Association for Academic Surgery

Health Spending and Health Cost Research

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Disclosures

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- AHRQ K08 HS024763
- NIA R01 AG039434
- AHRQ R01 HS026244
- Blue Cross Blue Shield of Michigan

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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

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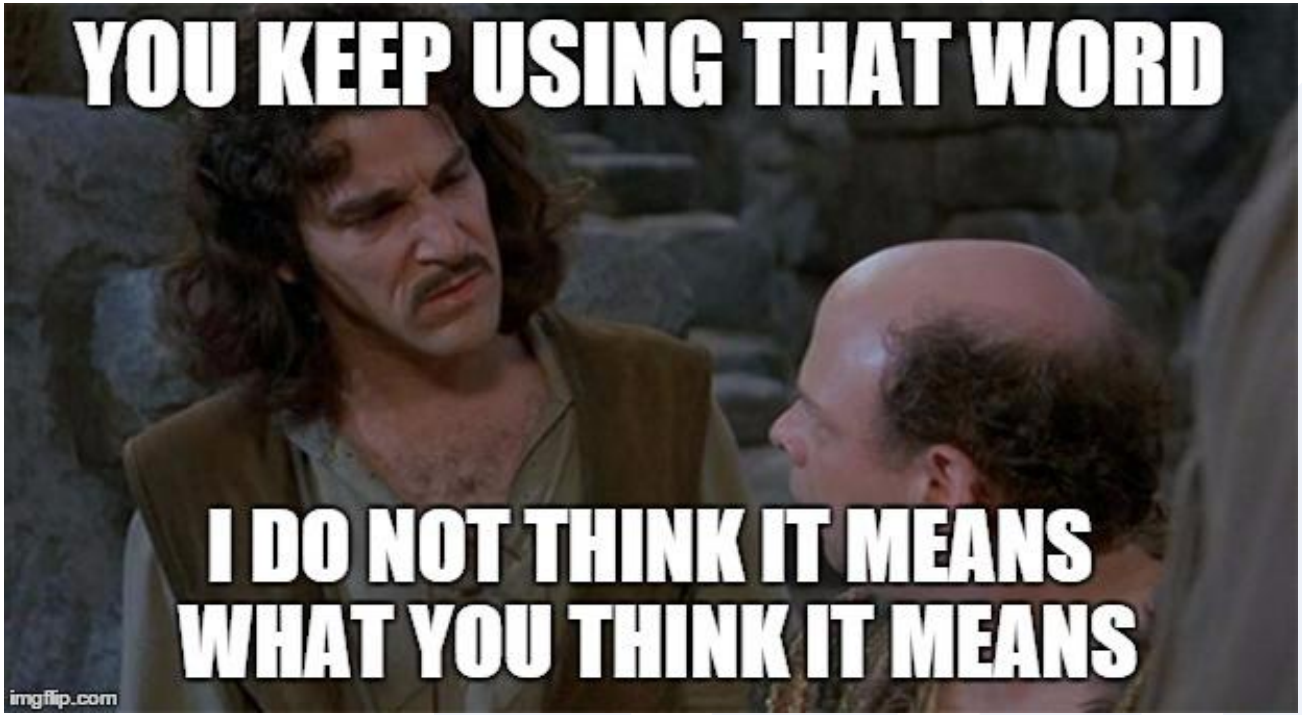
What do we mean by “costs”?



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The “cost” to whom?

Cost to the hospital

CMS
CENTERS FOR MEDICARE & MEDICAID SERVICES

UnitedHealthcare®

BlueCross BlueShield

Cost to the payer

Cost to the patient

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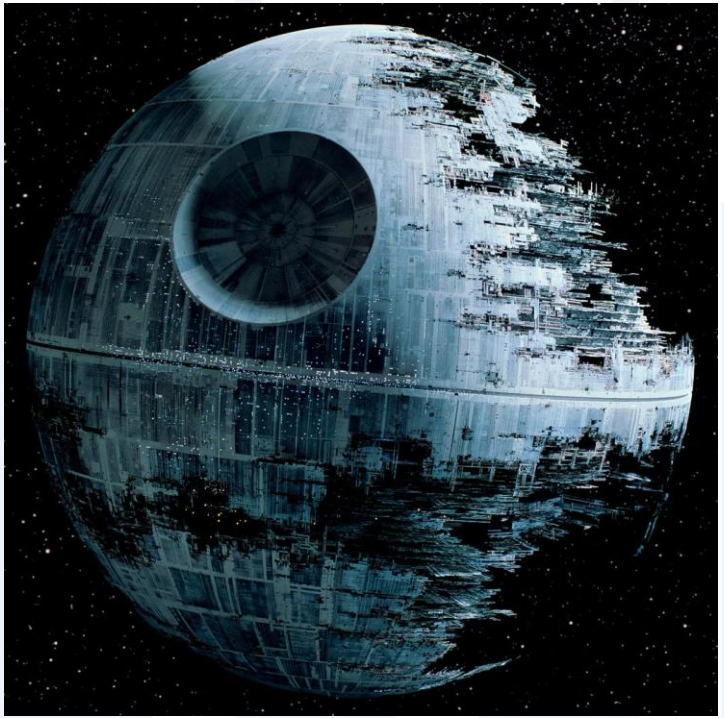
My agenda

