Patient Safety & Equity: Embracing Care Coordination Across Specialties

Arjun Venkatesh, MD, Nadja Kadom, MD, Christopher Moore, MD, Samantha Shugarman, MS, Judy Burleson, MHSA
Three initiatives improving patient safety

Focus
- Health Equity
- Diversity
- Inclusion

Showcase
- Interdisciplinary collaboration

Supported
- Gordon and Betty Moore Foundation
- Diagnostic Excellence Initiative
Arjun K Venkatesh, MD, MBA, MHS
Associate Professor
Chief of the Section of Administration
Department of Emergency Medicine
Yale University

Opportunities for Cross-specialty Collaboration
Emergency Medicine and Radiology: Peas in a Pod

- The ED is the de-facto setting for acute unscheduled care (Chou 2019)
- ED use of advanced imaging steadily rising (Chou 2020)
2015-2019: ACEP Emergency Quality Network
Early Success Together

Guidelines co-published

Imaging in Suspected Renal Colic: Systematic Review of the Literature and Multispecialty Consensus

The Data

Choosing wisely in emergency medicine: Early results and insights from the ACEP emergency quality network (E-QUAL)

Arjun K. Venkatesh, MD, MBA *, Jean Elizabeth Scofi, MD, Craig Rothenberg, MPH †, Carl T. Berdahl, MD, MS *, Nalani Tarrant, MPH, Dhruv Sharma, MS, Pawan Goyal, MD, Randy Pilgrim, MD, Kevin Klauer, DO, JD ‡, Jeremiah D. Schuur, MD, MHS

Table 2

Comparison of imaging utilization rates in 2017 vs 2018 for ED sites participating in both years.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>2017 Mean Utilization Rate (n ED Sites)</th>
<th>2018 Mean Utilization Rate (n ED Sites)</th>
<th>2017 vs 2018 Difference in Mean UR (95% CI)</th>
<th>P-Value</th>
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</thead>
<tbody>
<tr>
<td>Atraumatic low back pain</td>
<td>36% (n = 104)</td>
<td>33.3% (n = 104)</td>
<td>-2.7% (-5.9%, -0.5%)</td>
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<td>CT</td>
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<td>Minor head injury</td>
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<td>CT</td>
<td>76.3% (n = 102)</td>
<td>72.1% (n = 102)</td>
<td>-4.2% (-7.3%, -1.1%)</td>
<td>.008</td>
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</table>

* Indicates primary author
† Indicates co-lead author
‡ Indicates study site director
$55,093,582 saved from fewer avoidable imaging studies and hospitalizations

30,000 fewer patients harmed by ionizing radiation
What Next?

• Coordination of TEP, Guideline, White Paper, and Committees Activities

• Emerging Areas for Collaboration
  • Actionable Incidental Findings
  • Health Equity
Nadja Kadem, MD
Professor of Radiology
Interim Medical Director Radiology Quality
Department of Radiology
Emory University

Closing the Completion Loop on Radiology Follow-up
Recommendations for Noncritical Actionable Incidental Findings
The Patient Safety Gaps

- Care coordination and communication of actionable incidental findings (AIFs)
- ~ 30% of AIFs without follow-up documented
- ED imaging exams follow-up completion as low as 17%, lower for patients based on SDOH
- Completed follow-up results in diagnoses in 45% of patients, with ~ 5% cancer diagnoses
Chest CT performed in the ED for trauma

Early stage lung cancer
59% survival at 5 years

Advanced stage lung cancer
6% survival at 5 years

Missed recommended follow-up
Clinical Practice Management
Original Article

Novel Quality Measure Set: Closing the Completion Loop on Radiology Follow-up Recommendations for Noncritical Actionable Incidental Findings

Nadja Kadam MD a, b, c, Arjun K. Venkatesh MD, MBA, MHS b, Samantha A. Shugarman MS c, Judy H. Burleson MHSA d, Christopher L. Moore MD e, David Seidenwurm MD f
Objective

• Develop quality measures to improve completion of evidence-based follow-up recommendations for actionable incidental radiology findings.
Patient-level factors influencing adherence to follow-up imaging recommendations

Andrés Ángel-González Calvillo M.D., Laura Caroline Kodaverdian G., Roxana Garcia M.D., M.P.H., Daphne Y. Lichtensztajn M.D., Matthew D. Bucknor M.D.

