XXV Giornate Cardiologiche Torinesi
"ADVANCES IN CARDIAC ARRHYTHMIAS AND GREAT INNOVATIONS IN CARDIOLOGY"
Turin, September 27-28, 2013
Centro Congressi Unione Industriale

Chronic coronary artery disease: current controversies

PCI for the management of chronic CAD: indication and techniques in 2013

Leonardo Bolognese
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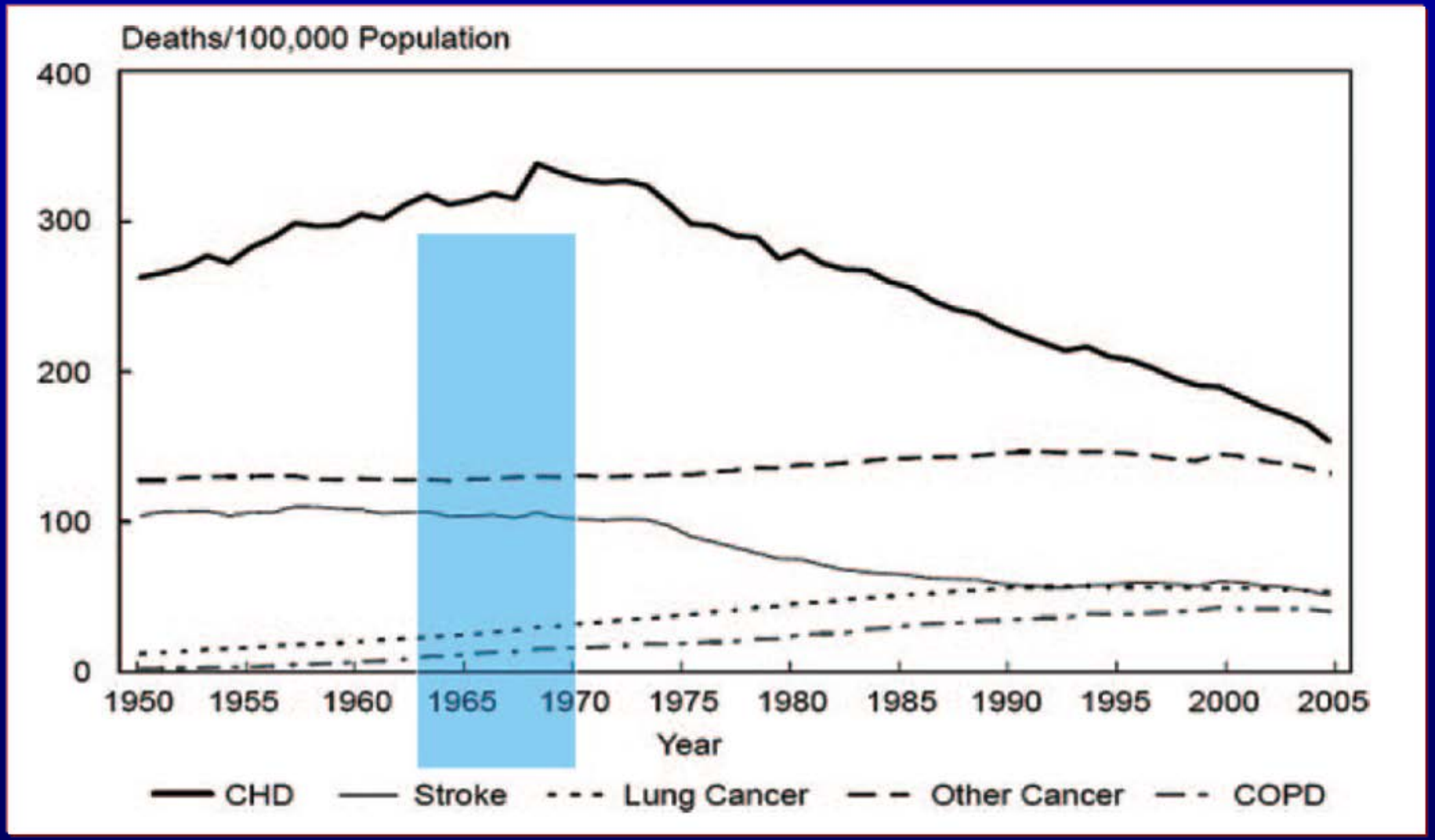
Death rates 1950 to 2004.



http://www.nhlbi.nih.gov/resources/docs/chtbook.htm.

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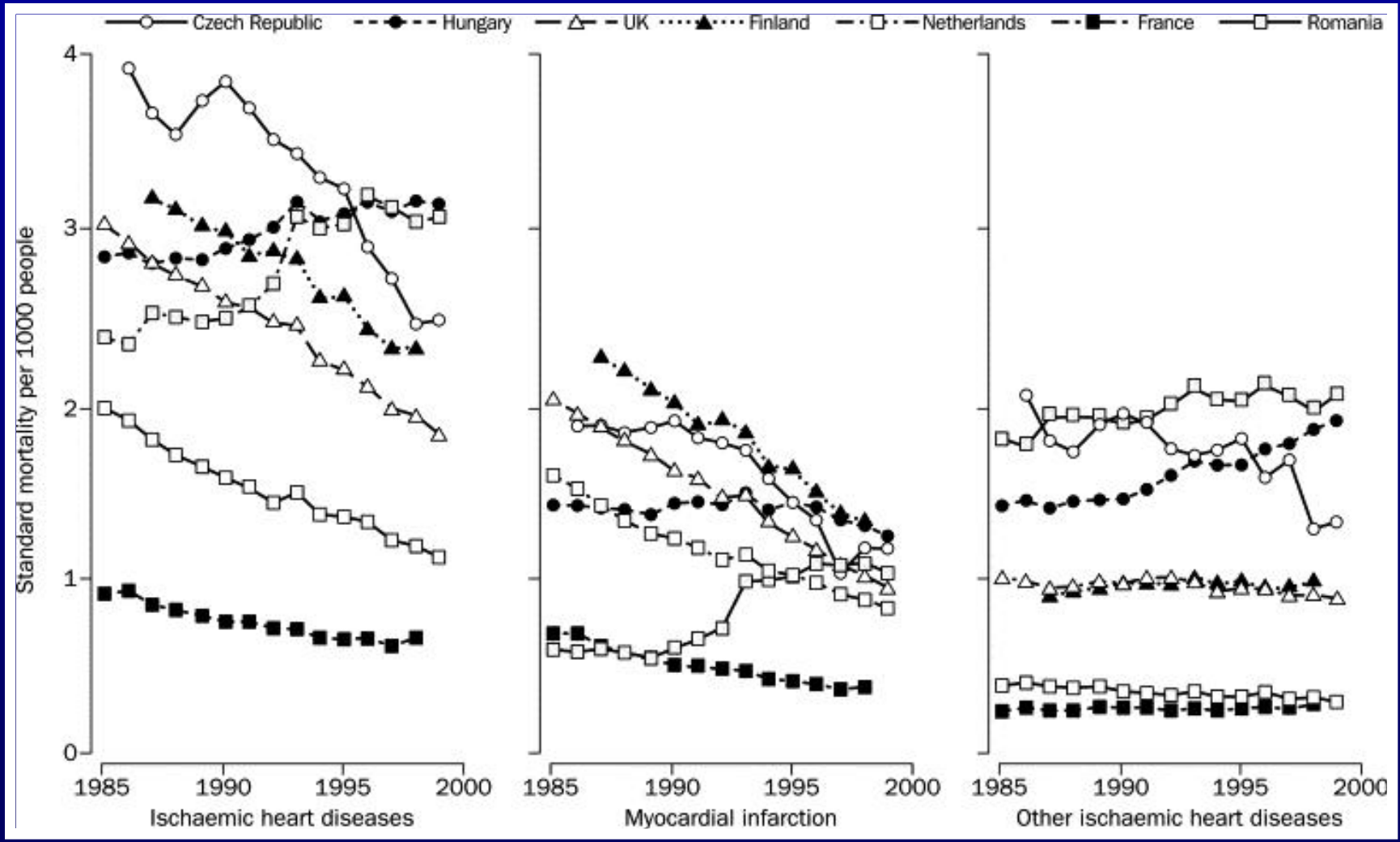
Standardised ischaemic heart diseases mortality in selected European countries



