



Gníomhaireacht Bainistíochta an Chisteáin Náisiúnta  
National Treasury Management Agency

An Ghníomhaireacht um Éilimh ar an Stát  
State Claims Agency

# Diagnostic Excellence

Dr John Fitzsimons

Consultant Paediatrician, Clinical  
Director for QI, HSE

#SCALearning25

# Diagnostic Excellence

DxEx

## From Error to Excellence

Dr John Fitzsimons

Consultant Paediatrician, CHI @ Temple Street,

CD for QI with HSE National QPS Directorate & Lead for Quality Improvement Education, RCPI

# Learning Outcomes

At the end of this session you will be able to...

Appreciate

- Appreciate the influence of diagnosis on the quality and safety of care

Describe

- Describe the features of *Diagnostic Excellence* and *Diagnostic Stewardship*

Find & apply

- Apply resources that support stewardship for *Diagnostic Excellence* in your workplace

Diagnosis  
is in the  
spotlight ...

WHO “World  
Patient Safety  
Day” Theme  
September 17<sup>th</sup>  
2024

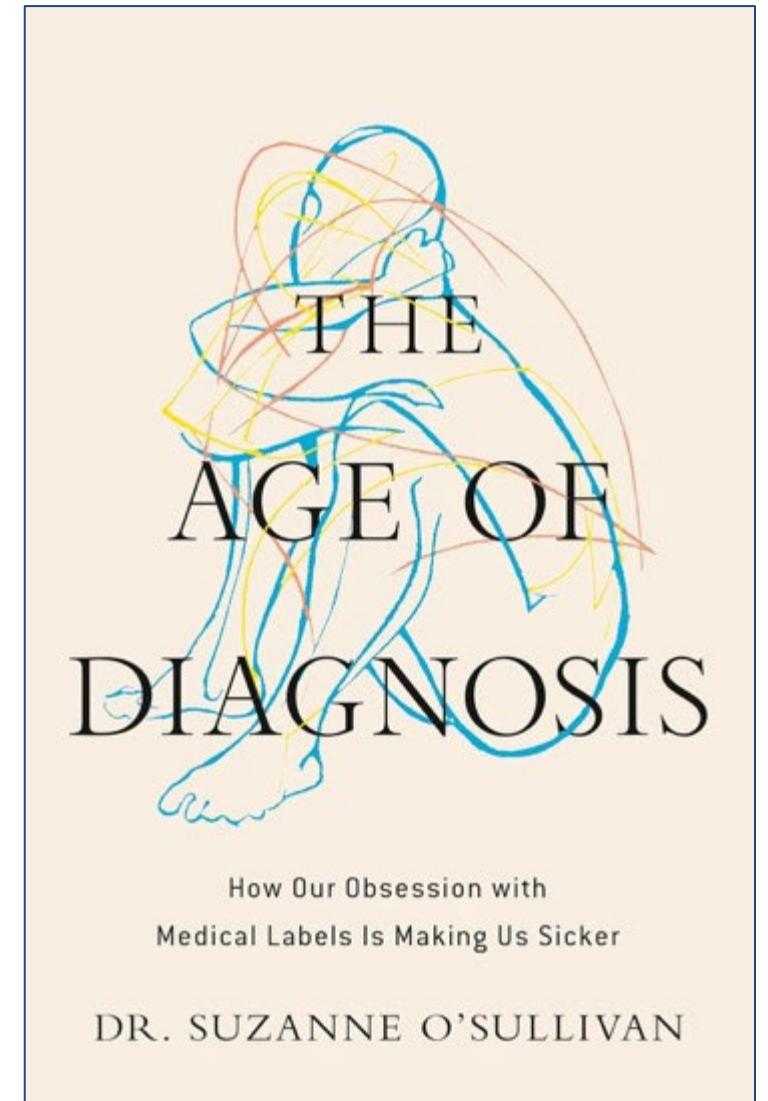
“Get it right, make it safe!”



Diagnosis has  
become  
topical...



Dr Suzanne O'Sullivan



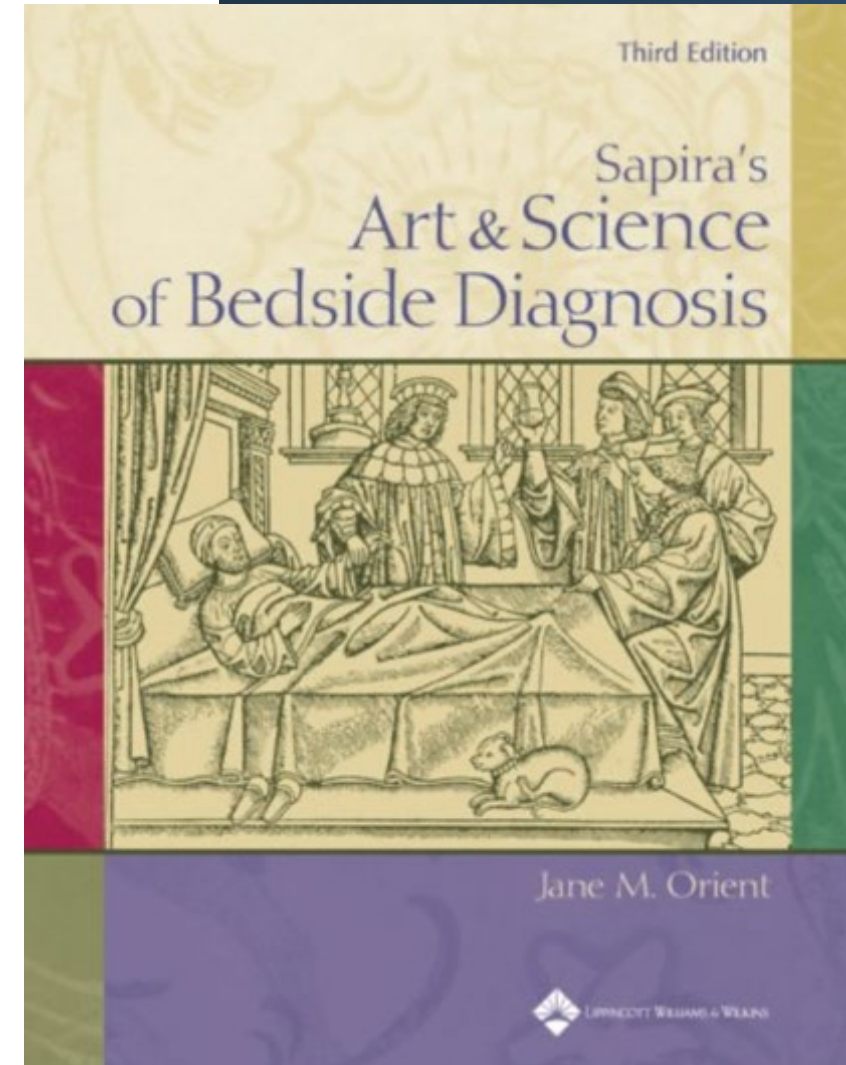


A word cloud centered around the word "diagnosis". The word "diagnosis" is the largest and most prominent, rendered in a dark blue serif font. Surrounding it are various related terms in different colors and sizes, including: "Post-operative" (blue), "Pre-operative" (green), "Screening" (green), "Admitting" (brown), "Initial" (brown), "Suspected" (pink), "Billable" (brown), "Working" (blue), "Genetic" (pink), "Discharge" (blue), "Telediagnosis" (brown), "Evolving" (green), "Internet" (green), "Preliminary" (brown), "Retrospective" (brown), "Laboratory" (green), "Tissue" (brown), "Final" (brown), "Pre-natal" (blue), "Principal" (brown), "Rule-out" (green), "AI-enhanced" (brown), "Alternate" (blue), "Clinical" (green), "Diagnosis-of-exclusion" (green), "Post-mortem" (brown), "Confirmed" (blue), "Dr.Google" (brown), "Self-diagnosis" (brown), "Mis-diagnosis" (green), and "Differential" (blue).

diagnosis

# What is Diagnosis?

- The art or act of identifying a disease from its signs and symptoms (Merriam-Webster Dictionary)
- A pre-existing set of categories agreed upon by the medical profession to designate a specific condition  
(Jutel, A. *Sociology of diagnosis*, 2009)
- The process of identifying a disease, condition, or injury from its signs and symptoms. (US National Cancer Institute)



# Diagnosis and Patient Safety

- Studies have shown that 5 % of patients in outpatient care (USA) and 4.3% of patients in primary care (UK) experience a diagnostic error each year
- Medical record reviews suggest that diagnostic errors account for 6-17 percent of hospital adverse events.
- Post-mortem examination research has shown that diagnostic errors contribute to approximately 10 percent of patient deaths.
- Diagnostic errors are the leading type of paid medical malpractice claims in the US.



