

# Contributions of Advanced Technology to the Quality of Life

## A Physician's Perspective

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# Technology and Cost in Medicine: Still a Big Issue

- “Increased Spending on Health Care: How Much Can the United States Afford?”

Chernew ME, Hirth RA, Cutler DM Health Affairs 2003; 22: 15-25

- “Is Technological Change in Medicine Always Worth it? The Case of Acute Myocardial Infarction?”

Skinner JS, Staiger DO, Fisher ES Health Affairs 2006; W34-W46

- “Is Technological Change in Medicine Worth It?”

Cutler DM and McClellan M. Health Affairs 2001; 20: 11-29

# Changes in Life Expectancy

## 1960-2000 US

Culter DM et al NEJM 2006

	1960	1970	1980	1990	2000	Cum Chg
N.B.	69.9	70.7	73.9	75.4	76.9	6.97
15 y.o.	57.3	57.7	60.2	61.4	62.6	5.29
45 y.o.	29.5	30.1	32.3	33.4	34.4	4.88
65 y.o.	14.4	15	16.5	17.3	17.9	3.5

# Costs Per Added Year of Life Expectancy US 1960-2000

Cutler DM et al NEJM 2006

	Newborn	15 year old	45 year old	65 year old
1960-70	\$25,000	\$75,000	\$60,000	\$75,000
1970-80	\$10,000	\$12,000	\$35,000	\$50,000
1980-90	\$25,000	\$35,000	\$60,000	\$120,000
1990-2000	\$30,000	\$45,000	\$100,000	\$145,000

# Technology and Cost in Medicine

## Examples from Cardiovascular Care

- Treatment of Acute Myocardial Infarction
- Surgery for Congenital Heart Disease
- Automatic Implantantable Cardioverter Defibrillator (AICD)
- Treatment of Chronic Coronary Artery Disease (Stents vs. CABG)

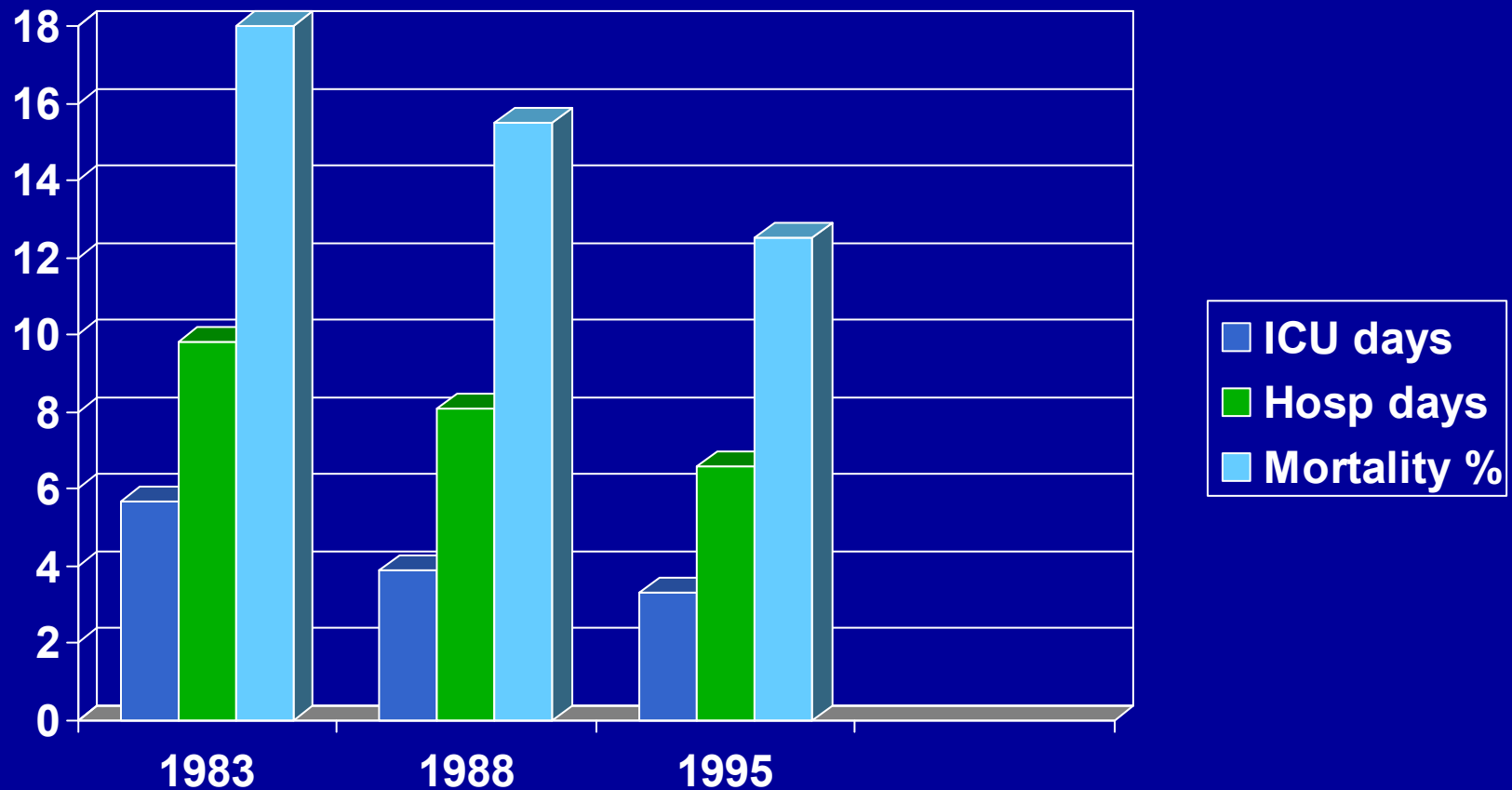
# Acute Myocardial Infarction

Cutler, DM and McClellan Health Affairs 2001

	1984	1998
Total spending \$ billions	3.0	4.8
# cases	245,687	221,133
Spending/case	\$12,083	\$21,714
Life Expectancy Years post MI	4.8	6.0