Boersma E et al. Lancet 2003;361:847–858.

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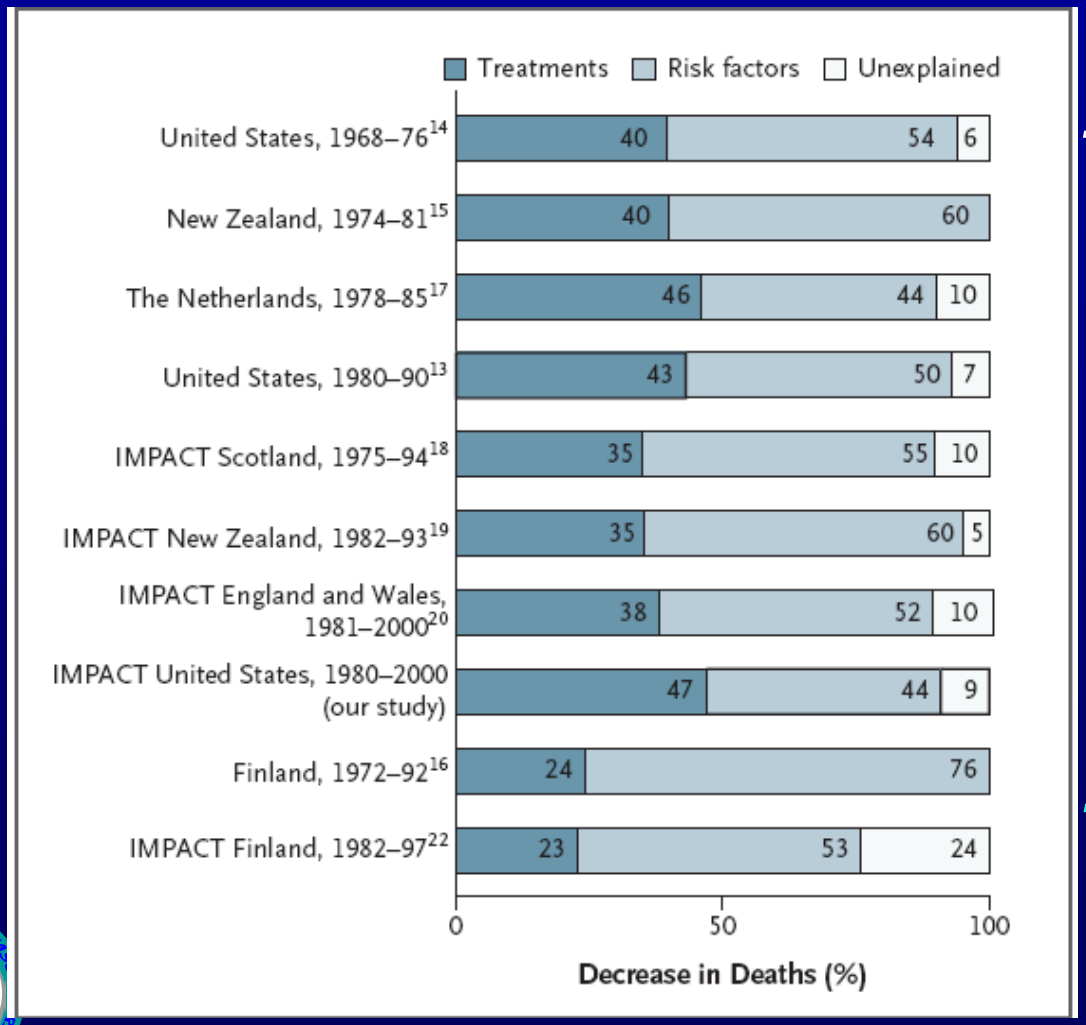
Percentage of the Decrease in Deaths from CHD Attributed to Treatments and Risk-Factor Changes

The Centers for Disease Control



The use of revascularization for chronic angina resulted in a reduction of approximately 15,690 deaths in 2000, as compared with deaths in 1980, or approximately 5% of the total and only 1.3% was attributable to PCI.

Ford ES et al N Engl J Med 2007; 356:2388

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PCI in Stable CAD: *The Debate*

It has long been recognized that the problems with alcohol relate not to the use of a bad thing but to the abuse of a good thing

Abraham Lincoln
1861

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Adherence of Cath Lab Cardiologists to ACC/AHA Guidelines for PCI and CABG: What Happens in Actual Practice?