- Surgical “episodes”
- Hospital charges
  - Cost to hospitals (?)
- Healthcare spending
  - Cost to payers
  - Cost to patients
- Modeling considerations



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What counts as surgical spending?

Avoiding the blame game

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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

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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)

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Nationwide inpatient sample

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

$$charge \times \frac{cost}{charge} = cost$$

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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

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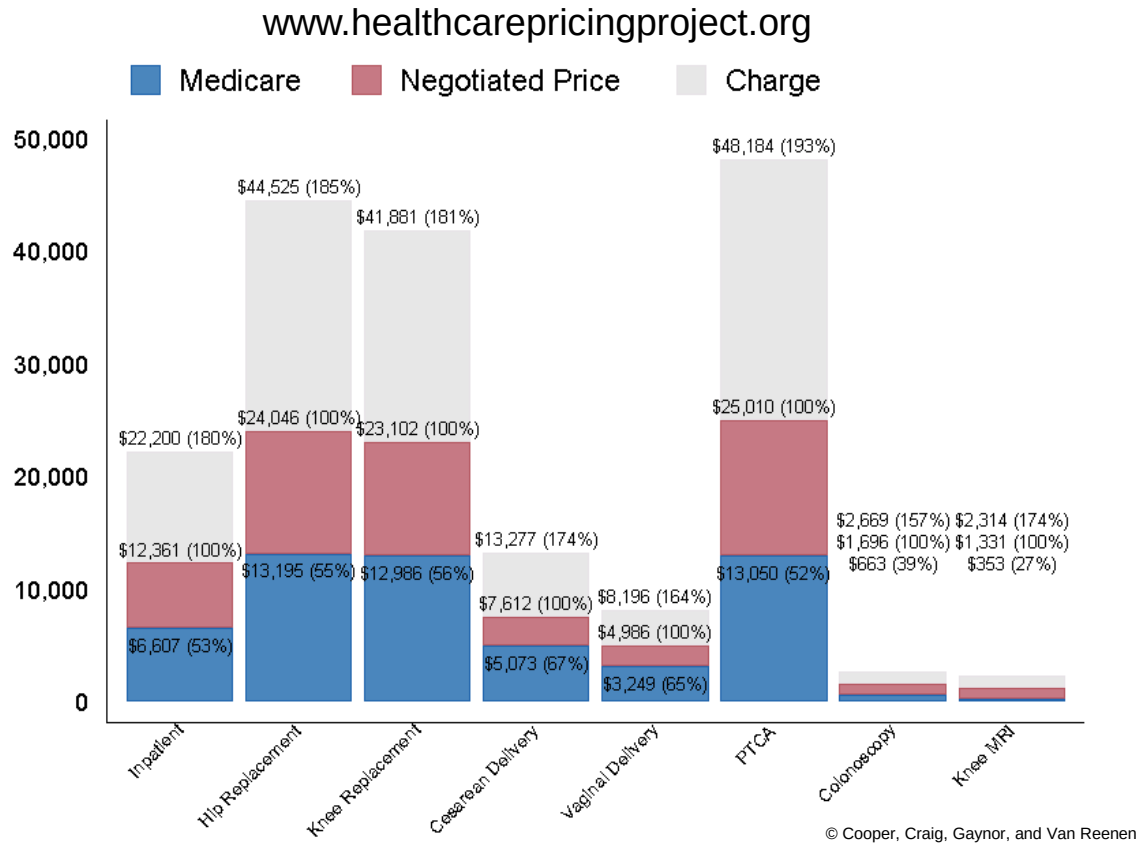
Charges have nothing to do with payments



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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

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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

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Medicare data

- Weaknesses
  - Restricted population
    - Age
    - Disability
  - Medicare Advantage (2015 only)
  - Some payment variation not related to utilization

