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**Academy CIBR Call on Clinical Effectiveness and Outcomes Research**

November 6, 2020

3:30-4:30PM EST

Call Summary

**Discussion Leads:**

**Hedvig Hricak, MD, PhD, Dr(hc)**, Chair, Academy's Coalition for Imaging & Bioengineering

**Christian Eusemann, PhD**, Vice President, Research & Innovation, Siemens Healthineers

**Ankur Pandya, PhD, MPH**, Associate Professor of Health Decision Science, Harvard T.H. Chan School of Public Health

**Pari Pandharipande, MD, MPH**, Director of the Institute for Technology Assessment at MGH, Associate Professor of Radiology, Harvard Medical School  
**Pina Sanelli, MD, MPH, FACR**, Professor, Institute of Health Innovations and Outcomes Research at Feinstein Institutes for Medical Research, Vice Chairman of Research, Executive Director, Imaging Clinical Effectiveness and Outcomes Research (iCEOR), Professor, Radiology, Donald and Barbara Zucker School of Medicine at Hofstra/Northwell

**Call Participants:**

Katherine Andriole, PhD  
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Brad Keller, PhD  
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John Haller, PhD  
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Chip Truwit, MD  
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**Call Goal:** Academy leadership has been discussing the shifting healthcare environment and the need to showcase the value of imaging within the clinical care pathway. There may be needs or opportunities to opening this discussion to the larger Academy membership for engagement.

- Cost-effectiveness and Outcomes Research (CEOR) in Medical Imaging is growing in importance due to a transition to value-based healthcare and the consolidation of hospitals. Proving the "effectiveness" of new or existing imaging is at the core of demonstrating the value of imaging to determine best practices to optimize patient outcomes.
- NIH funding availability for CEOR is very, very poor. In general, CEOR seems to be viewed as less exciting than the development of new imaging techniques or treatment. While the NIH had some CEOR related initiatives 10+ years ago (see links below), funding level for CEOR in recent years have been extremely low.
  - <https://jamanetwork.com/journals/jama/article-abstract/185972>
  - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4196319/>
  - <https://jamanetwork.com/journals/jama/article-abstract/2770757>
- QUESTION: Is it time for our community to increase awareness of this field? Is this something we could convince the funding agencies to support?

**Experts & Presentations:** Each expert spoke on their chosen topic for 5 minutes and presented slide decks for reference.

**Slides & Recording available here:**

<https://www.dropbox.com/sh/evs9683t650t22j/AACboGqR6eq1fU85V4Ye4mwaa?dl=0>

### **CEA in the USA: A Quantitative Approach to Measuring the Value of Imaging**

**Ankur Pandya, PhD, MPH**

- Big picture – Cost-effectiveness analysis can be used to get more “bang for buck” in population health.
  - The status quo has us putting money into our healthcare system and producing “health”. Cost effectiveness evaluations can help prioritize our interventions for better health outcomes.

- If we use cost effectiveness, we are able to target the best interventions, that are more cost effective, and still produce greater healthcare outcomes.
- Incremental Cost-Effectiveness Ratio (ICER)
  - Introduced by Milt Weinstein in 1977.
  - This is how we quantify the value in the healthcare system.
- If our goal was to maximum healthcare in our population based on Quality Adjusted Life Years (QALY), we would start by identifying a list of interventions and look at their value (highest to lowest) and effectively be able to go down the list and maximize the interventions that are most cost effective.
  - See value equation in slide deck or call recording.
- Use of simulation models to generate the cost and QALY results used to calculate cost-effectiveness ratios:
  - These are very compatible with diagnostic testing, information gathering strategy.
  - Radiology fits very well into these models and they can be adapted to any imaging test.
  - These models can be used to see what health and cost outcomes would look like under different policies.
    - They can be made to compare unique imaging strategies; the model will track QALY and cost across your different strategy.
- Value Based Policies & Cost-Effectiveness Analysis
  - As this country continues the transition from the volume of its healthcare to its value, these two concepts need to work together.
  - They already share the same equation of outcomes/cost.

## Imaging and Value in Cancer Care: A Policymaker's Lens

### Pari Pandharipande, MD, MPH

- Ex: You are working in the ER when a patient comes in with abdominal pain, before the CT is done, you are confident you know what the issue is already. Now the imaging has been ordered and it only confirms what you already knew.
  - That is the problem.
  - Study was done in 4 ER's where they looked at this exact question:
    - ER physicians were asked before and after their patient's CT scan about their leading diagnosis.
    - Found that in 1 of 2 patients, their leading diagnosis changed after the CT scan. You could say that this speaks to value, that CT has valued impact on diagnosis, but does this affect the population?
  - Looking at 6 tiered levels of evidence in diagnostic testing (see slide deck), "Impact on Society" has a direct correlation to cost-effectiveness.
    - Level 6 studies that focus societal impact and the cost-effectiveness of imaging procedures.
    - If you do not discuss the cost of an imaging procedure, then its feasibility does not come into play. This is the importance of cost-effective analysis.
- Policymaker Lens:
  - Cost-Effectiveness: Goal
    - Take the resources in a society and divide them up in such a way that you maximize the Quality Adjusted Life Expectancy (QALE).
    - How do you optimize resource allocation?
  - Question: Is MRI a cost-effective approach for pancreatic cancer screening in high risk patients?
    - What does the policy-maker need to know to answer this question?
      - Cost of MRI Program, not just the MRI itself.
      - Cost difference, MRI Program vs. Alternatives (No screen)
      - Cost vs. QALY – aka – Incremental Cost-Effectiveness Ratio

