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.

The Burden of Medical Debt: Results from the Kaiser Family Foundation/New York Times Medical Bills Survey. Kaiser Foundation.
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

| Screening | 1:00 | Coronary artery screening | Tony Lin, MD |
| Aortic aneurysm screening | 1:15 | Linda Chu, MD |
| Lung cancer screening | 1:30 | Tony Lin, MD |
| Colon cancer screening | 1:45 | Karen Horton, MD |
| Breast cancer screening | 2:00 | Susan Harvey, MD/Lisa Mullen, MD |
| Breast imaging | 2:15 | Breast imaging | Susan Harvey, MD/Lisa Mullen, MD |
| (palpable lesion, pain, nonpalpable mammographic abnormality) |
| MSK | 2:30 | Joint and extremity pain | Shivani Ahlawat, MD |
| Nuclear Medicine | 3:00 | Nuclear medicine when and why | Som Javadi, MD |
| Abdominal Imaging | 3:15 | Incidental findings on CT | Elliot Fishman, MD |
| Flank pain (kidney stone vs other) | 3:30 | Karen Horton, MD |
| Pelvic pain in women | 3:45 | Sheila Sheth, MD |
| Neuroradiology | 4:00 | Headache | Dave Yousern, MD, MBA |
| Low back pain | 4:15 | Gary Gong, MD |
| Dizziness | 4:30 | Ari Blitz, MD |
| TIA | 4:45 | Toyn 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

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
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