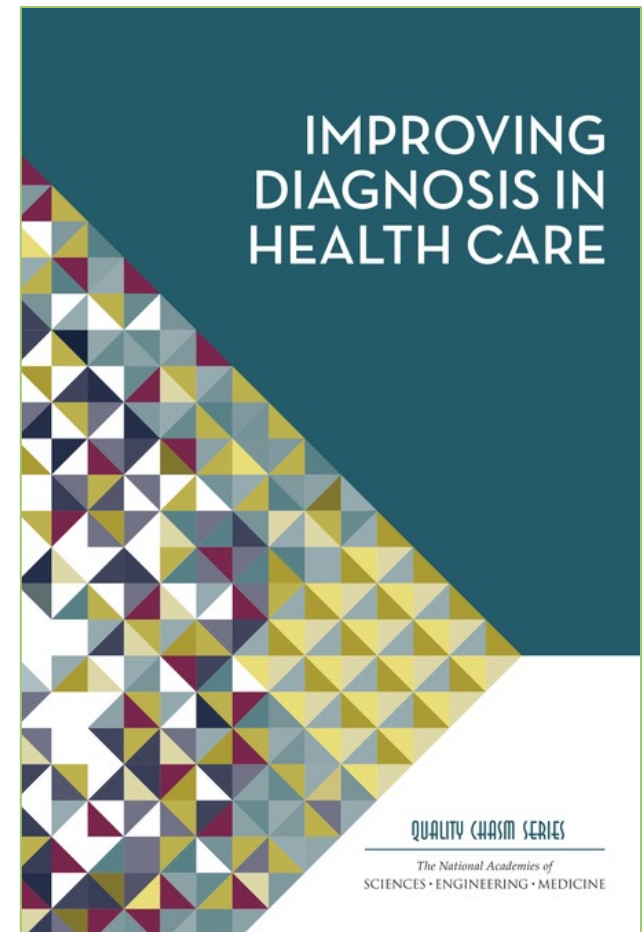
- The classification in Denmark for adverse events (DPSD) does not include the **diagnostic process** from the International Classification for Patient Safety (ICPS) Conceptual Framework, 2007:

Incident Type	Process	Problem
Clinical Process/Procedure	Diagnosis/Assessment	Incomplete/Inadequate

- (We) simply did not implement it in DK!
- In DPSD, problems with the diagnostic process are therefore a "blind eye"!

BACKGROUND DIAGNOSTIC EXCELLENCE

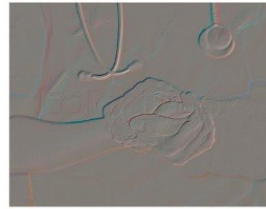
- New milestone report 2015: Improving Diagnosis in Health Care
 - Published by National Academy of Medicine (Insitute of Medicine)



BACKGROUND DIAGNOSTIC EXCELLENCE

Paths to better diagnoses
2019

- Danish Society for Patient Safety (PS!)
- Danish Patient Compensation



VEJE TIL BEDRE DIAGNOSER



Hvor tit sker der fejl?
Hvor går det galt?
Og hvad kan der gøres
ved det?



PS!
Dansk Selskab for
PatientSikkerhed

Patienterstatningen
– behandlings- og lægemiddelskader

BACKGROUND DIAGNOSTIC EXCELLENCE

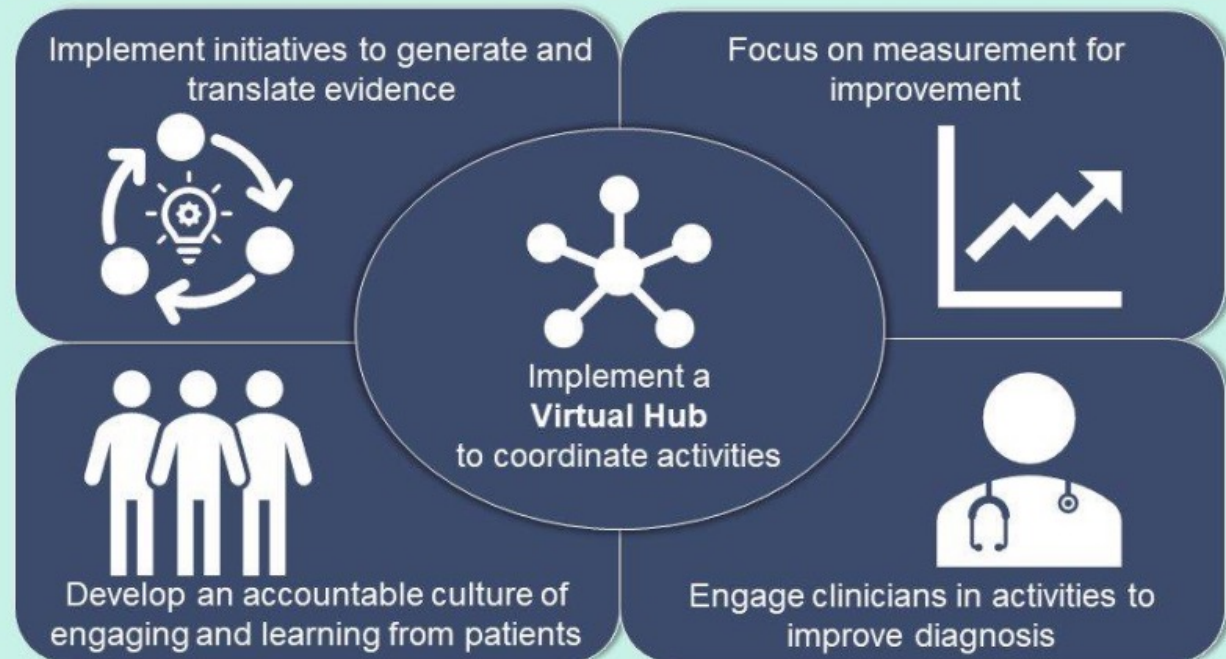
- **Developing Health Care Organizations That Pursue Learning and Exploration of Diagnostic Excellence (LEDE-organizations)**



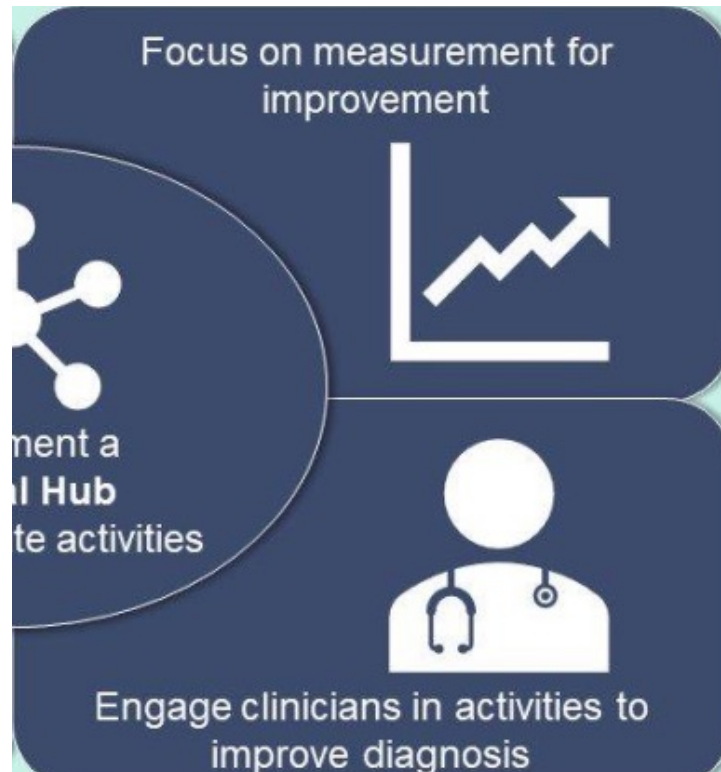
Hardeep Singh, M.D., M.P.H.
Baylor College of Medicine,
Houston

