HCAi
Department of Health Care Access and Information

Welcome to the

California Cardiovascular Outcomes Reporting Program (CCORP)
Clinical Advisory Panel (CAP)
Subcommittee Meeting
August 13, 2025

We will begin the meeting soon!

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Item #1: Call to Order and Welcome

Ralph Brindis, M.D., M.P.H., F.A.C.C., CAP Chair (or designee)

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Ground Rules – Hybrid Meeting

- Bagley-Keene Open Meeting Act will be followed
- CAP subcommittee members can appear virtually but need to be visible on camera. If a member is unable to appear on video due to connectivity challenges, the member must announce the technical reason for turning off their camera.
- Public Comment on each item and at end of meeting
  - If a member of the public is joining via Teams press the "hand raise" feature OR dial *5 on your telephone
  - All members of the public will be kept on mute throughout the meeting
  - Members of the public will not have access to the video function
- No delegates, substitutes, or proxies for subcommittee members
- Meeting minutes prepared after each meeting
- Materials posted on website

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Public Comment

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Item #2: HCAI Overview and Considerations for Expanding Cardiovascular Outcomes Reporting

Christopher Krawczyk, Ph.D., Chief Analytics Officer, HCAI (or designee)

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CCORP Mandate

- The department shall publish at least one risk-adjusted outcome report for coronary artery bypass graft surgery, transcatheter aortic valve replacement, or any type of interventional cardiovascular procedure for procedures performed in the state.
- For any type of interventional cardiovascular procedure other than coronary artery bypass graft surgery or transcatheter aortic valve replacement, the department shall only select from interventional cardiovascular procedures recommended by the clinical panel, not to exceed one additional interventional cardiovascular procedure every three years.
- California Health and Safety Code Section **128745.**(c)(2).

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Current CCORP Outcomes Reporting

- Coronary Artery Bypass Graft (CABG) Outcomes
  - Isolated CABG operative mortality
  - CABG + Valve operative mortality
  - Post operative stroke (isolated CABG)
  - 30-day readmissions (isolated CABG)
  - Clinical data collected by HCAI based on a subset of Society for Thoracic Surgeons (STS) Adult Cardiac Surgery Database
- Transcatheter Aortic Valve Replacement (TAVR) Outcomes
  - In-hospital/30-day mortality
  - In-hospital/30-day stroke
  - Clinical data acquired from STS/American College of Cardiology (ACC) TVT Registry (STS/ACC TVT Registry™)

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Current CCORP Outcomes Reporting (continued)

- Elective Percutaneous Coronary Intervention (PCI) Outcomes
  - In-hospital mortality
  - In-hospital stroke
  - Post procedure CABG (not risk adjusted)
  - California Department of Public Health mandate
  - Clinical data acquired from National Cardiovascular Data Registry (NCDR) Cath-PCI Registry (only for certified hospitals)
- All PCI Outcomes
  - In-hospital mortality
  - Included in the Agency for Healthcare Research and Quality Inpatient Mortality Indicators (IMIs)
  - Administrative data (In-patient only, no ambulatory surgery data)

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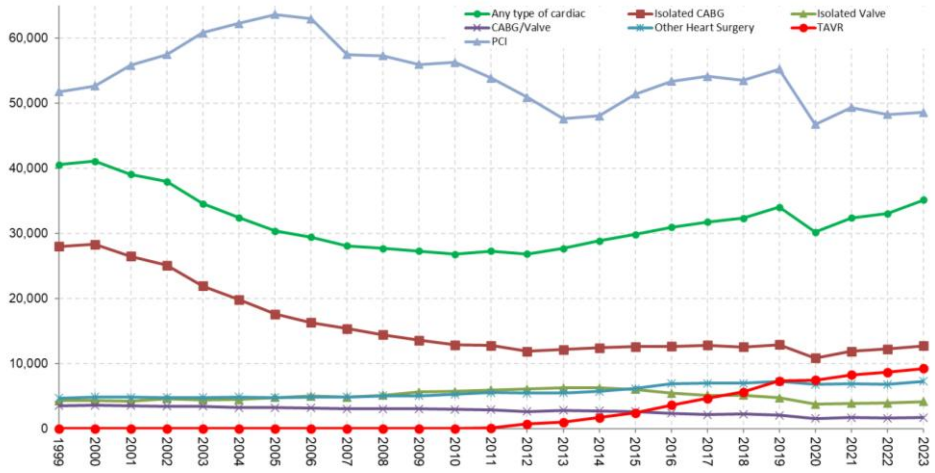
“Blue Sky” Discussions from previous CAP meetings

