

Leading Transformational Change for Healthcare Quality

The Road to Green Light Performance!

Dale W. Bratzler, DO, MPH
QIOSC Medical Director
Oklahoma Foundation for Medical Quality

RAND Study: Quality of Health Care Often Not Optimal

Patients' care often deficient, study says. Proper treatment given half the time.

On average, doctors provide appropriate health care only half the time, a landmark study of adults in 12 U.S. metropolitan areas suggests.

**Medical Care
Often Not
Optimal**

Failure to Treat
Patients Fully Spans
Range of What Is
Expected of
Physicians and Nurse

**Study: U.S.
Doctors are
not following
the guidelines
for ordinary
illnesses**

**Medical errors corrode
quality of healthcare system**

The American healthcare system, often touted as a cutting-edge leader in the world, suddenly finds itself mired in serious questions about the ability of its hospitals and doctors to deliver quality care to millions.

THE NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

Care in U.S. Hospitals — The Hospital Quality Alliance Program

Ashish K. Jha, M.D., M.P.H., Zhonghe Li, M.A., E. John Orav, Ph.D.,
and Arnold M. Epstein, M.D.

In summary, we found that the quality of hospital care in the United States varies widely across different indicators of quality and that individual hospitals vary in their performance according to indicators and conditions.

N Engl J Med 2005;353:265-274.

NEWS

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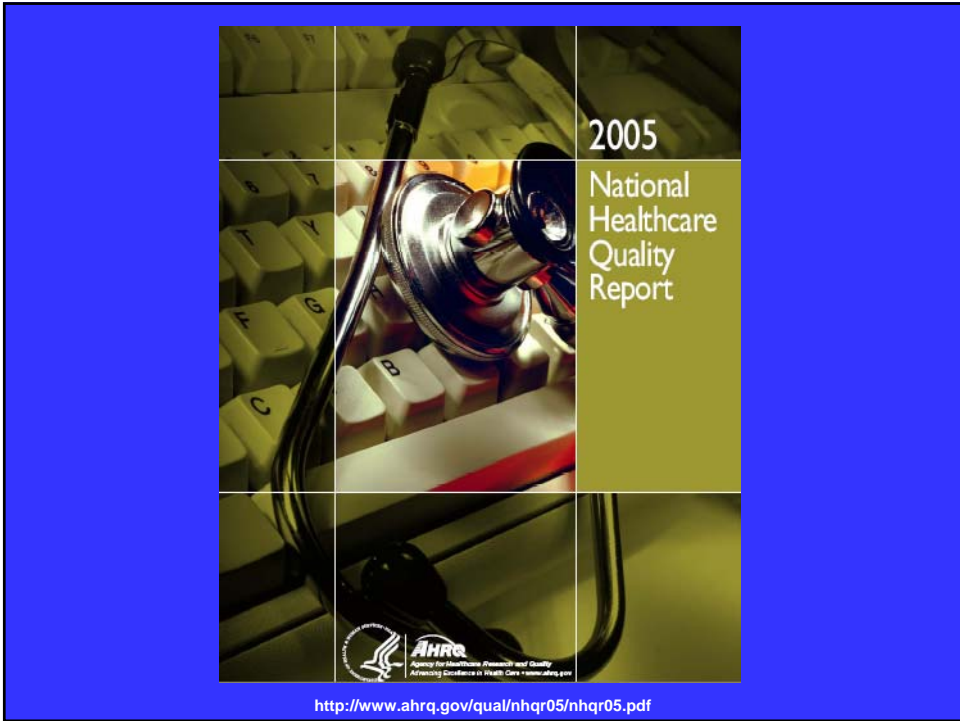
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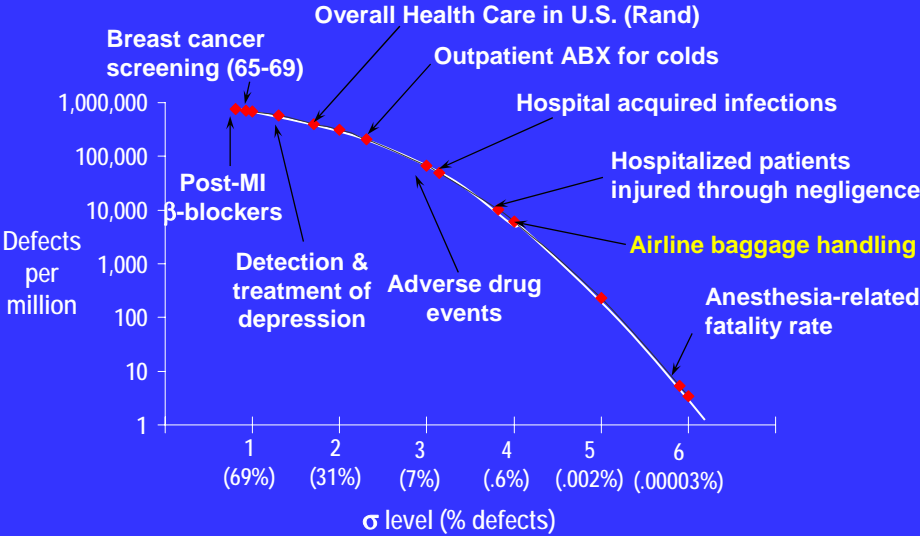
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FOR IMMEDIATE RELEASE

Medication Errors Injure 1.5 Million People and Cost Billions of Dollars Annually;
Report Offers Comprehensive Strategies for Reducing Drug-Related Mistakes



