WENNBERG INTERNATIONAL COLLABORATIVE
SPRING POLICY MEETING 2018

# The Elusive Link Between Healthcare Spending and Health Outcomes

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WIC WENNBERG INTERNATIONAL COLLABORATIVE

74 NRP Smarter Health Care National Research Programme

SSPH+ SWISS SCHOOL OF PUBLIC HEALTH

# A seemingly simple question

Do hospital systems that spend more get better health outcomes as a result?

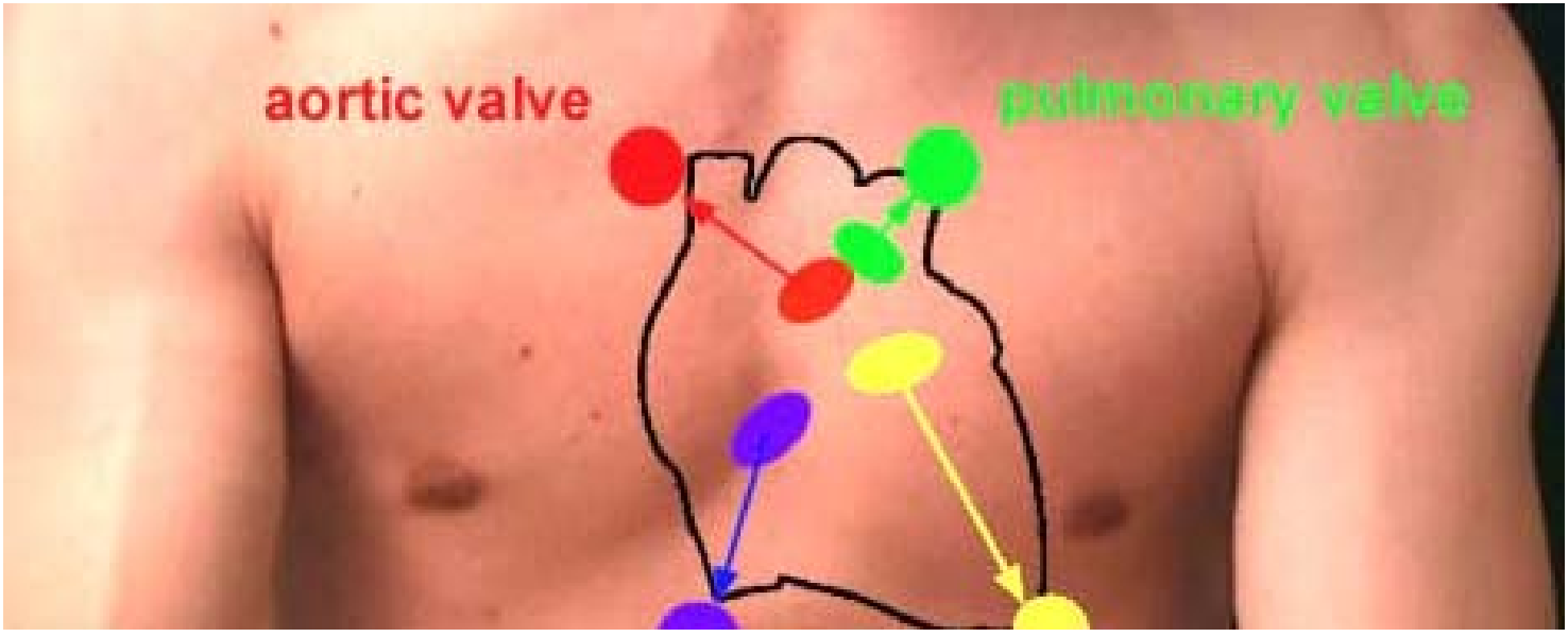
# Estimates are all over the map

NO: Fisher et al., 2003a,b; Fisher et al, 2004; Wennberg, 2011 Yasaitis et al., 2009; Skinner et al., 2005; Glance et al., 2010; [your name here], etc.

YES: Silber et al., 2010; Doyle, 2011; Doyle et al., 2012; Romley et al., 2011; Barnato et al., 2010; Doyle et al., 2015

SOMETIMES: Skinner and Staiger, 2015; Doyle et al., 2017; Likoski et al. (*JAMA Cardiology*, Dec. 20, 2017)

# To Pursue this Elusive Question: Consider Heart Attacks (AMI)



# Let's take a look at the data

Medicare fee-for-service claims, 2007-2015, Age 65+: N = 1,500,000.