DEVELOPING LEDE ORGANIZATIONS: LEARNING AND EXPLORATION OF DIAGNOSTIC EXCELLENCE

An Action Plan for Developing LEDE Organizations LEDE = Learning & Exploration of Diagnostic Excellence



DEVELOPING LEDE ORGANIZATIONS: LEARNING AND EXPLORATION OF DIAGNOSTIC EXCELLENCE



ONE OF THE CENTRAL
INGREDIENCIES IS
MEASUREMENT
AND
FEEDBACK

LEARNING HEALTH SYSTEM FOR DIAGNOSTIC SAFETY

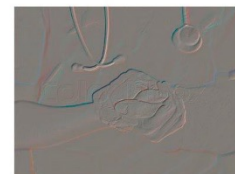
- Why measurement and feedback
- Data sources and methods for learning

DIAGNOSTIC ERROR COMPENSATION CASES

Akut
(40 % af materialet)

Bev
ap
(75

M
(25



VEJE TIL BEDRE DIAGNOSER



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PS!
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Insuf. US

Mgl.
Rtg./UL

Mgl. opfølg.

Mgl.
henvis.

Insuf. US

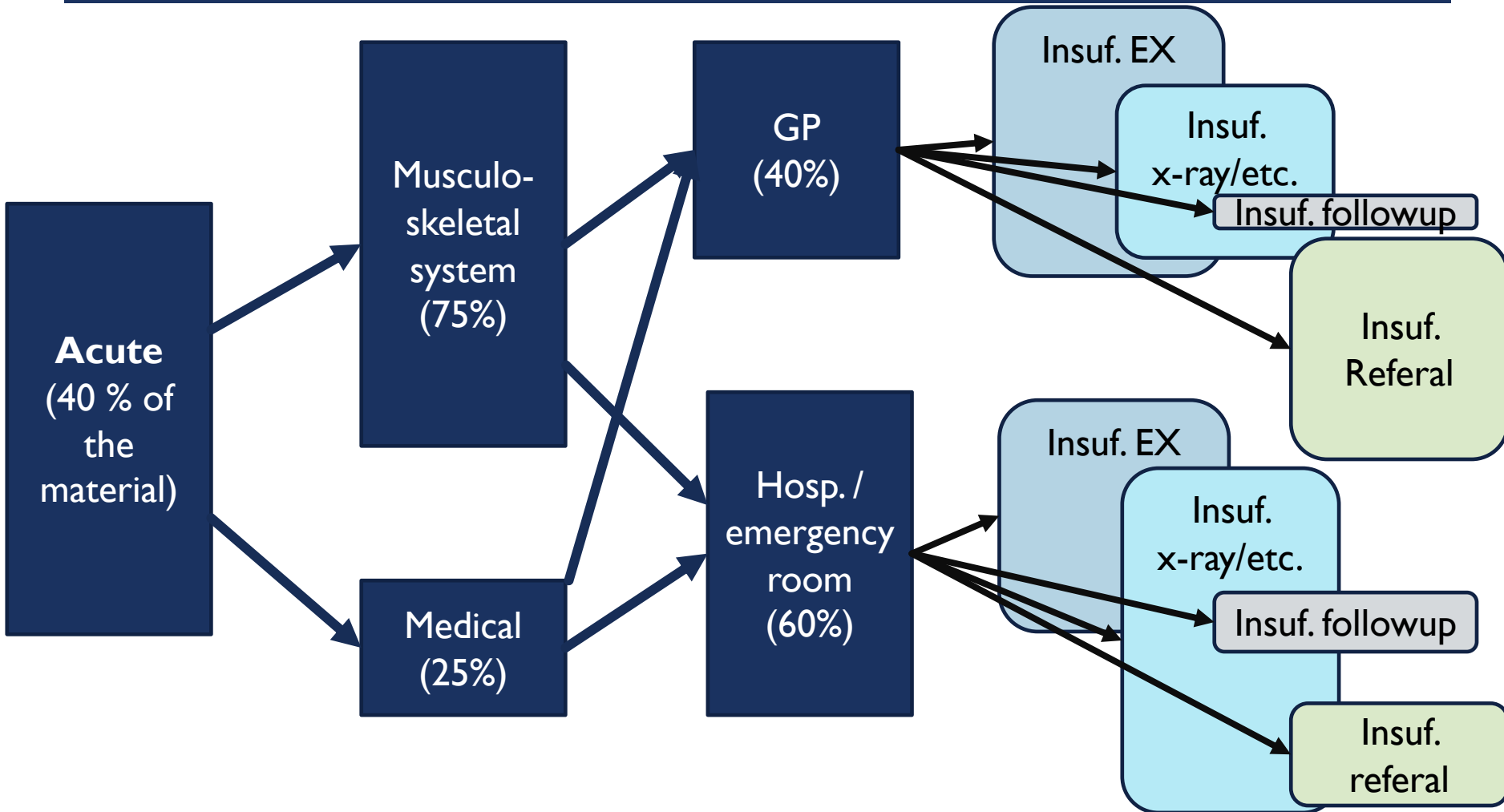
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Rtg./UL

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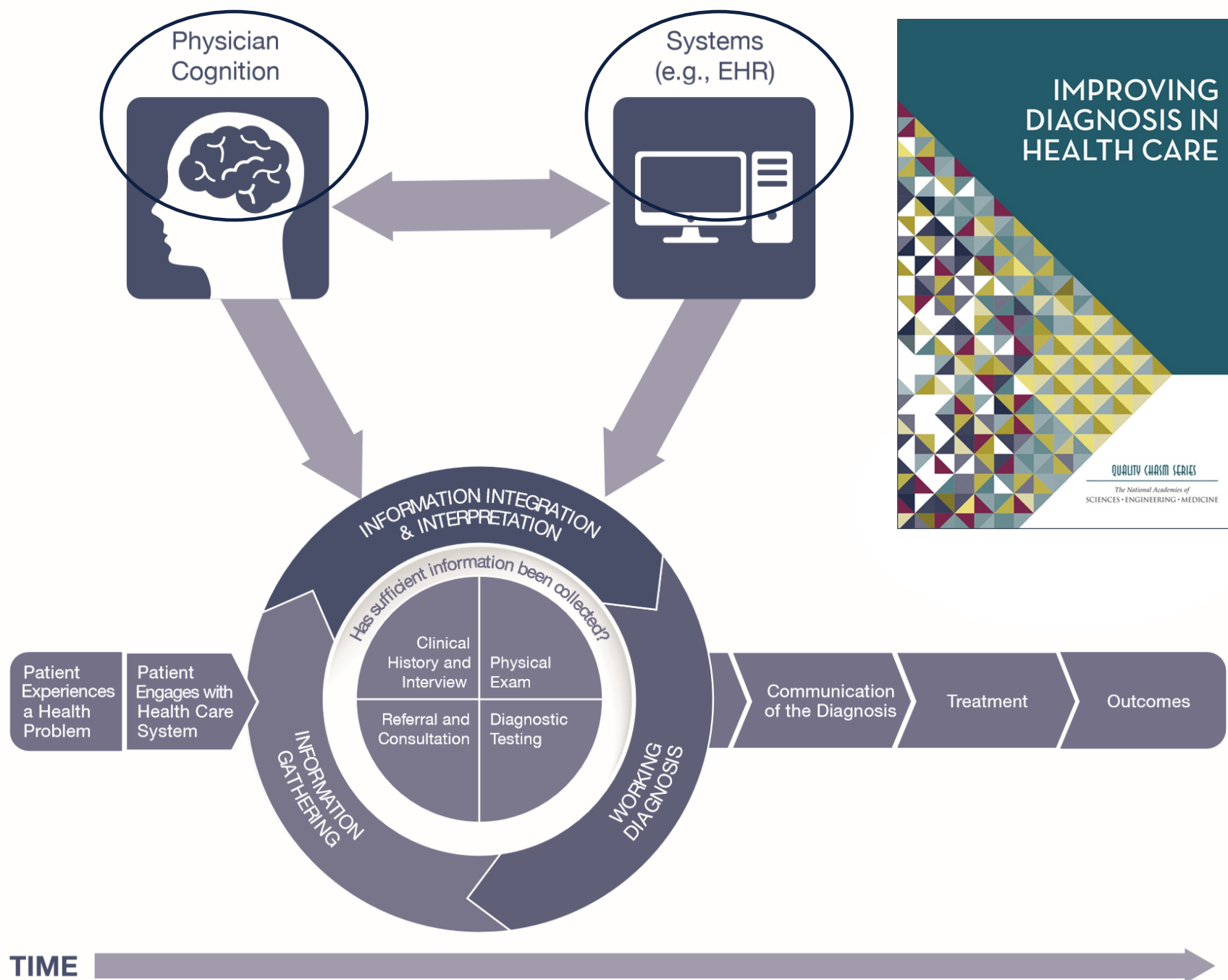
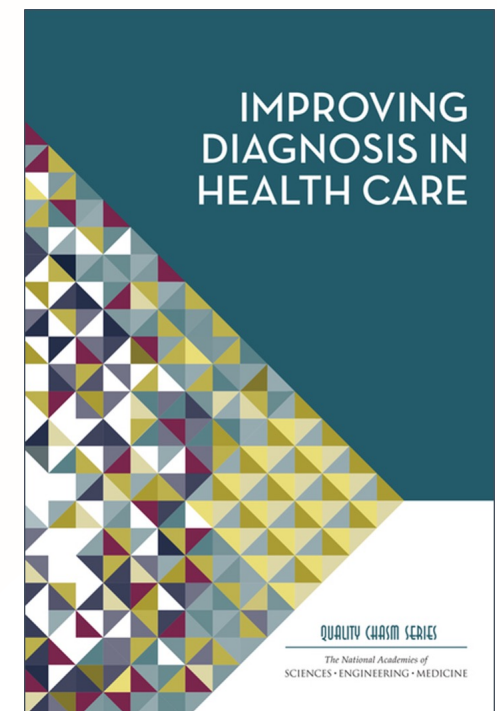
Mgl. henvis.