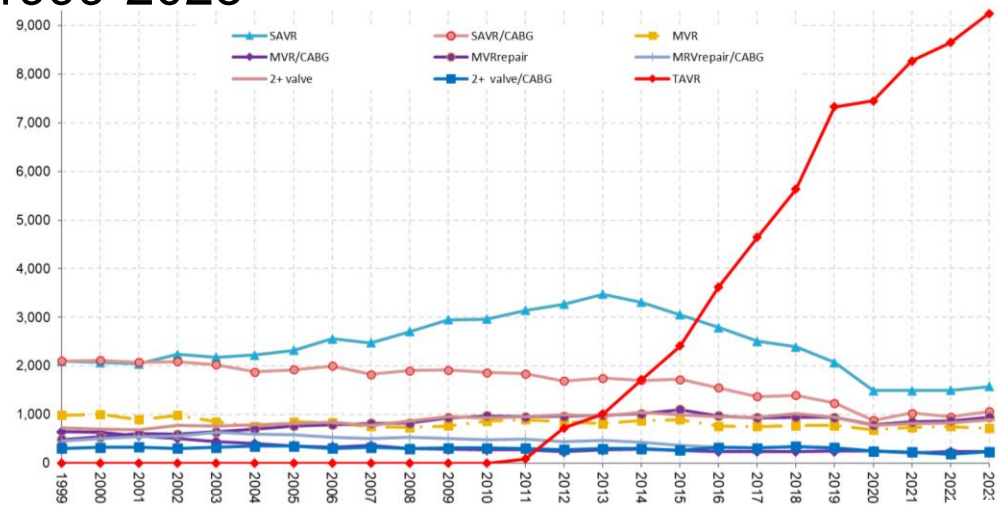
- PCI public reporting
- PCI and CABG 1 year Mortality
- Appropriateness – PCI, CABG, valve procedures
- Stress test data - assess appropriateness- degree of ischemia
- PCI/CABG revascularization ratio
- Isolated Valves
- TAVR/Percutaneous Valves (added starting with 2022 reporting)
- More cardiovascular surgery composite measures
- Price Transparency
- Social drivers of health

Volume of Cardiovascular Procedures and Interventions 1999-2023



Source: HCAI PDD, AS, ED

Volume of Valve Procedures and Interventions 1999-2023



Source: HCAI PDD, AS, ED

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Public Comment

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Item #3: Appropriate Use and Challenges for Data Collection and Analysis

Ralph Brindis, M.D., M.P.H., F.A.C.C., CAP Chair (or designee)

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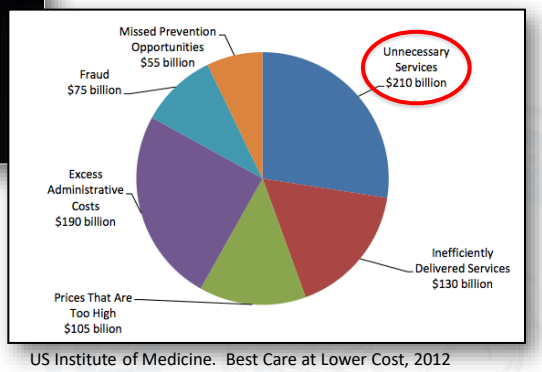
"Unintended variation is stealing healthcare blind"

Donald Berwick, MD



US Institute of Medicine. Best Care at Lower Cost, 2012

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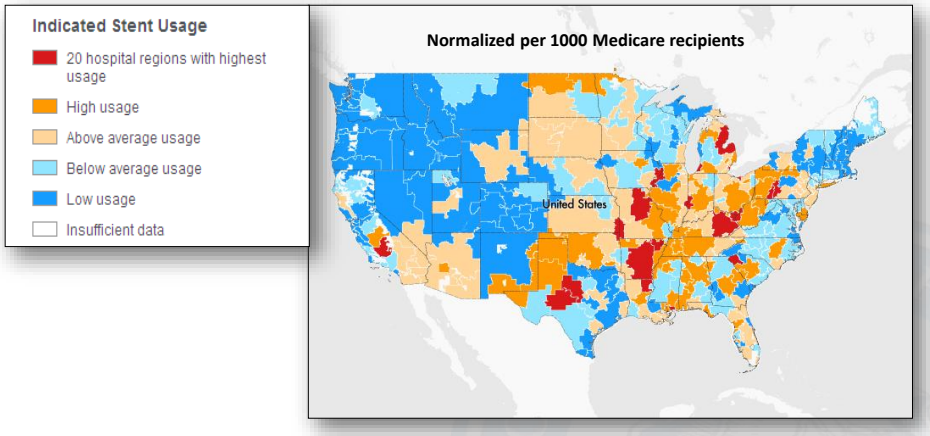
Variation in the Use of PCI - *Why?*



Source: Dartmouth Atlas of Health Care; 2010 CMS Data on Medicare beneficiaries
Bloomberg News: September 26, 2013