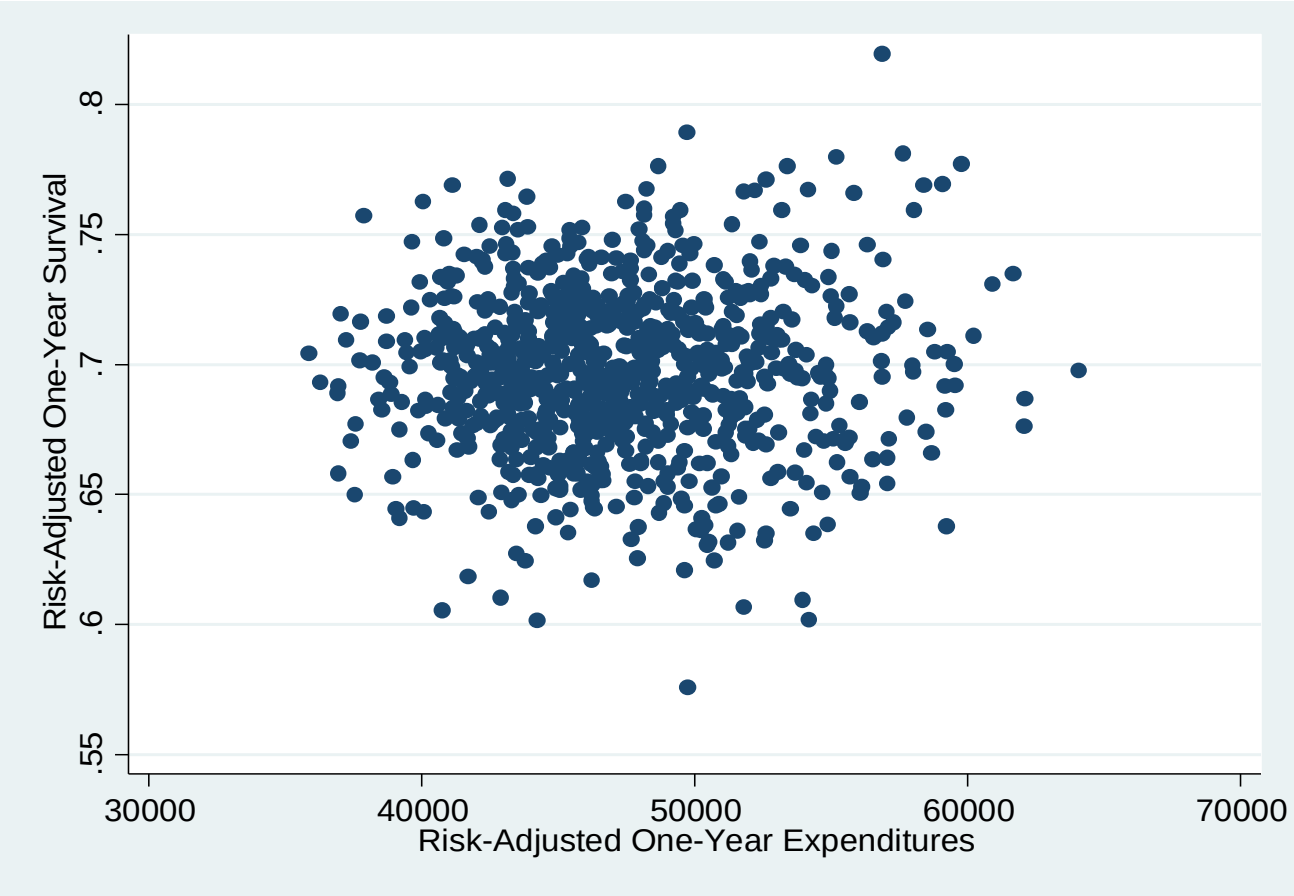
Outcomes: 1-year (post-admission) risk-adjusted survival and price- and risk-adjusted Medicare Expenditures

Create risk-adjusted survival and spending at the hospital level using:

Age/sex cells, Black, Native American, Hispanic, Asian, other Race/Ethnicity, ZIP code income, vascular disease, pulmonary disease, dementia, diabetes, liver failure, renal failure, cancer, location of MI (e.g., anterolateral, inferolateral, subendocardial, etc.) and Hierarchical Condition Categories (HCCs) from the 6 months prior to the hospital admission.

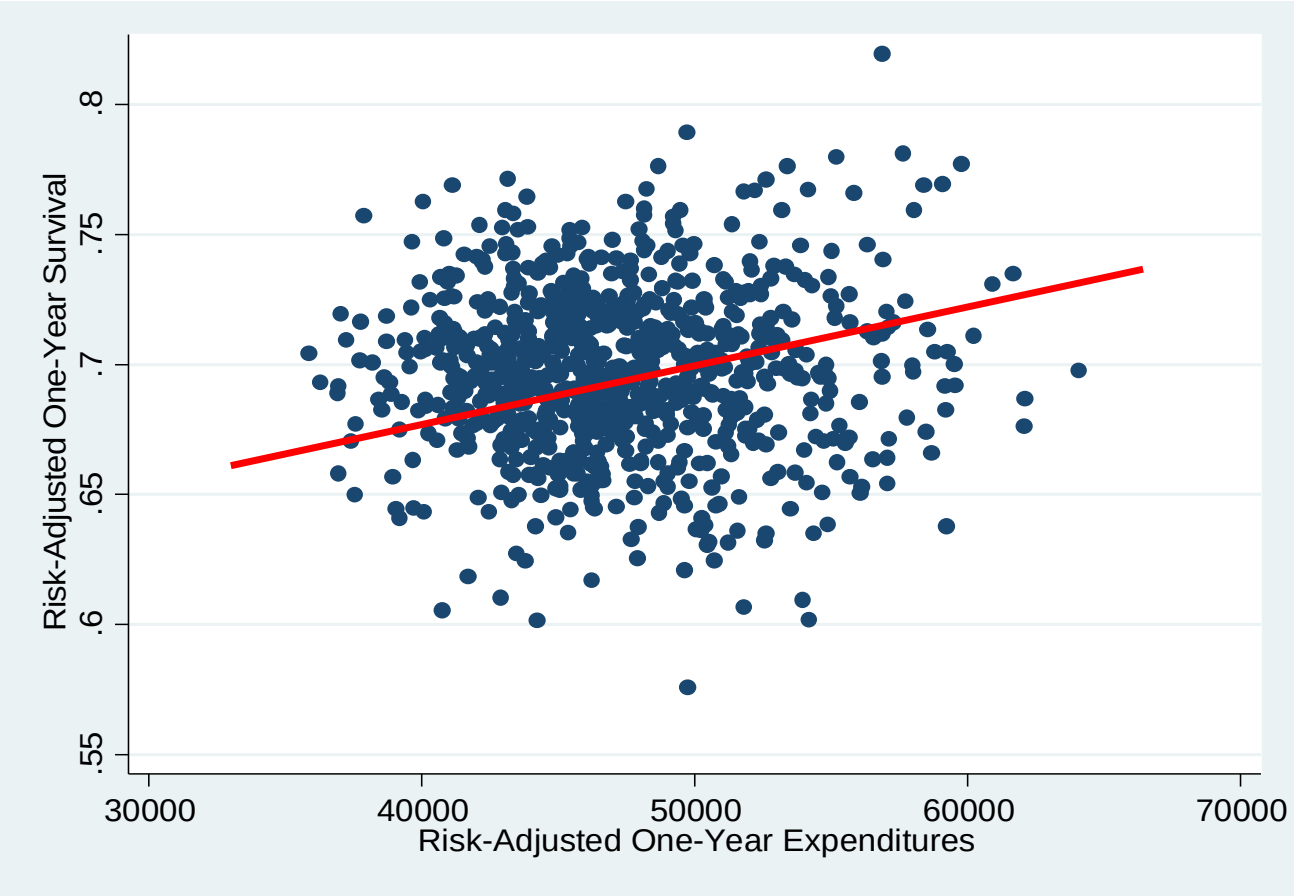
Based on A. Chandra, C. Colla, J. Skinner (unpublished manuscript)

