Quality in Echocardiography: why should we care, how should we measure it?

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Disclosure: none
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What is quality?

- How the recipient of a product or service views the product or service over time
- Meaning of quality differs depending on the circumstances
- Quality is whatever the customer perceives it to be
  - Exceeding customer expectations
  - Customer driven
- Measureable characteristics
Quality characteristics

- Measurable
- Responsiveness
- Reliability
- Competence
- Completeness
- Credibility
- Availability
- Timelinessness
- Safe
- Accurate
- Communication
- Reasonable price
Imaging shows highest cumulative growth in services per beneficiary (1999–2003)

Note: Includes all services in physician fee schedule
Source: MedPAC analysis of Medicare claims data
“This rapid growth in spending raises questions about whether all the services are appropriate”
MEDPAC recommendations to reduce cost

1. Lower payment

“We believe that the best way to address this behavior ... is to examine whether the pricing of imaging services by Medicare is accurate.”

2. Include nuclear medicine and PET under the Ethics in Patient Referrals Act

3. Establish standards for all providers who bill Medicare

The Congress should direct the Secretary to set standards for all providers who bill Medicare for performing diagnostic imaging studies. The Secretary should select private organizations to administer the standards.
An alternative method to reduce the costs of imaging

Reduce costs by excluding imaging that does not meet **quality** standards.
Quality in healthcare follows the same definitions

• Who are the customers
  – Patients
  – Payers
  – Care givers

• Perception of the service – different for different customers
  – Correct diagnosis, effective treatment, good experience, fits needs and preferences of customer, does not cause harm, no delays

• Measure (evaluate)
  – Goal is to identify deficiencies and improve
  – Improvement of
Measuring quality in health care

- **Patient experience**
  - Are they satisfied with level of care?

- **Process of care measures**
  - Are the providers following guidelines to provide appropriate care?

- **Risk adjusted outcomes**
  - How are the patients doing?

- **Accreditation not sufficient**
  - Identifies outliers (those deficient) but provides little info on quality of care delivered
  - Static view rather than continuous view
most agree that measuring and improving quality of echo labs is important

• Everyone aims to provide the best service possible
• What are the quality benchmarks for echo labs?
  – Little data about where quality gaps exist
  – Little data to identify elements of quality that lead to better patient care and outcomes
  – Mostly anecdotal or expert opinion
  – Quality guidelines for echo labs perceived to be lacking
How can we measure quality in the echo lab?

**FOCUS ISSUE: CARDIAC IMAGING**

Achieving Quality in Cardiovascular Imaging
Proceedings From the American College of Cardiology–Duke University Medical Center Think Tank on Quality in Cardiovascular Imaging
Developed in Collaboration With the Cardiovascular Imaging Collaborative Quality Work Group, American College of Radiology, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Coalition of Cardiovascular Organizations, Heart Failure Society of America, Heart Rhythm Society, Intersocietal Accreditation Commission, Society of Atherosclerosis Imaging and Prevention, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, and Society for Vascular Medicine and Biology

**GUIDELINES AND STANDARDS**

American Society of Echocardiography Recommendations for Quality Echocardiography Laboratory Operations

Journal of the American Society of Echocardiography 2011; 24:1-10

JACC 2006;48:2141-51

JACC CV Imaging 2009;2:231-40
Levels of quality

*setting the bar correctly*

- **Poor quality**
  - Goal is to move labs from this level

- **Minimum quality** ---- **ASE GOAL**
  - Achievable by the average practitioner

- **Highest quality**
  - “Best practices”
Framework for Evaluating Quality of CV Imaging

- Appropriate Patient Selection
- Diagnostic quality images
- Reproducibility
- Accuracy
- Interpretability
- Clarity / Definitiveness
- Completeness
- Timeliness
- Clinical integration

Picard et al, JASE 24:1-10; et al, Douglas et al JACC 2006;48:2141-51
Echo Quality Principles

