



NATIONAL REFERENCE LABORATORY



UNIVERSITY OF UTAH  
SCHOOL OF MEDICINE

Department of Pathology



# Measuring the Rate of Inappropriate Lab Test Ordering

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# Case Study: University of Utah

- Tertiary Referral Center, roughly 400 beds
  - Incl. Cancer, Ortho, Psych hospitals
  - Full spectrum of 1° care and subspecialty clinics
- ~\$50M/yr on total lab expense (incl. esoteric)

# David Entwistle, CEO, UofU Hosp/Clinics



- Need to cut hosp expenses ~10% over 5 yrs
- Mandate to lab:
  - $10\% * \$50M = \underline{\$5M}$

*But where to cut?*

# Where to Find Cost Savings?

- Squeeze reference lab? But we are the reference lab!
- Consolidation: some \$
- Service levels: smaller \$
- Biggest opportunities: **Overutilization**
  - Driven by individual doctors
  - Not directly controlled by lab

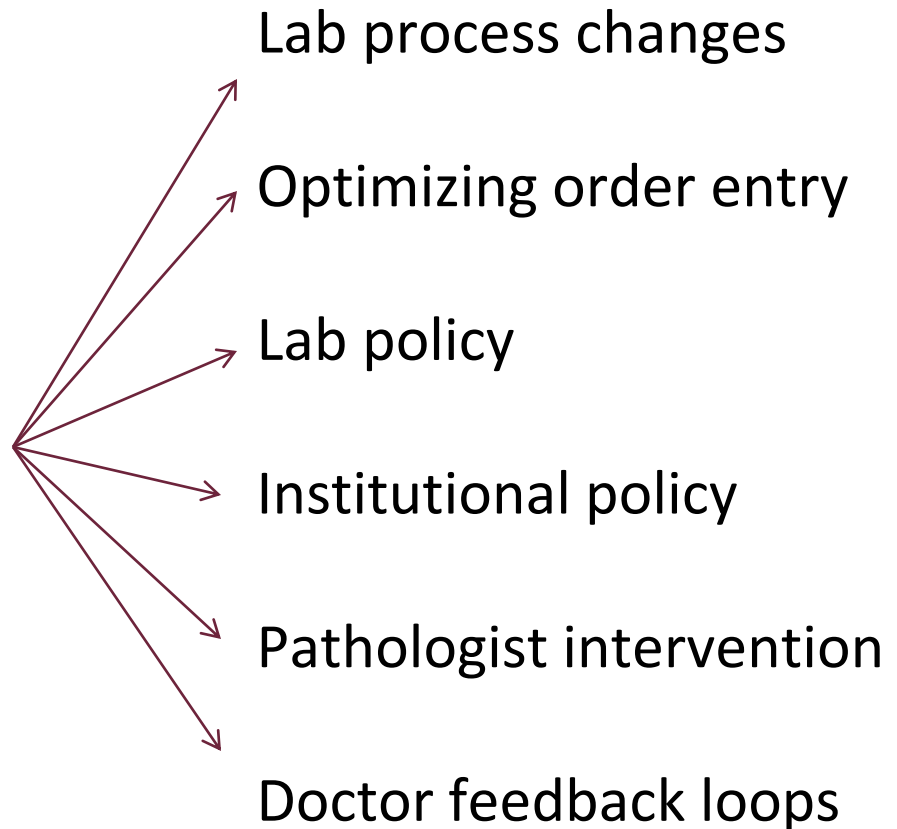
# Activity-based Costing in Health Care

- “How to Solve the Cost Crisis in Health Care”
  - Robert Kaplan and Michael Porter, Harvard Business Review, Sept 2011
- Interview and blog comments available on [www.hbr.org](http://www.hbr.org)
- Current model: Department-based costing
  - E.g. total annual lab cost
- Future model: Condition-based costing
  - E.g. average lab cost per CABG

# Improving Test Utilization

## Analytics:

- Which tests are misused
- How often
- By whom



# What Data Sources are Available?

- Analysis of billing data
- Provider/patient surveys
- Chart review
- Data analytics (data mining)
  - Intra- vs Inter-institutional
  - Lab data vs clinical data

# Analysis of Billing Data

- Study at 17 Academic Medical Centers
- Lab costs in highest quintile were 82% higher than in lowest quintile
- Lab costs varied more than any other cost category
- No measurable difference in outcomes

~~Fisher et al. Health Affairs 2004

# Surveys

- <50% of California physicians routinely screen women age 15-25 for *Chlamydia*
  - vs. 80% of nurse practitioners

~~Guerry et al. JGIM 20:1102-07

- 15% of Americans age 45-64 have had no cholesterol testing within previous 5 years

~~MMWR 54(35):865-870

# Chart Reviews of Lab Orders

Between 5% and 50% of all inpatient lab test orders are inappropriate.