# Hospital-Level Risk-Adjusted Spending & Survival




Note: Sample limited to hospitals with at least 800 AMI patients

# Is More Spending Better?

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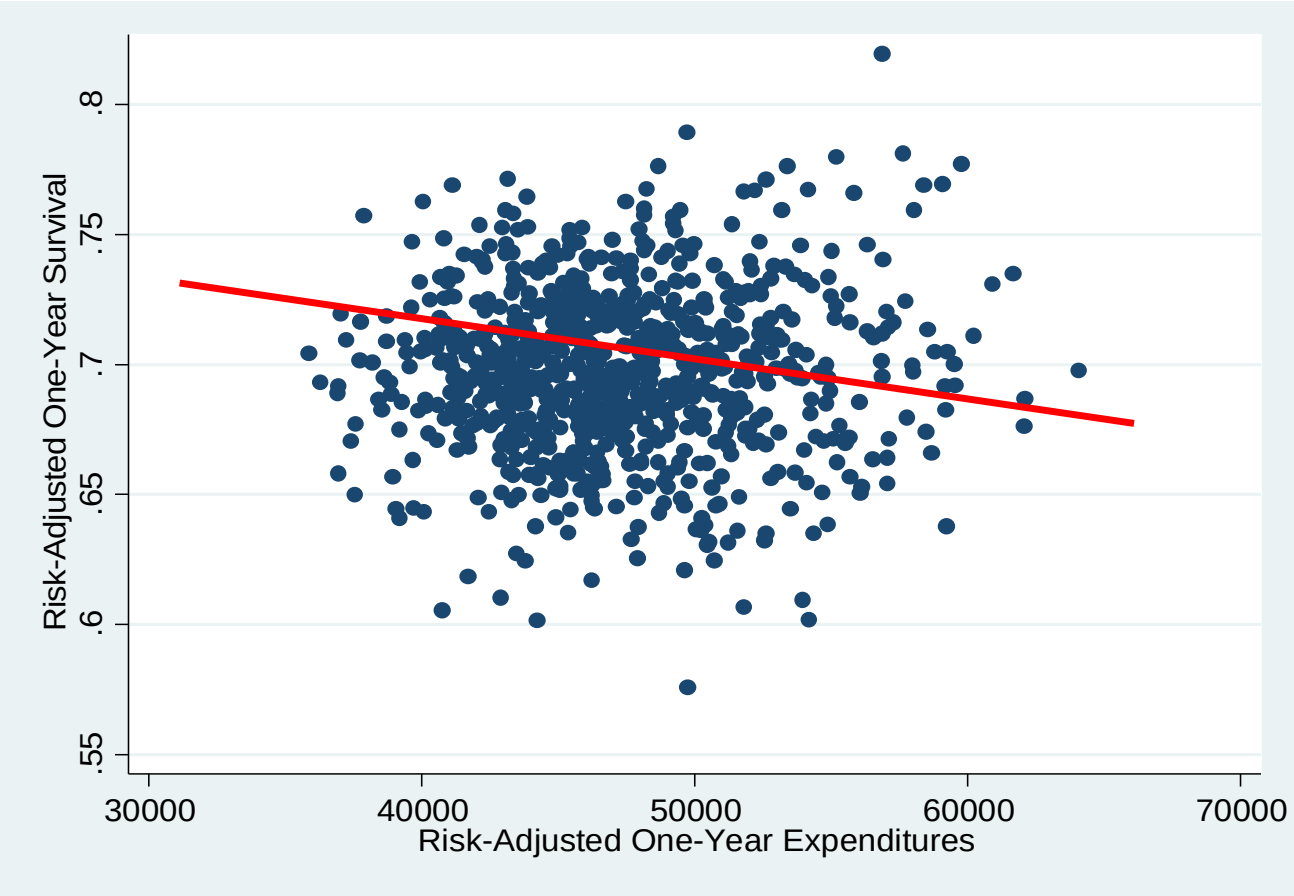
# Or is More Spending Worse?

