

ACOI's 69th ANNUAL CONVENTION
AND SCIENTIFIC SESSION
October 17, 2009

**QUALITY AND APPROPRIATENESS
IN CARDIAC IMAGING**

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Chair, ACCF/UHC SPECT Pilot

Chair, Appropriateness Use Criteria Implementation and Evaluation (ACC)

Member, Appropriateness Use Criteria Task Force (ACC)

Presenter Disclosure Information

Robert C. Hendel, MD

The following relationships exist related to this presentation:

Consulting

PGx Health

Modest

Astellas Pharma

Modest

Speakers' Bureau

Astellas Pharma

Modest

Research support

Astellas

Modest

GE Healthcare

Modest

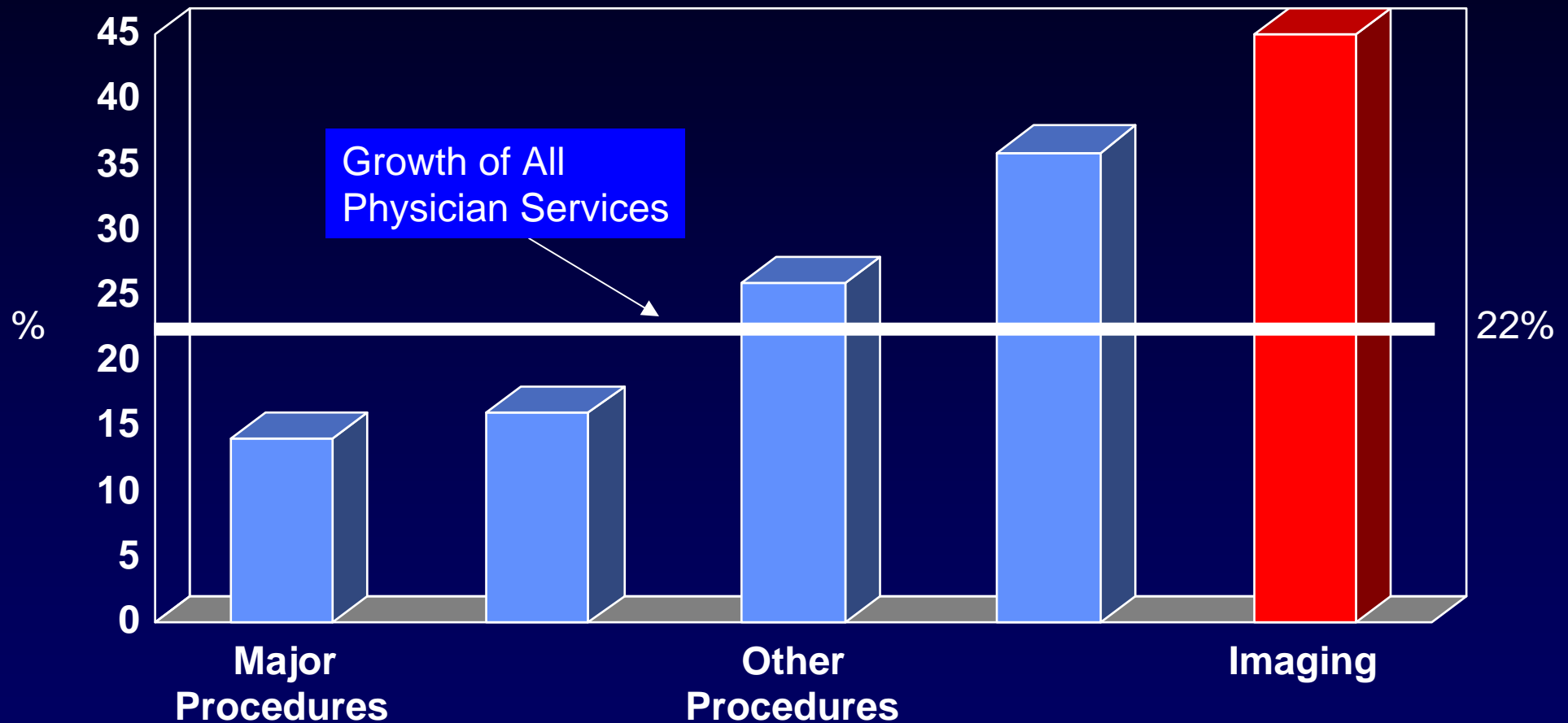
Organizational

ACC (Appropriate Use Criteria Task Force, others)

ICANL (Board of Directors)

