



## **The Wonderful World of Quality Metrics**

**September 11, 2008**

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### **Objectives**

- Approaches to defining and conceptualizing quality of care
- Major types of quality measures
- Roles of national quality measurement organizations
- Sources of hospital and physician data
- Measure sets used most widely at state and national levels
- Evaluating, prioritizing, and selecting measures
- How one CVE selected its measures.



## **Framing the Problem in 1998:**

### ***President's Advisory Commission on Consumer Protection and Quality in the Health Care Industry***

- “Exhaustive research documents the fact that today, in America, there is no guarantee that any individual will receive high-quality care for any particular health problem.
- The health care industry is plagued with...
  - **Overutilization of services (that don't work)**
  - **Underutilization of services (that do work)**
  - **Errors in health care practice.”**



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## **Challenging the Nation (2001):**

### ***IOM Committee on Quality of Health Care in America***

- “The American health care delivery system is in need of fundamental change...
- Health care today harms too frequently and routinely fails to deliver its potential benefits...
- Quality problems are everywhere, affecting many patients.
- Between the health care we have and the care we could have lies not a gap, but a chasm.”



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## Definitions of Quality

- **Roemer & Montoya-Aguilar, WHO (1988):**  
“The proper performance (according to standards) of interventions that are known to be safe, that are affordable to the society in question, and have the ability to produce an impact on mortality, disability, and malnutrition.”
- **Institute of Medicine (1990):**  
“the degree to which health services... increase the likelihood of desired health outcomes and are consistent with current professional knowledge.”
- **Brook and McGlynn (1991):**  
“High quality care...produces positive changes, or slows the decline, in health...”
- **Pauly (2004):**  
“...anything and everything about some good or service relevant to consumers’ (actual and perceived) well-being that is not measured by quantity” (or price).

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## IOM Domains of Quality

### Effectiveness

- Providing services based on scientific knowledge (avoiding overuse of inappropriate care, underuse of appropriate care)

### Patient Centeredness

- Care that is respectful of and responsive to patient preferences, needs, and values

### Timeliness

- Reducing wait times and sometimes harmful delays (for both patients and providers)



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## IOM Domains of Quality (2)

### Safety

- Avoiding injuries to patients from the care that is intended to help them

### Efficiency

- Avoiding waste, including waste of equipment, supplies, ideas, and energy

### Equity

- Care does not vary in quality because of personal characteristics (gender, ethnicity, location, SES)



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## Types of Quality Measures

### Donabedian 2003

- **Structure:** Conditions under which care is provided
  - Material resources (facilities, equipment)
  - Human resources (ratios, qualifications, experience)
  - Organizational characteristics (size, volume, IT systems)
- **Process:** Activities that constitute health care
  - Screening, diagnosis, treatment, rehabilitation, education, prevention
- **Outcome:** Changes attributable to health care
  - Mortality, morbidity (complications, readmissions)
  - Functional status, quality of life
  - Knowledge, attitudes, and behaviors
  - Satisfaction with care

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## Typology of Quality Measures: Integrating IOM With Donabedian

	Structure	Process	Outcome
<b>Effective</b>	Yes	Yes	Yes
<b>Patient Centered</b>	Maybe	Yes	Yes
<b>Timely</b>	Maybe	Yes	Yes
<b>Safe</b>	Yes	Yes	Yes
<b>Efficient</b>	N/A	N/A	N/A
<b>Equitable</b>	Maybe	Yes	Yes



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## Structural Measures: Background and Concerns

- Enabling factors of high-quality care
- Little explanation of process and outcome variability
- May be hard to modify
- Causal relationships are often unclear



