Mass General Brigham

Closed Loop Follow-Up: How can we keep patients with follow-up recommendations from falling through the cracks?

Giles Boland, MD
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Executive Vice President, Mass General Brigham

OUTLINE

- Error in Medicine and Radiology
- Quality and Safety Agenda
- Reducing missed opportunities from f/u recommendations
- Where do we go from here?
- Is elimination unrealistic?
- Leadership

(no disclosures, but thanks to Ramin Khorasani for material)

Major Themes in Medicine

Revenue	→	Survival
Politics and reimbursement	→	Payment models/Value based care
Consolidation and Branding	→	Alignment, cost, site of service
Systems	→	Market Share and Cost
Disrupters	→	Doing better at lower acuity care
Efficiency and Productivity	→	LOS and throughput
Outpatient delivery model	→	Patient convenience and Lower cost
Precision medicine	→	Care redesign, service lines
Quality/safety/outcomes	→	Remove variation
IT Innovation	→	AI/Machine learning/CDS/Virtual
Tension between Missions	→	Research vs. clinical delivery
Patient/Employee experience	→	Focus on People
DEI	→	Equity
Burnout	→	Wellness
Organized labor	→	Post-covid, inflation, new generation
Leadership	→	How to navigate the changes

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Variation and Error

- Still one of the greatest challenges in medicine
- IOM 2000, 100k deaths/year (let alone harm)
- Two Decades Since *To Err Is Human:* Progress, but still a "chasm" (JAMA 2020 Review)
- US health system has still fallen far short of the goal of providing safe, high-quality care
- Particularly disappointing given major shift to systems and networks where enterprise solutions are achievable

The New York Times

C.D.C. Sets New Standards for Hospitals to Combat Sepsis

The agency outlined "core elements" needed to detect and treat the condition, a factor in 1.7 million hospitalizations in the U.S. each year.

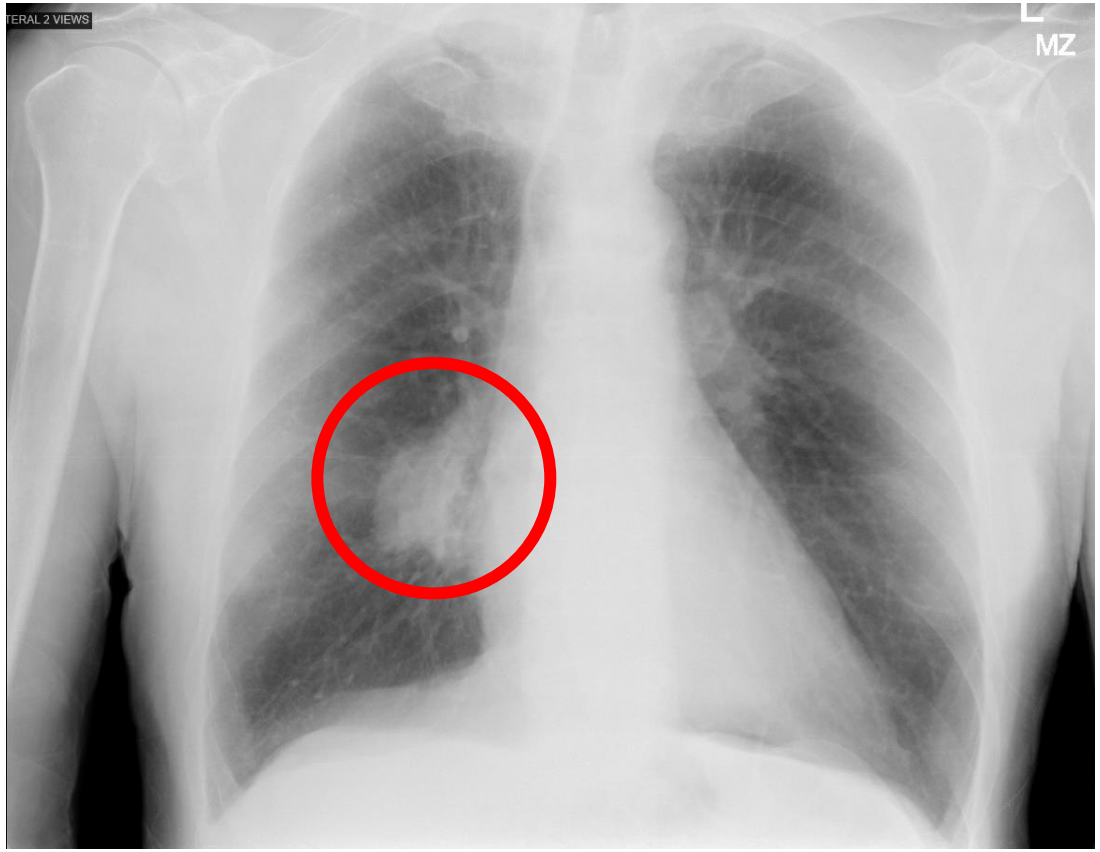
Sepsis is an extreme immune response to an infection, which sends a chain reaction through the body that can result in tissue damage, organ failure and death. About one in three people who die in a hospital had sepsis during their time there, according to the C.D.C. About 1.7 million adults in the United State develop sepsis each year, and about 350,000 of them die or are moved to hospice.

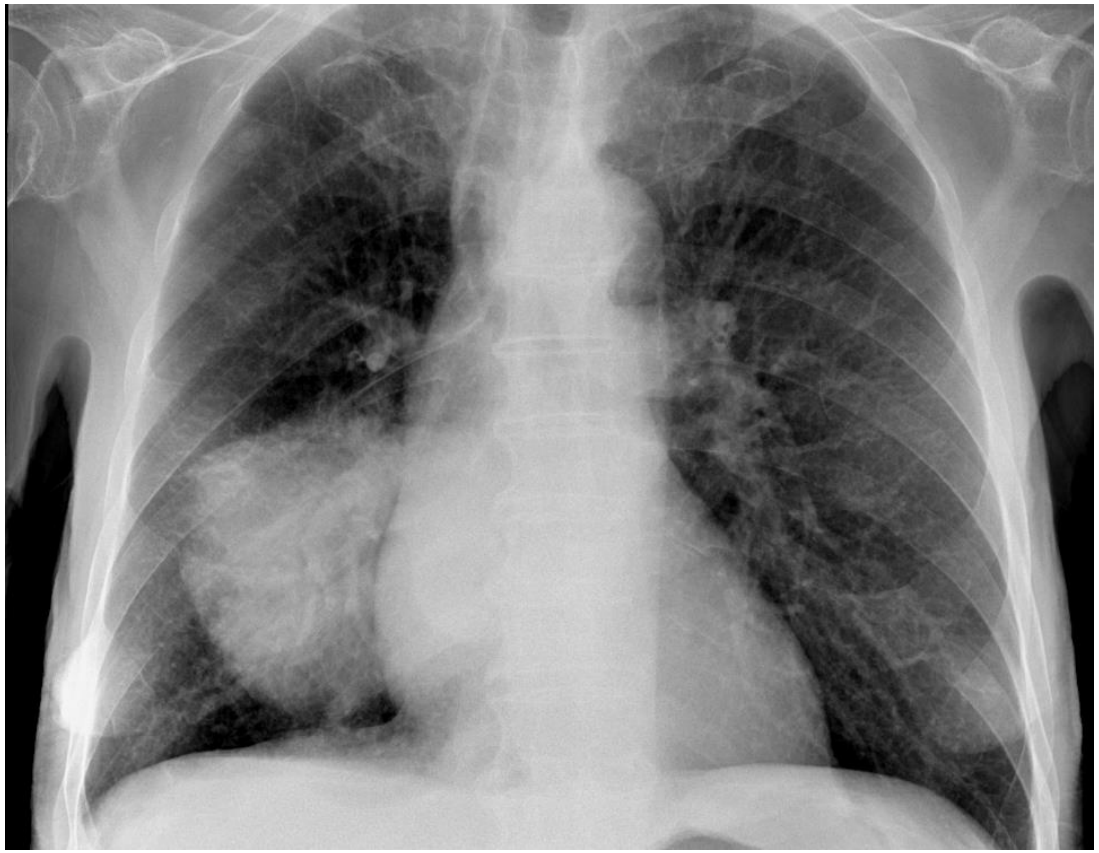
Despite its prevalence, hospitals often misdiagnose the illness because it is masked by common symptoms, such as fevers and shivering, clamminess and shortness of breath, according to Dr. Hallie Prescott, a sepsis expert at the University of Michigan who helped develop the C.D.C. guidelines.