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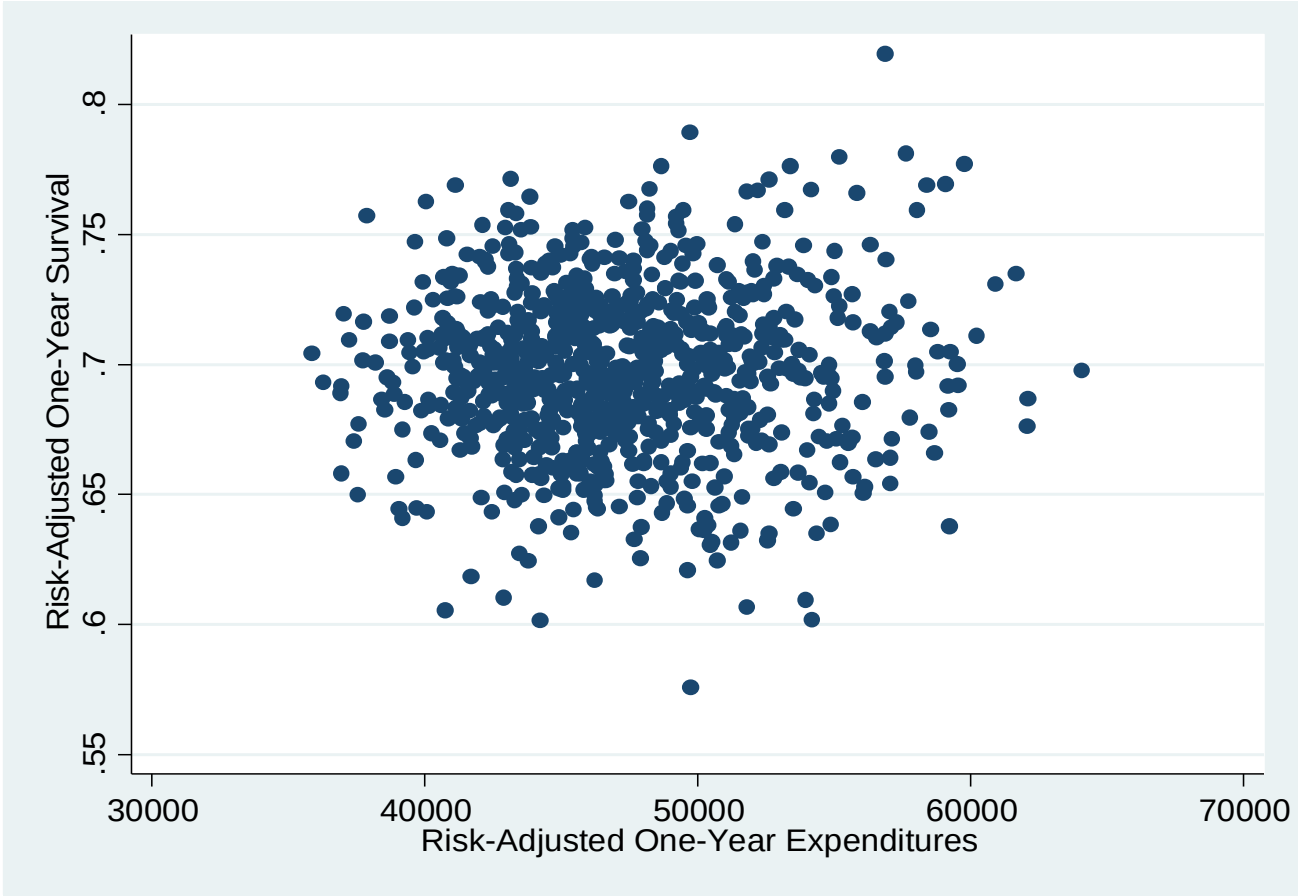
# Who Cares?