FOCUS ON MEDICAL IMAGING

MEDPAC Evaluation of Physician Services

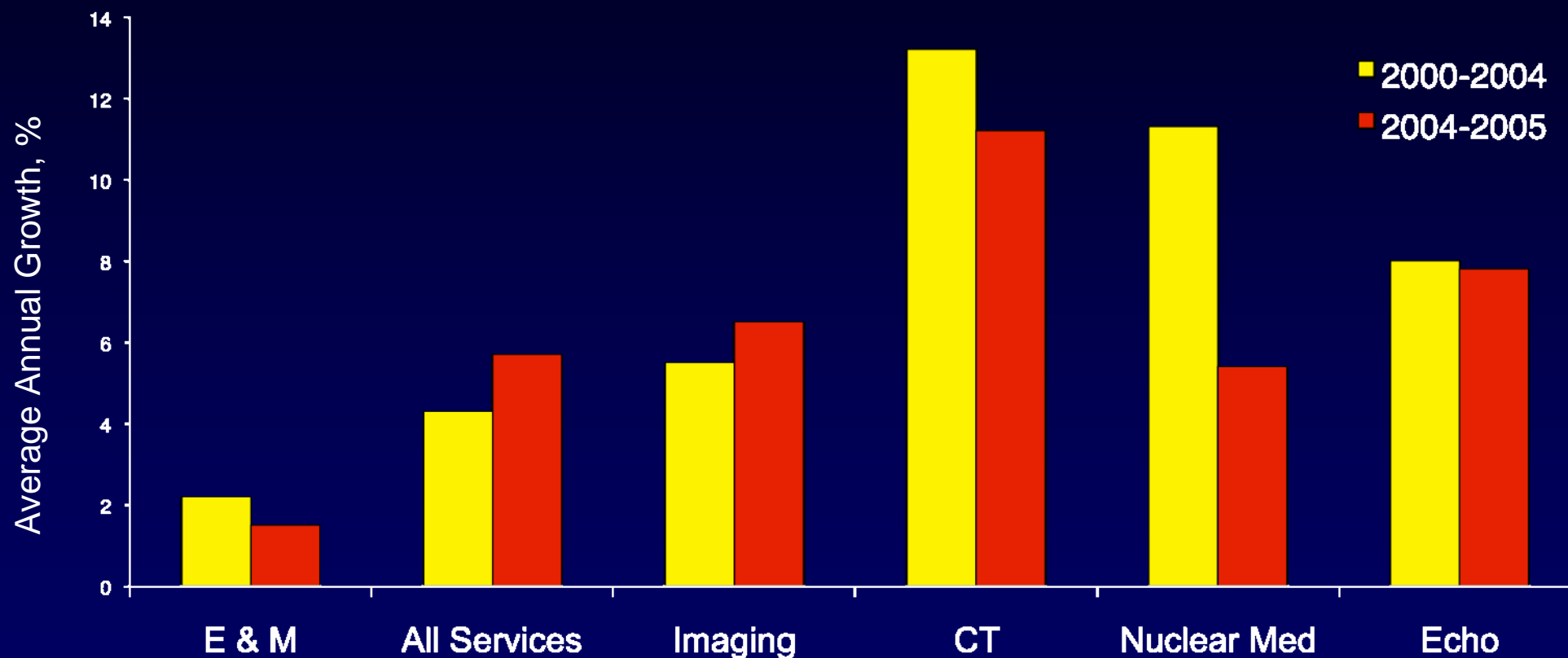


Includes all Services in the Physician Fee Schedule

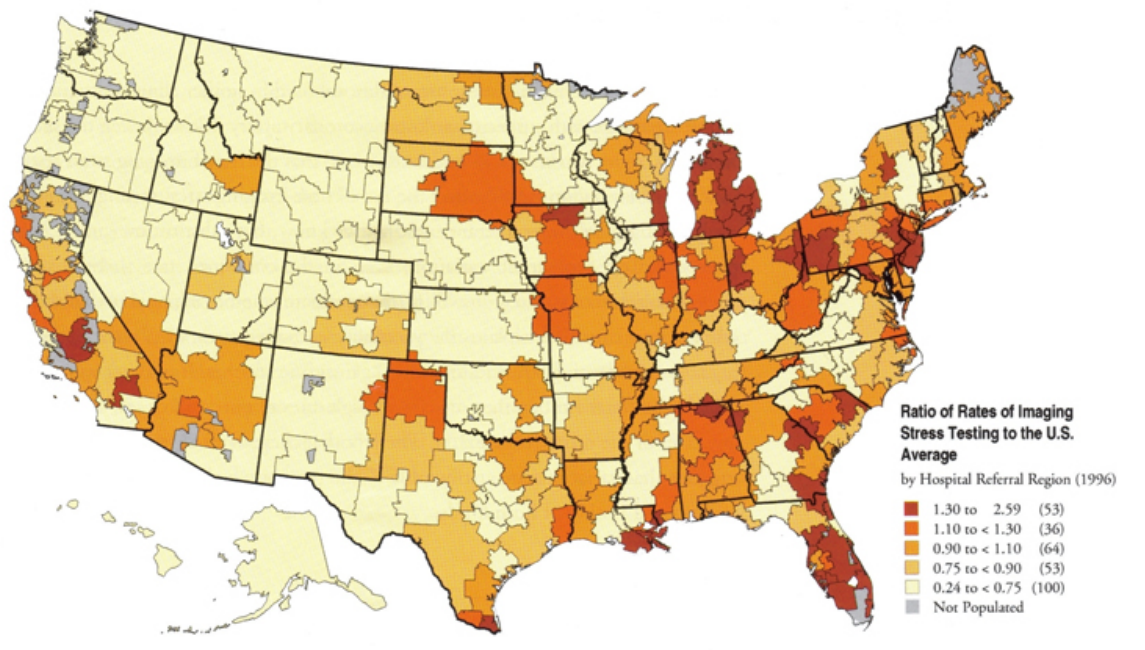
Source: MEDPAC Analysis of Medicare Claims Data

March 17, 2005, Executive Director, Medicare Payment Advisory Commission, Mark Miller,.htm

MEDICARE PAYMENT ADVISORY COMMISSION (MEDPAC) EVALUATION OF THE GROWTH IN PHYSICIAN SERVICES 2000-2004 AND 2004-2005



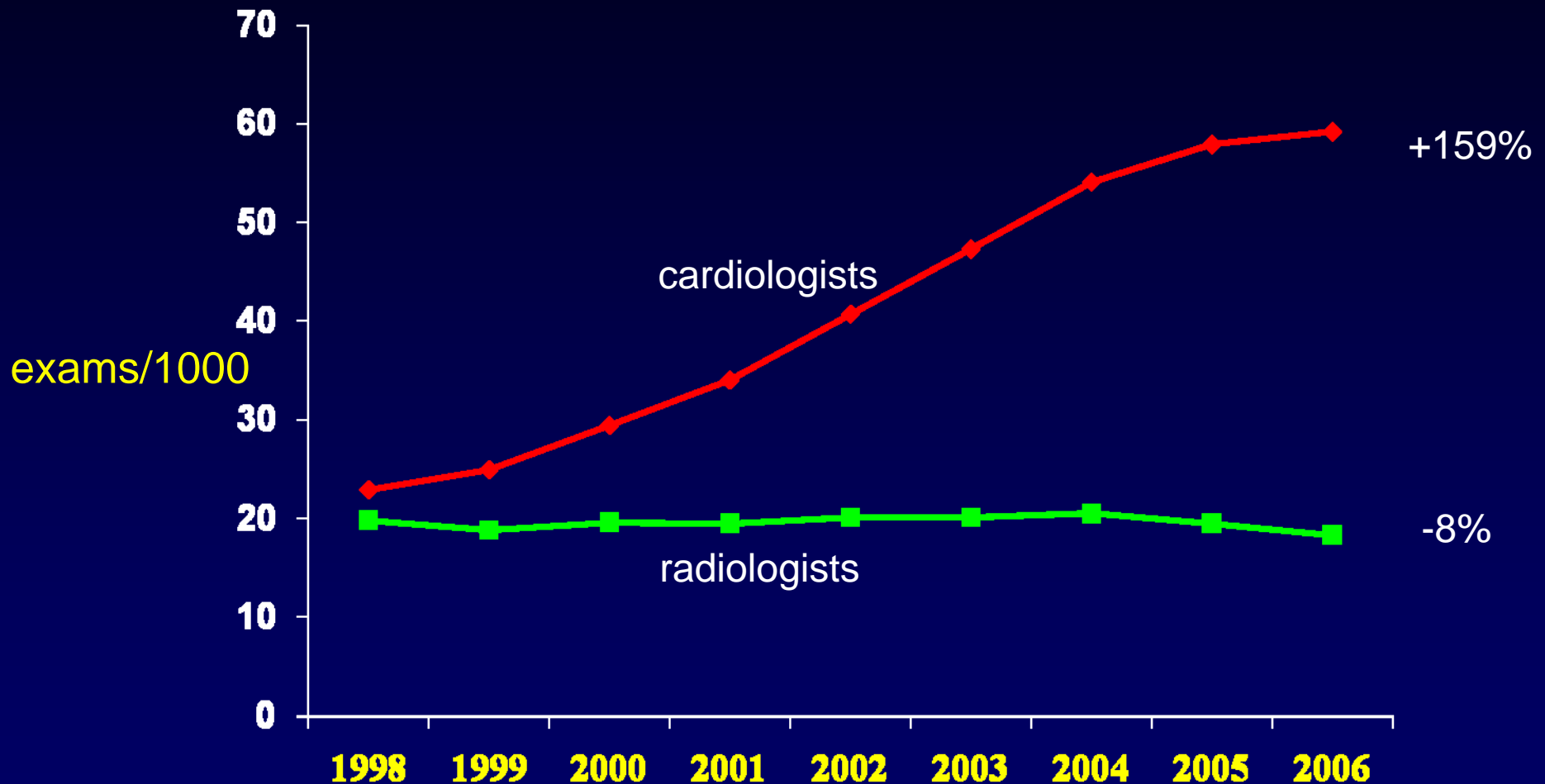
GEOGRAPHIC VARIATIONS IN IMAGING STRESS TESTING PROCEDURE RATES



- Up to 8-fold variation
- Often not risk-adjusted (GAO)

