

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 what ever the customer perceives it to be
 - Exceeding customer expectations
 - Customer driven
- Measureable characteristics

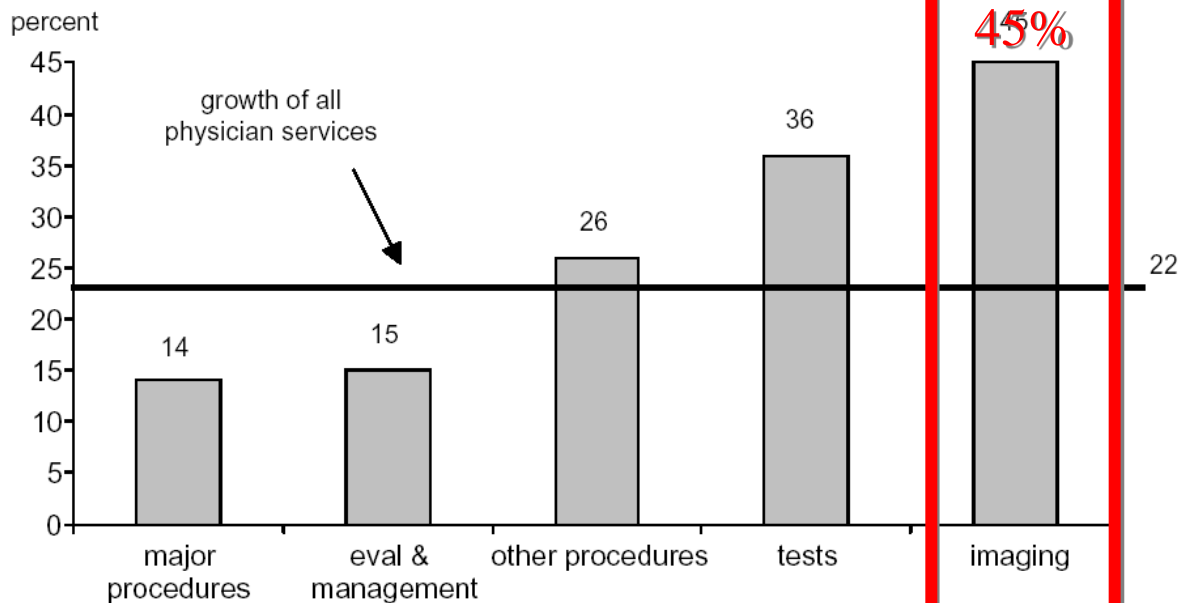


Quality characteristics

- Measurable
- Responsiveness
- Reliability
- Competence
- Completeness
- Credibility
- Availability
- Timeliness
- Safe
- Accurate
- Communication
- Reasonable price

FIGURE 1

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

REPORT
N
Pay

MEDPAC Medicare
Payment Advisory
Commission

601 New Jersey Avenue, NW • Suite 9000 • Washington, DC 20001
(202) 220-3700 • Fax: (202) 220-3759 • www.medpac.gov



MedPAC recommendations on imaging services

March 17, 2005

“This rapid growth in spending raises questions about whether all the services are appropriate”



MEDPAC recommendations to reduce cost

REPORT TO THE CONGRESS

Medicare
Payment Policy

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

RECOMMENDATION 3D

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

State-of-the-Art Paper

Quality in Cardiovascular 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

JACC 2006;48:2141-51

BUSINESS AND ADVOCACY

Achieving Quality in Cardiovascular Imaging II

Proceedings From the Second American College of Cardiology–Duke University Medical Center Think Tank on Quality in Cardiovascular Imaging

JACC CV Imaging 2009;2:231-40

GUIDELINES AND STANDARDS

American Society of Echocardiography Recommendations for Quality Echocardiography Laboratory Operations