ACC/AHA Indication/Cath Lab Recommendation	CABG, n (%)	PCI, n (%)	Medical		tal, n (%)
CABG	712 (5[illegible])				37 (100)
PCI					1 (100)
CABG				4 (<1)	1722 (100)
Neither			873 (71)	19 (2)	1223 (100)
Total	[illegible] (10)	7984 (77)	1310 (13)	49 (<1)	10 333 (100)

Of the 16,142 pts undergoing catheterization with complete data who were found to have CAD, the cath lab cardiologist was the final source of recommendation for 10,333 pts (64%)

Hannan EL et al. Circulation. 2010;121:267-275

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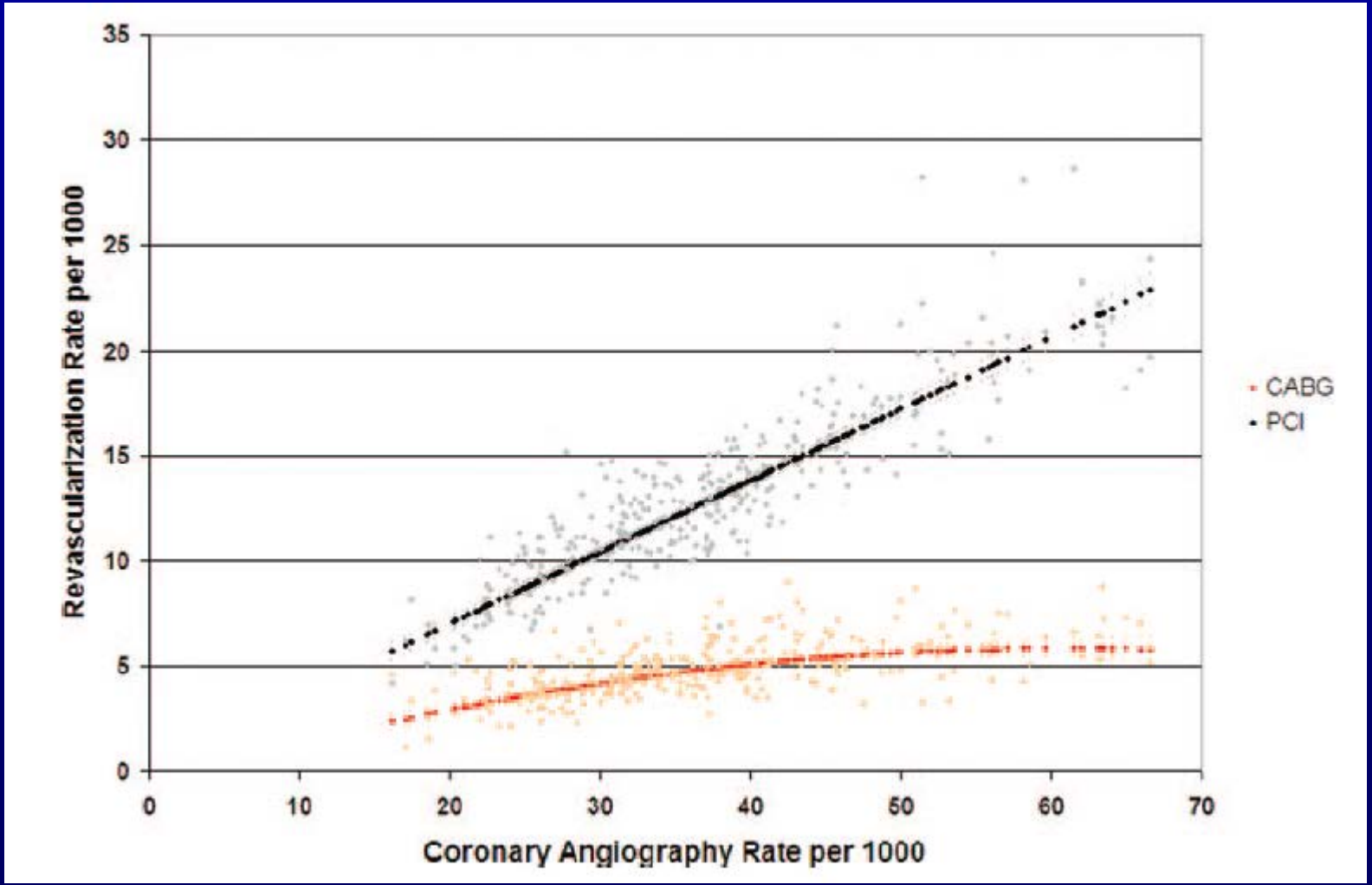
Diagnostic-Therapeutic Cascade Revisited: Coronary Angiography, CABG, and PCI in the Modern Era



Lucas FL et al. Circulation 2008;118;2797-2802

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Judge and Jury…

- Patients with CAD are referred to cardiologists
- Cardiologists investigate the patient
- Cardiologist decides on revascularization strategy
- In many healthcare systems, the cardiologist receives direct payment for the PCI procedure (‘fee for service’)

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Recommendations for decision making and patient information

	Class[a]	Level[b]
It is recommended that patients be adequately informed about the potential benefits and short- and long-term risks of a revascularization procedure. Enough time should be spared for informed decision making.	I	C
The appropriate revascularization strategy in patients with MVD should be discussed by the Heart Team.	I	C

Multidisciplinary decision pathways, patient informed consent, and timing of intervention

ESC/EACTS GUIDELINES

		ACS			Stable MVD	Stable with indication for *ad hoc* PCI[a]
	Shock	STEMI	NSTE - ACS[b]	Other ACS[c]		
Multidisciplinary decision making	Not mandatory.	Not mandatory.	Not required for culprit lesion but required for non-culprit vessel(s).	Required.	Required.	According to predefined protocols.
Informed consent	Oral witnessed informed consent or family consent if possible without delay.	Oral witnessed informed consent may be sufficient unless written consent is legally required.	Written informed consent[d] (if time permits).	Written informed consent[d]	Written informed consent[d]	Written informed consent[d]