Show more


Socioeconomic disparities in surveillance and follow-up of patients with thoracic aortic aneurysm

Michael Shang 1, Gabe Weininger 1, Makoto Mori 1, Arianna Kahler-Quesada 1, Eileen Degile 1, Cornell Brooks 1, Sameh Yousef 1, Matthew Williams 1, Roland Assi 1, Annar Geirsson 1, Prashanth Vallabhaiosyula 1

Affiliations + expand
PMID: 34873754 DOI: 10.1111/jocs.16173

Abstract

Background: Thoracic aortic aneurysm (TAA) is a significant risk factor for aortic dissection and rupture. Guidelines recommend referral of patients to a cardiovascular specialist for periodic surveillance imaging with surgical intervention determined primarily by aneurysm size. We investigated the association between socioeconomic status (SES) and surveillance practices in patients with ascending aortic aneurysms.

Methods: We retrospectively reviewed records of 465 consecutive patients diagnosed between 2013 and 2016 with ascending aortic aneurysm ≥4 cm on computed tomography scans. Primary outcomes were clinical follow-up with a cardiovascular specialist and aortic surveillance imaging within 2 years following index scan. We stratified patients into quartiles using the area deprivation index (ADI), a validated percentile measure of 17 variables characterizing SES at the census block group level. Competing risks analysis was used to determine interquartile differences in risk of death before follow-up with a cardiovascular specialist.

Results: Lower SES was associated with significantly lower rates of surveillance imaging and referral to a cardiovascular specialist. On competing risks regression, the ADI quartile with lowest SES had lower hazard of follow-up with a cardiologist or cardiac surgeon before death (hazard ratio: 0.46 [0.34, 0.62], p < .001). Though there were no differences in aneurysm size at time of surgical repair, patients in the lowest socioeconomic quartile were more frequently symptomatic at surgery than other quartiles (92% vs. 23%-38%, p < .001).

Conclusion: Patients with lower SES receive less timely follow-up imaging and specialist referral for TAAs. Resultina in surgical intervention only when alarming symptoms are already present.
Materials & Methods

• A multistakeholder TEP was assembled
• Project scope: Noncritical AIFs
• Goal: Encourages practices to develop and implement systems ensuring appropriate communication and follow-up to completion.
TEP Member Selection

Multi-disciplinary

Inclusive of patients

Diverse panel (gender, ethnicity, location, etc.)

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<th>Panelist ID</th>
<th>Member Category</th>
<th>Stakeholder Representation</th>
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<td>Member</td>
<td>Payer</td>
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Results

Nine measures developed

- 4 outcome measures
- 5 process measures follow-up to completion.
Outcome Measures

Closing the loop on completion of follow-up recommendations for (any) actionable incidental findings

Closing the loop on completion of follow-up recommendations for actionable incidental findings of AAA

Closing the loop on completion of follow-up recommendations for actionable incidental findings of pulmonary nodules

Patients’ cancer detection rate with follow-up imaging (surveillance measure)
## Process Measures

<table>
<thead>
<tr>
<th>Communication and tracking of AIFs:</th>
<th>Specificity of follow-up imaging recommendations for actionable incidental findings (lesion descriptor, modality, time interval)</th>
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<tbody>
<tr>
<td></td>
<td>Inclusion of available evidence or guidelines</td>
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<tr>
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<td>Communication of AIFs to the practice managing ongoing care</td>
</tr>
<tr>
<td></td>
<td>Identifying when AIFs have been communicated to patients</td>
</tr>
<tr>
<td></td>
<td>Employing tracking and reminder systems for AIFs</td>
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</tbody>
</table>
The Patient Voice

Include direct communication from radiology to patients

Consider patient factors that constitute exceptions
Radiologists and emergency physicians agree that:
- IFs present an increased risk
- The occurrence of closed-loop communication and AIF tracking

Disagree that:
- The clinician responsible for communicating the AIF

Radiologists and non-clinical healthcare professionals agree that:
- IFs present little to moderate risk
- Communicating AIFs lies with the primary care or ordering provider

Disagree that:
- There is widespread accessibility of AIF follow-up recommendation tracking

Summary of the measure development process to improve radiologist awareness and utilization of measurement tools regarding AIF.
Measure Pathway

- Literature Search
- Quality Measure Environmental Scan
- Evidence Grading
- Business Case Draft

Information Gathering

- Recruitment
- Panel Finalization
- Panel Meetings
- Specification Refinement

Technical Expert Panel (TEP)

- Period #1: Importance and Feasibility
- Period #2: Specification Updates and Test Findings

Public Comment

Measure Finalization

- Adoption into Routine Practice
- ACR stewardship

WE ARE HERE
Impact of Follow-up Tracking on Disparities of Care
Communication and follow-up of actionable incidental findings: ED Issues

- Clinicians, and patients, are justifiably focused on acute life or limb threat
  - May cause neglect of communication about IFs
  - Patient may not be able to “hear” at that time
- No ongoing relationship with patient
- 24/7/365 – 2am on a Saturday not always a good time for communication
Incidental Findings: A Survey of Radiologists and Emergency Physicians

Christopher L. Moore, MD, Nadja Kadom, MD, David Seidenwurm, MD, Gregory Nicola, MD, Nancy Fredericks, Samantha Shugarman, MS, Arjun Venkatesh, MD

How much risk do you feel recommendations for the follow-up of incidental findings represent to you as a clinician?