# IMPROVING DIAGNOSIS IN HEALTH CARE

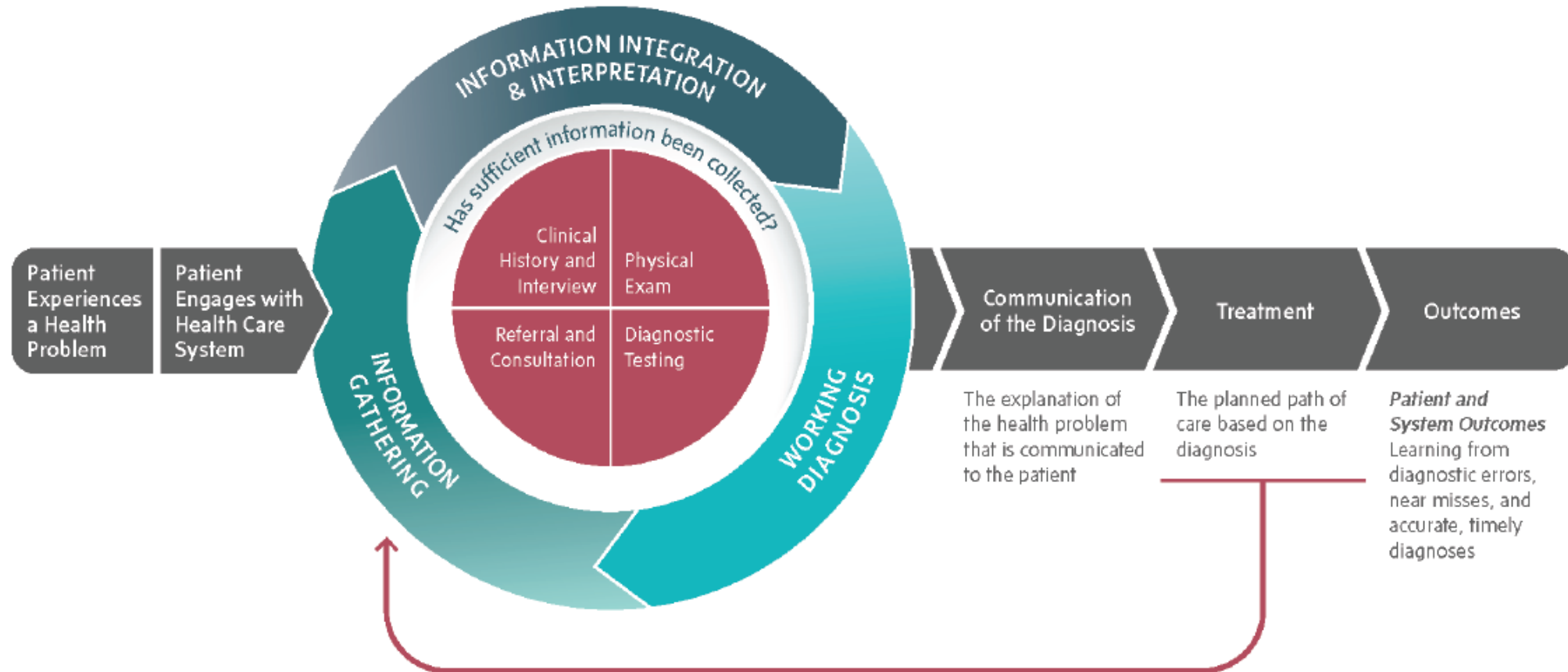
Committee on Diagnostic Error in Health Care;  
Board on Health Care Services; Institute of  
Medicine; The National Academies of Sciences,  
Engineering, and Medicine; **2015**

*“The purpose of diagnosis is to  
achieve a timely and accurate  
diagnosis and secondly; to  
communicate that diagnosis in a  
person centred way”*

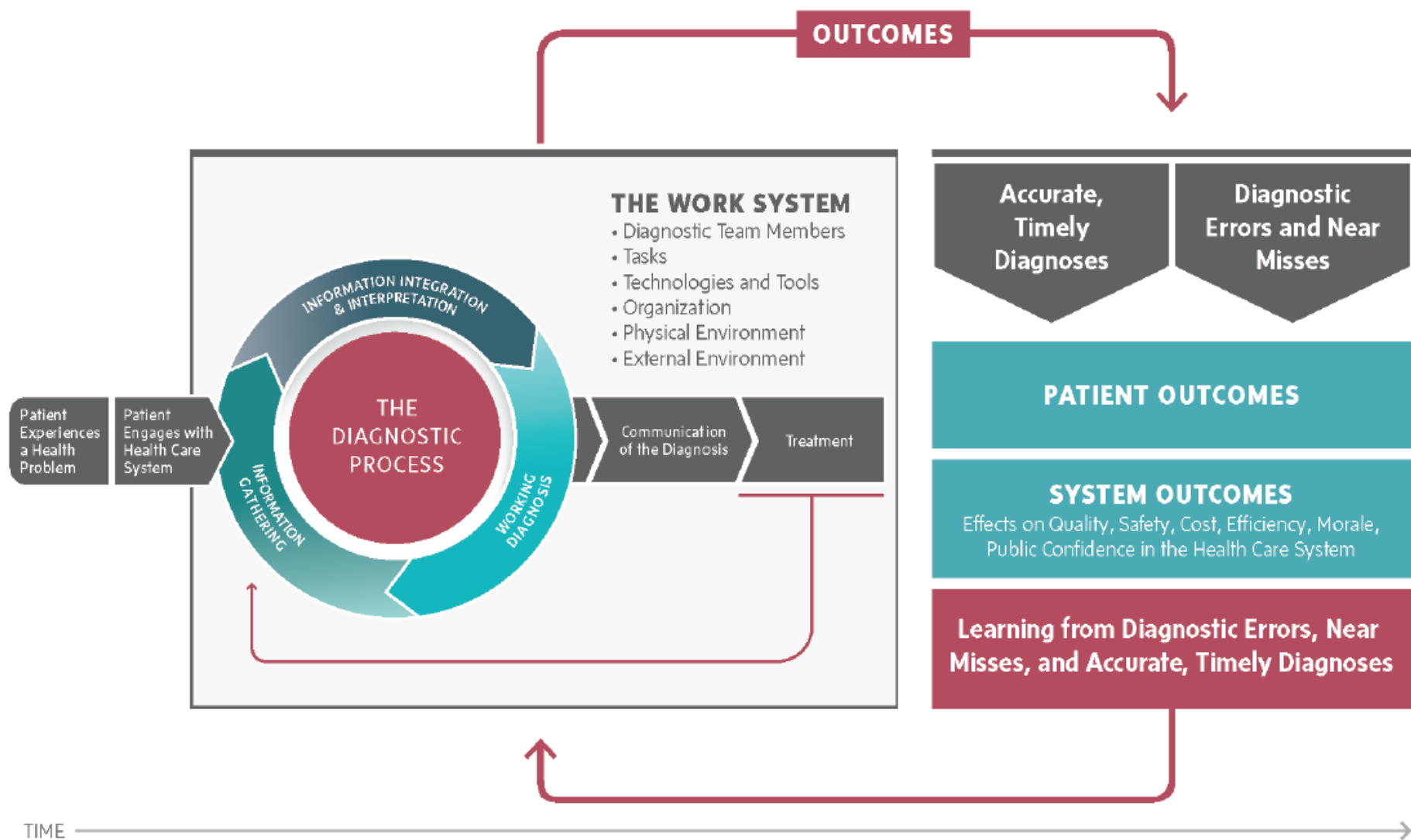
QUALITY CHASM SERIES

The National Academies of  
SCIENCES • ENGINEERING • MEDICINE

# The Process of Diagnosis



# Outcomes come from the Diagnostic Process & the Work System



# The Emergence of Diagnostic Excellence (DxEx)

Moving from a focus on Error to Excellence

# Where has Diagnostic excellence come from?

- Built on the NAM Model of Diagnostic Process & Work System
- Quality care is Safe And...  
...Person centred, Effective, Efficient, Equitable & Timely  
And...Sustainable!
- Safety II



# Diagnostic Excellence

*“Diagnostic excellence involves making a correct and timely diagnosis using the fewest resources while maximising patient experience and managing uncertainty”*

Meyer & Singh

*JAMA 2019;321:737-8.*

# Diagnostic Excellence

Safe  
Effective

Timely

Efficient  
Sustainable

*“Diagnostic excellence involves making a **correct** and **timely** diagnosis using the **fewest resources** while **maximising patient experience** and managing uncertainty”*

Meyer & Singh

Person  
centred

*JAMA 2019;321:737-8.*

# Diagnostic Excellence

Safe  
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Meyer & Singh

Person  
centred

*JAMA 2019;321:737-8.*

?Equity?