~~Van Walraven and Naylor, JAMA 1998

# Chart Review: Thrombophilia Panels

## Montefiore Medical Center

- Of 200 consecutive thrombophilia panels:
  - 20% had decreased Protein C and/or Protein S
    - All attributable to warfarin or pregnancy
  - 62% ordered during acute episode

~~Somma et al, AJCP 2006; 126(1):120-127

# Retrospective Analysis of Clinical Data

- Advantages
  - Data already exists
  - Data reflects “Real world” clinical setting
  - Can apply across full laboratory menu
- Limitations
  - Observational
  - Be careful of data biases

# Appropriate According to Whom?

- Guidelines
  - Advisory bodies, e.g. USPSTF
  - Specialty societies
  - Institutions
- Local expert opinion
- Benchmarks
- Test self-evidence

# Appropriate According to Whom?

- Guidelines
  - Useful where they exist
  - Already integrated with clinical issues
  - Built-in credibility
- But:
  - Cookie-cutter approach in some cases

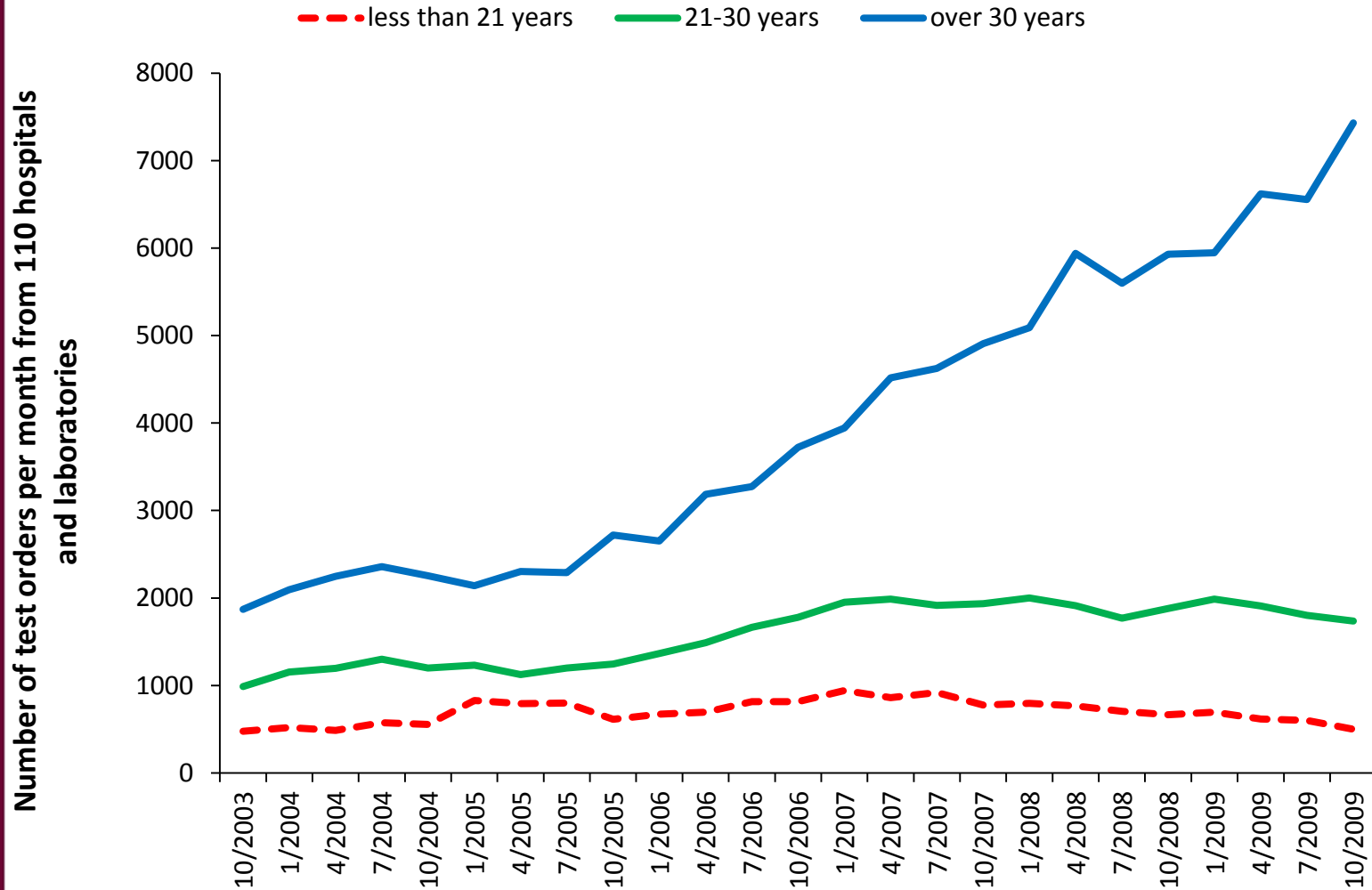
# Appropriate According to Whom?