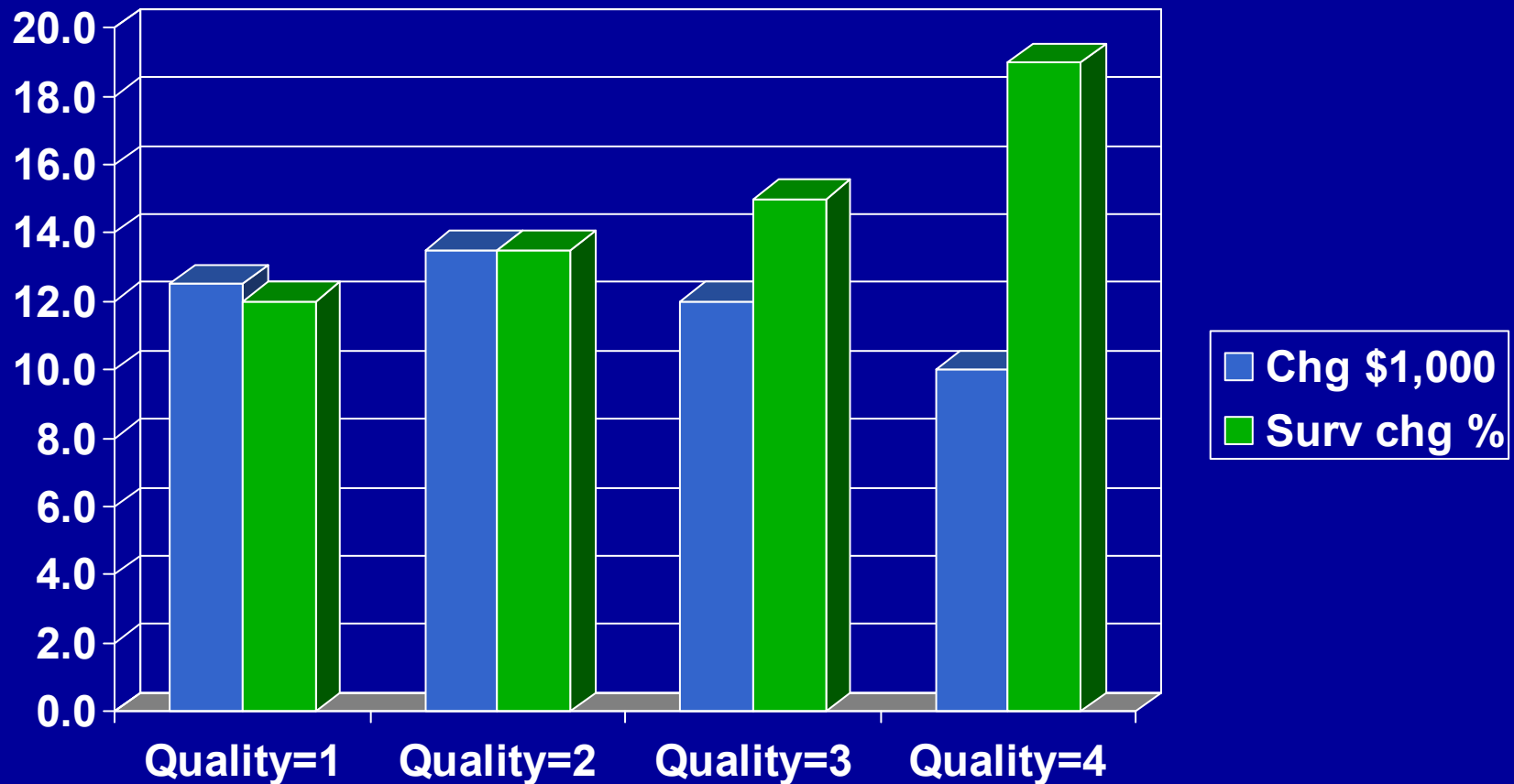
# Treatment of Acute MI

Porter, M and Teisberg EO, Redefining Health Care 2006

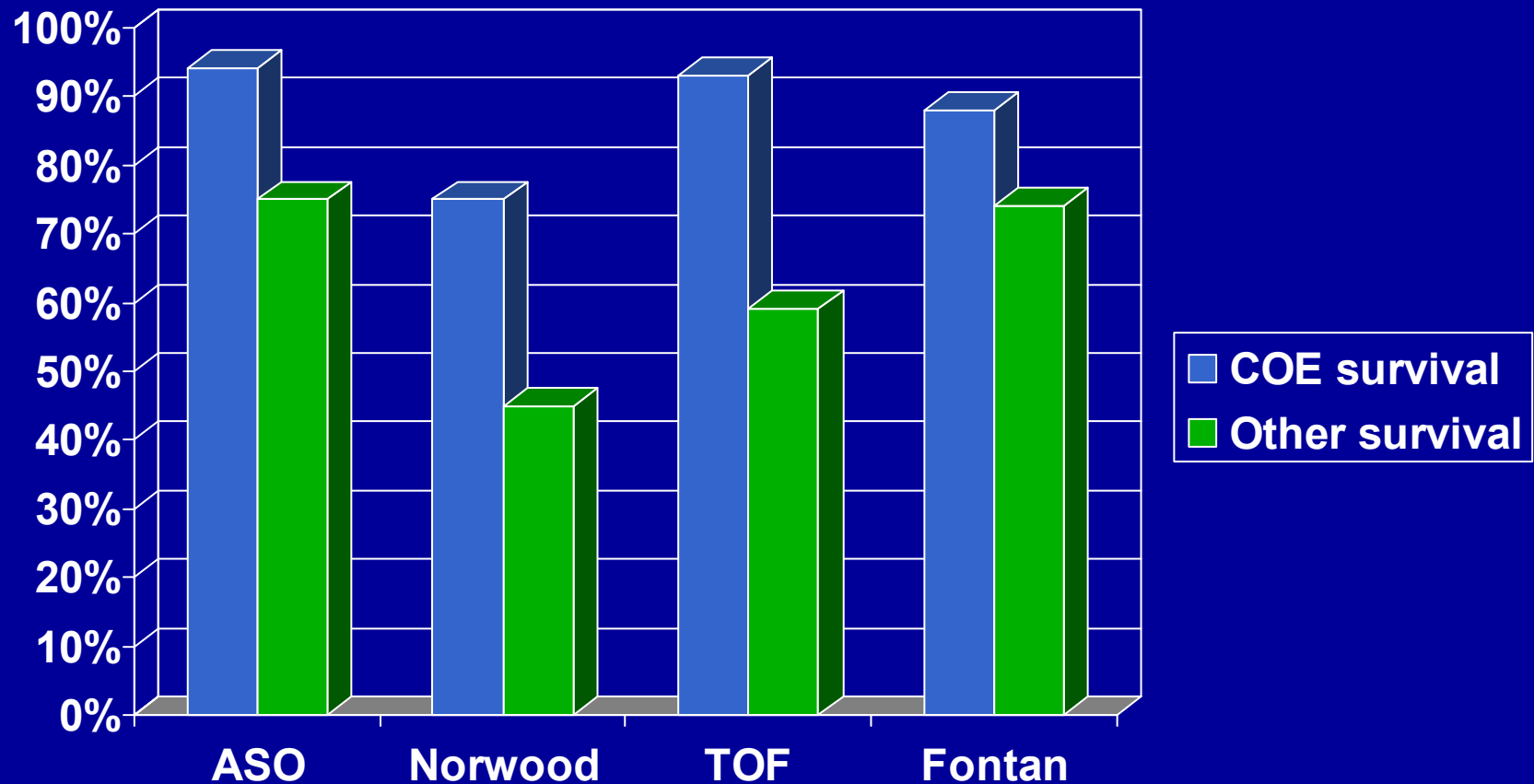


# Acute Myocardial Infarction

Skinner et al, Health Affairs 2006