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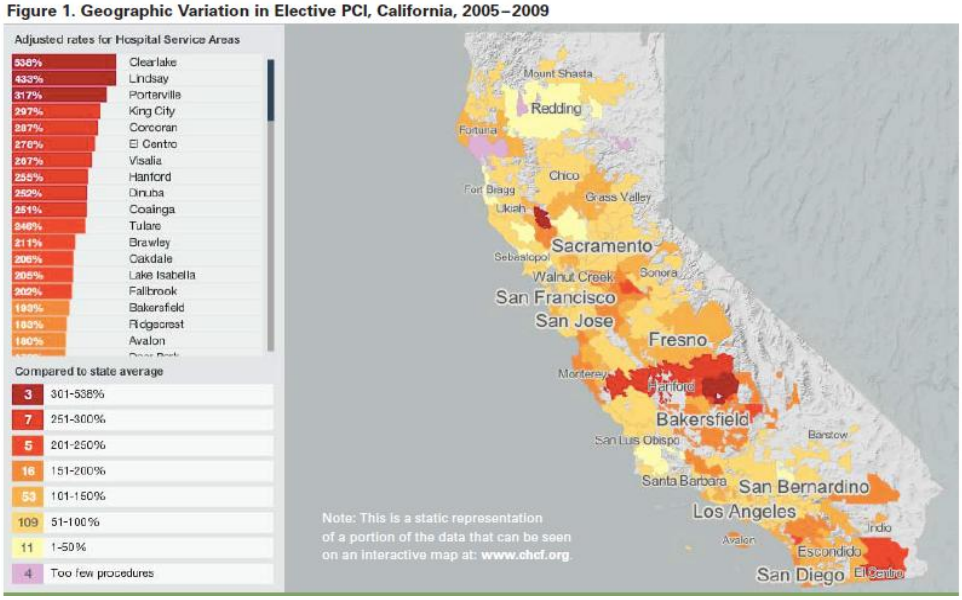
California Elective PCI Variation

California Health Care Foundation

Figure 1. Geographic Variation in Elective PCI, California, 2005–2009



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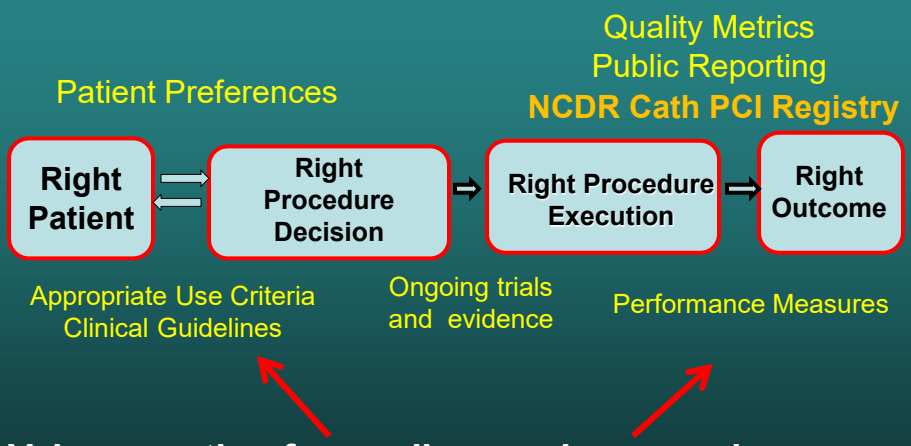
High Quality Cardiovascular Procedures



Value equation for cardiovascular procedures – was the right procedure done in the right way with the right outcome in a timely fashion? *Measures: AUC, Process, & Outcomes*

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Appropriateness Use Criteria Developed Using a Modified Rand/Delphi Methodology

Define "Appropriateness" for Coronary Revascularization

"Coronary revascularization is appropriate when the expected benefits, in terms of survival or health outcomes (*symptoms, functional status, and/or quality of life*) exceed the expected negative consequences of the procedure"

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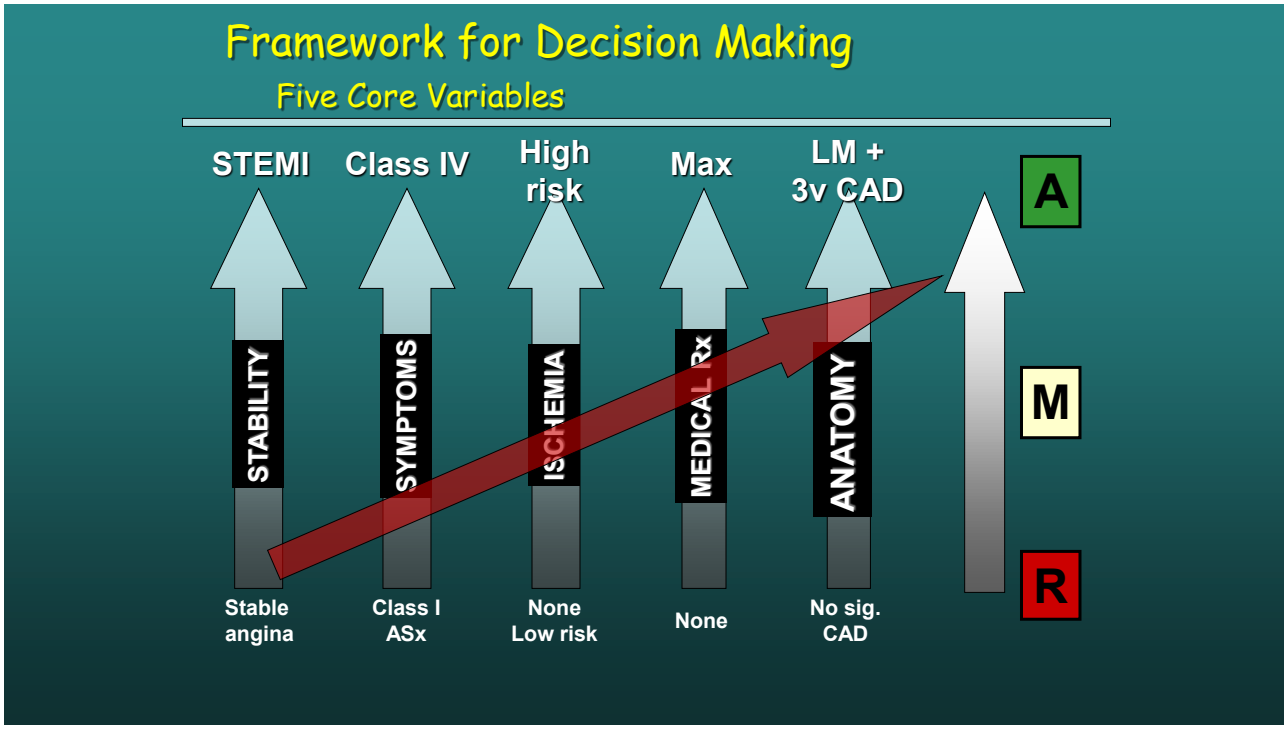
Framework for Decision Making
Five Core Variables
STEMI
Class IV
High risk
Max
LM + 3v CAD
STABILITY
SYMPTOMS
ISCHEMIA
MEDICAL Rx
ANATOMY
A
M
R
Stable angina
Class I ASx
None Low risk
None
No sig. CAD