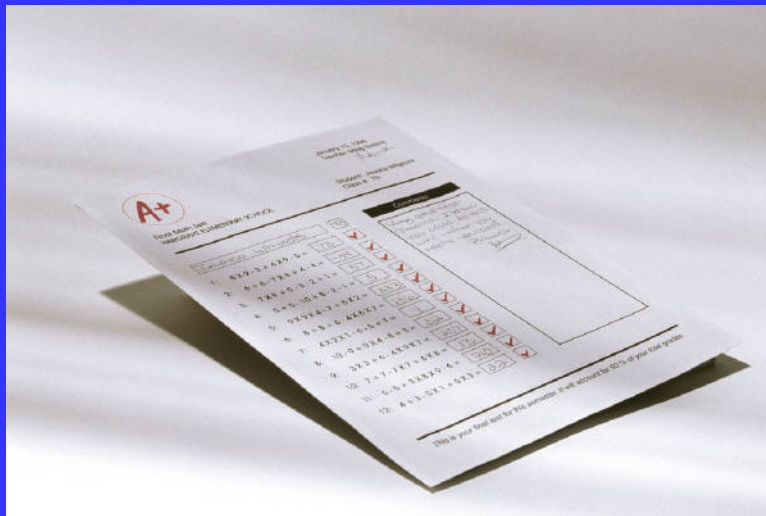
Healthcare Quality in the US



Source: modified from C. Buck, GE

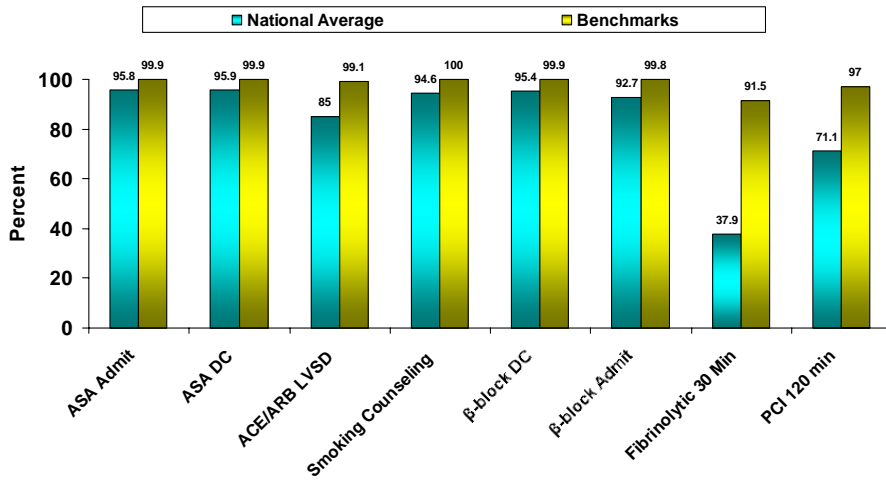
How do we achieve transformation?

In performance measurement, is an “A” good enough?



Acute Myocardial Infarction

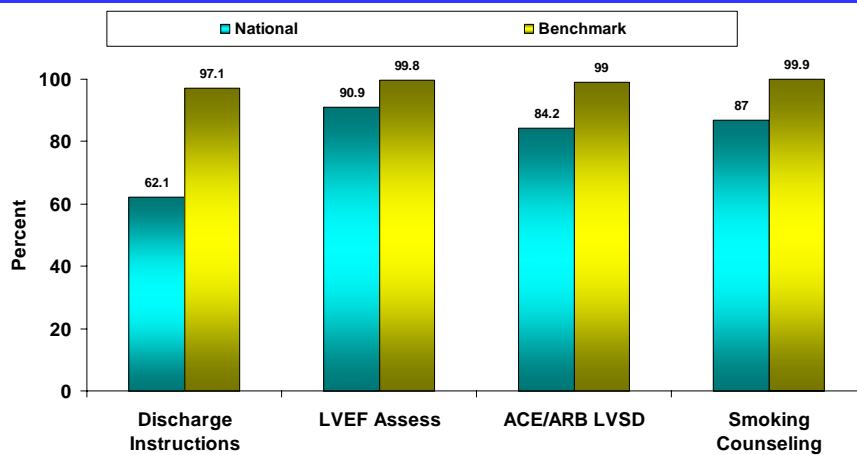
Quarter 4, 2005



National averages as reported to the QualityNet data warehouse.

Heart Failure

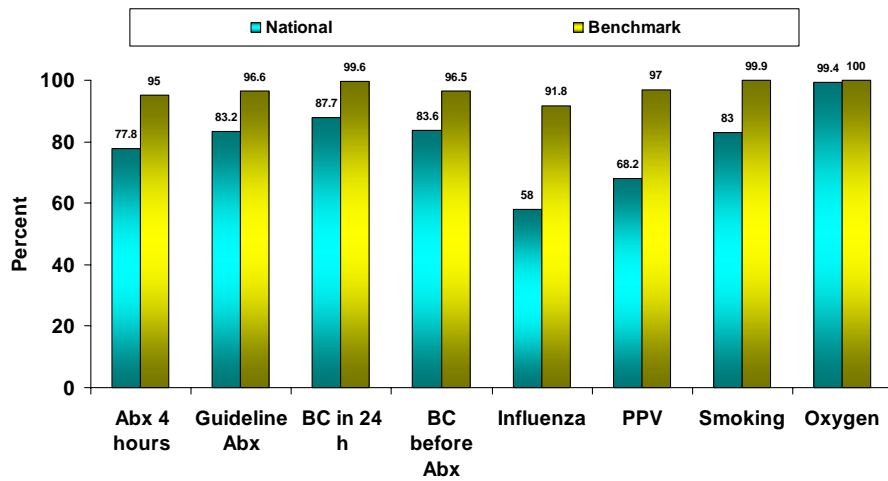
Quarter 4, 2005



National averages as reported to the QualityNet data warehouse.

Pneumonia

Quarter 4, 2005



National averages as reported to the QualityNet data warehouse.

