

Transforming Healthcare Delivery Through Cardiovascular Registries



Eric D. Peterson, MD, MPH

Fred Cobb, MD Professor of Medicine

Director of Performance Services Duke Heart Center

Director, Duke Clinical Research Institute (DCRI)

Disclosure Slide

- Receive research support from:
 - AHA GWTG Data Analytic Center
 - ACC NCDR Data Analytic Center
 - STS Data Analytic Center
 - AHRQ
 - NHLBI
 - Eli Lilly
 - Janssen Pharmaceuticals

Why Transformation is Needed

SHATTUCK LECTURE

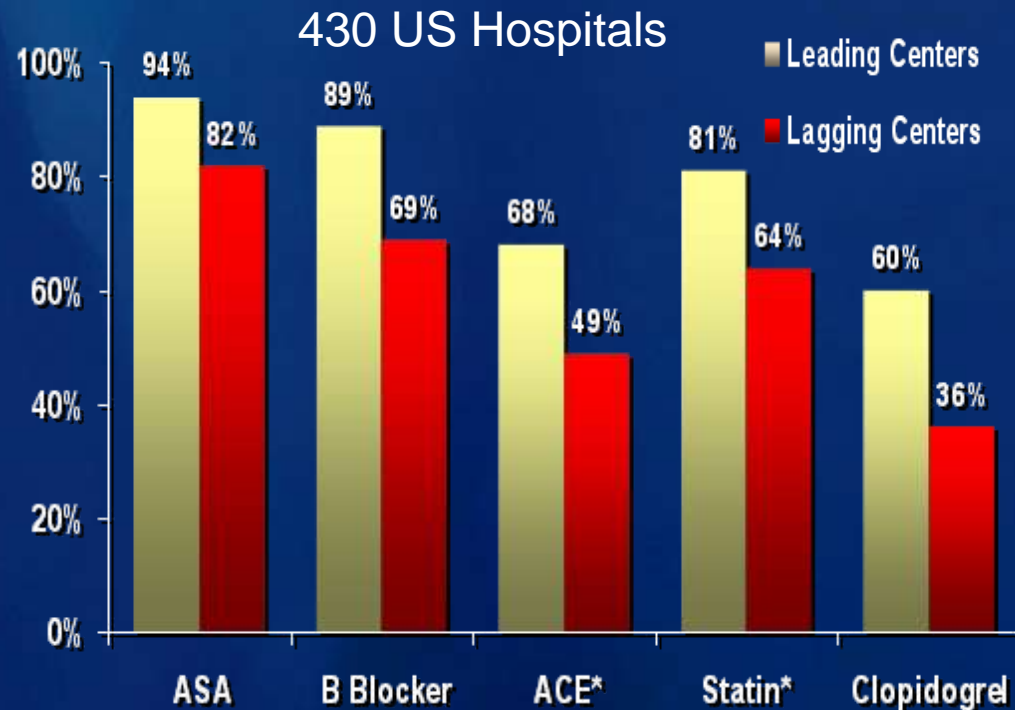
Clinical Research to Clinical Practice — Lost in Translation?

Claude Lenfant, M.D.

NEJM 2003;349:868-74

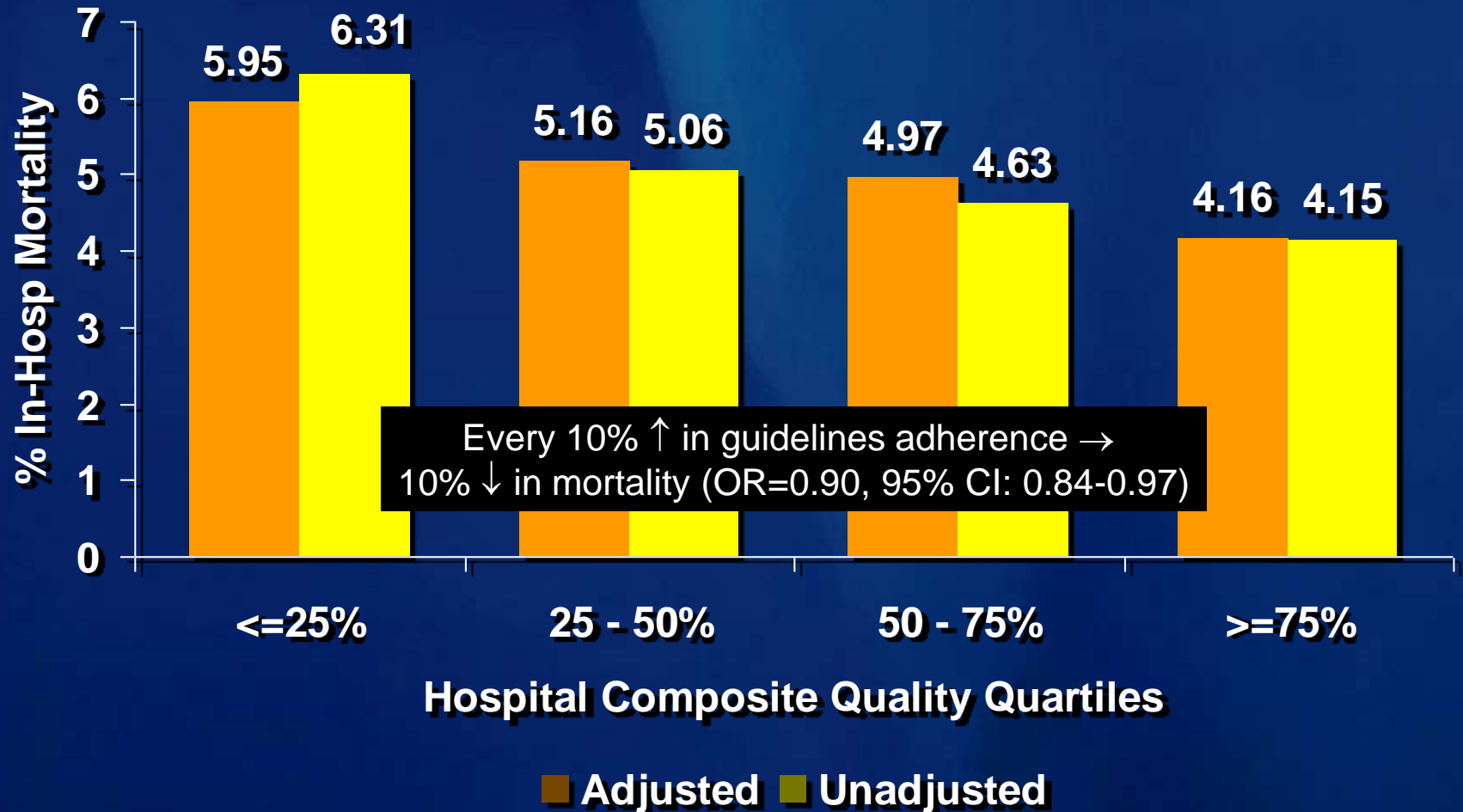
“It takes an average of 17 yrs for 14% of original research findings to lead to changes in care that benefit patients”

Ballas E & Boren S. Yearbook of Medical Informatics: Patient Centered Systems. 2000:65-70.



Peterson et al, JAMA 2006;295:1863-1912

Hospital Link Between Overall Guidelines Adherence and Mortality





The New York Times

Sunday Review | The Opinion Pages

WORLD U.S. N.Y. / REGION BUSINESS TECHNOLOGY SCIENCE HEALTH SP

“Missed opportunities? Quality concerns?
Not just our private little secret anymore

EDITORIAL

Simple Treatments, Ignored

Published: September 8, 2012

A new federal health analysis has found that 36 million adults in the United States have high blood pressure that is not being controlled even though 32 million of them get regular medical care and 30 million of them have health insurance.

Related

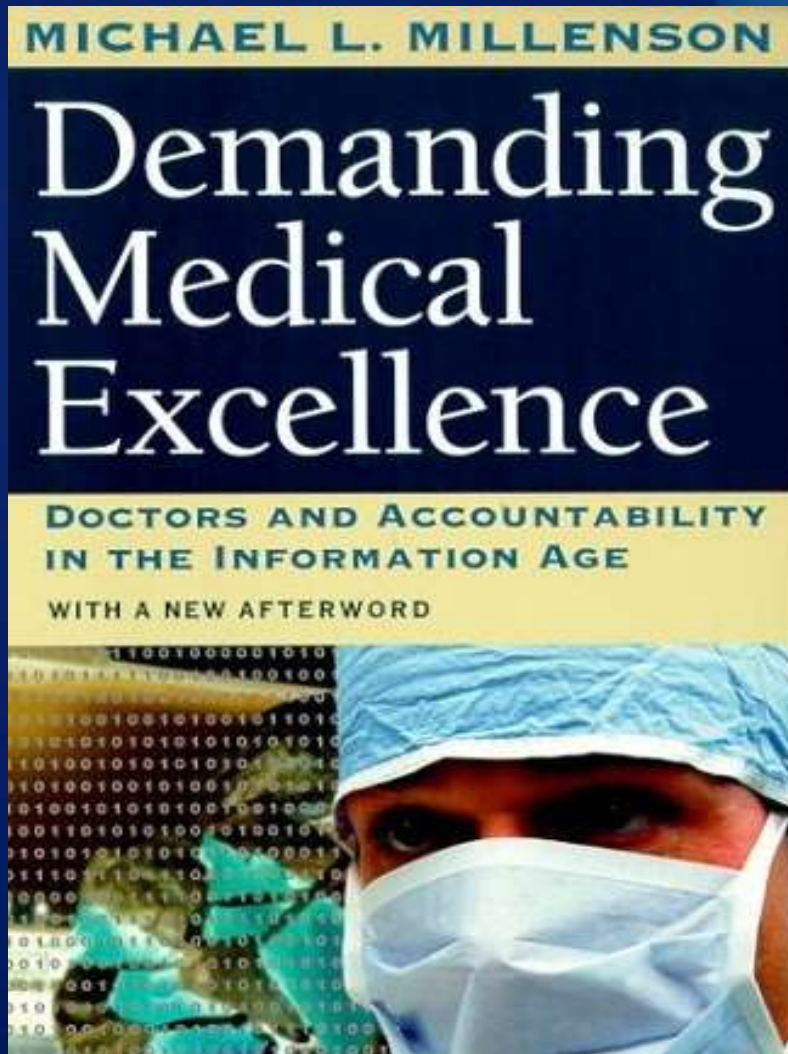
[More on Health Care »](#)

