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Advancing Measurement for Diagnostic Quality
A Virtual Listening Session

The event will begin shortly.
Please share your name and organization in the chat box.
Advancing Measurement for Diagnostic Quality
A Virtual Listening Session

June 5, 2023
Today’s Facilitator

Karen Cosby, MD
Program Director, Diagnostic Excellence Initiative
Gordon & Betty Moore Foundation
Welcome
Karen Cosby, MD
Gordon and Betty Moore Foundation
Diagnostic Error is a failure to:

• Establish an accurate and timely explanation of the patient’s health problem(s), or

• Communicate that explanation to the patient.
Emphasize Diagnostic Excellence:

- Optimal diagnosis
- Accurate, Timely, Effective, Efficient, Safe, Patient Centric, Equitable
- Avoids under- and over-diagnosis
Diagnostic Errors

- 12 million errors per year in outpatient settings.

- The most common cause of medical errors reported by patients, accounting for nearly 60 percent of all errors and an estimated 40,000-80,000 deaths per year.

- Most common source of malpractice claims and have largest payouts.

- Costs economy an estimated $100 billion/year.
YOU CAN'T IMPROVE WHAT YOU DON'T MEASURE.
Diagnostic Excellence Initiative

Improving the experience and outcomes of patient care

Improving diagnostic performance to reduce harm, improve health outcomes and save lives.

IMPACT STATEMENT

Strengthening accountability for diagnostic excellence, supporting growth and capacity of the field, and assessing the potential for new technologies to improve diagnostic performance.
Moore Initiative

32 grantees selected from over 300 applicants

65 measure concepts

Patient engagement throughout process

Collaborative experience

Focus on Big 3 - Acute vascular events, Cancer, and Infection
Strategic Partners
How does what you are hearing today connect to your work?

How can you advance measurement of diagnosis?
Today’s Facilitator

Caroline Jens, MPH
Program Associate, Diagnostic Excellence Initiative
Gordon & Betty Moore Foundation
Today’s Agenda

12:20PM ET  Session 1: Meeting the Challenge of Diagnostic Measurement, the Moore Experience

1:40PM ET  Session 2: Measuring to Meet the Cancer Moonshot

2:50PM ET  Session 3: Innovating for Diagnostic Quality Measurement
Part I: Patient-Reported Measures

3:25PM ET  Session 4: Innovating for Diagnostic Quality Measurement
Part II: Partners Advancing New Approaches to Diagnostic Measurement

4:20PM ET  Session 5: Recommended Steps: Urgent Directions

4:30PM ET  Questions & Reflections
Your Participation

• Recording to be shared after the event
• Use the chat box to ask questions and share reactions throughout. Questions may be answered live or post-event
• Technical difficulties? Send chat to “Support”
Session 1: Meeting the Challenge of Diagnostic Measurement, the Moore Experience

Moderated by: Arjun Venkatesh, MD, MBA, MHS
Yale University
Balanced Measures of Diagnostic Performance in Pulmonary Embolism

John Sather, MD
Department of Emergency Medicine
Yale University School of Medicine
Diagnostic safety involves two interrelated components
  • Accuracy
  • Risk and cost of diagnostic testing
Diagnostic performance improvement strategies are often guided by siloed measures
Balanced measures of diagnostic performance are needed
Pulmonary Embolism (PE) – A Unique Test Case
Measures

Accuracy
- Proportion of adult ED diagnostic opportunities in which an acute PE was diagnosed

Utilization
- Proportion of adult ED visits in which a CTPA was ordered to investigate for PE

Yield
- Proportion of CTPAs ordered in the ED that identified an acute PE
A code-based identification of an acute PE diagnostic event is not reliable (neither sensitive nor specific)

Examples:

- A patient has CT ordered to investigate for PE in the ED, but ED clinician admits patient with a diagnosis of chest pain.
- A patient with prior history of PE is admitted for appendicitis. The prior PE diagnosis is pulled into the diagnostic field as it was “treated” during hospitalization.
Challenges & Innovations

- **Natural Language Processing (NLP)** was used to screen radiology impression of all CTPAs to identify “acute PE”
- **Machine-learning** was used to create a logic that captured acute PE diagnostic events within the system
- Both performed better than a code-based approach
### Specifications

#### Diagnostic Utilization

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of all ED encounters/visits with chest CT ordered to investigate pulmonary embolism during the ED encounter time window</td>
<td></td>
</tr>
</tbody>
</table>

#### Diagnostic Yield

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of chest CTs ordered to investigate pulmonary embolism during the ED encounter time window with acute pulmonary embolism</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Numerator</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) NLP identified acute pulmonary embolism</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Denominator</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) ED encounter with chest CT (Epic image codes 3904, 3551, 4571) AND 2) Chest CT order occurs after ED arrival time and before ED departure time</td>
<td></td>
</tr>
</tbody>
</table>

#### Diagnostic Accuracy

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of ED diagnostic opportunities 0-7 days prior to system-wide PE with PE diagnosis</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Numerator</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) ED Diagnosis Code or ED Diagnostic Trigger Event identified acute pulmonary embolism (1a. ADT = PE diagnosis OR 1lb. ED Clinical Impression = PE diagnosis OR 1c. Chest CT OR 1d. V/Q Scan OR 1e. Procedure order after ED arrival time and before ED departure time; OR 1f. tPA medication order after ED arrival time and before ED departure time)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Denominator</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Acute PE Logic identified system wide acute pulmonary embolism (System-wide: Diagnostic Trigger occurred within the health system [i.e., not limited to ED]) 2) ED encounter occurred within 0 to 7 days prior to an Acute PE Phenotype Identified acute pulmonary embolism 3) During the ED encounter the patient exhibited signs or symptoms of a Pulmonary Embolism 4) Excluding trauma patients (ICD-10-CM Code from the NCQA Trauma Value Set)</td>
<td></td>
</tr>
</tbody>
</table>
Development Stage & Implementation Goal

2019-2022: Testing, validation, implementation in local health system

2022-2024: Testing, validation, implementation in clinical data registry

Future: Self-nomination for approval by CMS
Diagnostic Delay Of VTE* (DOVE)

Patricia C. Dykes, PhD, RN, FAAN, FACMI
Brigham and Women’s Hospital
Harvard Medical School

*Venous Thromboembolism
Venous Thromboembolism (VTE) is a dangerous, preventable public health problem

- Affects 300,000-600,000 individuals in the U.S. annually
- Requires timely and adequate treatment

VTE signs and symptoms are non-specific; timely recognition is challenging

- Delayed VTE diagnosis in primary care is common
- $\approx 4$ days between symptom onset and diagnosis
• Systematic measurement and reporting of delayed VTE diagnosis rates will inform stakeholders about opportunities to improve care, strengthen incentives for quality improvement, and improve the quality of care received by patients.
**Denominator:** Adult patients (18+) presenting in primary care with VTE-related symptoms who are diagnosed with VTE (≤ 30 days of visit).