Sepsis detection and care also require coordination across departments and disciplines, a weak point in many health care settings.

A new survey of over 5,000 hospitals found that about 73 percent had sepsis teams, but only 55 percent had a leader with time allocated to manage the program. Only about half of hospitals integrate their sepsis programs with antibiotic stewardship initiatives, despite the fact that these drugs are the key to recovery.

Male presenting with headache and cough.
Head CT aneurysm – repaired. No closed loop on lung mass





18 months later 15Kg weight loss

Where do we go from here?

- Multiple reasons for falling through the cracks
- Vague report (language/recommendations)
- Unstructured reporting (where are the key findings)
- Poor communication
- Too many recommendations
- Different clinical teams
- Patient out of network/changes provider/moves location
- IT or other solutions to fix problem
- Institutional focus - Leadership

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Recommendation Variation

Radiology

ORIGINAL RESEARCH • HEALTH POLICY A

Variation in Follow-up Imaging Recommendations in Radiology Reports: Patient, Modality, and Radiologist Predictors

Laila R. Cochon, MD, PhD • Neena Kapoor, MD • Emmanuel Carrodeguas, MD • Ivan K. Ip, MD, MPH • Ronilda Lacson, MD, PhD • Giles Boland, MD • Ramin Khorasani, MD, MPH

Up to 7x f/u recommendations from one radiologist to another within the same division

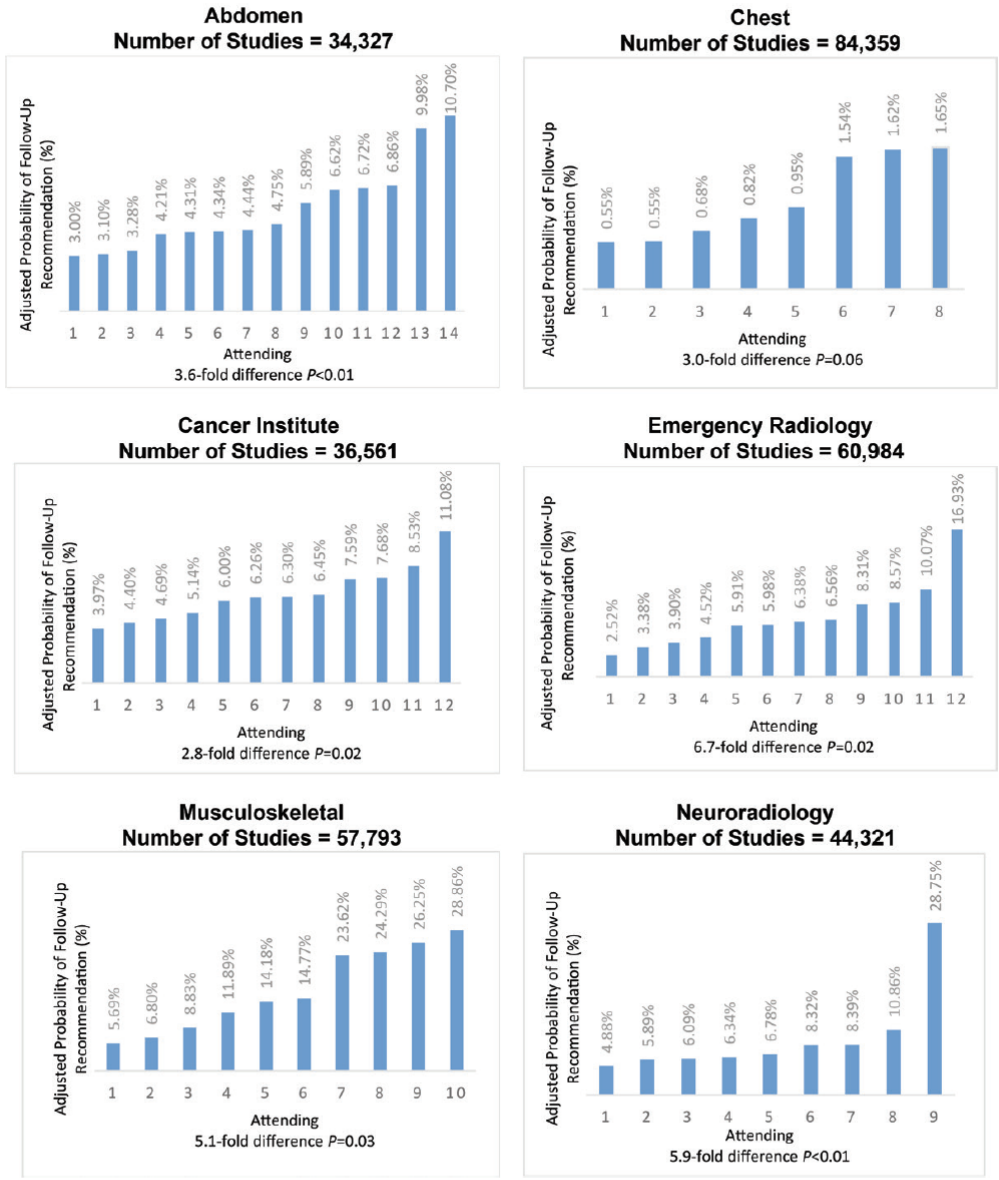


Figure 2: Follow-up recommendation probabilities per attending radiologist (n = 65) in each subspecialty division. Adjusted probability of a follow-up recommendation in percent (y-axis) for each radiologist in each division. P values were obtained from the division-level model. Radiologists in each division are represented by a unique attending identification (x-axis). Figure shows the wide variation within each department, with up to a 6.7-fold difference between the radiologist with the lowest follow-up recommendation probability and the radiologist with the highest probability of making a follow-up recommendation.