# Congenital Heart Disease Centers of Excellence (URN)



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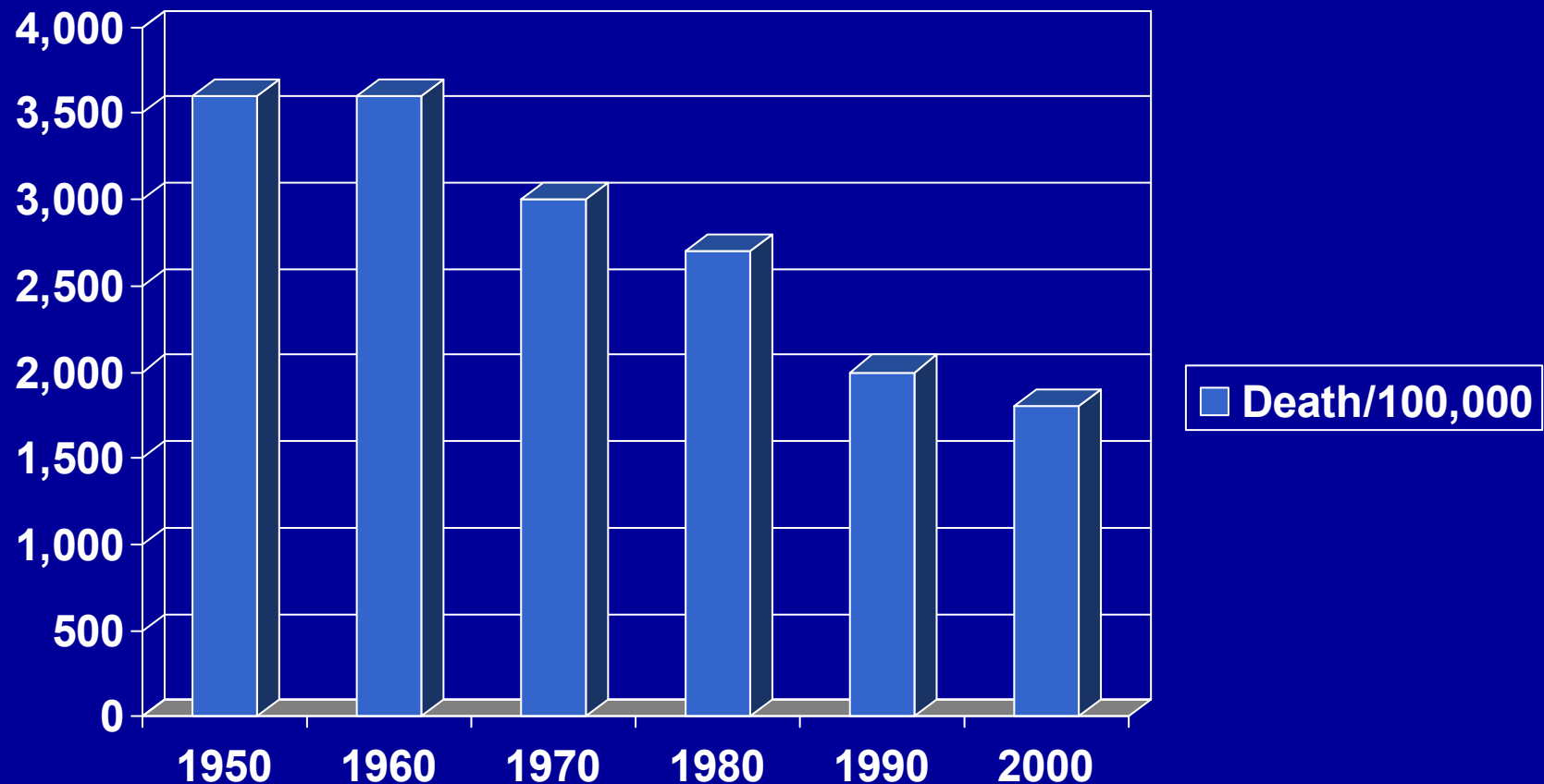
- Avg. case charges \$273,701
- Avg. case payment \$191,591
- COE avg. case payment \$ 90,604