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

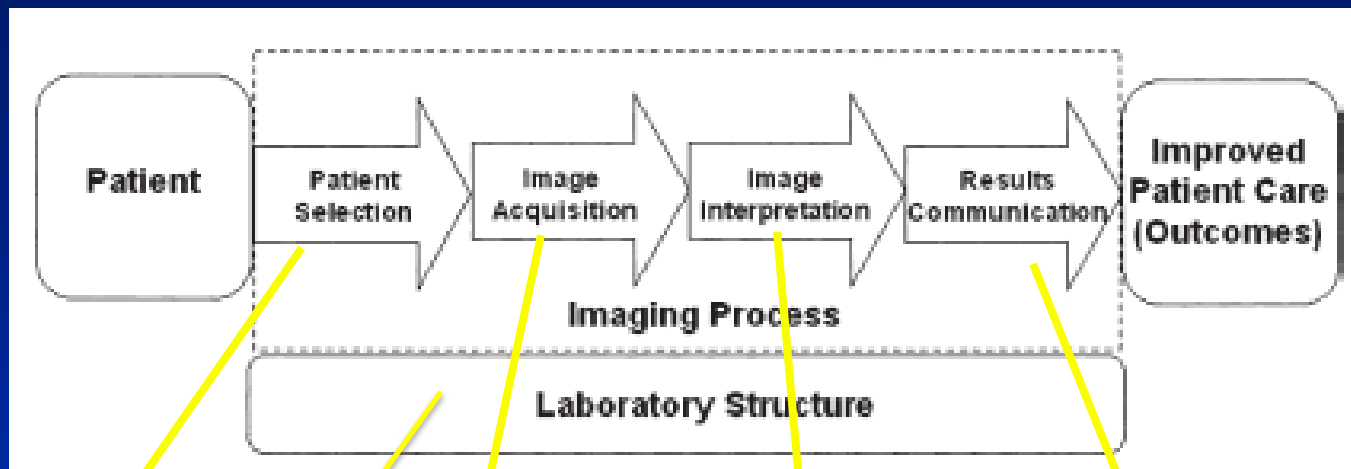


Levels of quality *setting the bar correctly*



- 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



Lab, Equipment, Sonographer, Physician

- Appropriate Patient Selection

- Diagnostic quality images
Standard exam components

- Reproducibility
- Accuracy

- Interpretability
- Clarity / Definitiveness
- Completeness
- Timeliness
- Clinical integration

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 (ICAEEL 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