**Numerator:** Subset of denominator where VTE diagnosis occurs greater than 24 hours following the index primary care visit.

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Score Type</th>
<th>Risk Adjustment</th>
<th>Exclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Electronic Health Record (EHR)</td>
<td>• Rate/Proportion</td>
<td>• None</td>
<td>• Hospice</td>
</tr>
<tr>
<td></td>
<td>• Low Score = Higher Quality</td>
<td></td>
<td>• Palliative Care</td>
</tr>
</tbody>
</table>
Challenges & Innovations

VTE Phenotyping Algorithm

Traditional method
- ICD
- PPV = 64%

Recent studies
- ICD
- Imaging
- PPV = 75%

BWH method
- ICD
- Imaging
- RxNorm
- PPV = 95.8%

Billing
Identification
Treatment
**Natural Language Processing (NLP) Algorithm**: Rule-based symptom extractor identifies symptoms of VTE in EHR notes

- NLP output is a binary variable for each VTE symptom
- VTE symptoms mapped to SNOMED CT symptom codes for fully specified eCQM

<table>
<thead>
<tr>
<th>Cough</th>
<th>Hypotension</th>
<th>Lightheadedness</th>
<th>Shortness of breath</th>
<th>Syncope</th>
<th>Tachycardia</th>
<th>Chest pain</th>
<th>Hemoptysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calf pain</td>
<td>Leg pain</td>
<td>Foot pain</td>
<td>Calf numbness</td>
<td>Leg numbness</td>
<td>Foot numbness</td>
<td>Calf tingling</td>
<td>Leg tingling</td>
</tr>
<tr>
<td>Foot tingling</td>
<td>Calf redness</td>
<td>Leg redness</td>
<td>Foot redness</td>
<td>Calf swelling</td>
<td>Leg swelling</td>
<td>Foot swelling</td>
<td>Calf tenderness</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Leg tenderness</td>
<td>Foot tenderness</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Calf warmth</td>
<td>Leg warmth</td>
<td>Foot warmth</td>
<td></td>
</tr>
</tbody>
</table>
Measure Development Stage

- Completed alpha/beta testing in two large healthcare systems with different EHR vendors, ongoing in a third
- Submitted measure for CBE/PQM and CMS MUC list endorsement evaluation, spring 2023

Implementation Target

- Integrated care delivery systems
- CMS MIPS program (provider group level)

Brigham and Women’s Hospital DOVE Team: Patricia Dykes, PhD, RN, David Bates, MD, MSc, Mica Bowen, BA, Frank Chang, MSE, John Laurentiev, MS, Stuart Lipsitz, ScD, Lucy Liu, MS, Michael Sainlaire, MS, Lipika Samal, MD, Wenyu Song, PhD, Ania Syrowatka, PhD, Tien Thai, BS, Li Zhou, MD, PhD
Session 1: Facilitated Discussion

Featuring:

John Sather, MD: Yale University

Patricia C. Dykes, PhD, RN, FAAN, FACMI: Brigham and Women’s Hospital; Harvard Medical School
Misdiagnosis of Infections

Valerie Vaughn, MD, MS, SFHM, FACP
Assistant Professor, Director of Hospital Medicine Research
University of Utah
83-year-old male admitted to the ICU with pneumonia

- Hospital day 7
- Shortness of breath, hypoxia
- Intubated
- Troponin: 140, 8 hours earlier: 240

Cause of death: free wall rupture, missed myocardial infarction
According to CDC estimates:

- 50% of hospitalized patients are treated with antibiotics
- 55% of treatment was *unsupported* (e.g., duration/selection could be improved)

**Misdiagnosis** (or overdiagnosis of infections) is one of the most common diagnostic errors in hospitalized patients, leads to:

- Anchoring (and missing true diagnosis)
- Antibiotic overuse and its consequences
Created two chart review-based metrics to measure misdiagnosis (overdiagnosis) of infections in hospitalized patients

- Urinary tract infection
- Community-acquired pneumonia

Number of patients who did not actually have infection

Number of patients treated for infection (non-ICU adults)

NQF # 3690- UTI
NQF # 3671- pneumonia
Treated for infection:
• Exclude patients with concomitant infections
• At least one day of antibiotic use

Don’t actually have infection: do not meet guideline criteria
• Pneumonia: ≥2 signs/symptoms AND radiographic findings
• UTI: specific sign (e.g., dysuria) or altered mental status plus systemic signs of infection*

Requires chart review for:
• Symptoms (not standardized text)
• Radiographic images (now collaborating with Dr. Barbara Jones for NLP)

Challenges & Innovations

Measures had been piloted in an existing collaborative of **69 hospitals**

- Allowed us to work out the “kinks” (e.g., adding abdominal CTs)
- Conducted **pay-for-performance** (with Blue Cross Blue Shield) to test use/usability of measure
- Obtained **feedback** (and preemptively heard all the complaints) from frontline users/physicians
Challenges & Innovations  UTI Misdiagnosis, over time

Pairing Diagnostic Error and Antibiotic Stewardship

- If you get the diagnosis wrong, the antibiotics may look wonderful but are likely incorrect or unnecessary
- Antibiotic stewardship has existing infrastructure (antimicrobial stewardship teams) that can be leveraged for diagnosis
- Synergy between the two patient safety efforts
Measures in use in **69 hospitals** in Michigan

Measures being tested in **12 critical access hospitals** in the Mountain West
  - Adapted to focus on patients discharged from emergency department

Collaborating with CDC to create metrics for inpatient pneumonia, hopefully with diagnosis included

Discussed with CMS using the measures with QIOs

Collaborating with Dr. Barbara Jones to create eCQM versions
Electronic measures of diagnostic excellence in pneumonia

Barbara Jones, MD, MSCI
Associate Professor, Pulmonary & Critical Care Medicine
University of Utah
Pneumonia demonstrates:

• High rates of under- and over-diagnosis
• No perfect gold standard

→ Variation in diagnosis quality hinders *all* pneumonia quality measures
Numerator: Discordances between initial (ED) pneumonia diagnosis and treatment versus:
   1. Discharge diagnosis
   2. Radiographic diagnosis

Denominator: All patients hospitalized from emergency department

317K Hospitalized Veterans
Specifications

- Diagnostic codes
- Natural language processing
- Medication data (antimicrobials)