# Diagnostic Stewardship



Clinicians



The System



Patient Partnership



Technology & AI enhanced diagnostic excellence



Reducing overuse & overdiagnosis

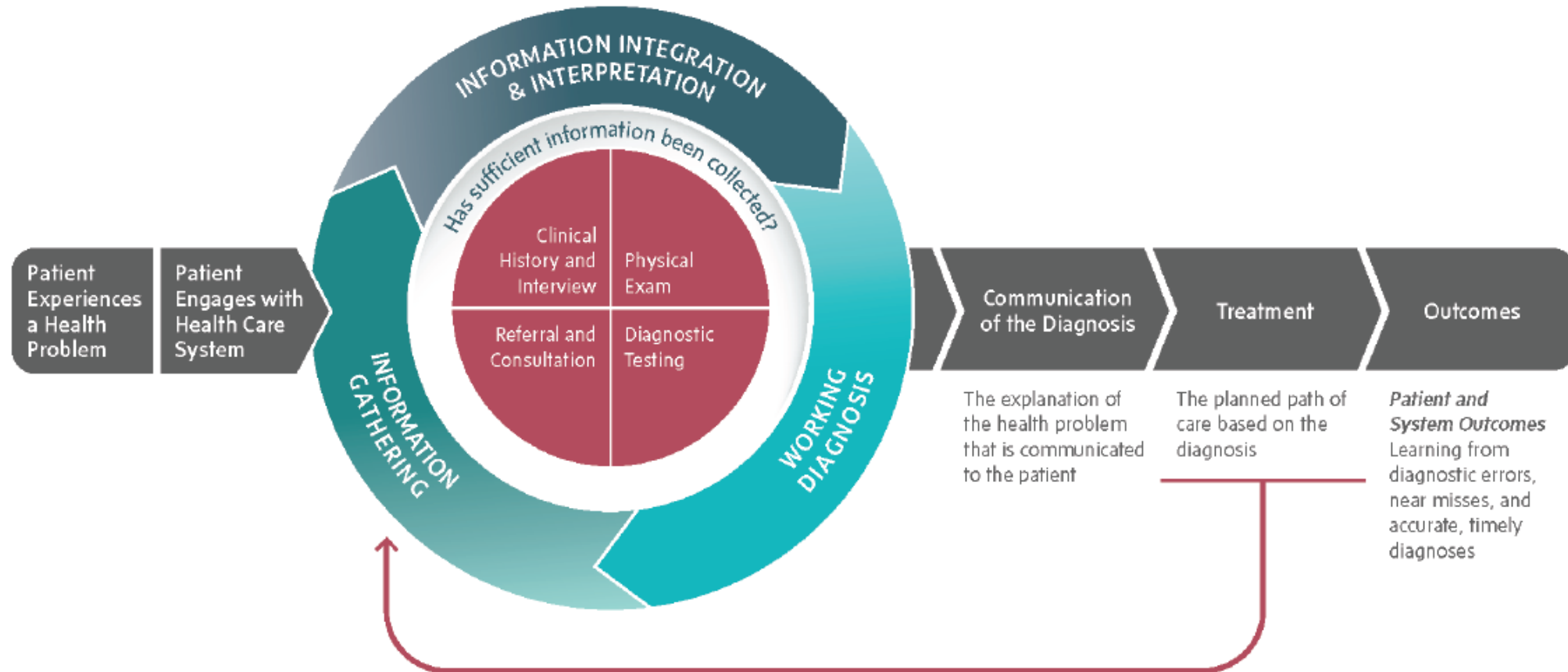


Special diagnostic situations

**THE CLINICIAN**



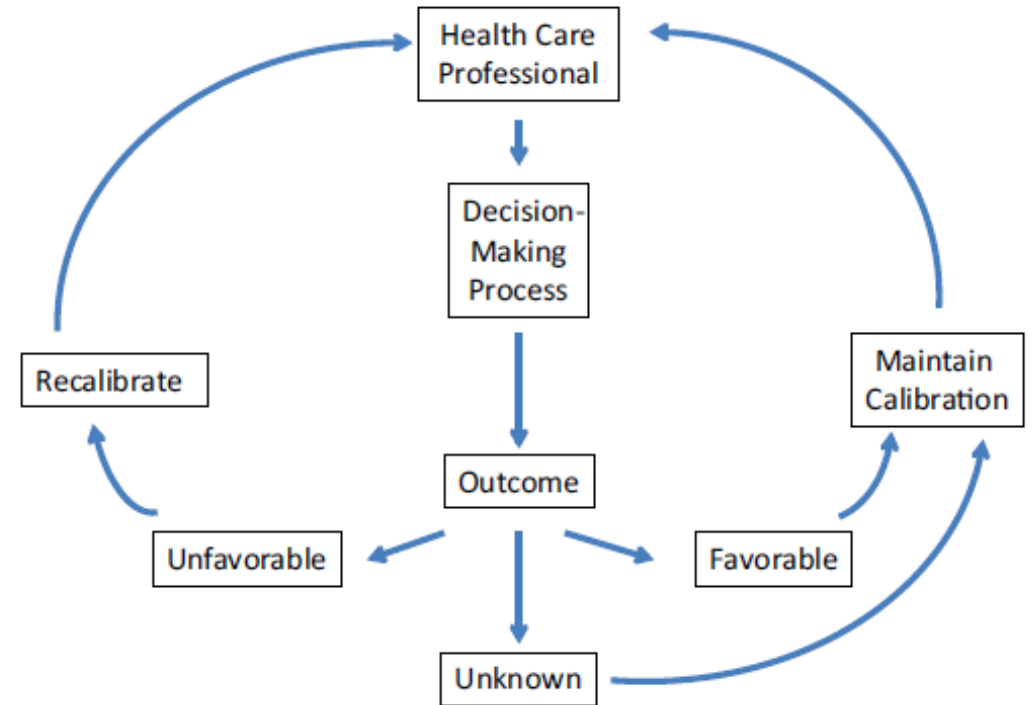
# The Process of Diagnosis



# Diagnostic Calibration



“The balance between accuracy and confidence in diagnosis”

**Hardeep Singh**



Singh H *et al* BMJ  
2022;376:e068044

## 5 Strategies For Advancing Diagnostic Excellence

Strategy	Why	How
 <b>Seek feedback on diagnostic decisions</b>	<ul style="list-style-type: none"><li>Fosters better understanding of your own diagnostic accuracy</li><li>Ensures better calibration of future decisions</li></ul>	<ul style="list-style-type: none"><li>Create an electronic list of patients where diagnosis-related questions remain</li><li>Solicit feedback from colleagues and patients on your performance</li></ul>
 <b>"Byte" sized practice</b>	<ul style="list-style-type: none"><li>Test-enhanced learning promotes knowledge acquisition and skill development</li></ul>	<ul style="list-style-type: none"><li>Integrate brief diagnostic challenges from apps, social media, and medical journals into your daily routine</li></ul>
 <b>Consider biases</b>	<ul style="list-style-type: none"><li>Encourages awareness of fallibility in clinical decision making</li><li>Promotes humility</li><li>Increases recognition of the impact of harmful societal forces (such as racism) on diagnosis</li></ul>	<ul style="list-style-type: none"><li>Find common ground, foster individuation, and build empathy</li><li>Use practice level data to identify harmful patterns in diagnostic evaluation</li><li>Consider if alternative diagnostic possibilities would be entertained if a patient had a different background or identity</li></ul>
 <b>Make diagnosis a team sport</b>	<ul style="list-style-type: none"><li>Diagnosis is not just the purview of doctors alone</li></ul>	<ul style="list-style-type: none"><li>Flatten hierarchy and elevate voices of all health professionals on the diagnostic team</li><li>Seek opportunities for group decision making with colleagues and invite patient concerns and opinions about diagnoses</li><li>Use technology to augment decision making</li></ul>
 <b>Foster critical thinking</b>	<ul style="list-style-type: none"><li>Optimises data acquisition and interpretation throughout the diagnostic process</li></ul>	<ul style="list-style-type: none"><li>Take a sceptical stance towards your initial provisional diagnosis by looking for data to both support and contradict it</li><li>Commit to monitoring and collecting more data and setting prompts for further investigation if the patient doesn't improve</li></ul>

# Providing Good & Safe Feedback

The Joint Commission Journal on Quality and Patient Safety 2021; 47:120–126

## INNOVATION REPORT

### A Program to Provide Clinicians with Feedback on Their Diagnostic Performance in a Learning Health System

Ashley N.D. Meyer, PhD<sup>\*</sup>; Divvy K. Upadhyay, MD, MPH<sup>\*</sup>; Charlotte A. Collins, PhD; Michael H. Fitzpatrick, MD; Maria Kobylinski, MD; Amit B. Bansal, MD, MBA; Dennis Torretti, MD; Hardeep Singh, MD, MPH

**Problem:** Reducing diagnostic errors requires improving both systems and individual clinical reasoning. One strategy to achieve diagnostic excellence is learning from feedback. However, clinicians remain uncomfortable receiving feedback on their diagnostic performance. Thus, a team of researchers and clinical leaders aimed to develop and implement a diagnostic performance feedback program for learning that mitigates potential clinician discomfort.

**Approach:** The program was developed as part of a larger project to create a learning health system around diagnostic safety at Geisinger, a large, integrated health care system in rural Pennsylvania. Steps included identifying potential missed opportunities in diagnosis (MODs) from various sources (for example, risk management, clinician reports, patient complaints); confirming MODs through chart review; and having trained facilitators provide feedback to clinicians about MODs as learning opportunities. The team developed a guide for facilitators to conduct effective diagnostic feedback sessions and surveyed facilitators and recipients about their experiences and perceptions of the feedback sessions.

**Outcomes:** 28 feedback sessions occurred from January 2019 to June 2020, involving MODs from emergency medicine, primary care, and hospital medicine. Most facilitators (90.6% [29/32]) reported that recipients were receptive to learning and discussing MODs. Most recipients reported that conversations were constructive and nonpunitive (83.3% [25/30]) and allowed them to take concrete steps toward improving diagnosis (76.7% [23/30]). Both groups believed discussions would improve future diagnostic safety (93.8% [30/32] and 70.0% [21/30], respectively).

**Key Insights and Next Steps:** An institutional program was developed and implemented to deliver diagnostic performance feedback. Such a program may facilitate learning and improvement to reduce MODs. Future efforts should assess long-term effects on diagnostic performance and patient outcomes.