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Care lags for common killer

March 6, 2006

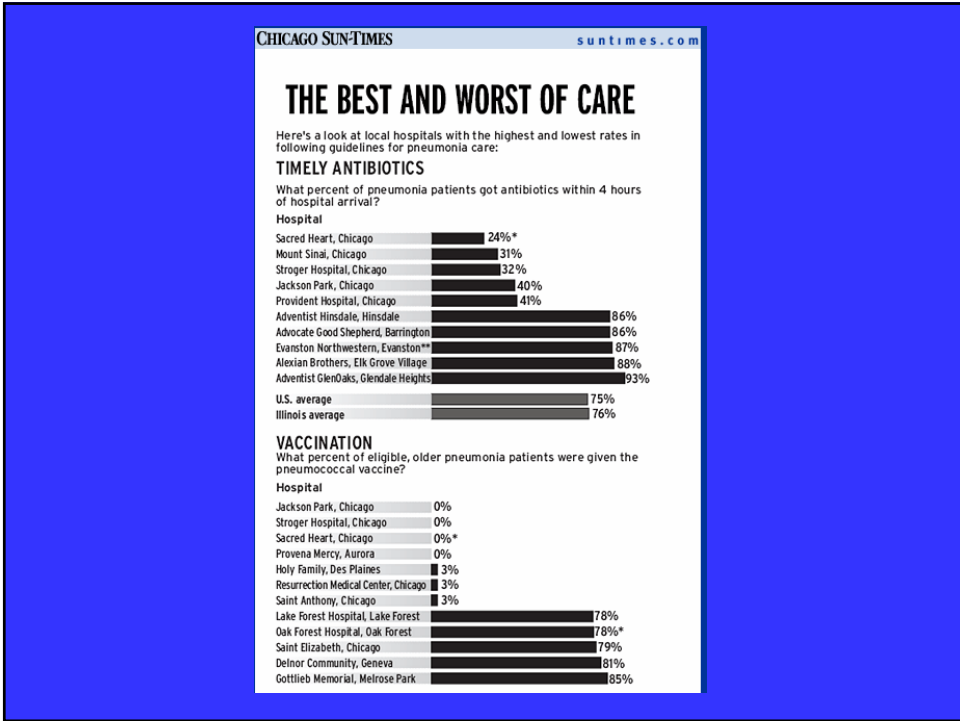
BY [LORI RACKL](#) Health Reporter

Pneumonia patients in the Chicago area often get hospital care that lags behind the rest of the nation, a Chicago Sun-Times analysis of government data shows.



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Kahn et al, 1990

- **Setting:** 297 hospitals in 5 states
- **Patients:** adults
- **Design:** retrospective record review
- **Outcome:** mortality 30 days after admission
- **Findings:** Care that included antibiotics within **4 hours associated with 5.4% lower mortality**
- **Issues:** Retrospective, limited adjustment, timing not focus

JAMA. 1990; 264:1969-1973.

McGarvey and Harper, 1993

- **Setting:** 3 hospitals in PA
- **Patients:** 870 adults, mean age 80 y
- **Design:** pre/post-intervention package with 4-hr administration
- **Outcome:** inpatient mortality, LOS
- **Findings:** Care including antibiotics within **4 hours associated with 3.4% lower mortality, 1.3 d LOS**
- **Issues:** No adjustment, timing not focus

QRB Quality Review Bulletin. 1993; 19:124-30.

Meehan, et al 1997

Findings

Antibiotic administration within **8 hours** associated with **lower 30-day mortality** among all patients:

Severity-adjusted **odds ratio = 0.85**; 95% confidence interval, 0.75 – 0.96.

A random sample of 14,069 patients aged > 65y, discharged from 3555 hospitals in US; 1994-95

JAMA. 1997; 278: 2080-84.

Houck PM, Bratzler DW, et al. 2004

- **Setting:** 3732 hospitals in US; 1998-99 (13371 patients)
- **Patients:** random sample 18,209 aged >65y; principal ICD9 code 48X, 038.X or 518.81 plus 48X; admit DX, (+) CXR, CAP, immunocompetent.
- **Design:** retrospective, medical record data, adjusted (PORT index, ICU, region, race, care process)

Arch Intern Med. 2004;164:637-44.

First Dose Timing and Outcomes

Timing of First Dose Group 1 vs Group 2	Group 1 Mortality %	Group 2 Mortality %	Adjusted Odds Ratio aOR (95% CI)	P value
≤ 1 hour vs > 1 hour	12.9	12.0	0.99 (.81-1.21)	0.906
≤ 2 hours vs > 2 hours	12.5	11.9	0.94 (.83-1.06)	0.322
≤ 3 hours vs > 3 hours	11.7	12.3	0.88 (.79-.99)	0.030
≤ 4 hours vs > 4 hours	11.6	12.7	0.85 (.76-.95)	0.005
≤ 5 hours vs > 5 hours	11.6	13.0	0.86 (.76-.97)	0.017
≤ 6 hours vs > 6 hours	11.6	13.5	0.84 (.73-.95)	0.008
≤ 7 hours vs > 7 hours	11.7	13.5	0.87 (.76-1.01)	0.060
≤ 8 hours vs > 8 hours	11.7	13.8	0.85 (.73-.99)	0.040
≤ 9 hours vs > 9 hours	11.8	13.8	0.86 (.73-1.02)	0.075
≤ 10 hours vs > 10 hours	11.9	13.4	0.91 (.76-1.09)	0.327

Using multivariate logistic regression [the model included the timing of antibiotic first dose, PSI score, ICU admission, US census region, race/ethnicity, other processes of care (oxygenation assessment, performance of blood cultures, and antibiotic selection)]. Patients who were on antibiotics prior to admission are excluded from this analysis. (Houck PM, Bratzler DW, et al. *Arch Intern Med.* 2004;164:637-44.)

First Dose Timing and Outcomes

Outcome	Within 4 hours	After 4 hours	Adjusted Odds Ratio	
	%	%	aOR (95% CI)	P value
30-day mortality	11.6	12.7	0.85 (.76-.95)	0.005
In-hospital mortality	6.8	7.4	0.85 (.74-.98)	0.029
Length of stay > 5 days	42.1	45.1	0.90 (.83-.96)	0.003
30-day readmission	13.1	13.9	0.95 (.85-1.06)	0.344

Using multivariate logistic regression [the model included the timing of antibiotic first dose, PSI score, ICU admission, US census region, race/ethnicity, other processes of care (oxygenation assessment, performance of blood cultures, and antibiotic selection)].