- Local expert opinion
  - Engages local experts, which is good
- Benchmarks
  - Useful for discovering patterns
  - Has modest intrinsic credibility
- Test self-evidence

# American Society for Colposcopy and Cervical Pathology 2006 Consensus Guidelines

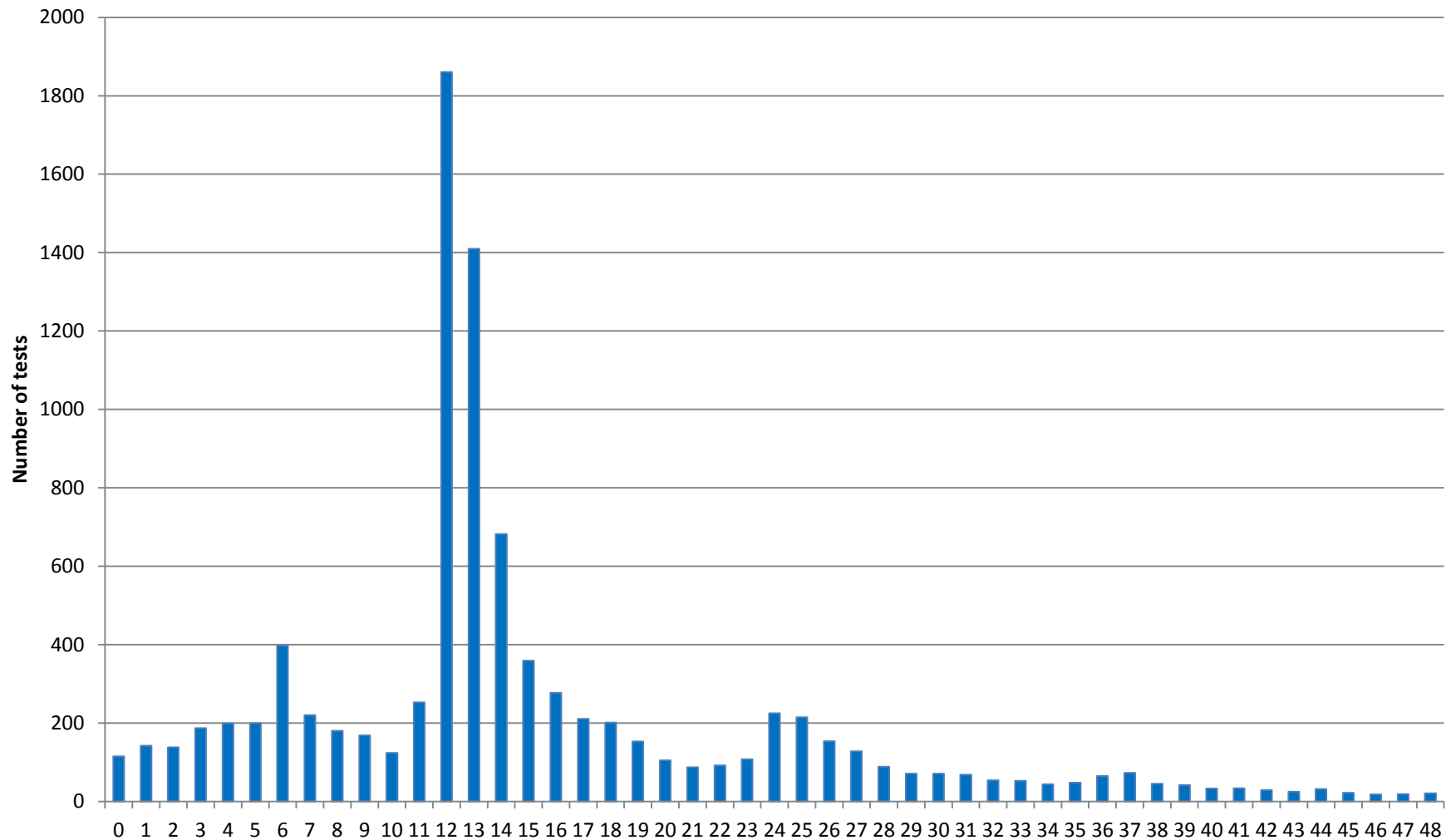
- Women under 21  
    HPV testing is contraindicated
- Women 21 to 30  
    HPV testing should not be used in primary screening  
    HPV testing may be used for f/u of certain lesions (ASC-US)
- Women over 30  
    HPV testing may be used for cervical lesions and for screening
- If HPV and cytology negative only screen every 3 years