# Automatic Implantable Cardioverter Defibrillator (AICD)

- Decreases mortality in selected populations
- Expensive (\$40,000 +)
- Expanding Indications
  - Ventricular fibrillation or tachycardia (1998)
  - Dilated cardiomyopathy (2004)
  - Post myocardial infarction with reduced LV function (2005)
- Regulatory Response- Medicare coverage for expanded indications linked to participation in a clinical registry

# Mortality from Coronary Artery Disease 1950-2000 US

Rosen AB et al Health Affairs 2007



# Acute Myocardial Infarction

## Cost of Added Benefit 1987-2000

Rosen AB et al Health Affairs 2007

	Lifetime cost	Life expectancy	Cost/added life year
1987	\$75,223	4.5 yrs	
2000	\$96,572	5.36 yrs	
Chg 1987-2000	\$21,349	0.86 yrs	\$24,824
PCI CABG increment	\$4,957	0.09 yrs	\$55,083
Medical rx increment	\$11,299	0.71 yrs	\$15,914

# Chronic Ischemic Heart Disease COURAGE Trial PCI vs. Med Rx

Boden et al NEJM 2007

	Medical Rx	PCI
Death + MI	18.5	19.0
Death, MI, Stroke	19.5	20
Hosp for ACS	11.8	12.4
Non-fatal MI	12.3	13.2
Revascular Rx (p<.01)	32.6	21.1

# Long-Term Outcomes of Coronary-Artery Bypass Grafting versus Stent Implantation

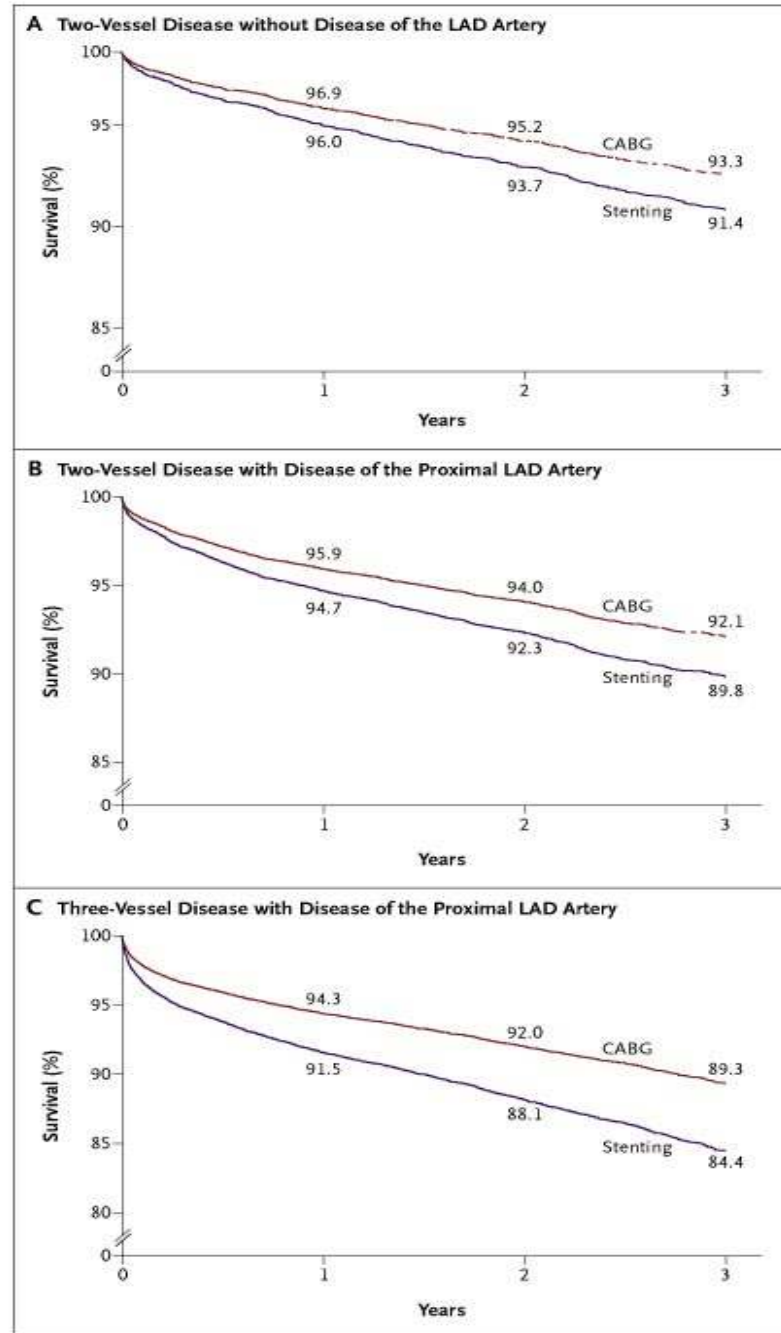
Edward L. Hannan, Ph.D., Michael J. Racz, Ph.D., Gary Walford, M.D., Robert H. Jones, M.D., Thomas J. Ryan, M.D., Edward Bennett, M.D., Alfred T. Culliford, M.D., O. Wayne Isom, M.D., Jeffrey P. Gold, M.D. and Eric A. Rose, M.D.

