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## Finding high quality hospitals in Philadelphia.

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# Finding high quality hospitals in Philadelphia

Robert D. Lieberthal

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# Outline

Measuring hospital quality

Mapping hospitals in Philadelphia

Work in progress

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# Hospital quality measures are hard to aggregate

- ▶ I want to identify the features of high quality hospitals
- ▶ Hospital quality includes process and outcome measures
  - ▶ Process measures include appropriate antibiotic use, frequent hand washing
  - ▶ Outcome measures include 30 day readmission rates, risk adjusted mortality
- ▶ It is hard to determine which observed measures of quality are good indicators of high quality hospitals
  - ▶ What is the relative importance of different measures?
  - ▶ How can we account for hospital characteristics like teaching status and ownership type?
  - ▶ Apparent high performance of hospitals could be a result of locating near a healthy population
- ▶ Quality should measure how much a hospital can improve a patient's health, not how healthy she was to begin with

## Hospital Compare contains publicly reported hospital quality data

Process measure	Average		Jefferson	
	US	PA	Adherence	Patients (N)
Antibiotic timing	87%	88%	82%	303
Correct antibiotic	93%	93%	98%	302

**Table:** Hospital compare sample data, 7/1/2009-12/31/2009

Research tip: you can get this data now!

# I use process measures and hospital characteristics

- ▶ 20 process measures from 4 areas at a single point in time
  - ▶ Heart attack (8 measures)
  - ▶ Heart failure (4 measures)
  - ▶ Pneumonia (6 measures)
  - ▶ Surgical infection prevention (2 measures)
- ▶ I include 3 other demographic variables
  - ▶ Acute care or critical access hospital
  - ▶ Hospital ownership (govt, nfp, fp)
  - ▶ Teaching intensity (several levels)

Reporting data is optional for some hospitals, mandatory for others (or Medicare would reduce their payments)

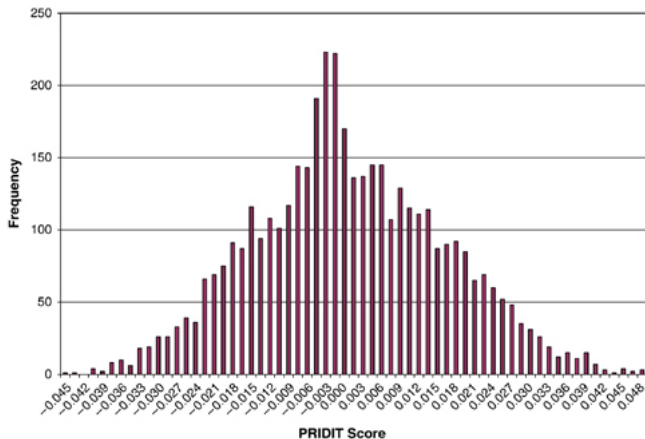
My sample includes 4,217 hospitals that report any data

# I aggregate all information into an overall quality score

- ▶ Combine all quality metrics with a statistic called *PRIDIT*
  - ▶ P = Principle Components Analysis
  - ▶ Ridit is a scoring system originally from biometrics
  - ▶ Problems that involve ranks: how rural or urban is an area?
- ▶ Scores range from -1 to 1
- ▶ Scores are all relative
- ▶ Higher scores on a variable don't always translate to higher quality
  - ▶ “Teaching to the test” could lead to lower overall quality
  - ▶ I assume that in isolation each process measure positively correlates with quality
  - ▶ In the results, all process measures are positively associated with quality



## Hospital quality is evenly distributed



Lots of hospitals in the middle, a few “outliers” of high and low quality

## A few variables account for most of the variation in quality

- ▶ Patients given beta-blocker at arrival and at discharge
  - ▶ Well reported (~85%)
  - ▶ Not universally adhered to (~85%)
- ▶ All 4 heart failure measures (esp. assessment of left ventricular function)
- ▶ Measures with total adherence are not useful for measuring quality
  - ▶ Oxygen assessment for pneumonia—99% adherence!
- ▶ Surgical measures not well reported and so did not explain much variation
- ▶ The more teaching at a hospital, the better it is

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# Map hospitals in Philadelphia to make results more relevant

- ▶ *PRIDIT* results are a rank ordering of over 4,000 hospitals
  - ▶ The ranks are all relative
  - ▶ Most people end up in one of a few local hospitals
  - ▶ Few people care about precise rankings—they just want to know what's best
- ▶ Solution to the problem of too much information—rank hospitals by their decile
- ▶ Making the information locally relevant—map Philadelphia hospitals with a color-code by deciles
  - ▶ GIS data came from PASDA
  - ▶ Deep red for the top decile
  - ▶ Deep green for the lowest decile
  - ▶ A rainbow in the middle
  - ▶ ArcGIS facilitates this color coding scheme

# North Philly hospitals come out on top

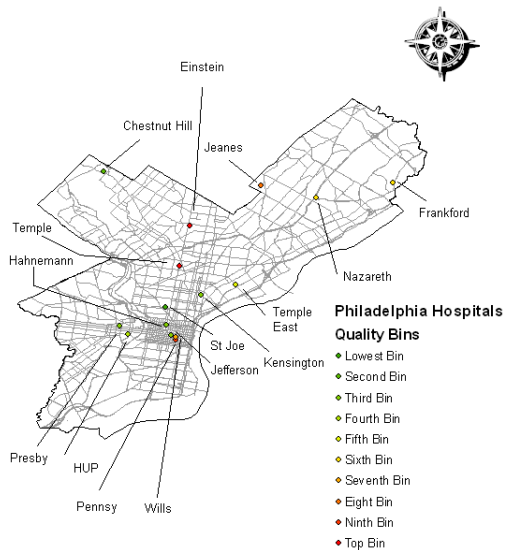


Figure: Philadelphia hospitals by quality

## Best hospitals are “islands of quality”

- ▶ Higher quality hospitals are in North Philly—not selection on healthier population
- ▶ Center city hospitals of middle to lower quality
  - ▶ Despite academic medical centers being higher quality in general
  - ▶ Pennsy higher than HUP and Presby—the effects of patient sorting within a health system?
  - ▶ Swath of green/yellow from Presby to Temple East—my main story is that most hospitals are of similar quality
  - ▶ Problem of harmful competition?
- ▶ “Islands of quality” idea—Medicare doesn't pay more for higher quality care, so maybe it is randomly distributed

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# Using national data and multiple observations

- ▶ National GIS data
  - ▶ Philadelphia is unusual—several academic medical centers in a small area
  - ▶ Urban vs. rural comparison is important
  - ▶ Many hospitals in sparsely populated areas are critical care hospitals
- ▶ Multiple observations of the same hospital over time
  - ▶ Measure the stability of rankings over time
  - ▶ Measure the relative importance of each measurement over time
  - ▶ More hospitals report more data over time
- ▶ Contribute to the ultimate goal of Hospital Compare—help individuals choose the best hospital near them