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FOR HEALTH POLICY
& CLINICAL PRACTICE

Improving Health Care Value:

Medical Care Epidemiology, Maps, and Variation

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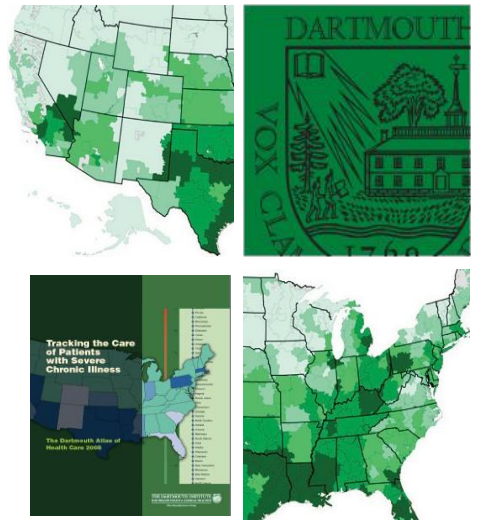
Odense, Denmark

June 2015



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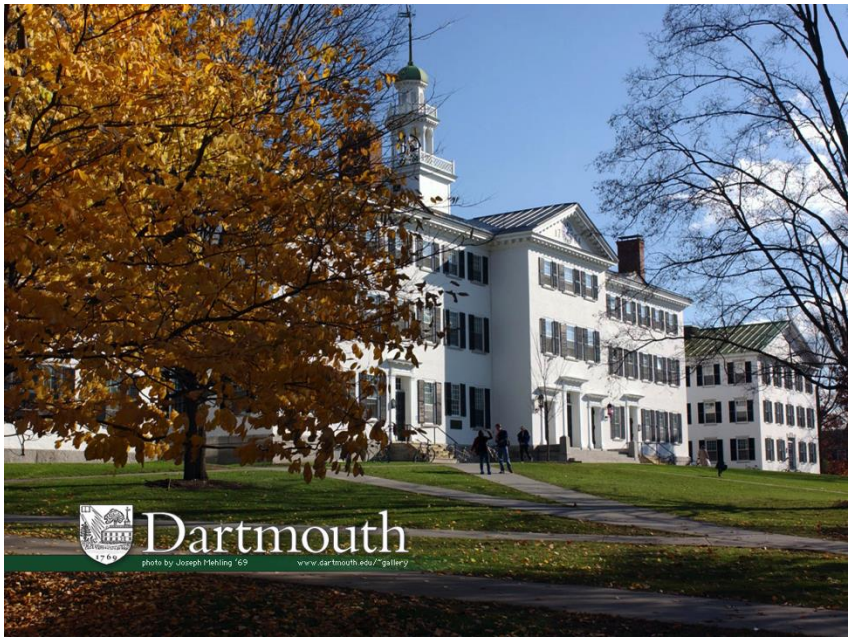



Frø Cafe


CREC

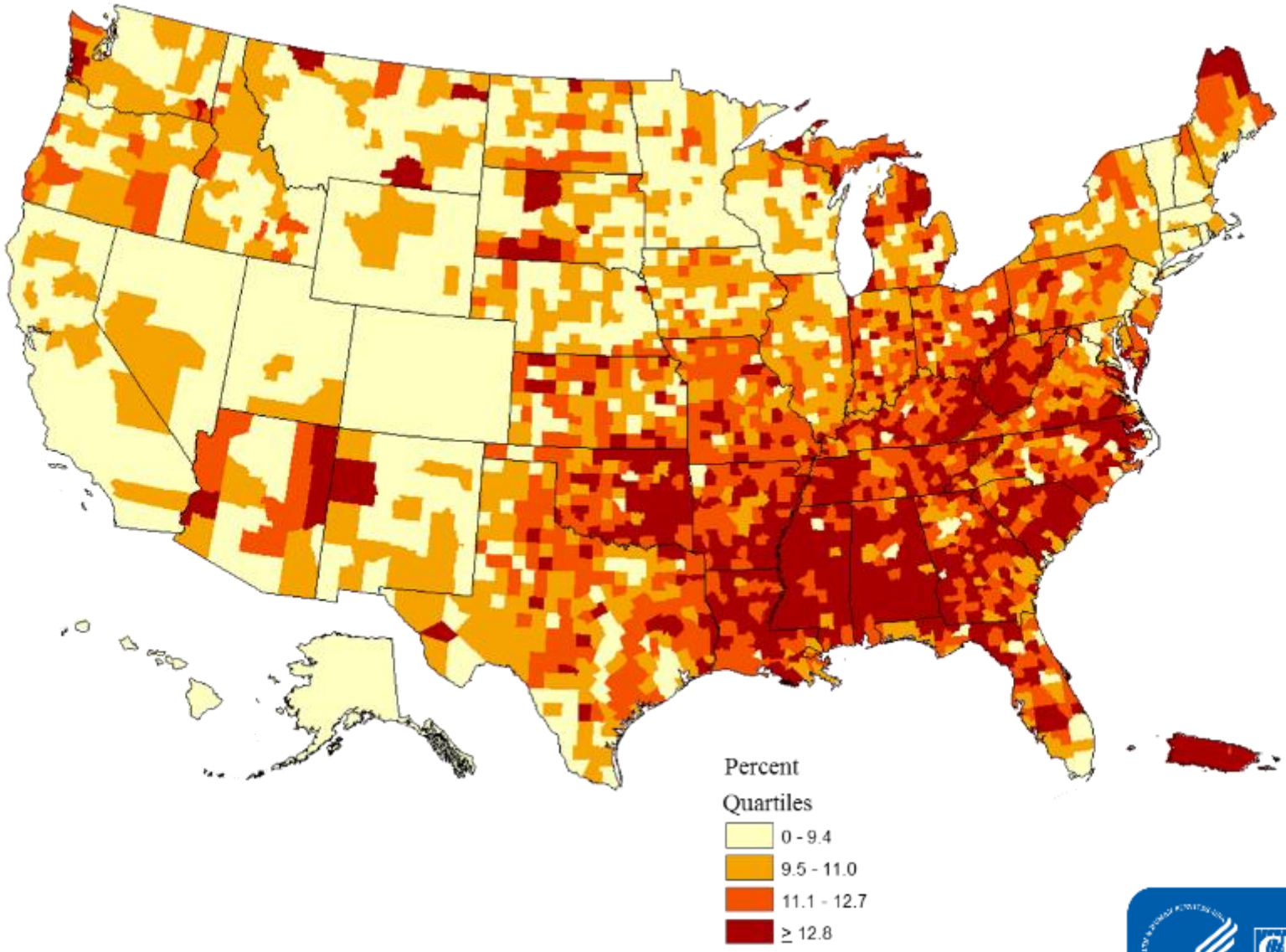
Susan Goodman Alkana

(1946 – 2008)

In Health Care, Is Geography Destiny?

Measuring health is essential to building a healthy society

County-level Estimates of Diagnosed Diabetes among Adults aged ≥ 20 years:
United States 2011



Measuring health is essential to building a healthy society

Measuring health care is just as important.

Medical care epidemiology

1970: The world is perfect

1973 - Hospital Service Areas in Vermont

Small Area Variations in Health Care Delivery

A population-based health information system can guide planning and regulatory decision-making.

John Wennberg and Alan Gittelsohn

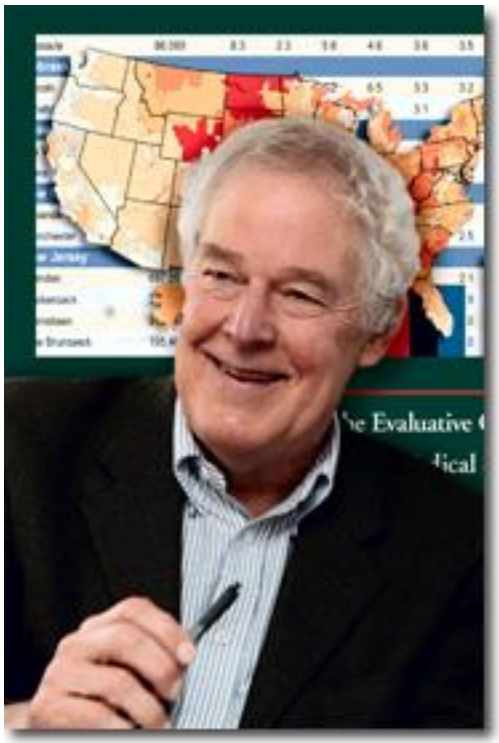
Recent legislation has extended planning and regulatory authority in the health field in a number of important areas. The 1972 amendments to the Social Security Act provide authority for regulating the construction of facilities and establish Professional Standard Review Organizations (PSRO's), which are accountable for setting standards and evaluating professional performance. Phase 3 of the Wage and Stabilization Act of 1970 and state insurance commissions provide authority for regulating dollar flow by controlling

impact of regulatory decisions on the equality of distribution of resources and dollars and the effectiveness of medical care services.

For technical and organizational reasons, documentation of the health care experience of populations has been restricted to large political jurisdictions such as counties, states, or nations. Studies at this level of aggregation have used indicators that support direct comparisons among areas. Relationships between the supply of manpower, facilities, and expenditures and

twice as high in California as in Arkansas. The number of physicians per thousand persons has been up to three times higher in some states than in others. International comparisons and studies of regions within states show that there are large differences in the rate of delivery of specific surgical procedures (*1*).

In 1969, there was implemented in the state of Vermont a data system that monitors aspects of health care delivery in each of the 251 towns of the state. When the population of the state is grouped into 13 geographically distinct hospital catchment, or service, areas, variations in health care are often more apparent than they are when the population is divided into fewer, larger areas. Population rates can be used to make direct statistical comparisons between each of the 13 hospital service areas. Since the medical care in each area is delivered predominantly by local physicians, variations tend to reflect differences in the way particular individuals and groups practice medicine. The specificity of the information in Vermont's data system makes it possible to appraise the impact that decisions controlling facility construction, price of insurance, and



line). Darker line shows boundaries of hospital service areas. Circles represent hospitals. Areas without circles are served principally by hospitals in New Hampshire.

Unwarranted variation is variation that cannot be explained by:

- Patient illness
- Patient preference

Unwarranted variation is the variation that is explained by health system performance and represents opportunities for improvement.