This is not primarily a case of poor, uninsured people unable to get the care they need. It is shocking evidence of how our complicated, dysfunctional health care system can't deliver recommended care to many patients

who could benefit because their doctors are asleep at the switch. As a result

Data Driven Transformation!

Knowledge Creation and Process Adoption...



“A growing revolution is transforming the everyday practice of medicine. Owing more to laptops than lab coats, this is an information revolution that will change forever the way doctors make decisions.”

Millenson ML Univ of Chicago Press 1997

Transformation of Data Collection

Data Collection

Chart review → Registry → EMR

Content

Procedure → Condition → Population/Prevention

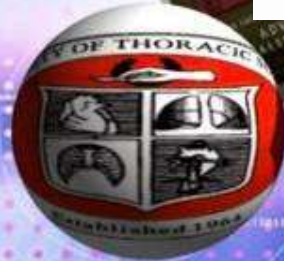
Setting

Hospital → Clinic → Community

Who's the Consumer of the Data?

Doctor → “Healthcare Team” → Team + Patient

US CV Professional Society Registries



NCDR™

National Cardiovascular Data Registry



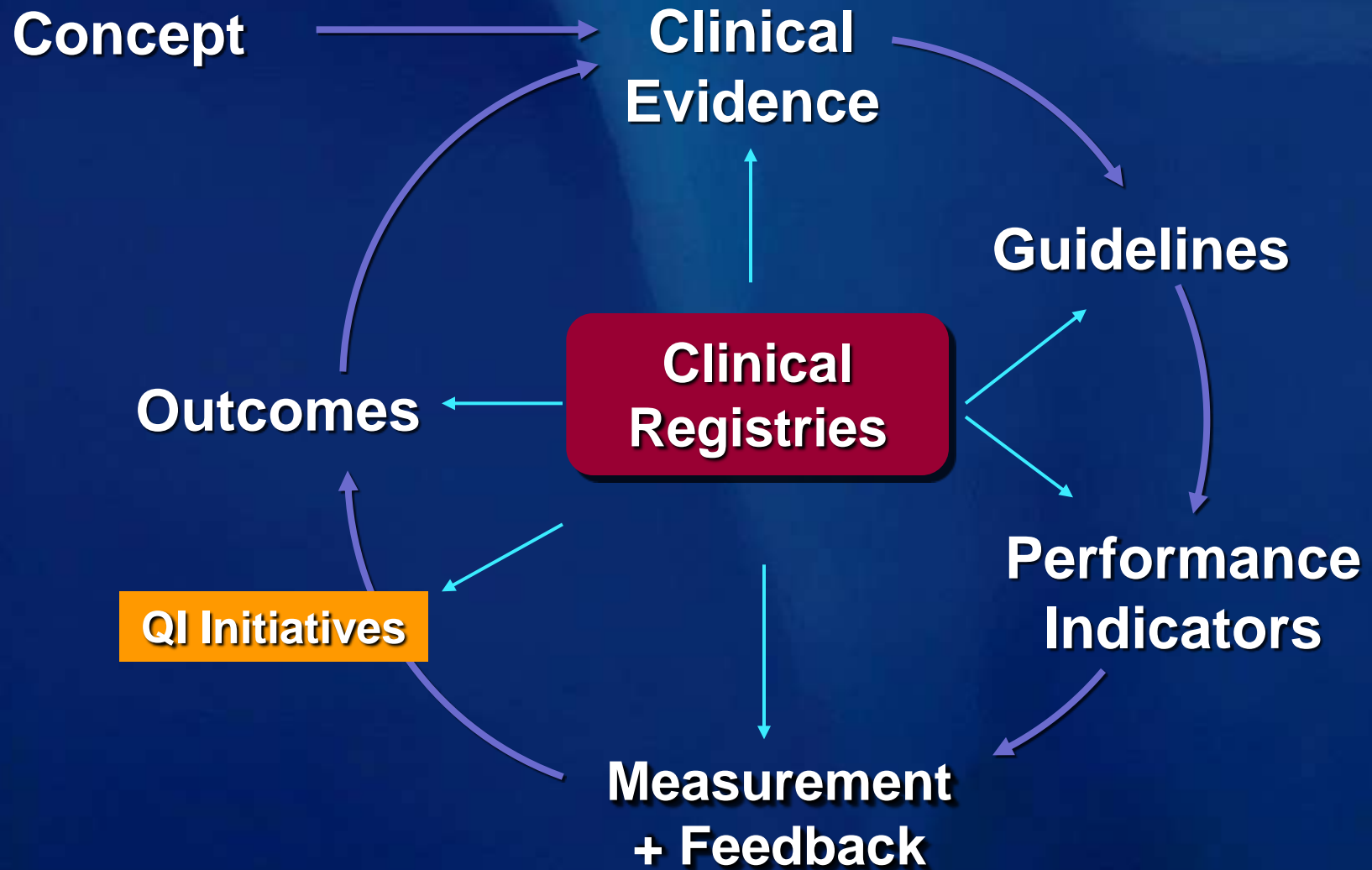
Turning Guidelines
Into Lifelines



CV Provider Led Clinical Registries

- **Society of Thoracic Surgery: 900+ centers**
 - Coronary artery bypass surgery
 - Valve surgery
 - Congenital heart surgery
 - Thoracic surgery
 - TAVR (shared with NCDR)
- **National Cardiovascular Data Registry: 1600+ Hospitals**
 - Cath/Percutaneous coronary intervention
 - Implantable cardiac defibrillators (ICD)
 - Acute coronary syndromes (shared with GWTG)
 - Carotid stenting
 - IC3: Ambulatory CV disease
- **AHA-Get With The Guideline Program: 1500+ hospitals**
 - Heart failure
 - Stroke
 - ADVANCE: Ambulatory module

Role of Registries in Evidence Development and Dissemination



*Adapted from Califf RM, Peterson ED
et al. JACC 2002;40:1895-901*

Roles for Clinical Registries

Epidemiology

- **Define disease + treatment patterns in community setting**
 - Disease presentation
 - Risk factors
 - Genetic, biomarkers
 - Treatment (trends)
 - Patient outcomes

Clinical Registries

as Engines for Discovery!