Variable and Ambiguous Language

ORIGINAL ARTICLE **CLINICAL PRACTICE MANAGEMENT**

Check for updates

Radiologist Preferences, Agreement, and Variability in Phrases Used to Convey Diagnostic Certainty in Radiology Reports

Atul B. Shinagare, MD[a], Ronilda Lacson, MD, PhD[a], Giles W. Boland, MD[b], Aijia Wang, MPH[a], Stuart G. Silverman, MD[b], William W. Mayo-Smith, MD[b], Ramin Khorasani, MD, MPH[a]

Abstract

Purpose: To understand radiologists' preference and variability in phrases for expressing diagnostic certainty in radiology reports.

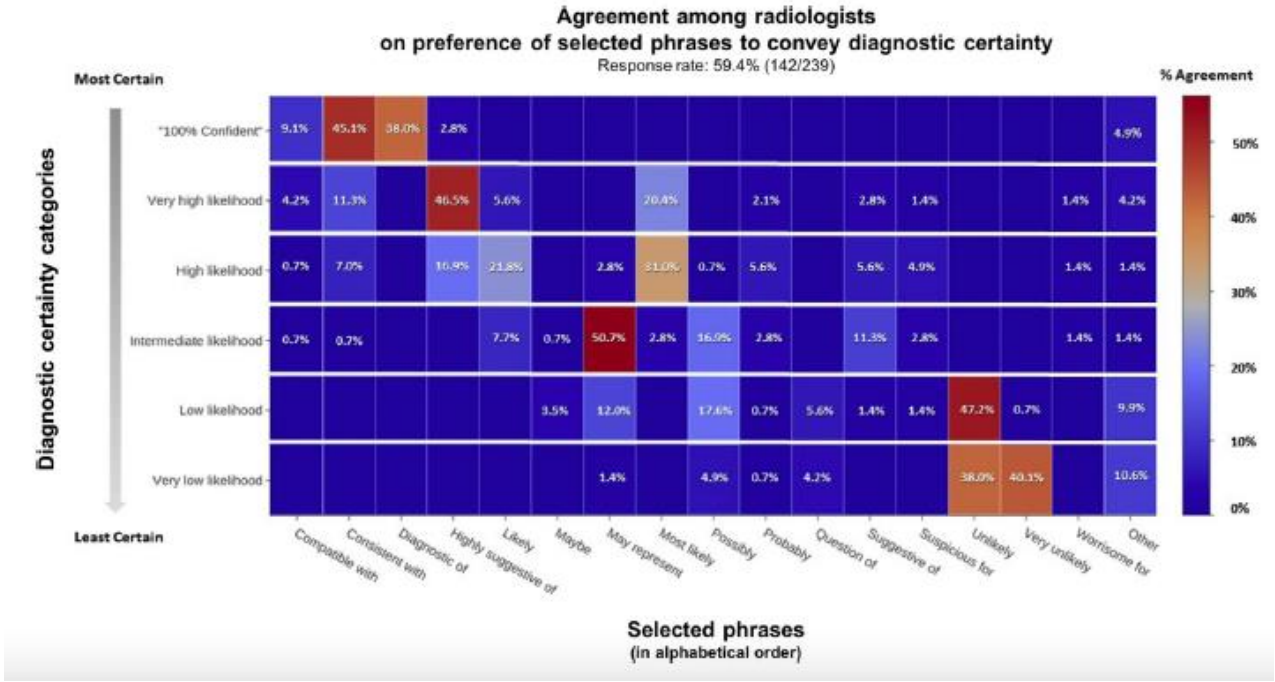
Materials and Methods: This institutional review board–approved study was part of a quality improvement initiative to improve the quality of radiology reports at a tertiary academic hospital. Sixteen phrases commonly used in radiology reports to convey diagnostic certainty were extracted from prior publications. The degree of diagnostic certainty was divided into six arbitrary categories by an expert panel. We used an anonymous online survey to query 239 radiologists at our institution regarding their preferred phrase for each category. We evaluated the distribution of preferred phrases, performed cluster analysis to find groups of phrases used to describe specific diagnostic certainty categories, and calculated Krippendorff's α to evaluate how reliably radiologists use various phrases to express diagnostic certainty.

Findings: In all, 59.4% (142 of 239) of radiologists completed the survey. The most commonly preferred phrases were "consistent with" (45.1%; 64 of 142) for 100% confident, "highly suggestive of" (46.5%; 66 of 142) for very high likelihood, "most likely" (31.0%; 44 of 142) for high likelihood, "may represent" (50.7%; 72 of 142) for intermediate likelihood, "unlikely" (47.2%; 67 of 142) for low likelihood, and "very unlikely" (40.1%; 57 of 142) for very low likelihood. Cluster analysis identified six groups of phrases used to indicate a similar level of diagnostic certainty; however, Krippendorff's α was 0.217, indicating radiologists do not consistently use the same phrases for similar degrees of confidence.

Conclusion: Wide variability persists among radiologists' preferences for phrases used to convey diagnostic certainty. Interventions to improve consistency of use of these phrases may help reduce ambiguity and improve quality of radiology reports.

Key Words: Diagnostic certainty, radiology report, agreement, survey

J Am Coll Radiol 2019;16:458-464.



The Radiologist Diagnostic Certainty Scale

Most likely means very high probability
Likely means high probability
May represent means intermediate probability
Unlikely means low probability
Very unlikely means very low probability

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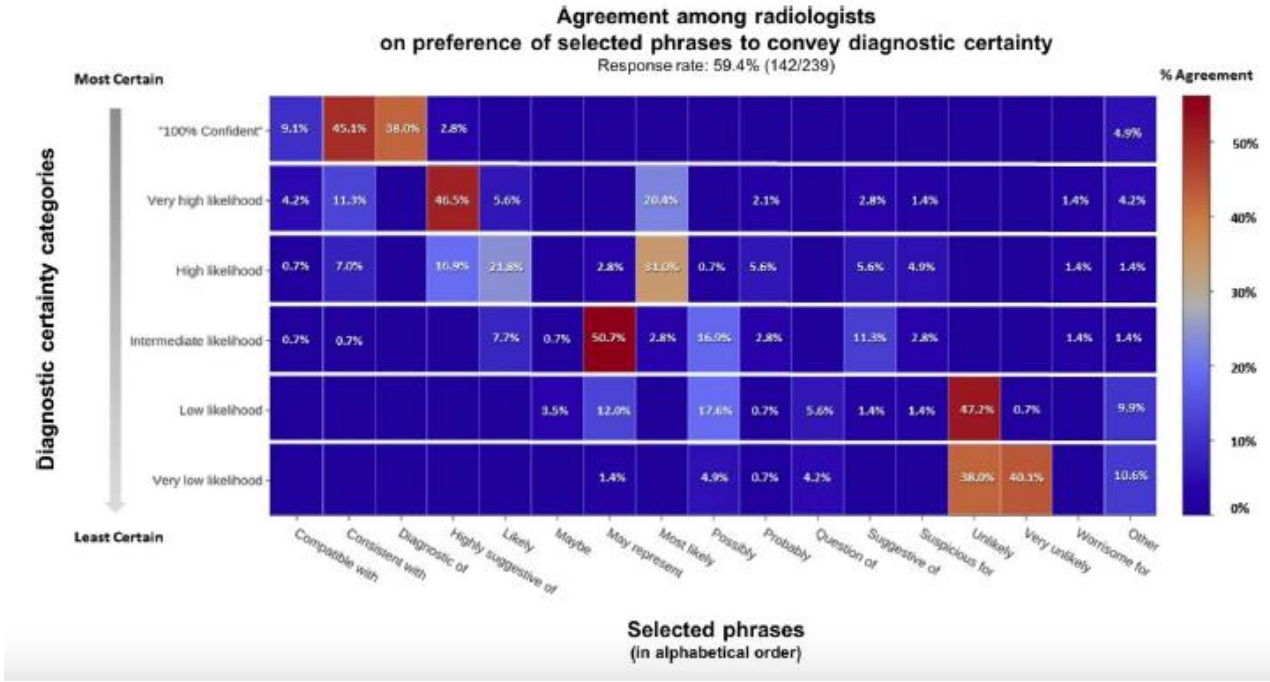