# HPV tests by age group, 2003-2009



Source: Shirts and Jackson, J Pathology Informatics 2010

# Repeat HPV Interval After Negative

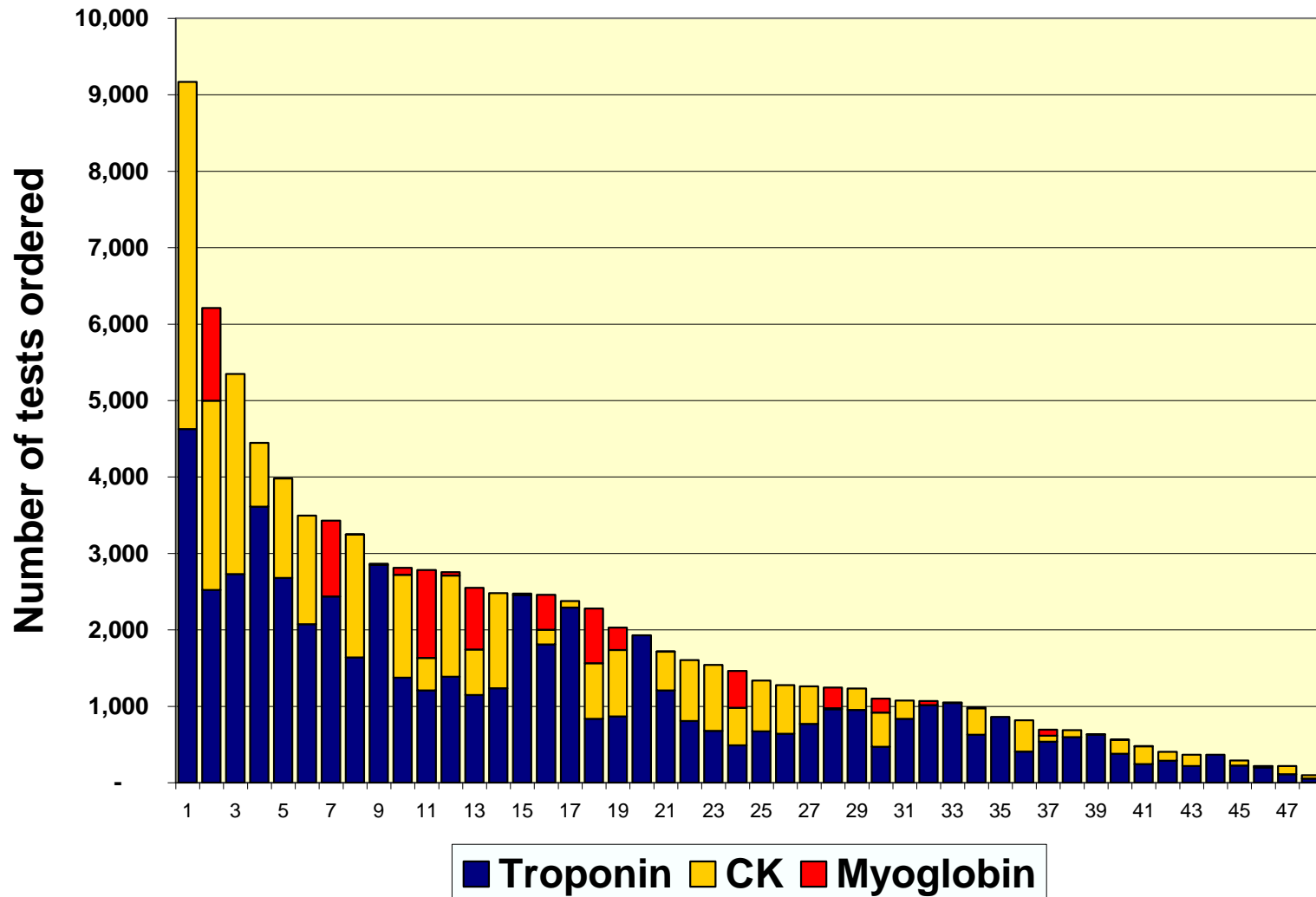


Source: Shirts and Jackson, J Pathology Informatics 2010

# Benchmarking: vs. other institutions, providers

- Example: Neopterin
- Nonspecific marker of inflammation
- Of research interest, but not in routine clinical use for any one disease
- 770 orders to ARUP in recent 12 month period
  - 83% from a single client
  - 64% of those were placed by a single physician (=53% of ARUP's national volume)

