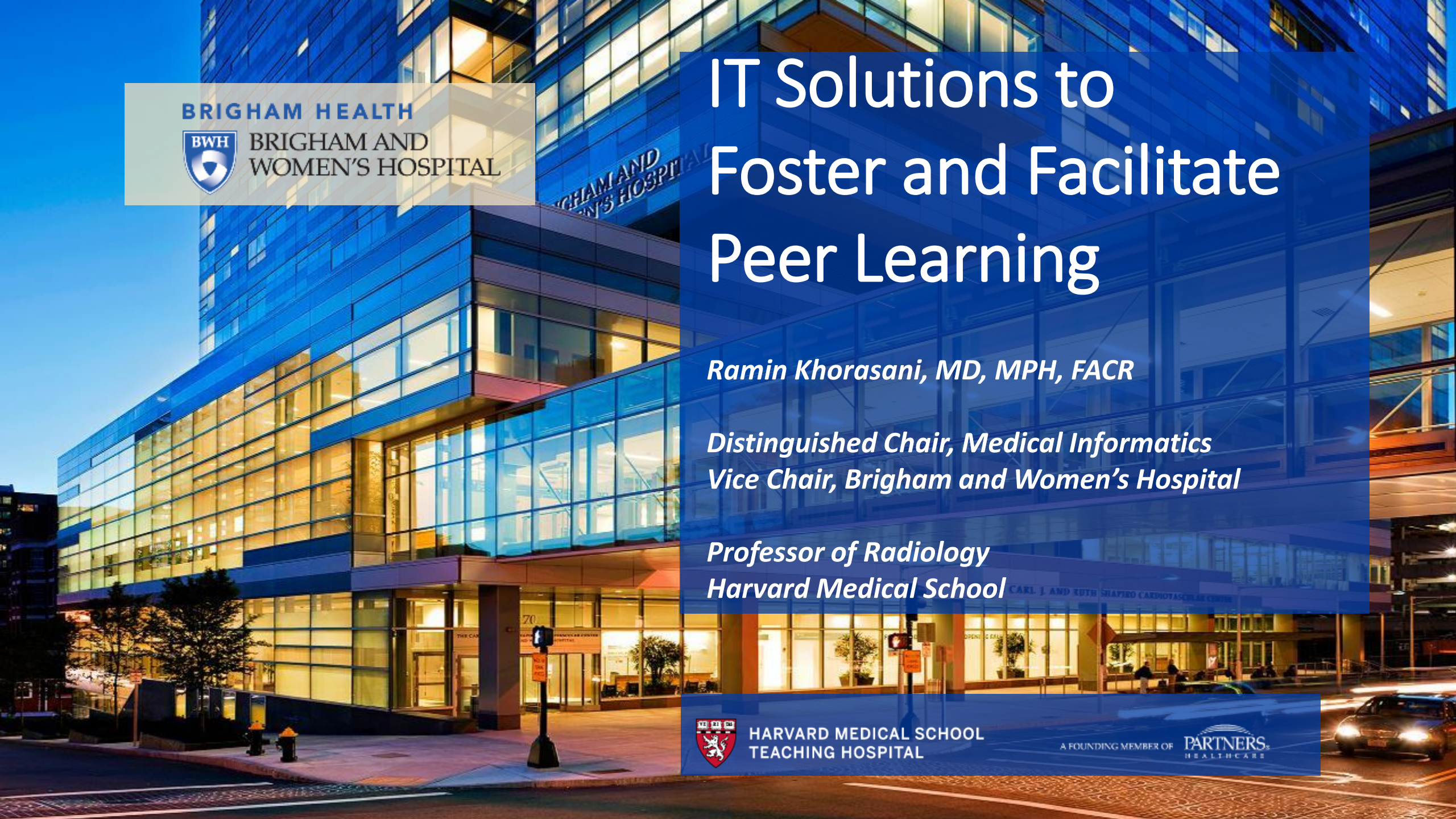


IT Solutions to Foster and Facilitate Peer Learning

Ramin Khorasani, MD, MPH, FACR

Distinguished Chair, Medical Informatics
Vice Chair, Brigham and Women's Hospital

Professor of Radiology
Harvard Medical School

HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

A FOUNDING MEMBER OF PARTNERS HEALTHCARE

Acknowledgement:

Giles Boland, MD, FACR

Overview

- Brief Background and context
- Functional requirements to enable peer learning
- Broad technical (IT) requirements
- BWH as Use Case
  - Workflow demonstration
  - Impact to date
- Conclusions

Peer Feedback, learning, and improvement: Institute of Medicine Report on Diagnostic Error

"Improving Diagnosis in Health Care" [IOM September 2015]

"health care organizations should adopt policies and practices that promote a non-punitive culture that values open discussion and feedback on diagnostic performance."

Balancing Peer Review and Peer Learning goals v 2020 Realities

- Physician burnout as a 'public health crisis'

Health Affairs Blog

Physician Burnout Is A Public Health Crisis: A Message To Our Fellow Health Care CEOs

John Noseworthy, James Madara, Delos Cosgrove, Mitchell Edgeworth, Ed Ellison, Sarah Krevans, Paul Rothman, Kevin Sowers, Steven Strongwater, David Torchiana, and Dean Harrison

March 28, 2017

- Contributing factors include:
  - Technology ('EHRs') a major driver of burnout
  - Interruptions, distractions, inefficiencies
  - Regulations/accreditation, performance measures, etc.
- Do interventions deliver desired results?