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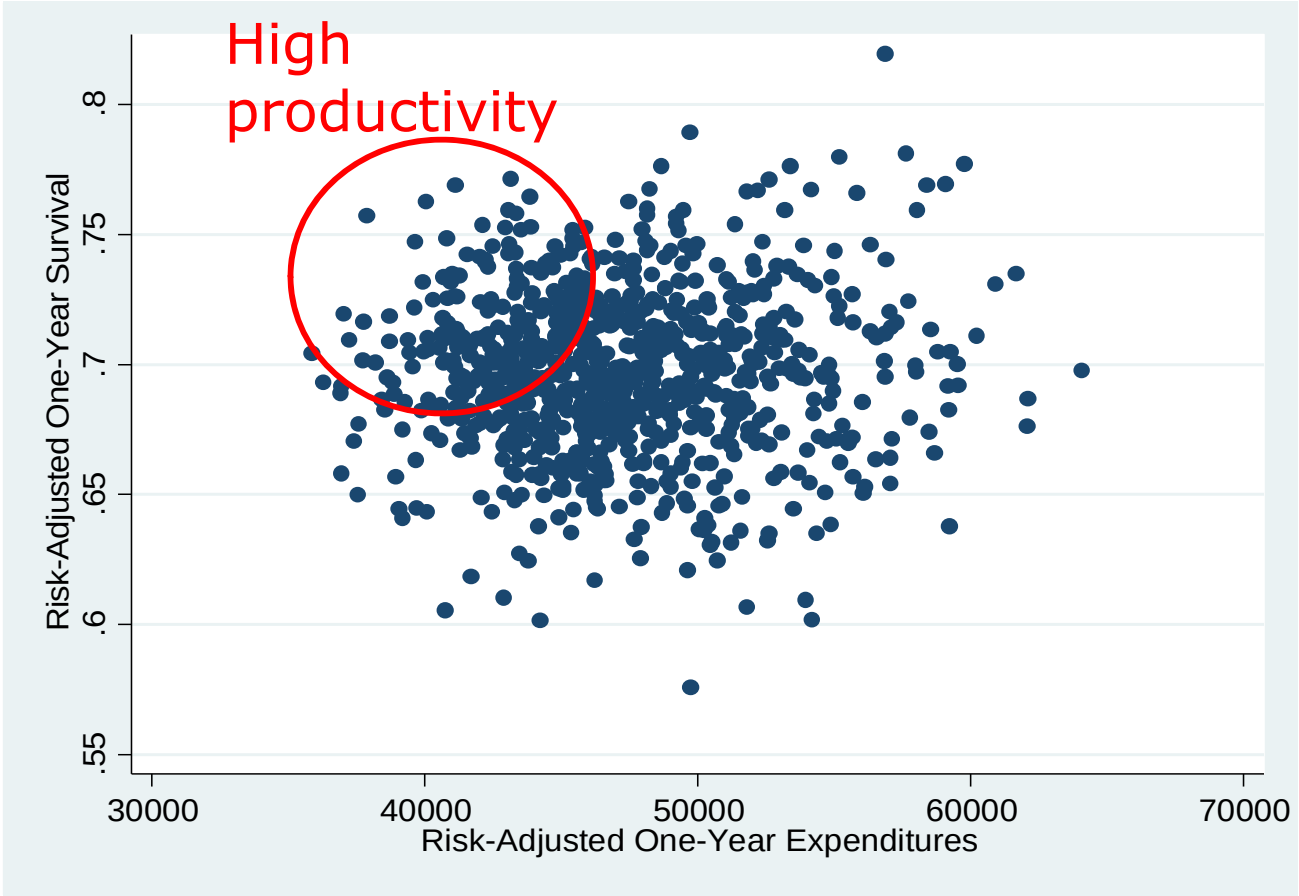
# There Are Large Differences in Hospital Productivity

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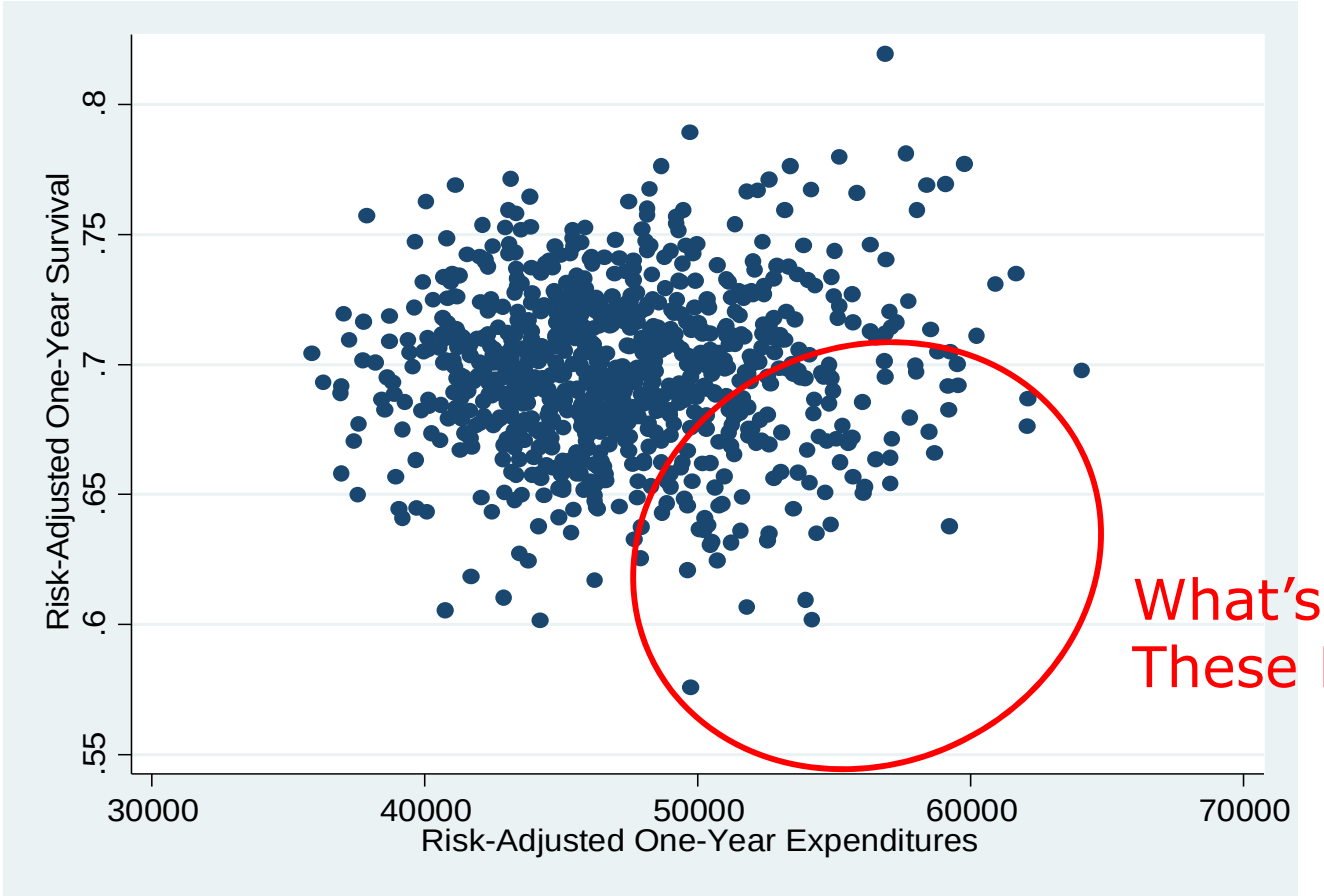