EHR

Empiric testing

Chart review

Provider feedback interviews
Challenges & Innovations

- Developed and validated NLP

- Tested NLP interoperability between VA and UU systems

- High accuracy and interoperability for radiology reports

<table>
<thead>
<tr>
<th>VA – trained tool in VA data</th>
<th>Precision</th>
<th>Recall</th>
<th>F1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency</td>
<td>88.1</td>
<td>86.0</td>
<td>87.1</td>
</tr>
<tr>
<td>Radiology</td>
<td>71.4</td>
<td>96.2</td>
<td>81.7</td>
</tr>
<tr>
<td>Discharge</td>
<td>88.3</td>
<td>93.0</td>
<td>90.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UU “Out-of-the-Box” (+/- difference)</th>
<th>Precision</th>
<th>Recall</th>
<th>F1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency</td>
<td>84.7 (-3.4)</td>
<td>94.3 (+8.3)</td>
<td>89.3 (+2.2)</td>
</tr>
<tr>
<td>Radiology</td>
<td>78.3 (+6.9)</td>
<td>100.0 (+3.8)</td>
<td>87.9 (-5.9)</td>
</tr>
<tr>
<td>Discharge</td>
<td>65.5 (-22.7)</td>
<td>92.7 (-0.3)</td>
<td>76.8 (-13.3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UU Customized (11/30/2021)</th>
<th>Precision</th>
<th>recall</th>
<th>F1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency</td>
<td>89.3 (+2.3)</td>
<td>94.3 (+8.3)</td>
<td>91.7 (+4.6)</td>
</tr>
<tr>
<td>Radiology</td>
<td>87.0 (+15.6)</td>
<td>100.0 (+3.8)</td>
<td>93.1 (+11.1)</td>
</tr>
<tr>
<td>Discharge</td>
<td>75.0 (-13.3)</td>
<td>95.1 (+2.1)</td>
<td>83.4 (-6.7)</td>
</tr>
</tbody>
</table>
Tested usability among providers

- Qualitative interviews and surveys with ED providers’ reviewing their data
- Reported high usability, current lack of feedback
- Had strong reactions (both positive and negative) to results
- Highlighted dx uncertainty and the importance of stabilization and treatment in the ED context
Physician reactions

Usability of feedback:
• “What’s **super interesting** is that... I distinctly remember him. And I'm very curious that his discharge diagnosis was AFib with RVR because I actually followed his clinical course in the ICU for his first few days.”
• “To get better would be the goal here. I personally think this kind of information is always helpful. Sometimes it's a little humbling. It's not always easy to see, but it's always helpful.”

Diagnostic uncertainty and importance of treatment:
• “Diagnosis was moderately important for me, I guess. It was **really more important to stabilize him at that point and make sure he stays stable. And then, you know, kind of treat badness.**”

Strong reactions to measure:
• “I'll just say many, **many such an excellent learning tool has been turned into outcomes evaluation, and skills evaluation and performance.... If I have a wrong diagnosis on a patient, I'd like to know. But my point is there's so many shades of gray.... our ED diagnosis doesn't have to match the discharge diagnosis.**”

Patient reactions
• “I think **honesty from the doctor in the diagnosis process** is key to just about everything. I mean, if you don’t know, don't be afraid to say that you don't know, I'd rather hear that than say have a misdiagnosis, or you're just shooting in the dark.”
Collaboration with Valerie Vaughn, MD, to develop and test eCQM:

Number of patients lacking radiographic diagnosis of pneumonia

Number of patients treated for pneumonia

First target = Hospitalized patients
Second target = Patients discharged from ED
Session 1: Facilitated Discussion

Featuring:

Valerie M. Vaughn, MD, MS, SFHM, FACP: University of Utah

Barbara E. Jones, MD, MSCI: University of Utah
Diagnosis of Vascular Risk to Reduce Heart Attack and Stroke

Paul Heidenreich, MD, MS
Stanford University School of Medicine; VA Palo Alto Health Care System
• Acute myocardial infarction and stroke are common first events

• Many patients are at identifiable high risk, but the risk is unrecognized

• If risk is recognized, treatment is available to reduce risk

• 10-year cardiovascular event risk $\geq 10\%$ age 40-75: Statin recommended (Grade B)
Our outcome measure—**observed/expected first acute MI** and **stroke**—can identify care settings that do well or poorly in recognizing patients at risk.
Specifications

**Numerator:** Number of patients with acute MI or stroke without prior evidence* of high risk for ischemic vascular disease.

**Denominator:** Expected number of patients with acute MI or stroke without prior evidence* of high risk for ischemic vascular disease. (Uses risk adjustment)

*No diagnosis of ischemic heart disease or stroke
*No treatment for high risk (e.g., statins)
Challenges & Innovations

• Innovations
  • Use of outcome data to estimate recognition of risk

• Challenges
  • Large sample size needed
  • Social determinants of health are impact risk

![Graph showing observed to expected first MI or stroke across VA Facilities with at least 6000 patients]
We created the measure for the VA and are completing for CMS.

**Implementation target:** VA, CMS, Kaiser

- Requires agreement at the highest levels of the health system
- Unit of attribution: VA-facility; Medicare-ACO, Kaiser-facility
- Difficult to “test” as performance may be ignored unless it is endorsed by the health system
Cardiovascular Risk Assessment Measures for Pregnant and Postpartum Patients

Afshan Hameed, MD, FACCC, FACOG
University of California, Irvine
Cardiovascular disease is the leading cause of deaths in pregnant and postpartum people with significant racial disparities.

Maternal deaths (25%–33%) are preventable with earlier detection of cardiovascular disease.

Cardiovascular disease signs and symptoms overlap with those of normal pregnancy.
• A cardiovascular risk assessment algorithm was integrated into the electronic medical record system at five large hospital networks.
Measure

#1
- Number of pregnant or postpartum patients who received CVD risk assessment among all pregnant or postpartum patients

#2
- Number of high risk of CVD pregnant or postpartum patients who received follow up among all high risk of CVD pregnant or postpartum patients
• The elements of risk stratification were built into the EMR
• Takes about a minute to complete the assessment
• Patients deemed high risk are referred to further testing and consultations
• Training and education at all practice sites
Challenges & Innovations

- Physician engagement and adoption
- Educational activities and individual reminders
- Monthly audits
- Advocacy at the national level
Challenges & Innovations

- Implementation of the CVD tool in emergency rooms and primary healthcare services
- Large scale implementation at the state level
• Measure submitted to Centers for Medicaid and Medicare Services (CMS) and the National Quality Forum (NQF) in 2022
• Measure received Conditional Support for Rulemaking for the MIPS program from the Measures – December 2022
• Measure was not approved by NQF – February 2023
Session 1: Facilitated Discussion

Featuring:

Paul Heidenreich, MD, MS: Stanford University; VA Palo Alto Health Care System

Afshan B. Hameed, MD, FACCC, FACOG: University of California, Irvine
Karen Cosby, MD
Program Director, Diagnostic Excellence Initiative
Gordon & Betty Moore Foundation
Interesting Quotes from Barb’s Technical Expert Panel

“If I had known how frequently diagnoses of pneumonia were wrong or changed, I would have asked more questions.”