Houck PM, Bratzler DW, et al. *Arch Intern Med.* 2004;164:637-44..

Is 4 hours better than 8 hours?

- Antibiotic administration within 4 hours, as opposed to within 8 hours, was associated with:
 - 31.7%* reduction in mortality in the elderly.
 - 12.5%* reduction in length of stay exceeding the median in the non-elderly
 - 7.4%* reduction in length of stay exceeding the median in the elderly
- Additional analyses showed that those receiving antibiotics in 4-6 hours were similar to those receiving antibiotics in 6-8 hours.

Singer ME, Krishnaswamy J, Bonomo RA. [Abstract] The American Society for Microbiology's 45th Annual International Conference on Antimicrobial Agents and Chemotherapy (ICAAC™).

Why not always within 4 hours?

“Diagnostic uncertainty” and clinical factors.

Clinical Factors	Diagnostic Uncertainty N=19 (%)	No Diagnostic Uncertainty N=59 (%)	P value
Rales	12 (63.2)	50 (84.7)	0.043
Fever	7 (36.8)	26 (44.1)	0.579
Oxygen desaturation (<92%)	6 (31.6)	39 (66.1)	0.008
Abnormal WBC	12 (63.2)	40 (67.8)	0.709
CXR infiltrate	9 (47.4)	50 (84.7)	<0.001

Metersky ML, et al. Chest. 2006.

What Works to Improve Care? *Role of Systems-based Improvement*

- CME and didactic programs have little impact on changing behavior!
- Effective strategies include
 - reminder systems
 - standing orders
 - clinical pathways or protocols
 - opinion leaders and physician champions
 - self-monitoring and feedback

Davis DA, et al. JAMA. 1995;274:700-706.

Reliable Systems

Improving First Antibiotic Dose Timing

- Identify the delays in the system
 - Triage to physician exam
 - Protocols for nursing referral to x-ray
 - Delays in diagnostic tests
 - Delays in availability and administration of antibiotics
- Expected performance for most hospitals is not 100%
 - Diagnostic uncertainty

Initial Antibiotic Selection

Update of Practice Guidelines – IDSA 2003

Mandell LA, et al. *Clin Infect Dis.* 2003;37:1405-1433.

Patient variable	Preferred treatment options
Inpatient	
Medical ward	
No recent antibiotic therapy	Quinolone¹ alone or advanced macrolide² + beta lactam³
Recent antibiotic therapy	An advanced macrolide² + beta-lactam³ or a quinolone¹ alone <i>(regimen depends on the nature of patient's recent antibiotic therapy)</i>

¹ Moxifloxacin, gatifloxacin, levofloxacin, or gemifloxacin.

² Azithromycin or clarithromycin.

³ Cefotaxime, ceftriaxone, ampicillin-sulbactam, or ertapenem.

Initial Antibiotic Selection

Update of Practice Guidelines – IDSA 2003

Mandell LA, et al. *Clin Infect Dis.* 2003;37:1405-1433.

Patient variable	Preferred treatment options
Intensive Care Unit <i>Pseudomonas</i> is not an issue	Beta-lactam ¹ + advanced macrolide ² or quinolone ³
Beta-lactam allergy	Quinolone ³ ± clindamycin
<i>Pseudomonas</i> is an issue ⁴	Either (a) an antipseudomonal agent ⁵ + ciprofloxacin; or (b) an antipseudomonal agent ⁵ + an aminoglycoside + quinolone ³ or macrolide
Beta-lactam allergy	Either (a) aztreonam + levofloxacin 750 mg/d; or (b) aztreonam plus moxifloxacin or gatifloxacin, ± aminoglycoside

¹ Cefotaxime, ceftriaxone, ampicillin-sulbactam, or ertapenem.

² Azithromycin or clarithromycin.

³ Moxifloxacin, gatifloxacin, levofloxacin, and gemifloxacin (only available orally).

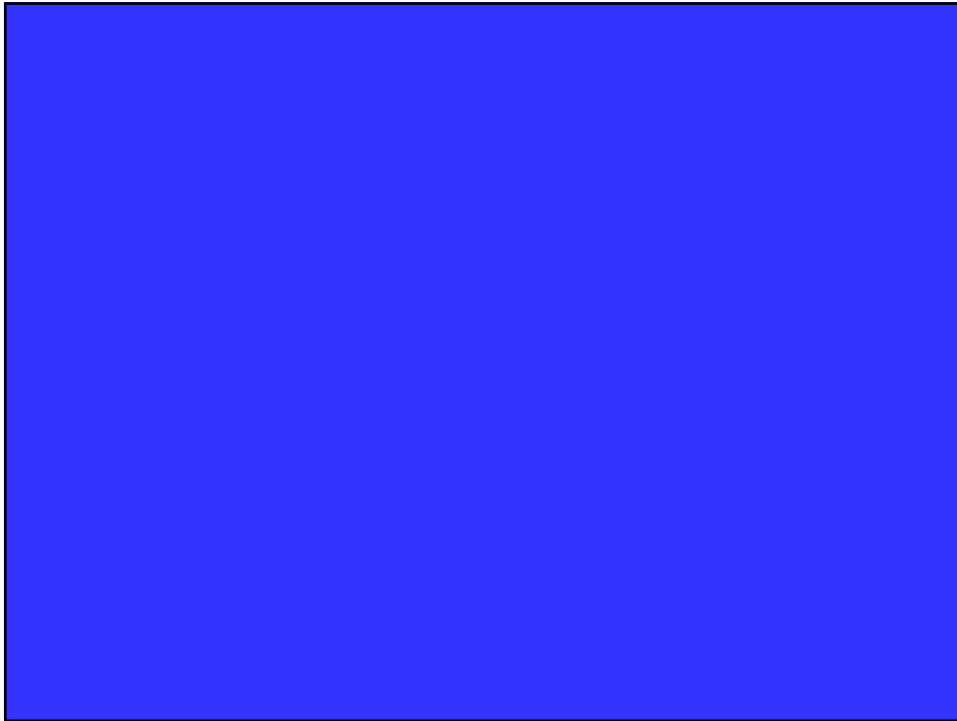
⁴ Severe structural lung disease (i.e., bronchiectasis) or recent antibiotic therapy or stay in hospital (esp. ICU).