THE "CASE" FOR SELF-REFERRAL

SPECT MYOCARDIAL PERFUSION IMAGING UTILIZATION RADIOLOGISTS & CARDIOLOGISTS, MEDICARE 1998-2006



*'98-'02 data in Levin DC, Intenzo CM, Rao VM et al, JACR 2005; 2: 821

THE INCREASE OF IN-OFFICE IMAGING

Factors Beyond Self-Referral

- Technological advances
- Expanded applications
- “True” expertise
- Avoidance of “other” methods
- Patient-centered (demand)
- Fear of litigation

CARDIAC IMAGING 2009

- Patients deserve (and demand) the highest level quality of health care, including ready access to imaging
- Providing imaging within specialities and practices does not make it “bad” by definition
 - Allows for clinical integration
 - May allow for earlier, less invasive, more accurate diagnosis
 - Quality is critical, irrespective of location

UTILIZATION MANAGEMENT FOR CARDIAC IMAGING

METHODS

- Non-coverage
- Privileging (exclusion)
- Profiling
- Prior notification
- Pre-certification
(prior authorization)

RBM

(RADIOLOGY BENEFITS MANAGERS)

- Procedural governors
- Increasing penetration
- Focus on ordering clinician,
often PCP
- Incentivized to reduce
volume/cost

CONCERNS REGARDING PRE-CERTIFICATION AND PRIOR NOTIFICATION

- No evidence for improved quality of care
- Favors indiscriminant volume reduction
- Lack of transparency
- Not firmly based on appropriateness criteria
- Inconsistent processes, with confusion and inefficiency
- Reduced timeliness
- Labor intensive
- Negative economic impact
- Steerage to the test of least resistance
- Scant data available for feedback/education
- No opportunity to refine process
- No correlation with imaging results or outcome
- No mechanism to understand practice variation or local expertise

WHY APPROPRIATENESS?

Background

- Unprecedented focus on assessment and improving quality
- Explosive growth of CV imaging
- Substantial regional variation
- True nature of utilization unknown
 - Overuse/ Underuse/Appropriate
- Clinicians, patients, and especially payers seeking guidance

PROOF OF VALUE OF IMAGING AND RBM's

- “We are not aware of any peer-review studies that conclusively show the role of imaging in reducing overall health care costs”
–GAO, 2008
- “I am not aware of any studies that conclusively show the role of RBM's in reducing overall health costs or improving quality”
–R. Hendel, 2009

PHYSICIAN RESPONSES TO MEDICAL IMAGING “CRISIS”

Individual Practitioner



Ignorance of problem

Medicolegal fears

Arrogance

Gratuitous practice

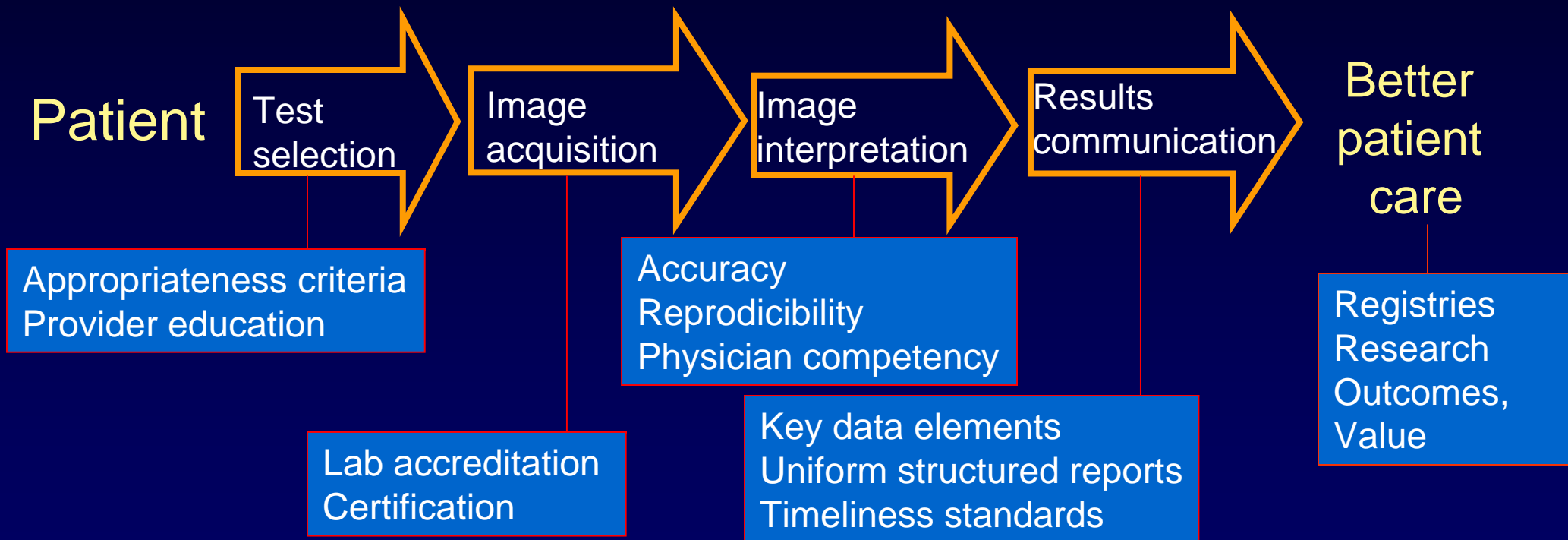
Economic incentive

ORGANIZATIONAL RESPONSES TO MEDICAL IMAGING “CRISIS”

ASNC, ACC and Subspecialty Organizations

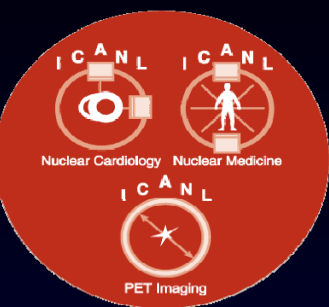
- Think Tank meetings on image quality
- Support of accreditation
- Establishment of policy on self-referral
- Focus on quality and access
- Development of AUC
- Development of alternatives to RBM, including point-of-service decision support tools.