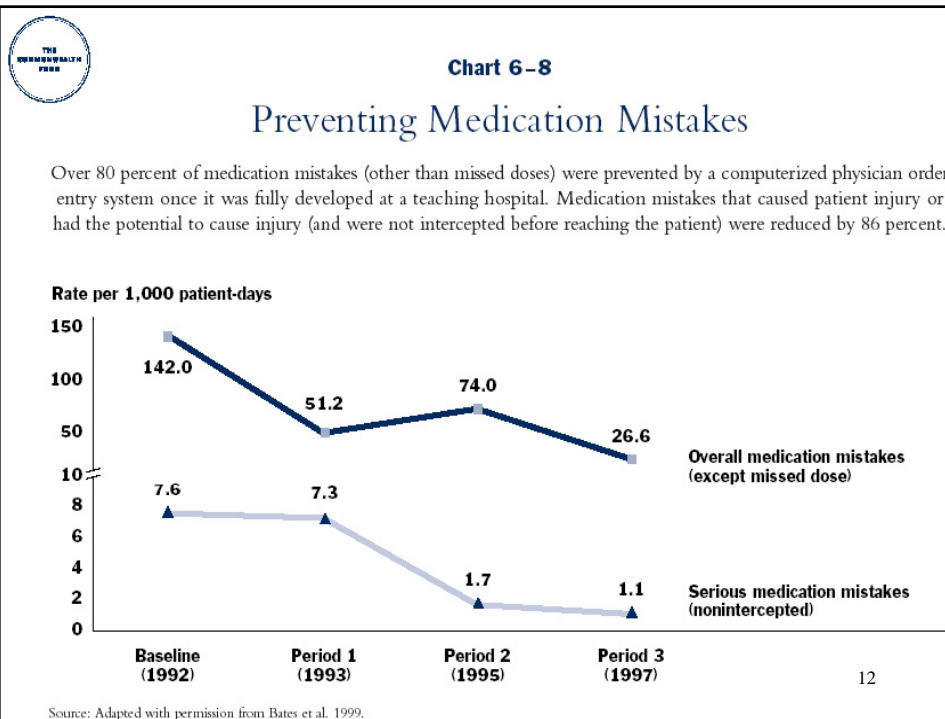
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## Structural Measures: Implications

- Should be viewed as markers or facilitators of quality, not true measures
- Used when process or outcome measures are not yet available, or have inadequate power
- Focus on modifiable measures that have a direct relationship with outcomes (e.g., nursing skill mix)
- CPOE case study



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## How CPOE Systems Facilitate Prescribing Errors

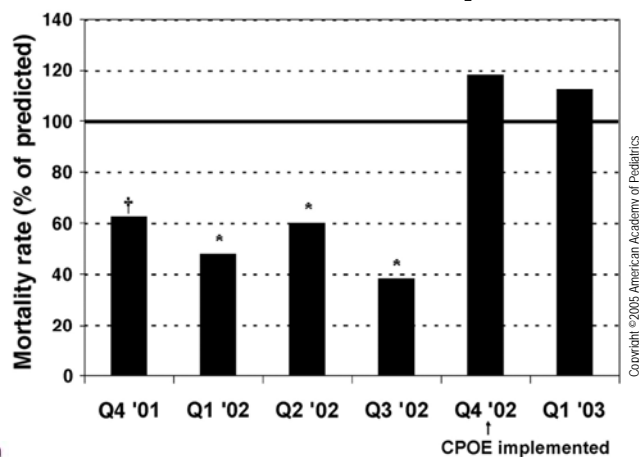
- Entering order for wrong patient due to interruption or display problems
- Delays in orders when patients not yet entered into system, CPOE crashes
- Incorrect default dosing or protocol
- Overloading users with alerts and reminders
- Medications discontinued without clinicians being aware (after surgery, antibiotics)



Koppel et al. "Role of CPOE in facilitating medication errors." *JAMA* 2005; Ash J et al. "Unintended Consequences of IT in Health Care." *J Am Med Inform Assoc* 2004.

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## Mortality Among Patients Transferred From Other Hospitals



Han, Y. Y. et al. *Pediatrics* 2005;116:1506-1512

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## What Went Wrong?

- “Order entry was not allowed until patient had physically arrived to the hospital and been fully registered...”
- “Entering stabilization orders often required an average of 10 ‘clicks’ on the computer mouse...”
- “Communication bandwidth was often exceeded...”
- “Second physician often needed solely to enter orders during the first 15 mins to 1 hour...”
- “Pharmacy could not process medication orders until they had been activated, [so] ICU nurses spent significant amounts of time... away from the bedside...”
- “Opportunities for face-to-face physician–nurse communication were diminished.”



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## Process Measures: Strengths

- Directly actionable by health care providers (“opportunities for intervention”)
- Highly responsive to change
- Often validated in randomized controlled trials (“do what works”)
- Illustrate pathways by which interventions may lead to better patient outcomes



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## Process Measures: Concerns

- Often costly or difficult to collect
  - Pharmacy/laboratory utilization (incomplete data capture)
  - Chart review (inadequate documentation)
  - Participant observation (Hawthorne effect, cost)
  - Provider surveys (social desirability bias)
  - Simulated patients (cost)
  - Patient surveys (biased recall)



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## Video Recording to Identify Errors in Pediatric Trauma Resuscitation

Mean of 5.9 errors per resuscitation, with 93% agreement between 2 reviewers.

