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M E D I C I N E

In pursuit of high value practice: Designing a strategic plan to reduce unnecessary imaging in an academic radiology department

Authors and Disclosure

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Introduction – A Call to Action

- Complexity of imaging exams has increased such that providers are challenged with choosing the best imaging exam for all clinical scenarios
- Concerning statistics
 - radiology exams are among the top 4 contributors to patients' healthcare debt
 - 20-40% of imaging may be unnecessary
 - imaging comprises >100 of the Choosing Wisely® targets for reduced utilization
- Accordingly, it is incumbent on radiologists to lead value-based quality improvement and ensure that all imaging exams performed are appropriate and that the best imaging modality and protocol are selected.

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Accessed January 7, 2017

Imaging Appropriateness

- Mission: to evaluate and improve appropriateness of all imaging across a 5 hospital health system
- Strategic Plan:
 - Identify inappropriate use
 - Engage faculty leaders from multiple specialties
 - Educate broadly and at the point of care
 - Identify resources to measure appropriateness and generate ordering provider feedback
 - Measure pre- and post-intervention utilization, appropriateness, radiation exposure and costs

Appropriate Imaging Expert Panel

Director of Appropriate Imaging: Pamela T. Johnson, MD

- Executive Lead: Karen M. Horton, MD
- Data Analytics Lead: Ken Lee, DrPH, MHS
- Research and Management Lead: Matt Alvin, MD, MBA
- Data Collection Lead: Boris Feldman (Radiology IT)
- IT lead: Ambulatory/Inpatient CDS Teams

JH Radiology Divisional Faculty Representatives

- David Yousem, MD, Director of Neuroradiology
- Elliot Fishman, MD, Diagnostic Imaging and Oncology
- Stefan Zimmerman, MD, Director of CV Imaging
- Jan Fritz, MD, MSK Radiology
- Ihab Kamel, MD, Director of Body MRI
- Lil Solnes, MD, NM Residency Program Director
- Ryan Woods, MD, MPH; Bora Lee, MD, Breast Imaging

- Chris Jones, Bayview Radiology

JH Non-Radiology Faculty Representatives

- Amit Pahwa, MD, Adult and Pediatric Medicine
- Jeff Trost, MD, Cardiology and Bayview Medical Center
- Roy Ziegelstein, MD, Cardiology
- Peter Hill, MD, Clinical Director of Emergency Medicine
- Doug Reh, MD, Otolaryngology, Head and Neck Surgery
- Deanna Saylor, MD, Neurology
- Richard Safeer, MD, JHHC
- Scott Berkowitz, MD, JHACO
- Scott Feeser, MD, JHCP

Implementation Plan

- **Identification of inappropriate imaging**
 - Radiology divisional review of practice patterns
 - Value analytics evaluation of commonly used expensive exams for FY 2015-2016
 - CMS Outpatient Imaging Efficiency Metrics
- **Interventions to reduce inappropriate imaging**
 - Cross departmental collaboration
 - Education: medical school, graduate medical education (GME) and CME
 - High value curricula at Johns Hopkins medical school
 - Engage residents and fellows in cross-departmental high value Q/I
 - Cross departmental education initiatives
 - Best imaging practices CME for ordering physicians ("Order Wisely")
 - American College of Radiology (ACR) Select[®] Clinical Decision Support
 - Radiology Senior Resident Consultation Service
 - Provider feedback regarding ordering frequency relative to peers
- **Evaluation**
 - Utilization, safety, quality and financial impact

Inappropriate Imaging Radiology Faculty Surveyed

Neuroradiology

- Combined head and maxillofacial CT
- MRI with & without contrast for headache
- MRI lumbar spine for LBP < 6 weeks
- CT and MRI brain in same patient
- CT complete spine in the trauma patients
- Sinus CT for acute rhinosinusitis

Musculoskeletal

- Lumbar spine radiographs (multiple views)

Body Imaging

- Chest radiographs in ICU patient
- Admission chest radiographs
- CTA for pulmonary embolism
- Inpatient US for acute renal insufficiency
- Inpatient US and body CT on same patient
- Complete body CT (C/A/P) in setting of trauma
- CT for acute pancreatitis