CONTINUED EMPHASIS ON QUALITY IN IMAGING



MANDATORY IMAGING LABORATORY ACCREDITATION

- Endorsed by ACC and subspecialty organizations (ASNC, ASE)
- Provided by ACR or ICA (Intersocietal Accreditation Commission)
 - ICAVL, ICANL, ICAEL, ICAMRL, ICACTL
- United Healthcare and other require accreditation
 - CT and CTA
 - CMR and MRA
 - Nuclear cardiology
 - PET
 - Echocardiography
- CMS to require lab accreditation by 2012



ICANL

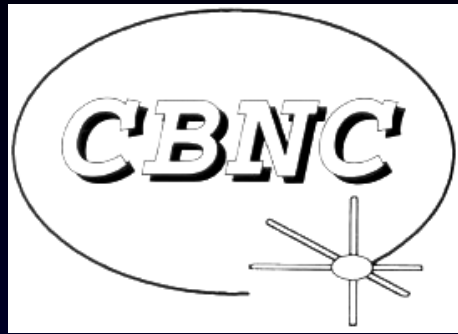
Intersocietal Commission for the Accreditation of Nuclear Medicine Laboratories



ICACTL

Intersocietal Commission for the Accreditation of Computed Tomography Laboratories

- 1,719 accredited labs, 2,406 sites (8/25/09)
 - Sponsored by ASNC, ACC, SNM, SNM-TS, AMI, ACNP
 - Substantial QA review, sample reports
 - Site visits now selective
 - 33% re-accreditation applications
- 45 accredited lab/sites for CCS, CCTA
 - Sponsoring organizations:
 - American Academy of Neurology
 - American Academy of Otolaryngology
 - American Association of Physicists in Medicine
 - American College of Cardiology
 - American Society of Echocardiography
 - American Society of Nuclear Cardiology
 - Society for Cardiovascular Angiography and Interventions
 - Society for Vascular Surgery
 - Society of Cardiovascular Computed Tomography
 - Society of Nuclear Medicine
 - Substantial QA review, sample reports, representative cases
- Ensures quality
 - Basis for reimbursement
 - Payers often now requiring accreditation
 - Accreditation mandated by ACC and ASNC



- NRC recognized pathway for AU Status
- Sponsoring organizations
 - American College of Cardiology
 - American Society of Nuclear Cardiology
- First exam, September 7, 1996
- 6,508 diplomates (as of 8/26/09)
- www.cbnc.org
- Sponsoring organizations
 - American College of Cardiology
 - American Society of Nuclear Cardiology
 - Society of Cardiovascular Angiography and Interventions
 - Society of Cardiovascular Computed Tomography
- First exam, September 22, 2008
- The mission of the Certification Board of Cardiovascular Computed Tomography (CBCCT) is to promote and enhance patient care by defining the domain of cardiovascular computed tomography and identifying the requisite knowledge and skills for quality practice through a certification program that fosters excellence and encourages continual learning.
- 731 diplomates (as of 8/26/09)
- www.cbcct.org

GUIDELINES, MEASURES, AND APPROPRIATENESS CRITERIA

- **Clinical Guidelines¹**

- Exhaustive review of literature
- Virtually all-inclusive
- Best practice
- “Should do, should not do”

1. Klocke FJ, Baird MG, Lorell BH, et al. ACC/AHA/ASNC guidelines for the clinical use of cardiac radionuclide imaging. *Circulation* 2003; 106: 1883-92

- **Performance Measures²**

- Selective, focused, measurable
- Based on guidelines
- “Must do”
- Tools for quality measurement

2. Krumholtz HM, Anderson JL, Brooks, et al. ACC/AHA clinical performance measures for adults with ST-elevation and non-ST-elevation myocardial infarction. *J Am Coll Cardiol* 2006; 47: 236-65.

- **Appropriateness Criteria³**

- Selective indications
- Largely guideline based
- Clinical scenarios
- “Reasonable to do”

3. Hendel RC, Berman DS, Di Carli M Fet al. ACCF/ASNC appropriateness use criteria for cardiac radionuclide imaging. *J Am Coll Cardiol* 2009; 53: 2201-29.

ACCF APPROPRIATENESS USE CRITERIA

- Literature-based (when possible) approach to improve utilization of resource-intensive tests and procedures
 - Developed by physicians/providers
 - Initial focus on cardiac imaging
 - Expansion to revascularization, potential for other procedures
- Serves as a method for focused reduction of procedures based on clinical value, not indiscriminant volume reduction
- Keeps money within the system and permits continuous quality improvement through education
- Preserves patient/provider relationship
- Provides for continued patient access

APPROPRIATE USE CRITERIA

The ACC Queue

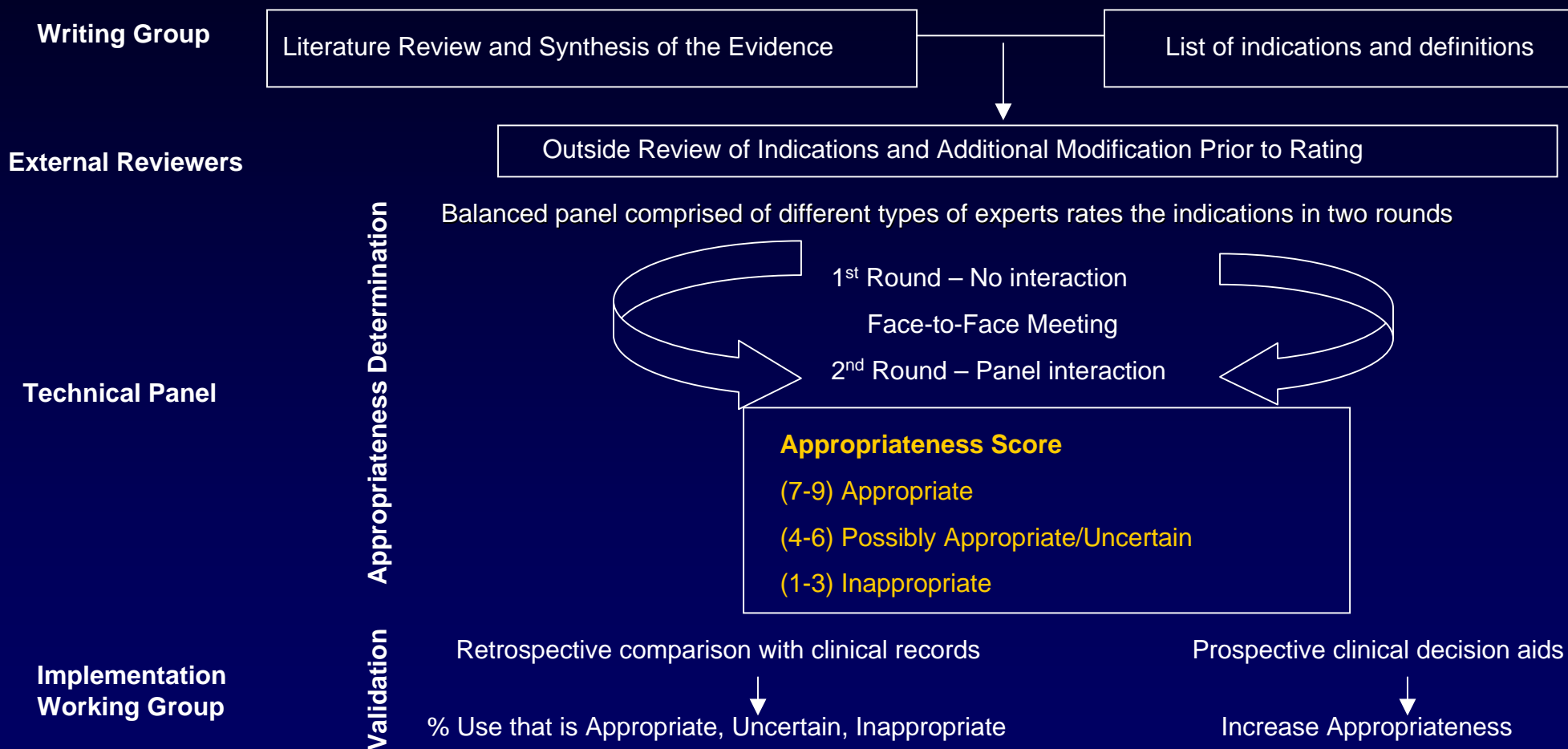
- ✓ Nuclear cardiology (SPECT)
October, 2005
- ✓ Cardiac CT/CMR
September, 2006
- ✓ Echocardiography (TTE, TEE)
July, 2007
- ✓ Echocardiography (Stress)
December, 2007
- ✓ Percutaneous coronary intervention
December, 2008
- ✓ Revised radionuclide imaging criteria (5/16/09)
- CV imaging cross modality (efficiency) evaluation
- Revised CT criteria

WHAT IS AN APPROPRIATE IMAGING STUDY?