DIAGNOSTIC ERROR COMPENSATION CASES

ACUTE CASES







QUEST FOR CALIBRATION

JAMA Internal Medicine

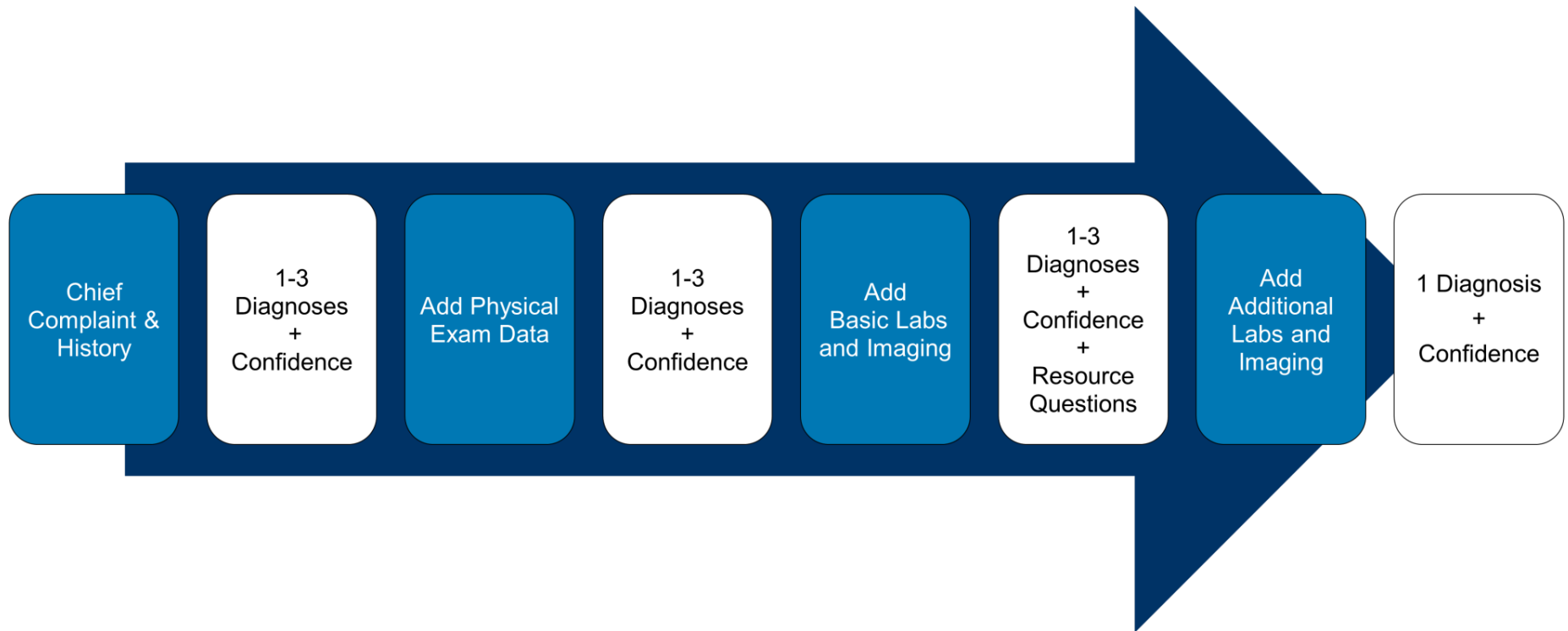
Original Investigation

Physicians' Diagnostic Accuracy, Confidence, and Resource Requests A Vignette Study

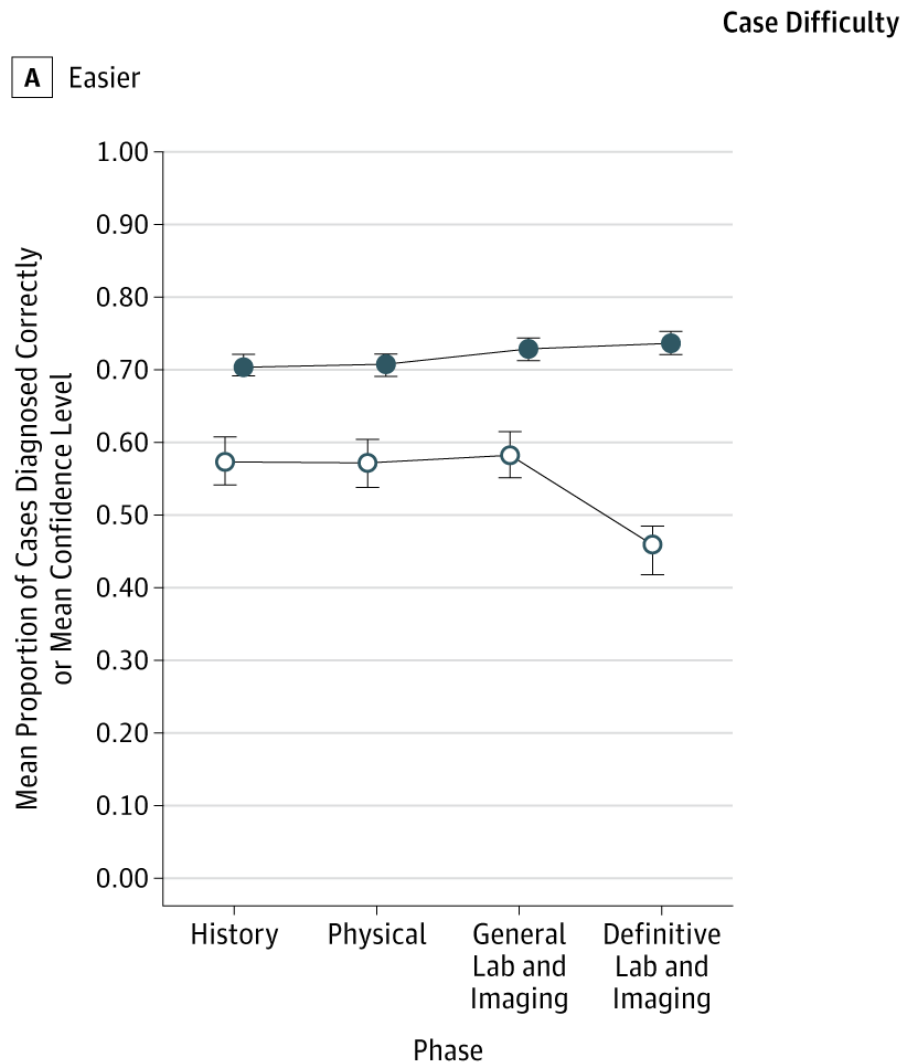
Ashley N. D. Meyer, PhD; Velma L. Payne, PhD, MBA; Derek W. Meeks, MD; Radha Rao, MD;
Hardeep Singh, MD, MPH