In-hospital
Registry

Cross sectional studies

In-hospital
Registry

Claims
Data

Longitudinal studies

In-hospital
Registry



Biomarker
Genetics Samples

Longitudinal
Outcomes

Translational Discovery

In-hospital
Registry

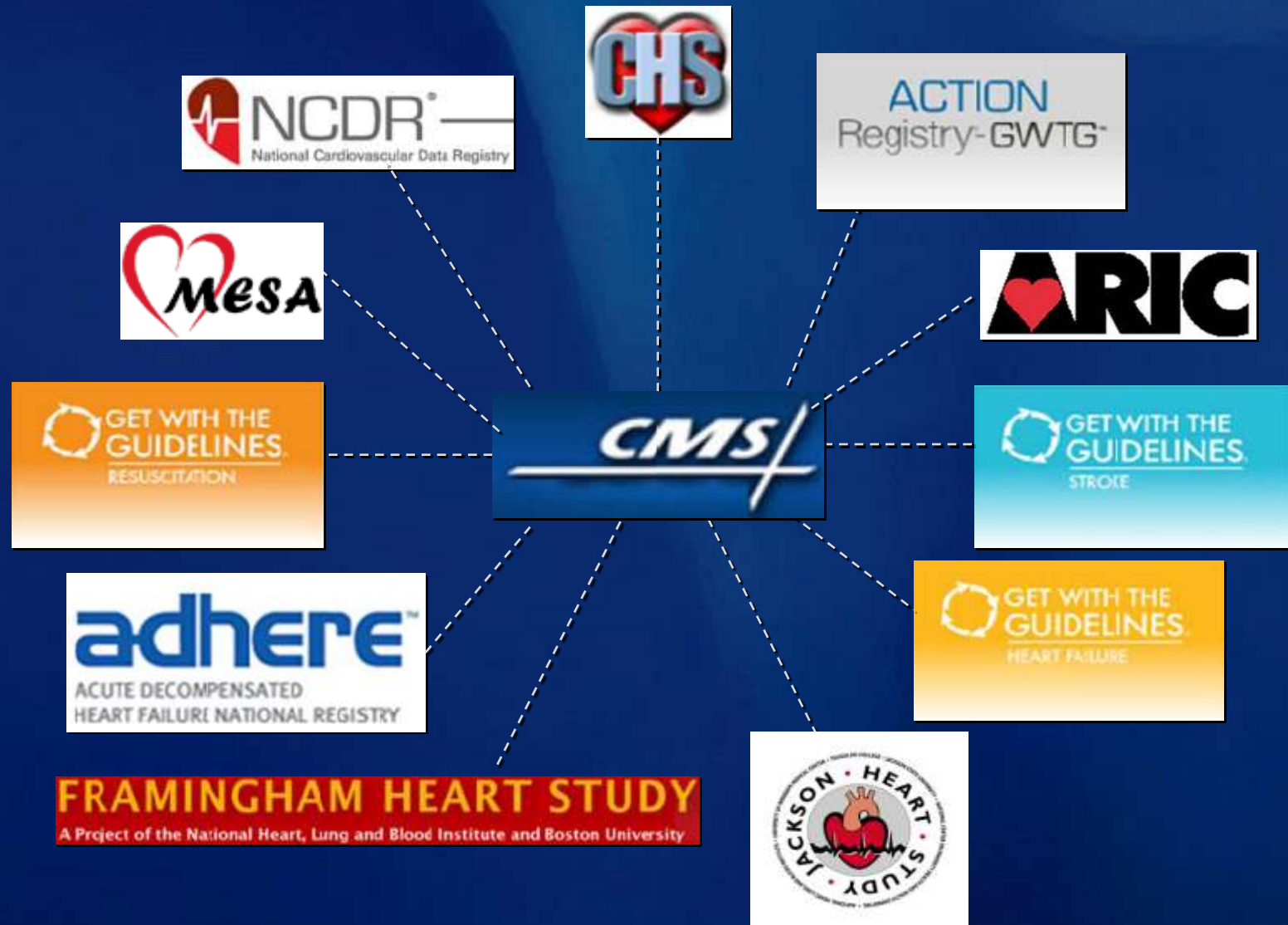


Device/Drug
Information

Longitudinal
Outcomes

Comparative Effectiveness

Creating Longitudinal Clinical-Claims Hybrids





The Future Paradigm: *Transform Medicine from Curative to Preemptive*



Predictive ↔ Personalized ↔ Preemptive

Roles for Clinical Registries

Safety and Comparative Effectiveness:

- **Support Post market Safety evaluation:**
 - Off-label uses and outcomes
 - Identify rare side-effects
 - Track late treatment outcomes (beyond trials)
 - Drug-drug and drug-device interactions

- **Comparative Effectiveness Research**
 - Compare outcomes
 - Compare resource use

Registries Supporting Safety Surveillance



One device, VasoSeal, demonstrated a high risk of any vascular complication compared to manual compression controls

(OR = 2.38 [1.47-3.85; $p = 0.0004$])