Danish studies of health care variation pre 1990

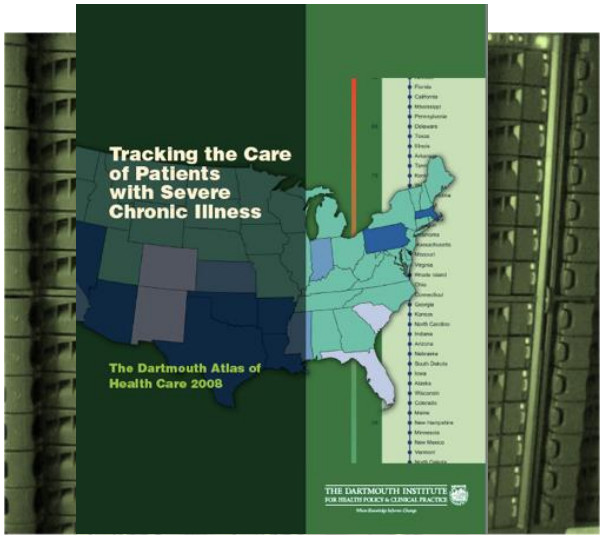
Authors	Year	Topic
Jönsson (1) Silverberg	1982	Admissions for ulcer
Bernth-Petersen (2) Elsa Bach	1983	Cataract surgery
Kamper-Jorgensen (3)	1984	Admissions
Andersen (4) Madsen Loft	1987	Hysterectomy

1. Scandinavian J Social Med 1982;10:63-70.
2. Acta Ophthalmologica 1983;61:397-405.
3. CIBA Foundation Conference, London, 1984.
4. Ugeskr Laeger 1987;149:2415-2419.

1994 - 2015: The Dartmouth Atlas of Health Care

The Dartmouth Atlas of Health Care provides national public reporting of health system performance over time through the lens of variation in utilization, cost, quality, and patient experience.

The Atlas highlights variation, its causes, and its consequences in order to provide target audiences with compelling data to effect positive changes in the health care system.



www.dartmouthatlas.org

Current Funders

Robert Wood Johnson Foundation
California HealthCare Foundation
Charles H. Hood Foundation

The Scientific Foundations of the Atlas

Several hundred research papers.

Collaboration with many other research groups,
including critics of our studies.

Open and free access to as much Atlas data as possible.

The world is perfect

But only to astronauts.

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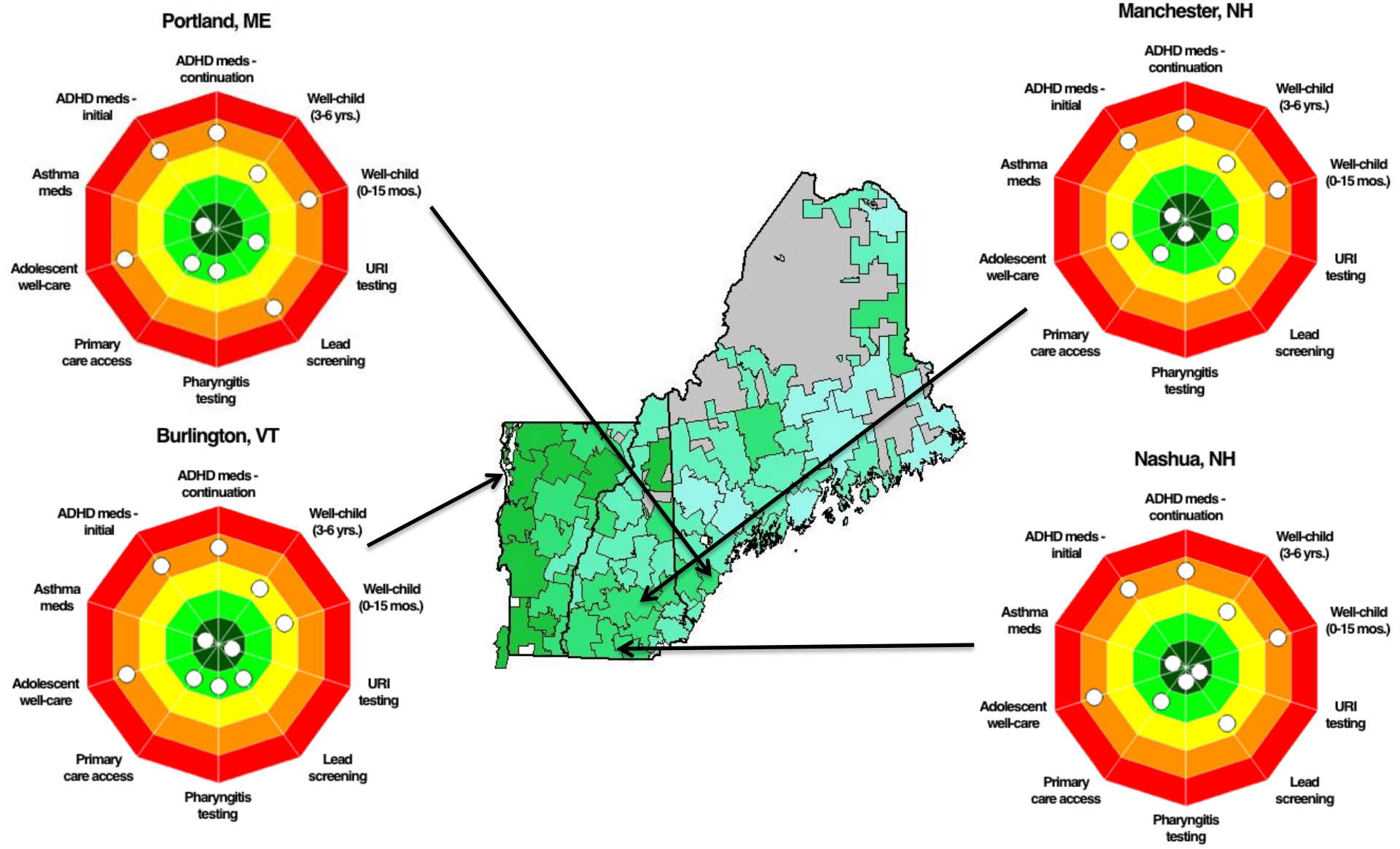
Quality Dartboards for four large Northern New England hospital service areas: Under age 18 quality measures



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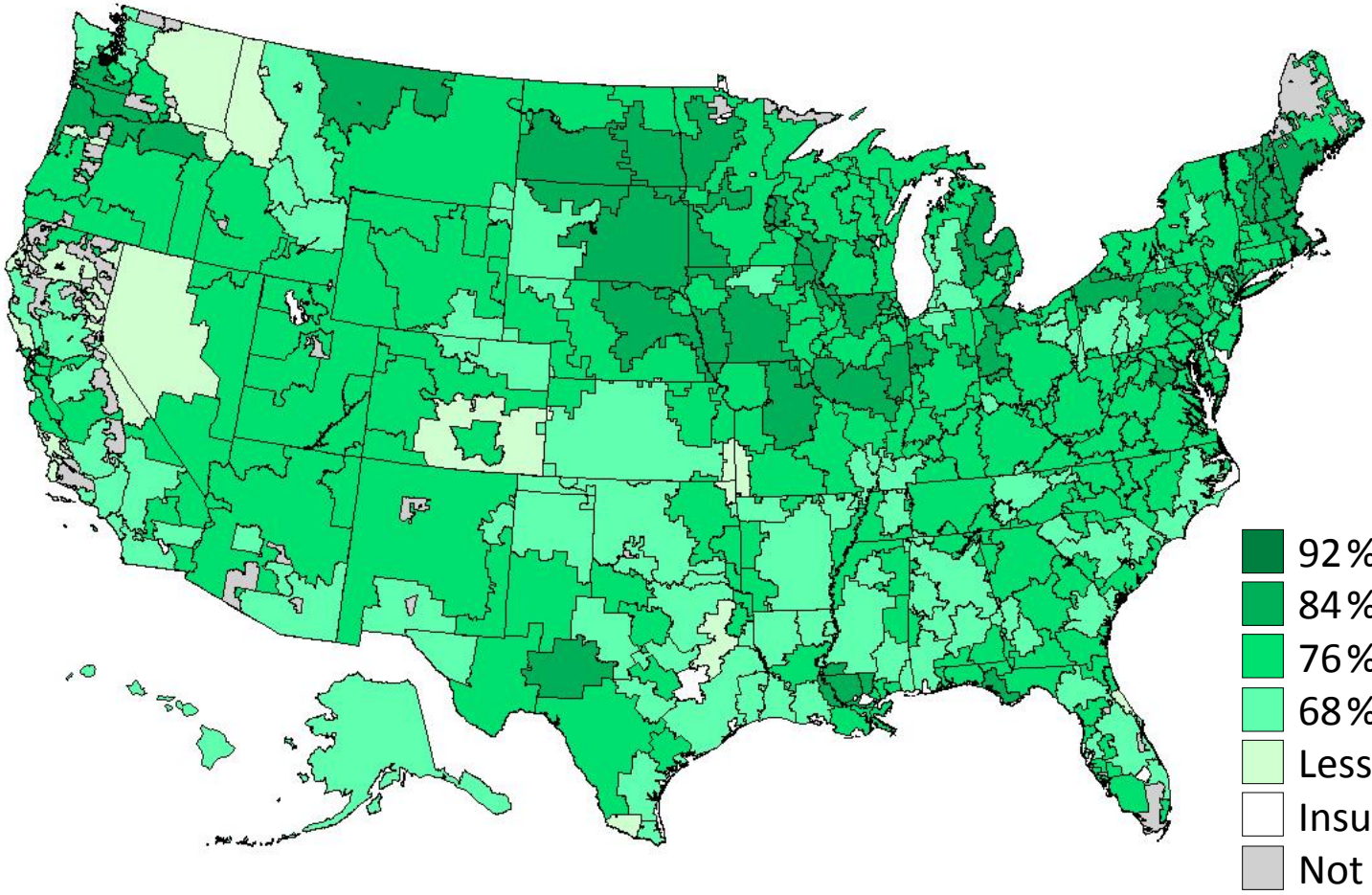
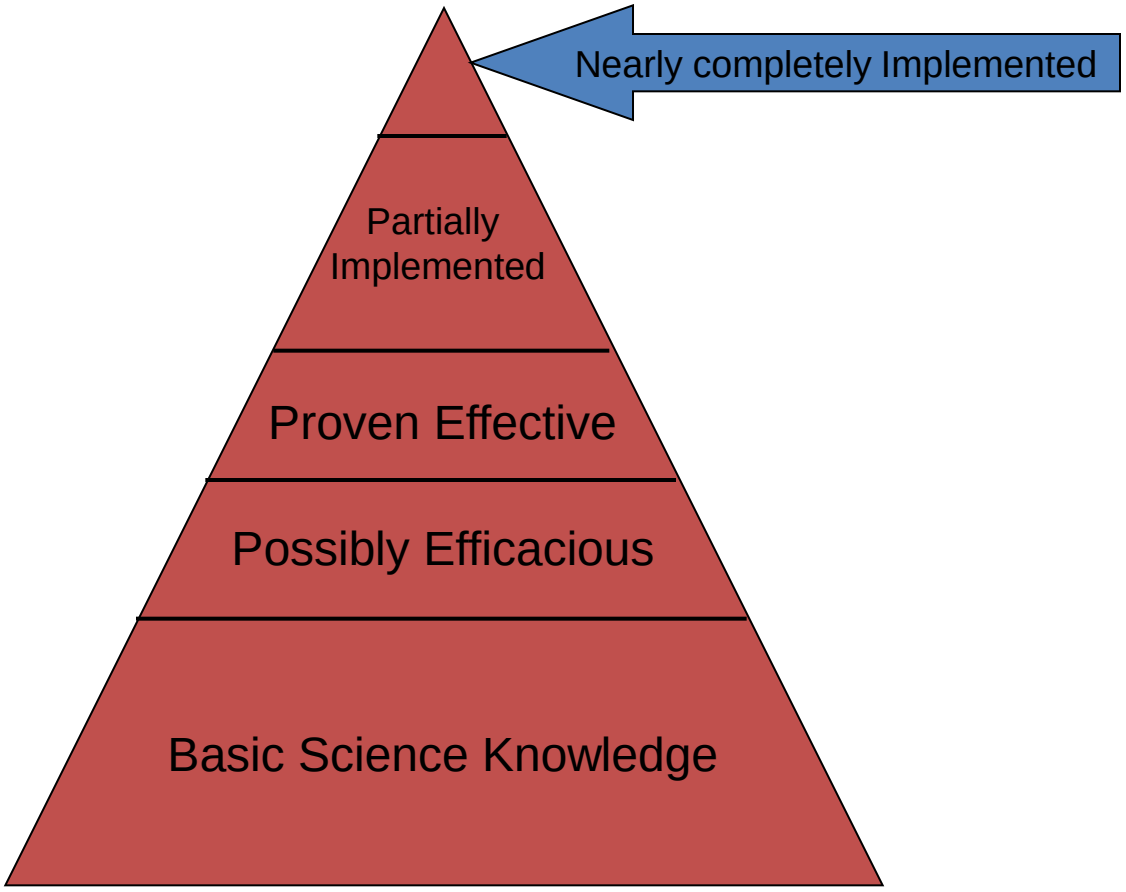
Use of beta-blockers 7-12 months following discharge for AMI (2008-10) (Medicare beneficiaries)