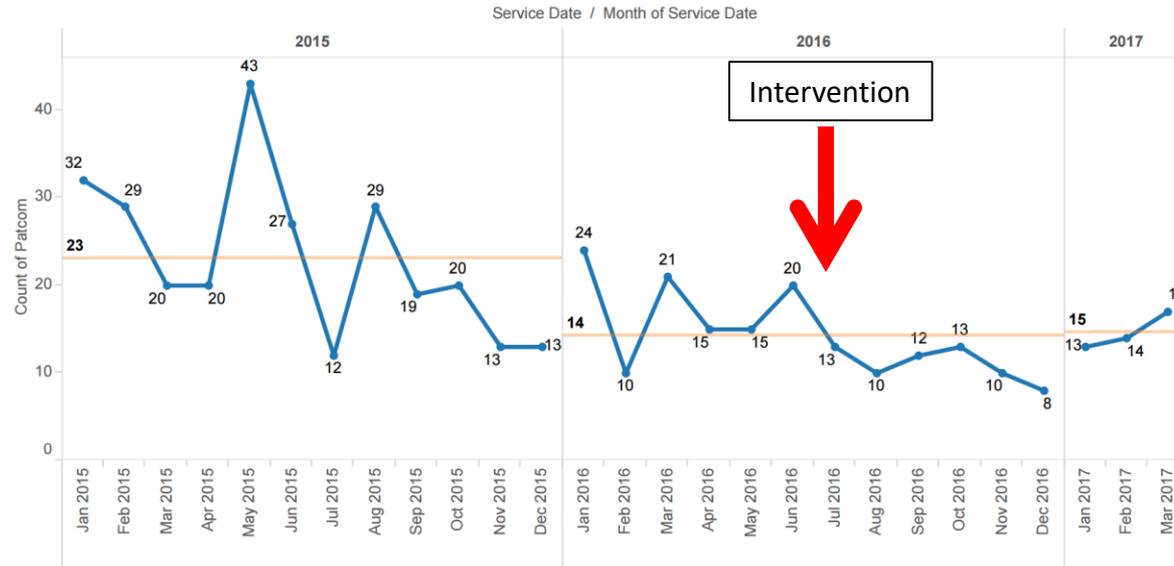
Nuclear Medicine

- PET/CT for paraneoplastic work up

Improving Appropriateness

Cross-departmental Collaboration

- CMS Outpatient Imaging Efficiency Metric: Combined head and sinus CT
- Radiology and ENT faculty collaborated to create an appropriate use plan



Imaging Appropriateness Educational Interventions to Date

- Medical student medicine sub-internship monthly interactive conference to review the appropriateness of their patients' imaging
- Radiology PD lectures to medicine and emergency medicine residents
- High value radiology CME lecture at annual Johns Hopkins Community Physician Provider Retreat
- Presentations at multiple executive committee meetings to engage department chairs, quality and safety leaders
- Content about imaging appropriateness and clinical decision support integrated into the Annual Medical Staff Update- a required module for all faculty and house staff.

Imaging Appropriateness Ongoing Educational Interventions

- Cross-specialty faculty and house staff quality-improvement teams.
- Radiology, neurology and ENT collaborating on specific imaging:
 - Lumbar spine MRI for low back pain
 - Sinus CT for sinusitis
 - Brain imaging for headache
 - Pan-spine imaging in trauma
 - Syncope
- Residents prepared educational guidelines, which are being formulated into online modules for widespread distribution across all 5 hospitals

Imaging Appropriateness Educational Initiative

- Surveyed ordering providers about their knowledge deficiencies with respect to imaging selection
- 51 respondents provided 246 responses
- Designed a tailored CME course based

Order Wisely CME Course

Best Imaging Exam Selection Lectures by Radiologists for Non-radiology Providers

Screening

1:00	Coronary artery screening	Tony Lin, MD
1:15	Aortic aneurysm screening	Linda Chu, MD
1:30	Lung cancer screening	Tony Lin, MD
1:45	Colon cancer screening	Karen Horton, MD
2:00	Breast cancer screening	Susan Harvey, MD/Lisa Mullen, MD

Breast imaging

2:15	Breast imaging (palpable lesion, pain, nonpalpable mammographic abnormality)	Susan Harvey, MD/Lisa Mullen, MD
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MSK

2:30	Joint and extremity pain	Shivani Ahlawat, MD
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Break 2:45-3:00 pm

Nuclear Medicine

3:00	Nuclear medicine when and why	Som Javadi, MD
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Abdominal Imaging

3:15	Incidental findings on CT	Elliot Fishman, MD
3:30	Flank pain (kidney stone vs other)	Karen Horton, MD
3:45	Pelvic pain in women	Sheila Sheth, MD

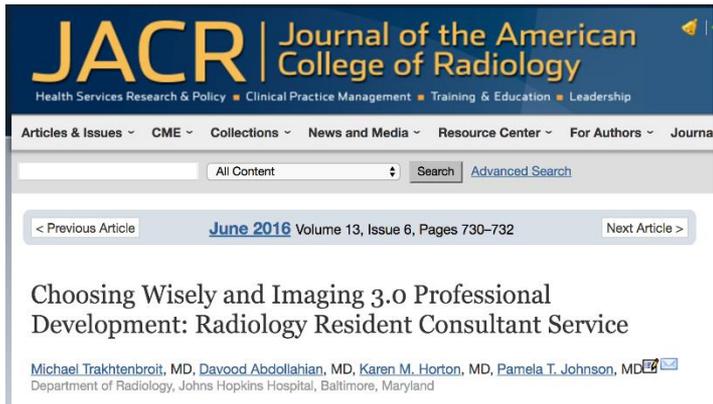
Neuroradiology

4:00	Headache	<u>Dave</u> Yousem, MD, MBA
4:15	Low back pain	Gary Gong, MD
4:30	Dizziness	Ari Blitz, MD
4:45	TIA	Toyin Idowu, MD