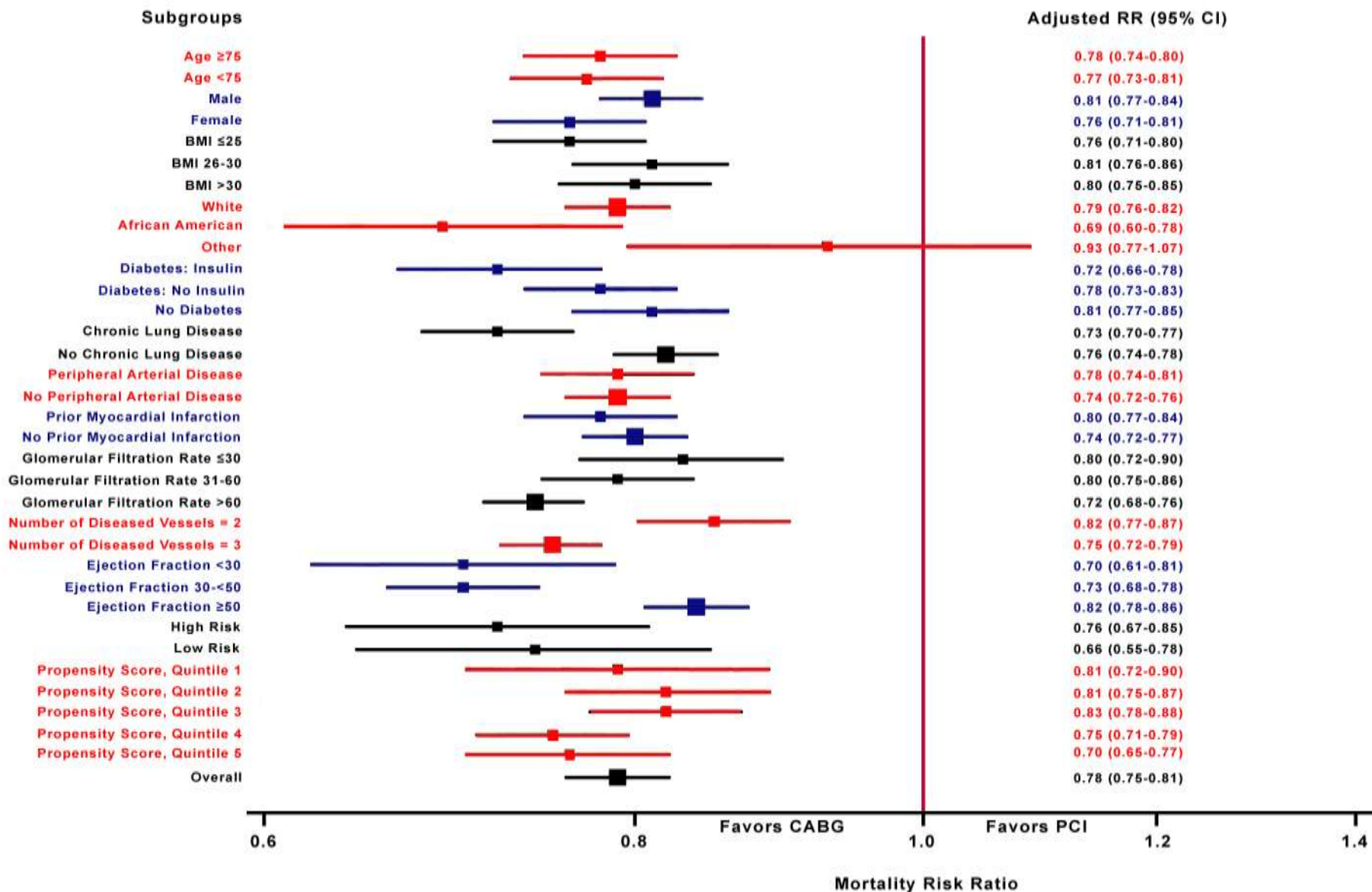


This resulted in VasoSeal being taken off the market

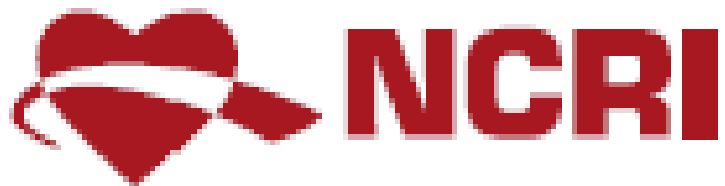


NCDR-STS: PCI vs CABG

Comparative Effectiveness Study



A registry research network can support clinical trials



NATIONAL CARDIOVASCULAR
RESEARCH INFRASTRUCTURE



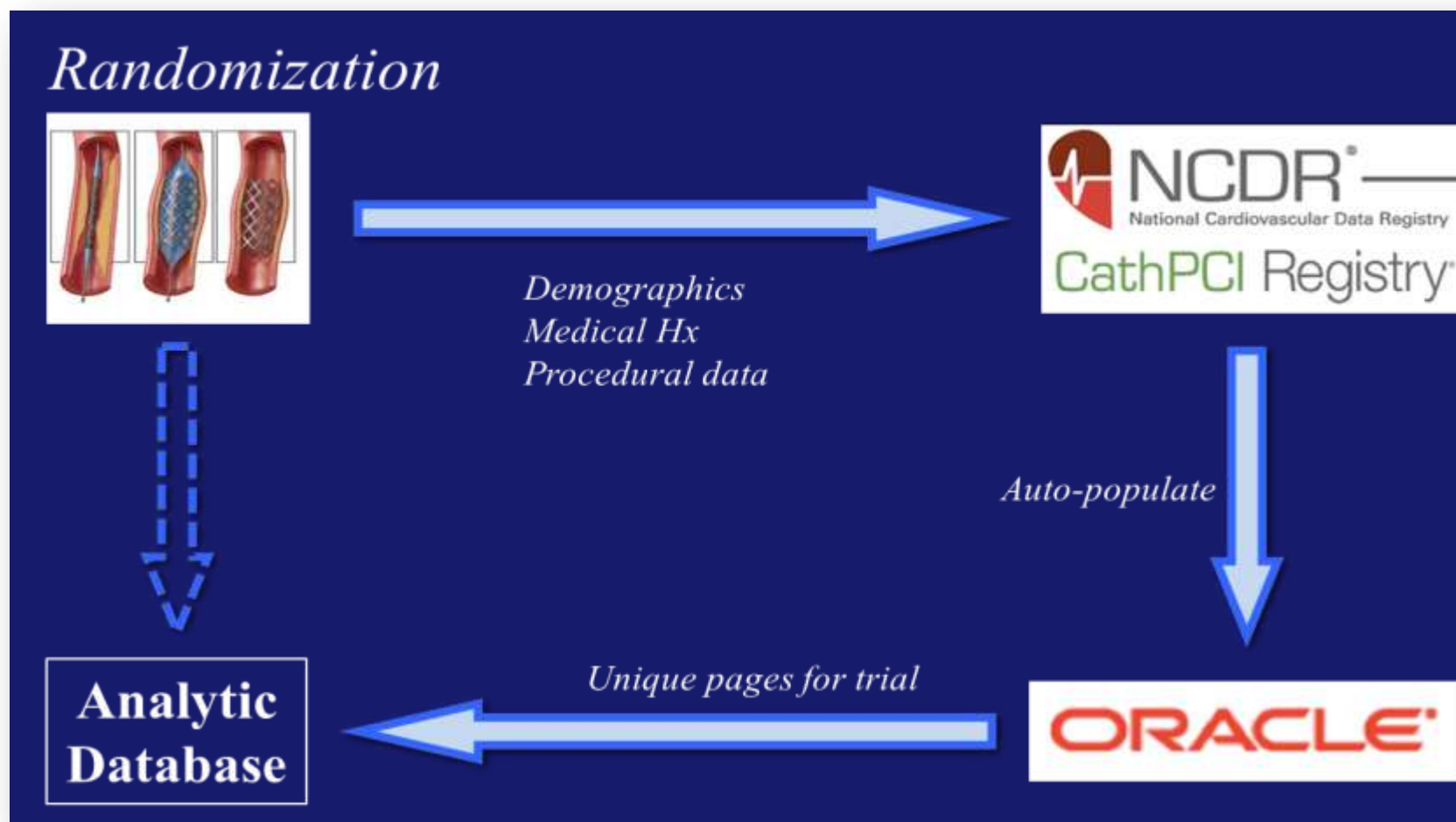
Recruit registry sites as
clinical trial participants

Existing registry data +
additional data specific for
trial

Built-in post-trial
surveillance

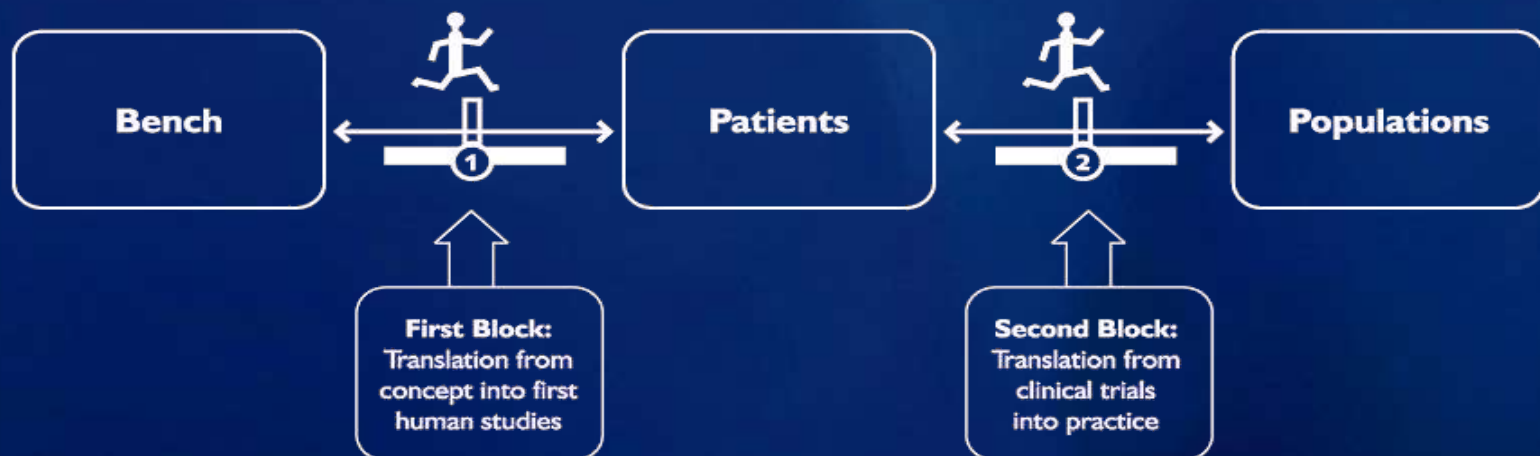
Efficient trials

Registry-trial Hybrid: Efficient patient enrollment and data collection : Safe PCI in Women Trial



Using Data to Transform our Care Practice Models

‘Learning methods to promote the rapid and complete uptake of clinical research findings into routine practice, leading to improved the quality of health care and outcomes.’



The Tools of Transformation

- Systematic Data Collection
- Performance feedback
- Education
- IT (monitors, reminders, decision-support)
- Incentive strategies (financial, behavioral)
- Policy change

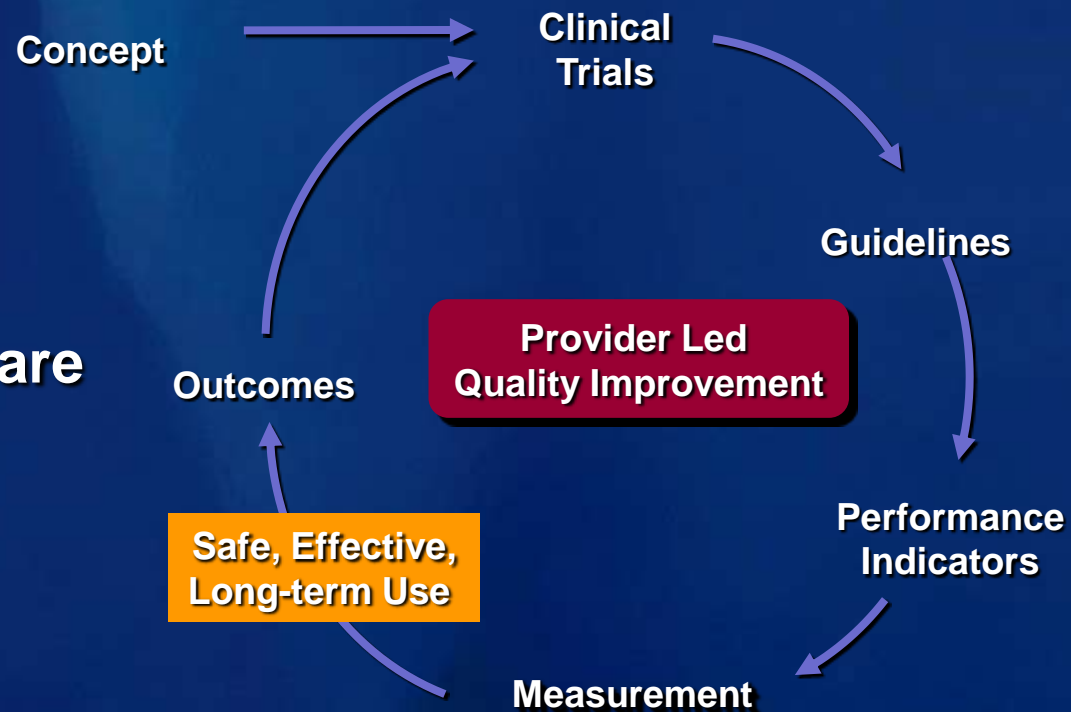
The Power of Measurement, Feedback and Provider Led QI

■ Provider-led feedback and QI can improve CV care!