Meyer et al., JAMA Intern Med 2013

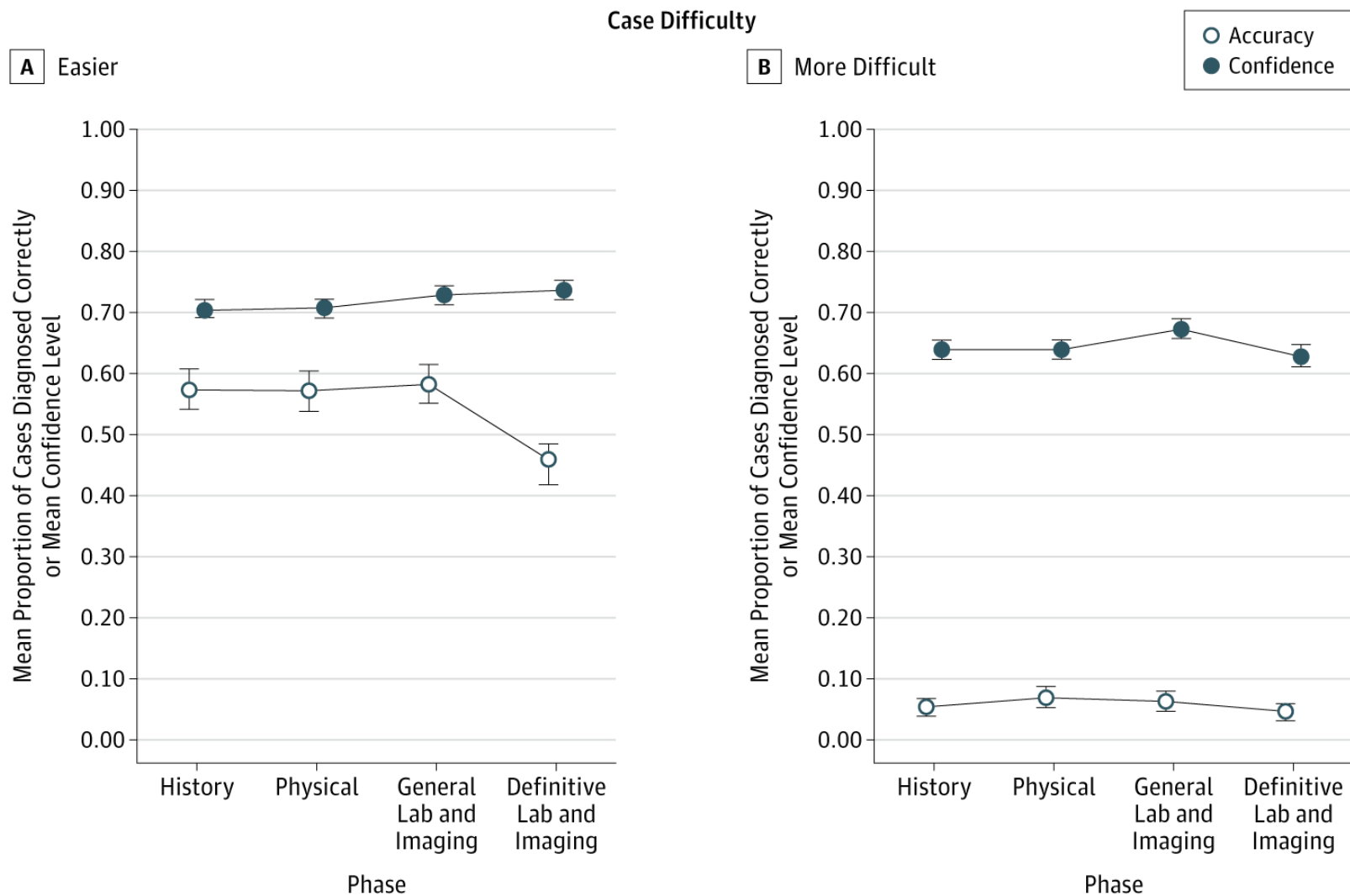
DIAGNOSTIC ACCURACY AND CONFIDENCE



DIAGNOSTIC ACCURACY VERSUS CONFIDENCE



DIAGNOSTIC ACCURACY VERSUS CONFIDENCE



Physicians' diagnostic accuracy
and confidence not aligned

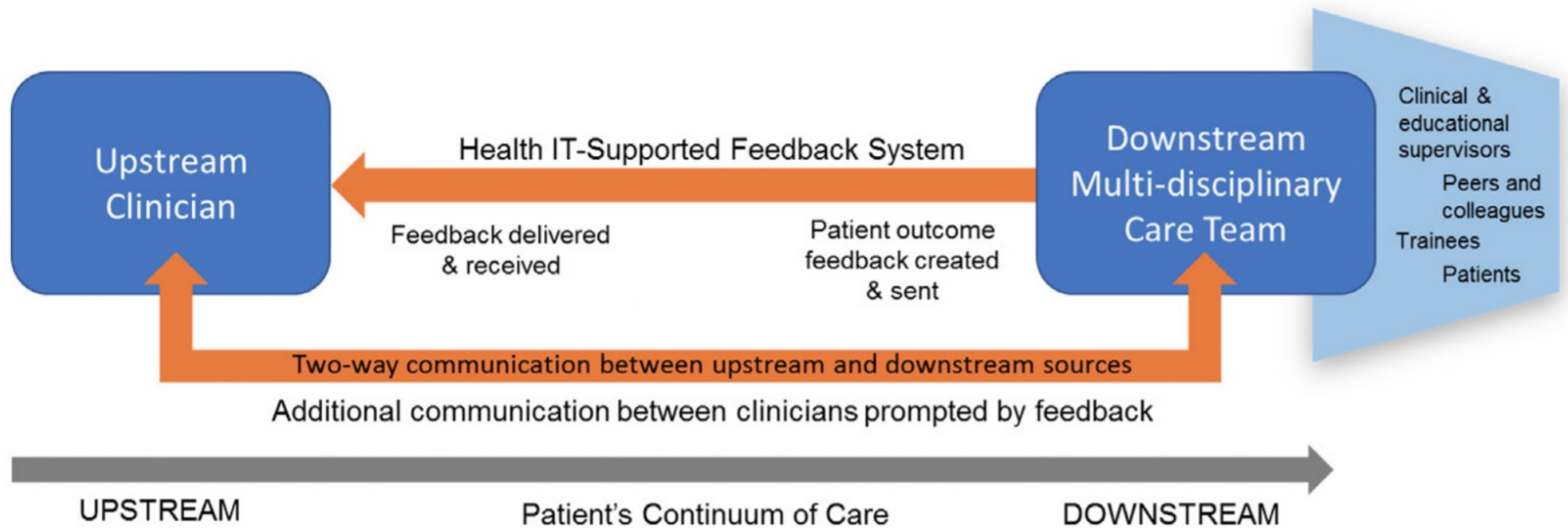


= Miscalibration

Physicians may not seek help (either from humans or decision support systems) when they most need it