- A great deal of risk
- A lot of risk
- A moderate amount of risk
- A little risk
- No risk at all
- Unsure

Rad Responses
EP Responses
Incidental Findings: A Survey of Radiologists and Emergency Physicians

Christopher L. Moore, MD, Nadja Kadom, MD, David Seidenwurm, MD, Gregory Nicola, MD, Nancy Fredericks, Samantha Shugarman, MS, Arjun Venkatesh, MD

Journal of the American College of Radiology Volume 18, Issue 10, October 2021, Pages 1373-1374
Incidental Findings: A Survey of Radiologists and Emergency Physicians

Christopher L. Moore, MD, Nadja Kadom, MD, David Seidenwurm, MD, Gregory Nicola, MD, Nancy Fredericks, Samantha Shugarman, MS, Arjun Venkatesh, MD
• Collaboration between ACR and the American College of Emergency Physicians (ACEP)
• Formed 15 member panel: 5 EPs, 5 radiologists, 5 quality/safety/IT/patient
• Modified Delphi process
• Currently under review at JACR and by ACEP Board
• Consensus on report elements and location:

<table>
<thead>
<tr>
<th>Report elements</th>
<th>Report location</th>
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<tbody>
<tr>
<td>presence of an actionable incidental finding (AIF)</td>
<td>Both body and summary</td>
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<tr>
<td>lesion size/location/characteristics</td>
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<tr>
<td>lesion characteristics</td>
<td>Body only</td>
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<tr>
<td>follow-up modality and timeframe</td>
<td>Summary only</td>
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<tr>
<td>evidence supporting recommendations (if available)</td>
<td>Summary only</td>
</tr>
<tr>
<td>documentation of notification/communication</td>
<td>Summary only</td>
</tr>
<tr>
<td>patient facing language</td>
<td>Summary only</td>
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</table>
Consensus on areas:

- Communication of findings with the patient (verbal and written D/C)
- Communication between providers
- Follow-up and tracking systems
- Take home consensus is that this is a systems issue
Catching Those Who Fall Through the Cracks: Integrating a Follow-Up Process for Emergency Department Patients with Incidental Radiologic Findings


Study objective: Abnormal findings unrelated to the indication for testing are identified on emergency department (ED) imaging studies. We report the design and implementation of an electronic health record–based interdisciplinary referral system and our experience from the first 13 months of ensuring that patients with incidental radiology findings were connected with the appropriate outpatient surveillance.

Results: Over the first 13 months after implementation, 932 ED patient visits had critical radiology alert referrals, for a total of 982 incidental findings. The primary outcome (confirmed post-ED communication and documented follow-up plan) was attained in 888 (95.3%, 95% confidence interval [CI] 93.9% to 96.6%) ED patient visits with confirmed post-ED communication and documented follow-up plans. The team was unable to contact or confirm follow-up with 44 (4.7%, 95% CI 3.4 to 6.1) patients by telephone or through the health care system’s electronic communication tools.
Follow-up of Incidental Radiology Findings: Is the Cart Ahead of the Horse?

Charissa B. Pacella, MD; Donald M. Yealy, MD

There are potential negative consequences to further action on all incidental findings: added radiation exposure, patient anxiety, unnecessary procedures with attendant complications, and health care costs—each one of these magnified if the “finding” is spurious or not truly associated with an early recognition benefit. In addition, the lack of standardized classification and reporting confounds our ability to accurately estimate risk versus reward.

This leaves us wondering: are we building carts now without the horse? To drive meaningful improvement in this area, we need to know whether processes designed around incidental findings benefit patients, society, or both. Although directly answering outcome questions is not feasible, we can better estimate risks and rewards. The first step is to use a uniform, validated classification system for incidental radiology findings. The next step is to determine the most appropriate follow-up. Once these pieces are in place, we will have a stronger foundation to investigate improvement opportunities that work to reduce disparities and extend beyond single or limited sites.
"If you can't measure it, you can't improve it."