- NRMI, CRUSADE
- AHA GWTG
- ACC-NCDR
- STS

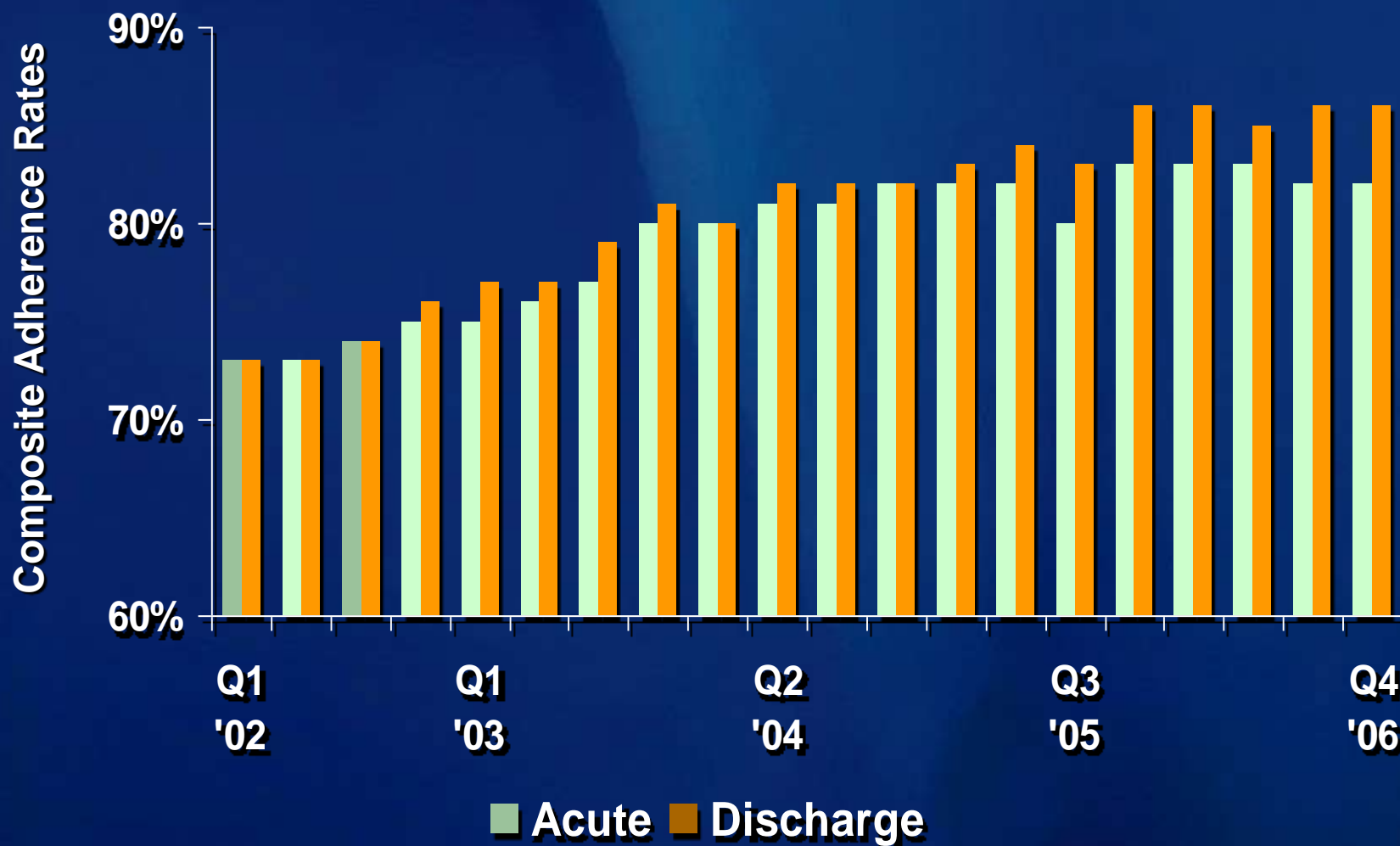
■ Means to Achieve better care

- Motivated advocates
- Timely, valued feedback
- Simple tools
- Collaborative Teams