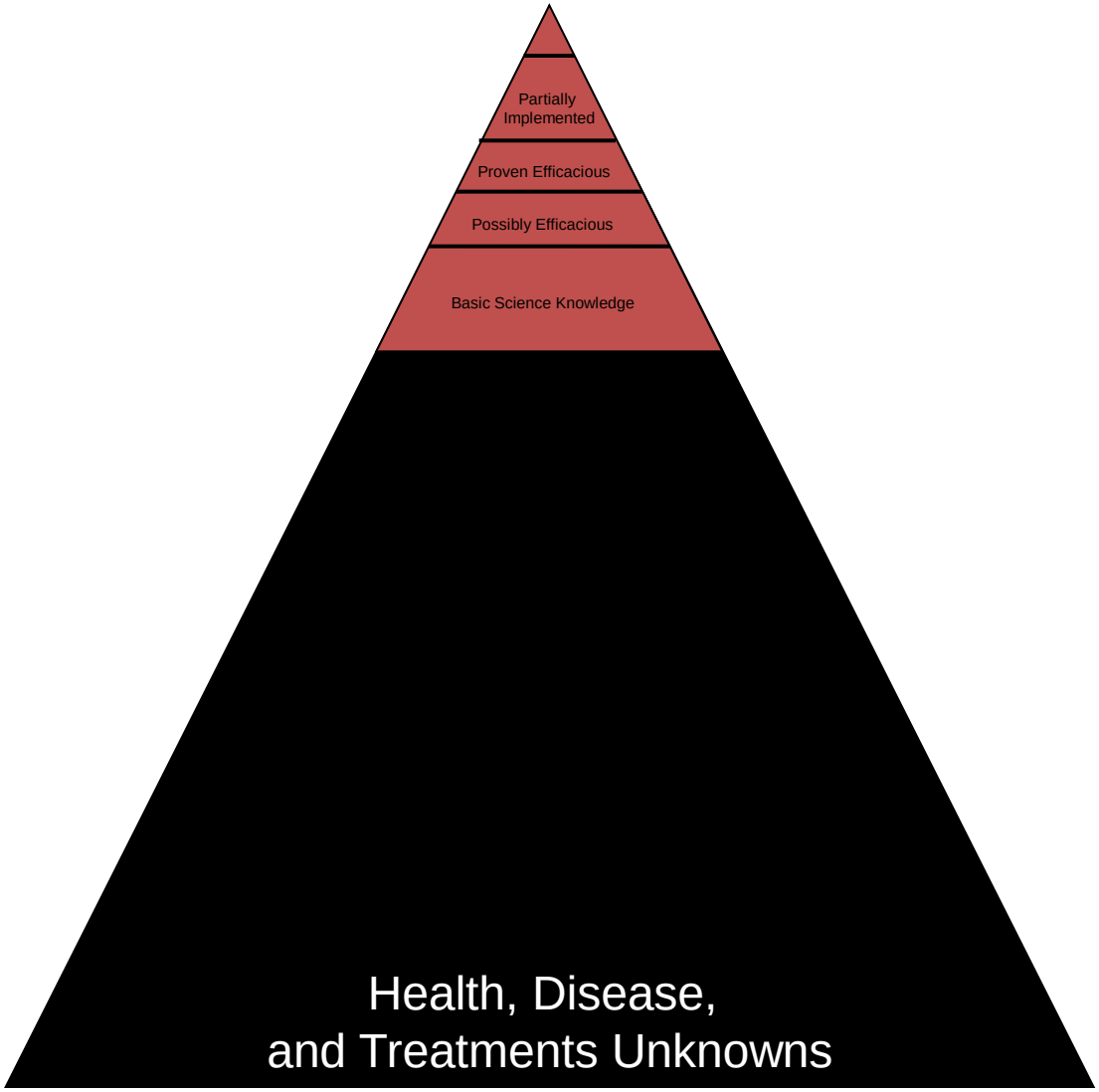
Variation in effective care



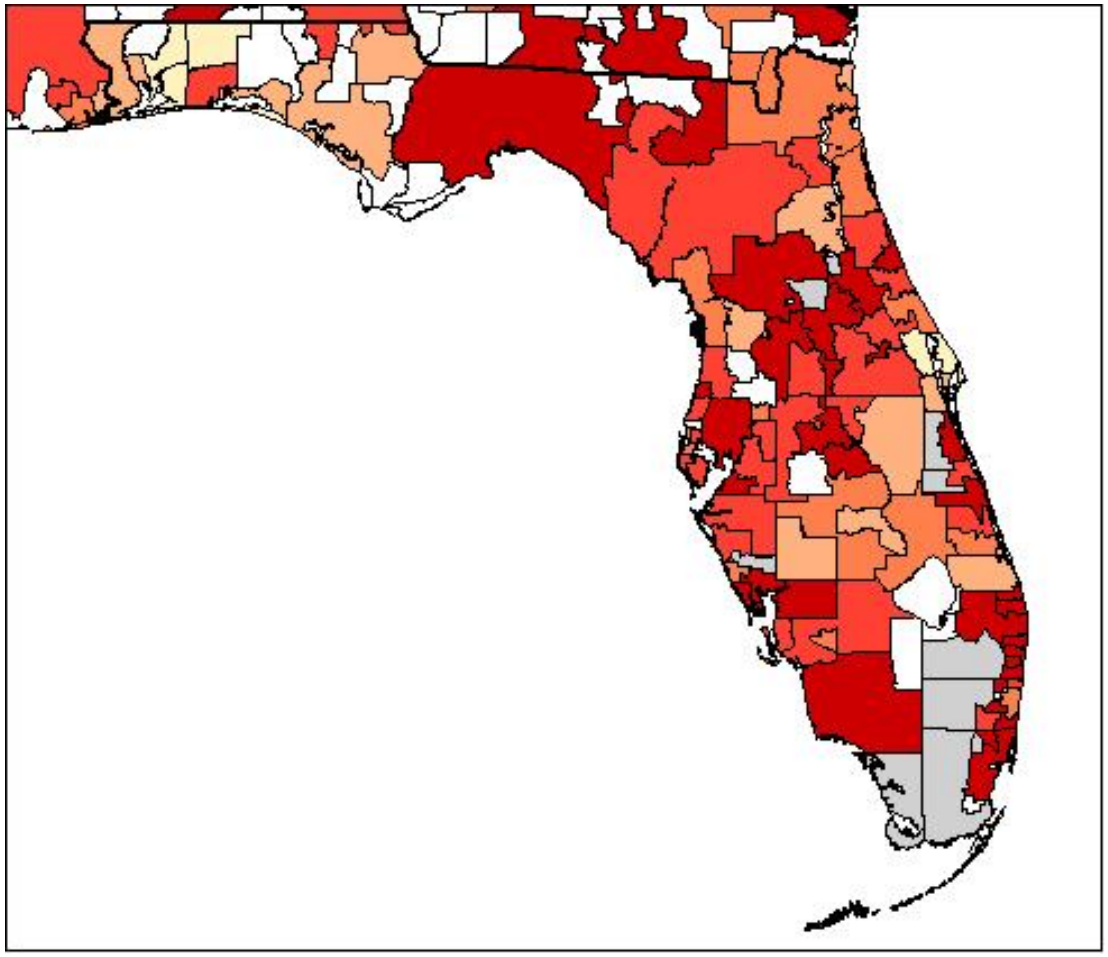
Domains of Effective Care



Domains of Effective Care



Percent of Male Medicare Beneficiaries Age 68-74 Receiving PSA Testing among HSAs (2010)



PSA Screening Benefits

U.S. Preventive Services Task Force, 2014

- Possible benefits:
  - At best, 1 man in 1,000 avoids prostate cancer death because of screening.
    (Most cancers detected by screening would not cause a man harm during his lifetime.)
- Expected harms:
  - For every 1,000 men who are screened with a PSA test:
    - 30 to 40 will experience erectile dysfunction or urinary incontinence due to treatment.
    - 2 will experience a serious cardiac event. (example: AMI)
    - 1 will develop a serious blood clot in his legs or lungs.
  - For every 3,000 men who care screened with a PSA test:
    - 1 will die from complications due to surgical treatment.

Susan Goodman Alkana

Metastatic breast cancer develops 10 years after stage III diagnosis and treatment.

(1946 – 2008)

What the oncologist said in 2008:

"I can provide you with life-prolonging treatment."

What Susie heard:

"Just like when I was diagnosed 10 years ago, I will get treatment and most likely return to my usual life and to my home."

What the oncologist meant:

"I can provide you with treatment that may extend your life for weeks or maybe months."

What the oncologist didn't say:

"The treatment is likely to make you feel even sicker than you do now. You may not be able to live at home. The treatment may also shorten your life. Your outcome is uncertain, but few patients live beyond a year."

What Happened to Susie

(1946 – 2008)

She received cytotoxic chemotherapy:

And, was hospitalized the next day with vomiting and dehydration.

She was sent next to a nursing facility:

And, received weekly chemotherapy that left her unable to live independently.

Her disease progressed and she developed a malignant pleural effusion:

After 8 weeks of treatment, she was readmitted to the hospital. Her oncologist did not initiate further discussions about care options.

She remained ill with poorly controlled pain.

Her brother initiated discussions about palliative care.

The night before she was transferred to a hospice center, she was short-of-breath from her effusion.