⁵ Piperacillin, piperacillin-tazobactam, imipenem, meropenem, or cefepime.

Reliable Systems

Antibiotic Selection

- Standard formulary antibiotics
 - Pre-printed order sheets for use in ED
 - Antibiotics available in the ED
 - Clinical pathways or protocols



PN-2: Pneumococcal Vaccination

- *Numerator*
 - Patients with pneumonia, age 65 and older, who were screened for pneumococcal vaccine status and were vaccinated prior to discharge, if indicated
- *Denominator*
 - Pneumonia patients 65 years of age and older
- *Key Exclusions*
 - Transfers from another acute care facility, no working diagnosis of pneumonia on admission, patients receiving comfort care only, expired in hospital, left AMA, discharged to hospice care, transferred to another hospital

Missed Opportunities Background

Epidemiologic rationale for hospital-based pneumococcal vaccination.

Study	Proportion of pneumonia patients previously hospitalized	Proportion of bacteremias previously hospitalized	Proportion of deaths previously hospitalized
Oxfordshire UK ¹	39%		49%
US case study ²		60%	70%
US series ^{3,4}		50-60%	67-78%
Shenandoah, VA ⁵	60-65%		

¹JAMA. 1982;248:1989-1995.

²Arch Intern Med. 1983;143:885-889.

³J Am Geriatr Soc. 1985;33:142-150.

⁴Arch Intern Med. 1986;146:2179-2185.

⁵JAMA. 1990;264:117-122.

Fedson DS, et al. *Infect Control Hosp Epidemiol.* 2000;21:692-699.



Benefits of Pneumococcal Vaccinations

Group	Effectiveness / Cost Savings
All Elderly Persons ¹	
Bacteremias	75% (57% to 85%)
Cost savings	\$8.27 per person
Elderly w/ Chronic Lung Disease ²	
Hospitalizations for pneumonia	43% (16% to 62%)
Deaths	29% (9% to 44%)
Cost savings	\$294 per person

¹ Sisk J. JAMA 1997; 278: 1333.

² Nichol KL. Arch Intern Med 1999; 159: 2437.

Effectiveness of Pneumococcal Vaccination in Older Adults:

- 3 year cohort study of 47,365 members of Group Health Coop (Seattle)
- PPV was associated with lower rates of bacteremia:
 - HR 0.56 (95% CI 0.33 – 0.93)
- PPV was *not* associated with lower rates of community acquired pneumonia
 - HR 1.07 (95% CI 0.99 – 1.14)

HR = hazard ratio.
Jackson LA, et al. NEJM 2003; 348: 1747.

Eur Respir J 2005; 26: 1086–1091
DOI: 10.1183/09031936.05.00030205
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Protective effect of pneumococcal vaccine against death by pneumonia in elderly subjects

A. Vila-Córcoles*, O. Ochoa-Gondar*, C. Llor*, I. Hospital*, T. Rodríguez# and A. Gómez*

ABSTRACT: The present study assessed the effectiveness of the 23-valent pneumococcal polysaccharide vaccine to prevent pneumonia and death in older adults in a first-time report between January and December 2002.

A prospective cohort study was conducted including all individuals ≥ 65 yrs of age assigned to one of eight primary care centres in Tarragona, Spain (n=11,241). The primary outcomes were community-acquired pneumonia (hospitalised or outpatient) and death from pneumonia. All pneumonias were validated by checking clinical records. The association between the pneumococcal vaccination and the risk of each outcome was evaluated by means of multivariate Cox proportional-hazard models, adjusted by age, sex, influenza vaccination status, comorbidity

AFFILIATIONS
*EVAN-65 Group of Primary Care Service Tarragona-Vells, Institut Català de la Salut, Tarragona, and #Dept of Statistic and Research of Jordi Gol i Gurina, Barcelona, Spain.

CORRESPONDENCE
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Tarragona 43004

“Pneumococcal vaccination did not alter the risk of hospitalisation from pneumoniaor overall pneumonia, but the vaccine was associated with considerable reductions of death risk from pneumonia (HR: 0.28; 95% CI: 0.09–0.83).”

Prior Pneumococcal Vaccination Is Associated with Reduced Death, Complications, and Length of Stay among Hospitalized Adults with Community-Acquired Pneumonia

David N. Fisman,^{1,2} Elias Abrutyn,^{1,2} Kimberly A. Spaude,¹ Alex Kim,² Cheryl Kirchner,² and Jennifer Daley²

¹School of Public Health and ²College of Medicine, Drexel University, Philadelphia, Pennsylvania; and ²Department of Clinical Quality, Tenet Healthcare, Dallas, Texas

Background. Vaccination with pneumococcal polysaccharide reduces the incidence of bacteremic pneumococcal disease in adults. We investigated the impact of prior pneumococcal vaccination on in-hospital mortality and the probability of respiratory failure among hospitalized adults with community-acquired pneumonia.

Methods. Consecutive individuals hospitalized with community-acquired pneumonia (diagnosed by *Interna-*

“Prior vaccination against pneumococcus is associated with improved survival, decreased chance of respiratory failure or other complications, and decreased length of stay among hospitalized patients with community-acquired pneumonia. These observations reinforce current efforts to improve compliance with existing pneumococcal vaccination recommendations for adults.”