N Engl J Med  
Volume 352;21:2174-2183  
May 26, 2005

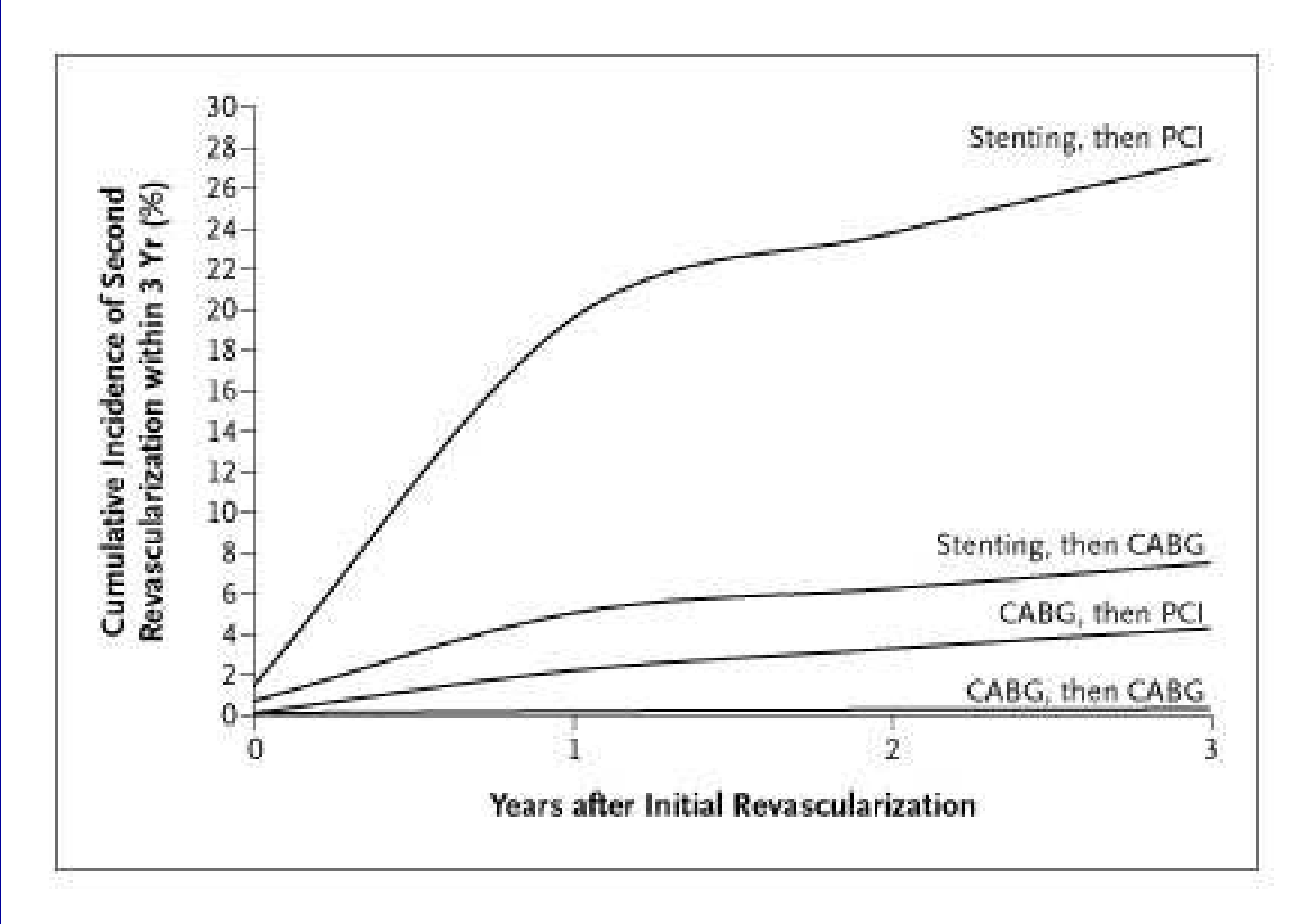


The NEW ENGLAND  
JOURNAL of MEDICINE

**Adjusted Survival Curves among Patients with Two-Vessel Disease without Involvement of the LAD Artery (Panel A), Patients with Two-Vessel Disease with Involvement of the Proximal LAD Artery (Panel B), and Patients with Three-Vessel Disease with Involvement of the Proximal LAD Artery (Panel C)**



# Percentage of Patients Undergoing a Second Revascularization Procedure within Three Years



Hannan, E. et al. N Engl J Med 2005;352:2174-2183

# Cost, Technology, and Quality

- The issue is not the technology, but how intelligently we apply it.
- Distinction between “efficacy” (what it takes to get regulatory approval) and “effectiveness” (how device or drug is used in the general population, the driver of costs)
- Critical role of outcomes focused registries in determining effectiveness
  - STS Adult Cardiac Database 3,000,000 pts 75% participation
  - ACC National Cardiac Database > 50% participation

# Cost and Quality

“The pursuit of quality should not presume that better care must cost more”

“More regulatory patches on a deeply flawed system do not alter dysfunctional competition”

Porter ME and Teisberg EO Redfining Health Care 2006

# Roles and Responsibilities of Profession

Brandeis and others

- Maintains and advances a body of knowledge
- Sets and enforces its own standards and values
- Cherishes performance above personal reward
- Places patients' interests above their own
- Fairly distribute finite medical resources

# Potential Roles for the Medical Profession in the Medical Cost Crisis

1. Engage the medical profession in solving this societal problem- Remember the role of the physician's pen (keyboard)
2. Incentivize/mandate acquisition of risk-adjusted outcomes information (clinical/cost)
3. Allow/incentivize profession to self-regulate
4. Consider specialty specific conversion factors to incentivize self-regulation
5. Be prepared to make outcomes information publicly available

The significant problems we face can not be solved at the same level of thinking we were at when we created them.