An appropriate imaging study is one in which the expected incremental information, combined with clinical judgment, exceeds the expected negative consequences* by a sufficiently wide margin for a specific indication that the procedure is generally considered acceptable care and a **reasonable** approach for the indication.

**Negative consequences include the risks of the procedure (i.e., radiation or contrast exposure) and the downstream impact of poor test performance such as delay in diagnosis (false negatives) or inappropriate diagnosis (false positives).*

APPROPRIATE USE CRITERIA USING THE RAND/DELPHI METHODOLOGY



ACCF/ACEP/ACR/AHA/ASE/ASNC/SCCT/ SCMR/SNM 2009 Appropriate Use Criteria for Cardiac Radionuclide Imaging

A Report of the American College of Cardiology Foundation Appropriate Use Criteria Task Force, the American College of Emergency Physicians, the American College of Radiology, the American Heart Association, the American Society of Echocardiography, the American Society of Nuclear Cardiology, the Society of Cardiovascular Computed Tomography, the Society of Cardiovascular Magnetic Resonance, and the Society of Nuclear Medicine

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J Am Coll Cardiol, 2009; 53:2201-2229

KEY DEFINITION

ISCHEMIC EQUIVALENT:

Chest Pain Syndrome, Anginal Equivalent, or Ischemic ECG abnormalities: Any constellation of clinical findings that the physician feels is consistent with obstructive coronary artery disease. Examples of such findings include, but are not exclusive to, chest pain, chest tightness, burning, shoulder pain, palpitations, jaw pain, and new ECG abnormalities suggestive of ischemic heart disease. Non-chest pain symptoms, such as dyspnea or worsening effort tolerance that are felt to be consistent with CAD may also be considered to be an anginal equivalent.

APPROPRIATENESS USE CRITERIA FOR RADIONUCLIDE CARDIOVASCULAR IMAGING

Clinical Stratification (1)

Age	Gender	Typical/Definite Angina Pectoris	Atypical/Probable Angina Pectoris	Nonanginal Chest Pain	Asymptomatic
< 39	Men	Intermediate	Intermediate	Low	Very low
	Women	Intermediate	Very low	Very low	Very low
40 - 49	Men	High	Intermediate	Intermediate	Low
	Women	Intermediate	Low	Very low	Very low
50 - 59	Men	High	Intermediate	Intermediate	Low
	Women	Intermediate	Intermediate	Low	Very low
> 60	Men	High	Intermediate	Intermediate	Low
	Women	High	Intermediate	Intermediate	Low

PRE-TEST PROBABILITY OF CAD

Diamond, GA, Forrester JS
NEJM 1979; 300: 1350-8

Adapted from ACC/AHA Exercise Testing Guidelines Gibbons et al, 2002
Available www.acc.org.

Modified for AUC RNI (Hendel et al, 2009)

CORONARY HEART DISEASE RISK

Adapted from 3rd Report of the NCEP Panel
Adult Treatment Panel III (ATP III)
ACC/AHA Scientific Statement:
NIH Publication No. 02-5215