Learning from major adverse events (macro-events)

- Learning from major adverse events (**macro-events**) is an established process to improve patient care (**Root Cause Analyses**, **Collaborative Case Reviews)**:
- ~1000 safety events (> 700,000 annual examination)
- 10-20 considered 'macro-events': e.g., death, delay in cancer diagnosis
- Typically related to performance of test or procedure or lack of closed loop communication of test results

Cochon L, et al. JAMIA 2018;25(11):1507-15.
Lacson R, et al. JACR 2018. In press.

Learning opportunities and peer learning

- Learning opportunities from **'micro-events'**-care that deviates from our best practices and occur tens of times each day
  - Traditional score-based random peer review programs perform poorly
  - Innovations are needed to capture every learning opportunity
- Learn from a 'miss' as well as a 'great call' or a 'consult'
- Create an easily searchable repository of 'vetted' learning opportunities to promote individual and group learning
- Promote *Just Culture* Principals

Trinh TW, et al. AJR 2018 Sep;211(3):630-4.
Trinh TW, et al. AJR 2019 Jan; 212(1):135-141.

Functional Requirements-1

- Define goal: capturing learning opportunities, v meeting perceived regulations v OPPE/FPPE, v physician's quality of interpretation
- **Discourage Under reporting of learning opportunities: *THE major challenge***
- Must be non-punitive, *just culture principles*
- 'Peer review protected'-data flow predominantly and preferably outside EHR
- Easy to use, safe and secure, minimize redundant data entry
- Embedded in workflow
  - interpretation (launch from PACS) and reporting (launch from reporting software) or EHR workflow
- Allow receiver confirmation and feedback
- **Welcoming and Valuable**
  - **Minimize 'threatening' look and feel, promote 'usual/expected' workflow, relevance to mission/goals evident as used**
- Searchable, 'vetted', access controlled, repository of learning opportunities

High level Technical Requirements

- Closed loop communication tool-[e.g., confirm receipt]
- Context sharing-Interoperability (web-enabled /SMART on FHIR/etc.), tethered or mobile device (particularly to view):
  - E.g.: Single Sign-on; Active directory (page, email)
  - E.g.: Context sharing URL launch from PACS, reporting system, EHR
  - E.g.: SMART on FHIR app launch from EHR (e.g. Apple orchard/Epic-etc.)
- Enable secure feedback from receiver to sender
- Integrate with image viewing software in context
- Analytics tool, data repository

Case Example:

Peer Learning Program at Brigham and Women's Hospital

'Worth Another Look'