“Wow! This would suggest I'm pretty sh*tty at diagnosing pneumonia.”

“…. If I have a wrong diagnosis on a patient, I'd like to know.”

From a Patient

From Providers Regarding Her Feedback Tool
Advancing Measurement for Diagnostic Quality
A Virtual Listening Session

The event will resume shortly.
Session 2: Measuring to Meet the Cancer Moonshot
Diagnostic Trajectories for Cancer

Elizabeth Sarma, PhD, MPH
Healthcare Delivery Research Program
Division of Cancer Control and Population Sciences
National Cancer Institute
I have no conflicts to disclose.

The work and ideas presented are my own and do not reflect official positions, policies, or endorsement of the National Cancer Institute or any other federal agency.
Most cancers are detected after symptomatic presentation.
Empirical evidence, largely coming from single healthcare settings in the US, supports this conclusion.

Mode of Detection for Colorectal Cancer

- **Massachusetts General Hospital**: 77% Symptomatic, 13% Screening
- **Madigan Army Medical Center**: 75% Symptomatic, 25% Screening
- **Kaiser Permanente (KP) Washington and KP Colorado**: 62% Symptomatic, 38% Screening

Leijssen et al., Surg Endosc, 2020; Hatch et al., J Gastrointest Surg, 2016; Sarma et al., Colorectal Dis, 2022
Symptomatic Detection: International Evidence

- Explores factors that may influence differences in cancer survival across 8 countries

- Phase 1: described routes to cancer diagnosis for breast, colorectal, lung, and ovarian cancers

Symptomatic Detection: ICBP

Routes to Colorectal Cancer Diagnosis

- Symptomatic: 82.4%
- Screening: 16.1%
- Other: 1.5%
Benefits of Detecting Symptomatic Cancers Earlier

• Better *clinical outcomes* (earlier stage diagnosis, improved survival)\(^1\)

• Better *patient-reported outcomes*\(^2\)

• Lower *treatment cost*\(^3\)

• Improved *care quality* (e.g., reducing diagnostic errors\(^4\))

---

Pathway to Diagnosing Symptomatic Cancers

Healthcare System Interval

Diagnostic Interval
A non-linear, iterative, cyclical process
- Diagnostic evaluation (e.g., lab tests, imaging, biopsy)
- Consultation with other healthcare providers

Treatment Interval

Patient Interval
- First noticing symptom
- First presentation to healthcare
- Referral to specialist
- Cancer diagnosis
- Treatment

NASEM, Improving Diagnosis in Health Care, 2015; Walter et al., J Health Serv Res Policy, 2012; Weller et al., Br J Cancer, 2012
Challenges in the Patient Interval

Appraisal of signs and symptoms as due to cancer
  • Influenced by many factors (e.g., symptom knowledge, comorbidities)

Barriers to healthcare access
  • E.g., direct and indirect costs

Challenges in the Diagnostic Interval

• Symptoms are common, but most patients do not have cancer

• Initial cancer suspicion influenced by education, knowledge, patient

• Balance risks of missed diagnosis vs. potentially unneeded evaluations

Koo et al., Neoplasia, 2018; Koo et al., JCO Glob Oncol, 2021; Sarma et al., Cancer Prev Res, 2020; Sarma et al., JAMA, 2022
Challenges in the Diagnostic Interval

• Lack of tools for diagnostic evaluation, competent and appropriate specialists

• Lack of effective communication and coordination among healthcare providers, and with patients
  • E.g., timely referrals, follow-up

Koo et al., *JCO Glob Oncol*, 2021; Mullen et al., *Br J Cancer*, 2021; Sarma et al., *Cancer Prev Res*, 2020; Sarma et al., *JAMA*, 2022
Conclusion and Important Gaps for Future Research

• **Most cancers** are likely **detected** after **symptomatic presentation**
  • Potential to achieve earlier-stage diagnoses and better outcomes for these cancers

• Need for **data to describe** pre-diagnostic care and **diagnostic pathways in US healthcare systems**
  • *Who* is being diagnosed with cancer? *When, where, how, and by whom?*
  • *Nature and frequency of presenting symptoms* that can be used for risk prediction?

• Can drive **intervention development** and **quality improvement**
Improving detection of lung cancer: what can we learn?

Matthew Thompson, MBChB, MPH, DPhil
Professor, Department of Family Medicine, University of Washington, Seattle
Most common cause of cancer-related death in the US

Prognosis largely reflects stage at diagnosis:

- 5-year survival rates (NSCLC/SCLC)
  - Localized: 64%/29%
  - Regional: 37%/18%
  - Distant: 8%/3%

Screening is recommended for high-risk individuals, yet uptake is low (US average 6% of eligible individuals)

Most people with lung cancer detected following symptomatic presentation (Sarma et al., Cancer Prev Res, 2020)
Problem

- Very little US data overall on pre-diagnosis phase of lung cancer
- Cancer registry data excludes pre-diagnosis phase of care
- Claims data = coded data (*What might free text/unstructured data add?*)
- Can we identify key steps/time-points in the pre-diagnosis pathway?
  - *When does the cancer first start?*
  - *Where are there potential delays?*
Medicare data from 50,000 patients >=65yr with lung cancer: median diagnostic interval (first symptomatic presentation to diagnosis) of 180 days, with 1 in 4 exceeding 300 days (Nadpara et al., Cancer Epi, 2015)

Commercially insured (Optum) 1,200 Non-small cell lung cancer, diagnostic tests beginning 5-6 months prior to diagnosis (Gildea et al., Clin Ec Outcomes Res, 2017)

European and UK studies: Increase in primary care consultations in 4-6 months prior to cancer diagnosis (Jensen et al., Cancer Epi, 2018; Purdie et al., Primary Care Resp Med, 2019)
Case-control Study

UW Medicine electronic medical record data 2012-2019

- Cases (n=698) with a first primary lung cancer
  - Established relationship with UW Medicine ambulatory care in 2 yrs prior to first lung cancer ICD code.
  - Had chest CT performed at UW Medicine
  - Linked to regional SEER cancer registry to verify cancer type and date
  - Only 38 (5.5%) detected after low dose CT screening
- Controls (N=6,841): 10 controls per case, matched by age, sex, type of clinic, and smoking
Defining key events/time points in pre-diagnosis period

- **First symptom**
- **First presentation/clinical appearance**
- **First investigation, primary care responsible for patient**
- **First referral to secondary care/refer responsibility**
- **First specialist visit**
- **Diagnosis**
- **Treatment start**