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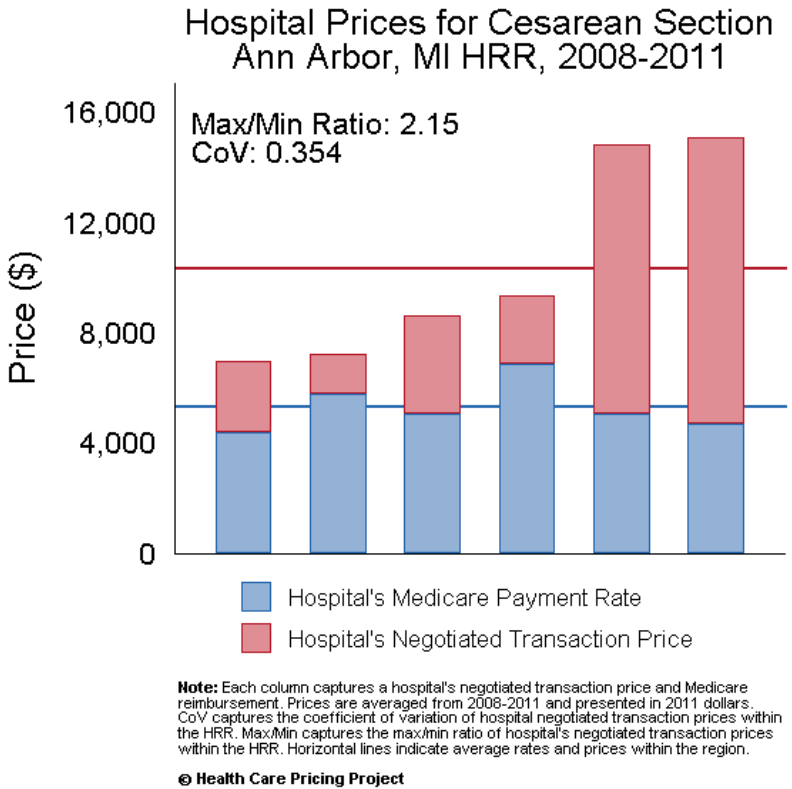
Payment variation in Medicare data



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Payment adjustments in Medicare data

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- 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

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“Price standardization”

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

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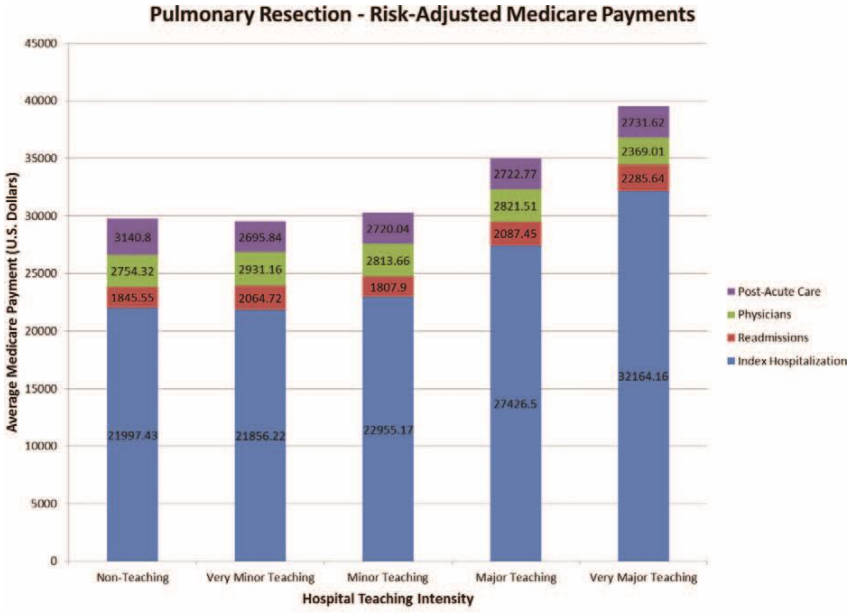
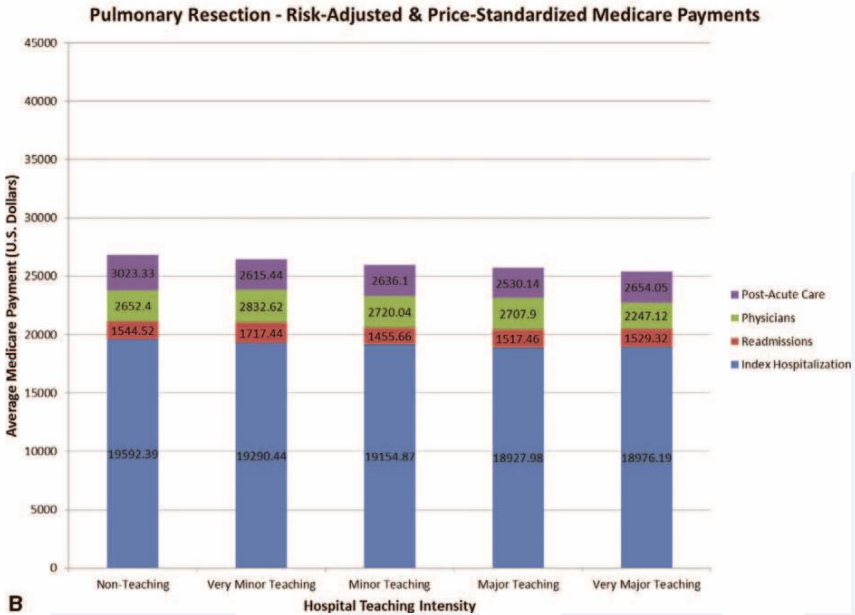
Impact of price standardization