- Pilot February 2017, Full Implementation October 2017

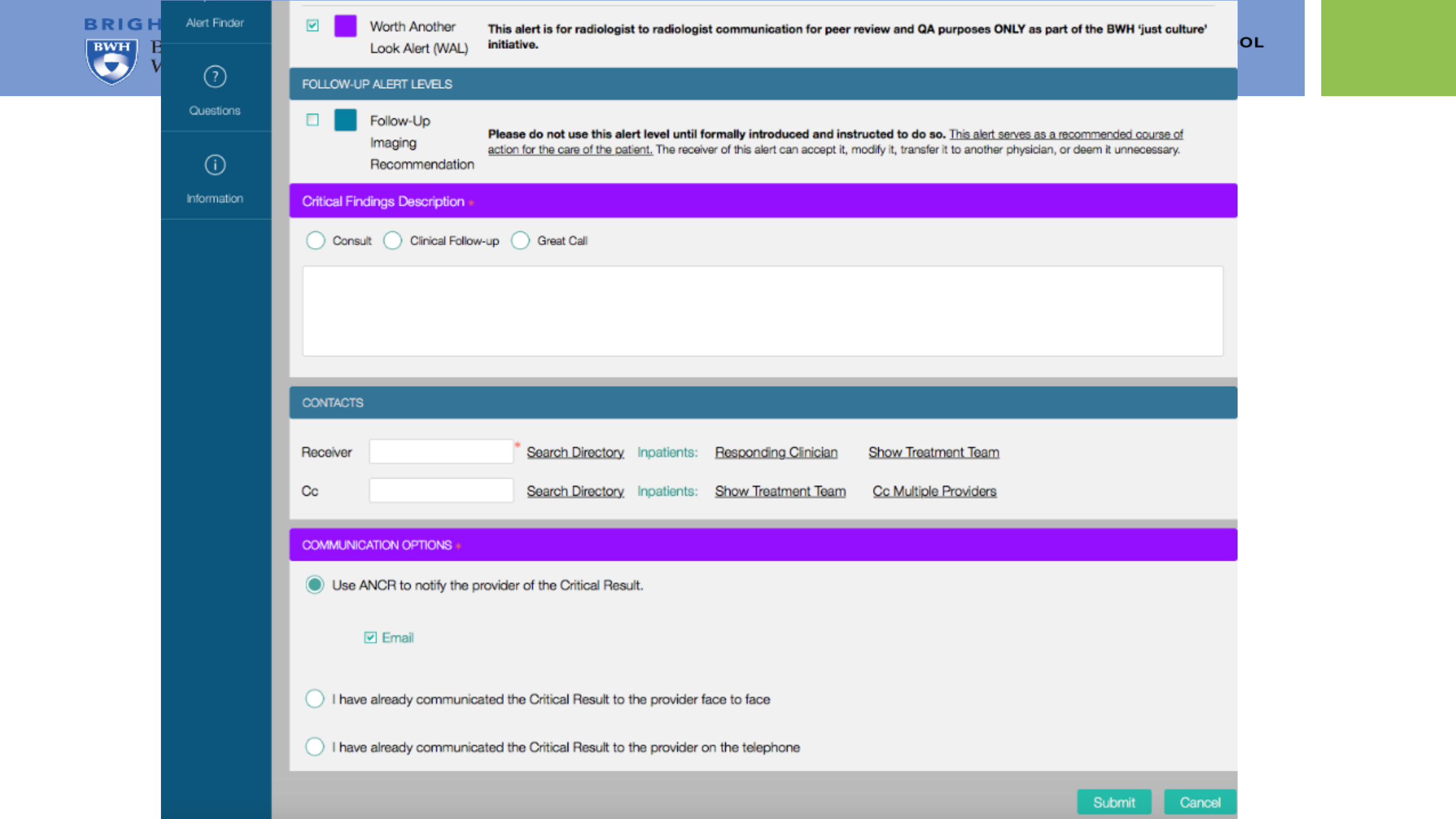
Workflow

Impact to-date

Key Components of Peer Learning Program

- Leadership
- *WHY?: Patients first*
- HOW?: Capture each learning opportunity to improve care
- To manage transition to peer learning:
  - Develop policies and procedures
  - Eliminate superfluous and wasteful programs (score-based peer review)
    - **[Strong ACR leadership support to transition to peer learning]**
  - Include in routine interpretation workflow to encourage use
  - Unambiguous metrics, celebrate milestones; modify based on feedback

ANCR
List
Create New
Alert Finder
Manage
Log Viewer
Questions
Information
PATIENT & EXAM INFORMATION
Patient Name
Exam ID
Patient DOB (mm/dd/yyyy)
Exam Date (mm/dd/yyyy)
Patient MRN
BWH
Exam Time
Exam Description
Find Alerts by Patient
Find Alerts by Exam
CRITICAL ALERT LEVEL
Critical Level 1 (Red)
Findings that are potentially immediately life-threatening. Requires "face-to-face" or "telephone" contact.
Critical Level 2 (Orange)
Findings that could result in mortality or significant morbidity if not appropriately treated urgently. Requires "face-to-face" or "telephone" contact.
Critical Level 3 (Yellow Email Alert)
Findings that could result in mortality or significant morbidity if not appropriately treated, but are not immediately life-threatening or urgent. Requires "face-to-face", "telephone", or other verifiable contact. Email is the default communication option and pager is optional.
Critical Level 3 (Yellow Page)
Findings that could result in mortality or significant morbidity if not appropriately treated, but are not immediately life-threatening or urgent. Requires "face-to-face", "telephone", or other verifiable contact. Pager is the default communication option and email is optional. (Example: for use in Emergency Dept.)
FOLLOW-UP ALERT LEVEL
Follow-Up Imaging Recommendation
This alert serves as a recommended course of action for the care of the patient. The receiver of this alert can accept it, modify it, transfer it to another physician, or deem it unnecessary
OTHER ALERT LEVEL
Worth Another Look Alert (WAL)
This alert is for radiologist to radiologist communication for peer review and QA purposes ONLY as part of the BWH 'just culture' initiative.
Pink Alert
This alert level is for Breast Imaging radiologists to communicate follow-up instructions to the mammography coordinators at the location where the imaging exam was performed (850, DFCI/MV/WS, FLK, FXB, LBC). Email is the only communication option for this level.
Technical Feedback
This alert is for radiologist to modality leadership communication for imaging QA and feedback (excluding patient callbacks).
Patient Callback
This alert is for radiologist to modality leadership communication for patient callbacks (excludes screening mammography).
Cc
Search Directory
Inpatients:
Treatment Team
Cc Multiple Providers
Outpatients:
Care Team
Submit
Cancel


Alert Finder
Questions
Information
Worth Another Look Alert (WAL)
This alert is for radiologist to radiologist communication for peer review and QA purposes ONLY as part of the BWH 'just culture' initiative.
FOLLOW-UP ALERT LEVELS
Follow-Up Imaging Recommendation
Please do not use this alert level until formally introduced and instructed to do so. This alert serves as a recommended course of action for the care of the patient. The receiver of this alert can accept it, modify it, transfer it to another physician, or deem it unnecessary.
Critical Findings Description *
Consult
Clinical Follow-up
Great Call
CONTACTS
Receiver
Search Directory
Inpatients:
Responding Clinician
Show Treatment Team
Cc
Search Directory
Inpatients:
Show Treatment Team
Cc Multiple Providers
COMMUNICATION OPTIONS *
Use ANCR to notify the provider of the Critical Result.
Email
I have already communicated the Critical Result to the provider face to face
I have already communicated the Critical Result to the provider on the telephone
Submit
Cancel

BRIGHA
BWH BR W

Questions

Information

Worth Another Look Alert (WAL)

This alert is for radiologist to radiologist communication for peer review and QA purposes ONLY as part of the BWH 'just culture' initiative.

FOLLOW-UP ALERT LEVELS

Follow-Up Imaging Recommendation

Please do not use this alert level until formally introduced and instructed to do so. This alert serves as a recommended course of action for the care of the patient. The receiver of this alert can accept it, modify it, transfer it to another physician, or deem it unnecessary.

Critical Findings Description *

Consult | Clinical Follow-up | Great Call

I would appreciate your opinion on this case. See image(s):

CONTACTS

Receiver: Khorasani, Ramin,M.D. * Search Directory Inpatients: Responding Clinician Show Treatment Team

Cc: Search Directory Inpatients: Show Treatment Team Cc Multiple Providers

COMMUNICATION OPTIONS *

Use ANCR to notify the provider of the Critical Result.