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F/U Radiology Recommendations

- Abassi et al AJR 2023
- 10-13% f/u imaging recommended (sub-specialty dependent)
- Approximately 50% for incidental findings
- Others unexplained findings
- <50% actually performed (30-60%)
- If all recommendations performed would lead to overuse of imaging, overdiagnosis and over treatment
- Significant variation amongst radiologists
- What to do? How to ensure closed loop follow-up?

Closed Loop Imperative: A Potential Solution

Addressing Radiology Recommendations Collaboratively – ARRC

Goal	**Ensures timely performance of clinically necessary radiology follow up recommendations (Collaborative Care Plans)**
ARRC	Enables creation of a collaborative care plan between a Radiologist and Ordering Provider with three teams (below) in place to ensure its timely execution
Radiology Care Coordination	Central Radiology Schedulers (Care Coordination) will assist with ordering and scheduling of imaging follow-up recommendations
SafetyNet	Will assist with care coordination with outside network or 'unknown' PCP and patient when needed
ARRC Operations	Use closed loop communication system (CRICO funded) and data analytics tools to track collaborative care plans to timely resolution

Closed Loop - ARRC intervention

Radiologist makes explicit follow-up recommendations (reason for follow- up, imaging modality, timeframe) using closed-loop communication tool

Referring provider explicitly agrees or disagrees with the recommendation

- ✓if agrees with (**agree=Collaborative Care Plan**), radiology care coordination team (central scheduling) enters order in Epic (in-Basket message referring provider for signature)- follow SOP for unscheduled radiology orders workflow
- ✓Safety net team engages ordering provider as needed (or outside provider and/or patient) to ensure timely resolution of every Collaborative Care Plan

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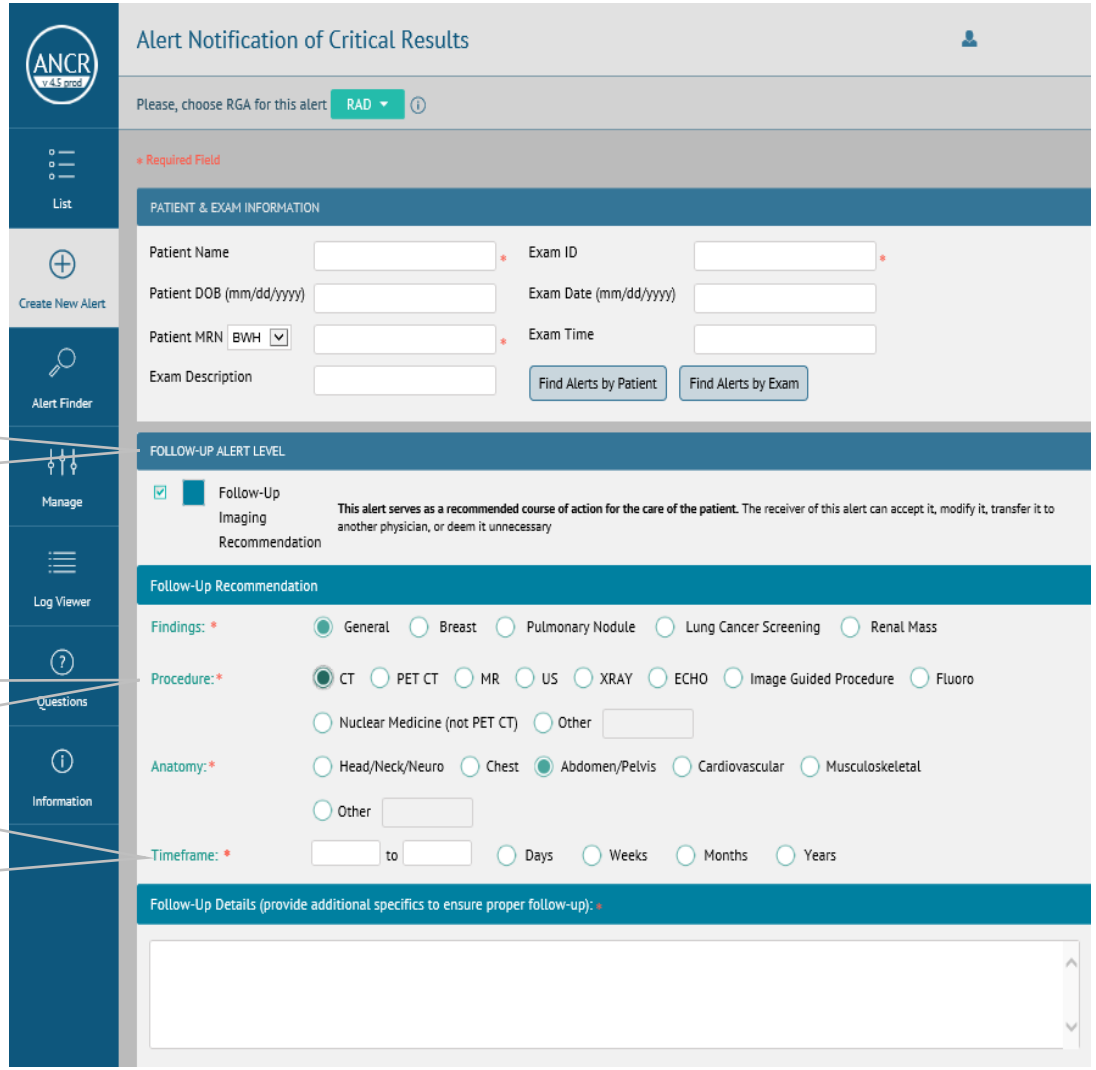
Radiologist Propose an Explicit Follow-Up Care Plan