European Heart Journal 2010
doi:10.1093/eurheartj/ehq277

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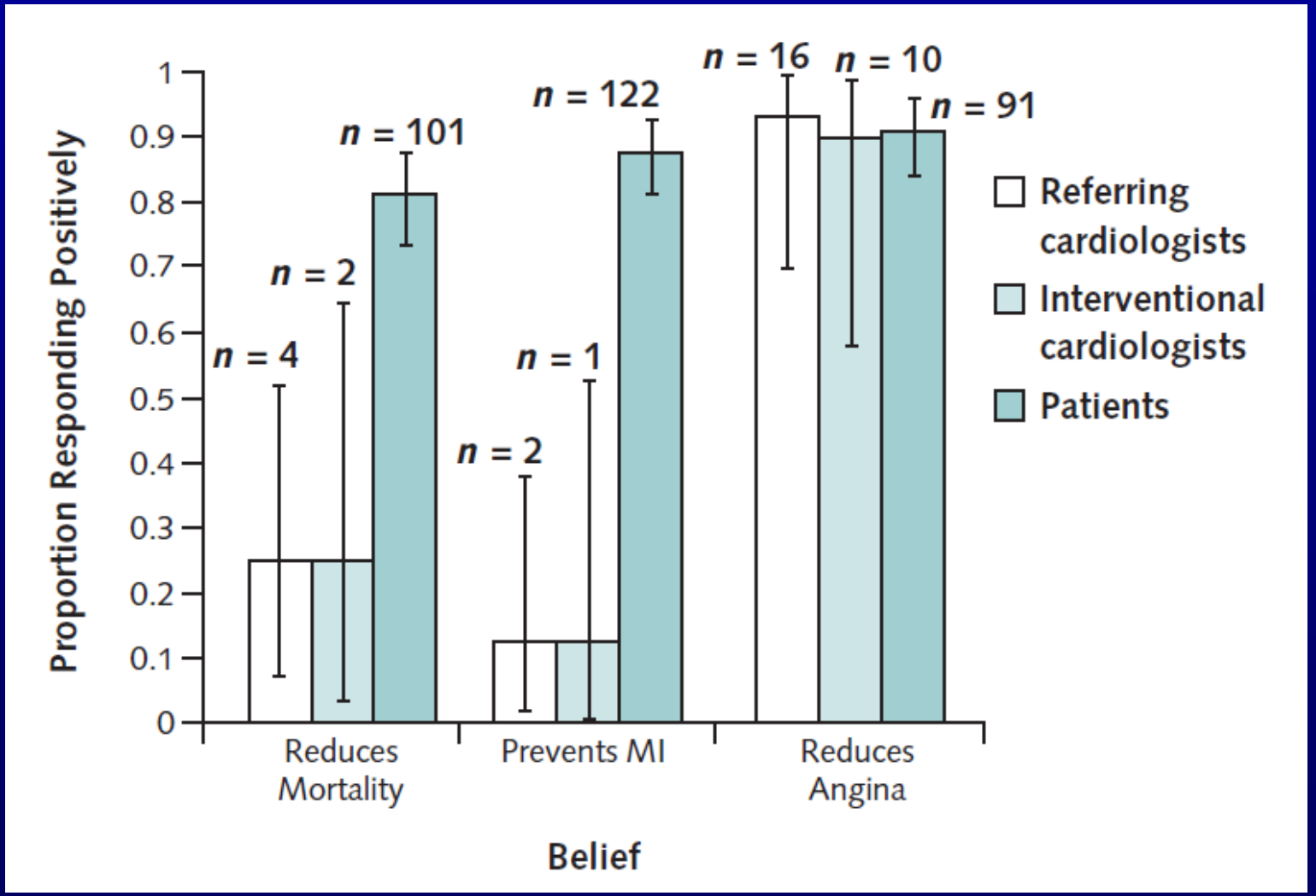
Patients' and Cardiologists' Perceptions of the Benefits of PCI for Stable CAD



Rothberg MB et al. Ann Intern Med. 2010;153:307-313

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Why do patients continue to overestimate the benefits of PCI for stable angina?

- This “therapeutic misconception” is based on the concept of “personal care”—that a physician’s first obligation is solely to the patient’s well-being
- Patients may not understand the distinction between unstable angina, for which PCI may be life-saving, and stable angina, because both cause chest pain
- Cardiologists’ decisions are often based on factors other than perceived benefit, such as patient expectations; medicolegal concerns; and the “oculostenotic reflex”.
- A final contributor to potential overuse of PCI may be the practice of ad hoc PCI. This practice leaves little opportunity for reflection and informed decision making. It may also interfere with collaborative decision

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ESC/EACTS GUIDELINES

Potential indications for ad hoc PCI vs at an interval

Ad hoc PCI
Haemodynamically unstable patients (including cardiogenic shock).
Culprit lesion in STEMI and NSTE-ACS.
Stable low-risk patients with single or double vessel disease (proximal LAD excluded) and favourable morphology (RCA, non-ostial LCx, mid- or distal LAD).
Non-recurrent restenotic lesions.
Revascularization at an interval
Lesions with high-risk morphology.
Chronic heart failure.
Renal failure (creatinine clearance <60 mL/min), if total contrast volume required >4 mL/kg.
Stable patients with MVD including LAD involvement.
Stable patients with ostial or complex proximal LAD lesion.
Any clinical or angiographic evidence of higher periprocedural risk with *ad hoc* PCI.