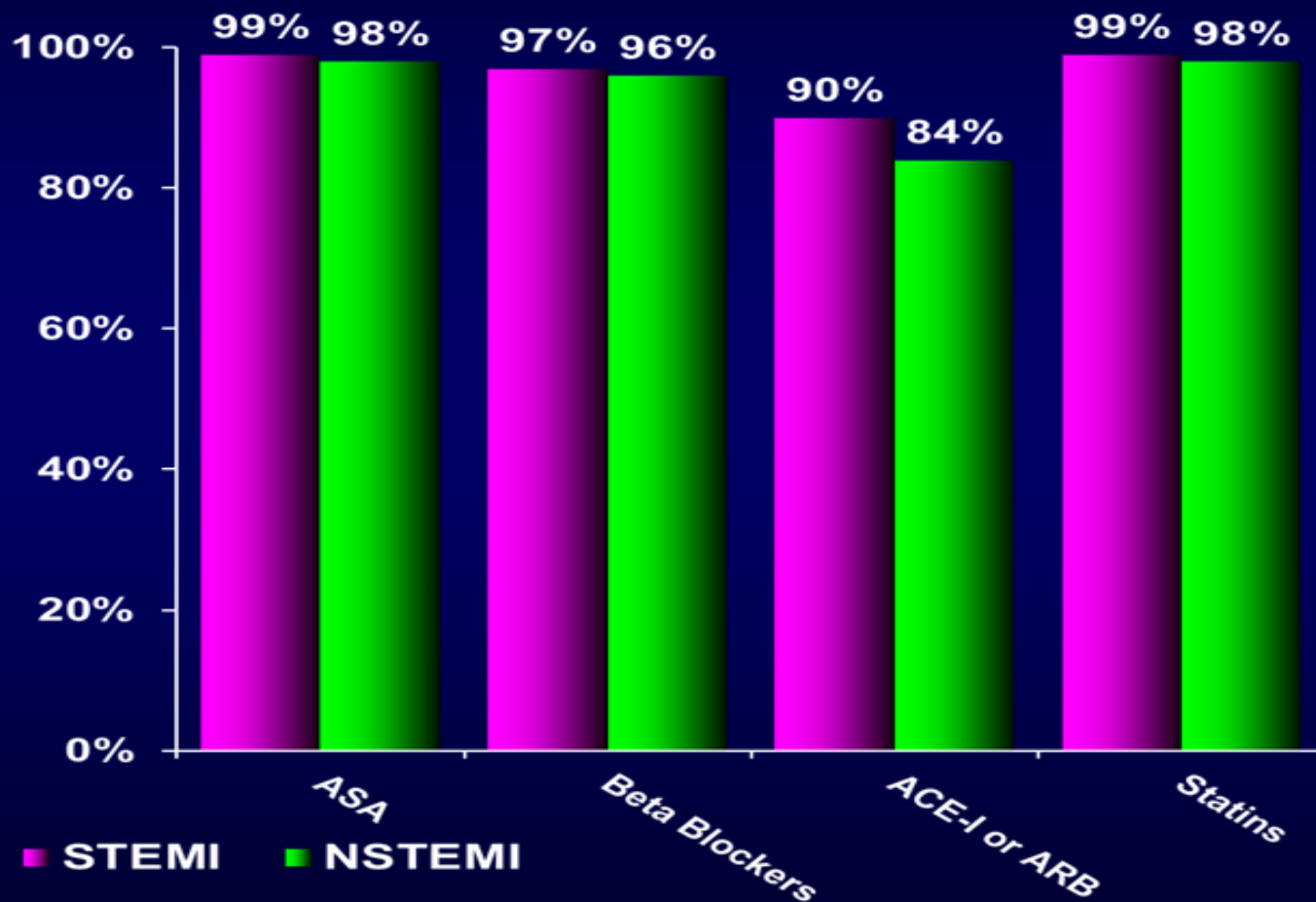


Improving In-Patient Guidelines Adherence *with Measurement, Feedback and QI*



Reaching the Pinnacle of Perfection

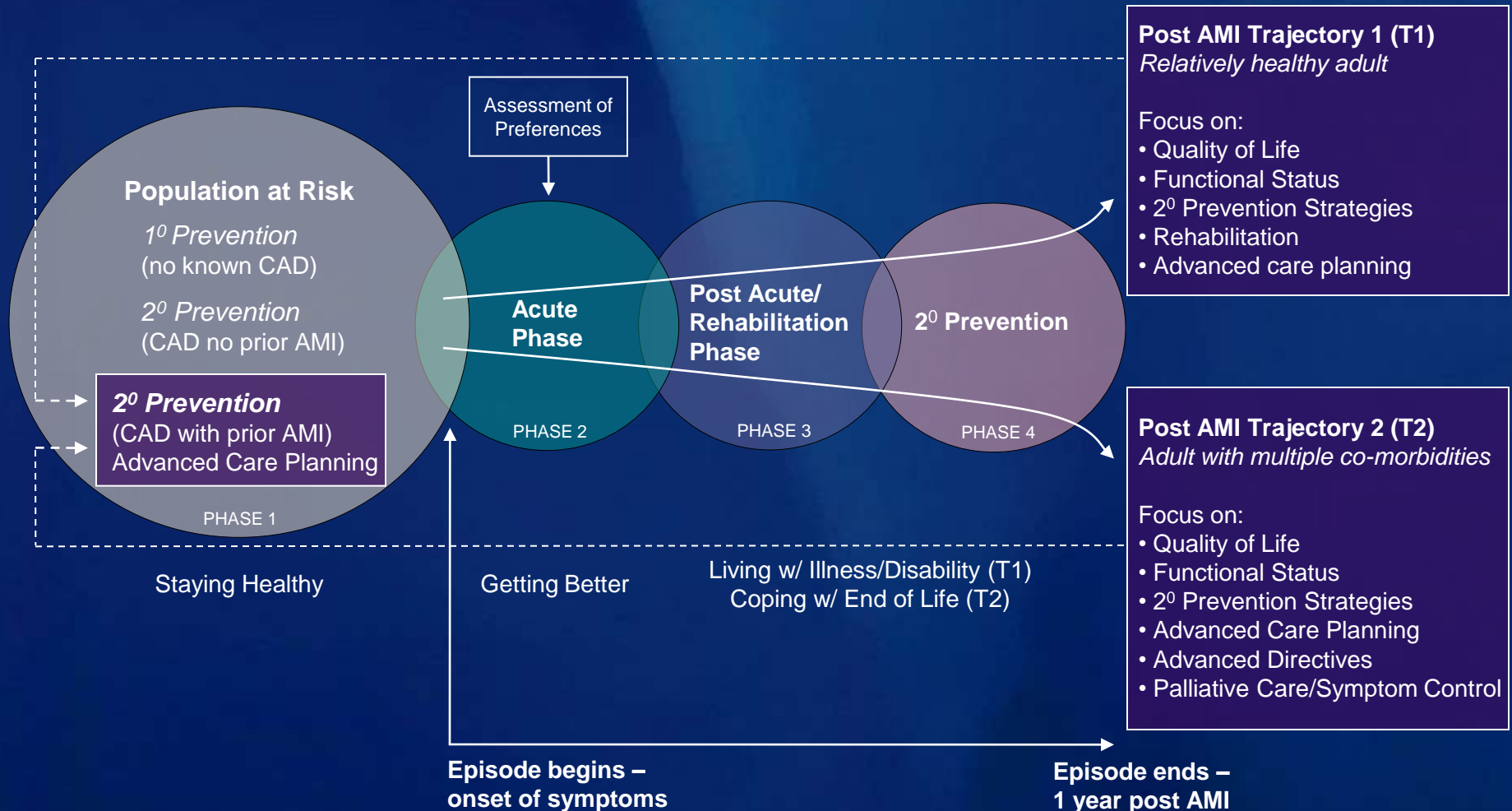
Discharge Medications STEMI vs. NSTEMI



* P2Y12's may overlap

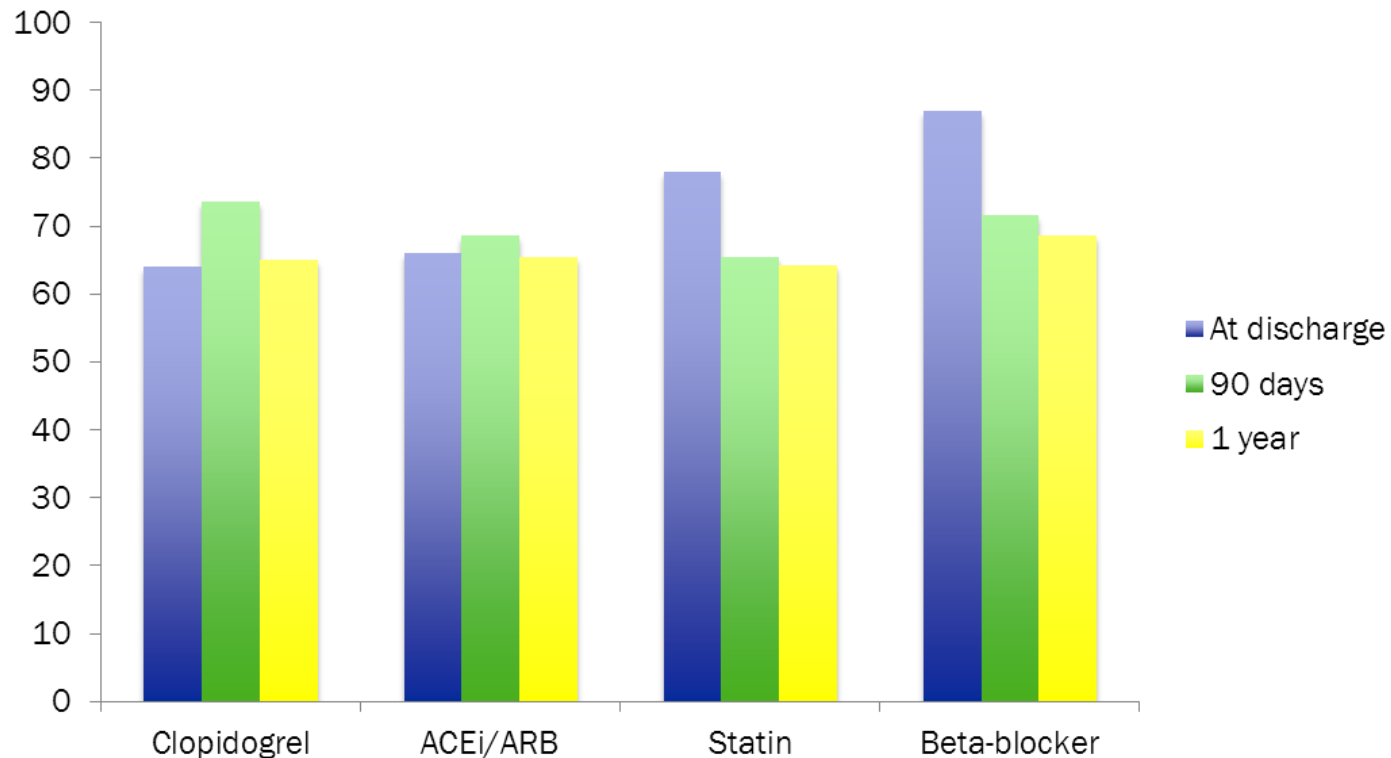
ACTION Registry-GWTG DATA: July 1, 2010 – June 30, 2011

Evolving View of Quality CV Care: Importance of a Longitudinal Perspective



Registries and Long-term Medication Adherence: TRANSLATE-ACS

Medication Use at Discharge, 90days, and 1 year



Implementation Science: *'Digging Deeper'*

Lessons from Basic Research

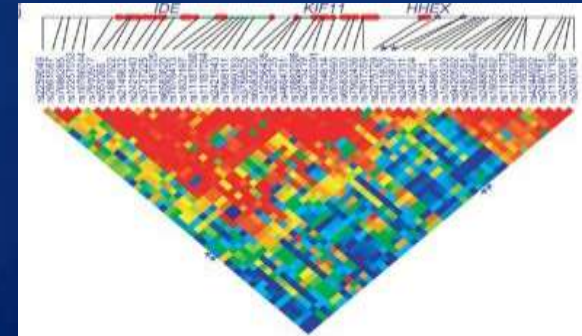
■ High Throughput Screening:

- allows rapid screening of a high #'s of chemicals to find an active compounds



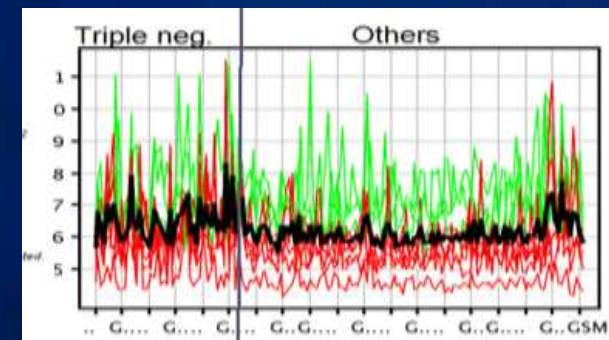
■ Genome-wide Association (GWAS):

- In-depth characterization of genes to identify those that are associated with the trait of interest



■ Biological Systems Perturbation:

- an experimental disruption of a system done to understand its properties



New Era Implementation Science

Methods and Nomenclature

■ High Throughput Site Screening:

- National Clinical Registries
- allows rapid screening of centers to find those few who are outstanding!



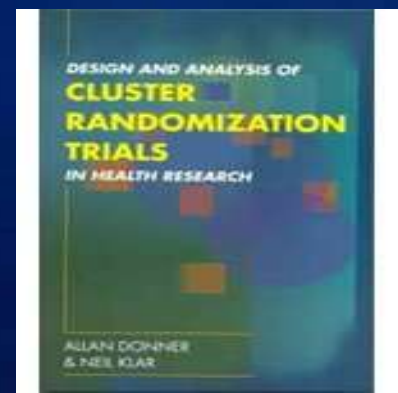
■ Qualitative/Quantitative Drilldowns

- In-depth characterization of hospital processes associated with better outcomes