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Pradarelli et al, Ann Surg 2017

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Analyzing spending: statistical modeling

Considerations for modeling

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- Bounded data
- Non-normal distribution of errors
- Outliers
- Correlations in data
- Sample size per hospital or provider

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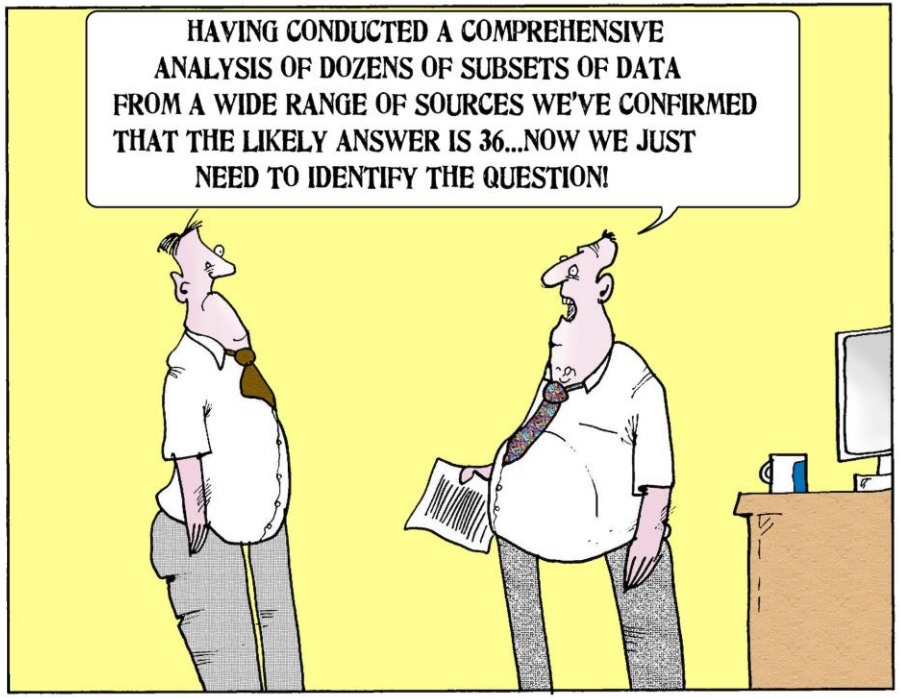
What's the question?



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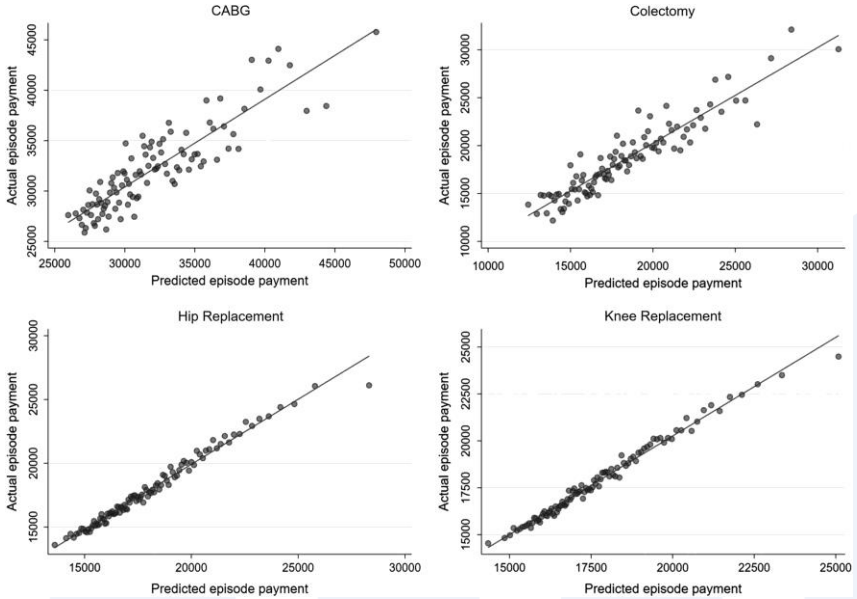
Risk-adjusting spending

- 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

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- Which outputs are of interest?
- Model fit and convergence
- Interpretability of coefficients
- Effect on inference

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“If you torture the data long enough, it [sic] will confess to anything.”

—Ronald Coase, Economist, Nobel Laureate

Thank you. Questions?

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