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# What Most Researchers Do:

Regress survival (S) on expenditures (M) and patient characteristics (Z): h

$$S_{ij} = \phi_k M_{ij} + Z_{ij}\beta + u_{ij}$$

# This Should Be a “Forbidden Regression”……..

Regress survival (S) on expenditures (M) and patient characteristics (Z): h

$$S_{ij} = \phi_k M_{ij} + Z_{ij}\beta + u_{ij}$$

# A Better Empirical Strategy

Regress one-year survival (S) and one-year expenditures (M) EACH on patient characteristics (Z) and hospital-level of treatment choices (X):

$$S_{ij} = Z_{ij}\beta + \sum_{k=1}^{K} X_{jk}\gamma_k + u_{ij}$$

$$M_{ij} = Z_{ij}\varphi + \sum_{k=1}^{K} X_{jk}\phi_k + \varepsilon_{ij}$$

# Different Categories of Medical Treatments

Category I: Treatments cost-effective for nearly every patient ("effective care")

Source: Chandra and Skinner, JEL, 2012; Wennberg et al., Health Affairs, 2002.

# Category I treatments for AMI

1. Beta Blockers
2. MD visit within 14 days of discharge

ORIGINAL INVESTIGATION

## Outpatient Follow-up Visit and 30-Day Emergency Department Visit and Readmission in Patients Hospitalized for Chronic Obstructive Pulmonary Disease

*Gulshan Sharma, MD, MPH; Yong-Fang Kuo, PhD; Jean L. Freeman, PhD; Dong D. Zhang, PhD; James S. Goodwin, MD*

# Different Categories of Medical Treatments

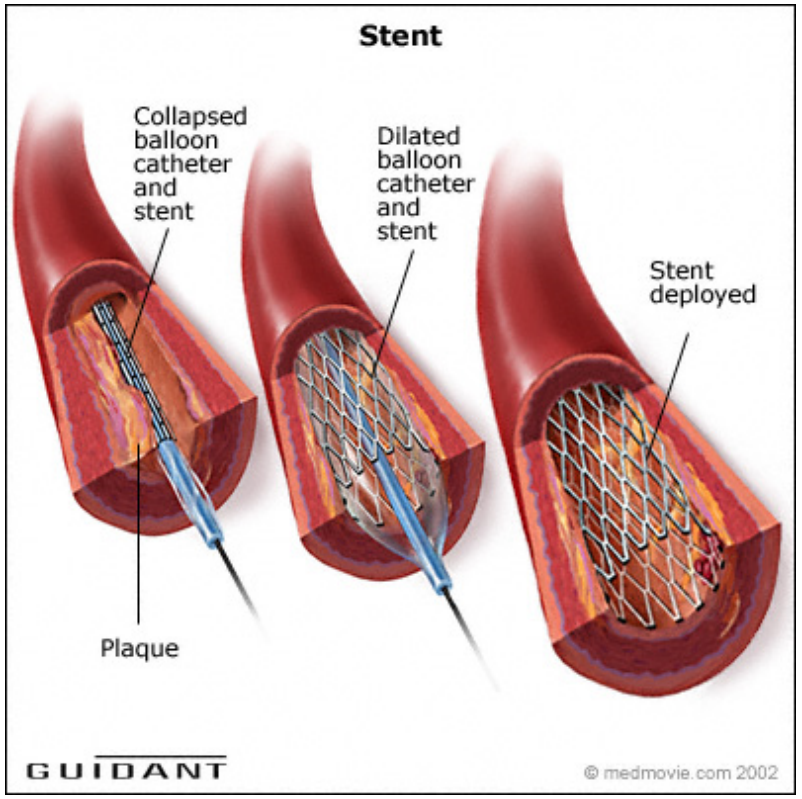
Category I: Treatments cost-effective for nearly every patient ("effective care")

Category II: Treatments that are useful for some, not for everyone ("preference-sensitive")

Source: Chandra and Skinner, JEL, 2012; Wennberg et al., Health Affairs, 2002.

# Category II treatment for AMI (example)

PCI or stent within 24 hours of AMI



# Different Categories of Medical Treatments

Category I: Treatments cost-effective for nearly every patient ("effective care")

Category II: Treatments that are useful for some, not for everyone ("preference-sensitive")

Category III: Treatments with very low or unknown benefits ("supply-sensitive")

Source: Chandra and Skinner, JEL, 2012; Wennberg et al., Health Affairs, 2002.