- This answers: How much extra life will this MRI screening provide and how much does it cost?
- Final question for policy-maker – should they fund this program?
  - Radiologists are more focused on the imaging program, BUT, the policy-maker is going to compare all programs in a wide range of areas, even outside of imaging.
  - But how can they make that comparison?
    - ICER – higher ICER (low bang for buck), lower ICER (high bang for buck/likely to be funded)
- Willingness to Pay Threshold – threshold that defines decision to fund something with a higher or lower ICER.
  - United States does not currently have a hard threshold for this decisions.
    - Most common example of a rigid threshold for funding decisions can be seen in the UK.
- Criticism of Cost-Effective Analysis:
  - Concept that is simple, too simple in some ways, money allocated to healthcare and you maximize the QALE of the population.
  - There are cases where societies want to spend more money on certain groups – ex: value on the life of children vs. adults.
- Conclusion: Cost Effective Analysis provides and advantage to the imaging community.

## **Paving the Pathway to Clinical Effectiveness and Outcomes Research in Radiology**

**Pina Sanelli, MD, MPH, FACR**

- Main Goal of the Imaging Clinical Effectiveness and Outcomes Research (iCEOR) Program: demonstrate the value of imaging, inform clinical practice and health policy decisions that improve patient care as well as population health.
- Clinical Care Pathways:
  - Can be very complex, representing from the time the patient enters the pathway to the time they leave.
  - Includes all potential encounters that affect the costs.
    - Diagnosis, Rehab, Treatment, Imaging, Follow-up, Etc.
- Models of the Clinical Care Pathways:
  - In these models, it is the imaging strategies that differ, when we compare them with what is being done in practice.
  - Might be some treatment options that stem from those imaging strategies, that then move into the outcomes.
- Main crux of clinical effectiveness: we are weighing the benefits of a strategy vs. the risks.
- Implementation in Health Policy: the outcomes of CEA can impact decisions in the implementation of health policy.
  - See slides & recording for Incremental Cost/Incremental Effectiveness Plain
  - Their study showed that 97% of iterations fell into the High Effectiveness and Low-Cost quadrant – typically when a strategy falls into this quadrant – it is chosen as the strategy.
  - The different scenarios in this plain, showed that a Maximum Acceptable ICER is needed, and missing, as Dr. Pandharipande mentioned in her presentation.
    - AKA the Willingness to Pay Threshold
- Shaping the future of Radiology:
  - Clinical Effectiveness will inform healthcare providers, patients, and payers what the value of imaging in clinical care is.

- Radiology Organizations that have contributed to the study of Clinical Effectiveness Outcomes Research:
  - American Institute for Radiologic Pathology
  - Radiological Societies of North America
  - American Society of Neuroradiology
  - American Roentgen Ray Society
  - Association of University Radiologists

### **Possible Next Steps:**

- Increased funding level for Medical Imaging related CEOR in both NIH and PCORI. Dedicated CEOR for Medical Imaging RFP. In this environment with the escalating healthcare costs on an unsustainable trajectory, it is timely to support imaging cost-effectiveness and outcomes research to demonstrate the value of imaging.
- Further support in CEOR for medical imaging education. Understanding cost-effectiveness of imaging is critical in non-Radiology specialties ordering imaging studies for patients for appropriate utilization of imaging in order to limit over-utilization and under-utilization of imaging studies that can improve patient outcomes and perhaps reduce long-term healthcare spending.
- Additional training programs are needed for Radiologists and other imaging researcher to perform this work. Currently available programs are RSNA's CERT and VOICE programs and the Introduction to Outcomes and Comparative Effectiveness Research program that is supported by the Neiman Health Policy Institute and hosted during the ACR's AIRP course.
- Academy and CIBR should engage CEOR leaders from large scale IDN's and Payors
- Jointly develop a strategy on how to broaden the perception of CEOR beyond CEA. This would be in the areas of implementation sciences, work-flow efficiency, operating costs on a health institution level, and importantly health policy.
- Maybe as kickoff a virtual workshop with expert speakers such as Pina Sanelli, MD, MPH from Northwell Health and Ankur Pandya, PhD, MPH from Harvard School of Public Health
- Development of a task-force (CBIR, Academy) with NIH leaders to support these efforts.
- Development of scientific review groups with expertise in CEOR such as Radiologists, decision scientists, health economists, operation engineers, etc...
- Effort to increase the awareness of the importance of imaging clinical effectiveness and outcomes research on a national funding level (i.e. NIH, PCORI, etc...)
- NIH/PCORI/AHRQ support for a National Collaboratory for resource sharing and networking with the limited expertise in the country (and perhaps internationally?).

In order to hear this call in its entirety, and view the slide decks, visit:

<https://www.dropbox.com/sh/evs9683t650t22j/AACboGqR6eq1fU85V4Ye4mwaa?dl=0>