Email

I have already communicated the Critical Result to the provider face to face

I have already communicated the Critical Result to the provider on the telephone

Submit Cancel

BRIGHA
BWH BR
WC

Questions

Information

Worth Another Look Alert (WAL)

This alert is for radiologist to radiologist communication for peer review and QA purposes ONLY as part of the BWH 'just culture' initiative.

FOLLOW-UP ALERT LEVELS

Follow-Up Imaging Recommendation

Please do not use this alert level until formally introduced and instructed to do so. This alert serves as a recommended course of action for the care of the patient. The receiver of this alert can accept it, modify it, transfer it to another physician, or deem it unnecessary.

Critical Findings Description *

Consult | Clinical Follow-up | Great Call

Clinical follow-up on a study you interpreted. See image(s):

CONTACTS

Receiver: Khorasani, Ramin,M.D. * Search Directory Inpatients: Responding Clinician Show Treatment Team

Cc: Search Directory Inpatients: Show Treatment Team Cc Multiple Providers

COMMUNICATION OPTIONS *

Use ANCR to notify the provider of the Critical Result.

Email

I have already communicated the Critical Result to the provider face to face

I have already communicated the Critical Result to the provider on the telephone

Submit Cancel

BRIGHA
BWH BR
W

Questions

Information

Worth Another Look Alert (WAL)

This alert is for radiologist to radiologist communication for peer review and QA purposes ONLY as part of the BWH 'just culture' initiative.

FOLLOW-UP ALERT LEVELS

Follow-Up Imaging Recommendation

Please do not use this alert level until formally introduced and instructed to do so. This alert serves as a recommended course of action for the care of the patient. The receiver of this alert can accept it, modify it, transfer it to another physician, or deem it unnecessary.

Critical Findings Description *

Consult | Clinical Follow-up | Great Call

Great Call. See image(s):

CONTACTS

Receiver: Khorasani, Ramin,M.D. * Search Directory Inpatients: Responding Clinician Show Treatment Team

Cc: Search Directory Inpatients: Show Treatment Team Cc Multiple Providers

COMMUNICATION OPTIONS *

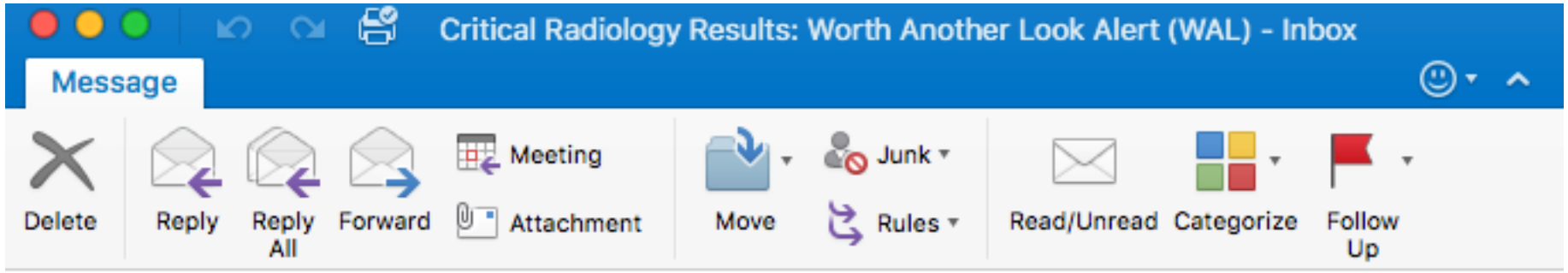
Use ANCR to notify the provider of the Critical Result.

Email

I have already communicated the Critical Result to the provider face to face

I have already communicated the Critical Result to the provider on the telephone

Submit Cancel



Critical Radiology Results: Worth Another Look Alert (WAL)