- *Albert Einstein*



# Co-opetition in Health Care

Co-Opetition: Brandenburger and Nalebuff, 1996

## Two views of competition

- It is not enough to succeed, others must fail (G. Vidal)
- You don't have to blow out the other fellow's light to let your own shine (B. Baruch)

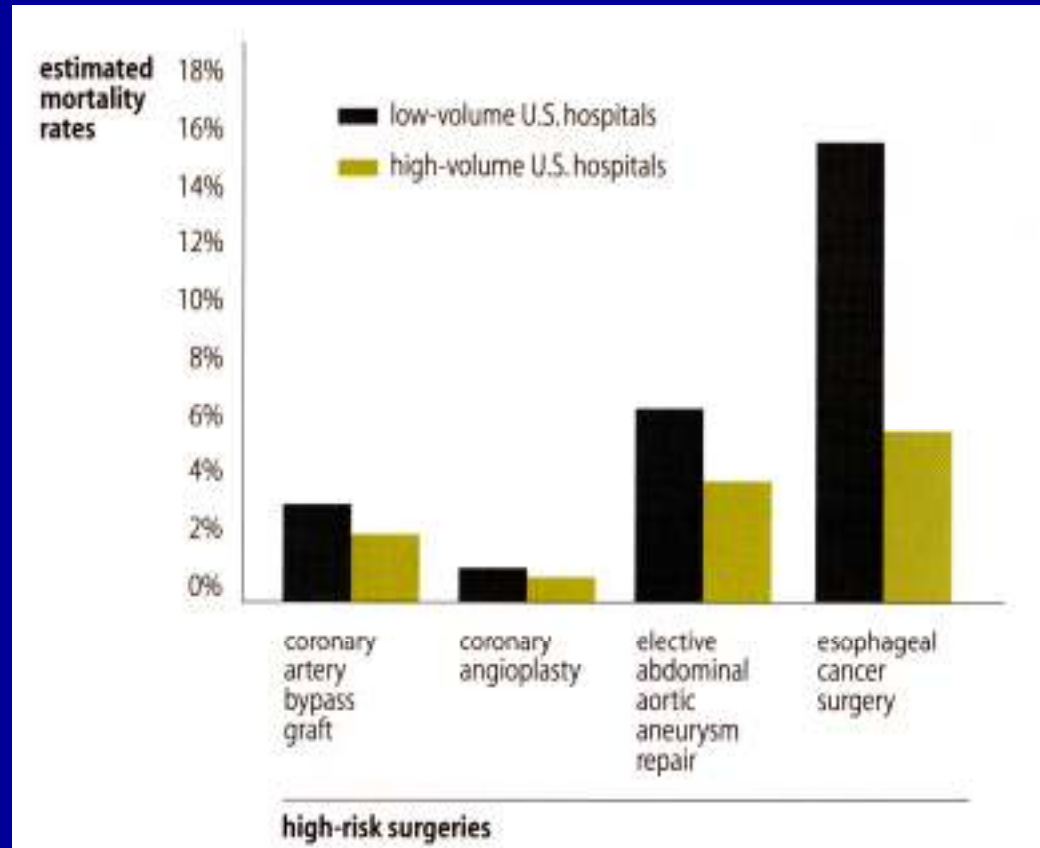
# Redefining Competition in Health Care

M.E. Porter and E.O. Teisberg, HBR, 2004

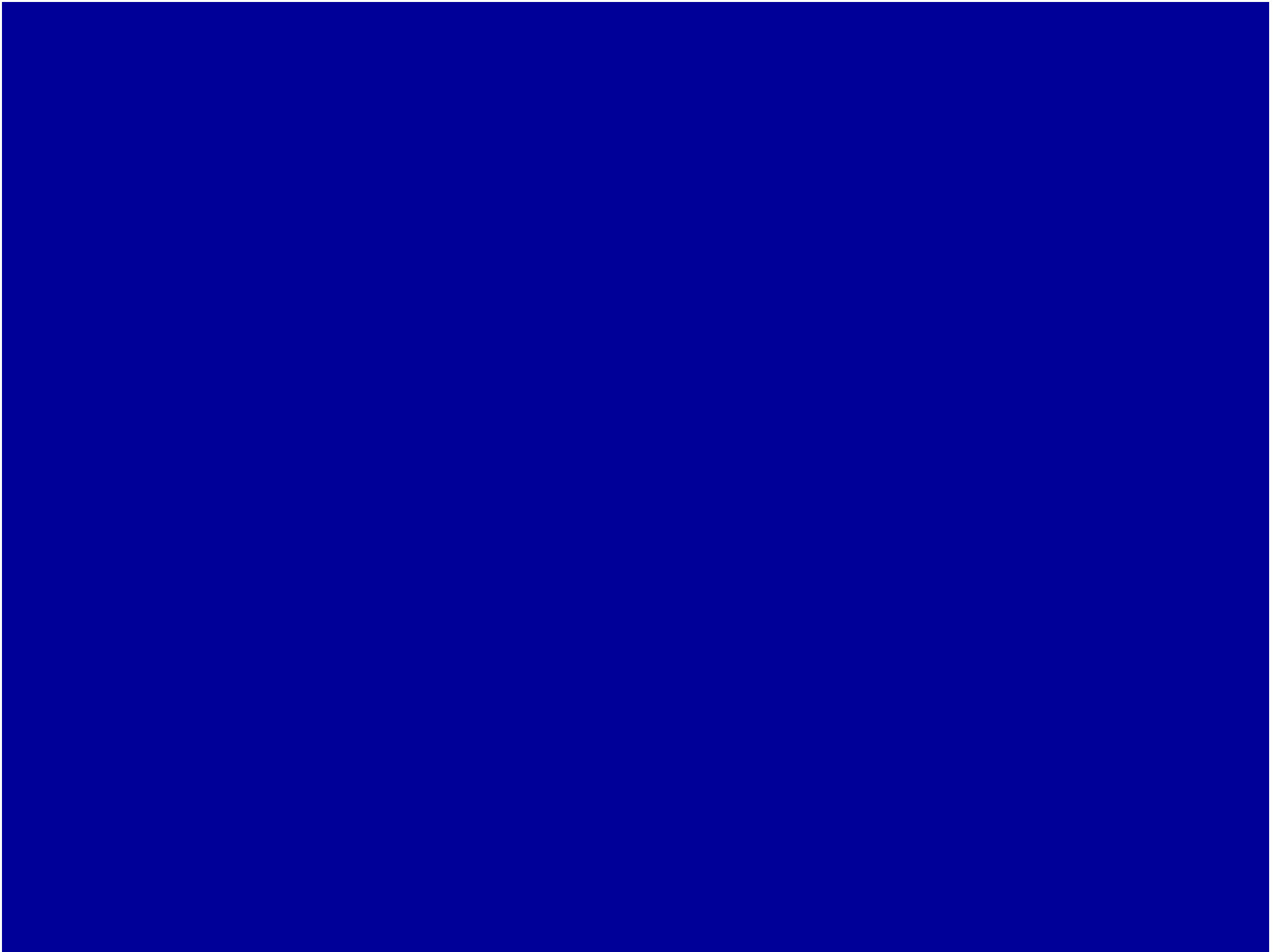
- Value= Quality/Cost
- Current state- Zero sum competition
  - System participants divide value instead of increasing it
    - Cost shifting
    - Pursuit of greater bargaining power
    - Restriction of choice and access
    - Resolution of conflicts by legal system
- Solution?- Positive Sum Competition
  - Competition at the level of diseases or treatments