JAMA®

# Tube Feeding in Patients With Advanced Dementia

## A Review of the Evidence

Thomas E. Finucane, MD
Colleen Christmas, MD
Kathy Travis, MD

Patients with advanced dementia frequently develop eating difficulties and weight loss. Enteral feeding tubes are often used in this situation, yet benefits and risks of this therapy are unclear. We searched MEDLINE, 1966 through March 1999, to identify data about whether tube feeding in patients with advanced dementia can prevent aspiration pneumonia, prolong survival, reduce the risk of pressure sores or infections, improve function, or provide palliation. We found no published randomized trials that compare tube feeding with oral feeding. We found no data to suggest that tube feeding improves any of these clinically important outcomes and some data to suggest that it does not. Further, risks are substantial. The widespread practice of tube feeding should be carefully reconsidered, and we believe that for severely demented patients the practice should be discouraged on clinical grounds.

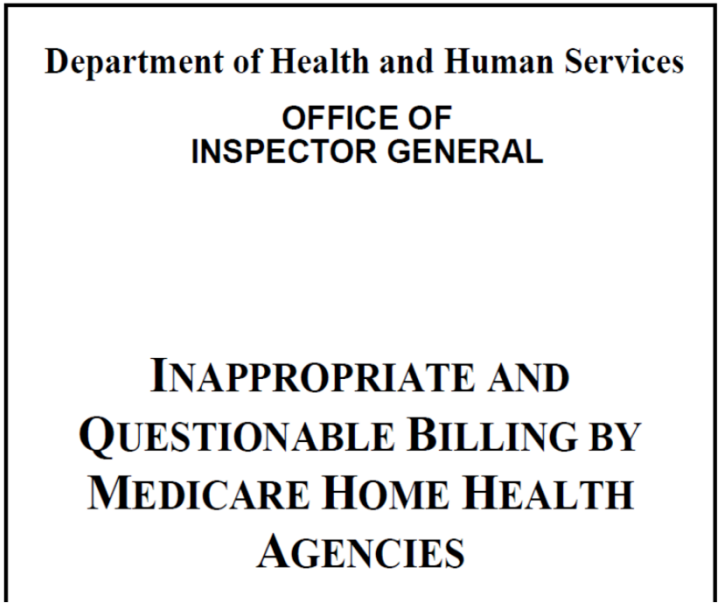
JAMA. 1999;282:1365-1370 www.jama.com

PATIENTS WITH ADVANCED DEmentia commonly develop difficulty eating, often when they become bedridden and dependent in all activities of daily living. They may resist or be indifferent to food, fail to manage the food bolus properly once it is in the mouth (oral phase dysphagia), or aspirate when swallowing (pharyngeal phase dysphagia). Enteral tube

# Fraudulent use of home health care…

Fraction of home health care patients billing > $11,000 per AMI

Average fraction = 0.10.



# One-Year Survival Regression

| Dependent Variable: Survival | Baseline Regression | t-stat. |
|---|---|---|
| Category I (effective) | | |
| β Blockers within 6 months | 0.015 | 3.5 |
| Doctor Visit 14 Days Post-Discharge | 0.065 | 5.4 |
| Category II (useful for some, not all) | | |
| PCI (Top Quartile, <= 1 Day) | 0.055 | 25.6 |
| Category III (ineffective or unknown) | | |
| Dementia Feeding Tubes | -0.110 | 2.4 |
| "Outlier" Fraction of Home Health | 0.003 | 0.4 |
| All regressions risk-adjusted including HCCs, clusters at the hospital level | | |



Note: other variables (risk adj., etc.( included in regression

# One-Year Spending Regression

| Dependent Variable: Price-adjusted Expenditures | Baseline Regression | t-stat. |
|---|---|---|
| Category I (effective) | | |
| β Blockers within 6 months | -2,076 | 4.6 |
| Doctor Visit 14 Days Post-Discharge | -5,201 | 3.8 |
| Category II (useful for some, not all) | | |
| PCI (Top Quartile, <= 1 Day) | 1,816 | 5.6 |
| Category III (ineffective or unknown) | | |
| Dementia Feeding Tubes | 49,443 | 11.1 |
| "Outlier" Fraction of Home Health | 13,090 | 13.2 |
| All regressions risk-adjusted including HCCs, clusters at the hospital level | | |



Note: other variables (risk adj., etc.( included in regression

# Inputs, Health Outcomes, & Spending: 4 Hospitals

| | Inter-mountain | Mayo Clinic | University of Miami | Hialeah Hospital |
|---|---|---|---|---|
| **Predicted Survival** | .771 | .757 | .696 | .672 |
| **Actual Survival** | .724 | .745 | .689 | .630 |
| **Predicted Spending** | $47,191 | $48,157 | $63,060 | $63,220 |
| **Actual Spending** | $42,980 | $45,225 | $73,044 | $59,243 |
| **Early Stents (PCI)** | .553 | .454 | .251 | .015 |
| **Fraction Home Health Care Paid as Outlier** | .123 | .031 | .413 | .438 |

**Sources: Medicare claims data (A&B), Medicare Part D data**

# Hialeah Hospital's Patients Speak Up

## Hialeah Hospital

Directions

2.7 ★★½☆☆ 45 Google reviews

Hospital

**Address:** 651 E 25th St, Hialeah, FL 33013

**Phone:** (305) 693-6100

**Hours:** Open today · Open 24 hours

## Reviews

Write a

"Find another hospital if you can."