■ Systems Intervention

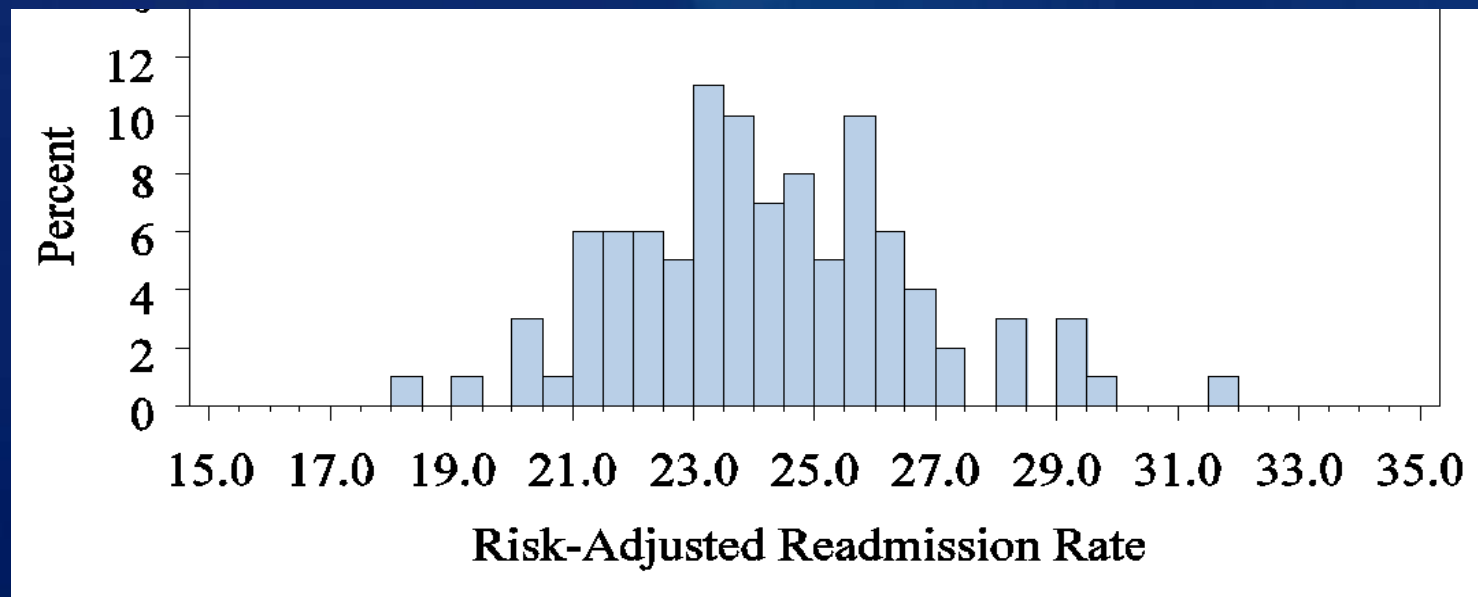
- Natural: policy/payment experiments
- Induced: Cluster randomized intervention



Using Variation to Advantage

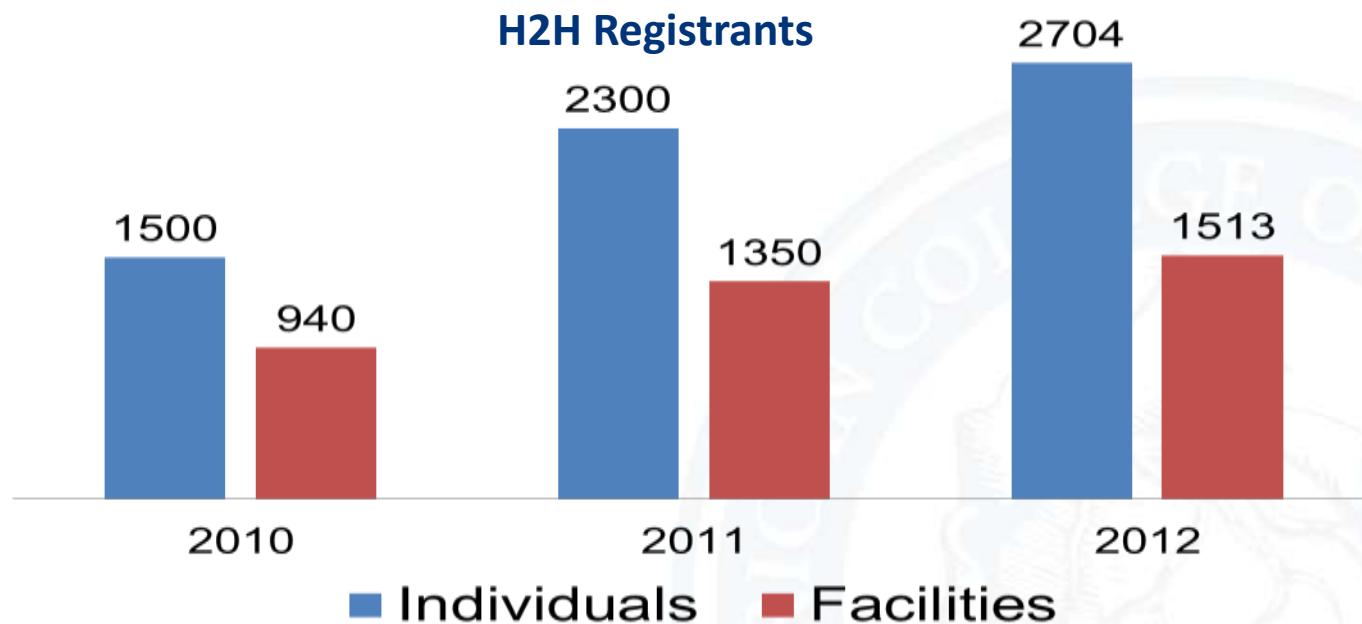
AHA GWTG Study of HF Readmissions

- Characterize variation in heart failure (HF) readmissions
- Identify modifiable MD, hospital and system factors associated with HF readmission



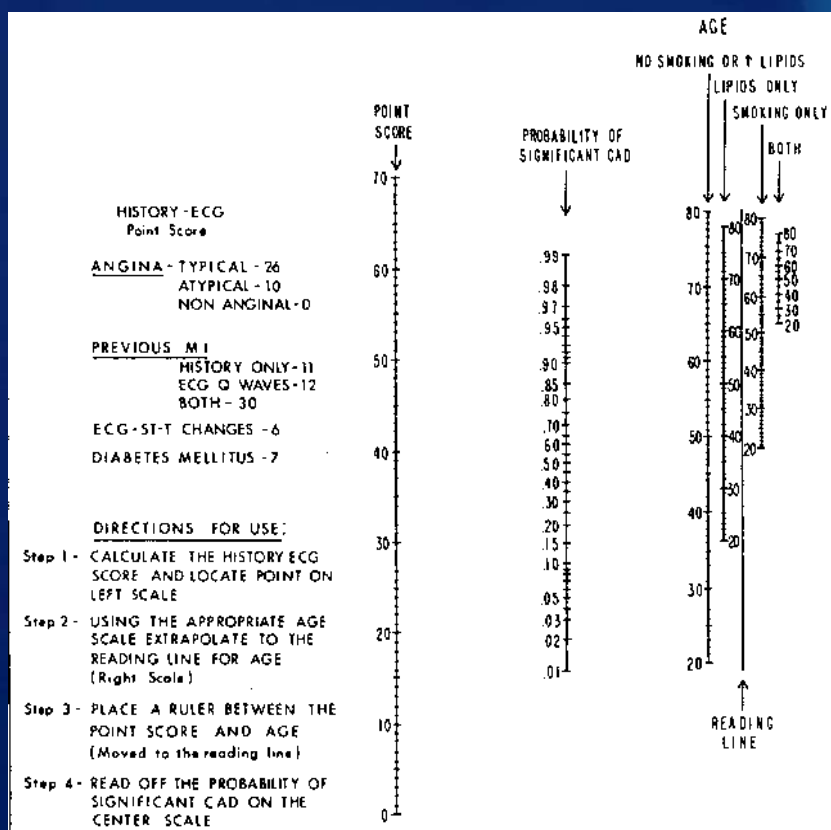
Goal

To reduce 30 day, all-cause, risk standardized readmission rates for patients discharged with cardiac conditions by 20% by Dec 2012

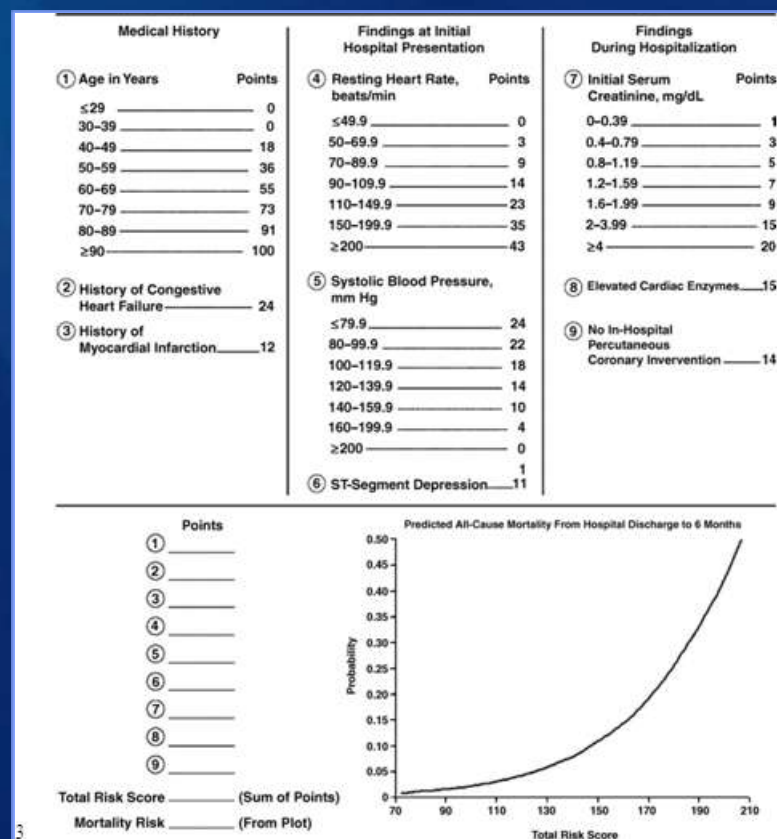


Using Registries to Support Diagnosis, Prognosis, + Decision Support

Duke DB Risk for CAD



GRACE ACS Score



Using IT to Stimulate Patient Centric Decision Support

$$\eta = \beta_0 + \beta_1 x_{T-1} + \dots + \beta_n x_{T-n}$$

$$\eta = \beta_1 x_{T-1} + \dots + \beta_n x_{T-n}$$

$$\eta_i = \beta_{i0} + \beta_{i1} x_{T-1} + \dots + \beta_{in} x_{T-n}$$

$$\mu_i = \begin{cases} \pi_i & i = 1 \\ \pi_i - \sum_{j=1}^{i-1} \pi_j & i = 2, \dots, s \text{ where } \pi_i = \Phi^{-1} \\ 1 - \sum_{j=1}^{i-1} \pi_j & i = s+1 \end{cases}$$