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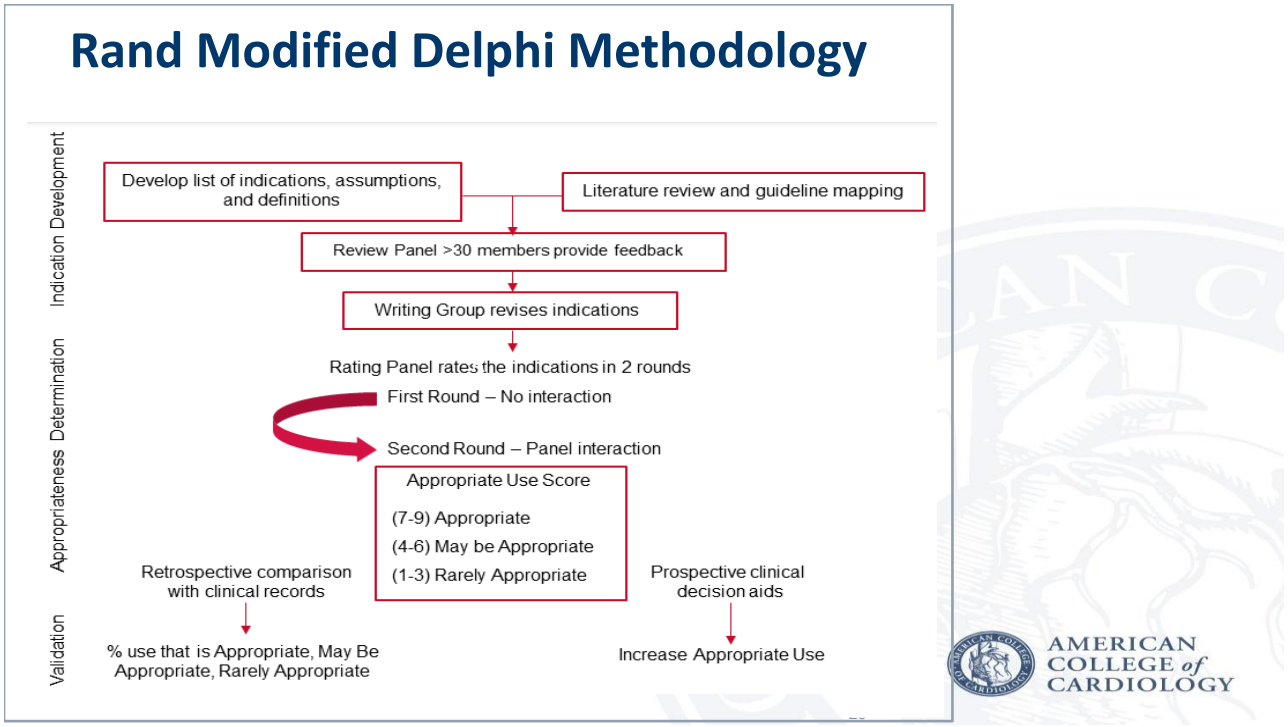
Rand Modified Delphi Methodology
Indication Development
Appropriateness Determination
Validation
Develop list of indications, assumptions, and definitions
Literature review and guideline mapping
Review Panel >30 members provide feedback
Writing Group revises indications
Rating Panel rates the indications in 2 rounds
First Round – No interaction
Second Round – Panel interaction
Appropriate Use Score
(7-9) Appropriate
(4-6) May be Appropriate
(1-3) Rarely Appropriate
Retrospective comparison with clinical records
Prospective clinical decision aids
% use that is Appropriate, May Be Appropriate, Rarely Appropriate
Increase Appropriate Use
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SIHD AUC Table