"Worse hospital ever."

"Nurses don't inform family patients of status for loved one.

# Pausing for breath…

- Wide variation in spending and outcomes, low correlation; this is observed in all countries
- Possible explanation: Hospitals and physicians make treatment and spending choices: some improve health, others cost money.
- *What to do about it?*

# Policy implications

*1. Population-based regulation of capacity*

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*1. Population-based regulation of capacity*

*2. Creative measurement of productivity...*

**Exploring Variations in Healthcare Expenditures – What is the Role of Practice Styles?**

by

Alexander AHAMMER
Thomas SCHOBER

JOHANNES KEPLER UNIVERSITY LINZ

# Policy implications

*1. Population-based regulation of capacity*

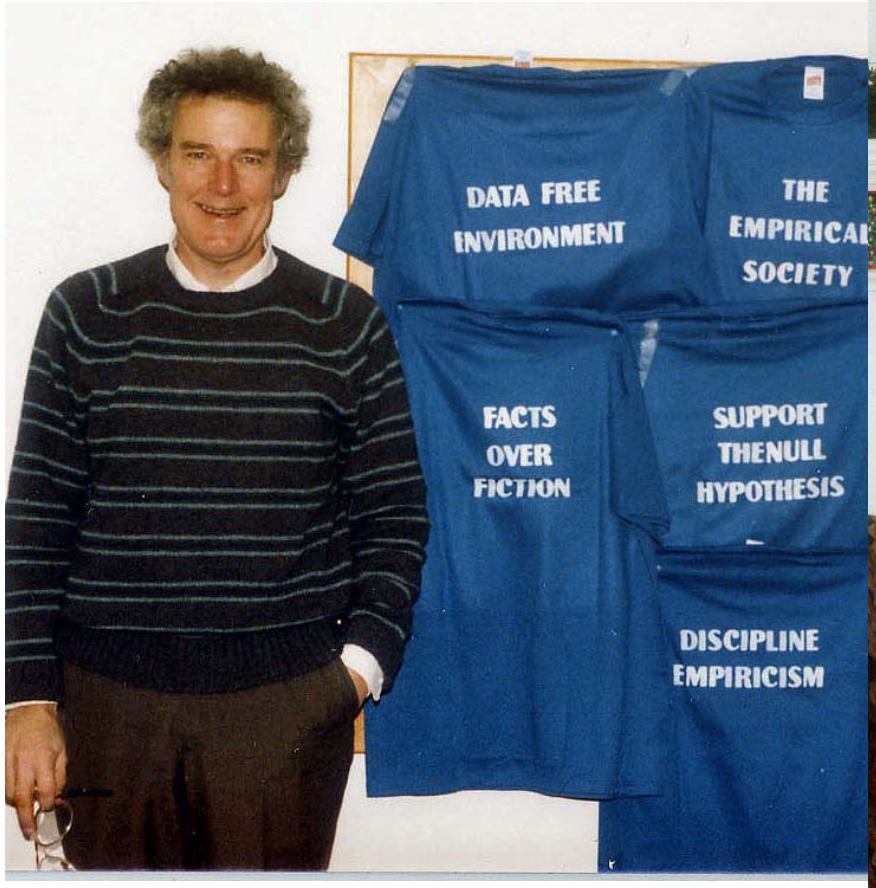
*2. Creative measurement of productivity...*

***3. Feedback/monitoring of:***

*I. Underuse of effective treatments*

*II. Appropriate use of treatments like PCI where preferences may matter*

*III. Overuse of low-value or ineffective treatments*


DATA FREE
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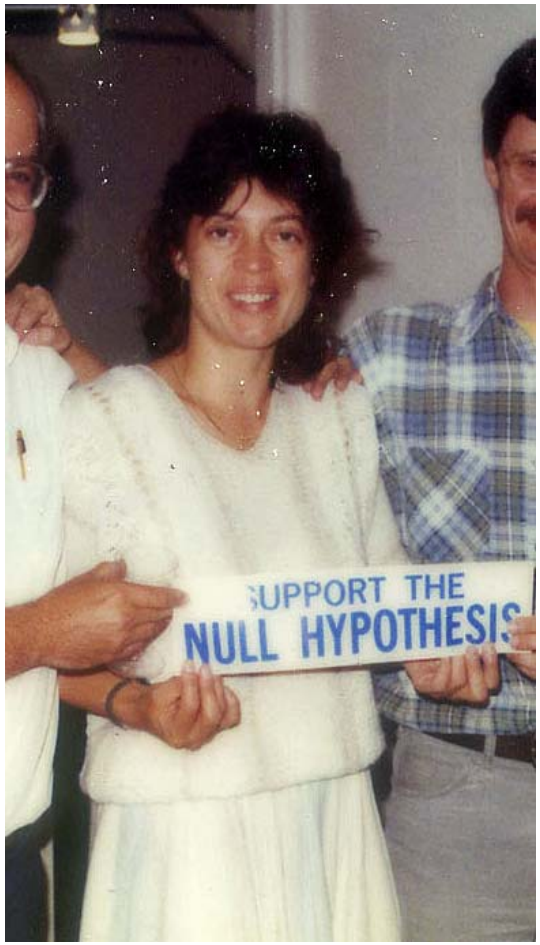
SUPPORT THE
NULL HYPOTHESIS

# Thank you!

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