## A GUIDE TO GIVING FEEDBACK TO CLINICIANS

### Providing Feedback on Diagnostic Performance

#### 1) SCHEDULE THE DEBRIEFING IN A TIMELY MANNER

- Ensure that the debriefing occurs soon after the event to promote a learning environment rather than a punitive one



#### 2) PLAN AND PREPARE FOR THE DEBRIEFING

- Encourage the recipient(s) to review the case before the debriefing.
- Consider including more than one person (e.g. care team) as recipients



#### 3) SET A FLEXIBLE TIME FRAME

- Schedule 10–20 minutes for debriefing
- Allow for more time with a larger group



#### 4) SET THE STAGE FOR A LEARNING ENVIRONMENT

- Take a non-judgmental stance
- Explain the context, including goals and objectives
- Be aware of non-verbal cues



#### 5) SEEK INPUT AND ALLOW FOR EXPLANATION

- Discuss specific actions or decisions
- Do not infer motives
- Explore unclear issues with curiosity
- Include what went well



#### 6) HAVE RECIPIENT(S) IDENTIFY LEARNING OBJECTIVES

- Emphasize learning for the individuals, the care team, the department, and the system



#### 7) END WITH APPRECIATION

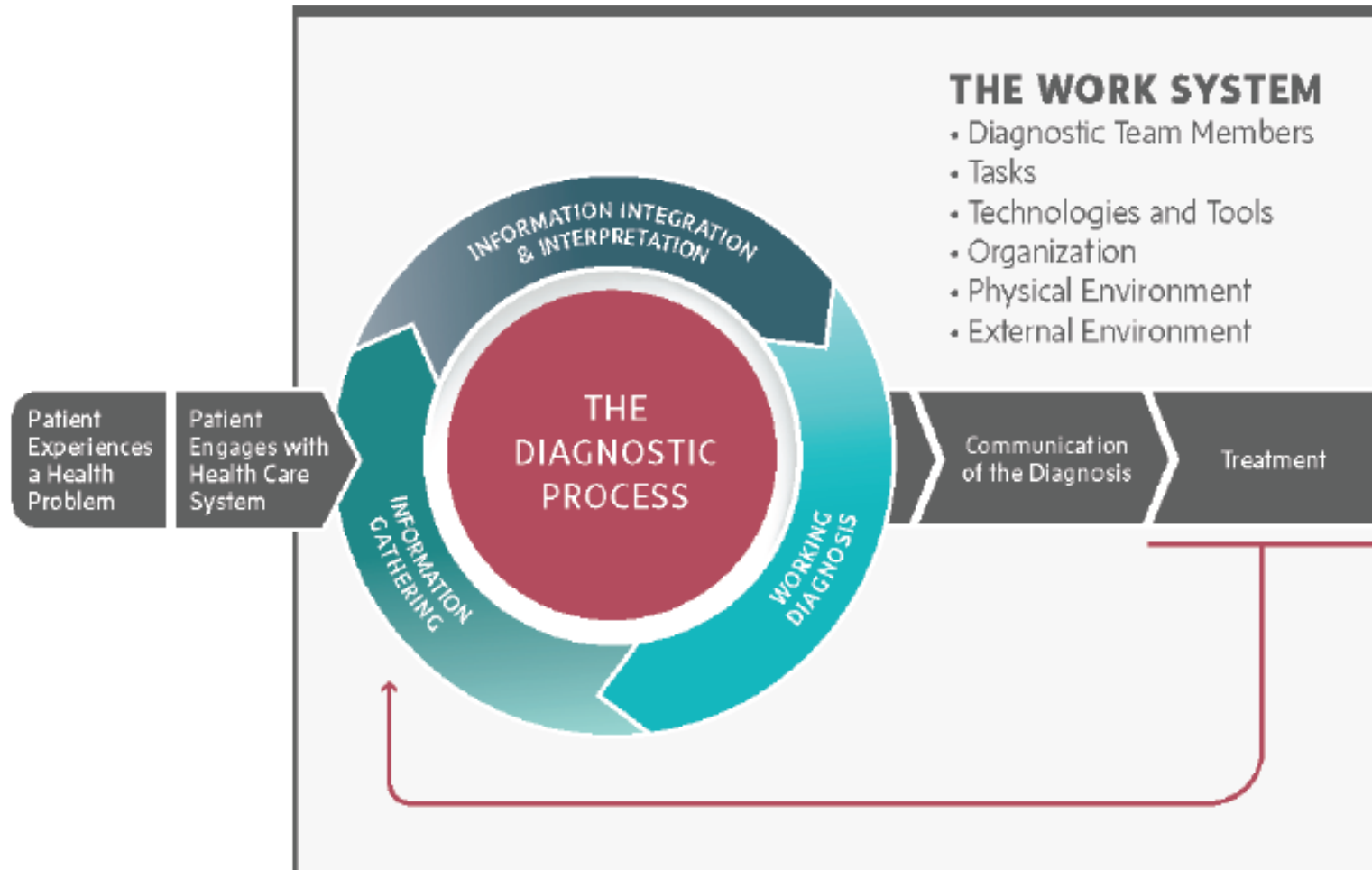
- For their input
- For their time
- For their willingness to help improve clinical decision making at the facility/system.



# THE SYSTEM

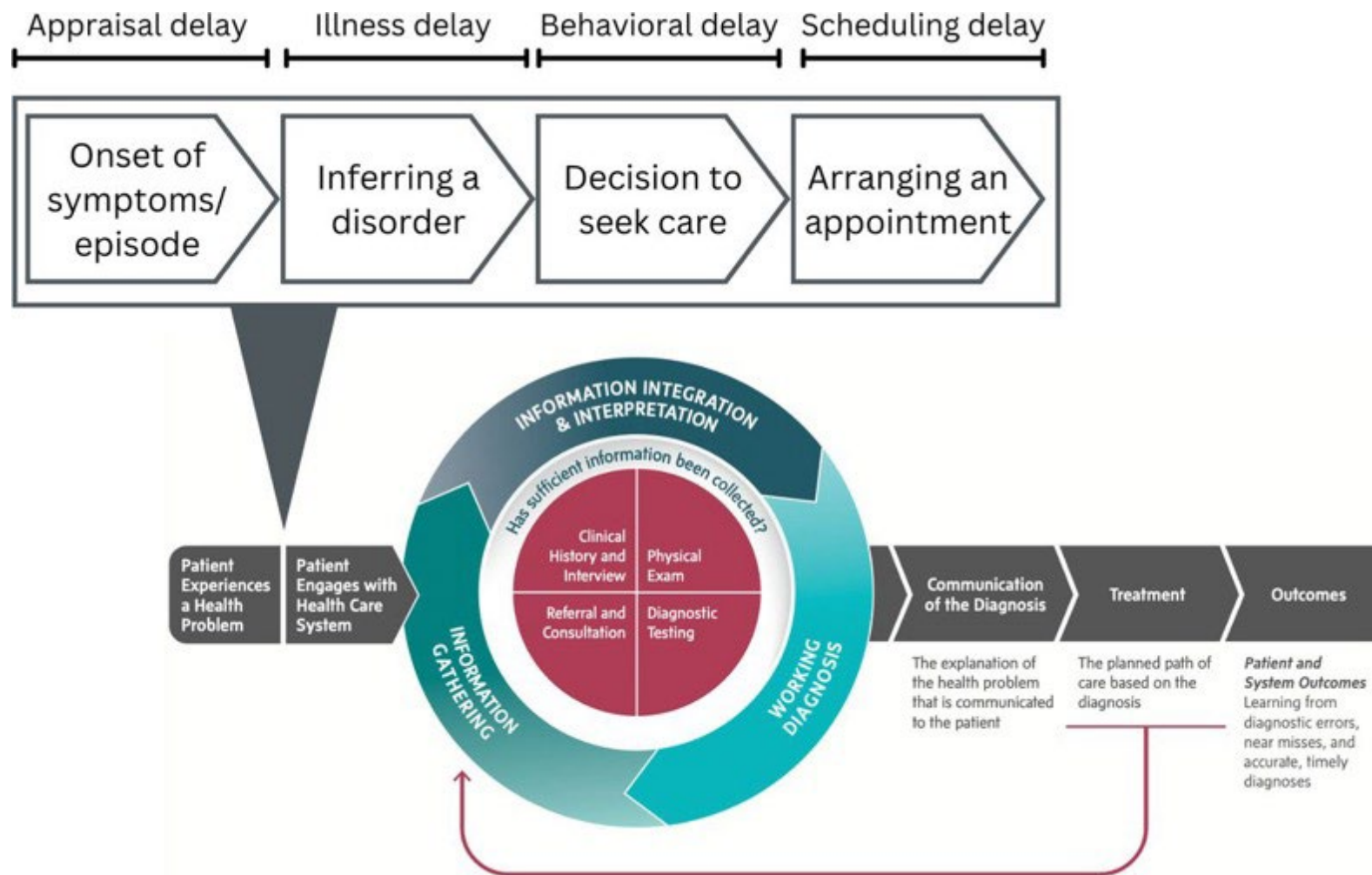


# The Diagnostic Process exists in System



# Diagnostic Challenges in Mental Health

Bradford A,  
Meyer AND, Khan S, et al.  
BMJ Qual Saf  
doi:10.1136/bmjqs-2023-016996



# Measure Dx

[www.ahrq.gov/diagnostic-safety/tools/measure-dx.html](http://www.ahrq.gov/diagnostic-safety/tools/measure-dx.html)

## Measure DX:

A Resource to Identify, Analyze, and Learn From Diagnostic Safety Events

- Learning Health System
- Enabled by IT and EHRs
- Using Audit, data and QI to improve
- Operational definitions, taxonomy and language of diagnostic process
- Improving feedback and calibration
- Relies on a Just Safety culture & Psychological safety



# Measure Dx - Diagnostic Error Index

THE JOURNAL OF PEDIATRICS • www.jpeds.com



ORIGINAL  
ARTICLES

## The Diagnostic Error Index: A Quality Improvement Initiative to Identify and Measure Diagnostic Errors

Michael F. Perry, MD<sup>1,2</sup>, Jennifer E. Melvin, MD<sup>2,3</sup>, Rena T. Kasick, MD<sup>1,2</sup>, Kelly E. Kersey, BS, CPHQ<sup>4</sup>, Daniel J. Scherzer, MD<sup>2,3</sup>, Manmohan K. Kamboj, MD<sup>2,5</sup>, Robert J. Gajarski, MD<sup>2,6</sup>, Garey H. Noritz, MD<sup>2,7</sup>, Ryan S. Bode, MD<sup>1,2</sup>, Kimberly J. Novak, PharmD<sup>8</sup>, Berkeley L. Bennett, MD<sup>2,3</sup>, Ivor D. Hill, MD<sup>2,9</sup>, Jeffrey M. Hoffman, MD<sup>2,10</sup>, and Richard E. McClelland, MD<sup>2</sup>

**Objective** To develop a diagnostic error index (DEI) aimed at providing a practical method to identify and measure serious diagnostic errors.