1 Open ANCR

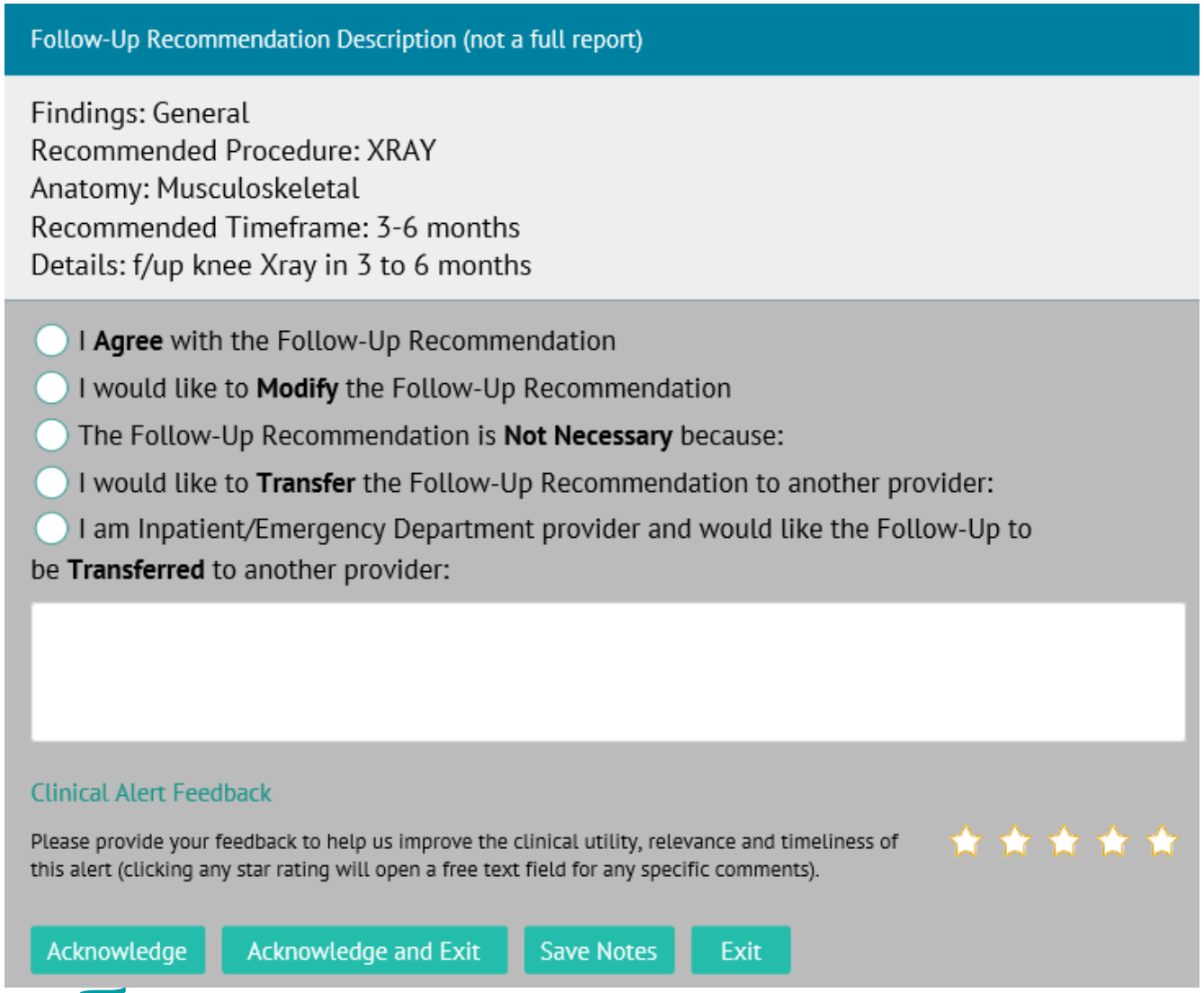
2 Click **"FOLLOW-UP ALERT LEVEL"**

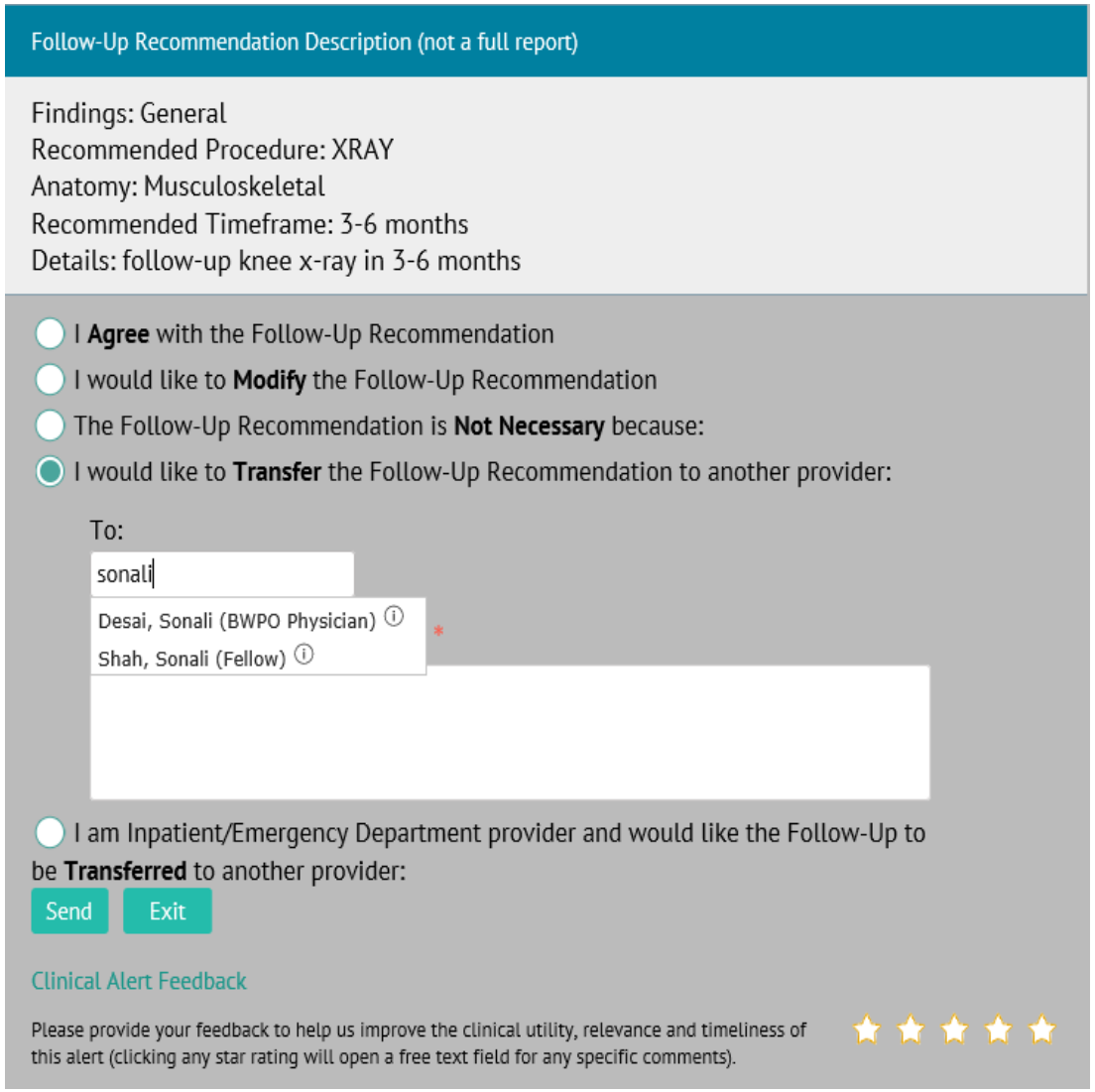
3 Recommend a *single* **Modality**

4 Be specific with **Timeframe** (*list beginning and end date*)



Closed Loop Solution





Outcomes

Table 2. Incidental Pulmonary Nodule (IPN) Follow-Up in Preintervention and Postintervention Cohorts

IPN Follow-Up	Preintervention Cohort (*N* = 110) *n* (%)	Postintervention Cohort (*N* = 108) *n* (%)	*P* Value*
Follow-up completed on time	71 (64.5)	91 (84.3)	**0.001**
Follow-up completed on time or late	87 (79.1)	102 (94.4)	**0.0009**
Follow-up not completed	23 (20.9)	3 (2.8)	
Follow-up not needed	NA	3 (2.8)	

*Bold indicates statistical significance.