**Date of 1st clinical encounter where >=1 symptom/sign associated with lung cancer recorded**

**Date of referral or receipt of CXR or Chest CT with linked reason related to suspicion of cancer**

**Date of referral or visit with specialist (e.g. surgery, oncology, radiation, thoracic, palliative) associated with a lung related ICD code**

**Date of 1st pathology report confirming cancer. Discrepancies between pathology date and diagnosis code reviewed manually**

**Date of initiation of any medical or surgical treatment**
Extracting symptoms/signs from the EMR

• First study to use NLP to extract free text data from medical records for lung cancer

• EMR searched for 2 yr period prior to diagnosis date (cases) or matching date (controls)
  • Coded symptoms/signs - ICD codes that clinician had entered at that consultation
  • Unstructured free text clinician notes - annotated using Natural Language Processing (NLP)
Multivariable analysis:
Frequency of symptoms/signs of cases vs. controls
Median number of days prior to diagnosis for key time intervals by stage of lung cancer

- A (symptomatic presentation)
- B (imaging)
- C (specialist)
- E (treatment)

Stage:
- Early stage (1,2)
- Late stage (3,4)
Conclusions

• The pre-diagnosis phase of lung cancer (and many other cancers) can be months
• Huge opportunities to measure diagnostic process & identify areas for improvement
• Some of the prime targets for intervention likely to be in the ambulatory care

Challenges:
• Funding support has been woeful (vs. research on cancer screening)
• Defining measurable time intervals is complex:
  • Spans multiple sectors of the health care system, different specialties, etc.
  • When does the ‘cancer clock start ticking’?
  • How to define ‘delay’?
• What data is most useful - where is the ‘signal’ in the noise?
(Yet....clinical quality measures for cancer diagnosis have been implemented in other countries)
Session 2: Measuring to Meet the Cancer Moonshot

Moderated by:
Rebecca Anhang Price, PhD, MS
RAND Corporation
Improving Diagnostic Quality and Safety in Lung Cancer Screening

Katharine A. Rendle, PhD, MSW, MPH
University of Pennsylvania
Annual lung cancer screening (LCS) using low-dose CT (LDCT) is shown to reduce lung cancer mortality (16-20%), but also associated with potential harms.

Benefits and risks likely differ in community settings than trials:
- Differences in patient populations
- Differences in diagnostic management
- **Suboptimal adherence & follow-up**

There are currently no widely implemented quality metrics in LCS.

Kim, Rendle...Vachani. Ann Am Thorac Soc. 2022
Kim, Rendle...Vachani Am J Respir Crit Care Med. 2023
In addition to their potential use for evaluating patient-level outcomes within systems, we selected these measures because we believe they are *modifiable*. Therefore, the intended impact includes translation of these metrics into targets for developing and implementing interventions.
Proposed Measure 1: Surveillance
\[ N = \text{Number of patients who receive recommended surveillance imaging (short-interval LDCT for Lung-RADS 3 or diagnostic scan for Lung-RADS 4)} \]
\[ D = \text{All patients with a positive LCS-LDCT (Lung-RADS 3-4a) in the calendar year} \]

Proposed Measure 2a: Benign biopsies
\[ N = \text{Number of patients in which the surgically biopsied nodule is proved to be benign} \]
\[ D = \text{All patients with a positive LCS-LDCT who undergo surgical biopsy in the calendar year} \]

Proposed Measure 2b: Procedural complications
\[ N = \text{Number of patients who experience a procedural complication} \]
\[ D = \text{All patients with a positive LCS-LDCT who undergo surgical biopsy in the calendar year} \]

Proposed Measure 3: Timely diagnosis
\[ N = \text{Number of patients with less than 30 days from date of suspicious LCS-LDCT (Lung RADS 4B/X) to biopsy-confirmed lung cancer diagnosis} \]
\[ D = \text{All patients with a suspicious LCS-LDCT (Lung-RADS 4B/X) and confirmed lung cancer diagnosis in the calendar year} \]
Challenges & Innovations

- Measure focused diagnostic process, but within continuum of care
- Inclusion of potential harms in addition to benefits
- Robust EHR data from six healthcare systems
- Coding variations, complications documentation, date of diagnosis

Figure 1. PROSPR Lung Cancer Screening Process Model
• **Surveillance Measure**: Preparing to start the endorsement process

• **Procedural Complications Measure**: Refining data specifications further and assessing potential work-up leading to procedures

• **Benign Biopsy Measure**: Preliminary data from one site shows greater than expected numbers – working data abstraction at 5 other systems

• **Timely Diagnosis Measure**: Not ready for endorsement due largely to challenges with identifying date of diagnosis
Biomarkers and Genomic Testing to Inform Personalized Cancer Therapy

Caitlin Drumheller
American Society of Clinical Oncology
22,000+ new ovarian cancer diagnoses annually, 13-15% have germline mutations in BRCA 1/2

- Heritable, predispose a patient to cancer
- BRCA 1/2 guides treatment recommendations, informs risk of other cancers, need for cascade testing in family members
- Maintenance therapy with PARPi

Approximately 30% of patients undergo any genetic testing
Appropriate Germline Testing for Ovarian Cancer Patients. Percentage of patients, aged 18 and older, diagnosed with epithelial ovarian, fallopian tube, or primary peritoneal cancer who undergo germline testing within 6 months of diagnosis

- Assesses national rates of germline testing for BRCA 1/2
- Allows for genetic counseling clinical workflow
Specifications

**Denominator:**
- Adult patients with ovarian cancer
- Newly diagnosed July of the previous calendar year to June of measurement period (two encounters)

**Numerator:**
- Patients who receive germline genetic testing for BRCA1 and BRCA2 or completion of genetic counseling within 6 months of diagnosis

**Denominator Exception:**
- Patients with BRCA testing completed before ovarian diagnosis
Challenges & Innovations

- Measure is specific to **germline** not somatic mutations
  - Variation in use of single-gene and multi-gene panels
- Currently infeasible to reliably differentiate germline testing
  - Feasibility testing
  - Outreach to EHR director of informatics, CAP
  - Exploration of new LOINC codes
  - Measure remains registry-based CQM
• Registry-based CQM fully-developed
  • Clinical workflow analysis
  • Face validity
  • Empiric validity
  • Signal-to-noise reliability
  • Data element validity
• Submitted to CMS MUC list
• Pursue CBE endorsement
Future considerations

- Exploring expansion of denominator with additional cancers
- Use of germline testing proxies to enable eCQM
- Continued pursuit, support of standardized, granular data
Measures for the Screening and Diagnosis of Lynch Syndrome