Bedside Decision Support Tool

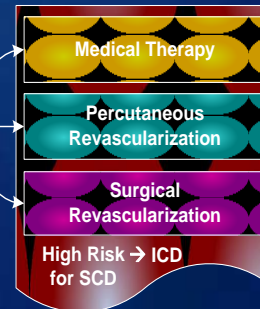


Feedback of Projected Outcomes



Patients Diagnosed with CAD

Medical Decision Making



Outcomes
(Survival, Function, Symptoms, Return to Work)

Complications
(Death, Recurrent MI, Stroke, Disability)

Costs
(Direct & Indirect)

Moving Global!

Worldwide *BURDEN OF CV DISEASE*

| 1990 | | 2020 |
|-------------------------------|----|-------------------------------|
| Lower Respiratory Infection | 1 | Ischemic heart disease |
| Diarrheal Disease | 2 | Depression |
| Perinatal | 3 | Road Traffic Accidents |
| Depression | 4 | Cerebrovascular |
| Ischemic Heart Disease | 5 | COPD |
| Cerebrovascular | 6 | Lower Respiratory Infection |
| Tuberculosis | 7 | Tuberculosis |
| Measles | 8 | War |
| Road Traffic Accidents | 9 | Diarrhoeal Disease |
| Congenital Diseases | 10 | HIV |
| Malaria | 11 | Perinatal Disease |
| COPD | 12 | Violence |
| Falls | 13 | Congenital |
| Iron-deficiency anemia | 14 | Self-inflicted injury |
| Protein calorie malnutrition | 15 | Bronchial and Lung Cancer |



Duke University

From Thought Leadership to Clinical Practice

www.dcp2.org

34 Clusters (Public Hospitals) including 1,150 consecutive patients with ACS

Concealed Randomization

Multifaceted Quality Improvement Intervention
(n= 17 clusters and 602 patients)

Routine Practice
(n= 17 clusters and 548 patients)

ITT

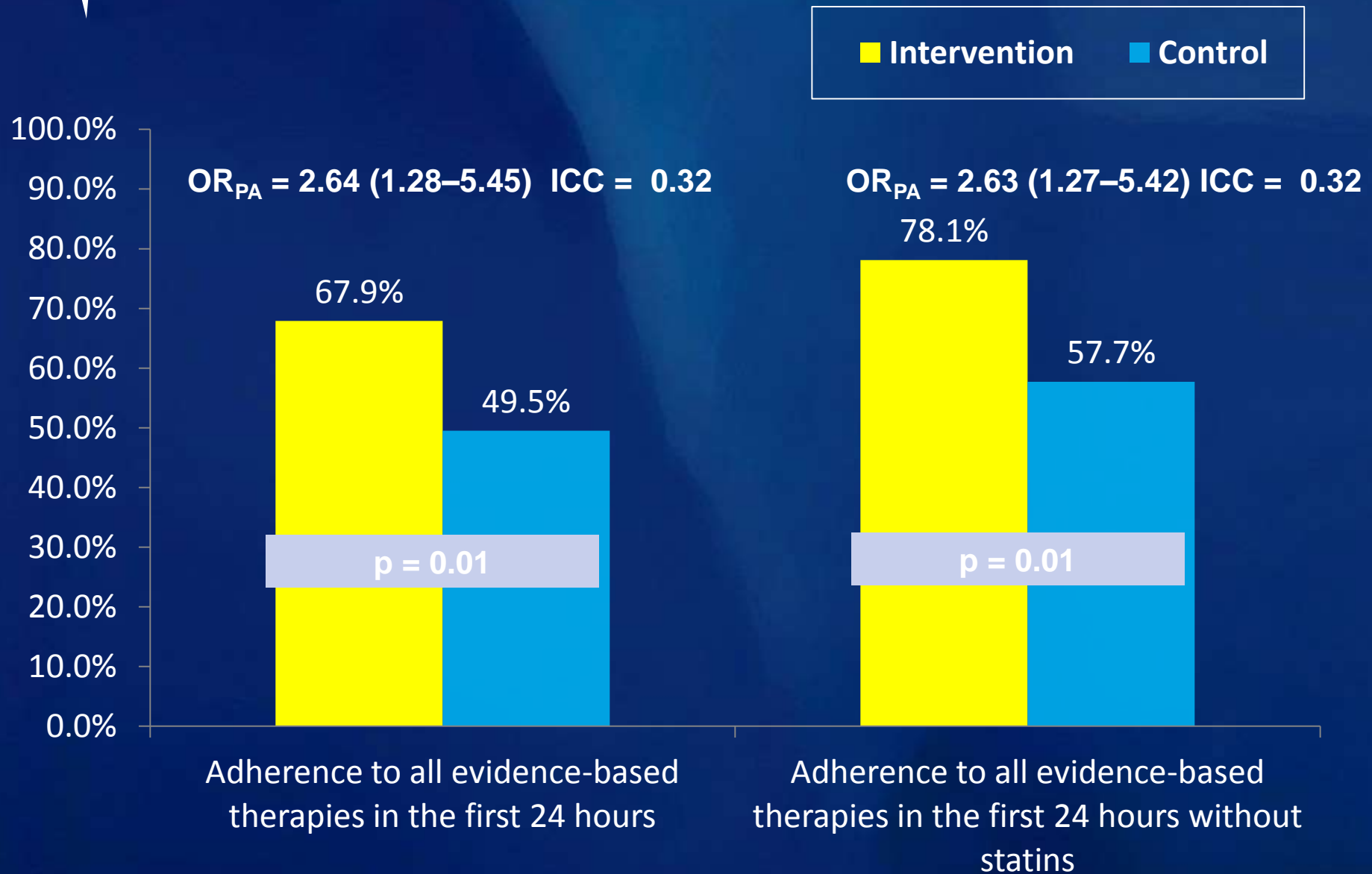
ITT

Primary Endpoint: Adherence to all eligible evidence-based therapies during the first 24 hours

Secondary Endpoints: Adherence to all eligible evidence-based therapies during the first 24 hours and at discharge, composite EBM score, major cv events



Results



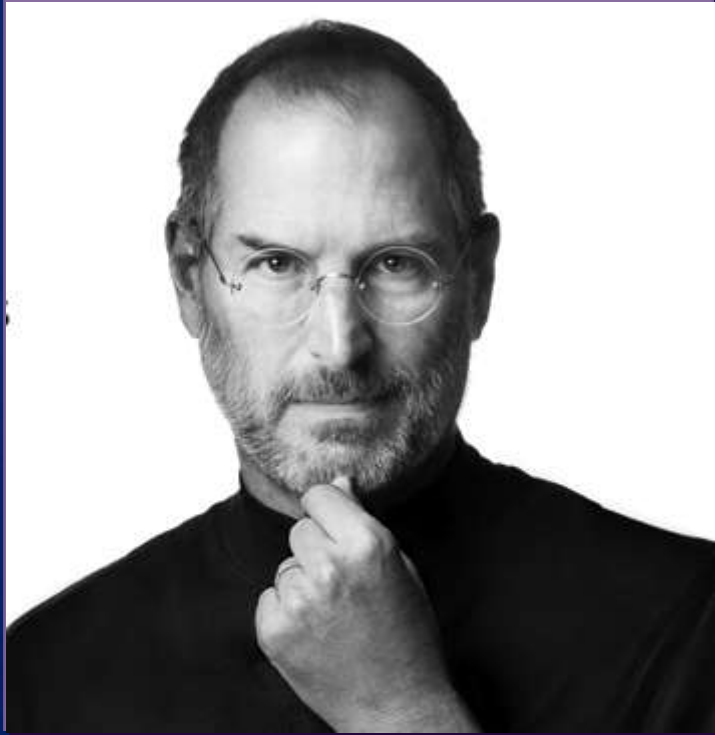
Registries: Conclusion

(or just the start!)

- Registries will continue to play a transformational role in CV care
- CV Registries can:
 - Promote scientific discoveries
 - Support RCTS
 - Identify gaps in care quality
 - Support quality improvement
- Ultimately leading to better patient care and outcomes around the nation and around the globe!



Driving Quality!



*“Be a yardstick of quality.
Some people aren't used to
an environment where
excellence is expected.”*