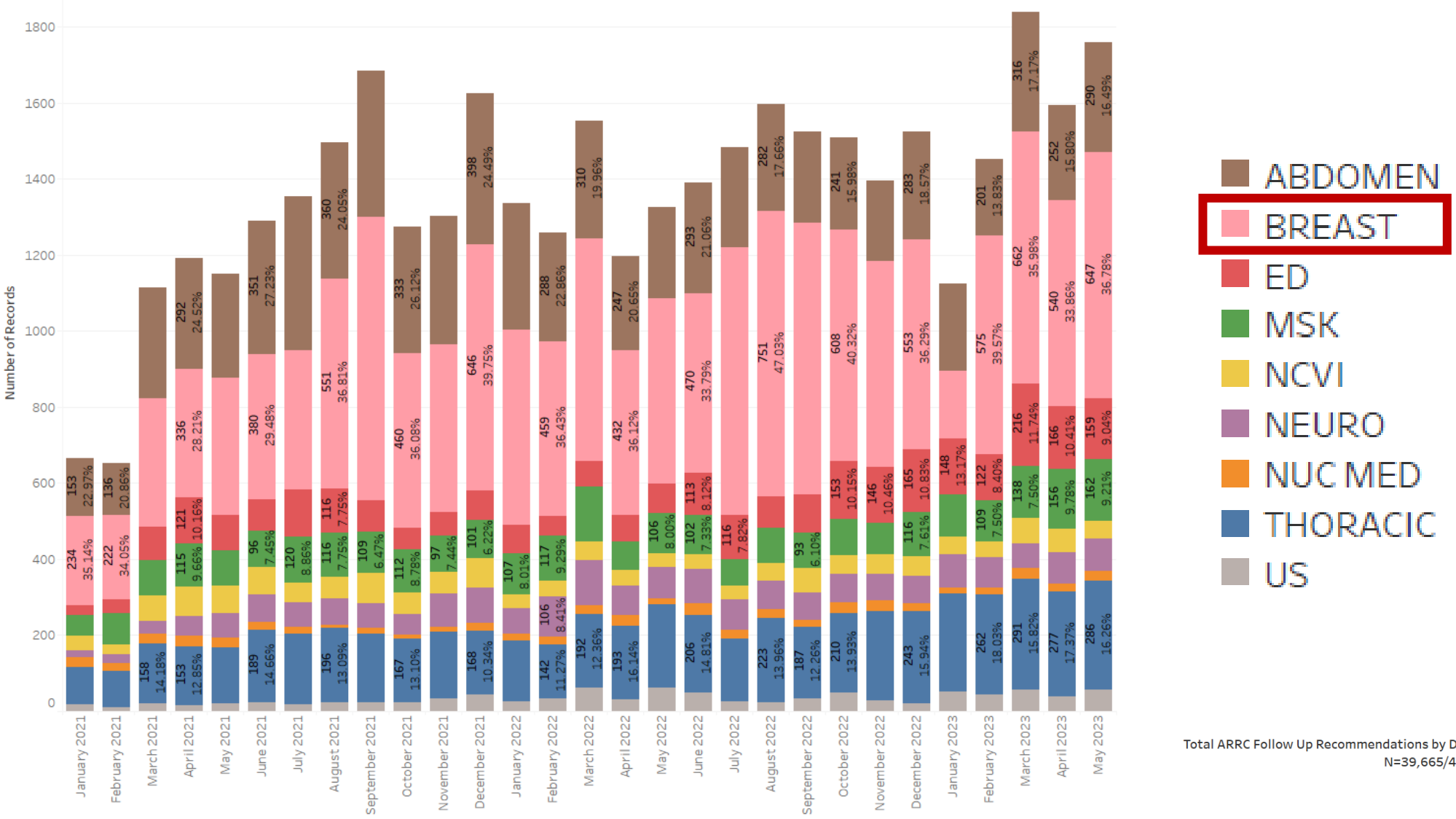
NA, not applicable.

The Joint Commission Journal on Quality and Patient Safety 2021; 000:1–7

RADAR: A Closed-Loop Quality Improvement Initiative Leveraging A Safety Net Model for Incidental Pulmonary Nodule Management

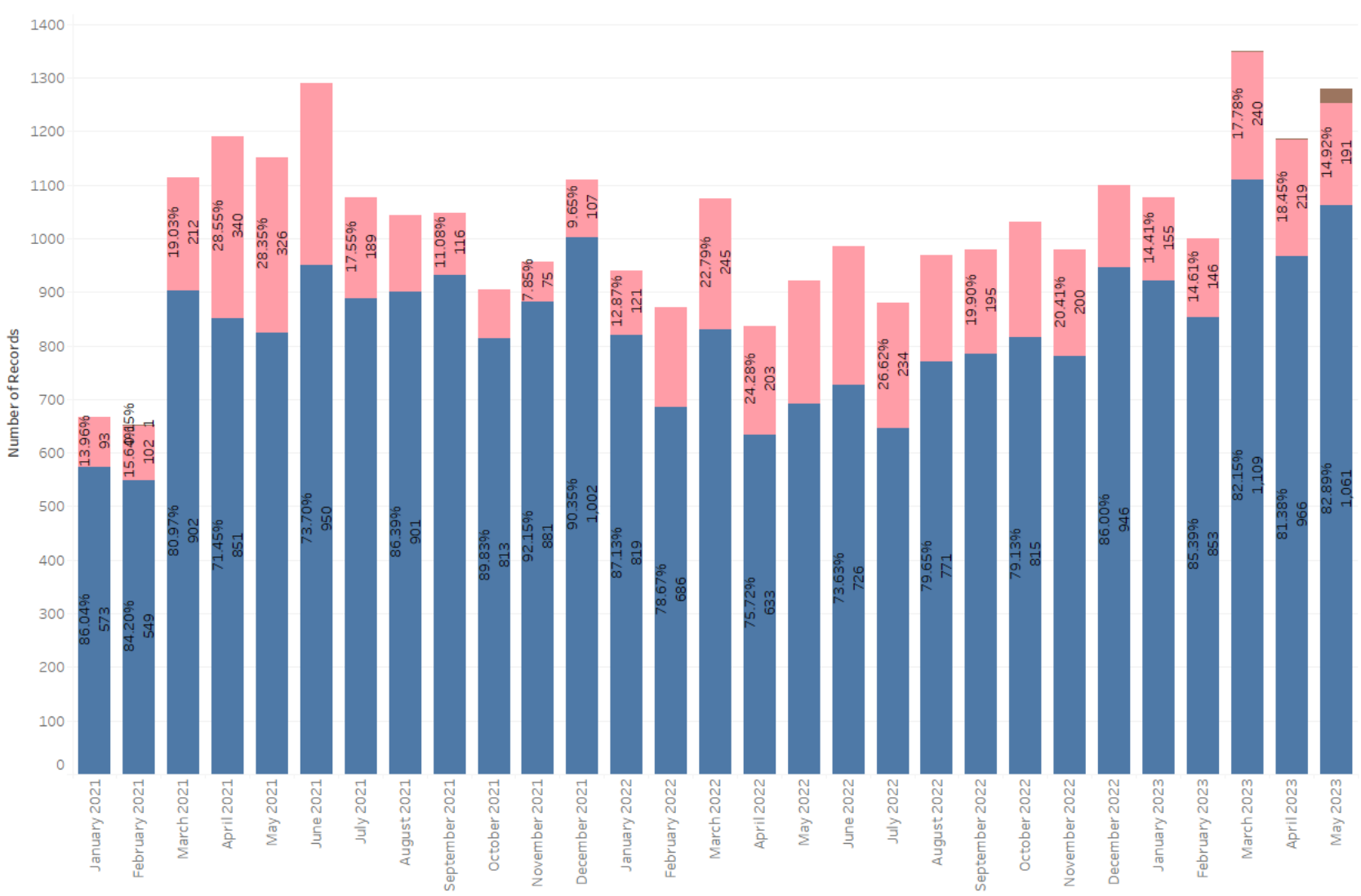
Sonali Desai, MD, MPH; Neena Kapoor, MD; Mark M. Hammer, MD; Alexandra Levie, MPH; Karthik Sivashanker, MD, MPH; Ronilda Lacson, MD, PhD; Ramin Khorasani, MD, MPH