Clin Infect Dis. 2006; 42:1093–101

PN-7: Influenza Vaccination

- **Numerator**
 - Patients discharged during October through February with pneumonia, age 50 and over, who were screened for influenza vaccine status and were vaccinated prior to discharge, if indicated
- **Denominator**
 - Pneumonia patients 50 years and older
- **Key Exclusions**
 - Transfers from another acute care facility, no working diagnosis of pneumonia on admission, patients receiving comfort care only, expired in hospital, left AMA, discharged to hospice care, diagnosis of influenza, transferred to another acute care hospital

Rationale for Hospital-based Influenza Vaccination

Age Group Y	Population N	<i>Discharged during the flu season</i> N (%)	<i>Subsequent P&I hospitalizations*</i> %	<i>Subsequent P&I deaths*</i> %
25-44	297,540	8,046 (3)	11	65
45-64	198,120	6,439 (3)	32	82
65-74	74,664	4,811 (6)	39	62
≥ 75	44,138	5,188 (12)	45	66

*Proportion of the population with subsequent hospitalization or death from pneumonia or influenza who had been discharged from a hospital.

Fedson DS, Houck P, Bratzler D. [Editorial] *Infect Control Hosp Epidemiol.* 2000;21:692-699.

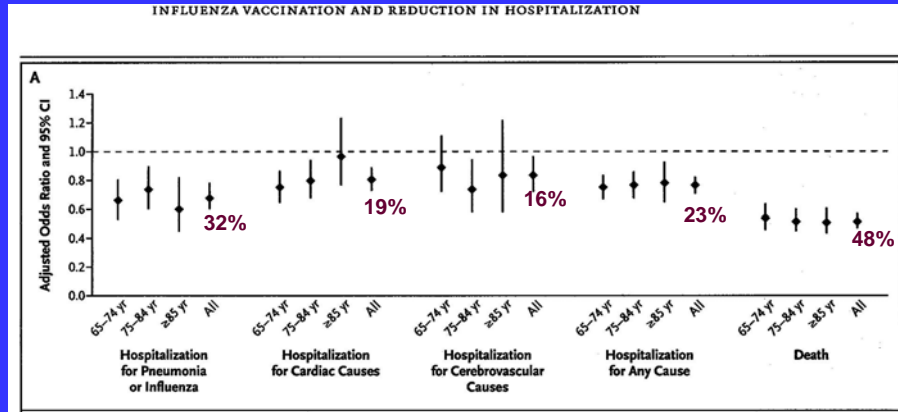


Benefits of Flu Shots in the Elderly *Pooled Estimates Over 6 Seasons*

Outcome	Vaccine Effectiveness
Hospitalizations for	
Pneumonia & Influenza	39% (26% to 52%)
All Respiratory Conditions	32% (29% to 40%)
Congestive Heart Failure	27% (15% to 39%)
Deaths	50% (44% to 56%)
Cost Savings	\$73 per person

Data from MN HMO, 1990-91 thru 1995-96.
Nichol KL. *Arch Intern Med* 1998; 158: 1769.

Influenza Vaccination *Reductions in Hospitalization and Death*



2 yr study of elderly members of 3 HMO¹ - 1998-99 & 1999-00 seasons with > 140,000 persons in each year's cohort

Nichol KL, et al. *N Engl J Med.* 2003;348:1322-1332.

Is Hospital-based Vaccination the Standard of Care?

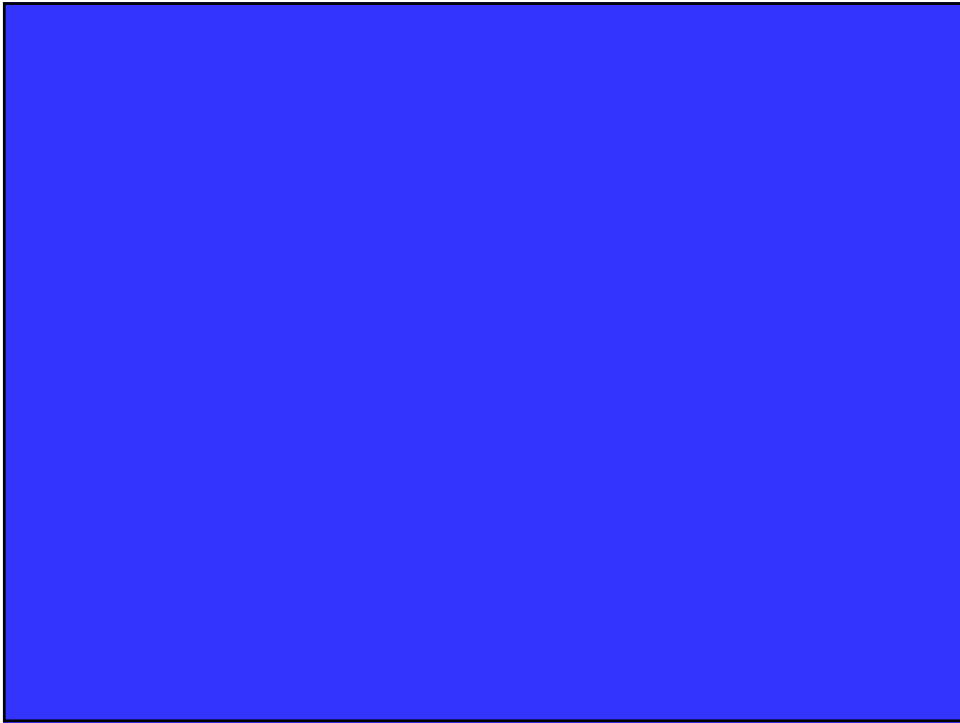
- CMS and JCAHO have adopted influenza and pneumococcal vaccination of inpatients as measures of hospital quality
- PPV written into the MMA as a publicly reported measure of quality
 - *Hospital Compare*
- Recommended by ACIP, IDSA, and others