Indication	Asymptomatic: Not on AA Therapy or With AA Therapy — PCI	Asymptomatic: Not on AA Therapy or With AA Therapy — CABG	Asymptomatic: Not on AA Therapy — PCI	Asymptomatic: Not on AA Therapy — CABG	Ischemic Symptoms: On 1 AA Drug (BB Preferred) — PCI	Ischemic Symptoms: On 1 AA Drug (BB Preferred) — CABG	Ischemic Symptoms: On ≥2 AA Drugs — PCI	Ischemic Symptoms: On ≥2 AA Drugs — CABG
No Proximal LAD Involvement								
7. ■ Low-risk findings on noninvasive testing	R (3)	R (2)	M (4)	R (3)	M (5)	M (4)	A (7)	M (6)
8. ■ Intermediate- or high-risk findings on noninvasive testing	M (5)	M (4)	M (6)	M (5)	A (7)	M (6)	A (8)	A (7)
9. ■ No stress test performed or, if performed, results are indeterminate ■ FFR ≤0.80* in both vessels	M (5)	M (4)	M (6)	M (4)	A (7)	M (5)	A (8)	A (7)
Proximal LAD Involvement and No Diabetes Present								
10. ■ Low-risk findings on noninvasive testing	M (4)	M (4)	M (5)	M (5)	M (6)	M (6)	A (7)	A (7)
11. ■ Intermediate- or high-risk findings on noninvasive testing	M (6)	M (6)	A (7)	A (7)	A (7)	A (7)	A (8)	A (8)
12. ■ No stress test performed or, if performed, results are indeterminate ■ FFR ≤0.80 in both vessels	M (6)	M (6)	M (6)	M (6)	A (7)	A (7)	A (8)	A (8)
Proximal LAD Involvement With Diabetes Present								
13. ■ Low-risk findings on noninvasive testing	M (4)	M (5)	M (4)	M (6)	M (6)	A (7)	A (7)	A (8)
14. ■ Intermediate- or high-risk findings on noninvasive testing	M (5)	A (7)	M (6)	A (7)	A (7)	A (8)	A (8)	A (9)
15. ■ No stress test performed or, if performed, results are indeterminate	M (5)	M (6)	M (6)	A (7)	A (7)	A (8)	A (7)	A (8)

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NCDR CathPCI AUC Metrics

PCI Appropriate Use Criteria (AUC) Metrics

Distribution of Hospital Performance

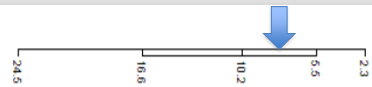
10th percentile — 90th percentile

Better →

30 **Proportion of PCI procedures not classifiable for AUC reporting**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
	10.2%	2.3%

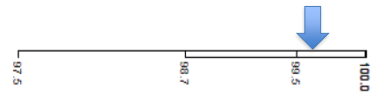
Proportion of PCI procedures that were not classifiable/evaluated for PCI AUC reporting due to incomplete or missing data. [Detail Line:1589]



31 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
	99.5%	100.0%

Proportion of PCI procedures that were evaluated as "Appropriate", among patients with ACS, meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival. [Detail Line:1581]



32 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness**

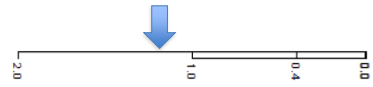
My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
	0.0%	0.6%

Proportion of PCI procedures that were evaluated as "Uncertain", among patients with ACS, meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival. [Detail Line:1582]

33 **Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate**

My Hospital	US Hospitals 50th Pctl	US Hospitals 90th Pctl
	0.4%	0.0%

Proportion of PCI procedures that were evaluated as "Inappropriate", among patients with ACS, meaning coronary revascularization is not generally



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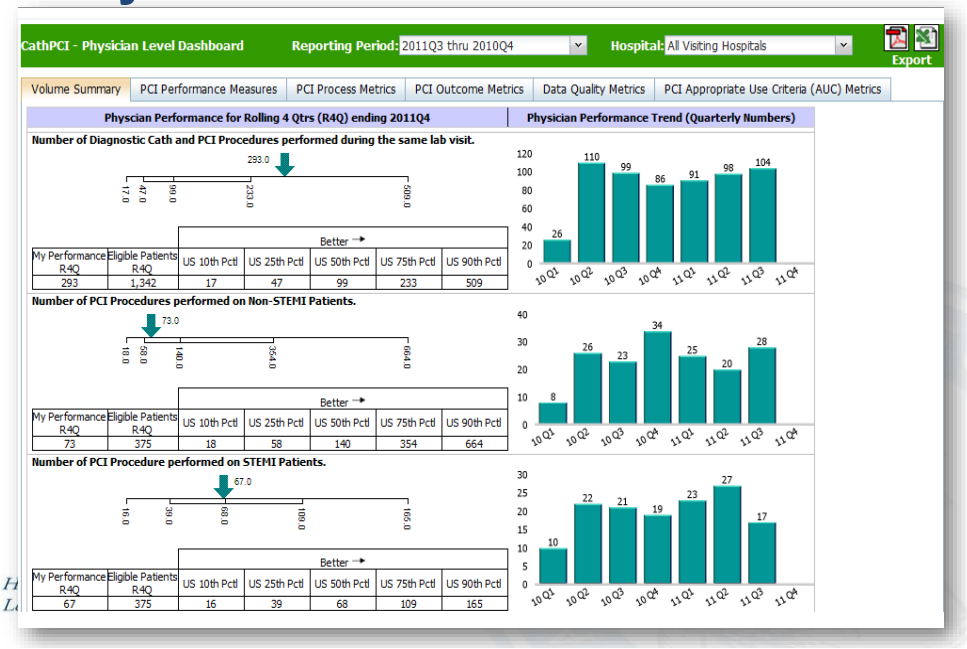
Physician Dashboard View