# Experience Matters

The more experience physicians and teams have in treating patients with a particular disease or condition, the more likely they are to create better outcomes - and, ultimately, realize lower costs. By performing particular procedures over and over, teams increase their learning opportunities and thereby reduce mortality rates.



Source: John D. Birkmeyer, *Leapfrog Patient Safety Standards: The Potential Benefits of Universal Adoption*, November 2000



# Problems with Patient Centered Health Care

Balance between market forces and the  
professions (Krause, Death of the Guilds)

- Professions are inherently anti-market and anti-competitive
- How to compete with professional colleagues and fulfill responsibility to share knowledge?

Co-opetition?

# The Evolution of Reform Models: *Past*

*Objective: Reduce costs, avoid costs*

*Focus on **costs, bargaining power and rationing***

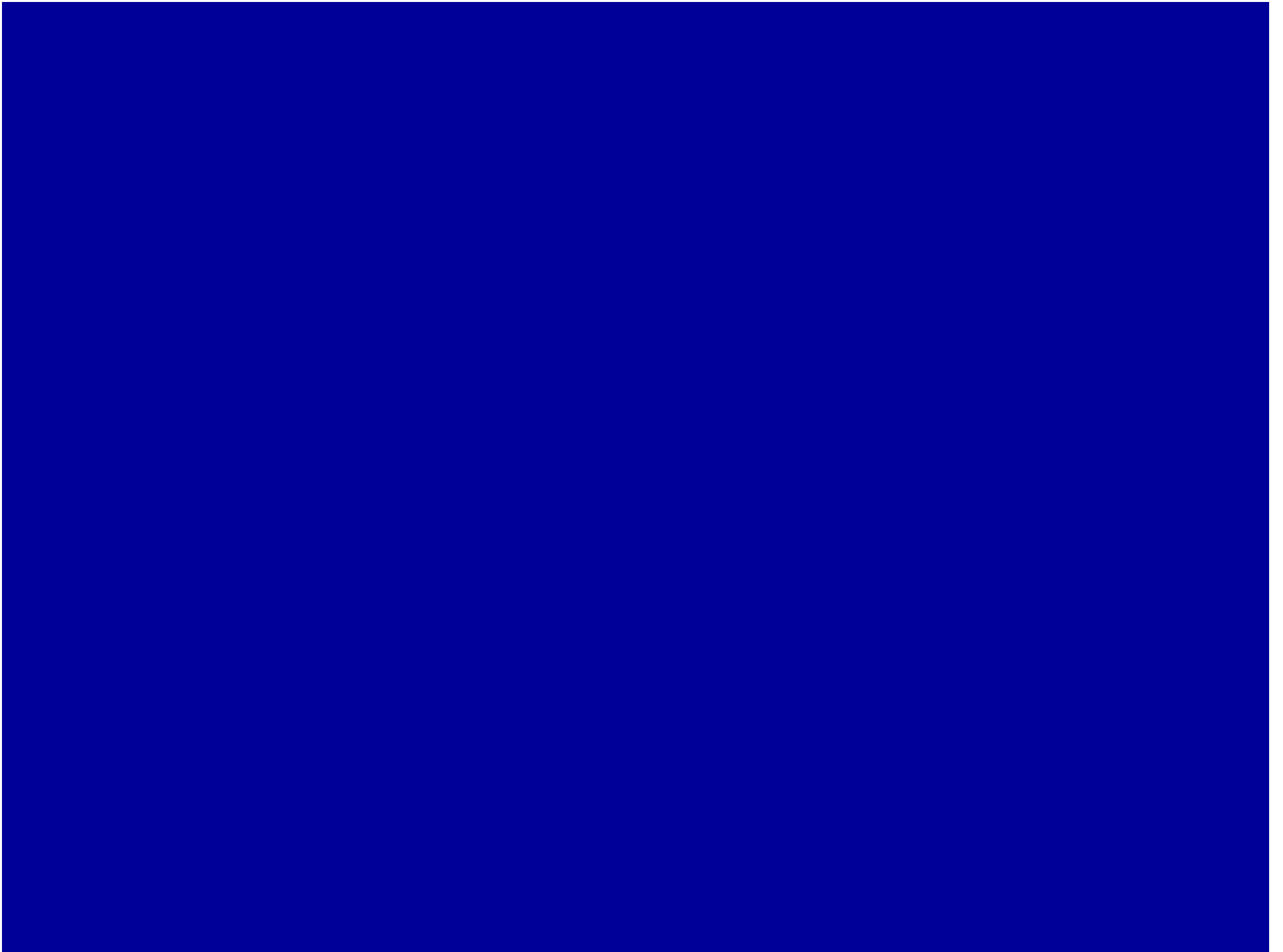
*System Characterized by:*

- *Cost shifting among patients, providers, physicians, payers, employers, and the government*
- *Limits on access to services*
- *Bargaining down prices for drugs and services*
- *Prices unrelated to the economics of delivering care*

*Focus on **legal recourse and regulation***

*System Characterized by:*

- *Patients' rights*
- *Detailed rules for system participants*
- *Increased reliance on the legal system*