A-

ANCR - Alert Notification of Critical Results <ancr@cebi.partners.org>

Tuesday, February 7, 2017 at 10:50 AM

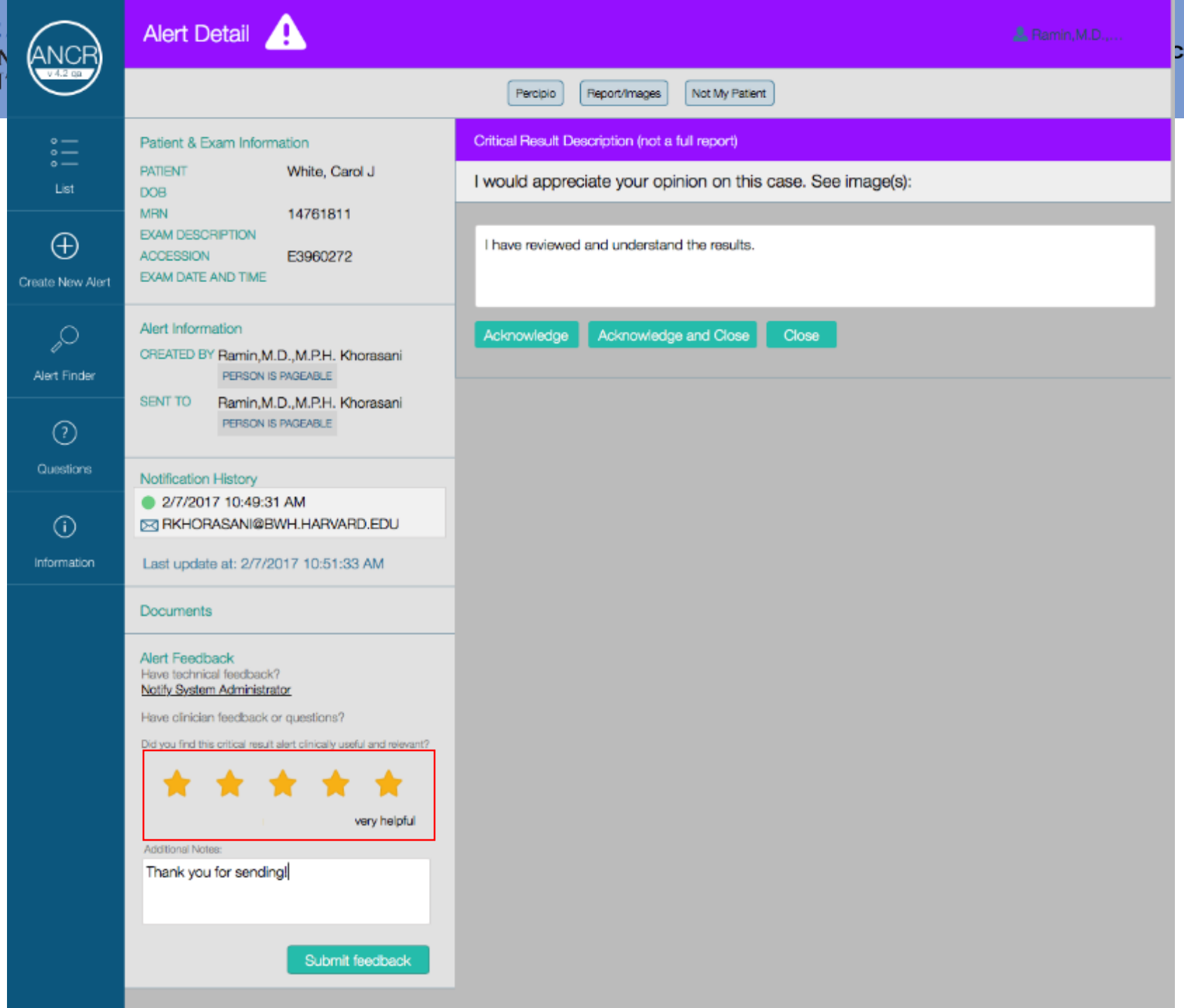
To: Khorasani, Ramin,M.D.,M.P.H.

A patient in your care has a Critical Radiology Result that requires your acknowledgement. The Worth Another Look Alert (WAL) was created by Ramin,M.D.,M.P.H. Khorasani on 2/7/2017 10:50:01 AM.

To view and acknowledge this alert follow this link:
https://ancrqa.partners.org/Alert/Details/114772

Important Notes:
Worth Another Look Alert (WAL): 30 Days for Acknowledgement of Receipt This alert is for radiologist to radiologist communication for peer review and QA purposes ONLY as part of the BWH 'just culture' initiative.

Any questions on the ANCR system please contact ancrsupport@partners.org. Please do not reply to this email.


ANCR
v 4.2 qa
List
Create New Alert
Alert Finder
Questions
Information
Alert Detail
Ramin,M.D.,...
Percipio
Report/Images
Not My Patient
Patient & Exam Information
PATIENT White, Carol J
DOB
MRN 14761811
EXAM DESCRIPTION
ACCESSION E3960272
EXAM DATE AND TIME
Alert Information
CREATED BY Ramin,M.D.,M.P.H. Khorasani
PERSON IS PAGEABLE
SENT TO Ramin,M.D.,M.P.H. Khorasani
PERSON IS PAGEABLE
Notification History
2/7/2017 10:49:31 AM
RKHORASANI@BWH.HARVARD.EDU
Last update at: 2/7/2017 10:51:33 AM
Documents
Alert Feedback
Have technical feedback?
Notify System Administrator
Have clinician feedback or questions?
Did you find this critical result alert clinically useful and relevant?
very helpful
Additional Notes:
Thank you for sending!
Submit feedback
Critical Result Description (not a full report)
I would appreciate your opinion on this case. See image(s):
I have reviewed and understand the results.
Acknowledge
Acknowledge and Close
Close