Mean of 2.2 errors in each seriously injured child, with 20% capture on medical records



Oakley, E. et al. *Pediatrics* 2006;117:658-664



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## Process Measures: Concerns

- Validity may be questionable
  - Are they really evidence-based (vs. “expert opinion”)?
  - Some processes that seem important probably are not
  - Many important processes have not yet been recognized
  - Measures may not generalize across settings
    - “Standard of care” may vary



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## Story of a Hospital Core Measure: Time to First Antibiotic Dose (TFAD) for Pneumonia

- Two seminal studies of Medicare patients showed that TFAD is associated with risk of death:
  - Meehan et al. (1997) In 14,069 community-acquired pneumonia (CAP) patients aged  $\geq 65$ , 15% lower 30-day mortality if TFAD  $\leq 8$  hrs
  - Houck et al. (2004) In 18,209 CAP patients aged  $\geq 65$ , 15% lower 30-day mortality if TFAD  $\leq 8$  hrs (no  $\downarrow$  with prior antibiotic treatment, and 16% $\downarrow$  if TFAD  $\leq 6$  hrs)
- Smaller studies found no association with mortality, but significant associations with adjusted LOS



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## Concerns About TFAD

- 22% of patients may have “appropriate” delays due to atypical presentations and diagnostic uncertainty
- Adherence may be related to factors beyond hospital control (e.g., number of ED registrants)
- In one 608-bed teaching hospital from 2003 to 2005:
  - Patients receiving antibiotics within 4 hours of triage increased from 54% to 66% BUT
  - “CAP” with normal CXR increased from 21% to 29%
  - CAP with “clear infiltrate” dropped from 55% to 41%
  - Final dx of CAP among patients with admit dx of CAP decreased from 76% to 59% (non-infectious dx increased from 16% to 30%)



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## Outcome Measures: Strengths

- Outcomes are what really matter to patients, families, and communities
- Intrinsically meaningful and easy to understand
- Outcomes reflect not just what was done but how well it was done (which is very difficult to measure directly)
- Often ascertainable at low cost using administrative data



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## Outcome Measures: Concerns

- Data depend on reporting by provider organizations
- Inconsistent documentation and report of morbidity measures (poor MD documentation and/or coding)
- Mortality measures may be confounded by variation in use of observation units, inter-hospital transfers, and LOS
- Severity of illness varies widely across providers; most existing data systems capture little of this variation
- Many adverse outcomes are rare or delayed (e.g., little short-term responsiveness, lots of random noise)
- Are outcomes sufficiently under providers' control?



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## Confirmation Rate for Selected PSIs

Preliminary estimates from AHRQ Validation Pilot Project

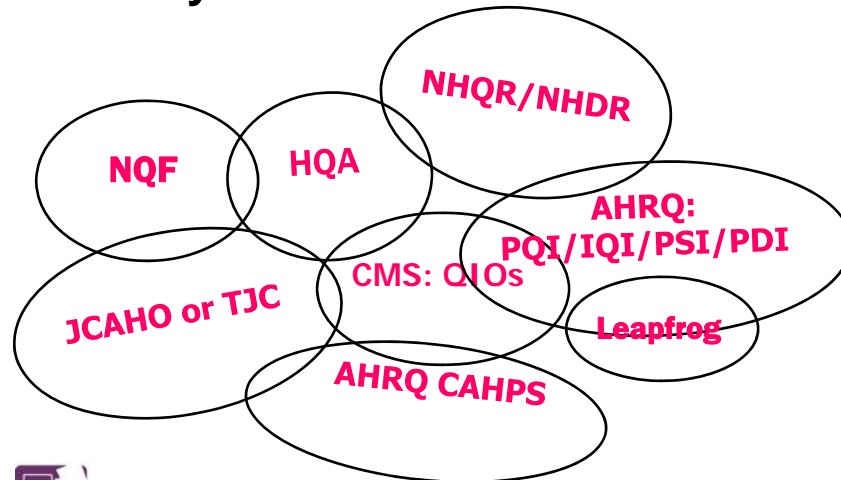
PSI	PPV%
Accidental puncture or laceration	91%
Iatrogenic pneumothorax	88%
Postoperative DVT/PE	48-83%
Selected infections due to medical care	61%
Postoperative sepsis	41%

Positive Predictive Values (PPVs) are high for NQF-endorsed indicators in 2008  
 Planned coding changes and POA logic should solve remaining problems



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## Alphabet Soup of National Quality Measurement Initiatives



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## Key Measure Sponsors

- The Joint Commission (TJC)
  - Core measures, accreditation, certification standards
- National Committee for Quality Assurance (NCQA)
  - Healthcare Effectiveness Data and Information Set (HEDIS)
- AMA Physician Consortium for Performance Improvement and specialty organizations
- Agency for Healthcare Research and Quality (AHRQ)
  - Quality Indicators (QIs), Consumer Assessment of Healthcare Providers and Systems (CAHPS) surveys



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## Key Measure Endorsers/Users

- National Quality Forum (NQF)
- Centers for Medicare & Medicaid Services (CMS)
- Hospital Quality Alliance (HQA)
- Ambulatory Quality Alliance (now AQA)
- Chartered Value Exchanges!