**Study design** A quality improvement (QI) study at a quaternary pediatric medical center. Five well-defined domains identified cases of potential diagnostic errors. Identified cases underwent an adjudication process by a multi-disciplinary QI team to determine if a diagnostic error occurred. Confirmed diagnostic errors were then aggregated on the DEI. The primary outcome measure was the number of monthly diagnostic errors.

**Results** From January 2017 through June 2019, 105 cases of diagnostic error were identified. Morbidity and mortality conferences, institutional root cause analyses, and an abdominal pain trigger tool were the most frequent domains for detecting diagnostic errors. Appendicitis, fractures, and nonaccidental trauma were the 3 most common diagnoses that were missed or had delayed identification.

**Conclusions** A QI initiative successfully created a pragmatic approach to identify and measure diagnostic errors by utilizing a DEI. The DEI established a framework to help guide future initiatives to reduce diagnostic errors. (*J Pediatr* 2021;232:257-63).

## 5 sources for Measuring Diagnostic Error



Autopsy findings according (Class-1 Goldman classification)



Institutional root cause analyses



Voluntary reporting through an electronic risk management system



Morbidity and mortality (M&M) conferences



Institutionally developed abdominal pain EHR trigger

### Accompanying Editorial Comment:

*"Even more important than the measure developed by Perry et al, however, is the fact that they are measuring diagnostic errors - **and talking about it**"*



# Using QI to achieve Diagnostic Excellence

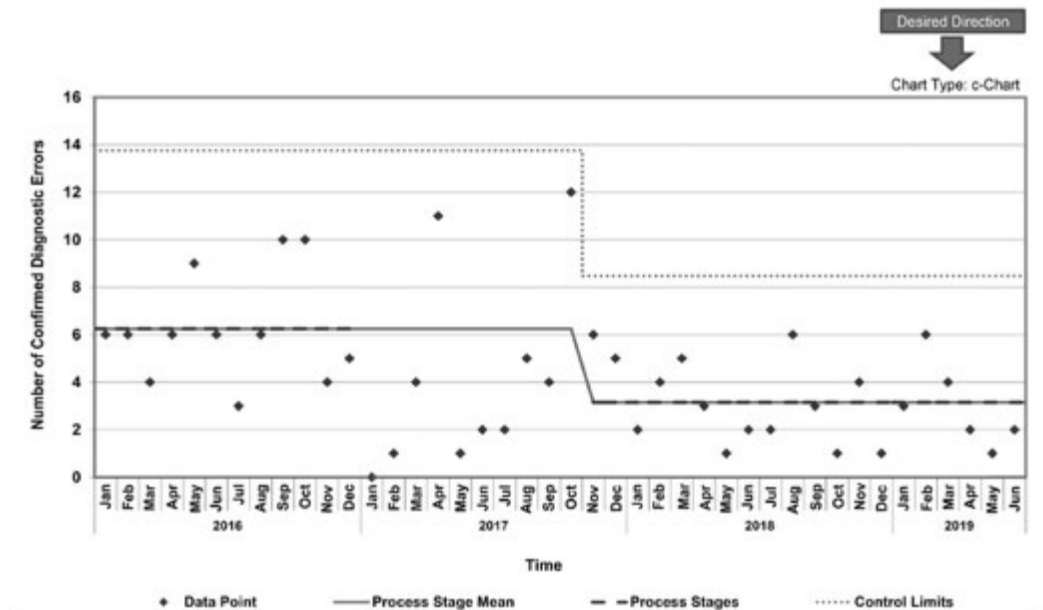
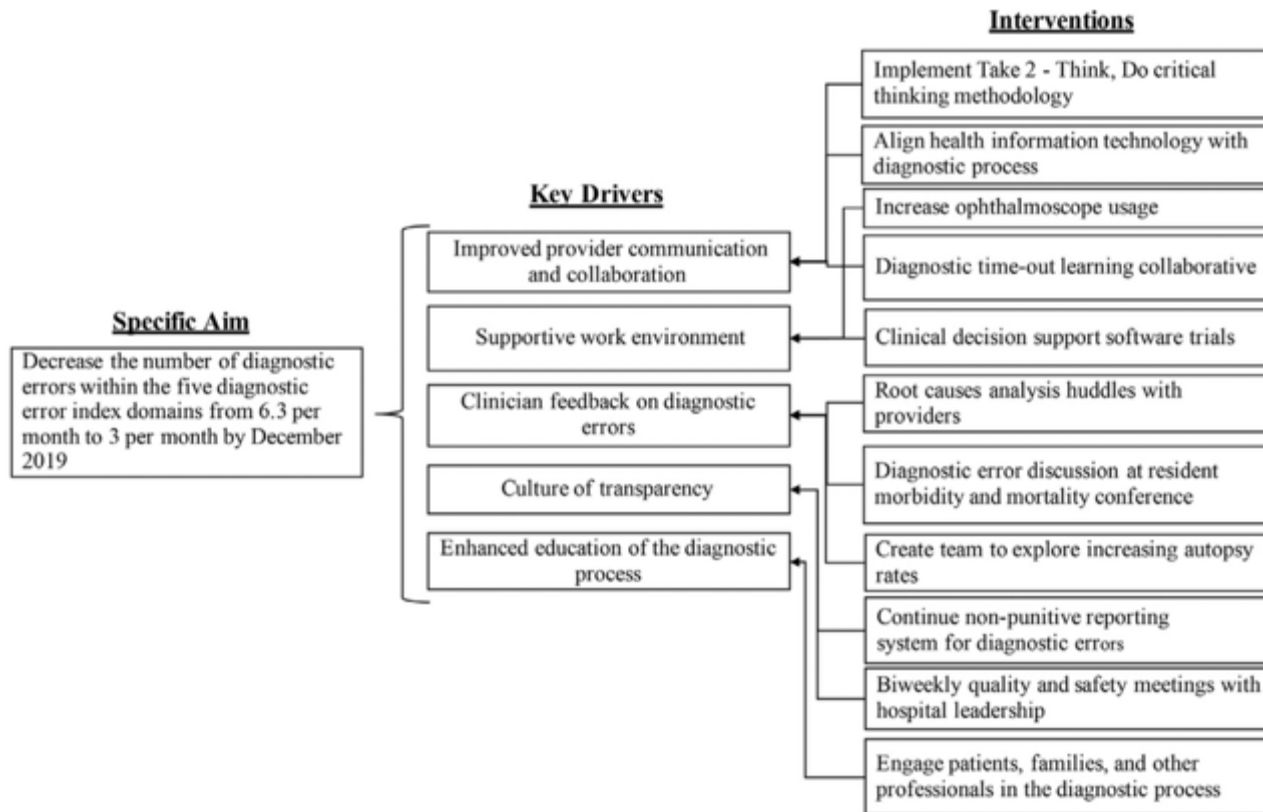


Figure 3. Statistical process control c-chart revealing the number of confirmed diagnosis errors each month.

Perry MF *et al.* The Diagnostic Error Index: A Quality Improvement Initiative to Identify and Measure Diagnostic Errors. J Pediatr. 2021 May;232:257-263. doi: 10.1016/j.jpeds.2020.11.065.



# Educational and Organisational Resources

## TeamSTEPPS Diagnosis Improvement Course



**TeamSTEPPS Course Guide**

**Module 1: Introduction** est. 60 min module  
This module provides an overview of the evidence on diagnostic error and how improved communication among all members of the care team can lead to a safe, accurate, and timely diagnosis in all healthcare settings. It also provides an overview of the TeamSTEPPS framework, competencies, and key principles.

**Module 2: Team Structure** est. 45 min module  
Who is on the diagnostic team? This module explores the diagnostic team and the benefits of teamwork and structure. Exercises will help you and your team identify their roles in achieving a safe, accurate, and timely diagnosis.

**Module 3: Communications** est. 30 min module  
Breakdowns in communication result in significant errors in diagnosis. This module provides diagnostic teams with structured communication tools and approaches to helping achieve a safe, accurate, timely, and communicated diagnosis.