Her oncologist performed a thoracentesis with local anesthetic to drain the effusion. She bled into her chest and died in the procedure room.

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Where Knowledge Informs Change

A Report of the Dartmouth Atlas Project

Quality of End-of-Life Cancer Care for Medicare Beneficiaries

Regional and Hospital-Specific Analyses

November 16, 2010

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Introduction

More than 1.5 million cancers are diagnosed each year in the United States.[1] This Dartmouth Atlas report examines how elderly patients with poor prognosis cancer are cared for across regions and hospitals and finds remarkable variation depending on where the patients live and receive care. Even among the nation's leading medical centers, there is no consistent pattern of care or evidence that treatment patterns follow patient preferences. Rather, the report demonstrates that many hospitals and physicians aggressively treat patients with curative attempts they may not want, at the expense of improving the quality of their last weeks and months.

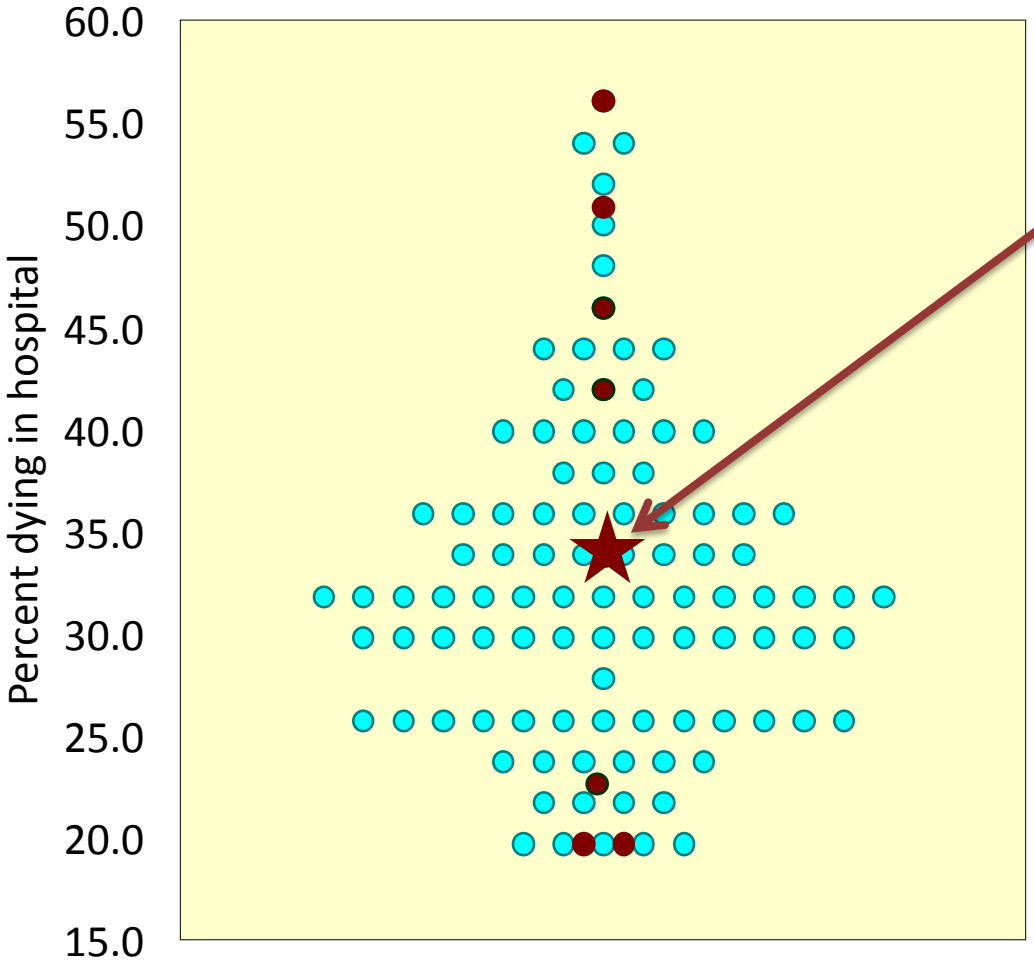
For many cancer patients, medical and surgical care leads to long-term remission or cure. Other patients have aggressive or disseminated (metastatic) cancer at the time of diagnosis or experience a recurrence later in their illness. Despite achievements in cancer detection and treatment, half a million patients die of cancer annually in the United States. The majority of these deaths are in those over age 65.[2]

For patients with a poor prognosis because the cancer is advanced or disseminated, death is the likely short-term outcome. When a cure is unlikely, patients and families

Percent of patients (> age 65) with advanced cancer dying in the hospital, 2010

(Adj. for age, sex, race, cancer type, chronic diseases)

NCI Cancer Centers and Academic Medical Centers (non-NCI)



The Hospital where Susan Goodman Alkana received her care in the last months of life.

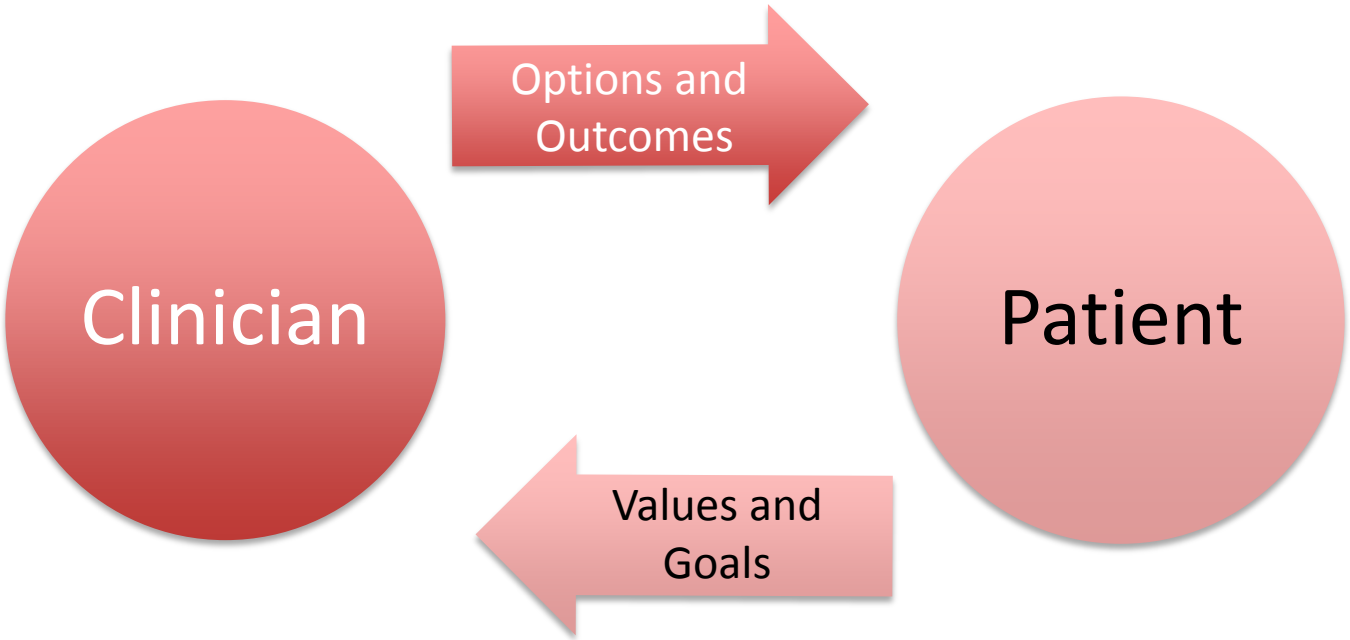
Westchester Medical Center, NY	57.1
Cedars-Sinai Med Ctr. LA, CA	51.9
New York-Presbyterian Hospital	46.2
Robert Wood Johnson Univ, NJ	42.4
Yale-New Haven, CT	33.5
Univ. Texas MD Anderson	24.5
Johns Hopkins Hospital	23.7
Evanston Northwestern, IL	18.7

Preference-Sensitive Care

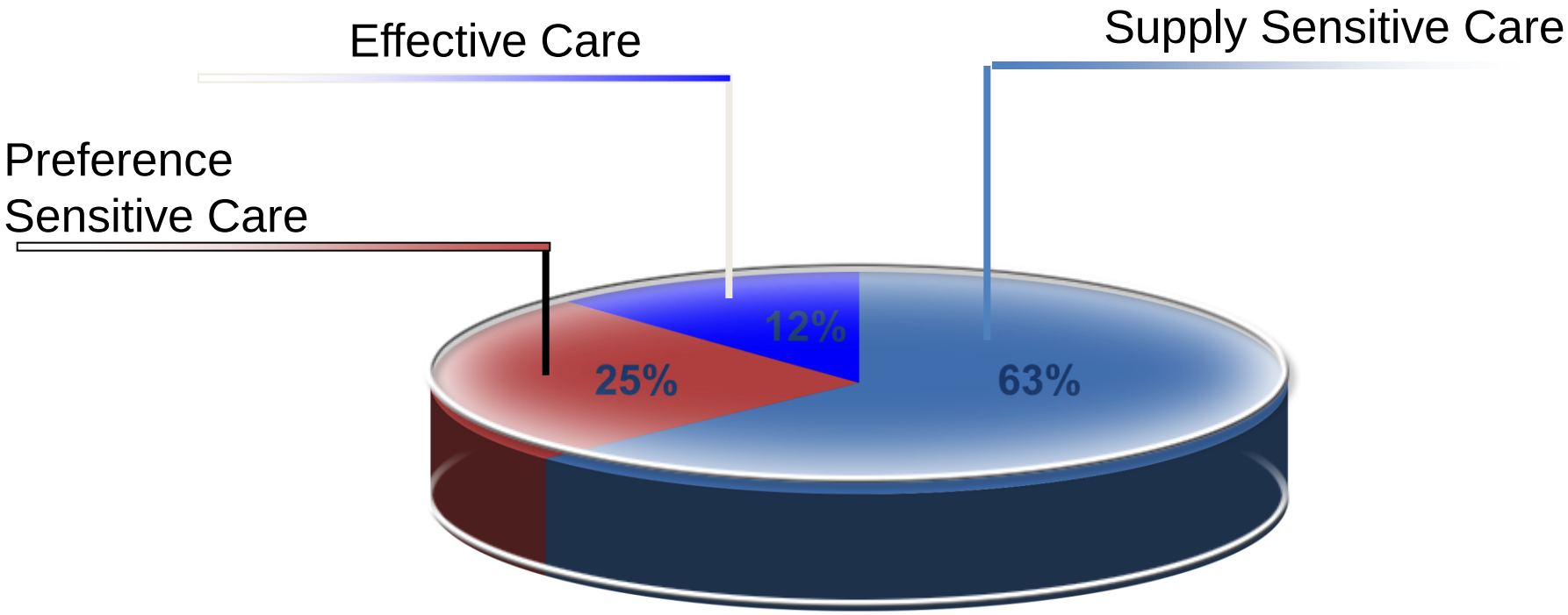
- Involves options with tradeoffs of benefits versus harms.
- Scientific uncertainty is often substantial.
- Physicians differ in their recommendations.
- Patient and provider values (or utilities) differ from each other.
- Usually the physician recommends an option.
- These are decisions that should be based on the patient's own preferences.
- Decision quality is improved through shared decision-making and decision aids.