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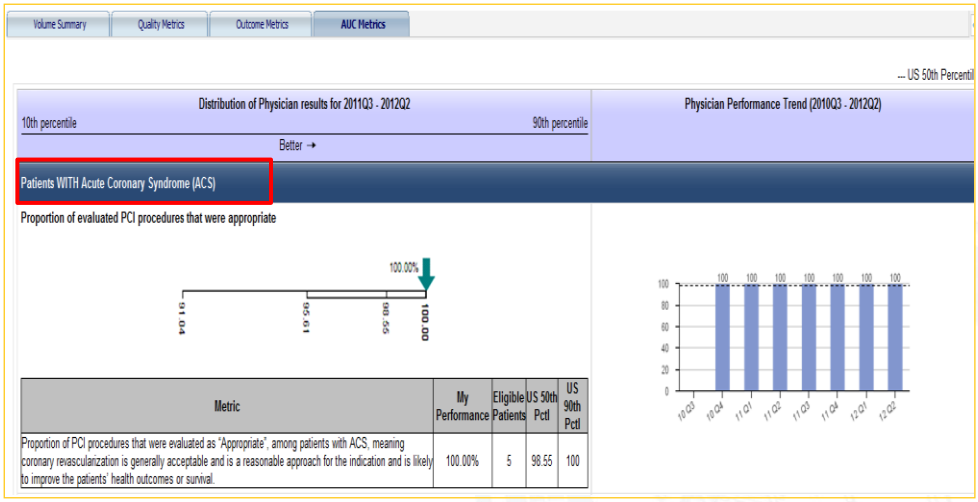
Appropriate Use Criteria Metrics



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AUC Metrics

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NCDR National Cardiovascular Data Registry

CathPCI Registry

The Four (6) Questions!!!

- Previous CABG
- ACS or Non-ACS
- Degree of Ischemia on Stress Testing
- Anti-Anginal Medications
- Severity of Angina – CCS
- Proximal LAD Lesion

Ischemia only documented 44% of time by stress testing prior to PCI

Lin, JAMA, 2008

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NCDR National Cardiovascular Data Registry

CathPCI Registry™

Top Reasons for Rarely Appropriate Revascularizations

1. **Asymptomatic with 1 or 2 vessel disease**
   - No or minimal anti-ischemic mediations
   - Low or intermediate risk findings on noninvasive study
2. **Asymptomatic with 1 or 2 vessel disease**
   - Maximal anti-ischemic medications
   - Low risk findings on noninvasive study
3. **CCS Class I or II with 1 or 2 vessel disease**
   - No or minimal anti-ischemic mediations
   - Low risk findings on noninvasive study

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The Society for Cardiovascular Angiography and Interventions SCAI

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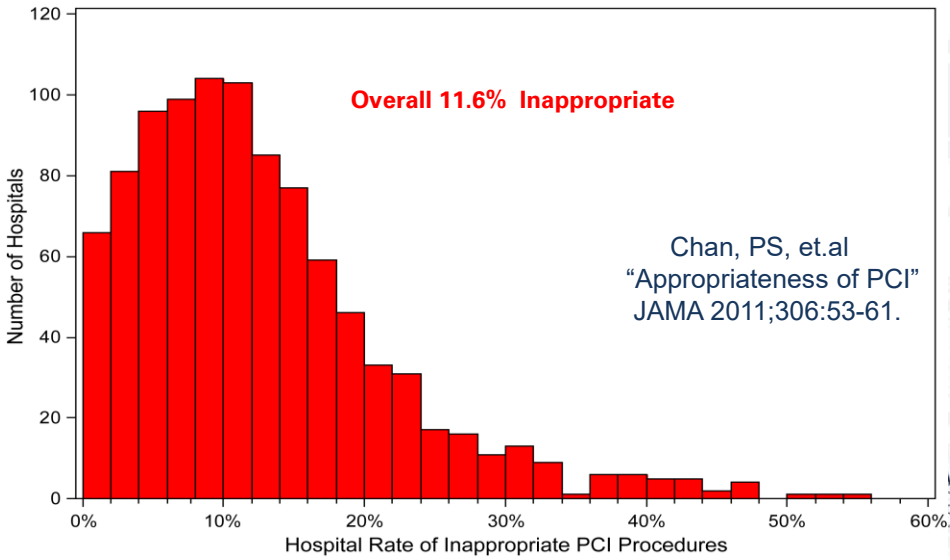
Hospital Variation in Non-Acute PCI Inappropriateness



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- 1625 patients with stable CAD
- AUC applied and related to the outcome