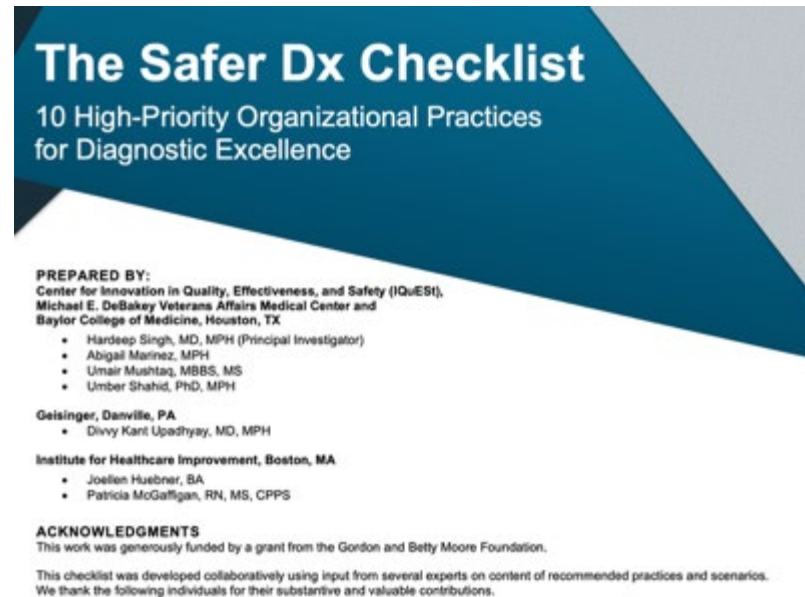
**Module 4: Leadership** est. 30 min module  
Strong leadership is crucial for diagnostic safety. This module defines effective team leadership and provides guidance and tools for healthcare leaders to lead and coach diagnostic teams.

**Module 5: Situation Monitoring** est. 30 min module  
Situation monitoring is the process of continually scanning and assessing a situation to gain and maintain an understanding of what is going on around you. This module describes how situation monitoring can affect diagnostic outcomes and provides tools to improve diagnostic safety.

**Module 6: Mutual Support** est. 30 min module  
The members of a diagnostic team must be mutually supportive to optimize diagnostic outcomes. This module defines mutual support and its role in enhancing diagnostic safety.

**Module 7: Pulling it All Together** est. 45 min module  
This module puts it all together and provides participants an overview of key concepts covered in the TeamSTEPPS course on communication to improve diagnosis.

## IHI Safer Diagnosis Checklist



**The Safer Dx Checklist**  
10 High-Priority Organizational Practices for Diagnostic Excellence

**PREPARED BY:**  
Center for Innovation in Quality, Effectiveness, and Safety (IQES),  
Michael E. DeBakey Veterans Affairs Medical Center and  
Baylor College of Medicine, Houston, TX

- Hardeep Singh, MD, MPH (Principal Investigator)
- Abigail Martinez, MPH
- Umair Mushtaq, MBBS, MS
- Umber Shahid, PhD, MPH

**Geisinger, Danville, PA**

- Divvy Kant Upadhyay, MD, MPH

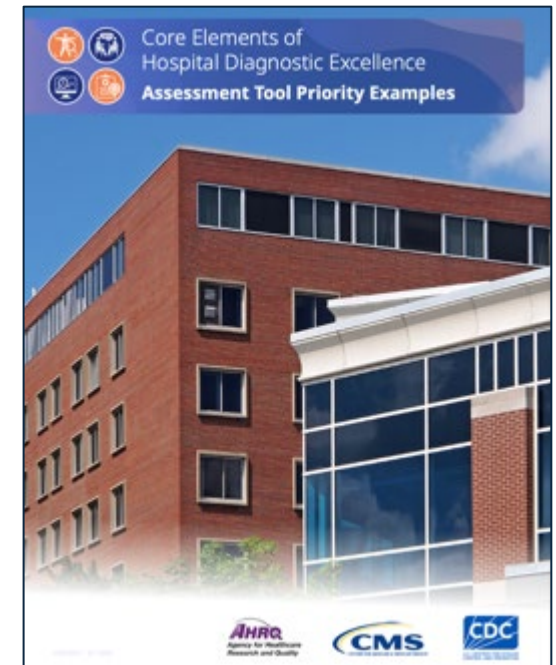
**Institute for Healthcare Improvement, Boston, MA**

- Joellen Huebner, BA
- Patricia McGaffigan, RN, MS, CPPS

**ACKNOWLEDGMENTS**  
This work was generously funded by a grant from the Gordon and Betty Moore Foundation.

This checklist was developed collaboratively using input from several experts on content of recommended practices and scenarios. We thank the following individuals for their substantive and valuable contributions.

## AHRQ/CMS/CDC Core Elements of Hospital Diagnostic Excellence



**Core Elements of Hospital Diagnostic Excellence**  
Assessment Tool Priority Examples

AHRQ  
Agency for Healthcare Research and Quality

CMS  
Centers for Medicare & Medicaid Services

CDC  
U.S. Department of Health & Human Services

**PATIENT PARTNERSHIP**

Eric Topol

*Author of The Creative Destruction of Medicine*

**THE  
PATIENT  
WILL SEE  
YOU  
NOW**

The **FUTURE** of **MEDICINE**  
is in **YOUR HANDS**

# Patient Partnership

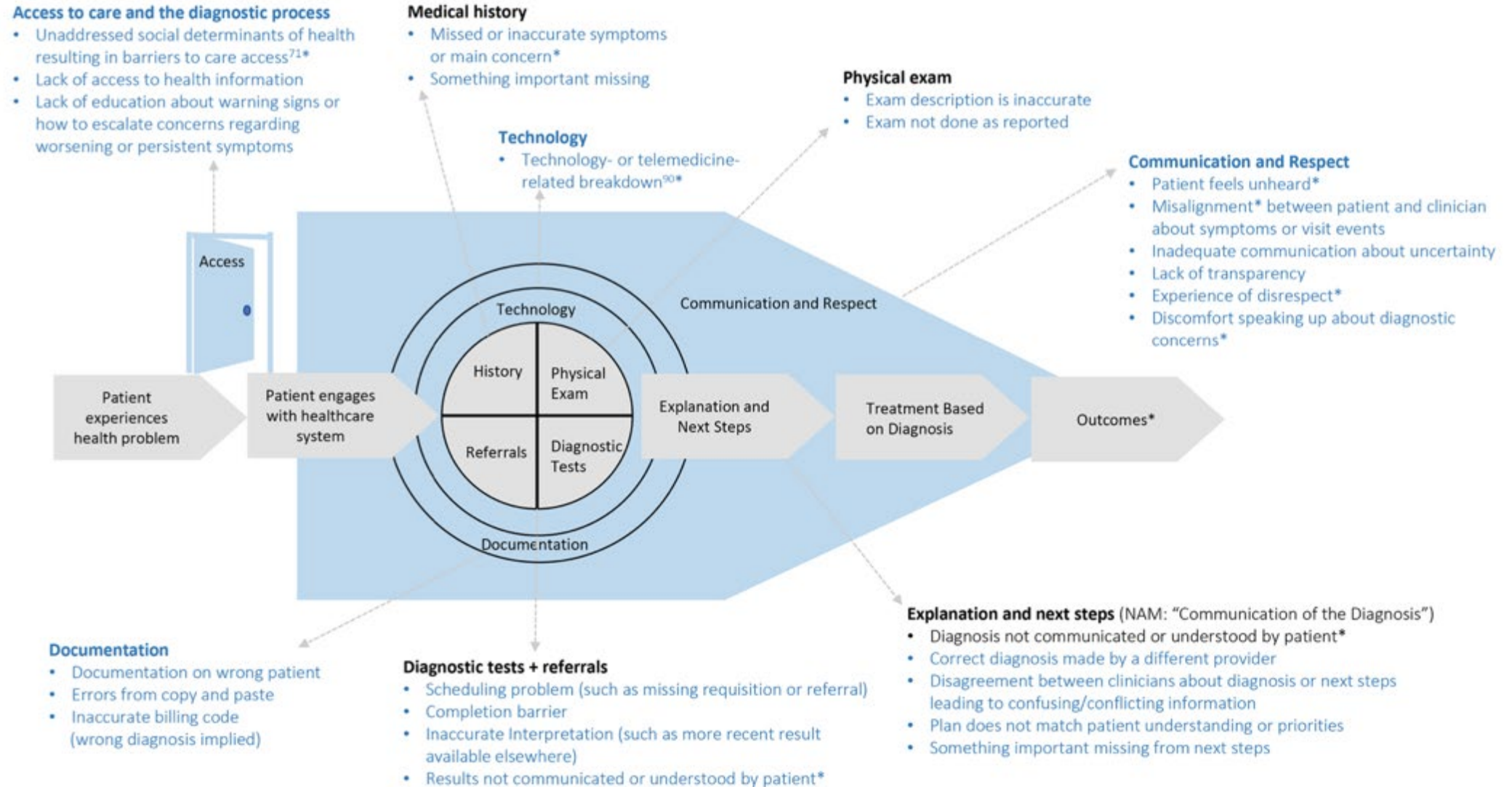
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“The patient is the single most unused person in healthcare”

Eric Topol

# Patient engagement through the Diagnostic Process

Bell SK, Bourgeois F, DesRoches CM, *et al.* *BMJ Qual Saf* 2022;**31**:526–540.