IMPLICATIONS: FEEDBACK IS ESSENTIAL

IMPLICATIONS: FEEDBACK IS ESSENTIAL



Bridging the feedback gap: a sociotechnical approach to informing clinicians of patients' subsequent clinical course and outcomes

Christina L Cifra ¹, Dean F Sittig ², Hardeep Singh ³

<https://qualitysafety.bmj.com/content/early/2021/05/10/bmjqs-2020-012464>



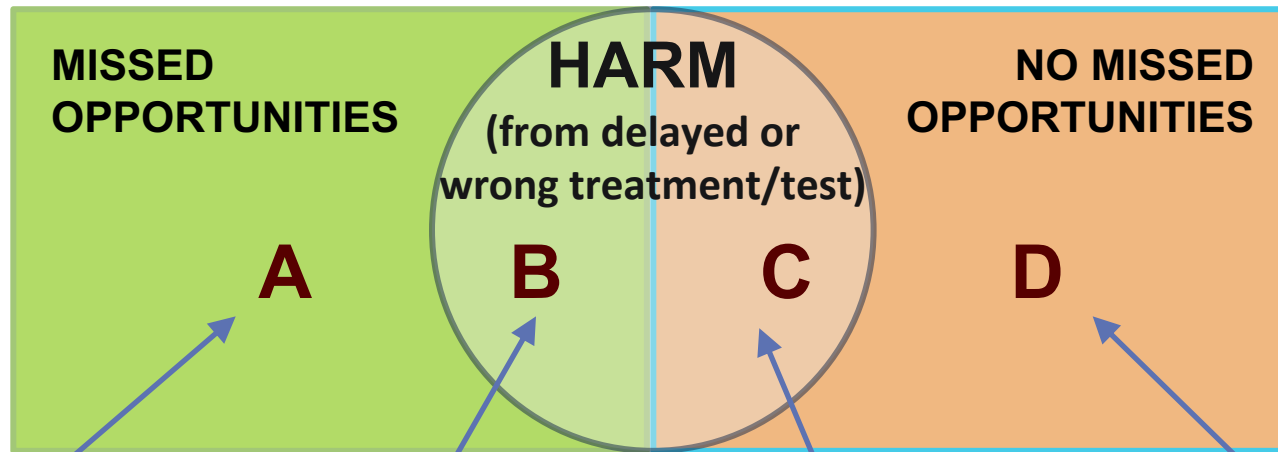
IMPROVING DIAGNOSIS IN HEALTH CARE

QUALITY CHASM SERIES

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

Accrediting organizations and Medicare “**require** that healthcare organizations have **programs** in place to **monitor the diagnostic process** and identify, learn from, and reduce diagnostic errors and near misses in a **timely fashion.**”

Focus on Preventable Diagnostic Harm



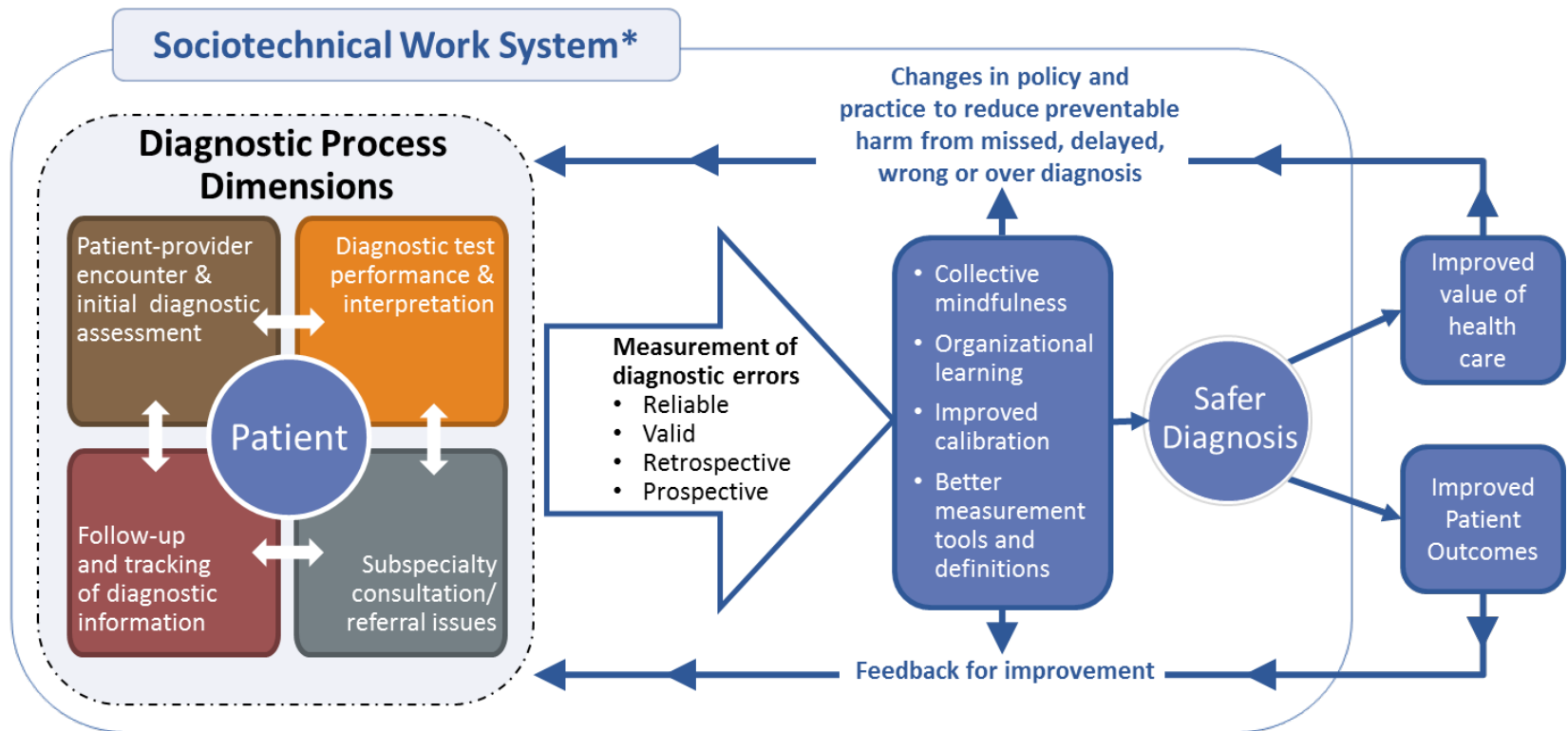
Missed opportunities in diagnosis due to system and/or cognitive factors

Preventable diagnostic harm

Delayed/wrong diagnosis associated with patient harm but no clear evidence of missed opportunities