- Assuring proper patient is imaged
- Assuring proper equipment is used
- Assuring proper test is performed
- Assuring qualified people do the echo
  - Assuring appropriate images included
- Assuring qualified people read the echo
- Assuring timely, accurate report is available to referring MD
  - Assuring interpreters are available to discuss results if concerns or questions
- Assuring processes in place for QA of all aspects of lab operations
Lab structure

examples of quality measures

• The Lab
  – ICAEL accredited
  – Mechanism in place for ordering urgent echoes
• Equipment
  – Capable of performing M-mode, 2D, color/spectral (flow + tissue)/continuous wave Doppler
    • ECG/physio, depth/flow calibrations on the display
    • Split/quad screen format if perform stress
    • Full range of transducers including non-imaging CW
      – Multiplane if TEE
    • Harmonic imaging
    • Digital storage compatible with DICOM standards
    • Image retention as per state regulations
      – contrast agents, IV s, resuscitation equipment
    – Preventive maintenance documented
Lab structure

*examples of quality measures*

- **Sonographer**
  - Credentialed through ARDMS or CCI

- **Physician**
  - Level II training in echo
  - NBE certification desired
  - Physician director – level III
  - At a minimum, the CMS Physician supervision rules must be followed
Image Process: appropriate patient selection

**Examples of quality measures**

- Labs should track rates of appropriate and inappropriate echoes
  - Annual audits
- Lab staff should understand echo AUC
  - Annual review with all staff
- Process to reduce inappropriate referrals
  - Incorporate into ordering procedure
  - Educate referring MDs
- Active application of AUC to selected procedures
  - TEE
  - Stress echo
- Access
  - Track wait time and processes to reduce
- Test selection
  - Track if proper components of test are being performed
Image Process: Image Acquisition

Examples of quality measures

- Imaging protocols (ICAEL required)
  - Recommended images
    - Comprehensive TTE, limited TTE, stress, complete TEE
  - Includes quantitation
    - LVEF, RVSP, chambers, valves
- Uninterpretable studies
  - Track rate
  - QA policies to minimize uninterpretable studies
    - Written policies for contrast use
Components of a complete interpretation

- Key elements
  - List varies by study type
  - Includes synthesis or summary of findings
  - Correlation with reason for study
  - Comparison to most recent echo to highlight if findings new, progressive, unchanged or resolved
### Table 4 Recommended TTE findings

- Left ventricle
- Left atrium
- Right atrium
- Right ventricle
- Aortic valve
- Mitral valve
- Tricuspid valve
- Pulmonic valve
- Pericardium
- Aorta
- Pulmonary artery
- Inferior vena cava
- Pulmonary veins
- Interatrial septum
- Interventricular septum

### Table 5 Recommended TTE measurements

- LV internal dimension at end-diastole
- LV internal dimension at end-systole
- Posterior wall thickness
- Interventricular septum
- Left atrial anteroposterior dimension
- Aortic root
- Ascending aorta
- Valve and Doppler measurements
- LV volumes
- Left atrial volumes
- LV ejection fraction
- RV size
- RV systolic function
- RV systolic pressure
- Regional LV function
  - Segment-by-segment assessment: normal, hypokinetic, akinetic, dyskinetic, not visualized
- LV diastolic function
Image Process: Results communication

examples of quality measures

• Echo report
  – Key elements
    • Cardiac structures and measurements
      – Uniform outline, common language
    • Demographics, echo findings, summary
    • Inadequately visualized structures noted
  – Amendments
    • Clearly identified, signed and dated
    • Key difference in summary
    • Notify ordering MD
  – Policies for security and system access
    • Including log of name, date and time of all who reaccess or modify electronic reports
Image Process: Results communication