www.nhlbi.nih.gov

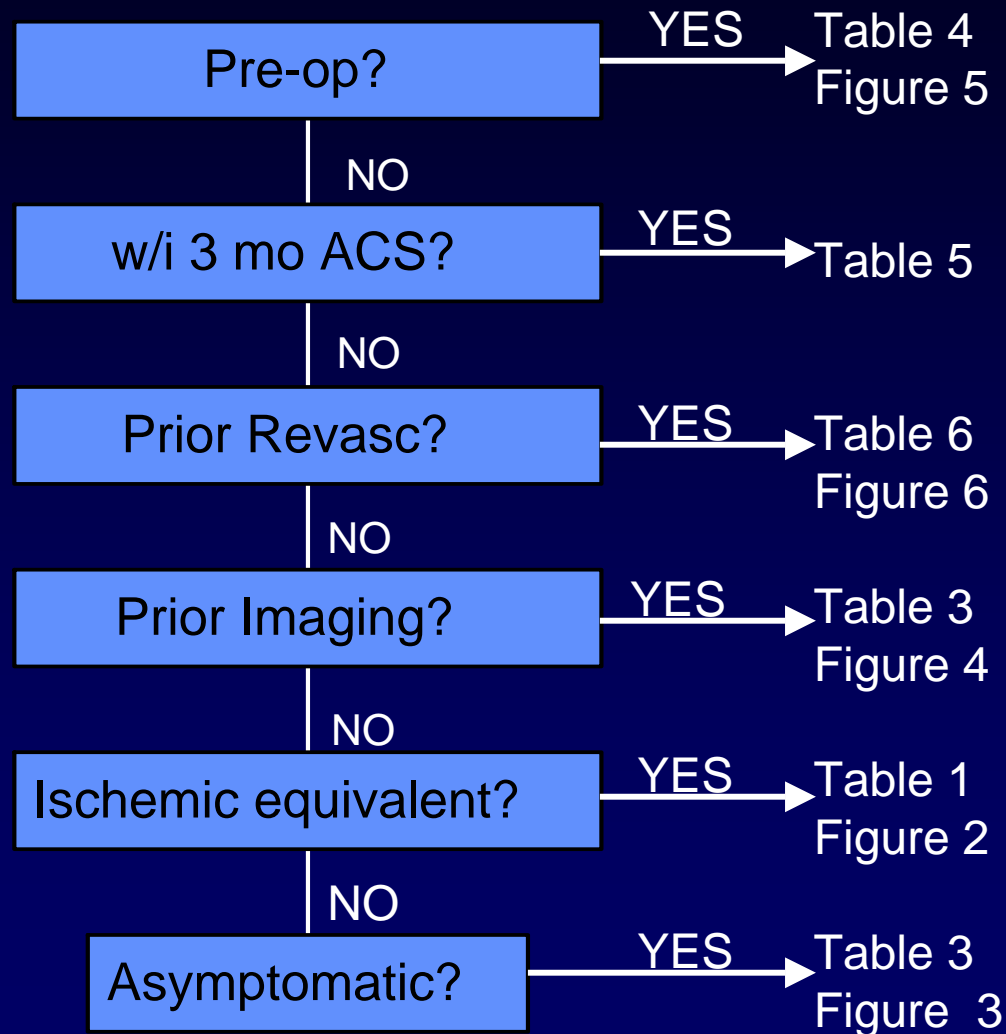
Low: 10-year absolute CHD risk <10%

Moderate: 10-year absolute CHD risk 10-20%

High: DM ≥ 40 y.o.a, PAD, or 10-year absolute CHF risk > 20%

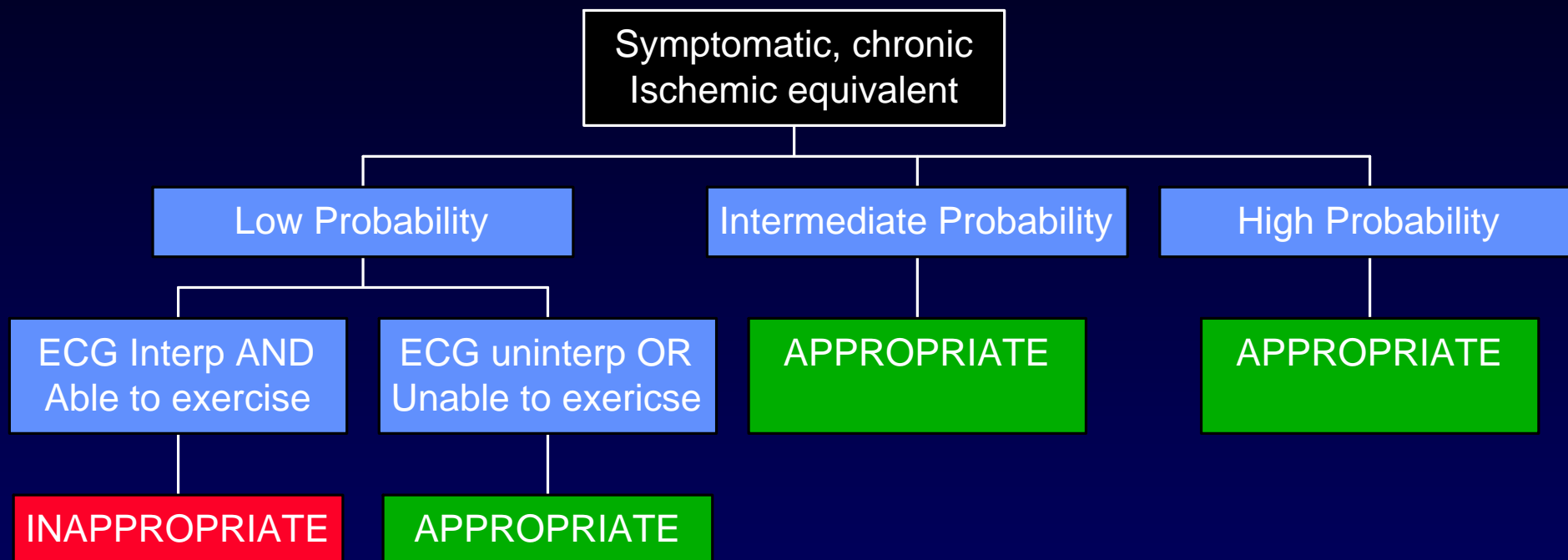
Risk relates to “hard event”

HIERARCHY OF POTENTIAL TEST ORDERING FOR AUC DETERMINATION



APPROPRIATE USE OF RNI

Evaluation of Suspected CAD



Possible ACS

ECG w/o ischemic Δ 's, or with LBBB, pacer
Normal or low-level troponin elevation
Low or high risk TIMI scores

APPROPRIATE USE OF MPI-REVISED AUC

Preoperative Evaluation for Elective Noncardiac Surgery

TYPE OF SURGERY

Low Risk Surgery

Intermediate Risk Surgery
OR
Vascular Surgery

INAPPROPRIATE

No Risk Factors
OR
Good Functional Cap.

≥ 1 Risk Factors
AND
Poor Functional Cap.

INAPPROPRIATE

APPROPRIATE *

RISK FACTORS

- History of CAD
- History of HF
- Cerebrovasc. disease
- Insulin-requiring DM
- Renal insufficiency

* Inappropriate if asymptomatic up to 1 year s/p normal angiogram, non-invasive test of previous revascularization

APPROPRIATENESS OF CARDIOVASCULAR IMAGING

Potential Impact of Appropriateness Criteria

- Establishment of partnership among clinicians, educators, and payers regarding rational practices in cardiovascular imaging and fair reimbursement
- Education of clinicians regarding their practice habits
- Emphasis of clinical indications to drive testing
- Facilitate reimbursement for “appropriate” and “uncertain” indications
- Support for requirement of preauthorization or denial of reimbursement for “inappropriate” indications
- Improve cost-effectiveness of cardiovascular imaging

APPROPRIATENESS USE CRITERIA

Concerns and Limitations

- Appropriateness criteria are NOT substitutes for sound clinical judgment and practice experience
- Should NOT be used to provide information regarding the technical aspects of imaging nor delineate training/performance requirements
- Imperfect product
 - Indications not inclusive but also too specific
 - May differ from guidelines
 - Difficult to use, but logistics improving

APPROPRIATE USE CRITERIA

Implementation and Evaluation

- Integration within practice workflow
 - Point-of-service
 - Point-of-order
- Logistics
 - Requisitions
 - Web tools
 - POE/EMR
- Must preserve physician autonomy and flexibility



SPECT MPI HOME

- [Search & Edit Cases](#)
- [Add New Case](#)
- [Patient Demographics](#)
- [History & Risk Factors](#)
- [Prior Procedures & Tests](#)
- [Current Study](#)
- [Error Check](#)

B. History & Risk Factors

Last Name : Wright First Name : Robert Test Date : 01/31/2008 ACC Patient ID : 10

History & Risk Factors :

Total Cholesterol³⁰⁰⁰ : 125 HDL³⁰¹⁰ : 100 LDL³⁰²⁰ : 75

Use of Lipid-lowering Medication³⁰⁷⁰ : Yes

Blood Pressure (resting)³⁰³⁰ : 129 ³⁰⁴⁰ : 65 (mmHg)

Use of Anti-Hypertensive Medication³⁰⁸⁰ : Yes

Current Smoker (w/in 1 month)³⁰⁵⁰ : Yes

HF or LV Systolic Dysfunction (new onset)³⁰⁹⁰ : Yes

Diabetes Mellitus³⁰⁶⁰ : Yes

Atrial Fibrillation (new onset)³¹⁰⁰ : Yes

Symptoms³¹¹⁰ : Asymptomatic

If Asymptomatic, Estimated CHD Risk (Framingham)³¹²⁰ : Low [NHLBI Website](#)

Chest Pain Type(Angina)³¹³⁰ : Typical (3 below); Atypical (2 below); Non-anginal (1 or none)
(check any that apply)

- Substernal chest pain or discomfort
- Provoked by exertion or emotional distress
- Relieved by rest and/or nitroglycerin