Shared Decision Making

- Providing patients with unbiased information about care options, the chances of associated benefits and harms.
- Eliciting patients' values and goals.
- Legitimizing patients' participation in decision making.



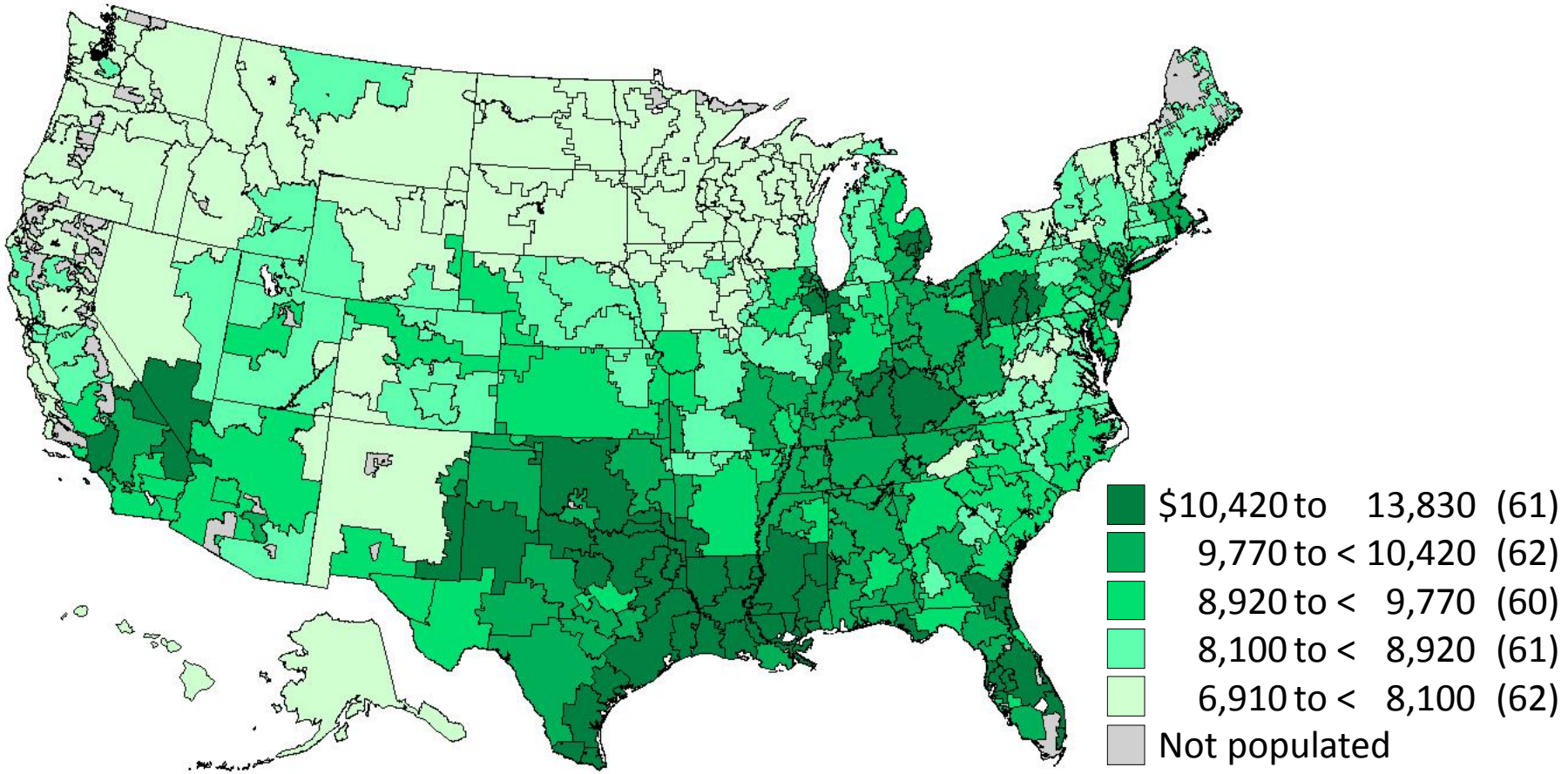
Proportion of Medicare Spending Attributed to Each Category of Care



Source: John E. Wennberg and Dartmouth Atlas

Price-adjusted Medicare spending per beneficiary

among hospital referral regions (2010)



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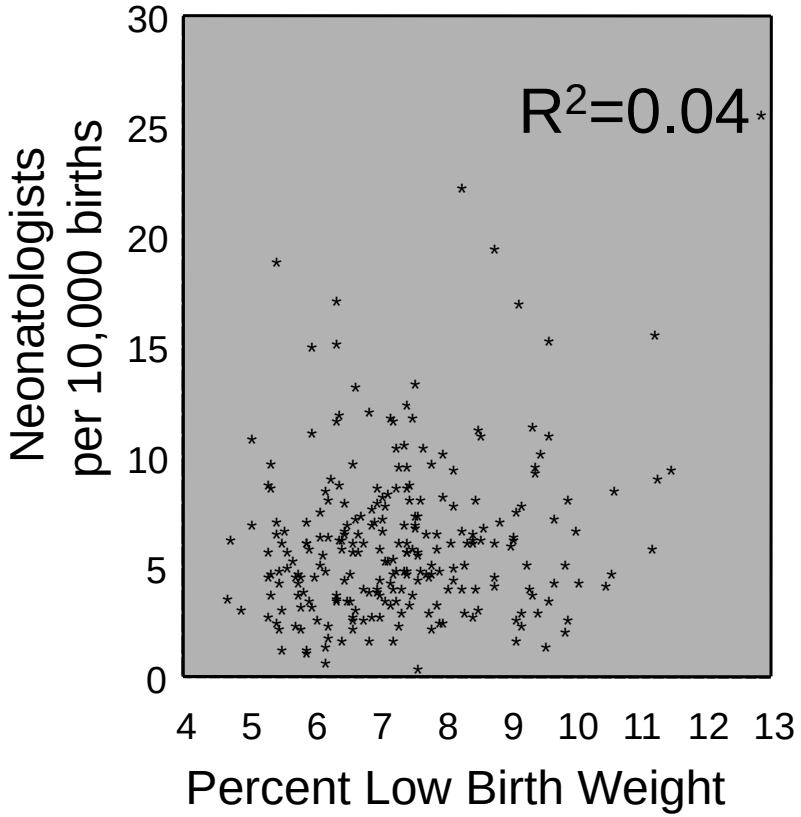
Relationship of Physician Supply to Population Need

Neonatologists

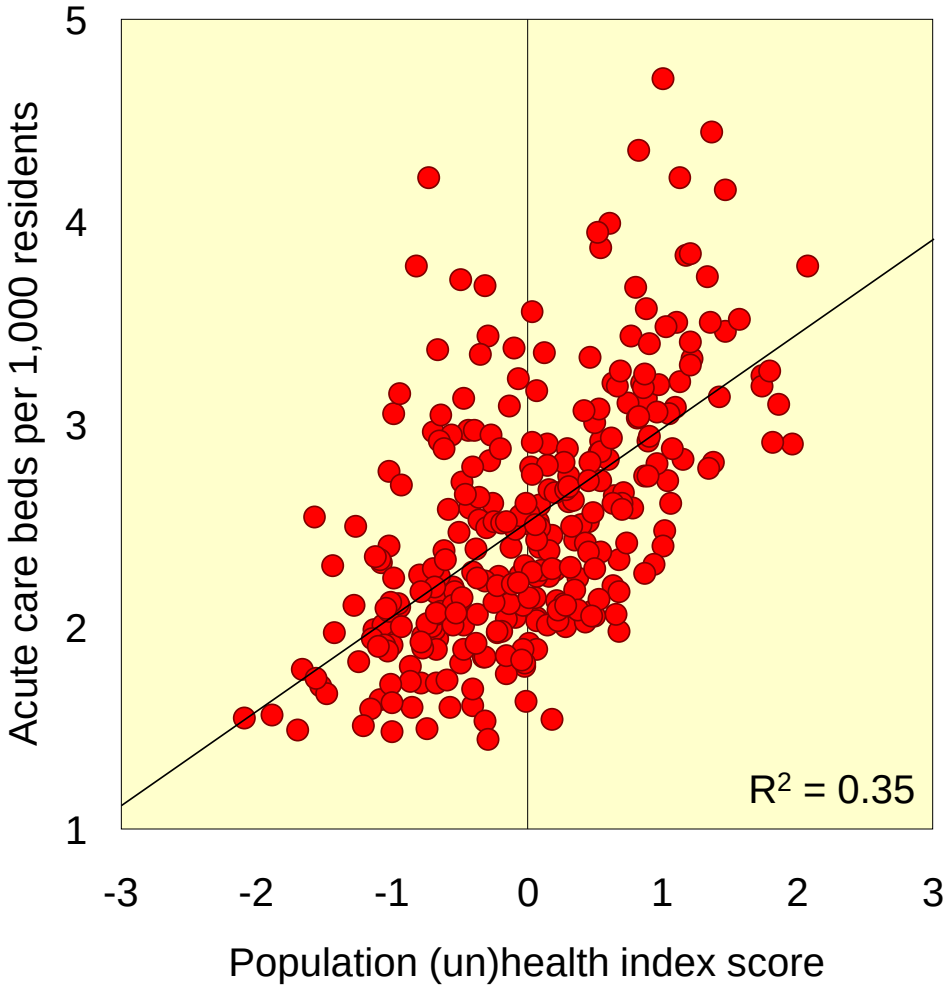
Relationship Between Newborn Need and Neonatologists Across 246 Neonatal Intensive Care Regions, U.S. 1996.