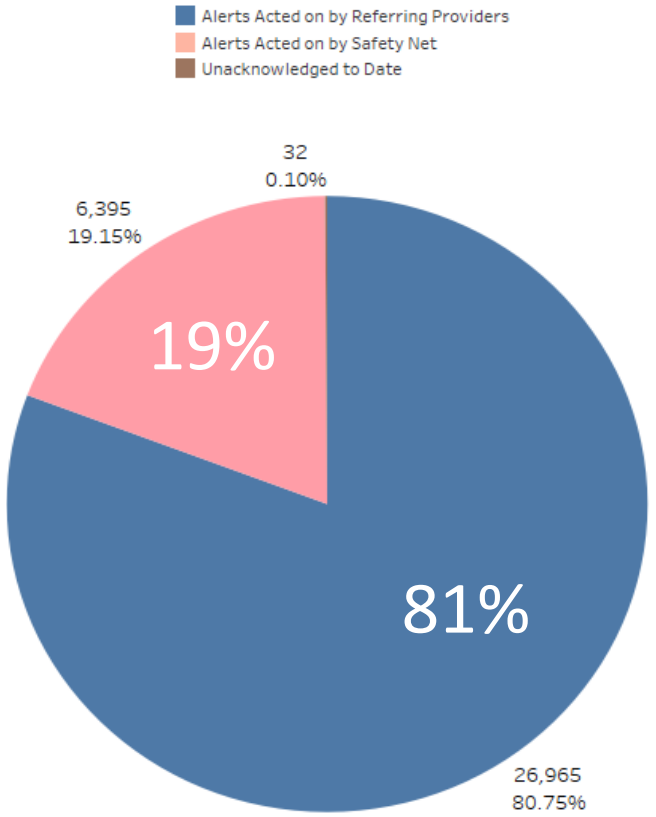
Recommendations/month by Division



Total ARRC Follow Up Recommendations by Division by Month - 1/1/2019-5/31/2023
N=39,665/43,398

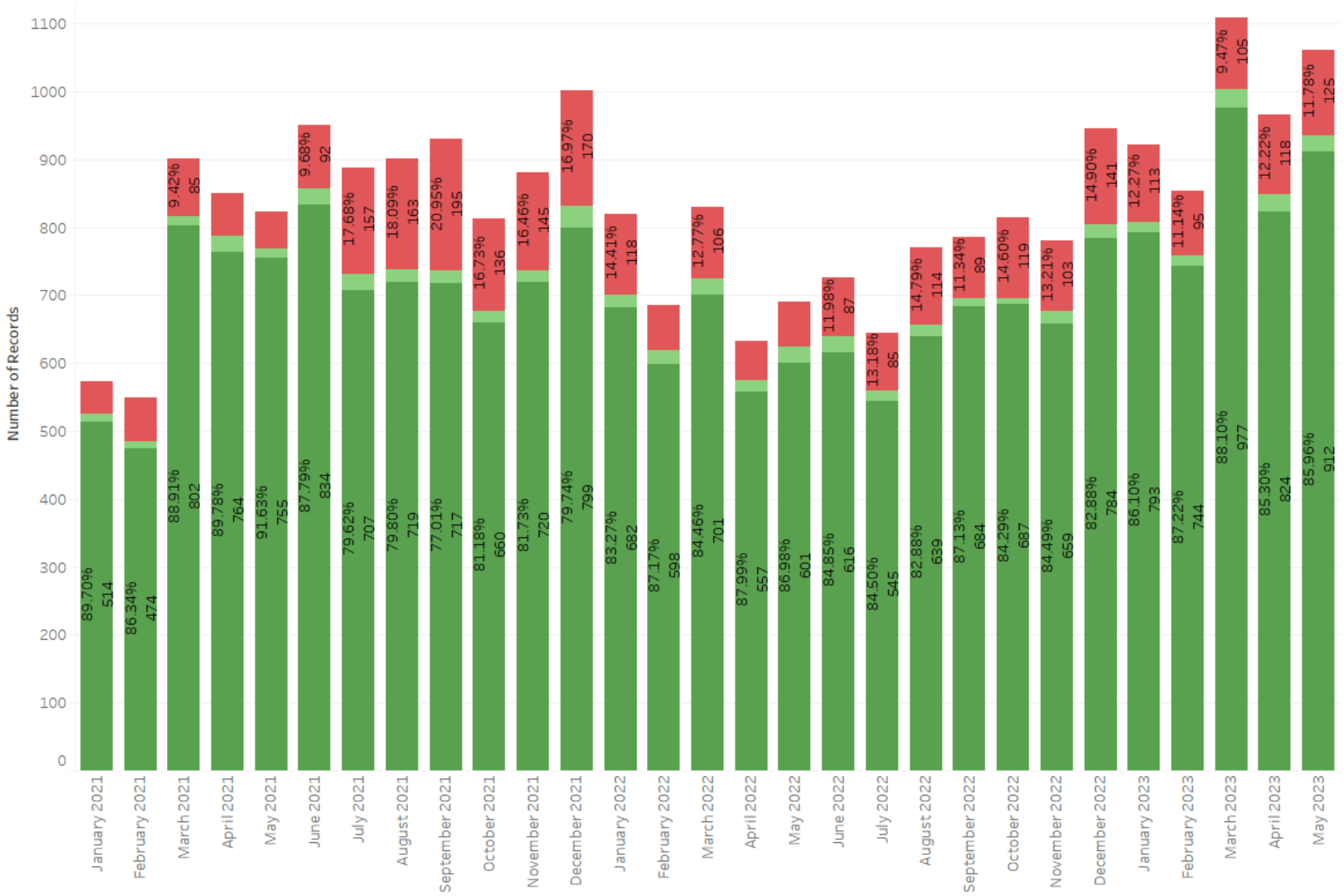
Acted on by Referrers (blue) vs. Safety Net (pink)

