Health Spending and Health Cost Research

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Disclosures

- AHRQ K08 HS024763
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Why study surgical costs?

• 50% of hospital costs
• > $500 billion per year
• Lots of variation
• Lots of interest
  – Payers
  – Government
  – Public
What do we mean by “costs”?

YOU KEEP USING THAT WORD
I DO NOT THINK IT MEANS WHAT YOU THINK IT MEANS

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The “cost” to whom?

- Cost to the hospital
- Cost to the payer
- Cost to the patient

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My agenda

- Surgical “episodes”
- Hospital charges
  - Cost to hospitals (?)
- Healthcare spending
  - Cost to payers
  - Cost to patients
- Modeling considerations
What counts as surgical spending?
Avoiding the blame game
Defining surgical episodes

- All spending associated with an event (e.g., surgery) over a period of time (30 or 90 days)
- Intended to prevent cost-shifting (but may include unrelated costs)
- Policy relevance: bundled payments
- For surgery, usually includes
  - Index hospital admission
  - Physician services
  - Post-acute care
  - ED visits
  - Readmissions
Hospital charges
National Inpatient Sample

- Agency for Healthcare Research and Quality (AHRQ) Healthcare Cost and Utilization Project (HCUP)
- Strengths
  - Nationwide
    - 20% sample of discharges from non-federal hospitals
    - 46 states, >97% of US population
  - All-payer (includes private insurance)
  - Great for small populations (e.g., uncommon procedures, minority groups)
Nationwide inpatient sample

• Weaknesses
  – No hospital identifiers
  – Sample of discharges, not hospitals
  – Provides charges and hospital inpatient cost-to-charge ratios

\[ \text{charge} \times \frac{\text{cost}}{\text{charge}} = \text{cost} \]
Cost-to-charge ratios

• Problems
  – “Cost”: financial costs related to operations, training, facility acquisition and management, and management overhead as reported by hospitals
  – Is this the relevant “cost” metric?
  – Operational costs are notoriously difficult to calculate
  – Ratio varies by service line
Charges have nothing to do with payments

www.healthcarepricingproject.org

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Hospital charges are “what a drunken billionaire would pay a hospital if his wife were not around to control the bastard.”

—Uwe Reinhardt
Healthcare spending
Private payer data

- Optum (UnitedHealthcare)
- Truven MarketScan
  - >100 employer-sponsored plans
  - Medicare FFS
  - Medicaid
- Health Care Cost Institute
  - Employer-sponsored (Aetna, Humana, UnitedHealthcare)
  - Medicare Advantage
  - Medicare FFS
Medicare data

• Centers for Medicare & Medicaid Services (CMS)
• Strengths
  – (Almost) all hospitals
  – Track patients longitudinally and across providers
  – Can get 100% of fee-for-service data
  – Actual payments
Medicare data

• Weaknesses
  – Restricted population
    • Age
    • Disability
  – Medicare Advantage (2015 only)
  – Some payment variation not related to utilization
Payment variation in Medicare data

Hospital Prices for Cesarean Section
Ann Arbor, MI HRR, 2008-2011

Max/Min Ratio: 2.15
CoV: 0.354

Noted: Each column captures a hospital's negotiated transaction price and Medicare reimbursement. Prices are averaged from 2008-2011 and presented in 2011 dollars. CoV captures the coefficient of variation of hospital negotiated transaction prices within the HRR. Max/Min captures the maximum ratio of hospital negotiated transaction prices within the HRR. Horizontal lines indicate average rates and prices within the region.

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Payment adjustments in Medicare data

- Teaching hospitals
  - Graduate medical education (GME)
  - Indirect medical education (IME)
- Low-income and uninsured populations
  - Disproportionate share payments (DSH)
  - Uncompensated care
- Geographic variation
- Value based purchasing (VBP) payments
- Penalties
  - Hospital readmission reduction program (HRRP)
  - Hospital acquired condition (HAC) reduction program
  - Quality reporting programs
“Price standardization”

- “Undo” intentional payment adjustments
- Methods vary by type of payment
- Units of service (utilization) vs actual payments
Impact of price standardization

Pradarelli et al, Ann Surg 2017
Analyzing spending: statistical modeling
Considerations for modeling

• Bounded data
• Non-normal distribution of errors
• Outliers
• Correlations in data
• Sample size per hospital or provider
What’s the question?

HAVING CONDUCTED A COMPREHENSIVE ANALYSIS OF DOZENS OF SUBSETS OF DATA FROM A WIDE RANGE OF SOURCES WE’VE CONFIRMED THAT THE LIKELY ANSWER IS 36...NOW WE JUST NEED TO IDENTIFY THE QUESTION!
Risk-adjusting spending

- Predictors of outcomes versus predictors of spending
- Severity of disease versus treatment decisions

Chhabra et al, Med Care 2019: Predicted vs actual 30-day episode payments using Chronic Conditions Warehouse comorbidities and last year’s spending.

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The “right” modeling approach

• Which outputs are of interest?
• Model fit and convergence
• Interpretability of coefficients
• Effect on inference
“If you torture the data long enough, it [sic] will confess to anything.”

—Ronald Coase, Economist, Nobel Laureate
Thank you. Questions?