# The Evolution of Reform Models: *Present*

Objective: Enable choice, reduce errors

Focus on **choice of health plan**

System Characterized by:

- *Competition among health plans*
- *Information on health plans*
- *Financial incentives for patients*

Focus on **provider and hospital practices**

System Characterized by:

- *Online order entry*
- *Six Sigma practices*
- *Appropriate ER staffing*
- *Volume thresholds for complex referrals*
- *Mandatory guidelines*
- *“Pay for performance” when standards of care are used*

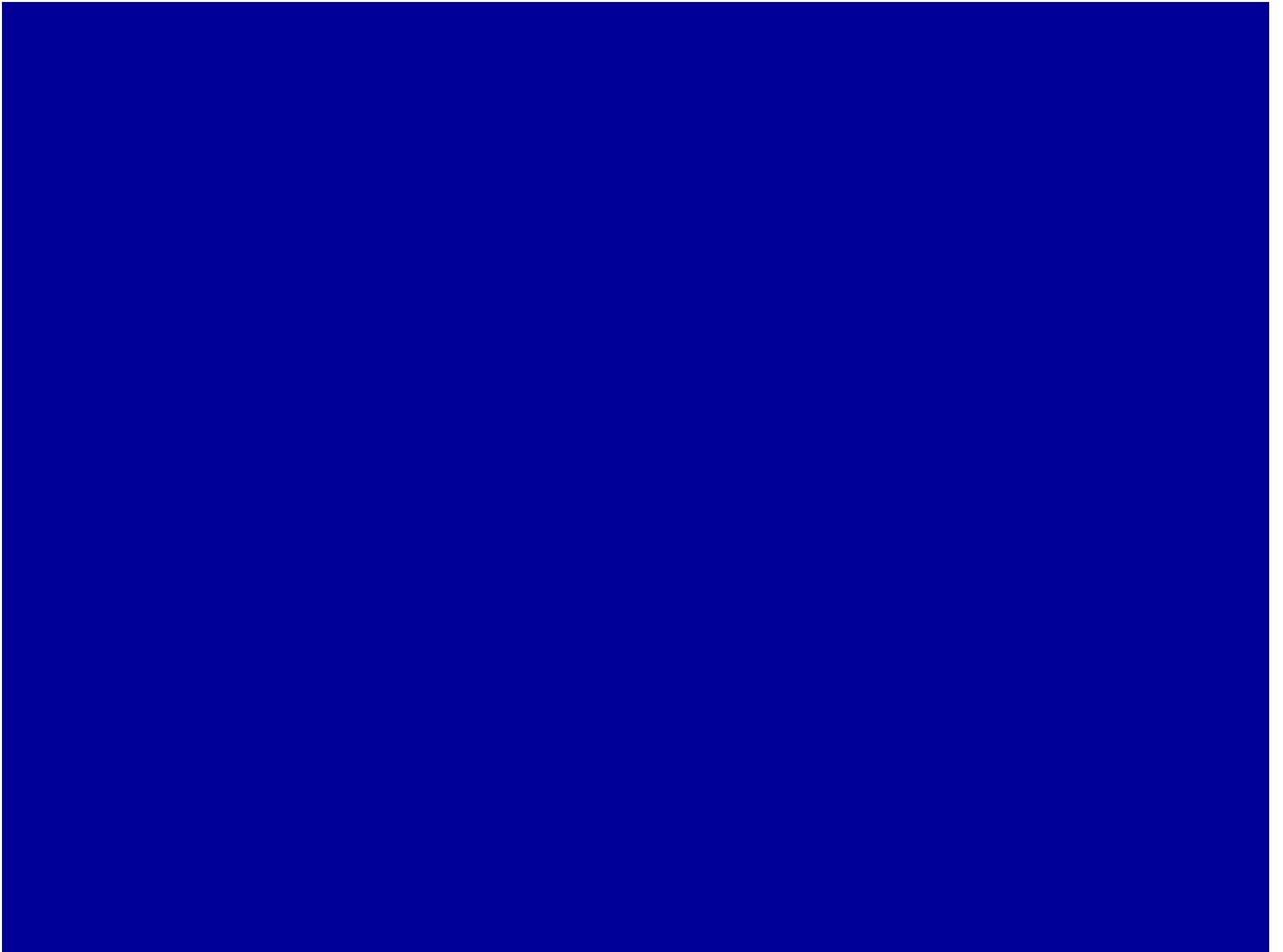
# The Evolution of Reform Models: *Future*

Objective: Increase value

Focus should be on **the nature of competition**

System Characterized by:

- Competition at the level of specific diseases and conditions
- *Distinctive strategies by payers and providers*
- Incentives to increase value rather than shift costs
- *Information on providers' experiences, outcomes, and prices*
- Consumer choice



# The Ingredients for Change

## ***No Restrictions to Competition and Choice***

- No preapprovals for referrals or treatments
- No network restrictions
- Strict antitrust enforcement against collusion, excessive concentration, and unfair practices
- Meaningful co-payments and medical savings accounts with high deductibles, all of which will give consumers incentives to seek good value

# The Ingredients for Change

## *Accessible Information*

- Appropriate information on treatments and alternatives is formally collected and widely disseminated
- Information about providers' experience in treating particular diseases and conditions is made available immediately
- Risk-adjusted outcome data are developed and continually enhanced
- Some information is standardized nationally to enable comparisons

# The Ingredients for Change

## *Transparent Pricing*

- Provider sets a single price for a given treatment or procedure
- Different providers set different prices
- Price estimates are made available in advance to enable comparison

# Co-opetition in Health Care Value Net Concept

Customers (Patients, Payors)

Competitors

(Cardiologists)  
(Hosp+Surgeons)

Company

Hosp+Surgeons

Complementors

(Cardiologists)  
(Anesthesia)  
(Hosp+Surgeons)

Suppliers

(Cardiologists)  
(Device manufacturers)