EHJ 2010
doi:10.1093/eurheartj/ehq277

ESC/EACTS GUIDELINES

Indications for revascularization in stable angina or silent ischaemia

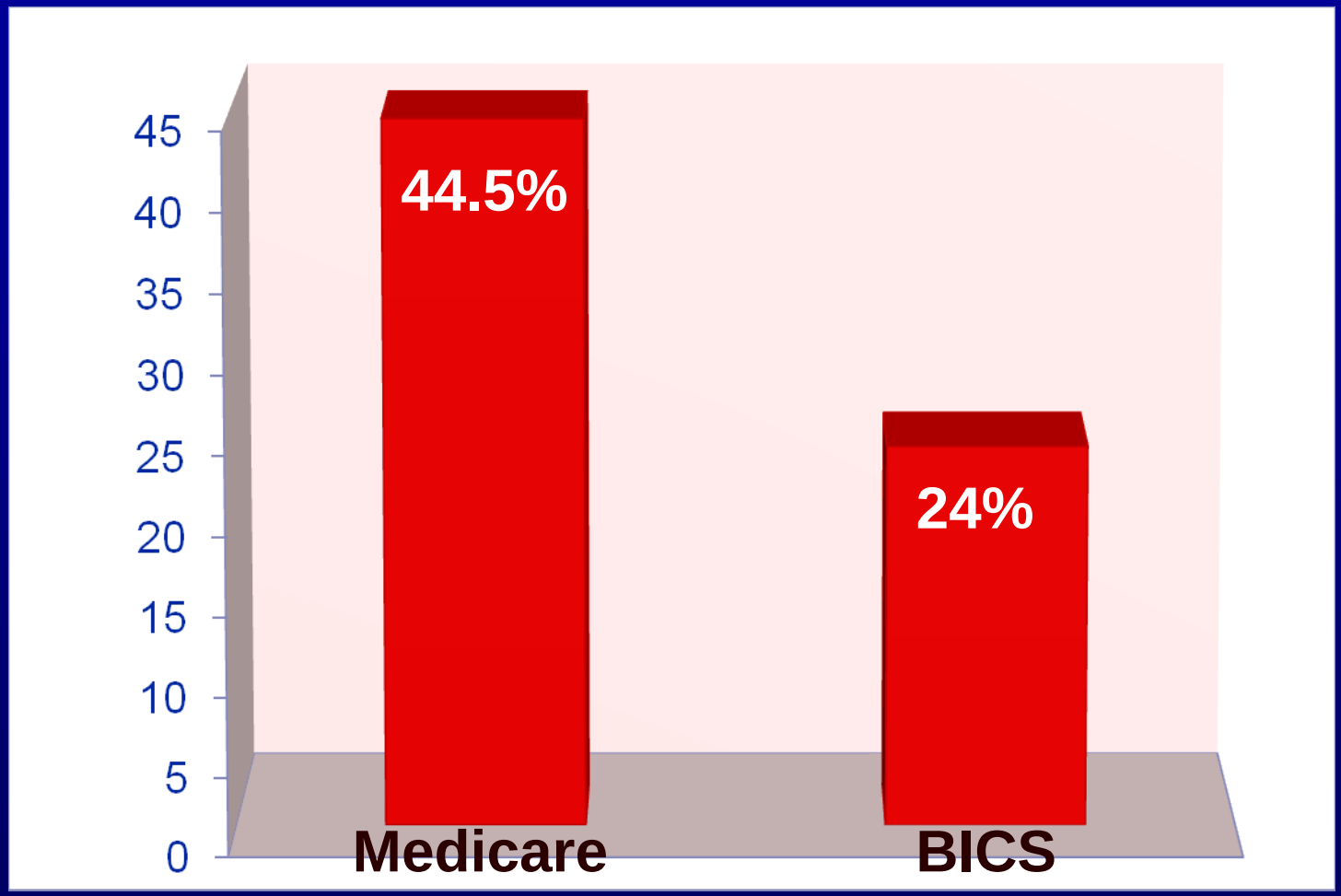
d

With documented ischaemia or FFR ,0.80 for angiographic diameter stenoses 50–90%.

	Subset of C	my	Class[a]	Level[b]
For prognosis	Left main >50%[d]		I	A
	Any proximal LAD >50%[d]		I	A
	2VD or 3VD with impaired LV function[d]		I	B
	Proven large area of ischaemia (>10% LV)		I	B
	Single remaining patent vessel >50% stenosis[d]		I	C
	1VD without proximal LAD and without >10% ischaemia		III	A
For symptoms	Any stenosis >50% with limiting angina or angina equivalent, unresponsive to OMT		I	A
	Dyspnoea/CHF and >10% LV ischaemia/viability supplied by >50% stenotic artery		IIa	B
	No limiting symptoms with OMT		III	C

d

Frequency of Stress Testing to Document Ischemia Prior to Elective Percutaneous Coronary Intervention



Ludman P http://www.bcis.org.uk/resources/audit

Lin GA et al. JAMA. 2008;300:1765-1773

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Indications for revascularization in patients with stable CAD

- Depending on its symptomatic, functional and anatomic complexity, CAD can be treated by Optimal Medical Therapy (OMT) alone, or combined with revascularisation using PCI or CABG.
- The two issues to be addressed are:
  - the appropriateness of revascularisation,
  - the relative merits of CABG and PCI in different patterns of CAD.
- Revascularisation can be readily justified:
  - on **prognostic** grounds in certain anatomical patterns of CAD or a proven significant ischaemic territory or acute CAD,
  - on **symptomatic** grounds in stable patients with persistent limiting symptoms despite OMT.

Appropriateness Criteria

ACCF/SCAI/STS/AATS/AHA/ASNC 2009 Appropriateness Criteria for Coronary Revascularization

A Report of the American College of Cardiology Foundation Appropriateness Criteria Task Force, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Association for Thoracic Surgery, American Heart Association, and the American Society of Nuclear Cardiology

Endorsed by the American Society of Echocardiography, the Heart Failure Society of America, and the Society of Cardiovascular Computed Tomography

APPROPRIATE USE CRITERIA

ACCF/SCAI/STS/AATS/AHA/ASNC/HFSA/SCCT 2012 Appropriate Use Criteria for Coronary Revascularization Focused Update

A Report of the American College of Cardiology Foundation Appropriate Use Criteria Task Force, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Association for Thoracic Surgery, American Heart Association, American Society of Nuclear Cardiology, and the Society of Cardiovascular Computed Tomography

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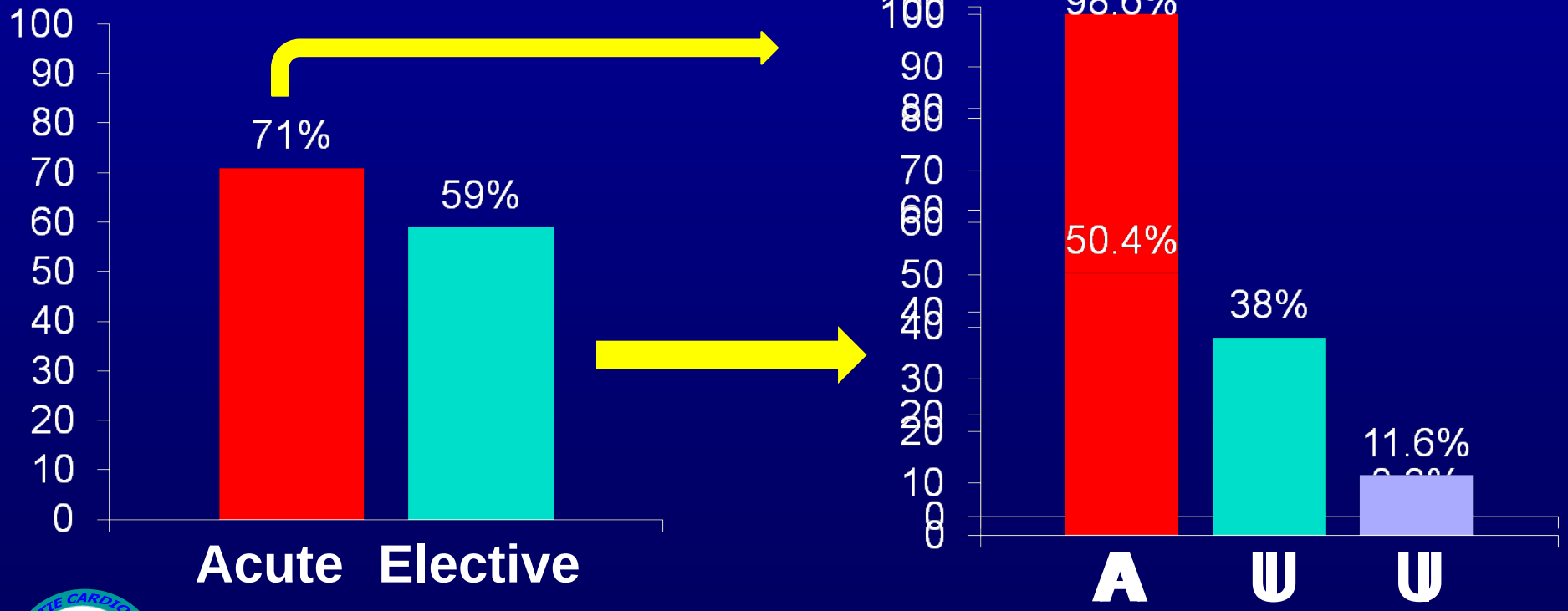
Appropriateness of PCI in the National Cardiovascular Data Registry