		Revasc. performed	Type of revasc.	Outcome (Death or ACS at 3 years)
Appropriate	68%	69%	PCI 57% CABG 43%	Performed 11.8%* Not performed 16.1%
Uncertain	18%	54%	PCI 86% CABG 14%	Performed 8.0% Not performed 15.3%
Inappropriate	14%	45%	PCI 82% CABG 18%	Performed 14.2% Not performed 9.4%

* HR 0.61, p < 0.009

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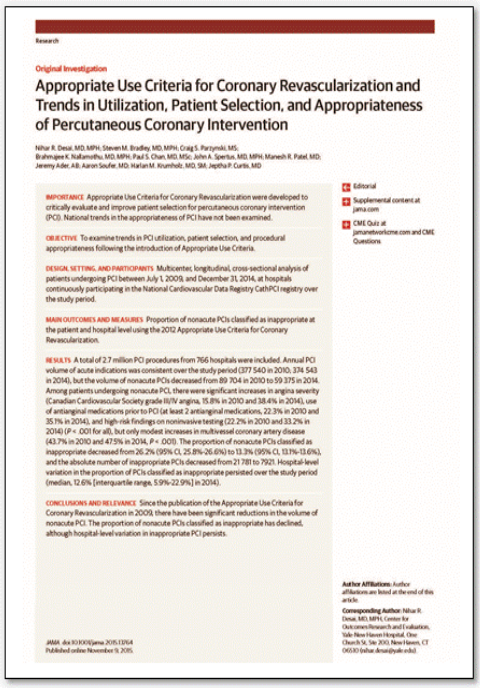

JAMA
The Journal of the American Medical Association

NR Desai and coauthors

Appropriate Use Criteria for Coronary Revascularization and Trends in Utilization, Patient Selection, and Appropriateness of Percutaneous Coronary Intervention

Published online November 9, 2015

Available at jama.com and on The JAMA Network Reader at mobile.jamanetwork.com

The JAMA Network

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Trends in Indication for PCI

PCI indication /Year	Overall	2009*	2010	2011	2012	2013	2014
Overall, n	2,685,683	243,580	538,076	502,995	481,889	462,636	456,507
Acute, n (%)	2,047,853 (76.3)	168,366 (69.1)	377,540 (70.2)	373,423 (74.2)	380,331 (78.9)	373,650 (80.8)	374,543 (82.0)
Non-acute, n (%)	397,737 (14.8)	41,024 (16.8)	89,704 (16.7)	78,328 (15.6)	66,849 (13.9)	62,457 (13.5)	59,375 (13.0)
Non-mappable n (%)	240,093 (8.9)	34,190 (14.0)	70,832 (13.2)	51,244 (10.2)	34,709 (7.2)	26,529 (5.7)	22,589 (4.9)

*Includes 6-months of data (July 1 to December 31, 2009)

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Baseline Characteristics Among Patients Undergoing Non-acute PCI

	2010		2014		Absolute Change from 2014-2010	
Patient Characteristics	#	%	#	%	#	%
N	89,704	22.6	59,375	14.9	-30,329	-7.7
Angina						
No symptoms	26,313	29.3	12,890	21.7	-13,423	-7.6
CCS I or II	47,710	53.2	23,689	39.9	-24,021	-13.3
CCS III or IV	15,681	17.4	22,796	38.4	+7,115	+21.0
No. of antianginal medications						
0	27,076	30.2	11,521	19.4	-15,555	-10.8
1	42,610	47.5	27,031	45.5	-15,579	-2.0
>=2	20,011	22.3	20,816	35.1	+805	+12.8
Stress test results (those with a test)						
Unavailable	10,328	18.4	4,708	11.2	-5,620	-7.2
Low or intermediate risk	33,468	59.5	23,475	55.6	-9,993	-3.9
High risk	12,460	22.2	14,018	33.2	+1,558	+11.0
Multi-vessel CAD on angiography	39,231	43.7	28,192	47.5	-11,039	+3.8

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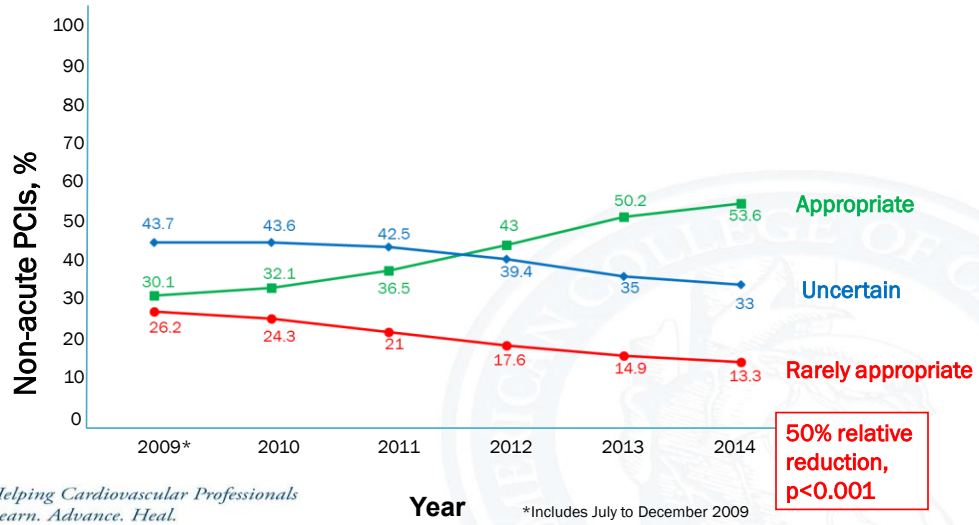
Patient-level Trends in Appropriateness of Non-acute PCI