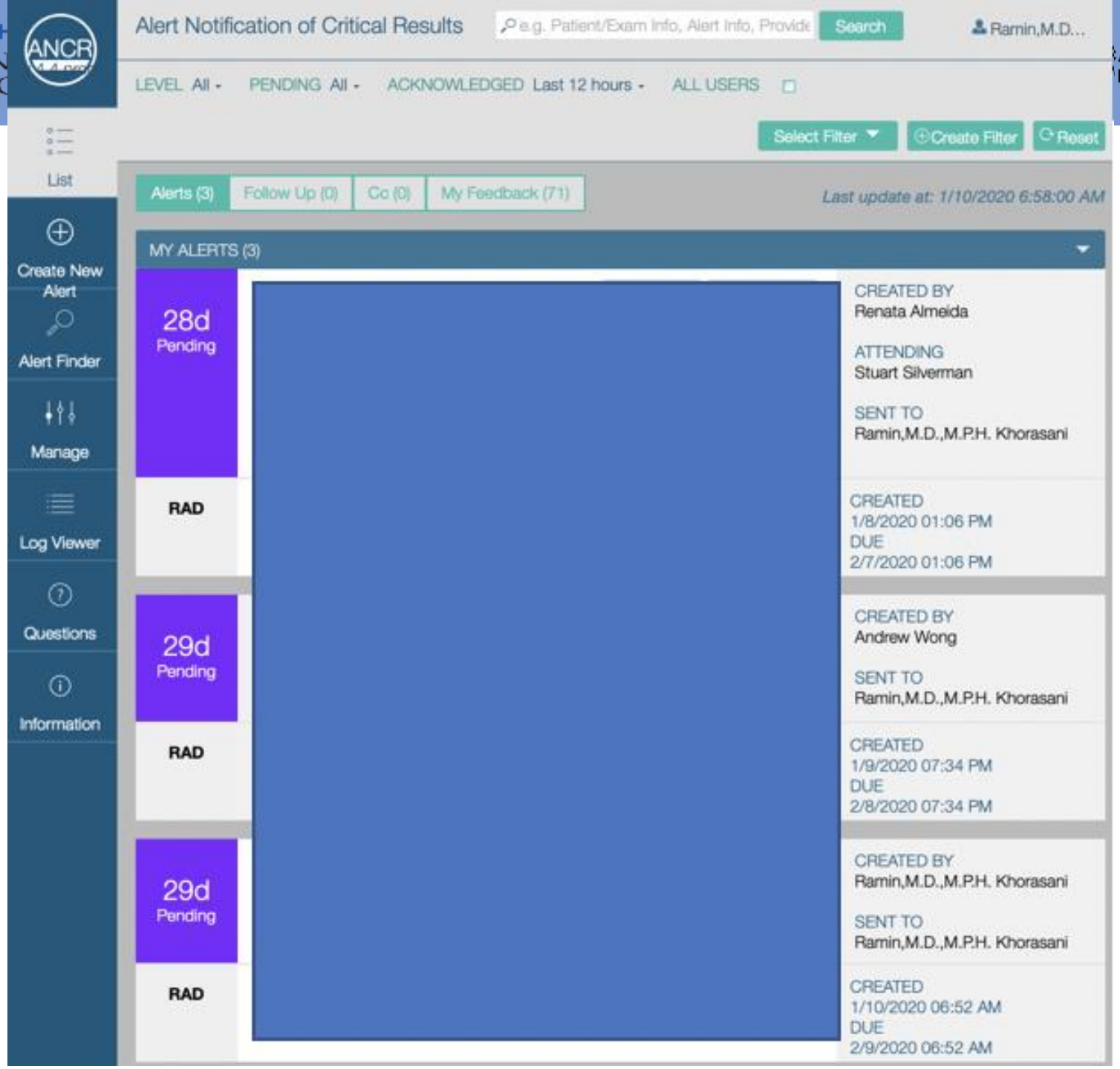
OTHER ALERT LEVEL

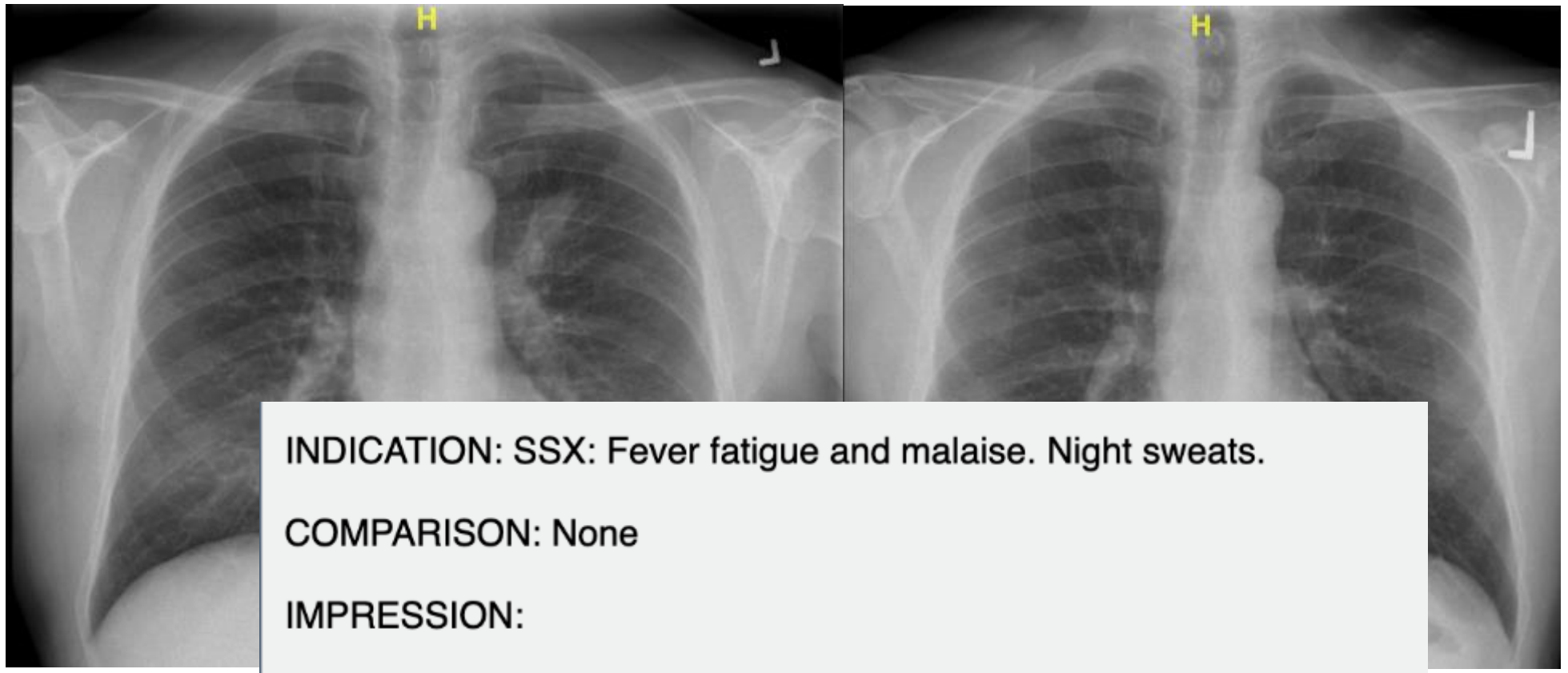
☑	Worth Another Look Alert (WAL)	**This alert is for radiologist to radiologist communication for peer review and QA purposes ONLY as part of the BWH 'just culture' initiative.**
☐	Pink Alert	This alert level is for Breast Imaging radiologists to communicate follow-up instructions to the mammography coordinators at the location where the imaging exam was performed (850, DFCI/MV/WS, FLK, FXB, LBC). **Email is the only communication option for this level.**
☐	Technical Feedback	This alert is for **radiologist** to **modality leadership** communication for imaging QA and feedback (excluding patient callbacks).
☐	Patient Callback	This alert is for **radiologist** to **modality leadership** communication for **patient callbacks** (excludes screening mammography).
☐	Non-Critical Result	This alert is for closed-loop communication of non-critical results for exams with priority of **STAT, Urgent/Patient Waiting, and Needed for Discharge.**