Image Process: Image Interpretation

examples of quality measures

- 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

examples 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

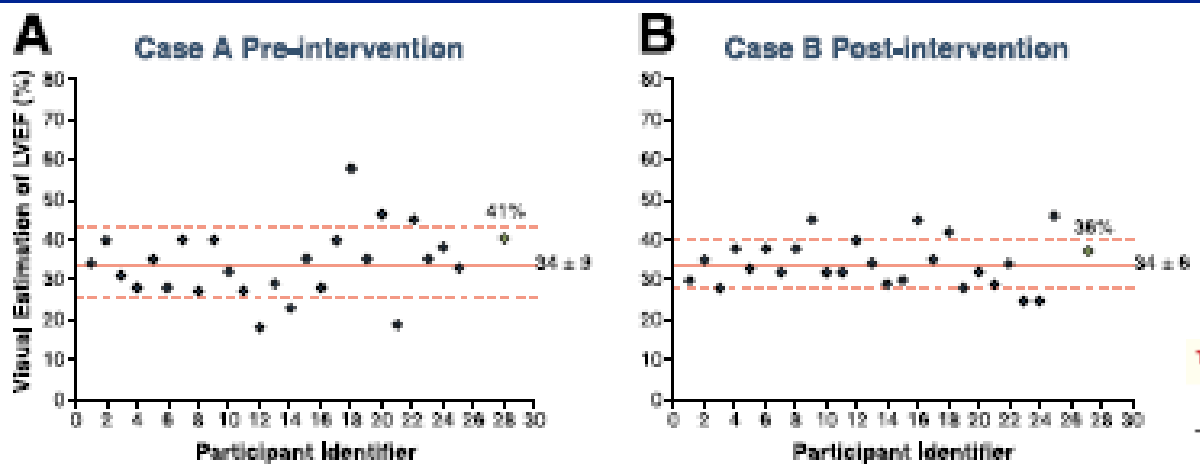


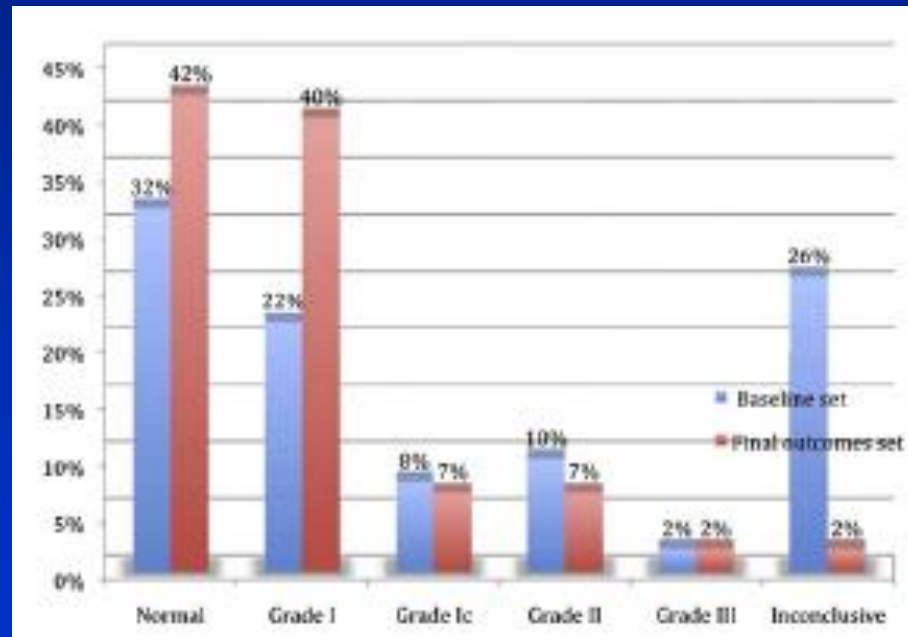
Table 3. Ejection Fraction by Simpson Method Pre- and Post-Intervention

Case #	Pre-Intervention		Post-Intervention		
	Group Mean ± SD	Study Quality	Case #	Group Mean ± SD	Study Quality
1	0.16 ± 0.05	1	1	0.19 ± 0.02	2
2	0.59 ± 0.05	2	2	0.39 ± 0.02	1
3	0.30 ± 0.09	1	3	0.55 ± 0.04	2
4	0.45 ± 0.02	2	4	0.38 ± 0.02	1
5	0.31 ± 0.04	1	5	0.24 ± 0.04	1

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.”

– Pamela S. Douglas, J Am Soc Echocardiogr 2008;21:1016-17



Quality in echocardiography

the future

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



[Doctors and Medical Groups](#) [Medical Group Ratings](#)

Medical Group Ratings 2011 Edition

San Mateo

[Choose a different county](#)

- ★★★★★ Excellent
- ★★★★ Good
- ★★★ Fair
- ★ Poor

Meeting National
Standards of Care

Patients Rate
Medical Groups

[Brown & Toland Medical Group](#)



[Chinese Community Health Care Association](#)

Too few patients in sample to report



[Hill Physicians Medical Group - San Francisco](#)



[Kaiser Permanente Medical Group - Redwood City Medical Center](#)



[Kaiser Permanente Medical Group - San Francisco Medical Center](#)



[Kaiser Permanente Medical Group - South San Francisco Medical Center](#)



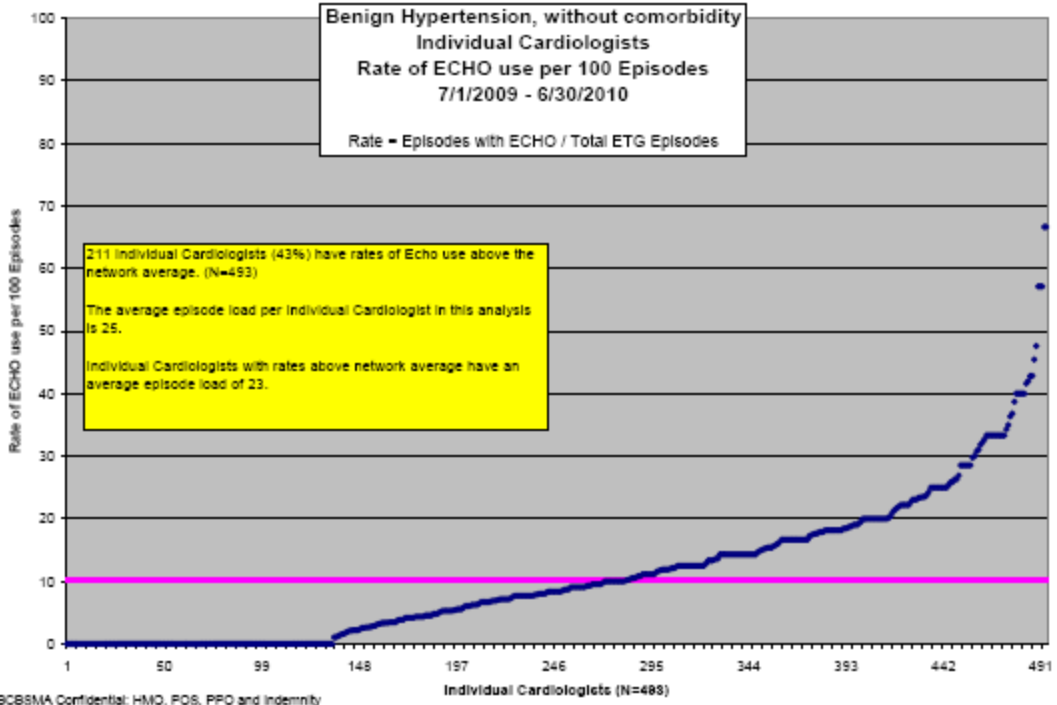
[Mills-Peninsula Medical Group](#)