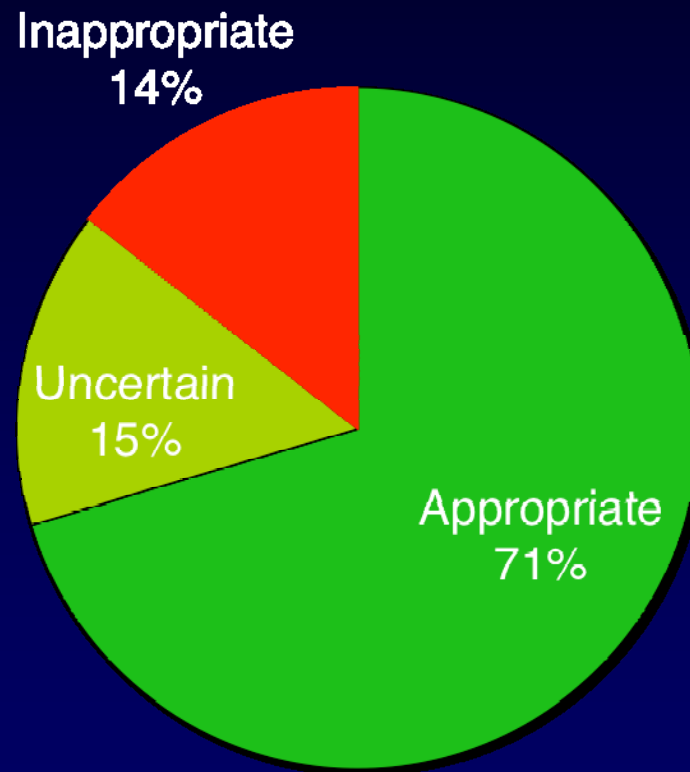
Estimated Pre-test Probability of CAD³¹⁴⁰ : Low

Exercise Tolerance³¹⁵⁰ : < 4 METS

Ability to Achieve Max Predicted HR³¹⁶⁰ : Yes

Acute Coronary Syndrome (w/in 1 mo.)³¹⁷⁰ : No

ACCF/UNITEDHEALTHCARE SPECT PILOT Appropriateness Classification (n = 5,928)



EVALUATION OF APPROPRIATENESS

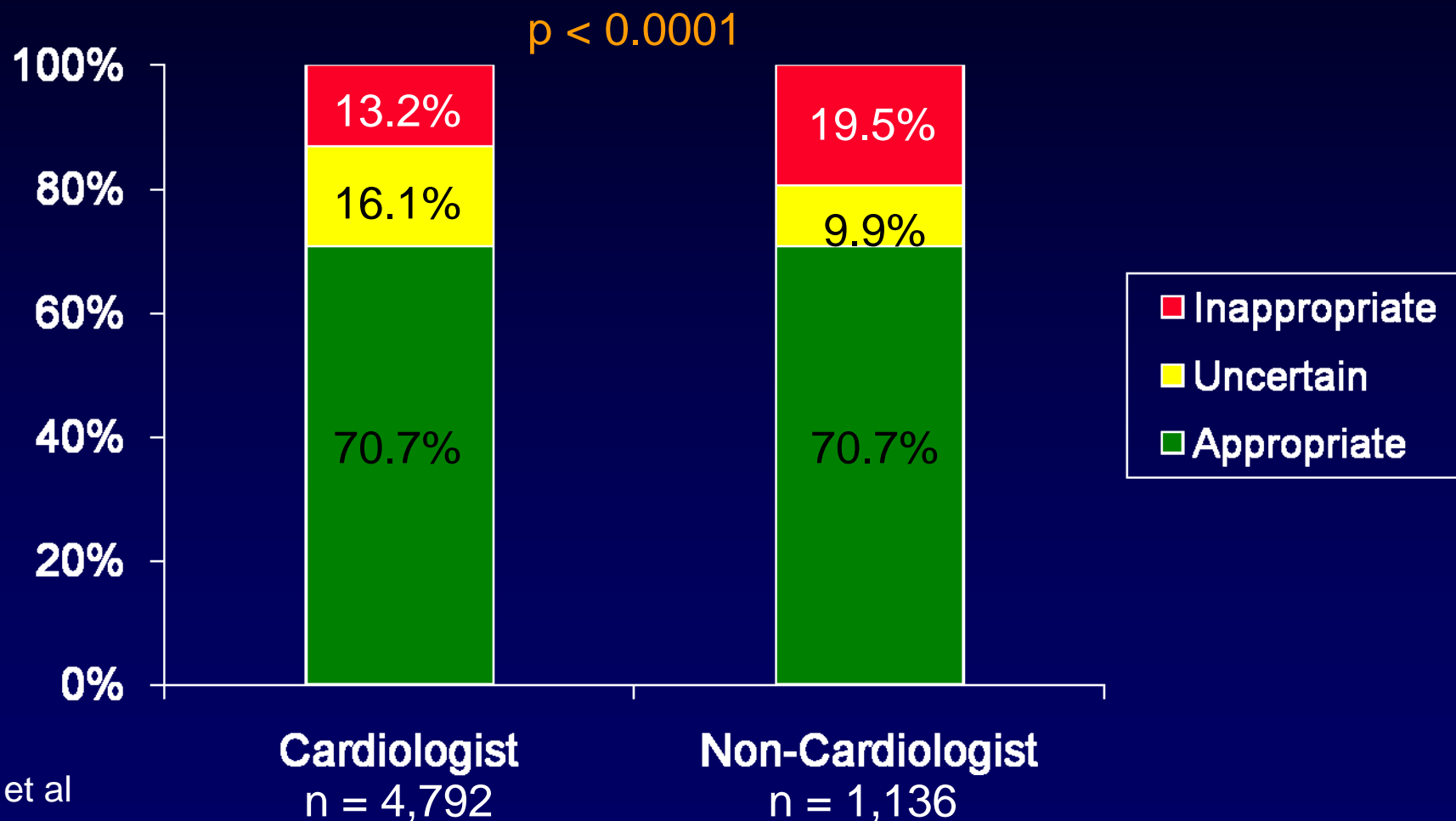
	Appropriate	Uncertain	Inappropriate
Hendel, 2006	83%	6%	11%
Mehta, 2006	78%	5%	8%
Ayyad, 2007	85%	5%	10%
Druz, 2007	57%	33%	10%
Gaztanega, 2007	55%	28%	17%
Al-Mallah, 2007	75%	12%	13%
Gibbons, 2008	64%	11%	14%
Hendel, 2009	71%	15%	14%

ACCF/UNITEDHEALTHCARE SPECT PILOT

Most Common “Inappropriate” Indications

INDICATION	% INAPPRO INDICATIONS	% TOTAL STUDIES
Detection of CAD Asymptomatic, low CHD risk	44.5%	6.0%
Asymptomatic, post-revascularization < 2 years after PCI, symptoms before PCI	23.8%	3.2%
Evaluation of chest pain, low probability pt Interpretable ECG and able to exercise	16.1%	2.2%
Asymptomatic or stable symptoms, known CAD < 1 year after cath or abnormal prior SPECT	3.9%	0.5%
Pre-operative assessment Low risk surgery	3.8%	0.5 %
TOTAL	92.1%	12.4 %

APPROPRIATENESS CATEGORY Based on Referral



APPROPRIATE USE CRITERIA

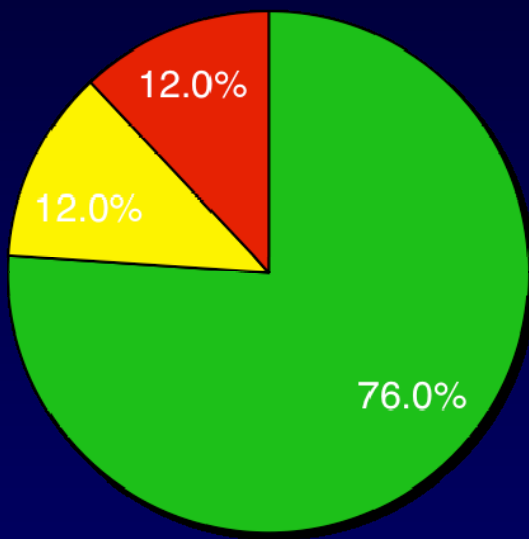
Educational Initiatives

- Target inappropriate indications
 - Determine most common inappropriate indications
 - Pocket cards, explanatory information
- Joint attribution
 - Ordering and performing/interpreting physicians
 - Provide sample letter to practices for education on ordering patterns and focused discouragement of key inappropriate indications
- Improvement in ordering patterns
 - PDA and web-based tools to provide immediate feedback
 - Interim reports to practices
 - Establishment of inappropriate “threshold”
 - Order entry and decision support tools
 - Threshold values or percent reduction of inappropriate exams