# Patient Partnership for Diagnostic Excellence

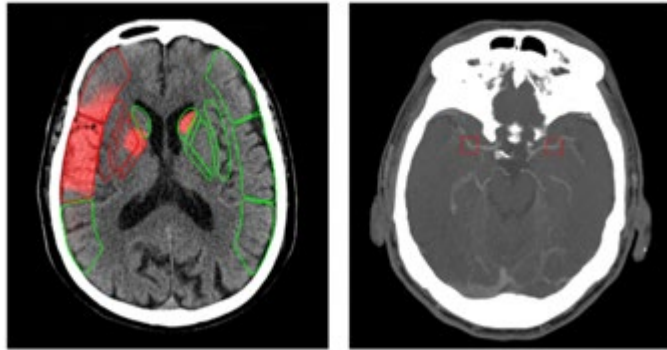
- Diagnostic System Co-Design
  - Culture of Partnership – humility & mutual respect
  - Education & Awareness for patients and HCPs
  - Improved appreciation of risk & uncertainty
- Questions
  - Tools like “Ask me 3” and “Your health/Your voice”
  - BRAN (benefits, Risks, Alternatives, {what if we do Nothing?})
- Communication
  - *Teachback*
  - Co-produced information, risk assessment and shared decision-making tools

**AI & IT ENHANCED DIAGNOSTIC EXCELLENCE**



# AI Enhanced Healthcare

## RAPID STROKE DIAGNOSIS A REALITY IN UK WITH AI-ASSISTED TRIAGE TOOL



CT scan to clinical decision in zero clicks cuts 30-minutes from process, potentially helping to save damage to the brain

NEJM  
Catalyst

JOURNAL ▾ EVENTS ▾ INSIGHTS COUNCIL ▾ TOPICS ▾ ABOUT PUBLICATIONS ▾ 🔍

COMMENTARY

f X in ✉

## Ambient Artificial Intelligence Scribes to Alleviate the Burden of Clinical Documentation


**Authors:** Aaron A. Tierney, PhD, Gregg Gayre, MD, Brian Hoberman, MD, MBA, Britt Mattern, MBA, Manuel Balleca, MD, Patricia Kipnis, PhD, Vincent Liu, MD, MS, and Kristine Lee, MD [Author Info & Affiliations](#)

Published February 21, 2024 | NEJM Catal Innov Care Deliv 2024;5(3) | DOI: 10.1056/CAT.23.0404 | VOL. 5 NO. 3



PERSPECTIVE

# Use of GPT-4 to Diagnose Complex Clinical Cases

Alexander V. Eriksen , M.D.,<sup>1,2</sup> Sören Möller , M.Sc., Ph.D.,<sup>3,4</sup> and Jesper Ryg , M.D., Ph.D.<sup>1,2</sup>

Received: July 10, 2023; Revised: September 15, 2023; Accepted: September 29, 2023; Published: November 9, 2023

## Abstract

We assessed the performance of the newly released AI GPT-4 in diagnosing complex medical case challenges and compared the success rate to that of medical-journal readers. GPT-4 correctly diagnosed 57% of cases, outperforming 99.98% of simulated human readers generated from online answers. We highlight the potential for AI to be a powerful supportive tool for diagnosis; however, further improvements, validation, and addressing of ethical considerations are needed before clinical implementation. (No funding was obtained for this study.)

# Reducing Diagnostic Overuse & Overdiagnosis

*THE SOLUTION TO BETTER DIAGNOSIS IS NOT MORE DIAGNOSIS!*

# Diagnosis & Uncertainty

---

“Medicine is a science of uncertainty and an art of probability”

Sir William Osler  
(1849-1919)



Overuse

Overuse is the provision of medical services (including investigations) that are more likely to cause harm than good

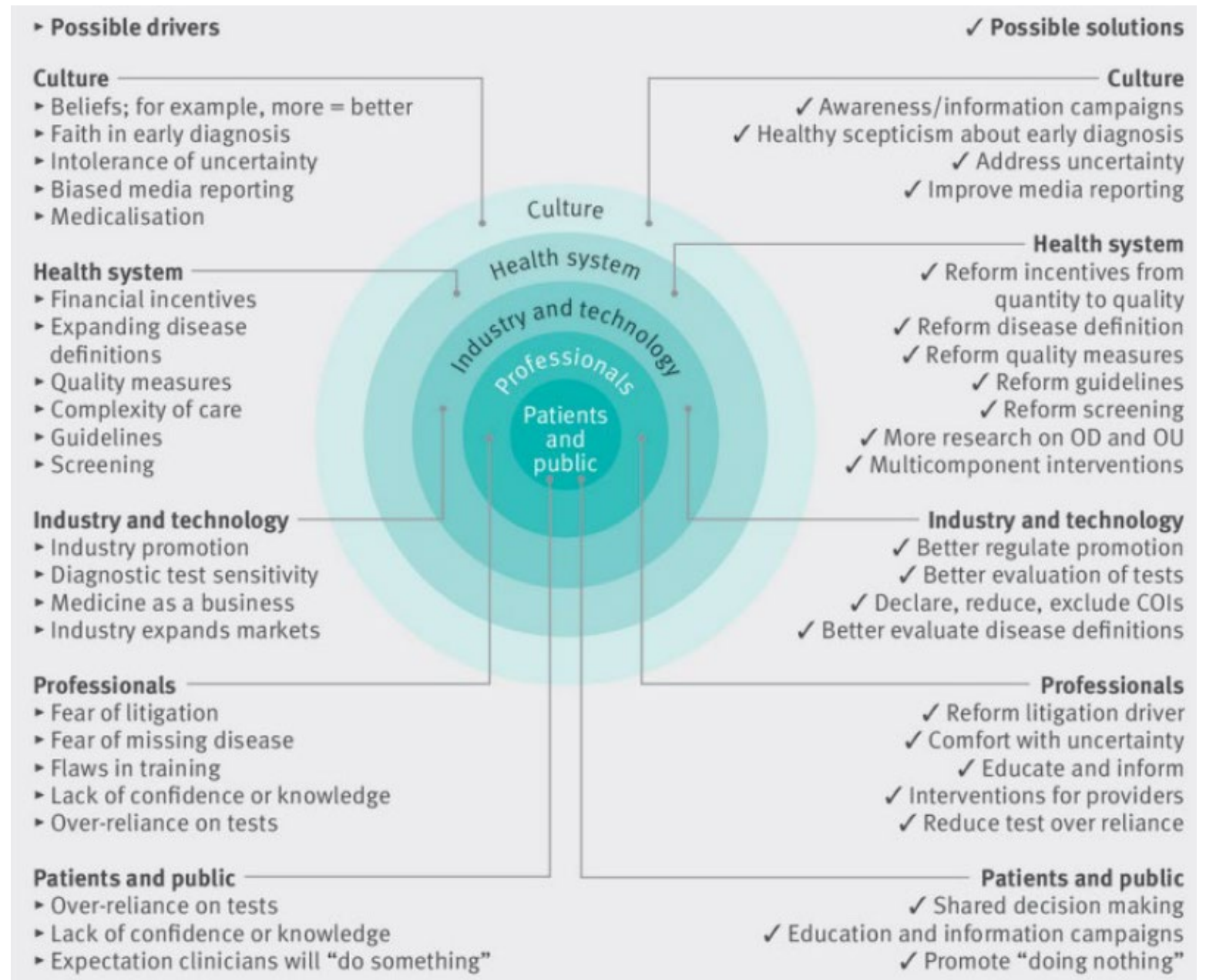
Overdiagnosis

Overdiagnosis means making people patients unnecessarily, by identifying problems that were never going to cause harm or by medicalising ordinary life experiences through expanded definitions of diseases.

*New forms of harm*



# Reduce Overuse





# Choosing Wisely

www.choosingwisely.org



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Our Mission

Clinician Lists

For Patients

Getting Started

Success Stories



## Choosing Wisely®

Promoting conversations between patients and clinicians

**Choosing  
Wisely**

*An initiative of the ABIM Foundation*



## 5 QUESTIONS to Ask Your Doctor Before You Get Any Test, Treatment, or Procedure

- 1 Do I really need this test or procedure?** Medical tests help you and your doctor or other health provider decide how to treat a problem. And medical procedures help to actually treat it.
- 2 What are the risks?** Will there be side effects? What are the chances of getting results that aren't accurate? Could that lead to more testing or another procedure?
- 3 Are there simpler, safer options?** Sometimes all you need to do is make lifestyle changes, such as eating healthier food or exercising more.
- 4 What happens if I don't do anything?** Ask if your condition might get worse — or better — if you don't have the test or procedure right away.
- 5 How much does it cost?** Ask if there are less-expensive tests, treatments or procedures, what your insurance may cover, and about generic drugs instead of brand-name drugs.

# Special diagnostic situations

- RARE DISEASES
- CHALLENGING DIAGNOSES - SEPSIS

# A Rare Disease Diagnosis

## Patient Journey through diagnosis

"It's a waiting game, but you tell a mum to wait when she's waited 15 years. It's difficult. – Nuria

"People began to ask which side of the family it came from...It was a difficult time for us as parents. – Alexa

"We went around, travelling across the entire city to find a nursery for our son. It was impossible to have him accepted. – Gaston

"A diagnosis may be bad news, it may be very bad news or it may be no news. But all of that's OK and there's help and support for whatever spectrum you end up on. – Peter



Infographic by Solve-RD Community Engagement Task Force,  
led by EURORDIS [solve-rd.eu/community-engagement-task-force/](https://solve-rd.eu/community-engagement-task-force/)

# Improving Rare Disease Diagnosis

Questions for  
Healthcare  
Professionals

If you put the pieces together...