*examples of quality measures*

- Timeliness of reports
  - Stat
    - interpreted and communicated immediately
  - Routine
    - Within 1 business day
  - Notations by sonographers should never be used for clinical management
- Critical Values
  - Policy for reporting/communicating
  - Documentation of communication with referring MD
  - Tracking compliance of reporting critical values
QA

descriptions of quality measures

• Image Acquisition
  – Reviews of sonographer’s TTE and MD’s TEE studies
• Completeness and quality
  – 90% of the component images must be present
  – On at least 90% of the image sets all components necessary for valve quantitation must be present

• Image interpretation
  – Quarterly
    • interpretation reviews
  – Annual
    • Cross modality comparisons
  – Interobserver variability
    • LVEF quantitation / valve regurgitation

• Results discussed at annual lab meeting
What do we need?

- Demonstrations that quality matters
  - Studies that show that outcomes/patient experience/referring MD satisfaction are better in echo labs that meet more of the measures of quality
- Demonstration that quality does not cost more
- Or
- That the extra cost of quality results in improved outcomes
Evidence
NBE certification is a marker of quality!

• Heidenreich (ASE funded outcomes grant)
  – Measuring quality of echocardiography using predictive value of LVEF
    • Is accuracy of LVEF associated with echo training and experience?
      – LVEF and survival compared for different physician groups based on experience
      – Relationship between LVEF + survival strongest for board certified echocardiographers
Evidence

QA works in echo!

- Johri et al, JACC CV Imaging, 2011;4:821-829
  - Teaching intervention reduces interobserver variability in LVEF assessment
More evidence for QA

Improvement in Diastolic Function Following Implementation of Quality Improvement Initiative
Johnson et al, JASE 2011;24;1169-79
“The ‘holy grail’ is improved quality of care, but this is difficult to assess in imaging because the patient outcomes are rarely directly dependent on the performance of a diagnostic test. Quality is our issue as healthcare providers, and one for which the price of not leading can be exorbitant. We must learn to measure quality effectively, and payors must be convinced that they should seek to reward value over volume.”

Quality in echocardiography
the future

• What will patients demand/expect?
  – Simple benchmarks
    • Accreditation / Certification
    • Experience
    • Other markers of quality

• What will payers demand/expect?
Benign Hypertension, without comorbidity

Individual Cardiologists
Rate of ECHO use per 100 Episodes
7/1/2009 - 6/30/2010
Rate = Episodes with ECHO / Total ETG Episodes

211 individual Cardiologists (47%) have rates of Echo use above the network average. (N=453)
The average episode load per individual Cardiologist in this analysis is 25.
Individual Cardiologists with rates above network average have an average episode load of 23.
Future paradigm
“Quality metrics”

• Ongoing quality measurement and feedback
  – Common data elements
  – National benchmark data
• External mechanism to improve accuracy / reliability
• New “Quality Metrics”

GUIDELINES AND STANDARDS

American Society of Echocardiography
Recommendations for Quality Echocardiography
Laboratory Operations
Why should you care about echocardiography quality?

• Someday payment will depend on quality

• All echocardiography should meet a high standard

• It has the potential to improve health outcomes
The end
With accelerating calls to reduce medical spending, imaging procedures are under increased scrutiny

- Providers and payers are focusing on how to manage increased echo utilization
  - Payers reduce reimbursement, create barriers
- But focus should be on value/quality
  - Maximize quality, minimize cost to health care system
  - Insuring every echo is appropriate and done well
  - Critical task for echocardiographers as a counter to reimbursement cuts and increased administrative burdens
Is there a quality problem with medical imaging?

- Anecdotes, referrals from “elsewhere”
  - 52 yo M with embolic stroke referred for PFO closure based on TTE. TEE at start of procedure reveals mobile 1 x 1.5 cm AV vegetation.
  - 58 yo M referred for PMV for MS by TTE. Intra-procedural TTE shows mobile non-stenotic MV, severe MR.
  - 68 yo F referred to cardiac surgery with pulmonic valve tumor by TEE. Review of images shows reverberation artifact and no tumor.