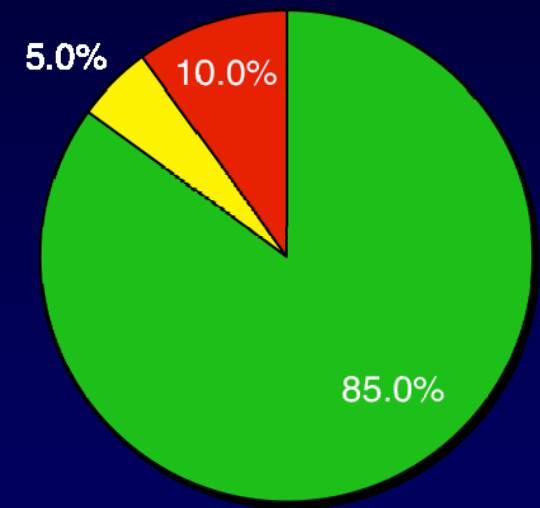
CHANGING PATTERNS OF APPROPRIATENESS

Impact of Education (n=862)

2006



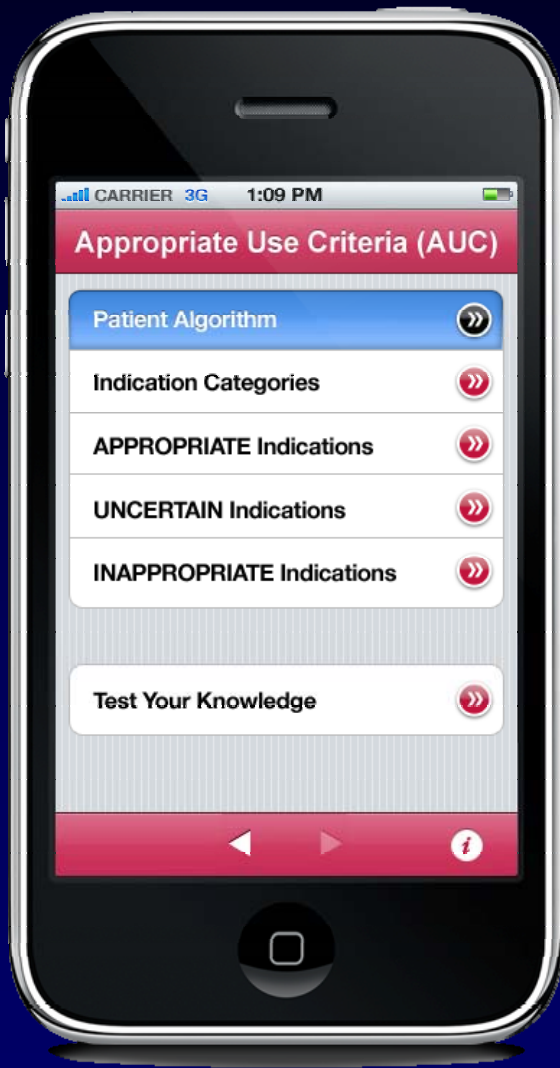
2007



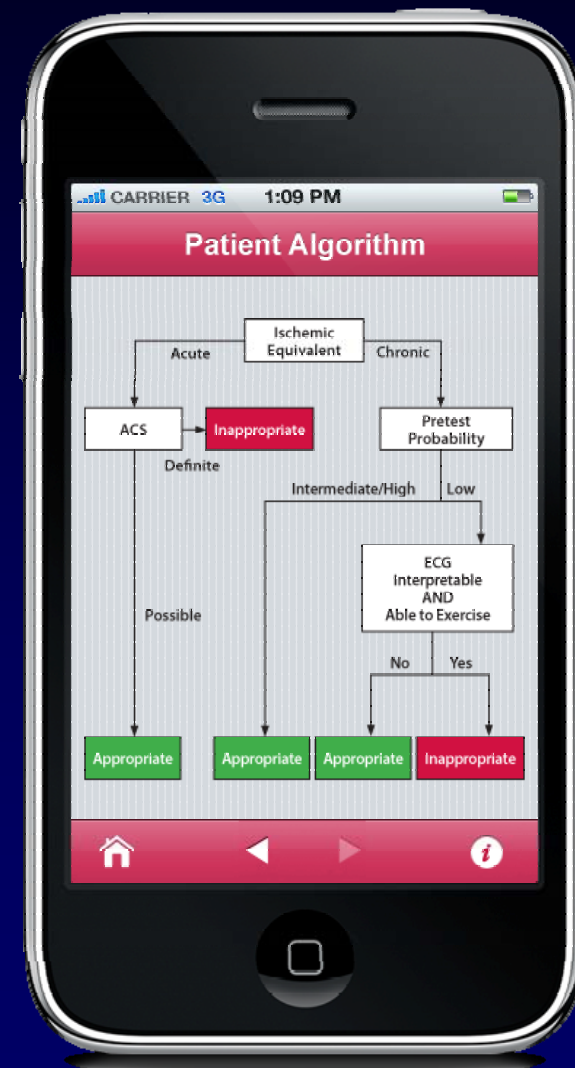
- Appropriate
- Uncertain
- Inappropriate

AUC: IMPLEMENTATION AND EVALUATION

New Technology



- Migration towards point-of-order
- Embedded clinical decision support
- Tracking/data registry
- Reporting/feedback



APPROPRIATE USE CRITERIA

Potential Impact on Physician

- Education regarding practice habits
- Emphasize clinical indications to drive testing
- Documentation of quality metric
- Facilitation of reimbursement
- Recognition that rate of inappropriate testing is not zero, nor should it be
- Avoidance of RBM

WHITE HOUSE SUMMIT ON HEALTH CARE

March 5, 2009

“With the support of Congress and others, the ACC is willing to commit to reducing the rate of inappropriate cardiovascular imaging by 15 percent in the first year through the use of physician created appropriate use criteria...[to] reduce the financial burden of our health care system.”

W. Douglas Weaver, MD
President, ACC

QUALITY ISSUES IMPACTING PRACTICE

Conclusions

- Utilization management of cardiac imaging will continue
 - Self-regulation is a large and bitter “pill to swallow”
- Most physicians are not knowingly ordering inappropriate tests or self-referring for economic reasons
 - Physicians must take responsibility for all aspects of cardiac imaging, including utilization
 - Must be joint effort by physicians, policymakers and patients
- Practices must begin/continue quality improvement processes
- AUC, accreditation, and other quality metrics should serve as the foundation for utilization strategies
 - AUC, CPG, PM have been developed to provide guidance, but their implementation and evaluation are key to improving performance
 - These provide alternatives to more onerous utilization management strategies, including prior authorization