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## Data Sources for Quality Measurement

- Ask patients (surveys) to capture:
  - Morbidity (complications, functional status, quality-of-life)
  - Knowledge, attitudes, and behaviors
  - Satisfaction and experiences with care
  - Simulated patients to observe/video/audiotape actual processes of care
- Potential concerns:
  - Poor response rate, non-response bias
  - May be costly to do it right
  - Multi-step development process (shortcut using CAHPS)
  - Recall bias, social desirability bias



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## Data Sources for Quality Measurement (2)

- Ask health care providers (surveys) to capture:
  - Ratings of others' reputation
  - Description of own material and human resources
  - Description of own characteristics and practices (vignettes)
- Potential concerns:
  - Poor participation rate, non-response bias
  - Social desirability bias
  - Does quality actually drive reputation? Or does reputation reflect longevity in community and networking?



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## Data Sources for Quality Measurement (3)

- Review linked claims/administrative data sets to capture:
  - Mortality, morbidity (complications, readmissions)
  - Adherence to guidelines involving use of billable services (laboratory, radiology, pharmacy, OR)
- Potential concerns:
  - Limitations of ICD-9-CM or CPT codes (avoid by using HEDIS, AHRQ QIs, etc.)
  - Incomplete capture of relevant claims
  - Errors in diagnosis, documentation, and coding



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## Data Sources for Quality Measurement (4)

- Review/abstract medical records to capture:
  - Morbidity (complications, readmissions)
  - Adherence to guidelines
- Potential concerns:
  - Errors in diagnosis and documentation
  - May be costly to do it right (avoid by using TJC/HQA measures)



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## Prioritizing & Selecting Measures: NQF Evaluation Criteria

- Similar criteria are used by NCQA, TJC, etc.
  - Importance or relevance
  - Scientific acceptability or soundness
  - Usability
  - Feasibility
- Relative importance of these criteria may depend on local circumstances and priorities...



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NQF	IOM/NHQR	TJC	NCQA
<b>NQF Criterion: Importance/Relevance</b>			
Leverage point for improving quality	Impact on health	Targets improvement in the health of populations	Strategically important Clinically important
	Meaningfulness to policymakers, consumers		Meaningful to consumers, purchasers, plans, providers
Performance in the area is suboptimal			Potential for improvement
Aspect of quality is under provider control.*	Susceptibility to being influenced by health care	Under provider control	Controllable
Considerable variation in quality of care exists			Variance among plans/providers
			Financially important



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NQF	IOM/NHQR	TJC	NCQA
<b>NQF Criterion: Scientific Acceptability/Soundness</b>			
Well-defined and precisely specified		Precisely defined and specified	Precisely specified (under "Feasibility")
Reliable	Reliability ("stable results")	Reliable ("identify consistently")	Reproducible
Valid ("accurately representing concept")	Validity ("measure what it is intended...")	Valid ("capture what it was intended...")	Valid (face, construct, content)
Precise, adequate discrimination			Accurate ("reasonable level of precision")
Adaptable to patient preferences and variety of settings			Comparability of data sources
Adequate, specified risk-adjustment		Risk-adjusted or stratified (if needed)	Risk-adjustable
Evidence linking processes to outcomes	Explicitness of the evidence base		Degree of professional agreement

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NQF	IOM/NHQR	TJC	NCQA
<b>NQF Criterion: Usability</b>			
Can be used by at least one stakeholder audience for decision-making		Useful to supplement or enhance the accreditation process	
Performance differences are statistically meaningful			
Performance differences are clinically meaningful			
Risk stratification or adjustment can be applied	Capacity to support subgroup analyses		
Effective presentation and dissemination strategies exist		Can be interpreted by data users	
Information about appropriate conditions is given			
Methods for aggregating measure are defined			

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NQF	IOM/NHQR	TJC	NCQA
<b>NQF Criterion: Feasibility</b>			
Point of data collection tied to care delivery, when feasible			
Timing and frequency of measure collection are specified			
Benefit of measurement is evaluated against financial and administrative burden	Cost and burden of measurement	Data collection effort is assessed (availability, accessibility, effort, cost)	Reasonable cost
Auditing strategy is designed and can be implemented			Auditable
Confidentiality can be addressed			Confidential
	Existence of prototypes (in use)	Public availability (access to measure construct and calculation algorithm)	Logistically feasible



Learning Network for  
**Chartered**  
Value Exchanges

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## Consider Potential Unintended Effects

- Manipulation of data (e.g., exception reporting)
- Teaching to the test
- Risk of overtreatment (especially with all-or-none scoring) or undertreatment (with efficiency measures)
- Increased disparities