- Governmental (April 8, 2011)
  - Medicare Payment Advisory Commission recommends that CMS require prior authorization for MDs who order more advanced diagnostic imaging tests than their peers. Also recommends lower payments for successive imaging performed in same session.
Top 10 Healthcare Quality Issues for 2011

1. **Imaging** - radiation exposure and overutilization
2. Dialysis mortality
3. Central line infections
4. Patient involvement in care
5. Electronic health record adoption
6. Transparency
7. Medical errors
8. Nurses’ role
9. SGR cuts
10. Data breaches
What is the evidence that quality matters?

*Lessons from the business world*

- **post-WWII Japan**
  - Reputation for cheap goods, poor quality
  - Only economic successes were disposable goods
- **US specialists recruited to improve their quality**
  - Quality becomes a religion in Japan
  - By the 1980’s Japan produced the highest quality products (auto, electronic, etc)
    - Over take many US businesses
  - In the 1990’s focus on quality in the US intensifies
    - IBM, Ford, etc
Quality is a marker of value

• For important services if the cost equivalent, most customers prefer (higher) quality products
  – Perceive as a better value for their money

  – Healthcare model
Quality of Medical Care
Institute of Medicine definition (NEJM 1990;322:707-12)

• The degree to which health care systems, services, and supplies for individuals and populations increase the likelihood for desired health outcomes in a manner consistent with current professional knowledge.
How did quality initiatives in echo compare in 2009?

<table>
<thead>
<tr>
<th>Table 1. Steps In Quality of Cardiovascular Imaging by Subspecialty/Society</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Laboratory structure</strong></td>
</tr>
<tr>
<td>Accreditation</td>
</tr>
<tr>
<td>Tools for achieving lab accreditation</td>
</tr>
<tr>
<td>Technologist credentialing</td>
</tr>
<tr>
<td>MD credentialing</td>
</tr>
<tr>
<td><strong>Patient selection</strong></td>
</tr>
<tr>
<td>Appropriateness criteria (AC)</td>
</tr>
<tr>
<td>Tools for evaluating AC</td>
</tr>
<tr>
<td>Tools for implementing AC</td>
</tr>
<tr>
<td><strong>Image acquisition</strong></td>
</tr>
<tr>
<td>Imaging protocols</td>
</tr>
<tr>
<td><strong>Image interpretation</strong></td>
</tr>
<tr>
<td>Standards for variability</td>
</tr>
<tr>
<td>Standardized image set</td>
</tr>
<tr>
<td><strong>Results communication</strong></td>
</tr>
<tr>
<td>Key data elements</td>
</tr>
<tr>
<td>Structured reporting</td>
</tr>
<tr>
<td>Timeliness guidelines</td>
</tr>
<tr>
<td><strong>Improved outcomes</strong></td>
</tr>
<tr>
<td>Metrics for measuring outcomes</td>
</tr>
<tr>
<td>Patient satisfaction</td>
</tr>
</tbody>
</table>

Assessments of status were provided by each society, and not otherwise verified.

C = complete; ACC = American College of Cardiology; ACR = American College of Radiology; ASNC = American Society of Nuclear Cardiology; ASE = American Society of Echocardiography; IP = In process/planned; NASCI = North American Society for Cardiovascular Imaging; SCAI = Society for Cardiovascular Angiography and Interventions; SCCT = Society of Cardiovascular Computed Tomography; SCMR = Society for Cardiovascular Magnetic Resonance; and SVM = Society for Vascular Medicine.
Evidence
Does size (volume) matter?

• Huesch, Health Services Research 2011;46:1-26
  – MassDAC review of 13,000 CABG
  – Hospital volume and surgeon X hospital interaction influence outcome

• Arthritis & Rheumatism (6/7/11)
  – Joint replacement risks higher at lower volume hospitals

• American Association of Thoracic Surgery
  – Good CABG outcomes
    • independent of program or surgical volume
    • Strongly correlated when focus on quality and process compliance

• No data yet from echo labs