Critical Findings Description *

- ○ Consult
- ○ Clinical Follow-up
- ◉ Discrepant Opinion
- ○ Great Call
- ○ Teaching Case
- ○ Report Template Feedback
- ○ Unclear reason for STAT
- ○ Consult Resident Feedback

Please describe the potential discrepancy and the provider(s) with whom you have communicated:


ANCR
Alert Notification of Critical Results
e.g. Patient/Exam Info, Alert Info, Provide
Search
Ramin,M.D...
LEVEL All
PENDING All
ACKNOWLEDGED Last 12 hours
ALL USERS
Select Filter
Create Filter
Reset
List
Create New Alert
Alert Finder
Manage
Log Viewer
Questions
Information
Alerts (3)
Follow Up (0)
Cc (0)
My Feedback (71)
Last update at: 1/10/2020 6:58:00 AM
MY ALERTS (3)
28d
Pending
RAD
CREATED BY
Renata Almeida
ATTENDING
Stuart Silverman
SENT TO
Ramin,M.D.,M.P.H. Khorasani
CREATED
1/8/2020 01:06 PM
DUE
2/7/2020 01:06 PM
29d
Pending
RAD
CREATED BY
Andrew Wong
SENT TO
Ramin,M.D.,M.P.H. Khorasani
CREATED
1/9/2020 07:34 PM
DUE
2/8/2020 07:34 PM
29d
Pending
RAD
CREATED BY
Ramin,M.D.,M.P.H. Khorasani
SENT TO
Ramin,M.D.,M.P.H. Khorasani
CREATED
1/10/2020 06:52 AM
DUE
2/9/2020 06:52 AM



INDICATION: SSX: Fever fatigue and malaise. Night sweats.

COMPARISON: None

IMPRESSION:

PA and lateral chest examination demonstrates parenchymal opacification within the left upper lobe, possibly due to malignancy or pneumonia. No pleural effusion is seen and there is no pneumothorax. CT scan the chest is recommended.

Critical results were communicated and documented using the Alert Notification of Critical Radiology Results (ANCR) system.
END IMPRESSION

Improving Radiology Peer Learning: Comparing a Novel Electronic Peer Learning Tool and a Traditional Score-Based Peer Review System

Tony W. Trinh[1,2]
Giles W. Boland[2]
Ramin Khorasani[1,2]

OBJECTIVE. The purpose of this study was to compare the yields of peer learning between a radiology electronic peer learning tool (PLT) and a score-based peer review (SBPR) system.

MATERIALS AND METHODS. This retrospective study was performed from May 1, 2017, through October 31, 2017, at a 776-bed academic hospital performing more than 620,000 radiology examinations annually. Use of a PLT that generates alerts facilitating closed-loop feedback was initiated on March 1, 2017. Functions included providing peers with the following: clinical follow-up after review of prior reports, positive feedback, and consultation to solicit second opinions. In the same period, an SBPR system yielded the following scores: 1, agree with original interpretation; 2, minor discrepancy; 3, moderate discrepancy; and 4, major discrepancy. Potential learning opportunities were defined as cases receiving a clinical follow-up alert (PLT system) and reports scored 3 or 4 (SBPR system). Primary outcome was clinically significant feedback per total reports reviewed, measured as radiology report addendum rate (number with addenda divided by number of reports reviewed monthly for each system). The secondary outcome was potential learning opportunity rate (number of clinical follow-up alerts or reports scored 3 or 4 divided by the total number of radiology reports reviewed monthly). A paired *t* test was used for statistical analysis.

RESULTS. The overall PLT report addendum rate was 11.2% (23 addenda/206 reports) versus 0.27% (13 addenda/4861 reports) for SBPR ($p = 0.03$), a 41-fold difference (11.2/0.27). The potential learning opportunity rate for PLT was 50.0% (206 clinical follow-up alerts among 412 total alerts) versus 0.53% (26 scored 3 or 4 among 4861 reports reviewed) for SBPR ($p = 0.00003$), a 94-fold difference (50/0.53).

CONCLUSION. A PLT improves radiology peer learning with a significantly higher yield of clinically significant feedback and potential learning opportunities compared with a traditional SBPR system.

Trinh TW, et al. AJR 2019 Jan; 212(1):135-141.