Co-PI: Sepheen Byron, DrPH, MHS
National Committee for Quality Assurance

Co-PI: Ravi Sharaf, MD, MS, Weill Cornell Medicine
Lynch Syndrome is a common hereditary cancer syndrome

Affects 1 in 280 individuals

Up to 60% lifetime risk of developing colorectal or endometrial cancers

Enhanced screening and treatment can decrease cancer incidence and mortality by up to 90%

Only 2% are diagnosed
3 measures proposed to improve screening, diagnosis and cascade testing:

- Screening of Tumors for Lynch Syndrome
- Genetic Counseling and Testing for Lynch Syndrome
- Family Notification of Lynch Syndrome
Screening of Tumors for Lynch Syndrome
• Adults with a new diagnosis of colorectal or endometrial cancer who had tumor screening for Lynch Syndrome or direct genetic counseling and germline testing for Lynch Syndrome

Genetic Counseling and Testing for Lynch Syndrome
• Adults with a new diagnosis of colorectal or endometrial cancer, whose tumor screened positive for Lynch Syndrome, and had subsequent genetic counseling and genetic testing

Family Notification of Lynch Syndrome
• Adults with a new diagnosis of Lynch Syndrome who informed family members of their diagnosis
Challenges & Innovations

Unstructured Information

- Information existed across different systems and was non-standardized

Innovations

- Feasibility testing vs. “demonstration project”
- 2-phase testing helped us to work with test sites to understand how data could be improved
Challenges & Innovations

Missing Information
• Information needed to assess family notification not documented
• Notification practices vary across U.S.

Innovations
• Restructure measure to assess whether patient was given resources to help inform family members
Development Stage & Implementation Goal

Completed testing, public comment and stakeholder vetting

Implementation Goals

• Reporting programs for health systems
• Submit for CMS Measures Under Consideration list
• Continue working with sites to inform an implementation toolkit
Session 2: Facilitated Discussion
Can patient-reported measures provide information that is unique, important, and actionable about their diagnosis?
Advancing Measurement for Diagnostic Quality
A Virtual Listening Session

The event will resume shortly.
Poll Results: Patient-Reported Measures

Can patient-reported measures provide information that is unique, important, and actionable about their diagnosis?
Session 3: Innovating for Diagnostic Quality Measurement

Part I. Patient-Reported Measures

Moderated by:
Kathryn McDonald, PhD, MM
Johns Hopkins University
Lessons and Recommendations from Developing Patient-Reported Measures for Improving Diagnosis

Mark Schlesinger, PhD (Yale University)
Claire O’Hanlon, PhD, MPP (RAND Corporation)
Kelly Gleason, PhD, RN (Johns Hopkins University)
Kathy McDonald, PhD, MM/MBA (Johns Hopkins University)
Unique Aspects of Diagnostic Process Observed by Patients

• **Patient Experience from a Population Perspective**
  • Survey Data: Nationally representative; includes narrative questions
  • 500+ cases reporting diagnostic problems

• **Three Unique Perspectives**
  • Experiences during the diagnostic process
  • Contextual factors that affect diagnostic harms
  • Harms that persist long after diagnostic problems emerge
Unique Aspects Observed by Patients, Part 1

- Experiences during the diagnostic process

Exhibit 1:
Problematic Aspects of the Diagnostic Process
That Are Only Reportable by Patients

Communication-Related Issues
Patient's Personal Attributes Impacted Diagnostic Interactions
Providers Worsened Problems After Diagnostic Mishap
Unique Aspects Observed by Patients, Part 2

- Contextual factors that affect diagnostic harms

Exhibit 2: Contextual Factors Reported by Patients that Exacerbate Harms from Diagnostic Problems

- No Regular Source of Care
- No Clinician Guide During Diagnostic Journey
- Multiple Clinical Settings [Excluding ED-Inpatient]
- Patient Delayed Seeking Diagnosis (COVID)
Harms that persist long after diagnostic problems emerge

Exhibit 3:
Harms Following Diagnostic Mishaps Often Persist for Multiple Years

- Any Persisting Harm
- Physical Impairment
- Emotional Trauma
- Loss of Trust
- Avoiding Medical Care
- Any Financial Harm
Condition-Specific Measure Development Process

• **Measure:** patient-reported measure of timeliness of cancer diagnosis, derived from responses to a patient survey

• **Development process**
  • Environmental scan
  • **Technical Expert Clinical User Patient Panel (TECUPP)**
    • 7 clinical and measure experts, 7 patients/caregivers with cancer experience
    • 5 90-minute meetings January-March 2023 anchored by patient/caregiver story
  • Development of draft survey
  • Cognitive testing (now)
  • Pilot testing (summer 2023)
For each factor contributing to diagnostic delay, we asked the TECUPP to consider if...

It’s important
For each factor contributing to diagnostic delay, we asked the TECUPP to consider if…

It’s important

Patients can report on it
For each factor contributing to diagnostic delay, we asked the TECUPP to consider if...

- It’s important
- Patients can report on it
- Health care professionals/organizations can act on it
For each factor contributing to diagnostic delay, we asked the TECUPP to consider if...

- It’s important
- Patients can report on it
- Health care professionals/organizations can act on it

Included in patient-reported measure
Factors contributing to timeliness of cancer diagnosis

TESTS AND REFERRALS
COMMUNICATION AND RESPECT
EXPLANATION AND NEXT STEPS
ACCESS TO CARE
MEDICAL HISTORY
PHYSICAL EXAM

It’s important

TESTS AND REFERRALS
COMMUNICATION AND RESPECT
EXPLANATION AND NEXT STEPS
ACCESS TO CARE

MEDICAL HISTORY
PHYSICAL EXAM
Patients can report on it

TESTS AND REFERRALS

COMMUNICATION AND RESPECT

EXPLANATION AND NEXT STEPS

ACCESS TO CARE

MEDICAL HISTORY

PHYSICAL EXAM
Health care professionals/organizations can act on it

TESTS AND REFERRALS

COMMUNICATION AND RESPECT

EXPLANATION AND NEXT STEPS

ACCESS TO CARE

MEDICAL HISTORY

PHYSICAL EXAM
Factors in our patient-reported measure

TESTS AND REFERRALS
COMMUNICATION AND RESPECT
EXPLANATION AND NEXT STEPS
ACCESS TO CARE
MEDICAL HISTORY
PHYSICAL EXAM
Example in an Emergency Department Setting

- Developed and tested Patient-Report to Improve Diagnostic Excellence in the Emergency Department setting (PRIME-ED)
- Designed for use in one setting, the emergency department, within a 30-day post-visit time window
- Early findings suggest that by systematically following up with patients following an emergency department visit, we learn about potential missed diagnoses that would not have been caught by the health system electronic health record data and other valuable information
About 7% of patients reported they disagreed their given diagnosis was true following an emergency department visit.