Reliable Systems *Inpatient Vaccination*

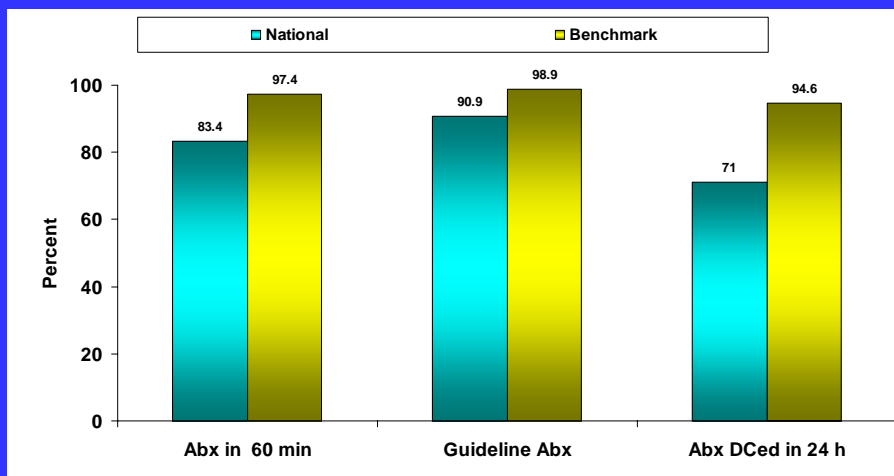
- **Standing orders programs**
- **Reminder systems**
 - **Especially electronic reminders**
 - **Arm bands**
 - **Discharge protocol**
 - **Nursing admission assessment**

Reliable Systems

- **Standard smoking cessation referral programs or in-house training**
 - **Incorporation into nursing admission assessment**
 - **Incorporation into discharge process**
 - **Link to cardiac rehabilitation services**



Surgical Infection Prevention *Quarter 4, 2005*



National averages as reported to the QualityNet data warehouse.

What worked to improve antibiotic delivery?

- **Assigned responsibility for administration and documentation of antibiotic prophylaxis**
 - Often involved transfer of ownership of the process to anesthesia
 - Ensuring the delivery of the antibiotic near or in the OR
 - Use of preprinted protocols for antibiotic selection and duration (forcing function to DC)
 - Antibiotics available in the OR
 - Some incorporated into the 'time out'
 - Revision of forms to require documentation of antibiotic dose and time

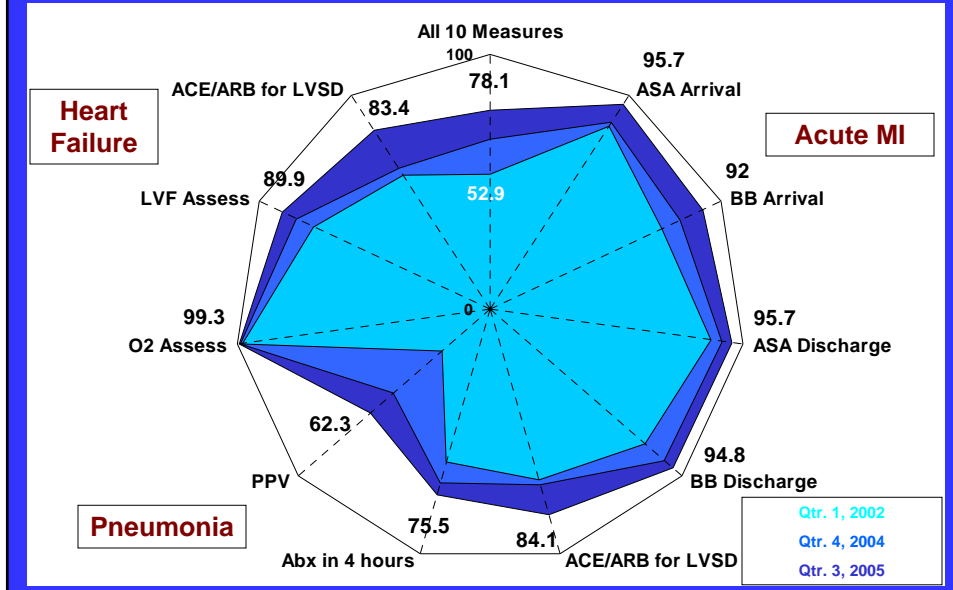
CMS Quality Vision

“Every person receives the right care every time”

Should we Aggregate Measures?

- Individual measures provide a limited and overly optimistic assessment of quality of care at the patient level
 - An “A” may not be good enough
- There is no “partial credit” in all or none measurement – you did everything right for the patient or you did not
 - “pass” or “fail”

Appropriate Care Measure *National Performance*



**What else is important to be
a high performing
organization?**

Hospital Quality

- Leadership must put quality as top priority
 - Challenges
 - Culture of quality not promoted
 - Inadequate tools to drive quality improvement efforts

The key to high quality healthcare is committed leadership.

Hospital Quality

- Overcoming the feeling of being overwhelmed by the process
 - Challenges
 - Stretched resources, limited personnel, competing priorities
 - Perception that medical staff priorities are not aligned with hospital measurement and reporting requirements

Come to agreement on a few areas to prioritize for improvement and do it!