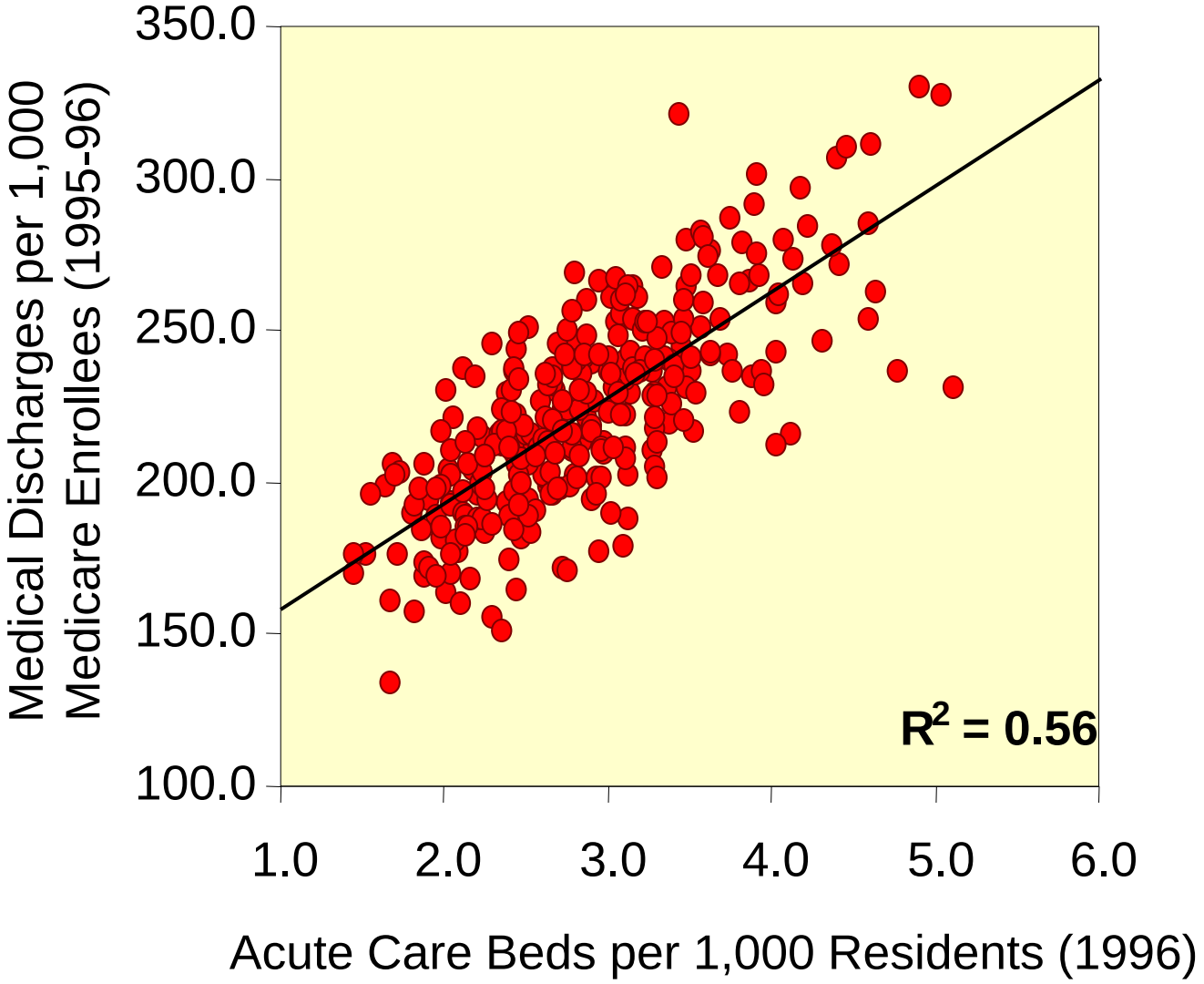
Goodman, et al. *Pediatrics*, 2001.

Relationship between the population (un)health index and acute care beds per 1,000 residents (2006)

(obesity, smoking, unhealthy days, hip fractures, strokes)

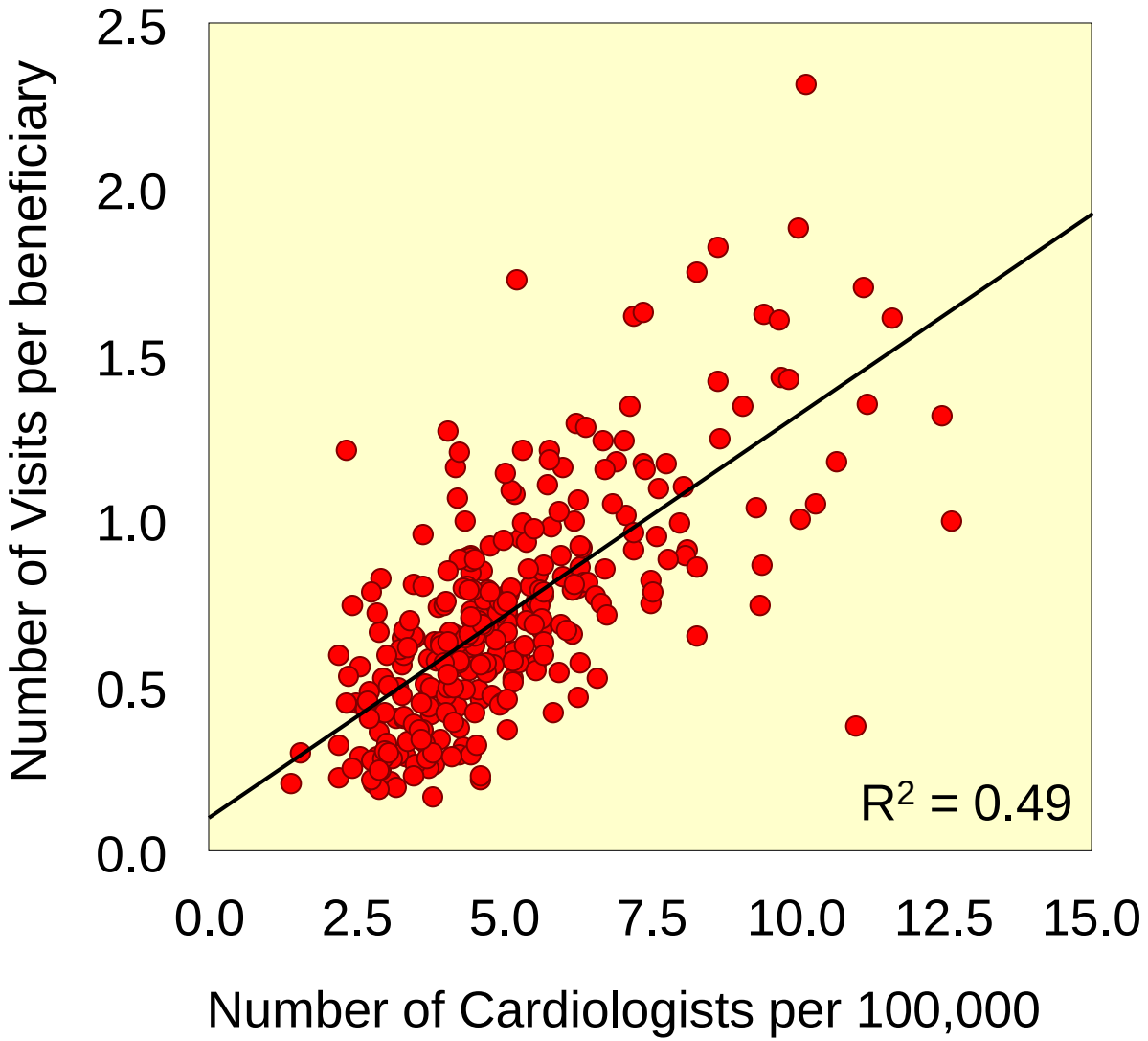


Hospital Beds (1996) vs. Adjusted Discharge Rates for Medical Conditions (1995-96)

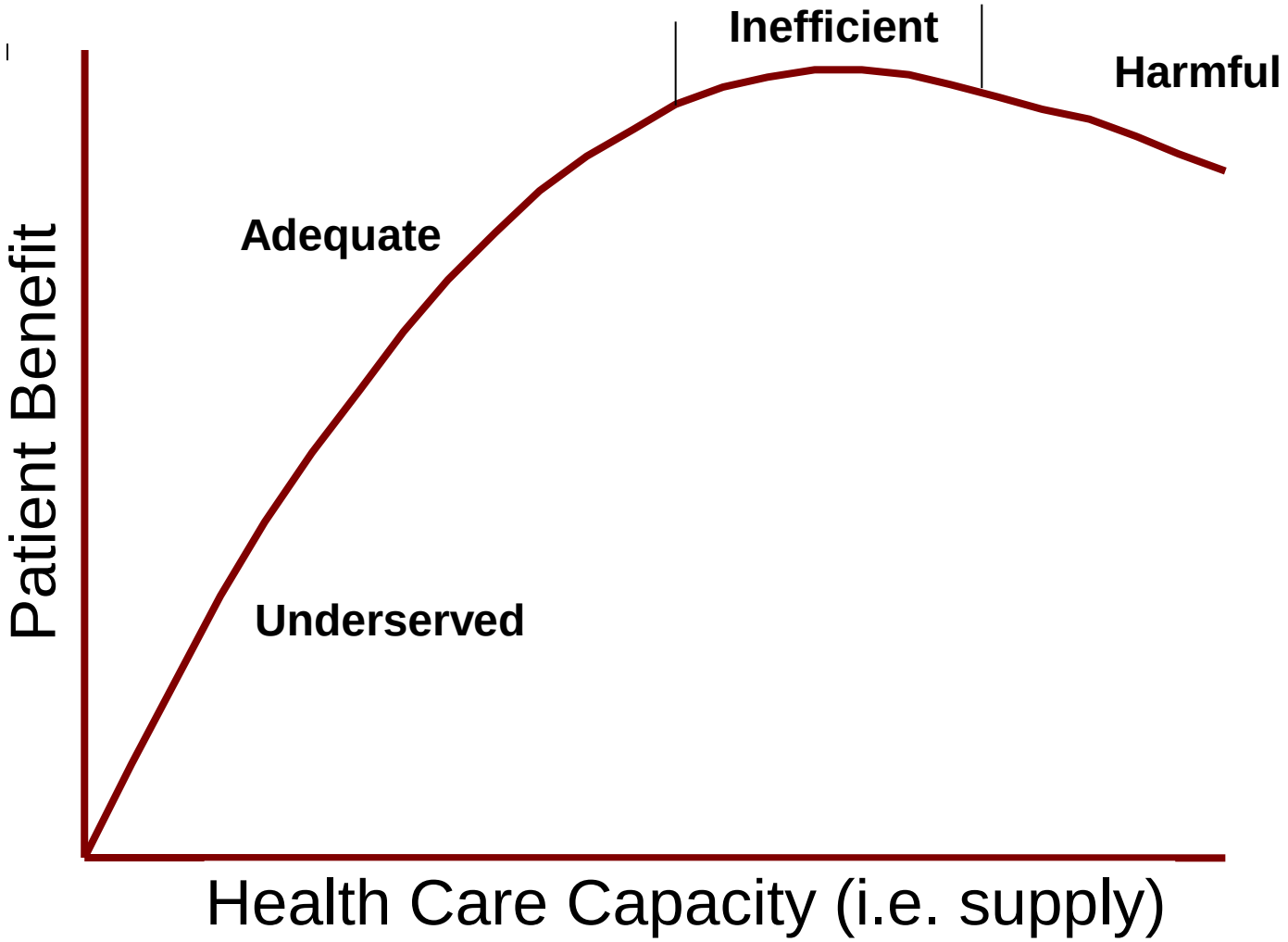


Physician Supply and Physician Visits

Cardiologists



What are the benefits of greater capacity (supply & spending)?