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Challenges in Appropriate Use Evaluations

- Not all clinical scenarios are “mappable” with data elements available- in PCI 15-20% unmappable
- AUC time lag due to changing science- RCTs incorporated into CPGs and then AUCs and finally registry element updates – >5 years or more!…… losing Face Validity
- Gaming AUC by clinicians- comprehensive auditing would be $$ prohibitive and even requiring film reviews at times

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Current AUC CV Documents

- 2017 Appropriate Use Criteria for Multimodality Imaging in Valvular Heart Disease
- 2017 Appropriate Use Criteria for the Treatment of Patients With Severe Aortic Stenosis
- 2023 Multimodality Appropriate Use Criteria for the Detection and Risk Assessment of Chronic Coronary Disease
- 2025 Appropriate Use Criteria for Implantable Cardioverter-Defibrillators, Cardiac Resynchronization Therapy, and Pacing
- 2024 Appropriate Use Criteria for Multimodality Imaging in Cardiovascular Evaluation of Patients Undergoing Nonemergent, Noncardiac Surgery
- 2016 Appropriate Use Criteria for Coronary Revascularization in ACS
- 2017 Appropriate Use Criteria for Coronary Revascularization in Patients With Stable Ischemic Heart Disease
- 2020 Appropriate Use Criteria for Multimodality Imaging During the Follow-Up Care of Patients With Congenital Heart Disease
- 2018 Appropriate Use Criteria for Peripheral Artery Intervention
- 2013 Appropriate Use Criteria for Implantable Cardioverter-Defibrillators and Cardiac Resynchronization Therapy:

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Public Comment

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Item #4: Workgroup Discussion and Identifying Recommendations for Consideration by CAP

Ralph Brindis, M.D., M.P.H., F.A.C.C., CAP Chair
Christopher Krawczyk, Ph.D., Chief Analytics Officer, HCAI (or designees)

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Item # 4

Solicit candidate cardiac procedures while considering feasibility, impact and overall direction of CCORP

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Considerations in Healthcare Quality Measurement

- Data source
- Data collection burden
- Data quality and audit
- Types of measures (outcomes best)
- Variation, gap, impact
- Sample size and endpoint frequency, which impact
  - selection of target diagnoses, procedures
  - level of attribution (physician, hospital, system)
  - statistical power, reliability
- Accurate patient to provider attribution
- Patient observation period
- Provider observation period
- Risk adjustment
  - clinical face validity
  - statistical methodology
    - logistic, hierarchical
    - direct or indirect standardization
  - risk model performance
- Measure validity, reliability
- Outlier determination
- Patient-friendly presentation
- Minimizing time lag
- Public reporting vs confidential
- Unintended consequences

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Questions in Measurement Development

- Who developed your measure? Clinicians involved?
- What is your data source, and is it representative of the overall population?
- Are your data audited?
- Are your measures risk-adjusted, and if so, how?
- Management of exceptional risk cases?
- How do you classify outliers? Rate or rank? Confidence interval criteria?
- Are your methods published, preferably in the peer-reviewed literature?
- Have you submitted your measures for external validation/endorsement (e.g., NQF or Battelle, the current Consensus-Based Entity)?

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Consequences of Inaccurate/Inconsistent Quality Metrics

- Confuse or mislead patients and families in their choice of providers
- Inappropriately penalize good performers
  - Reputation, referrals, reimbursement
- Inappropriately reassure or reward low performers
- Misdirect scare quality improvement resources

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Impact Key Considerations

- Population impact for equitable cardiac care across CA
- Evidence-based and best practices for cardiac interventional procedures to impact cardiovascular outcomes
- Volume of interventional procedure significant to make a meaningful impact for cardiac care
- Timeliness of reporting (pool data across multiple years may delay release of report)
- Relevance for appropriateness of care and health care quality

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Candidate Procedures and Additional Analyses

- All PCI
  - Mortality measure could mirror CABG, and could consider one-year mortality for both
- Surgical Aortic Valve Replacement (SAVR)
- Additional analyses of existing procedures
  1. Trends by patient demographics
  2. Volume to outcome relationships
  3. Population-density/volume relationship
  4. Clinical indicators for procedures
- Other procedures recommended by workgroup

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Candidate Interventional Cardiovascular Procedures

Workgroup Discussion

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Overall Direction of CCORP and Expanding Cardiovascular Outcomes Reporting

Workgroup Recommendations

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Public Comment

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Item #5: Public Comment

Ralph Brindis, M.D., M.P.H., F.A.C.C., CAP Chair (or designee)

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Item #6: Adjournment

Ralph Brindis, M.D., M.P.H., F.A.C.C., CAP Chair (or designee)

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