500 000 cases from July 2009 to June 2010



Chan P et al. JAMA. 2011;306(1):53-61

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The VRPO (Variation in Revascularization Practices in Ontario) study

Treatment According to Appropriateness Categories

80

Table 2 Unadjusted Rates and Adjusted Hazards of Death or Recurrent Acute Coronary Syndrome at 3 Years, According to Appropriateness Categories and Coronary Revascularization

Appropriateness Category	n	Crude Rate %		HR (95% CI)	Adjusted p Value
		No Revascularization	Revascularization		
Inappropriate*	311	16 (9.4%)	20 (14.2%)	0.99 (0.48-2.02)	0.97
Uncertain*	326	23 (15.3%)	14 (8.0%)	0.57 (0.28-1.16)	0.12
Appropriate†	991	50 (16.1%)	80 (11.8%)	0.61 (0.42-0.88)	0.0087

ACC Appropriateness Categories

Ko TD et al. J Am Coll Cardiol 2012 60:1876-1884

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Appropriateness Ratings by Low-Risk Findings on Noninvasive Imaging Study and Asymptomatic (Patients Without Prior CABG)

Low Risk Findings on Noninvasive Study							Asymptomatic					
Symptoms **Med. Rx**							**Stress Test Med. Rx**					
Class III or IV Max Rx	U	A	A	A	A		High Risk Max Rx	U	A	A	A	A
Class I or II Max Rx	U	U	A	A	A		High Risk No/min Rx	U	U	A	A	A
Asymptomatic Max Rx	I	I	U	U	U		Int. Risk Max Rx	U	U	U	U	A
Class III or IV No/min Rx	I	U	A	A	A		Int. Risk No/min Rx	I	I	U	U	A
Class I or II No/min Rx	I	I	U	U	U		Low Risk Max Rx	I	I	U	U	U
Asymptomatic No/min Rx	I	I	U	U	U		Low Risk No/min Rx	I	I	U	U	U
Coronary Anatomy	CTO of 1 vz.; no other disease	1-2 vz. disease; no Prox. LAD	1 vz. disease of Prox. LAD	2 vz. disease with Prox. LAD	3 vz. disease; no Left Main		**Coronary Anatomy**	CTO of 1 vz.; no other disease	1-2 vz. disease; no Prox. LAD	1 vz. disease of Prox. LAD	2 vz. disease with Prox. LAD	3 vz. disease; no Left Main

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Former US President George W Bush Gets a Stent

Freddy Ford, a Bush spokesperson, told that the former president *underwent a stress test as part of his physical examination*, although *he did not have any symptoms* of coronary artery disease. An abnormal finding on the ECG led to a computed tomography (CT) angiogram where the coronary lesion was detected.

"Routine stress testing in patients without symptoms can lead to procedures that are not indicated. Bush likely got the classical thing that happens to VIP patients, when they get so-called executive physicals and they get a lot of tests that aren't indicated. This is American medicine at its worst! "

Steven Nissen

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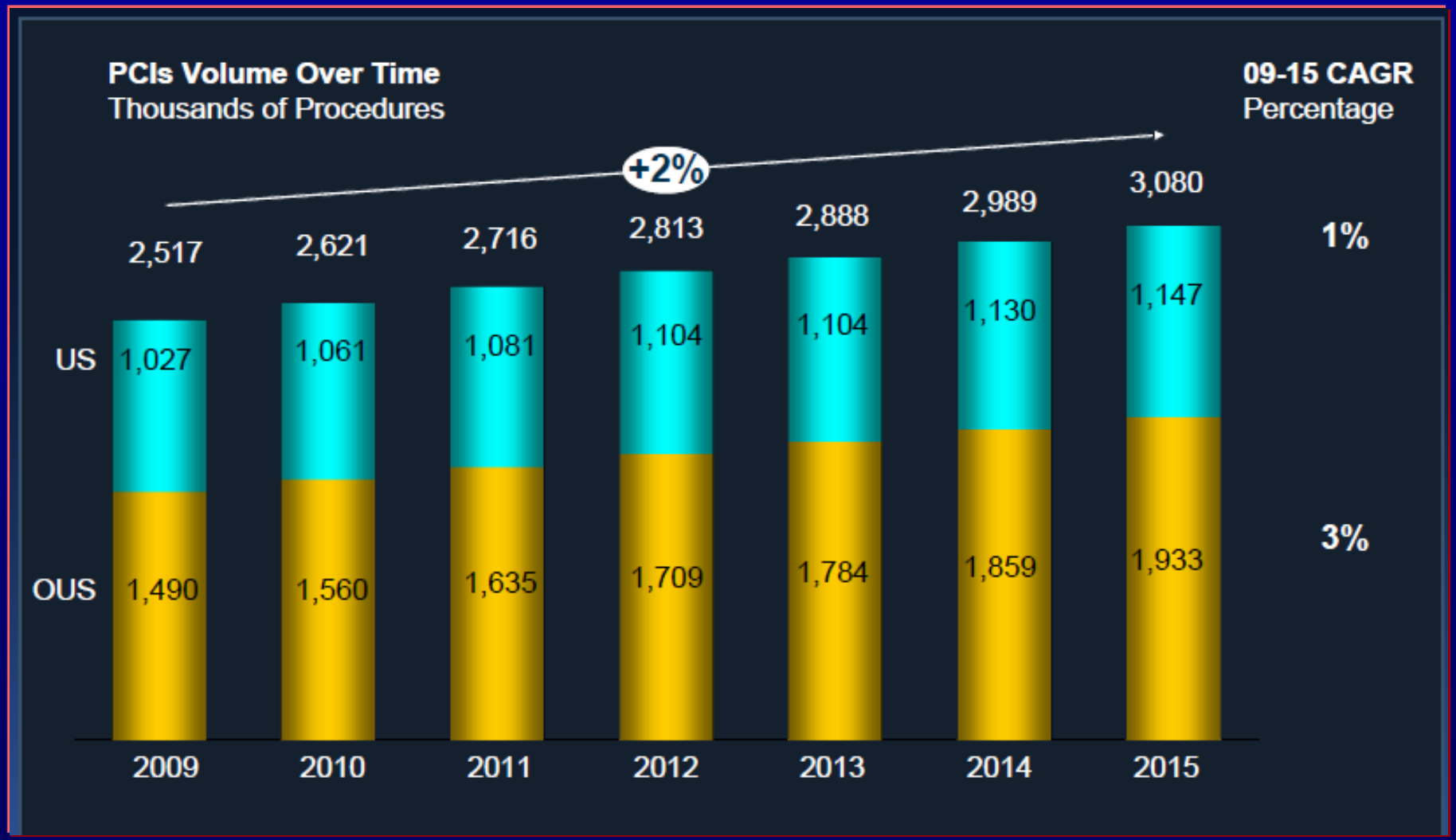
Worldwide PCI Procedures