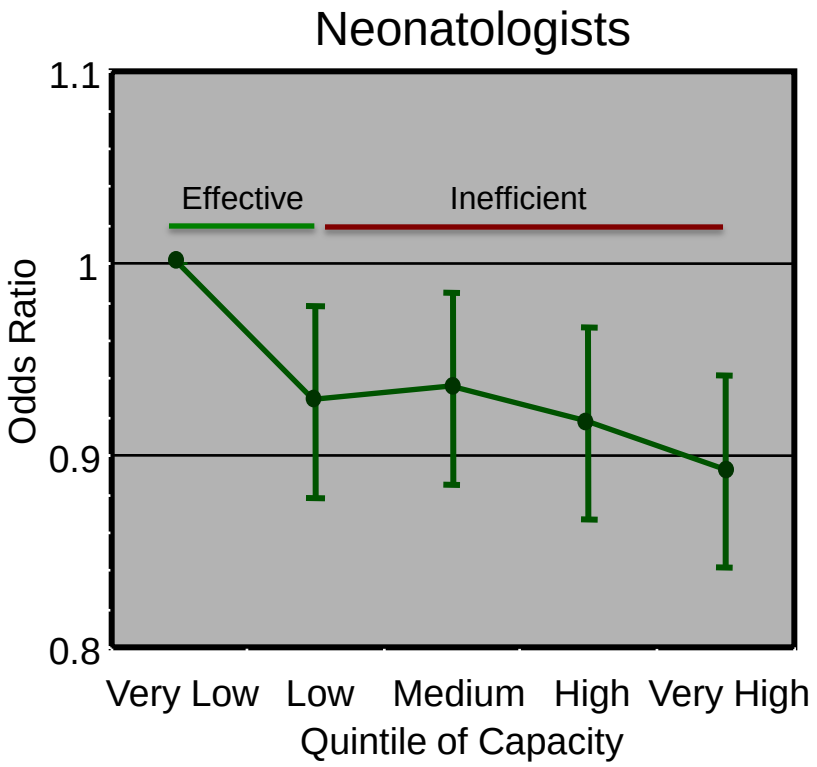


Is Greater Capacity Associated with Better Outcomes?
Not reliably so.

27 Day Adjusted Mortality
by Quintile of Intensive Care Capacity

Higher neonatologist capacity is not reliably associated with lower newborn mortality.

27 Day Adjusted Mortality
by Quintile of Intensive Care Capacity



Goodman, et al. *NEJM*, 2002.

Annals of Internal Medicine | ARTICLE

The Implications of Regional Variations in Medicare Spending. Part 1: The Content, Quality, and Accessibility of Care

Elliott S. Fisher, MD, MPH; David E. Wennberg, MD, MPH; Thérèse A. Stukel, PhD; Daniel J. Gottlieb, MS; F.L. Lucas, PhD; and Étoile L. Pinder, MS

Background: The health implications of regional differences in Medicare spending are unknown.

Objective: To determine whether regions with higher Medicare spending provide better care.

Design: Cohort study.

Setting: National study of Medicare beneficiaries.

Patients: Patients hospitalized between 1993 and 1995 for hip fracture ($n = 614\,503$), colorectal cancer ($n = 195\,429$), or acute myocardial infarction ($n = 159\,393$) and a representative sample ($n = 18\,190$) drawn from the Medicare Current Beneficiary Survey (1992–1995).

Exposure Measurement: End-of-life spending reflects the component of regional variation in Medicare spending that is unrelated to regional differences in illness. Each cohort member's exposure to different levels of spending was therefore defined by the level of end-of-life spending in his or her hospital referral region of residence ($n = 306$).

Outcome Measurements: Content of care (for example, frequency and type of services received), quality of care (for example, use of aspirin after acute myocardial infarction, influenza immunization), and access to care (for example, having a usual source of care).

Results: Average baseline health status of cohort members was similar across regions of differing spending levels, but patients in higher-spending regions received approximately 60% more care. The increased utilization was explained by more frequent physician visits, especially in the inpatient setting (rate ratios in the highest vs. the lowest quintile of hospital referral regions were 2.13 [95% CI, 2.12 to 2.14] for inpatient visits and 2.36 [CI, 2.33 to 2.39] for new inpatient consultations), more frequent tests and minor (but not major) procedures, and increased use of specialists and hospitals (rate ratio in the highest vs. the lowest quintile was 1.52 [CI, 1.50 to 1.54] for inpatient days and 1.55 [CI, 1.50 to 1.60] for intensive care unit days). Quality of care in higher-spending regions was no better on most measures and was worse for several preventive care measures. Access to care in higher-spending regions was also no better or worse.

Conclusions: Regional differences in Medicare spending are largely explained by the more inpatient-based and specialist-oriented pattern of practice observed in high-spending regions. Neither quality of care nor access to care appear to be better for Medicare enrollees in higher-spending regions.

Ann Intern Med. 2003;138:273-287. www.annals.org

For author affiliations, see end of text.

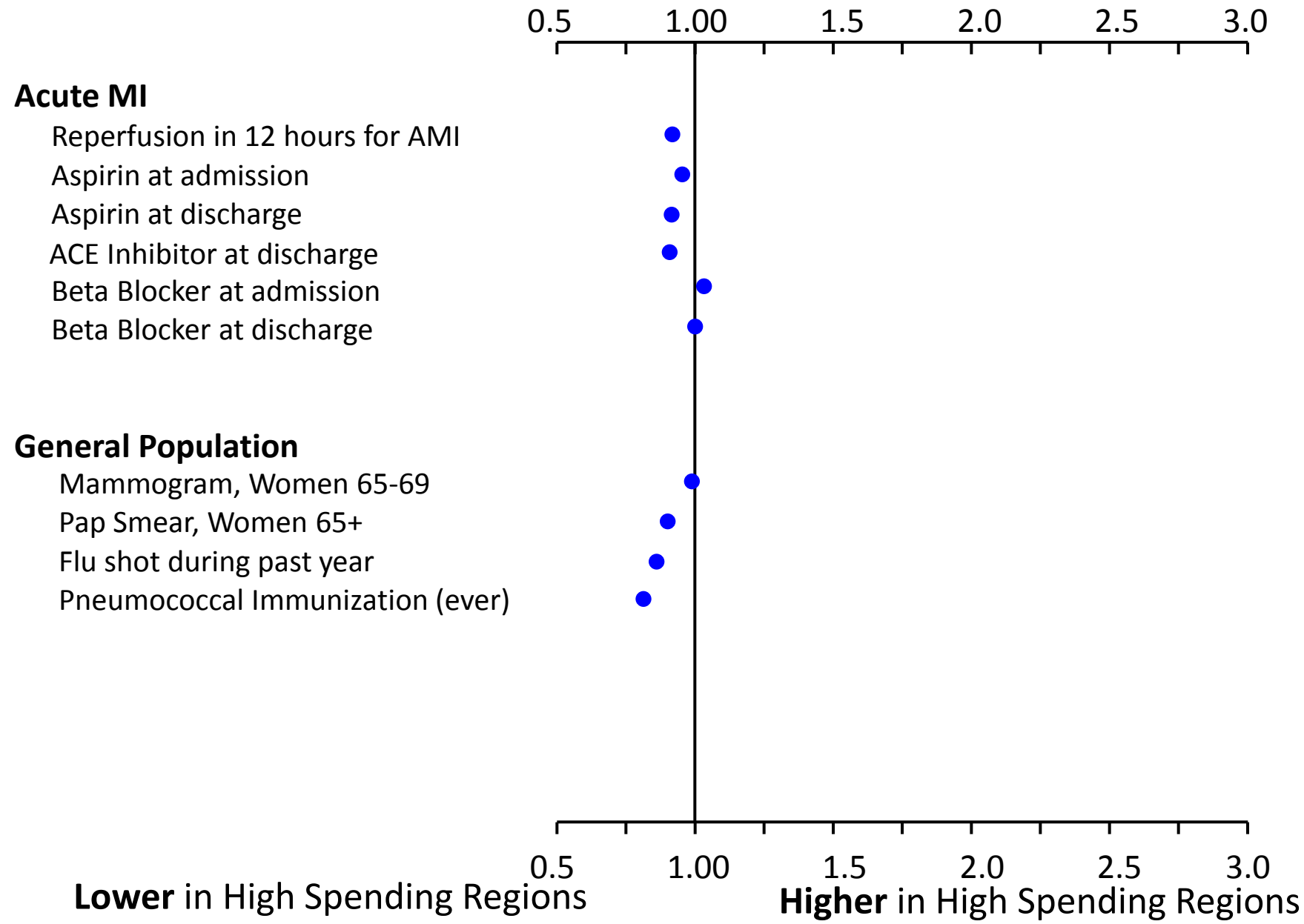
See related article on pp 288-298 and editorial comments on pp 347-348, 348-349, and 350-351.

Capacity -- the local supply of resources
Physician capacity and utilization

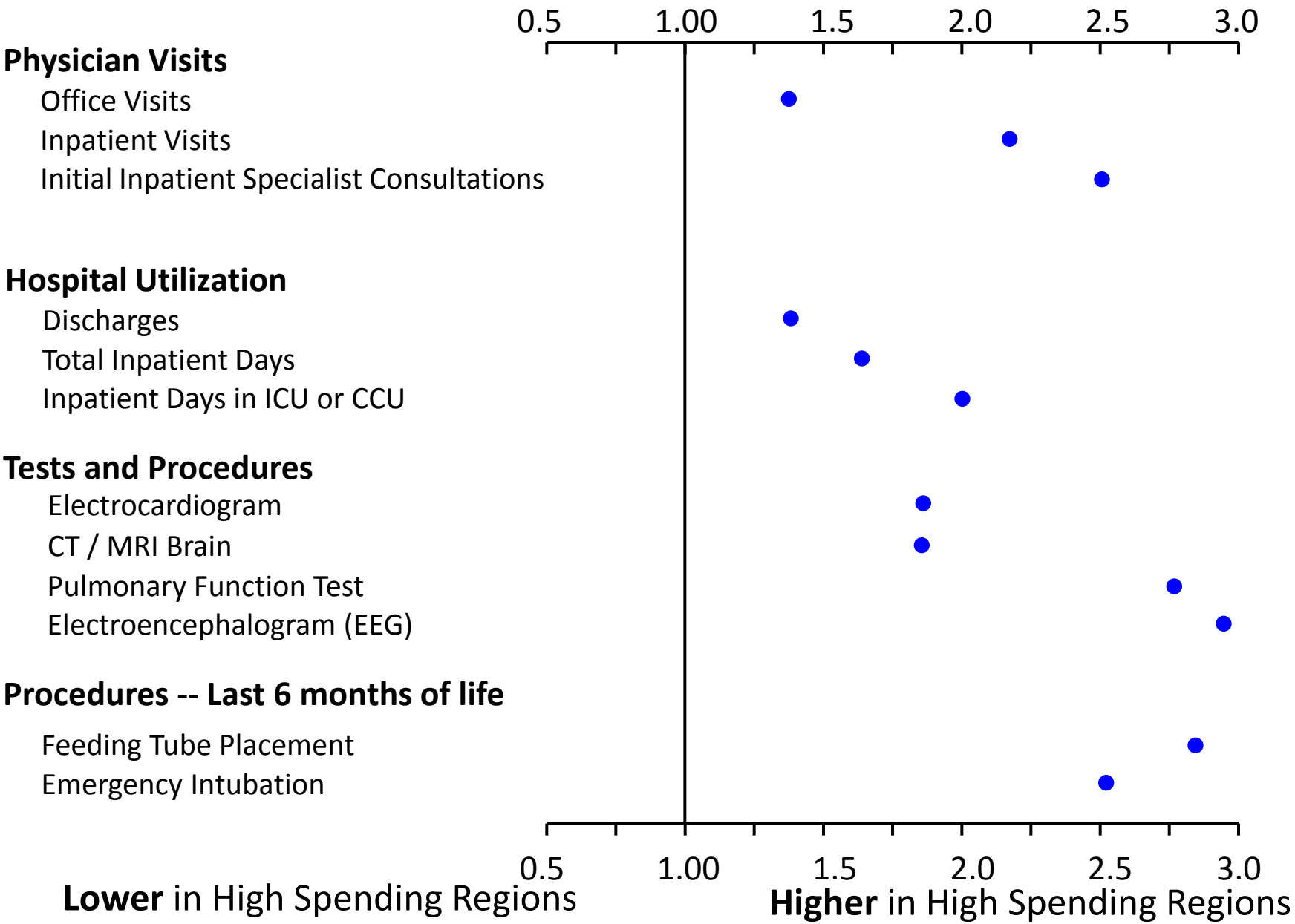
	Lowest Quintile	Highest Quintile	Ratio
Average Medicare Spending	**$3,922**	**$6,304**	**1.61**
Supply of Resources			
Hospital Beds / 1000	**2.4**	**3.2**	**1.32**
Physician Supply	**185**	**242**	**1.31**