# Cardiac Marker Orders at Academic Med Ctrs

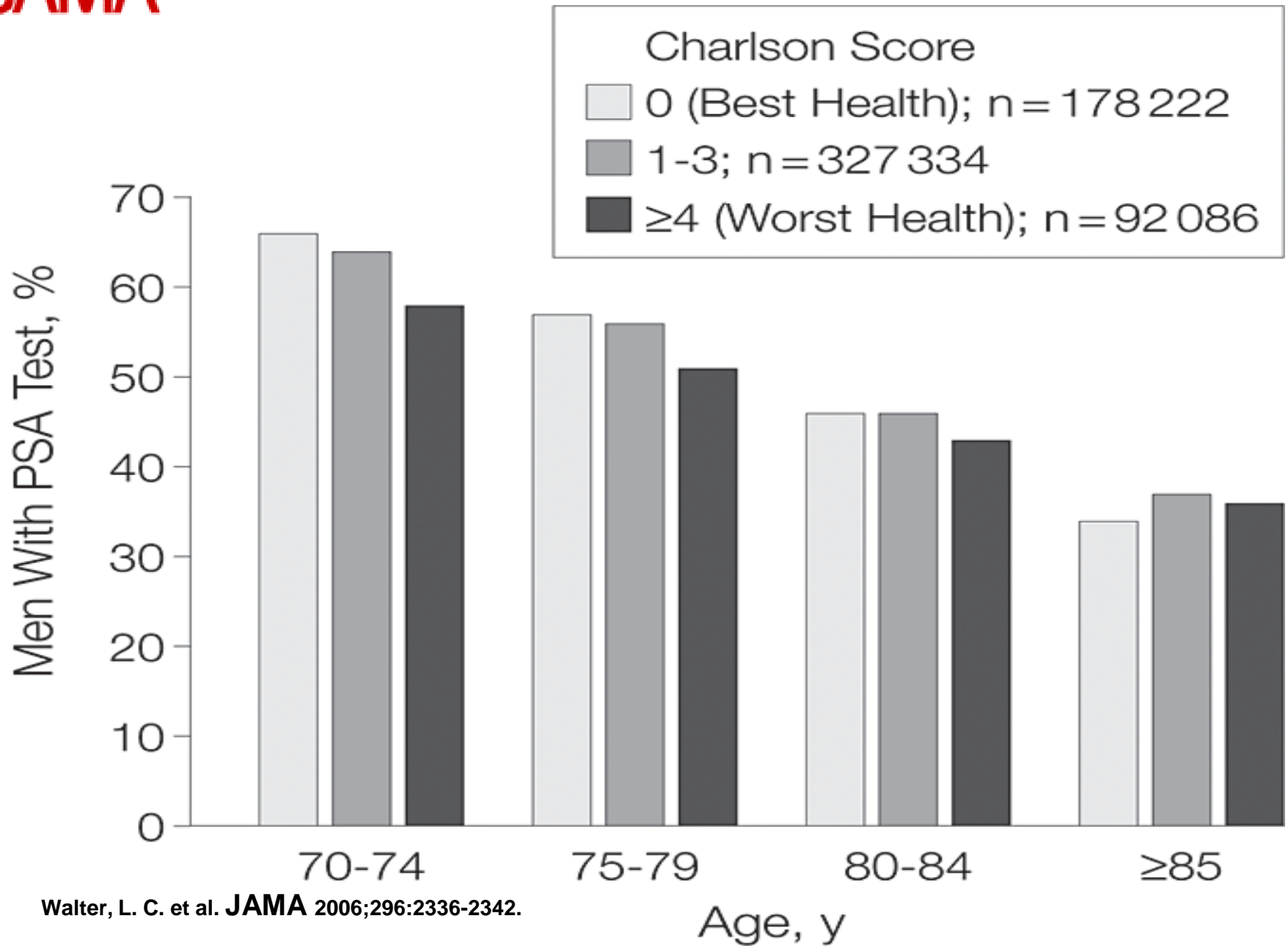


©2008 University HealthSystem Consortium

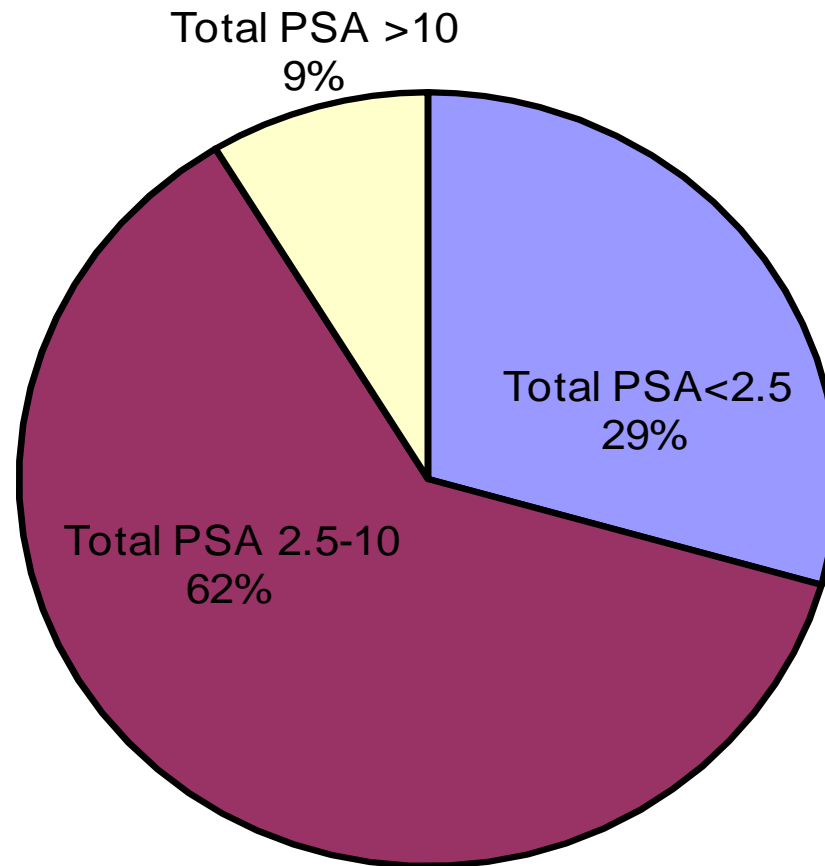
# Benchmarking: vs. other patient groups

- Useful when a test is indicated in some patients but not in others
- E.g. PSA for prostate cancer screening
  - Men between 50 and 75 with at least 10 years life expectancy should be offered PSA and DRE  
~~American Cancer Society Guideline
  - Insufficient evidence to recommend for or against screening with PSA or DRE  
~~US Preventative Services Task Force

**Percentage of Men Who Received PSA Screening in 2003  
According to Health Status and Age (N = 597 642)**



# Overall appropriateness of Free PSA orders based on tPSA alone



Jackson BR, Roberts WR. J Gen Int Med 2005 Sep;20(9):859-61

# Which Rates to Monitor?

- Total orders per month or year
  - Lacks clinical denominators
- Average orders per pt-dz per year (Ambulatory)
- # and total \$ of tests per episode per DRG (inpt)
- Avg days in which an order was placed per DRG (“Routine” inpatient tests)