Worth Another Look (WAL)

P<0.03

Program	Total Alerts	Consult	Clinical F/U	Great Call		Addenda	Addendum Rate
WAL	412	77	206	129		23	11.2%
Peer review	4861	4543	292	18	8	13	0.3%
Program	Total cases	Level 1	Level 2	Level 3	Level 4	Addenda	Addendum Rate

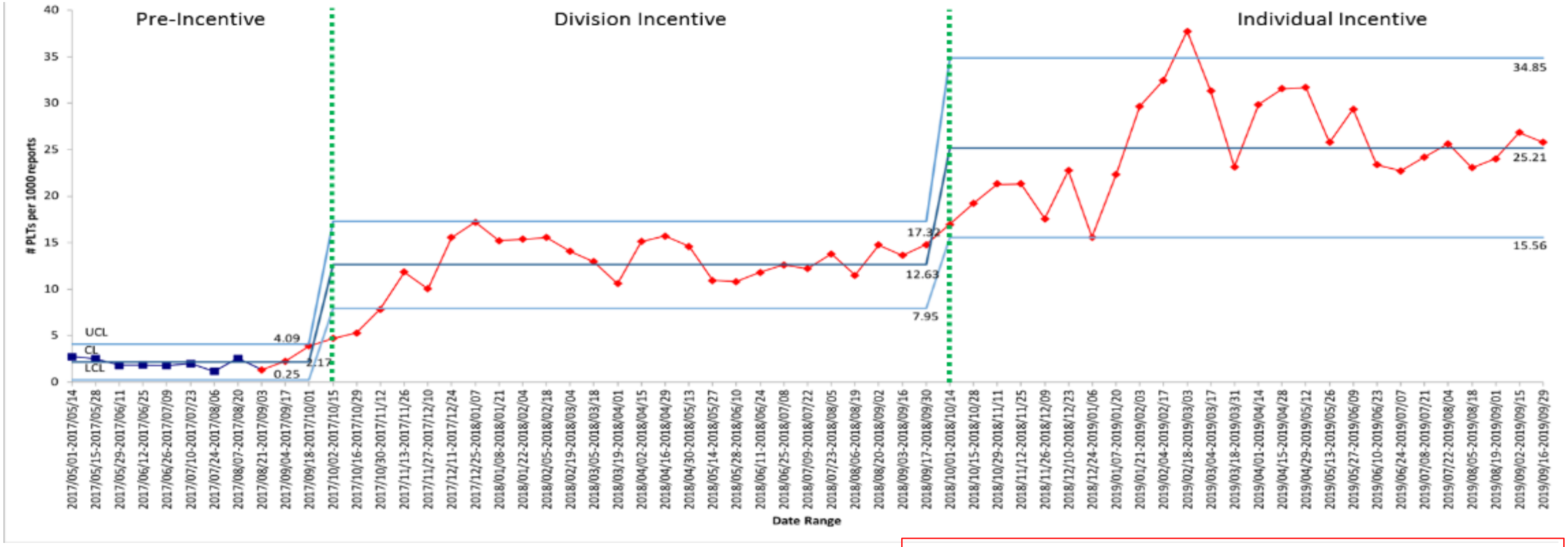
Trinh TW, Boland GW, Khorasani R. AJR 2019 Jan; 212(1):135-141.

Key Components of Peer Learning Program

- Leadership
- *WHY?: Patients first*
- HOW?: Capture each learning opportunity to improve care
- To manage transition to peer learning:
  - Develop policies and procedures
  - Eliminate superfluous and wasteful programs (score based peer review)
    - [ACR leadership very supportive of transition to peer learning]
  - Include in routine interpretation workflow to encourage use
  - Unambiguous metrics, celebrate milestones; modify based on feedback
- Embed in radiologist performance expectations:
  - **Radiology Patient Outcome Measures (RPOMS)**
  - **5% of individual radiologist compensation**

Impact of Physician Performance Incentive Program on Clinical Impact and Usage of Peer Learning Program

XmR chart, 3 sigma



Zhao A, Burk K, et al. Unpublished

Impact of Physician Performance Incentive Program on Clinical Impact and Usage of Peer Learning Program*

Addendum Rate (%)	
Time Period	**Mean**
Pre-Incentive	9.9%
Division Incentive	8.3%
Individual Incentive	7.9%

P =0.55

Clinical Follow-Up Rate (%)	
Time Period	**Mean**
Pre-Incentive	37.5
Division Incentive	34.4
Individual Incentive	31.2

P <0.05

Addendum rate 25-30 times higher than Score-based peer review

* Excluded Breast Imaging Division

Zhao A, Burk K, et al. Unpublished

Impact of Physician Performance Incentive Program on Clinical Impact and Usage of Peer Learning Program

- No significant change in rate of addended reports; 8-9% of 'clinical follow up' alerts which account for ~30-35% of peer learning alerts
- 5-fold increase in use with group incentive; 10-fold increase in use with individual incentive
  - 1% of salary (withhold)
  - Each faculty must generate, on average, 1 WAL per clinical day in each quarter
    - What is the right target?
  - Currently ~2-3% of all reports (excluding breast imaging); >10,000/year

Zhao A, Burk K, et al. Unpublished

Key Points and Next Steps

- Peer learning, a key component of ***learning health systems,*** must help identify learning opportunities to improve quality of care ***for patients***
  - 'Micro-events' occur tens of times each day; under reporting is a major challenge
  - Supplement safety reporting for 'macro-events' that occur much less frequently
- Effective implementation and adoption will require addressing people, process and technology requirements