Source: JP Morgan

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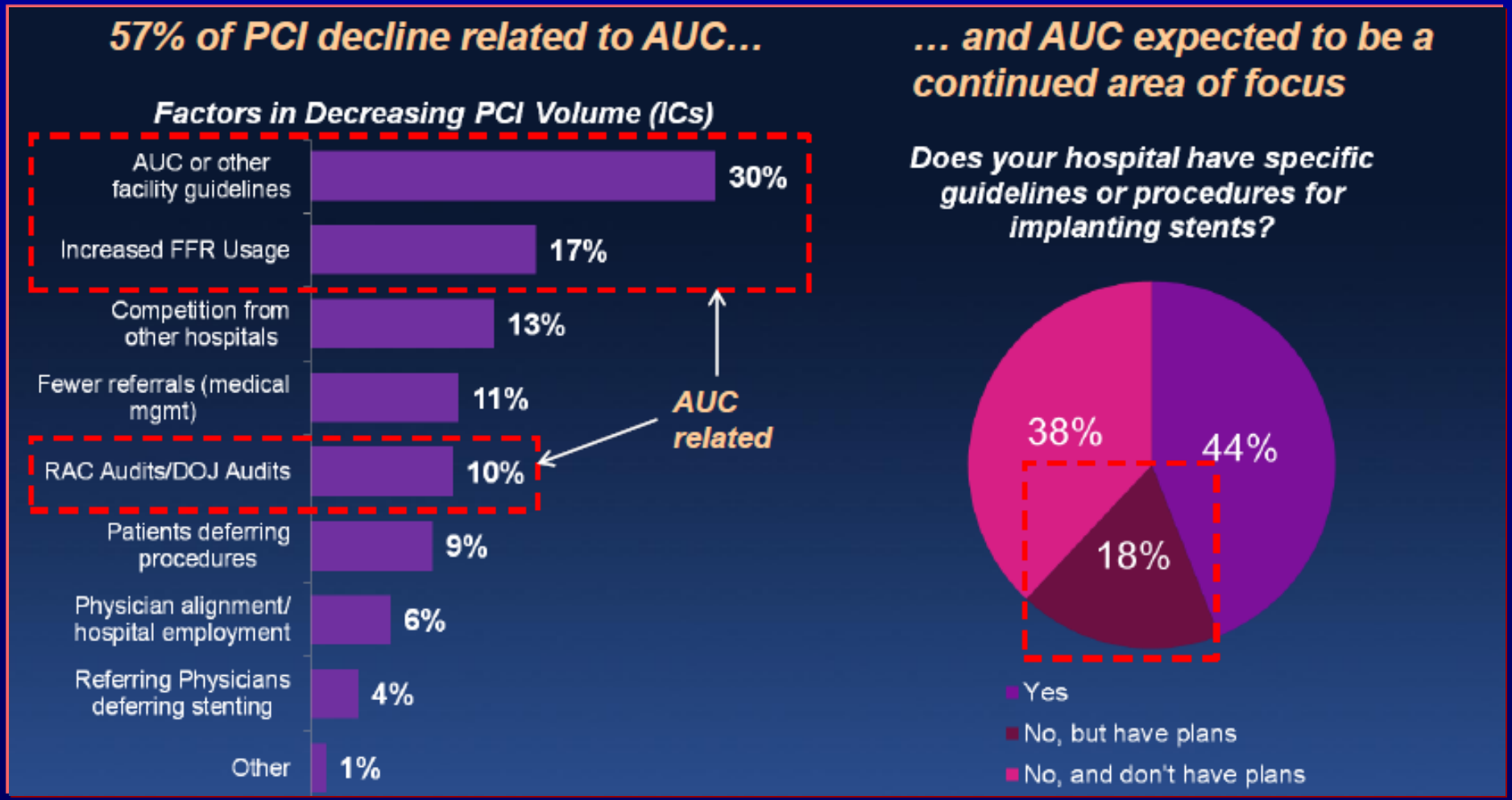
Appropriate Use Criteria (AUC) Largest Driver of PCI Decline in US and Expected to Continue



Source: Industry Survey Data (n=43 US ICs, 18 US hospital administrators)

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Have Guidelines and its derivative products - such as appropriateness criteria - any probability to be implemented in clinical practice?

Can we appropriately measure appropriateness?

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Concordance of Physician Ratings With the Appropriate Use Criteria for Coronary Revascularization

Rates of Nonagreement in Ratings of Appropriateness Within Each Group

Lack of concordance within the AUC technical panel and between the AUC technical panel and clinical cardiology community!