# Outpatient misordering rates

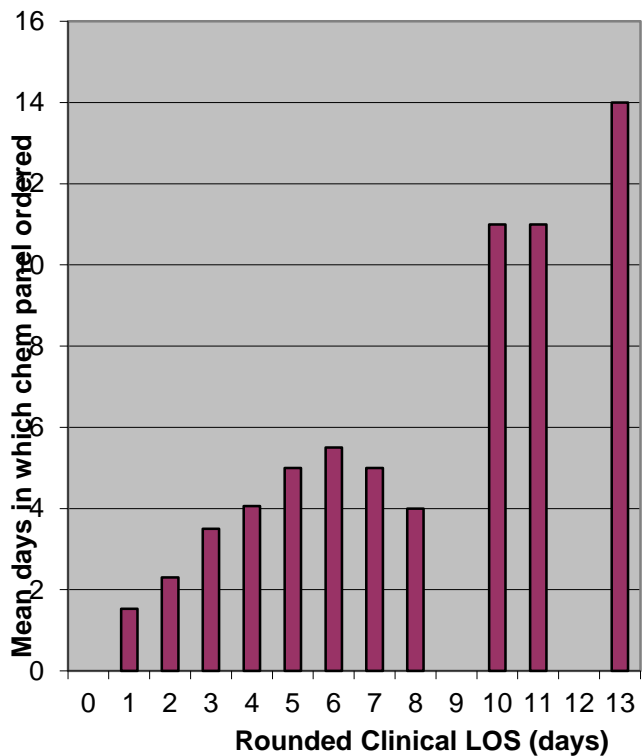
- Group Health Cooperative
  - Source: Dr. Kim Riddell
- “Report card” approach to clinician feedback
  - Avg # of orders for CBC, TST, CMP per well-adult visit
- Decreased unnecessary test ordering in asymptomatic adults
  - 30% decrease in CBC’s
  - 50% decrease in TSH and complete metabolic panels

# Inpatient Overordering Rates of “Routine” Tests

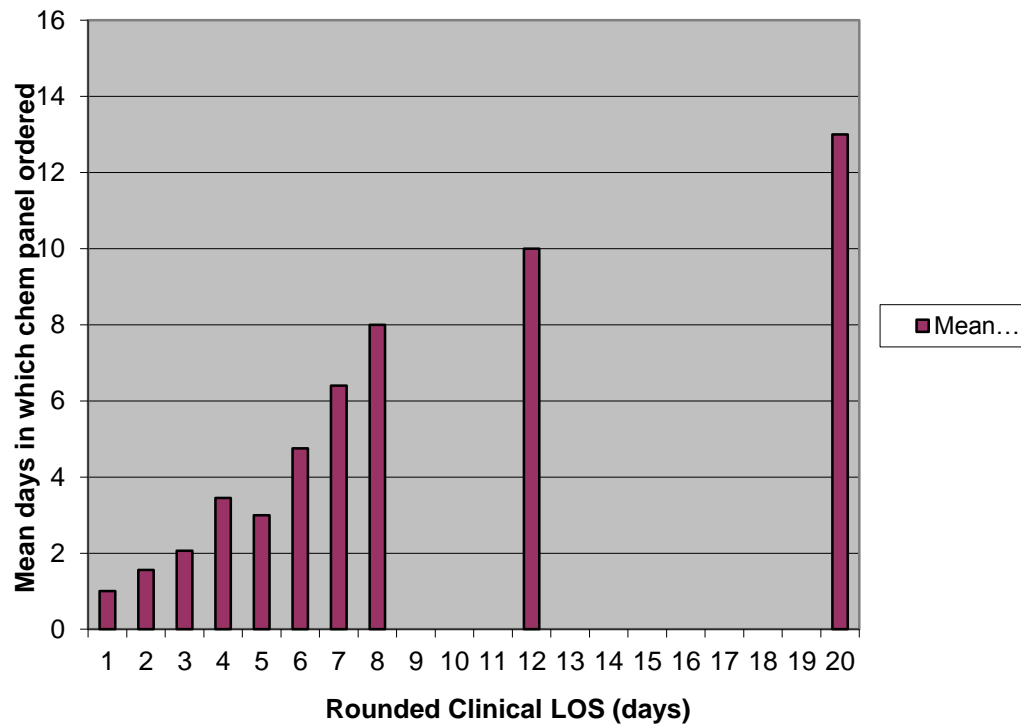
- CBC and BMP orders at University of Utah
- Hypothesis:
  - qAM CBCs not needed for most CHF and arrhythmia pts
  - qAM BMPs not needed for most cellulitis or UTI pts