Peter Drucker
Moore Foundation (no relation!)

- Funded in fall of 2021 to develop an *equity measure* of the follow-up of incidental findings (specifically ED chest CT incidental lung nodules) will provide a *within-institution* measure of equity in this space, providing a metric for improvement.
### Overview of measure(s)

**Actionable Incidental Findings Equity Measures**

**Description:** Proportion of ED chest CT Reports with Actionable Incidental Findings, for which follow up is recommended

**Numerator:**
1) # of patients having timely follow up imaging  
2) Time to Initial Cancer Diagnosis (days)  
3) Proportion of late stage (III/IV) cancers

**Denominator:**
Number of ED chest CTs with actionable incidental findings for which follow-up is recommended; AND  
Patient 18 years of age or older  
Excluding Known Active/Prior Malignancy, Do Not Resuscitate Orders, Undergoing Palliative Care

- Within-institution equity measures
  - Black/Latinx vs. White/non-Latinx  
  - Commercial insurance vs. Medicaid/self pay  
  - Low vs. high socioeconomic status (by zip code)
ED Chest CTs

- ED Chest CTs in one of our 3 main EDs 2014 to present
- 26,545 CTs
- Follow up recommendations
- Actual follow-up
- Actual cancers: Connecticut tumor registry (CTR)
Insurance

- 26,545 CTS analyzed
  - 26,444 payor instances identified via chart review in EPIC
  - Insurance vs. CT Date alignment Discrepancies
  - For multiple insurances in chart at time of CT, the one with the most likely payor was used
- Payor prioritization
  - Medicare>Federal>Medicaid>Private>Other

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<th>Insurance Payer Category</th>
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</table>

Insurance Types

- Commercial: 34%
- Federal: 3%
- Medicaid: 0%
- Medicare: 28%
- Self pay/Uninsured: 1%
- Other/unknown: 34%
## Yale ED Ethnicity Distribution

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### Yale Ethnicity Distribution 2014-2021

- Hispanic or Latino: 83%
- Not Hispanic or Latino: 17%
- No Matching Concept: 0%
Race and Ethnicity

Hispanic or Latino Ethnicity by Race

- Count: 1497
- White: 328
- Black or African American: 43
- Native Hawaiian or Pacific Islander: 17
- Asian: 8
- American Indian or Alaska Native Race: 2492
- Other Race: 0
- No matching Concept: 23
- Unknown: 60
- Race not stated: 0

Not Hispanic or Latino Ethnicity by Race

- Count: 14081
- White: 6931
- Black or African American: 11
- Native Hawaiian or Pacific Islander: 326
- Asian: 352
- American Indian or Alaska Native Race: 358
- Other Race: 4
- No matching Concept: 24
- Unknown: 108
- Race not stated: 0
Natural Language Processing (NLP)

- Needed to define the denominator
  - Patients with CT reports that specify a need for follow-up
    - We are not looking at actual images, or parsing reports that may need follow-up based on nodule description or characteristics
  - “Hard” follow-up – follow-up no matter what
  - “Conditional” follow-up – need for f/u based on risk factors (particularly smoking)
- Exceptions that NLP may be able to help with:
  - Active cancer being treated/ followed
  - CT that shows actual cancer or metastatic disease rather than just a “suspicious” nodule
Progress – NLP Denominator

Confusion Matrices

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Intended use and impact

- We feel this measure is likely to be most useful as part of the Outpatient Quality Reporting (OQR) Program
  - Mandated by Tax Relief and Healthcare Act of 2006
  - Requires hospitals to submit data on measures of quality of care in the outpatient setting
  - Failure is a 2% reduction in Outpatient Protective Payment System (OPPS)
- More appropriate than MIPS as this is systems issue
- Current OQR measures do not include an equity measure
Anticipated challenges

• Data:
  • Accurate determinations from the electronic health record (EHR): Race/ethnicity; insurance; SES
  • Follow-up if outside of institution
  • Determination of cancer – pre-existing, time/stage at diagnosis
• Scalability outside of our institution
• Incorporation, stewardship, and sustainability into quality measure framework
• Incentivizing use
Take Home

- AIFs are common in imaging – and there is a LOT of ED imaging
- There are large disparities in the follow-up of AIFs
  - Location based (ED, inpatient vs. outpatient)
  - Race/ethnicity/insurance/SES
- Significant patient safety/medicolegal issue
- **Systems Issue**
- Looking at measuring and quantifying discrepancies
Questions or Comments?
Q & A