Fisher ES et al. *Ann Intern Med* 2003 Feb 18; 138(4): 273-87, 288-98.

Effective Care: Ratio of Rates in Highest vs Lowest Spending Regions



Supply-Sensitive Care : Highest vs Lowest Spending Regions

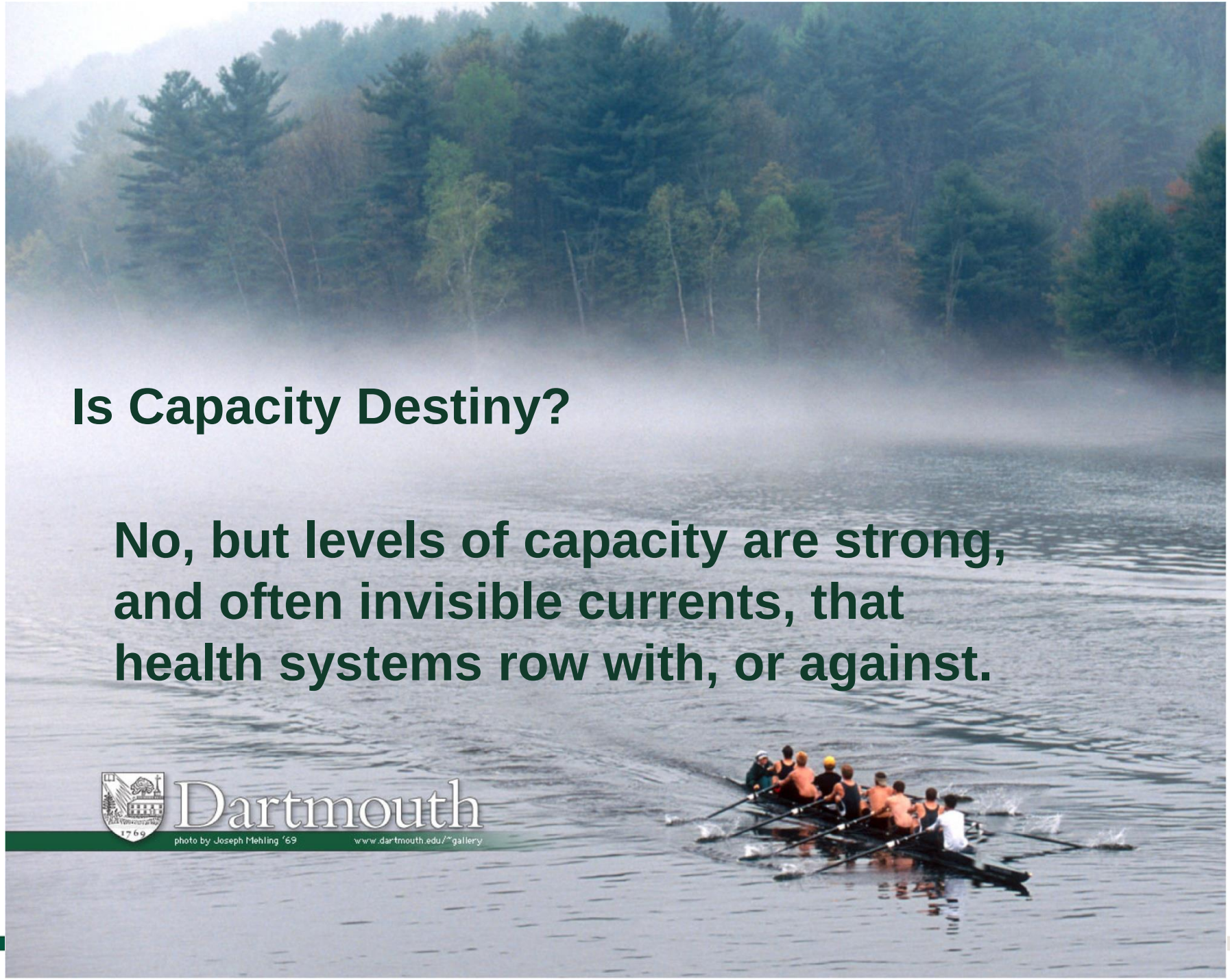


Summing up on supply sensitive care

- The pitiful relationship between many types of capacity and population needs is well established.
- There is good evidence that for many types of care, higher capacity is associated with higher utilization. This includes effective use and overuse.

  Given that capacity is not located in accordance with need, it is untenable to argue (from a clinical – epidemiologist viewpoint) that: patient need -> utilization -> capacity.

- Supply-sensitive tends to have:
  - Weak evidence-base about which rate is right.
  - Care that occurs after first contact with health care system.
- Often weakly associated with outcomes.
- Is responsible for substantial portion of variation in spending.


Is Capacity Destiny?
No, but levels of capacity are strong, and often invisible currents, that health systems row with, or against.
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1769
photo by Joseph Mehling '69
www.dartmouth.edu/~gallery

And the rest of the world?

Systematic review of medical practice variation in OECD countries

Corallo A, Coxford R, Goodman D, Bryan E, Srivatava D, Stukel T.
Health Policy 2013.

	Number of studies	Percent
United States	319	38
United Kingdom	123	15
Canada	111	13
Australia/N.Z.	53	6
Netherlands	22	3
Denmark	**13**	**2**
Germany	13	2
Sweden	12	1
Spain	11	1
Switzerland	11	1
Japan	10	1
France	10	1

	Number of studies	Percent
Norway	8	1
Ireland	8	1
Italy	7	
Finland	6	
Belgium	3	
Austria	2	
Estonia	1	
Greece	1	
Hungary	1	
Portugal	1	

Published during period 2000 – 2011.

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www.wennbergcollaborative.org

LSE Health

First Open Registration Wennberg International Collaborative Meeting June 4 & 5, 2015 in Berlin

THE WENNBERG INTERNATIONAL COLLABORATIVE POLICY CONFERENCE

Zi ZENTRALINSTITUT FÜR DIE KASSENÄRZTLICHE VERSORGUNG IN DEUTSCHLAND

TRACKING REGIONAL VARIATION IN HEALTH CARE

– A Key to Understanding and Improving Our Health Care Systems?

4-5 June 2015

www.wic-policy-conference.de

The Dartmouth Institute for Health Policy & Clinical Practice

LSE Health

An International Conference, Berlin (Germany), 4-5 June 2015

Is geography destiny in health care? A growing body of research shows that geographic variation in health care within countries is the rule. A recent OECD report calls for action. Variation is important for patients, and challenges both health policies and the medical professions. If variation cannot be avoided, can it be used to better understand and improve our health care systems? This is the first open international conference that addresses fundamental questions on the causes of variation and how analyses can help build better health care systems: Is health care equitable? Is technical quality at its best? Are patients appropriately engaged in decision-making? Are public funds spent efficiently? In many countries geographic analysis of health care delivery has revealed unwarranted variations and has identified examples of best practice to guide improvement efforts.

At this conference we will discuss current methods and results in geographic analysis of variations to improve health care. Experts from the field will present at plenary sessions. Breakout sessions will focus on practical methods, interpretation, communication of variation, and strategies for using the information. *If you like to make a difference, then join this event!*

How to join or present a paper?
The conference is based on open enrollment. A small registration fee (< 200 €) will be required. The conference website for online registration will be available by the end of January. If you would like to present a paper (there are limited spaces), please provide an abstract no later than March 15th, 2015.
Abstract forms can be downloaded from the conference website.

Wennberg International Collaborative (WIC) *is a research network committed to improving healthcare by examining organizational and regional variation in health care resources, utilization, and outcomes. The WIC is a joint initiative established by The Dartmouth Institute for Health Policy and Clinical Practice and the London School of Economics and Political Science.*

Zentralinstitut für die kassenärztliche Versorgung in Deutschland (Zi) *is the research unit of the 17 Regional Physician Associations and the Federal Association of Statutory Health Insurance Physicians in Germany. It is a not-for-profit foundation in support of equitable and efficient ambulatory health care in Germany.*

41 years after the Wennberg's *Science* paper

Fall 2014

OECD Health Policy Studies

Geographic Variations in Health Care

WHAT DO WE KNOW AND WHAT CAN BE DONE TO IMPROVE HEALTH SYSTEM PERFORMANCE?

Edited by Divya Srivastava, Gaétan Lafortune, Valérie Paris and Annalisa Belloni

Contents

Consult this publication on line at *http://dx.doi.org/10.1787/9789264216594-en.*

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OECD Health Policy Studies Geographic Variations in Health Care WHAT DO WE KNOW AND WHAT CAN BE DONE TO IMPROVE HEALTH SYSTEM PERFORMANCE?

OECD Health Policy Studies

Geographic Variations in Health Care

WHAT DO WE KNOW AND WHAT CAN BE DONE TO IMPROVE HEALTH SYSTEM PERFORMANCE?

OECD

Studies of Health Care Variation
Stages of Development

Exploratory studies

- Opportunistic
- Descriptive
- Atheoretical
- Cross-sectional
- Focus on utilization outcomes

Causal studies

- Development of inferential models
- Shift to cohort and longitudinal analyses
- Outcomes also include health outcomes, cost, and/or resource inputs

Established causal theories

- These may vary by clinical area and by health system.
- Causes are controversial because they are linked to accountability.

Developed remedies

- Linked to causal theories
- Establishes the value of studies (finally)
- Requires continued surveillance of outcomes