Hospital Quality

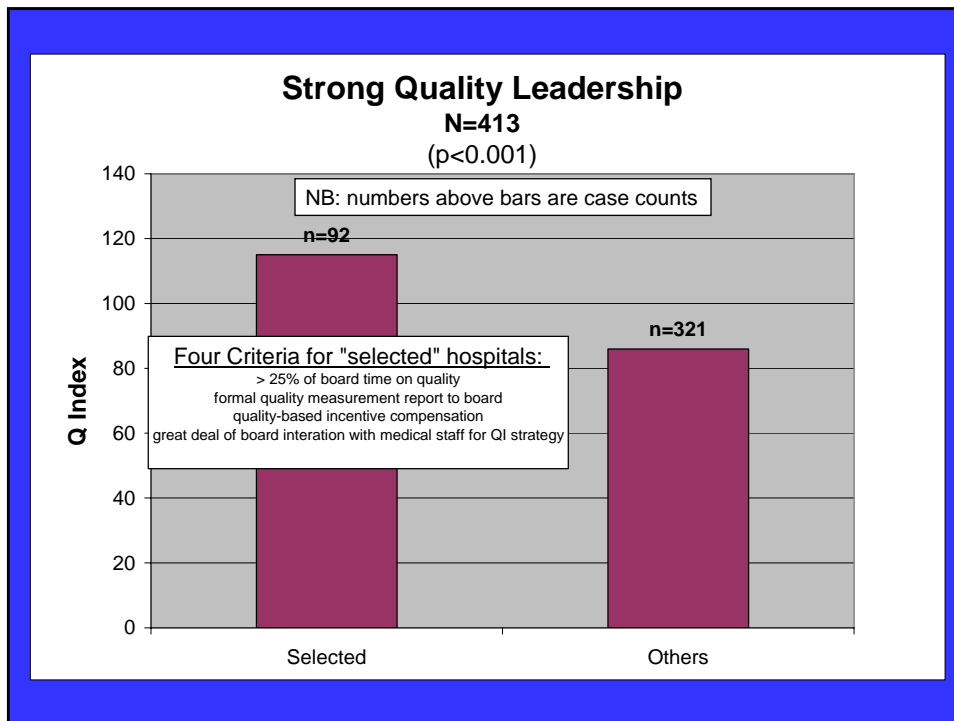
- Must be able to focus on more than the short term including financial instability
- Overcome the lack of personnel, skills, and experience
 - Challenges
 - Lack of training in performance improvement

Commit some resources to training on quality and improvement

So what does leadership look like in high performing hospitals?

Survey link: better outcomes are associated with hospitals where...

1. the board spends >25% of time on quality issues
2. the board receives a formal quality performance measurement report
3. there is a high level of interaction between the board and the medical staff on quality strategy
4. the senior executives' compensation is based in part on QI performance

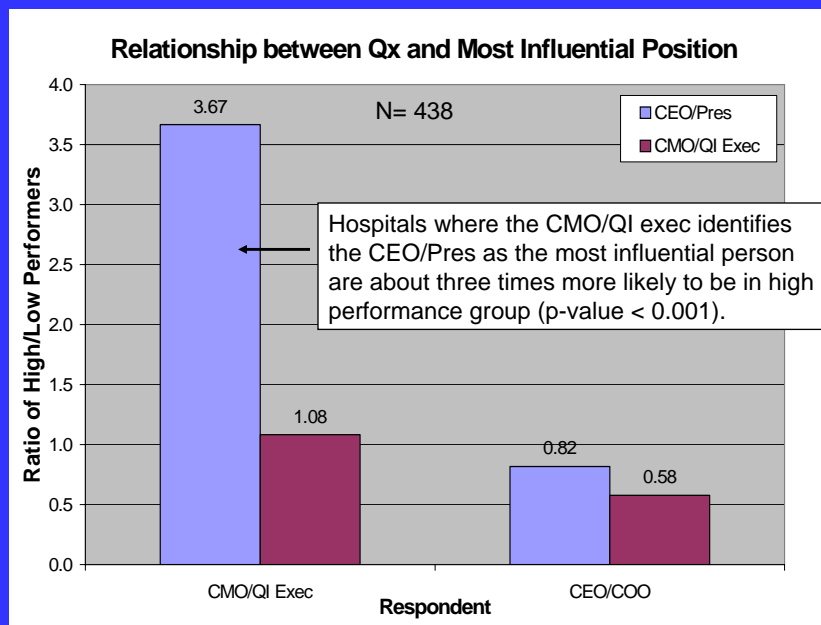


Survey link: better outcomes are associated with hospitals where...

AND.....

5. the CEO is identified as the person with the greatest impact on QI ($p=0.01$), especially when so identified by the QI executive ($p<0.001$).

Quality CANNOT be delegated to a department or a person



What's the big picture??

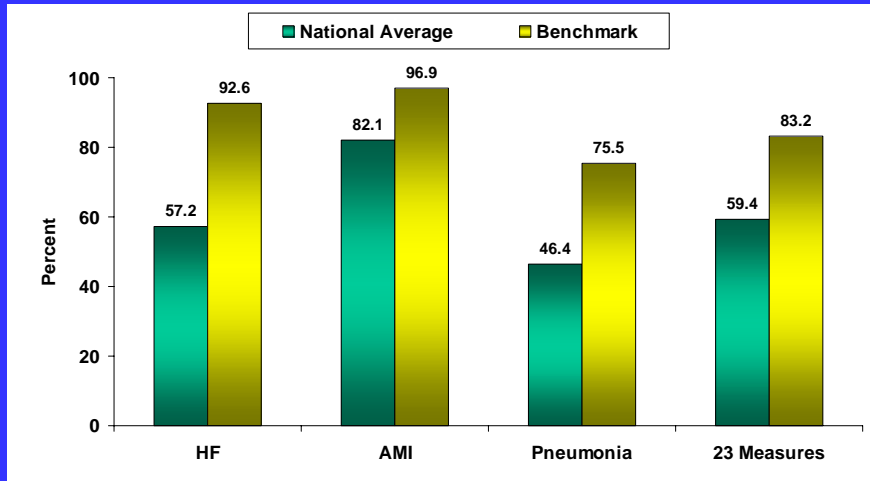
Serious and widespread problems of quality exist in the United States, with evidence of underuse of beneficial services, overuse of other procedures that are not medically necessary, and mistakes leading to patient injury. The Institute of Medicine of the National Academy of Sciences has stated, "that the quality of health care received by the people of the United States falls short of what it should be." Commonwealth Fund



**Hey dad, a
"C" is good
enough!**

Appropriate Care Measure

An "A" is not good enough on individual measures!



Based on the expanded set of 23 performance measures (four HF, eight AMI, eight pneumonia, and three SIP).