[Palo Alto Medical Foundation](#)



[Physicians Integrated Medical Group](#)



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

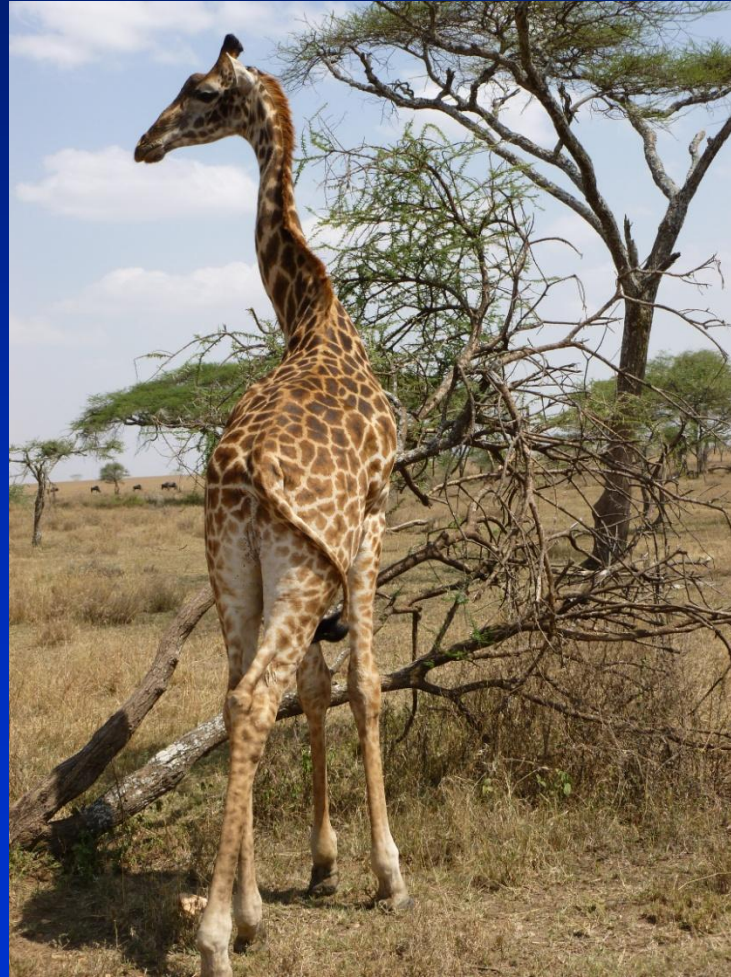


Why should you care about echocardiography quality ?

- 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

C. Clark, *HealthLeaders Media* January 3, 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 1. Steps In Quality of Cardiovascular Imaging by Subspecialty/Society

	ACC	ACR	ASE	ASNC	NASCI	SCCT	SCMR	SVM	SCAI
Laboratory structure									
Accreditation	C	C	C	C	IP	C	C	C	C
Tools for achieving lab accreditation	—	—	C	—	—	—	—	—	—
Technologist credentialing	—	C	C	C	—	—	C	C	C
MD credentialing	C	C	C	C	IP	IP	C	C	C
Patient selection									
Appropriateness criteria (AC)	C	C	C	C	C	C	C	IP	C
Tools for evaluating AC	C	IP	IP	C	IP	—	—	—	—
Tools for Implementing AC	IP	IP	IP	IP	—	—	—	—	—
Image acquisition									
Imaging protocols	—	C	C	C	IP	IP	C	C	—
Image Interpretation									
Standards for variability	—	C	—	IP	—	—	—	—	—
Standardized Image set	—	C	C	IP	IP	—	IP	C	—
Results communication									
Key data elements	C	IP	C	C	IP	IP	IP	—	—
Structured reporting	C	IP	IP	IP	IP	—	IP	—	—
Timeliness guidelines	—	IP	C	C	IP	C	IP	—	IP
Improved outcomes									
Metrics for measuring outcomes	—	IP	—	—	—	—	—	—	IP
Patient satisfaction	—	IP	—	—	—	—	—	—	IP

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