Delayed/wrong diagnosis but no clear evidence of missed opportunities

SAFER DX FRAMEWORK: MEASUREMENT OF DIAGNOSTIC ERRORS IN HEALTHCARE



Donabedian's Structure-Process-Outcome model

LEARNING HEALTH SYSTEM FOR DIAGNOSTIC SAFETY

- Why measurement and feedback
- Data sources and methods for learning

Figure 2. Implementation Readiness of Diagnostic Safety Measurement Strategies

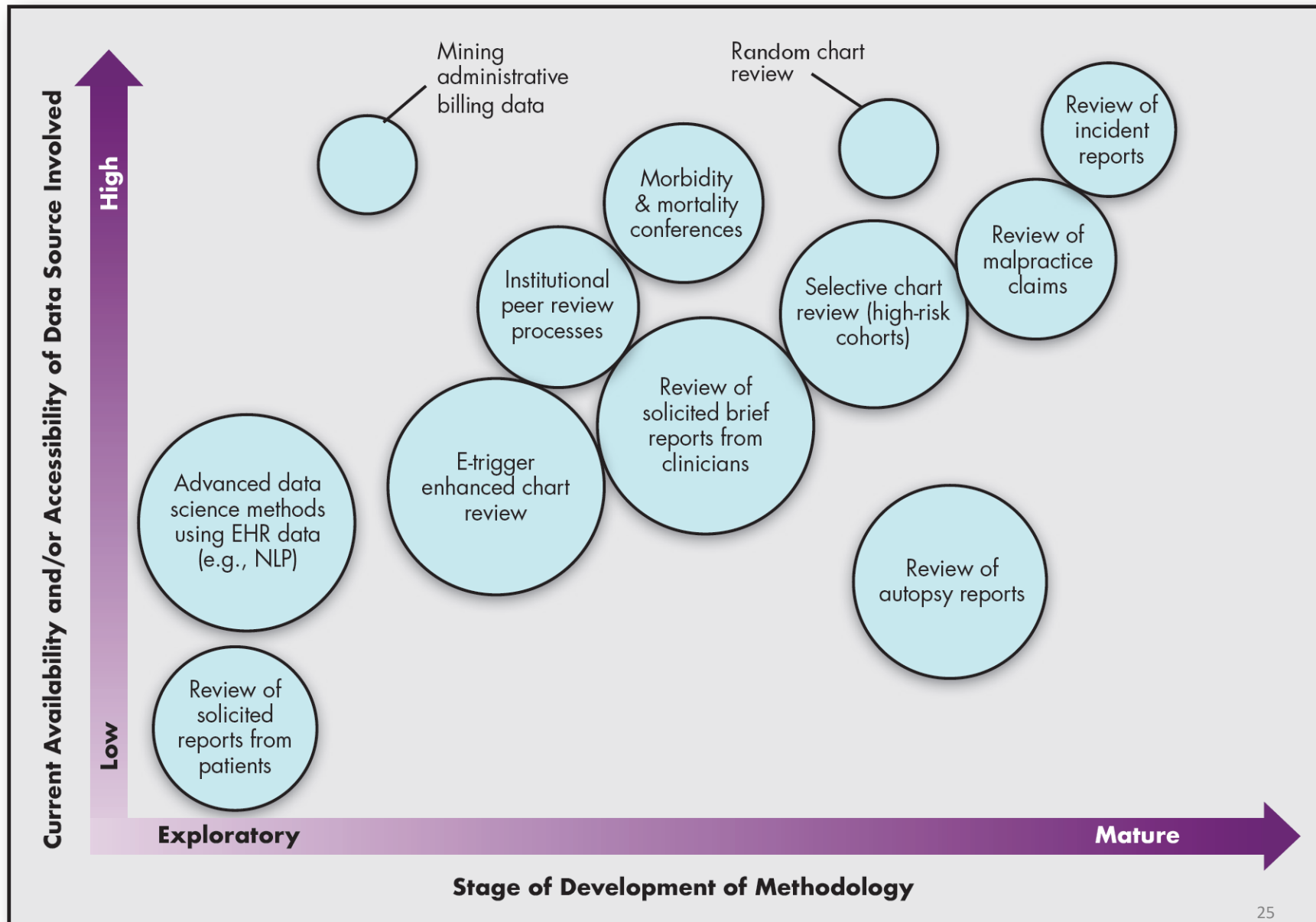
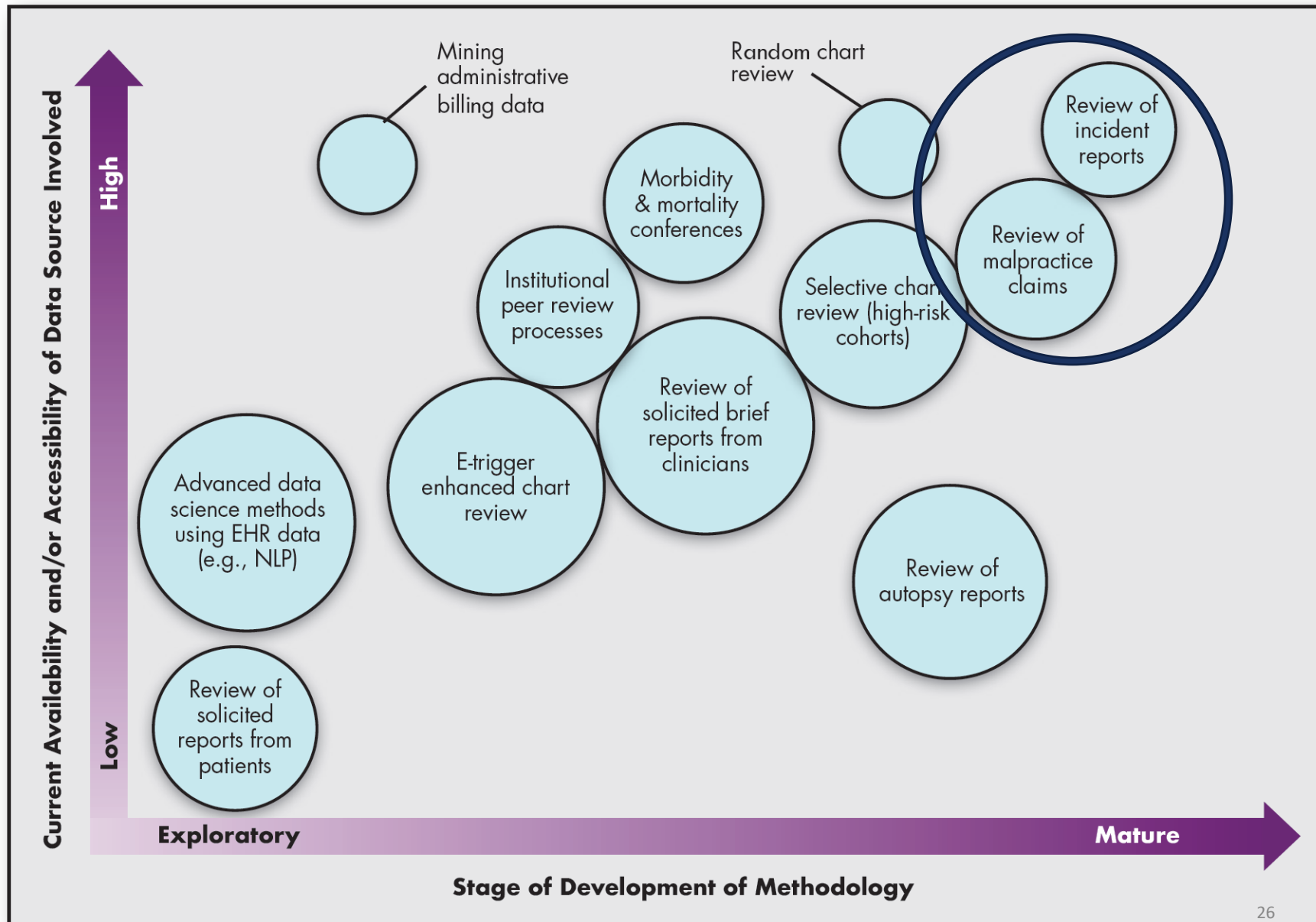


Figure 2. Implementation Readiness of Diagnostic Safety Measurement Strategies



ENGAGE CLINICIANS TO REPORT DATA

Few studies have engaged frontline physicians in reporting

Requires substantial frontline provider engagement, leadership support and physician champion/s