# University of Utah “Routine” Inpt tests

Chem panel orders in UTI

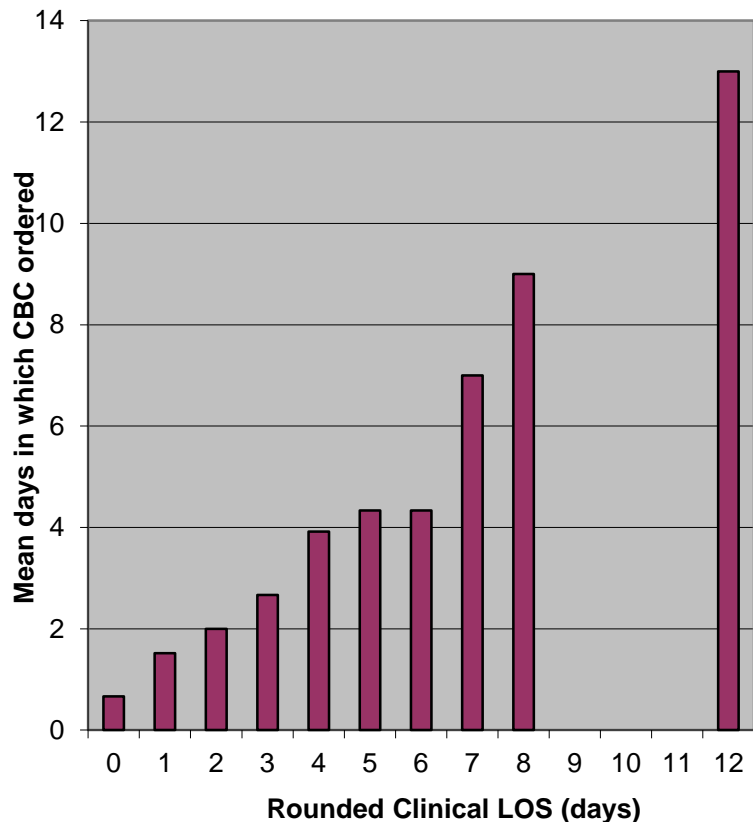


Chem panel orders in cellulitis

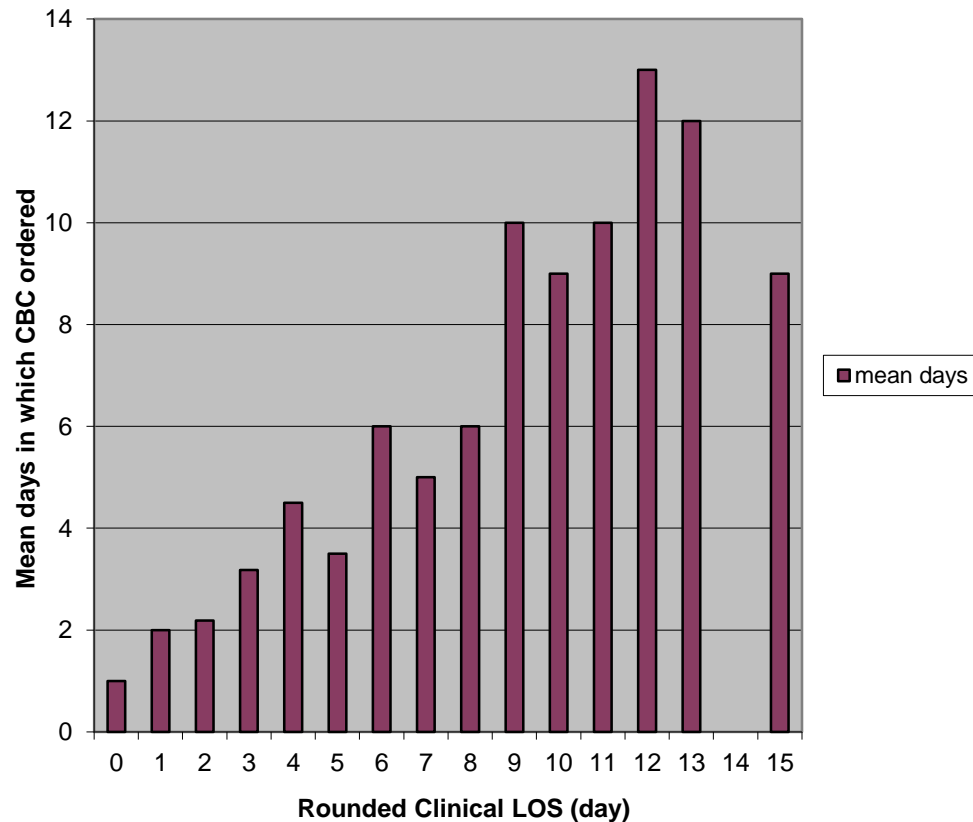


# University of Utah "Routine" Inpt tests

### CBC orders in arrythmia



### CBC orders in heart failure



# Summary: Measuring Utilization Rates

- Global testing costs are of limited value
  - Need to drill down to individual service lines, tests
- Multiple potential sources of useful data
  - Clinical data warehouses!
- “Gold Standard” issues
  - No easy solutions, but standards need to be credible



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