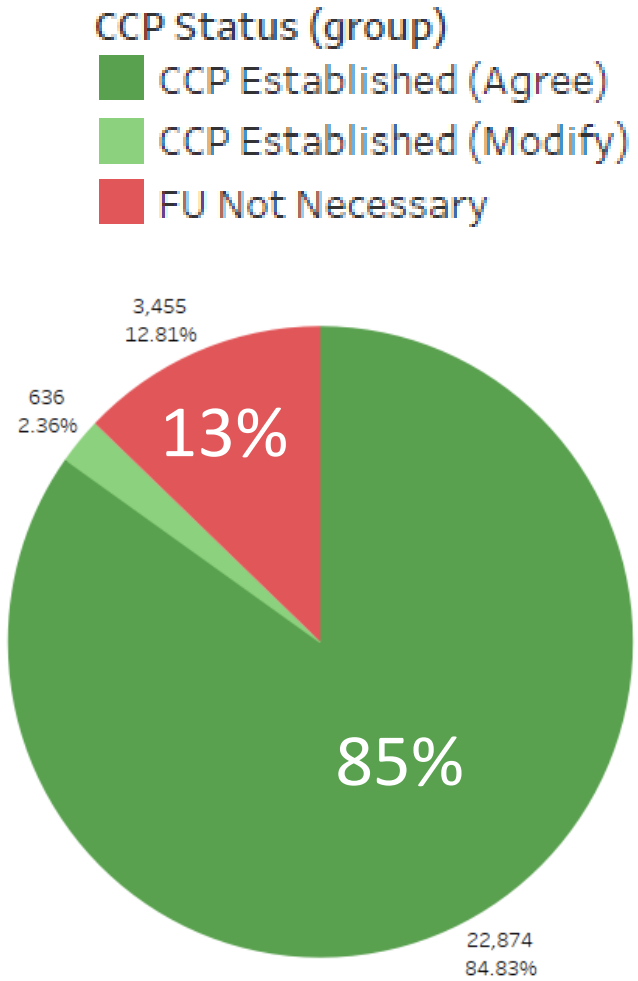




BWPO ARRC Alerts Acted Upon by Referring Providers vs. Safety Net by Month - 10/21/2019-5/31/2023
N=29,659/43,398

Recommendations Performed

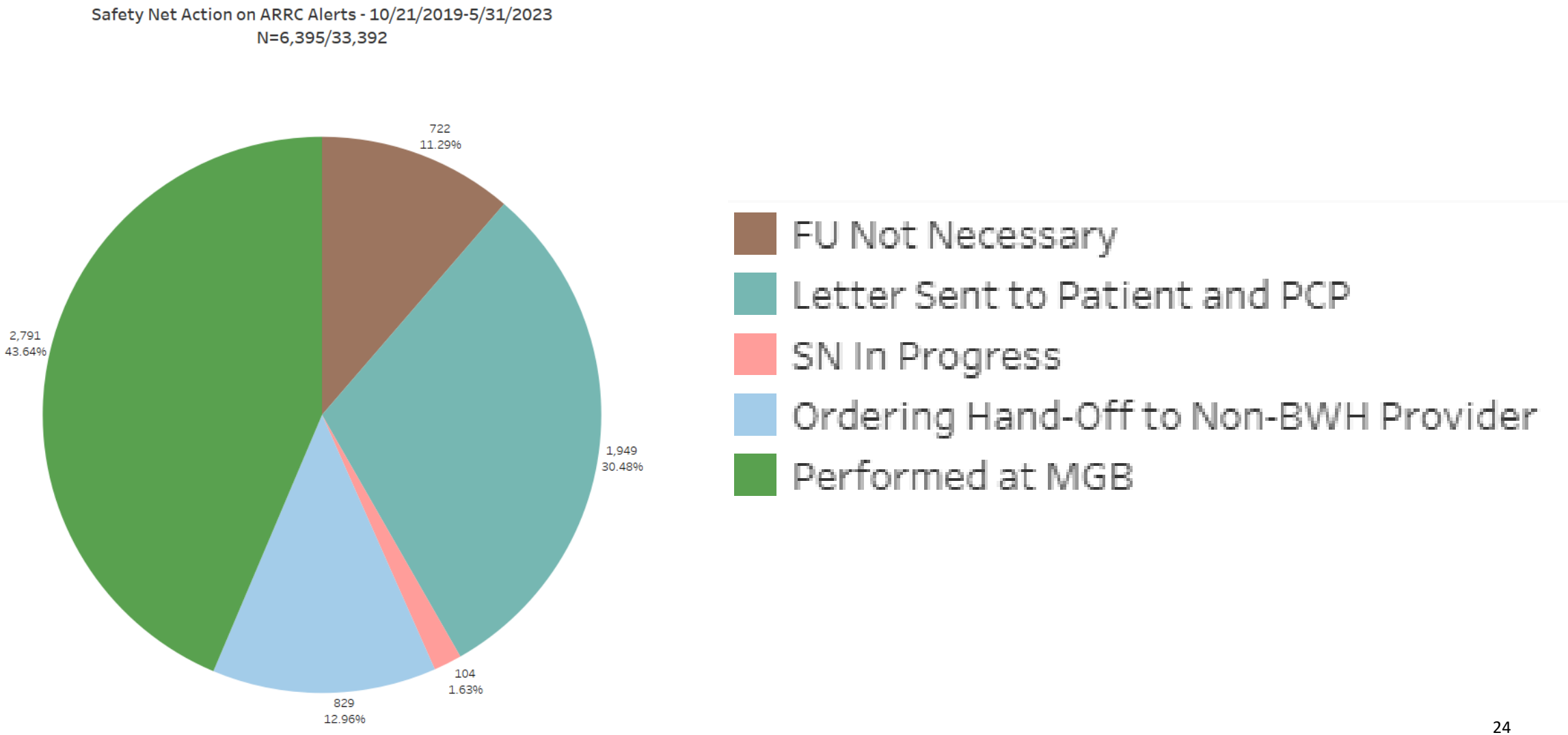




BWPO Referring Provider Action on ARRC Alerts by Month - 10/21/2019-5/31/2023
N=24,102/33,392

BWPO Referring Provider Action on ARRC Alerts - 10/21/2019-5/31/2023
N=26,965/33,392

Safety Net (19% of recommendations)



Conclusions

- F/U recommendations common
- Need to fix variation and language and report structure (impression and recommendations in header)
- Collaboration with other departments and providers
- IT systems and people (yes…costs $)
- “Enemy of the good is better” problem – just do it!
- Multiple stop-gaps (prevent the cracks problem)
- Most critical move → LEADERSHIP (dept. and org.)
- Zero tolerance for patient harm – aim for elimination

Mass General Brigham

Thank You

Giles Boland, MD
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