Increasing Physician Reporting of Diagnostic Learning Opportunities

Trisha L. Marshall, MD,^{a,b,c} Anna J. Ipsaro, MD, MBE,^a Matthew Le, MD,^d Courtney Sump, MD,^d
Heather Darrell, MS, APRN, CPNP-AC,^a Kathleen G. Mapes, BSN, CPN,^e Julianne Bick, BA,^f Sarah A. Ferris, BA,^a
Benjamin S. Bolser, MD,^a Jeffrey M. Simmons, MD, MSc,^{a,b,c} Philip A. Hagedorn, MD, MBI,^{a,b,f,g} Patrick W. Brady, MD, MSc^{a,b,c}

BMJ Journals

Emergency Medicine Journal

Using voluntary reports from physicians to learn from diagnostic errors in emergency medicine

Nnaemeka Okafor,¹ Velma L Payne,^{2,3} Yashwant Chathampally,¹ Sara Miller,¹
Pratik Doshi,¹ Hardeep Singh^{2,3}

Volume 33, Issue 4



GATHER PATIENT REPORTED DATA

Patients and families identify issues not collected by traditional sources

Patient experiences not gathered

ORIGINAL RESEARCH

Use of patient complaints to identify diagnosis-related safety concerns: a mixed-method evaluation

Traber D Giardina ^{1,2} Saritha Korukonda,³ Umber Shahid,^{1,2} Viralkumar Vaghani,^{1,2} Divvy K Upadhyay,⁴ Greg F Burke,^{4,5} Hardeep Singh ^{1,2}

The Joint Commission Journal on Quality and Patient Safety 2022; 48:271–279

Compensation Claims in Danish Emergency Care: Identifying Hot Spots and Blind Spots in the Quality of Care

Lars Morsø, PhD; Søren Birkeland, PhD; Sisse Walløe, MSc; Claire Gudex, PhD; Mikkel Brabrand, MD, PhD; Kim L. Mikkelsen, PhD; Søren Bie Bogh, PhD

HealthAffairs

VOL. 37, NO. 11: PATIENT SAFETY

Learning From Patients' Experiences Related To Diagnostic Errors Is Essential For Improving Patient Safety

Traber Davis Giardina¹, Helen Haskell², Shailaja Menon³, Julia Hallisy⁴, Frimpong Urmimala Sarkar⁶, Kathryn E. Royse⁷, and Hardeep Singh⁸See fewer authors

- Not possible to find or review everything
- Trigger queries can alert safety personnel of possible adverse event
- E-trigger algorithm queries for a selective “high-risk” sample in an EHR data warehouse

BMJ Quality & Safety

Application of electronic trigger tools to identify targets for improving diagnostic safety

Murphy DR, Meyer AN, Sittig DF, Meeks DW, Thomas EJ, Singh H.
Online First: 05 October 2018. doi: 10.1136/bmjqs-2018-008086

SELECT
CHARTS TO
REVIEW

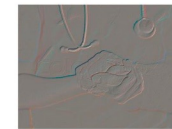
PATHS TO BETTER DIAGNOSES


**Danish Patient
Compensation**

PS!

Dansk Selskab for
PatientS!kkerhed

Danish Society for Patient Safety



VEJE TIL BEDRE DIAGNOSER

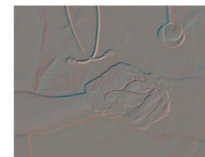


Hvor tit sker der fejl?
Hvor går det galt?
Og hvad kan der gøres
ved det?



PROJECT DESIGN

- A quantitative and a qualitative analysis has been carried out on data from the Danish Patient Compensation
- All cases 2009-2018 (90.000 cases)
- Before Covid-19!



VEJE TIL BEDRE DIAGNOSER



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Annually 760 Danish citizens is compensated for injuries caused by diagnostic error.

- 63 citizens die (mean age: 55 years).

Misdiagnosis accounts for 30% of all recognized treatment injury cases

2,25 billion Danish kroner has been payed in compensation for diagnostic errors over a 10-year period (225.000 mio. pr year)

- ~ 0,13 % of total Danish healthcare expenditures (170 billion Danish kroner pr. year)

Five major diseases account for 75 % of diagnosis-related cases:

- Traumatic lesions, cancer, musculoskeletal conditions, vascular diseases and disease of the alimentary tract.

QUANTITATIVE ANALYSIS

QUALITATIVE ANALYSIS METHOD

213 cases were audited

The cases were distributed between 3 independent reviewers, all experienced medical specialists.

During the review period they met twice to ensure methodological consistency

The records contain all background material, medical charts, hospital records, lab results, x-ray-pictures etc. and the medical expert evaluation

QUALITATIVE ANALYSIS I CHRONOLOGICALLY

Analyzing the Diagnostic Process

The CBS taxonomy enables data analyses along the process of care that help identify where breakdowns most commonly occur. Each of the 12 steps described below presents focal points for more detailed analysis and opportunities for provider training and systems improvements.



58%
of cases involve
assessment
failures

INITIAL DIAGNOSTIC ASSESSMENT

Covers the patient's presentation with a complaint, through the physician's assessment, differential diagnosis, and test orders. Factors that trigger malpractice allegations are primarily related to voids in the physician's evaluation of the patient's history and cognitive processing related to presentation, differential diagnosis, and test ordering.

- 1. Problem Noted, Care Sought**
Issues: Access, scheduling, or waiting issues impede the patient from raising a relevant health problem, or delays him or her from seeking care for a recognized problem.
- 2. History and Physical Conducted**
Issues: The patient's (personal and family) history is not fully recorded or updated; the physical examination is absent or inadequate.
- 3. Patient Assessed and Symptoms Evaluated**
Issues: The patient's complaints or symptoms are not thoroughly addressed.
- 4. Differential Diagnosis Established**
Issues: A narrow diagnostic focus, failure to establish a differential diagnosis, or reliance on a chronic condition or previous diagnosis.
- 5. Diagnostic Test(s) Ordered**
Issues: The ordering of appropriate tests/imaging/labs is impeded by an incomplete or biased assessment.



29%
of cases involve
testing
failures

TESTING AND RESULTS PROCESSING

From the scheduling, performance, and interpretation of diagnostic tests, through the management of the test results. The factors that trigger malpractice allegations are primarily related to breakdowns in clinical systems for test result management, the cognitive skills related to interpretation, and communication of results to the ordering physicians.

- 6. Tests Performed**
Issues: Ordered test/imaging is not performed, performed incorrectly, or specimen is mislabeled or mishandled.
- 7. Test Interpreted**
Issues: Report of findings are determined to be incomplete or inaccurate; abnormal findings not ruled out.
- 8. Test Results Transmitted to/Received by Ordering Physician**
Issues: Receipt/review of test result by ordering physician is not completed, or is significantly delayed.



46%
of cases involve
follow-up
failures

FOLLOW UP AND COORDINATION

Encompasses decisions made and actions taken after assessment and testing, including consultations and communication. The factors driving malpractice allegations are primarily related to failure to involve specialty consultation and breakdowns in communication among caregivers and between caregivers and the patient.

- 9. Physician Follows Up with Patient**
Issues: Findings are not communicated to the patient, follow-up testing is not arranged, or follow up is not documented.
- 10. Referrals/Consults**
Issues: Appropriate referrals to specialists (or consults) are not made or adequately managed, or identification of the physician responsible for ongoing care is unclear.
- 11. Patient Information Communicated Among Care Team**
Issues: Failure by one or more provider to fully review or share patient information that influences ongoing diagnostic process.
- 12. Patient and Providers Establish Follow-up Plan**
Issues: Patient fails to adhere to the follow-up plan, including appointments and treatment regimen.