## Could your patient have a rare disease?

Does your  
patient want  
advice about  
a genetic  
issue?

Have  
they been  
unable to  
attain a  
diagnosis?

Do they see a  
GP frequently  
with  
unexplained  
symptoms?

Is a genetic cause  
suspected for an  
unexplained  
issue(s)?

Do they have a  
relative with a rare  
disease?

Do they have  
multiple  
symptoms which  
could appear to be  
unconnected?

Do they see  
a number of  
consultants?

### Key rare disease facts



1 in 17 people have a rare disease. This makes rare disease a public health priority.



Diagnosis of a rare disease in the UK can take 4 - 6 years, in which patients can feel isolated and unsupported.



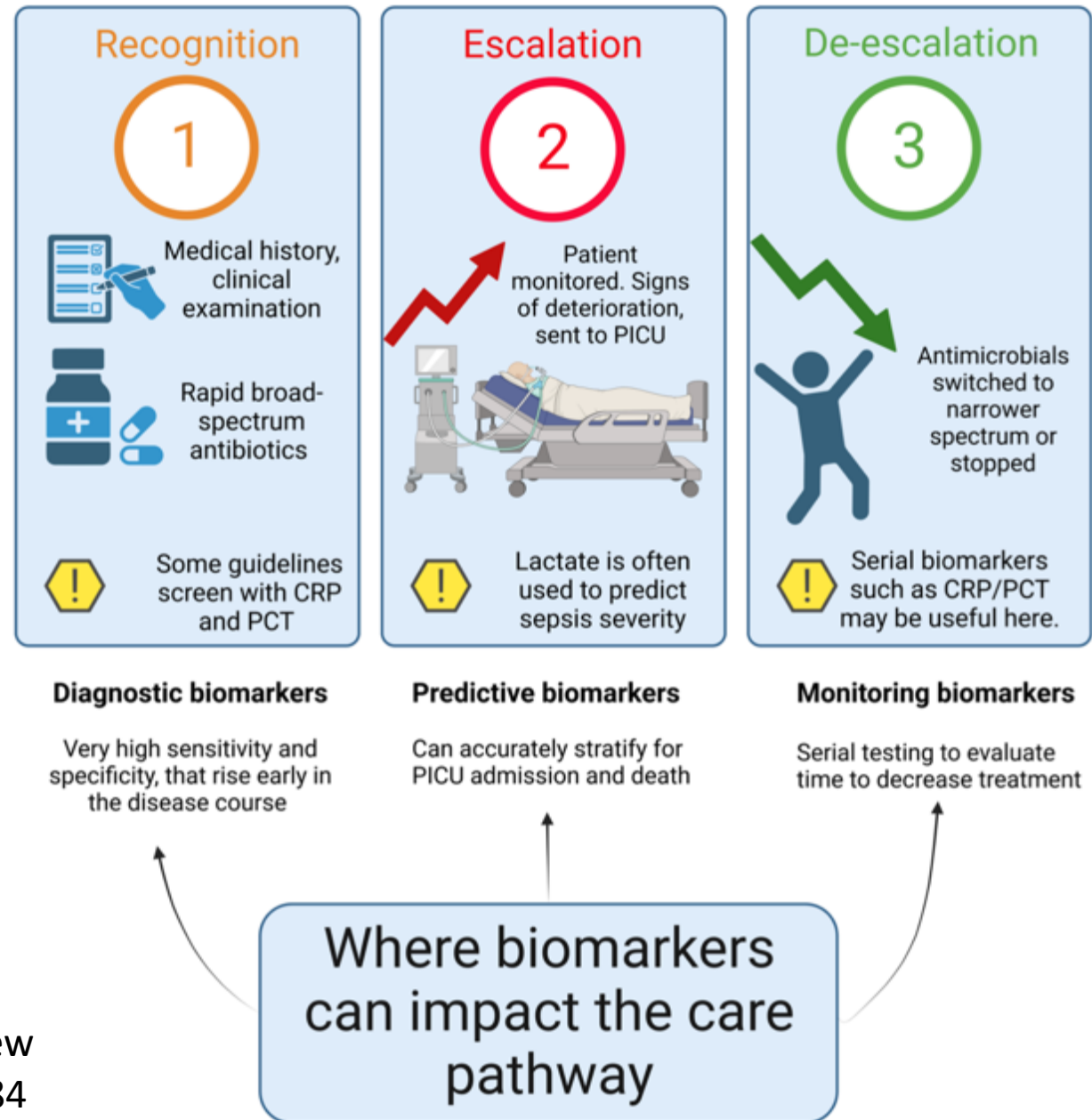
80% of rare diseases have a genetic cause, so referral to genetic services is advised.



75% of rare diseases affect children - 30% of patients with a rare disease don't reach their 5th birthday.



# Challenging Diagnosis- Sepsis



Rodgers O, Mills C, Watson C, *et al.*

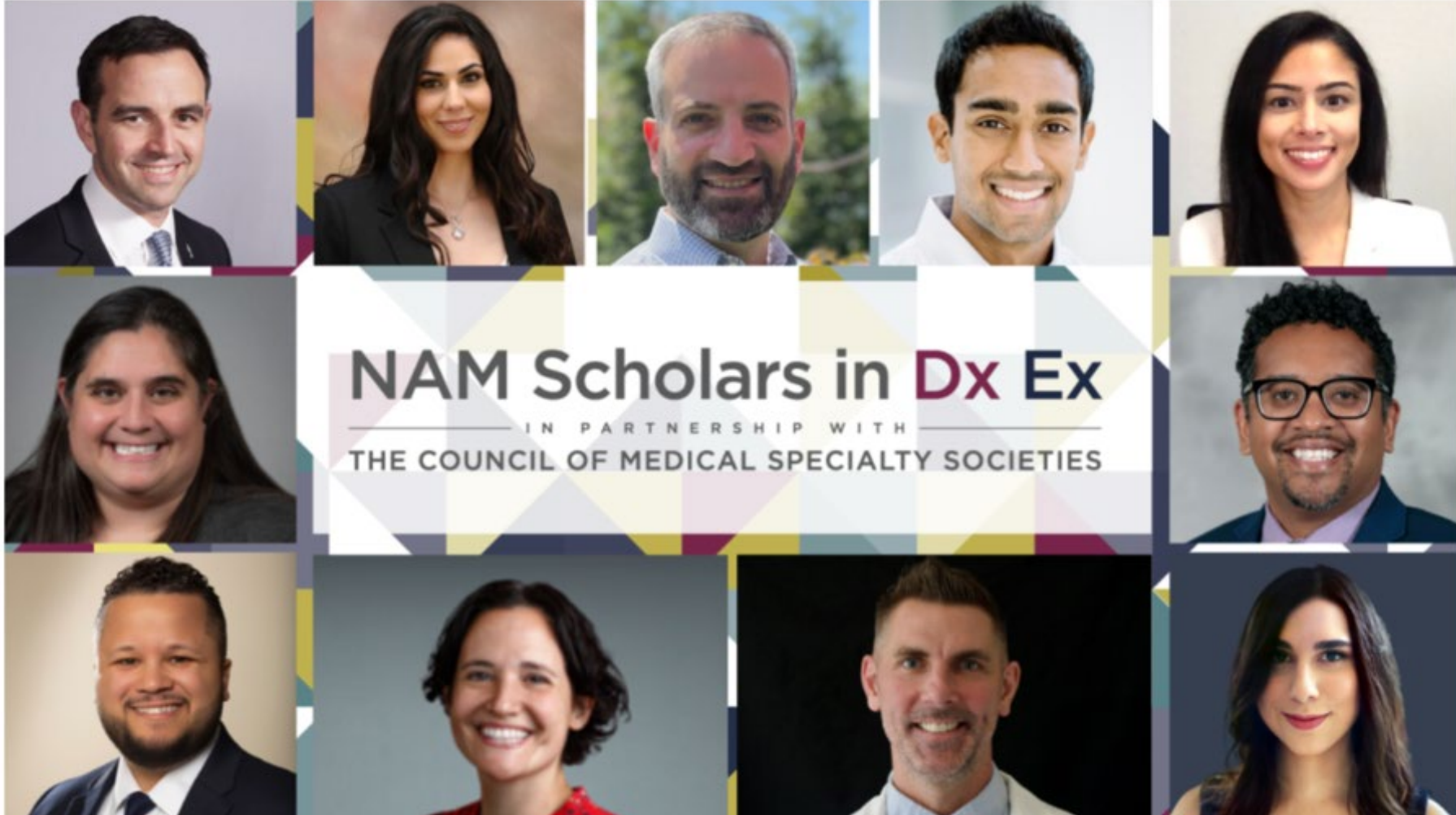
**Role of diagnostic tests for sepsis in children:** a review

*Arch Dis Child* doi:10.1136/ archdischild-2023-325984



# NAM Scholars in **Dx Ex**

IN PARTNERSHIP WITH  
THE COUNCIL OF MEDICAL SPECIALTY SOCIETIES





# Walk & Talk Improvement Podcast

Diagnosis mini-series <https://hsengqps.podbean.com/>



# Conclusions

- Diagnosis is a complex and uncertain process which has significant quality implications
- A deep understanding of the diagnostic process can help the development of *Diagnostic Excellence*
- Partnership with all the people involved in diagnosis is needed to provide *Diagnostic Stewardship*
- The ability to Improve *Diagnostic Excellence* will be enhanced by Technology – but depends on a good learning & safety culture

Thank You