“My father went to the ER with severe back pain and confusion. Because of Covid, we could not go in with him. After 2 hours they told him to go home, he was just having back spasms. I tried to talk to the doctor but only a nurse came out and told me that. We took him home and he got worse. The next day we took him to a different hospital ER and he was admitted for Sepsis.” Free-text explanation from respondent who strongly disagreed.
About 10% of patients reported their diagnosis was not communicated well

“The dr gave me the information. I asked if he could explain the problem and we talked over the results in a way I could understand. I was given my discharge paperwork with what we went over. I was over all happy with the situation.” – Respondent who strongly agreed

“Visited for possible symptoms of COVID 19. Tested negative. Then passed test for flu. Tested negative too. Doctor ended up prescribing antibiotic, fever and cough suppressant. I asked him why he prescribed antibiotic if no test for bacterial infection was done and both viral tests results were negative. No explanation given. Afterwards, I did not take the antibiotic.” – Respondent who strongly disagreed
About 11% of patients rated parts of the diagnostic process poorly

“My daughter had a 105° temp. Before going I went to necessary measures to break the fever. Got to ER they treated me like I was neurotic. Said she's fine, probably just a virus.”
– Respondent who strongly disagreed

“The health care team took many tests and thoroughly examined my problem. They carefully explained their findings to me in terms I could understand and gave me a plan to continue care at home.”
– Respondent who strongly agreed
Lessons and Recommendations from Developing Patient-Reported Measures for Improving Diagnosis
Dx Patient-Reported Measures (PRMs): Motivation

- Listen to patient voice
- Patients (and their care partners) have unique and important information about their diagnostic experiences and outcomes
- That cannot be obtained from any other method
Near Term Recommendations for Federal Agencies

- Advance Dx Patient-Reported Measures
  - Start with quality improvement rather than public accountability
  - Support field testing
- Pursue assessment of patient experiences of diagnosis from various entry points
  - “Front Door”: General population, prospective
  - “Back Door”: In context of a condition and/or setting, retrospective
- Use to achieve diagnostic equity
  - Enable stratification for vulnerability analysis
  - Ask directly about biased or unfair experiences in the diagnostic process
Accelerating Benefits from Dx PRMs: Other Actions

• Encourage structural measures related to PRM activity and learning systematically about diagnostic quality from patients

• Provide federal partners for stakeholder engagement in new Center of Excellence for Patient Reported Measures of Diagnosis
  • Welcome inquiries kmcdonald@jhu.edu (Kathy McDonald, Johns Hopkins)
Session 3: Facilitated Discussion
Patient perspectives aren’t wrong,
They’re just different.
Advancing Measurement for Diagnostic Quality
A Virtual Listening Session

The event will resume shortly.
Session 4: Innovating for Diagnostic Quality Measurement

Part II. Partners Advancing New Approaches to Diagnostic Measurement

Moderated by:
Dana Gelb Safran, ScD
National Quality Forum
National Initiative to Publicly Report and Recognize Diagnostic Excellence in Hospitals and Health Systems

Missy Danforth
The Leapfrog Group
Initiative Objectives

Goal:
Use the Leapfrog model of measurement, public reporting, and purchaser engagement to reduce harm to patients from diagnostic errors in hospitals

Project timeframe:
January 2021 - June 2025
Progress to Date – Publication of National Report

Practice 2.3C – Communicate clear instructions to patients discharged with pending test results

The hospital has a process and protocol in place to ensure that patients are discharged from the ED or hospital with: 1) a list of their lab and imaging test results and 2) a list of any pending test results and written instructions to obtain those results.

Rationale

A test result is a critical piece of diagnostic information. Missed test results can lead to a missed diagnosis, or a missed opportunity to correct an erroneous diagnosis. The risk of a missed test result is magnified for patients in transition from hospital to home.236 237 A systematic review of 12 studies concluded that up to 16% of patients released from the ED and 23% of patients discharged from inpatient care will have laboratory test results pending.236 In one study, 41% of medical inpatients had one or more test results (laboratory or imaging) pending at discharge; over 40% of the results were abnormal, and 9% required action. Importantly, the patients’ physicians were unaware of 62% of the test results.237

Often, test results pending at discharge are not mentioned in the discharge summary. The clinician(s) who assume the patient’s care in the post-discharge ambulatory setting may not be aware that these tests were ordered and will not see the results because they are routed back to the hospital-based physician. It is critical to ensure patients know where and when to obtain these results.

Resources and Strategies

- The hospital implements a rigorous follow-up system for test results pending at discharge with a clear hierarchy of clinicians responsible for acting on results as they come in.
- The hospital develops a standard set of clear instructions for patients to obtain pending test results, using input from patients and family caregivers, representatives from Laboratory Medicine and Radiology, and representatives from the ED and other relevant hospital departments (hospitalists).
- The hospital monitors test results pending at discharge before and after implementation of the new discharge instructions to ensure more patients are obtaining their pending test results once they are discharged home.
- The hospital implements an automated email or text message system that notifies patients when their pending test results are ready. Discharge instructions note that patients can expect the email notification.236
Progress to Date – Pilot Survey
What’s Coming – Publicly Reported Survey Results

Search Leapfrog’s Hospital and Surgery Center Ratings

Preventing and Responding to Patient Harm

<table>
<thead>
<tr>
<th>Measure name</th>
<th>Leapfrog’s Standard</th>
<th>Hospital’s Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective Leadership to</td>
<td>Hospitals should take meaningful steps to raise awareness about patient safety, hold leadership accountable for reducing unsafe practices, provide resources to implement a patient safety program, and develop systems and structures to support action to improve patient safety.</td>
<td>ACHIEVED THE STANDARD</td>
</tr>
<tr>
<td>Prevent Errors</td>
<td></td>
<td>SHOW MORE ON THIS HOSPITAL’S PERFORMANCE</td>
</tr>
<tr>
<td>Staff Work Together to</td>
<td>Hospitals should assess their culture of safety and hold leadership accountable for implementing policies, procedures, and staff education to improve the culture of safety.</td>
<td>ACHIEVED THE STANDARD</td>
</tr>
<tr>
<td>Prevent Errors</td>
<td></td>
<td>SHOW MORE ON THIS HOSPITAL’S PERFORMANCE</td>
</tr>
</tbody>
</table>
BLUF: NLP for data extraction generates comparable reliability and validity metrics to traditional CQM and eCQM

- Potential for more clinician acceptance
- Potential for less clinician burden
- Case identification (specificity)
- Signs & symptoms
- Behavioral risk factors
- Social risk factors
NLP as part of an overall digital-computable strategy