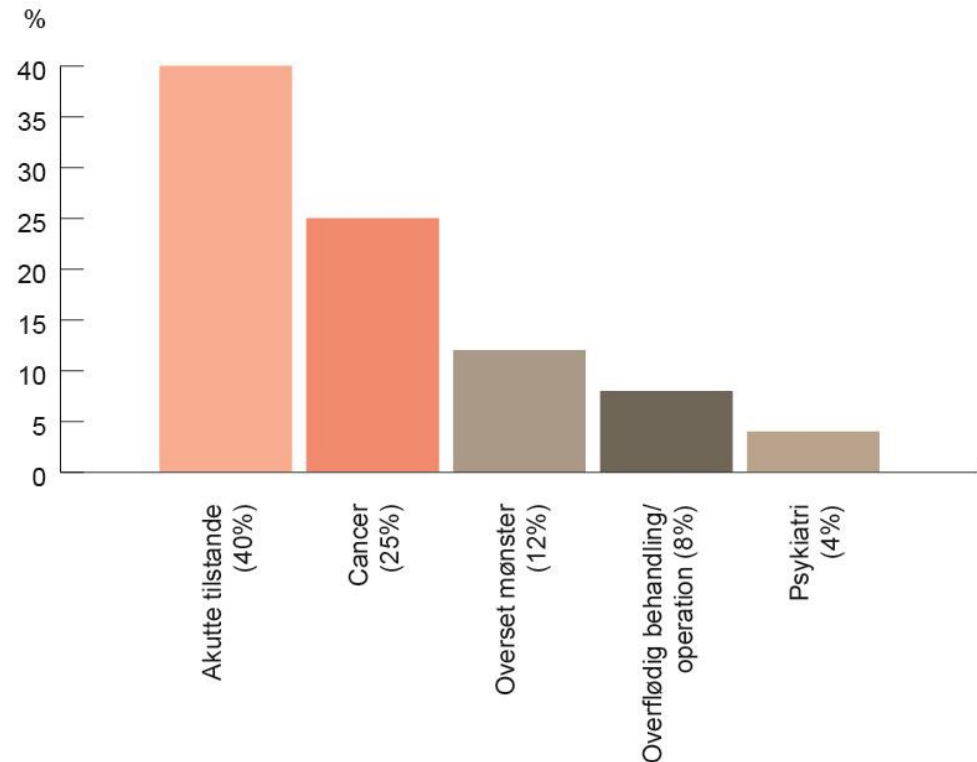
- Our tool was translated and adapted from a tool originally designed by the American organization CRICO (The Risk Management Foundation of the Harvard Medical Institutions Incorporated) to analyze and learn from malpractice claims.
- 3 phases with a total of 12 steps

QUALITATIVE ANALYSIS I RESULTS

Initial diagnostic assessment					Testing and results processing			Follow up and coordination			
80 %					27 %			33 %			
I	2	3	4	5	6	7	8	9	10	11	12
Problem noted – Care sought	History and Physical Conducted	Patient Assessed and Symptoms Evaluated	Differential Diagnosis Established	Diagnostic Test(s) Ordered	Tests Performed	Tests Interpreted	Test Results Transmitted to/ Received by Ordering Physician	Physician Follows up with Patient	Referrals/ Consults	Patient Information Communicated among Care Team	Patient and Providers Establish Follow up Plan
1%	23%	52%	44%	38%	2%	25%	0%	7%	24%	4%	1%

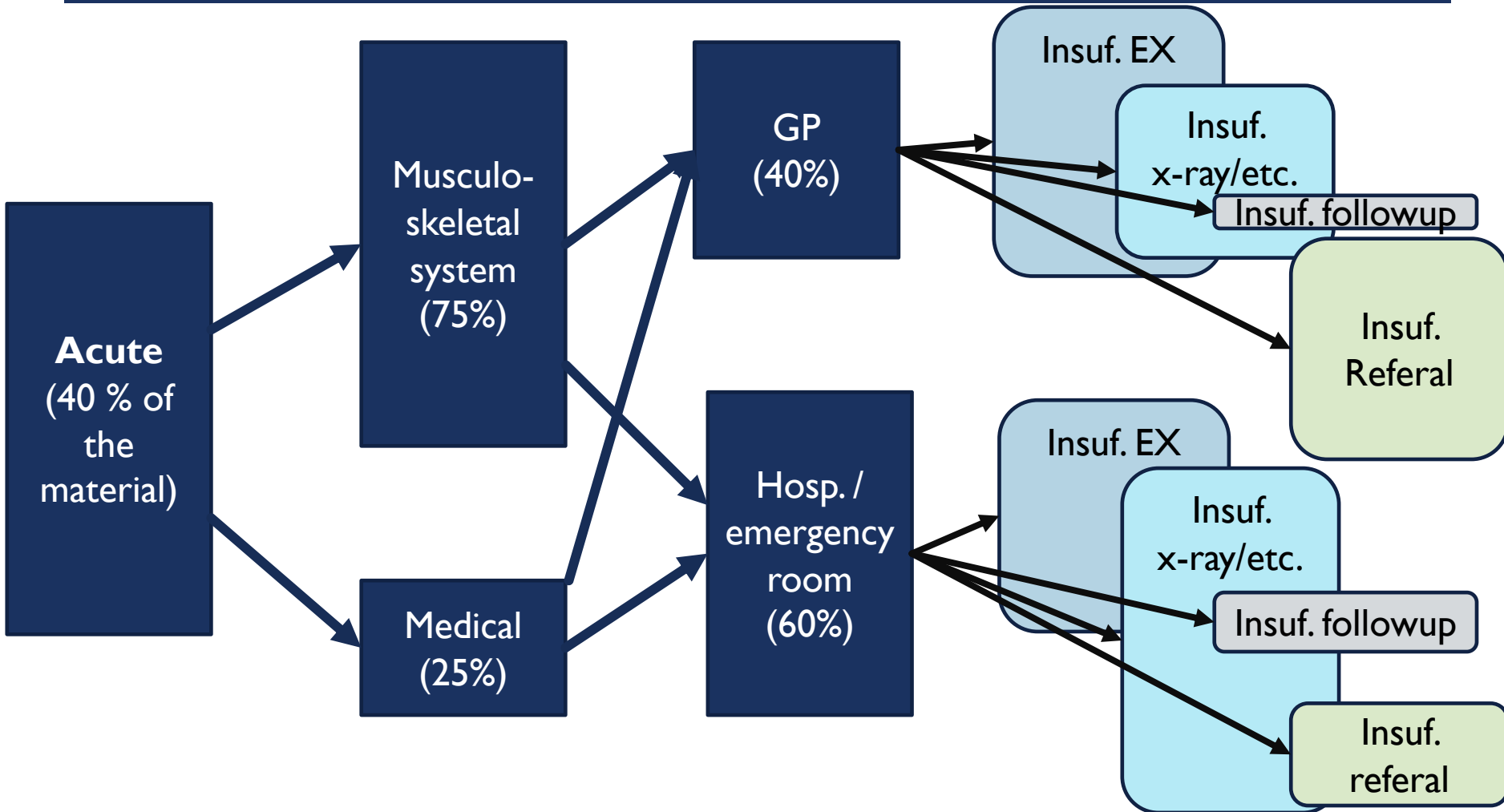
QUALITATIVE ANALYSIS II THEMATIC

- Acute symptoms, medical or surgical
- Cancer-suspected symptom or finding
- Errors in the form of overtreatment (operation)
- Overlooked pattern/lack of pattern recognition
- Psychiatric treatment



DIAGNOSTIC ERROR COMPENSATION CASES

ACUTE CASES



CAUSES OF DIAGNOSTIC ERROR

- Quite easy for reviewers to determine what phase in the diagnostic process was affected
- In the qualitative thematic analysis it was possible to reveal some underlying failure patterns
- Difficult to determine the exact cause of error