Uncertain	32%	100%	100%	100%
Inappropriate	20%	70%	63%	79%

Chan PS et al. J Am Coll Cardiol 2011;57:1546–53

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Transparency of Appropriateness Criteria

The story of how George Washington's doctors contributed to his rapid demise

The former president contracted probable epiglottitis, for which his 2 senior physicians prescribed 6 to 8 pints of bloodletting. The third physician (the junior member of the team at age 37 yrs) recognized upper airway obstruction and recommended tracheotomy—an accepted therapy for this condition. He was overruled, and the elder clinicians proceeded with blood removal until Mr. Washington's struggling subsided and he died peacefully.

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Witt CB Jr. The health and controversial death of George Washington. Ear Nose Throat J 2001;80:102–5.

Transparency of Appropriateness Criteria

the dangers of expert opinion without adequate scientific evidence

- ✓ **As nearly 50%of the guideline recommendations are Level of Evidence C (based upon expert opinion, case studies, or standards of care)**
- ✓ **The recent proliferation of appropriateness criteria for various CV conditions and procedures are based on these same guidelines**
- ✓ ***After all, George Washington was treated "appropriately" but with a therapy supported by Level of Evidence: C (expert opinion).***

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Gaps Between Ideal and Actual Care

…..a shift is needed from the "science of recommendation" to a "science of implementation"

Alegria M. Health Services Research 2009; 44:1

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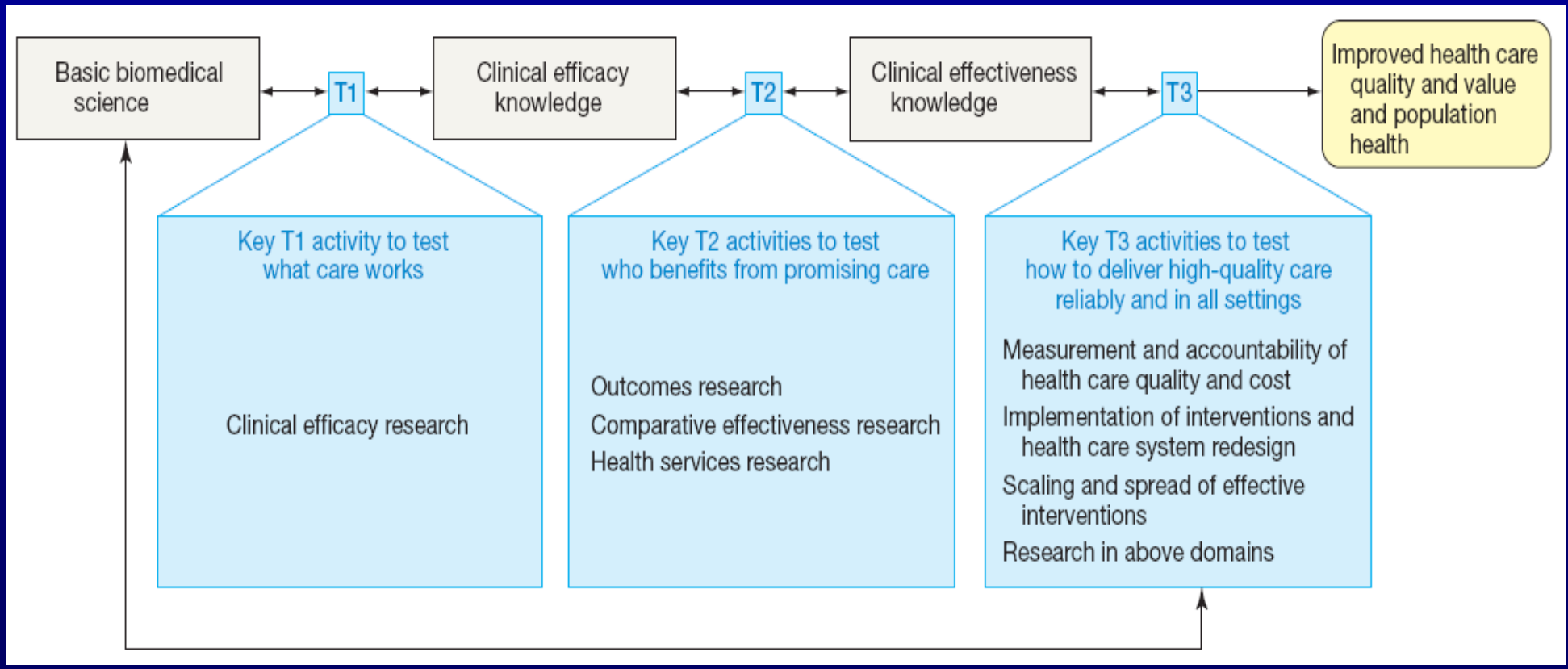
The “3T’s” Road Map to transform Health care: The How of High-Quality care

The long journey from science to action



Dougherty D, Conway PH JAMA 2008; 19:2319

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Linking Comparative-effectiveness Research with Implementation Research to Improve Quality

The remarkable example of Primary PCI

The Three Translations Required to Improve the Quality of Primary Percutaneous Coronary Intervention (PCI) in Patients with Acute Myocardial Infarction.

Translational Tier	Type of Research	Products of Research
T1	Clinical efficacy research	Proof that primary PCI is more effective than fibrinolytic therapy in controlled clinical trials
T2	Comparative-effectiveness and health services research	Establishment of a 90-minute standard for the interval between arrival in the emergency department and the initiation of coronary intervention
T3	Implementation research	Identification of hospital-based strategies to reduce the time to PCI and establishment of consortium to guide local integration of strategies

Naik AD, Petersen LA NEJM 2009;360:19

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New strategies to improve quality and appropriateness in invasive cardiology

- Current quality measures are designed to identify problem areas leading to poor quality rather than to improve quality
- The focus of quality improvement initiatives should be tied to local actions and local results rather than national norms
- Efficiency and appropriateness should be incorporated into the domains of quality of care for CAD patients
- Minimizing overuse and underuse of PCI should be a healthcare priority
- The remarkable improvement in the quality of primary PCI is one encouraging example, although uncommon, of the fruits of linking CER with implementation research

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Can We Appropriately Measure Appropriateness?

At a national interventional cardiology meeting, the speaker challenged his audience with 3 sequential questions to which he invited a show of hands.

1. "Have any of you witnessed an inappropriate coronary intervention?"

Virtually all of the hands in the room were raised

2. "Have any of you witnessed someone else in this room conduct an inappropriate intervention?"

The vast majority of hands shot up

3. "Which of you yourselves has performed an inappropriate intervention?"

None of the hands was raised!

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