- Extracting from unstructured or semi-structured data to complement structured data
- Support the transition from unstructured to structured data
- Leverage existing eCQM infrastructure
- Centralized, distributed, or federated
- Standards for reliability and validity (no gold standard) testing
Proposed scope of responsibilities

• Systematically identify, discuss, and review requirements for common and “atomized” tasks and tools
• Contribute expertise to understand implications of proposed requirements
• Attempt to achieve community consensus on a course of action
• Provide a forum to share information about plans for new use cases
Testing Reliability
Goal:
To break through barriers to diagnostic excellence measurement and improve patient care

Project timeframe:
September 2022 - September 2025
Phases and Project Timeline

Data Standards
- Identify diagnostic excellence-related data standards needed to speed interoperability

Data and Methods Solutions
- Recommend solutions to existing diagnostic measurement challenges

Natural Language Processing
- Develop a framework and criteria for assessing NLP in clinical quality measures

Call to Action
- Develop a call to action to foster adoption of diagnostic excellence measurement

Virtual Repository
- Create a virtual repository for diagnostic excellence measurement resources

Jun 2023 - Sept 2025
Innovating for Diagnostic Quality Measurement

Helen Burstin, MD, MPH, MACP
Council of Medical Specialty Societies
Session 4: Facilitated Discussion
Session 5: Recommended Steps: Urgent Directions
Challenge to Action
Karen Cosby, MD
Gordon and Betty Moore Foundation
Challenges

1) Develop a better data infrastructure and support for measure development (specific for diagnosis)

2) Create a comprehensive strategy for measuring and improving diagnostic excellence across healthcare
Diagnostic Excellence Initiative

Measure Implementation Challenge-to-Action Brief
Challenge to Measurement of Diagnostic Quality

We need enough data

We need the right data
  • Specific
  • Granular
  • Rich in context
  • Longitudinal
Measurement should be:

- Routine
- Real-time
- Serve quality improvement and accountability

We need Innovations:

- NLP
- ML
Collaboration Accelerates Progress
Improved Measurement Infrastructure

More Measurement

Less Burden
Raise the Floor, Raise the Ceiling
Patients are the Single Best Source of Information about Their Journey

The Diagnostic Journey

- FIRST SYMPTOM
- FIRST VISIT
- OCCULT DISEASE
- INCIDENTALOMAS
- SCREENING

SUSPICION OF DISEASE
TRADITIONAL DIAGNOSTIC PROCESS
TESTING
REFERRALS
CONSULTS
REFINE SEARCH

DX
TREATMENT
UNEXPECTED OCCURRENCE
Improving Diagnosis
The Diagnostic Journey for Cancer
The Diagnostic Journey for Cancer

- **FIRST SYMPTOM**
- **FIRST VISIT**
- **INCIDENTALOMAS**
- **SCREENING**
- **OCCULT DISEASE**

**CQM**

**SUSPICION OF DISEASE**

**TRADITIONAL DIAGNOSTIC PROCESS**

**TESTING**

**REFERRALS CONSULTS**

**REFINE SEARCH**

**UNEXPECTED OCCURRENCE**

**TREATMENT**

**DX**
The Diagnostic Journey for Cancer

1. **INCIDENTALOMAS**
2. **FIRST SYMPTOM**
3. **FIRST VISIT**
4. **SUSPICION OF DISEASE**
5. **TESTING**
6. **REFERRALS CONSULTS**
7. **REFINE SEARCH**
8. **DX**
9. **TREATMENT**
10. **UNEXPECTED OCCURRENCE**

**CQM**

- **SCREENING**
- **OCCULT DISEASE**

**Traditional Diagnostic Process**
The Diagnostic Journey for Cancer

- **First Symptom**
- **First Visit**
- **Screening**
- **Incidentalomas**
- **Occult Disease**
- **Referrals**
- **Consults**
- **Testing**
- **Refine Search**
- **Traditional Diagnostic Process**
- **Suspicion of Disease**
- **DX**
- **Treatment**
- **Unexpected Occurrence**

**Flow:**
- CQM to Screening
- CQM to Incidentalomas
- OCQ to First Symptom
- First Symptom to First Visit
- First Visit to Testing
- Testing to Refine Search
- Refine Search to DX
- DX to Treatment

**Workflows:**
- Workflow Solutions

**Concepts:**
- CQM
- Occult Disease
- Screening
- Incidentalomas
- First Symptom
- First Visit
- Testing
- Referrals
- Consults
- Refine Search
- Traditional Diagnostic Process
- Suspicion of Disease
- DX
- Treatment
- Unexpected Occurrence

**Foundation:**
- Gordon and Betty Moore Foundation
The Diagnostic Journey for Cancer

1. **First Symptom**
2. **First Visit**
3. **Incidentalomas**
4. **Screening**
5. **Occult Disease**
6. **Suspicions of Disease**
7. **Referrals Consults**
8. **Refine Search**
9. **Testing**
10. **Unexpected Occurrence**
11. **Traditional Diagnostic Process**
12. **DX**
13. **Treatment**

**Workflow Solutions**

CQM - Continuous Quality Monitoring
The Diagnostic Journey for Cancer
The Diagnostic Journey for Cancer

1. FIRST SYMPTOM
2. FIRST VISIT
3. OCCULT DISEASE
4. INCIDENTALOMAS
5. SCREENING
6. TESTING
7. SUSPICION OF DISEASE
8. REFERRALS
9. CONSULTS
10. TRADITIONAL DIAGNOSTIC PROCESS
11. DX
12. TREATMENT
13. UNEXPECTED OCCURRENCE

WORKFLOW SOLUTIONS

CQM
Accountability versus Coordinated Partnership
Can we have one big measure for diagnosis?
Measurement Capability, a Beginning?
A Role for All Our Guests
We appreciate your feedback

Karen.Cosby@moore.org
Questions & Reflections

Featuring:
Michelle Block Schreiber, MD
& Lee A. Fleisher, MD

Centers for Medicare & Medicaid Services
Next Steps

We will be sending out a follow-up email with:

- Key takeaways from today’s listening session
- Session recording link
- Answers to any questions not covered during the session

Feel free to forward the information to colleagues that couldn’t attend today.

We’d love to hear from you.

Contact: Karen.Cosby@moore.org

- With your insights on how federal agencies can use the information we have shared today.
- If you have any questions about today’s session or you want to reach out to any of the presenters.
- If you have any feedback about today’s session.
Thanks

• The Gordon and Betty Moore Foundation – Board & Staff
• Our grantees – and the patients, clinicians, and stakeholders they engaged to support the work you saw today
• Our presenters and speakers
• Battelle
• CMSS
• Leapfrog
• NQF
• CMS and their guests
• Our production team led by McCabe Message Partners