Intervention

Clinical Decision Support

- Senior radiology resident consultant service
 - 4th year resident carries an iPhone to assist with selection of best imaging exam
 - Widely used after listing contact information on ordering page in EPIC
 - Interaction modified practice in 97% of cases



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Choosing Wisely and Imaging 3.0 Professional Development: Radiology Resident Consultant Service

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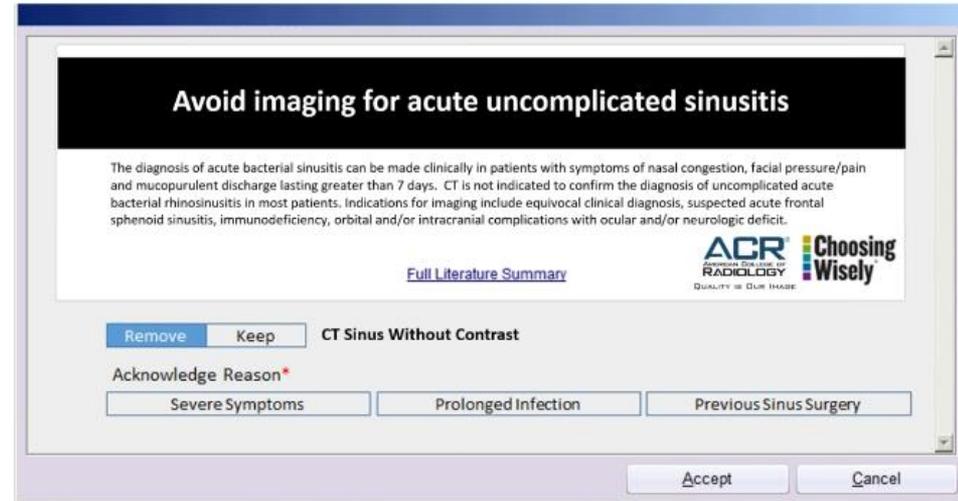
New data: result of 219 consultations made for best imaging guidance:

Selected best imaging test (caller unsure what to order)	54%
Optimized imaging protocol	30%
Eliminated unnecessary imaging test	10%
Selected more appropriate imaging test (changed the exam originally selected)	4%
No change in provider's order	3%

Intervention

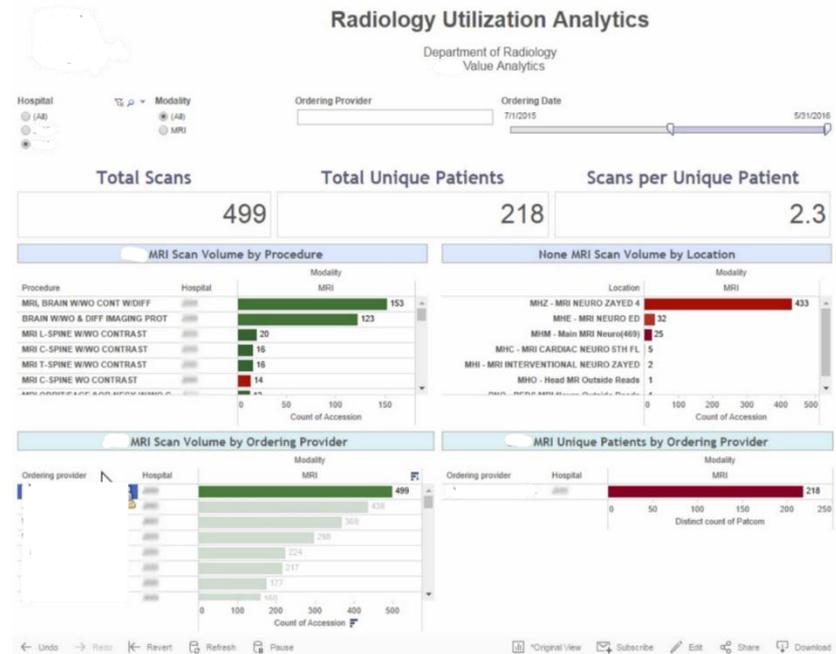
Clinical Decision Support

- Clinical decision support tool in EPIC: ACR Select®
- Implemented in outpatient setting
- Fine-tuning indication lists to improve efficiency and effectiveness
- Adding educational feedback messages for unindicated exams



Intervention Provider Feedback

- Value-analytics provider performance feedback profiles provides utilization data only
- ACR Select® CDS reporting package generates provider level ordering appropriateness data
- CMS requires provider feedback to identify performance outliers



Summary

- Radiologists must serve as the stewards for refining imaging utilization
- Cross-specialty collaboration is essential and provides great opportunities for house staff quality-improvement projects
- Multiple educational and clinical decision support interventions are required to combat overutilization in imaging
- Utilization appropriateness improvements will decrease unnecessary radiation exposure and reduce costs