Technology Diffusion and Healthcare Cost Growth

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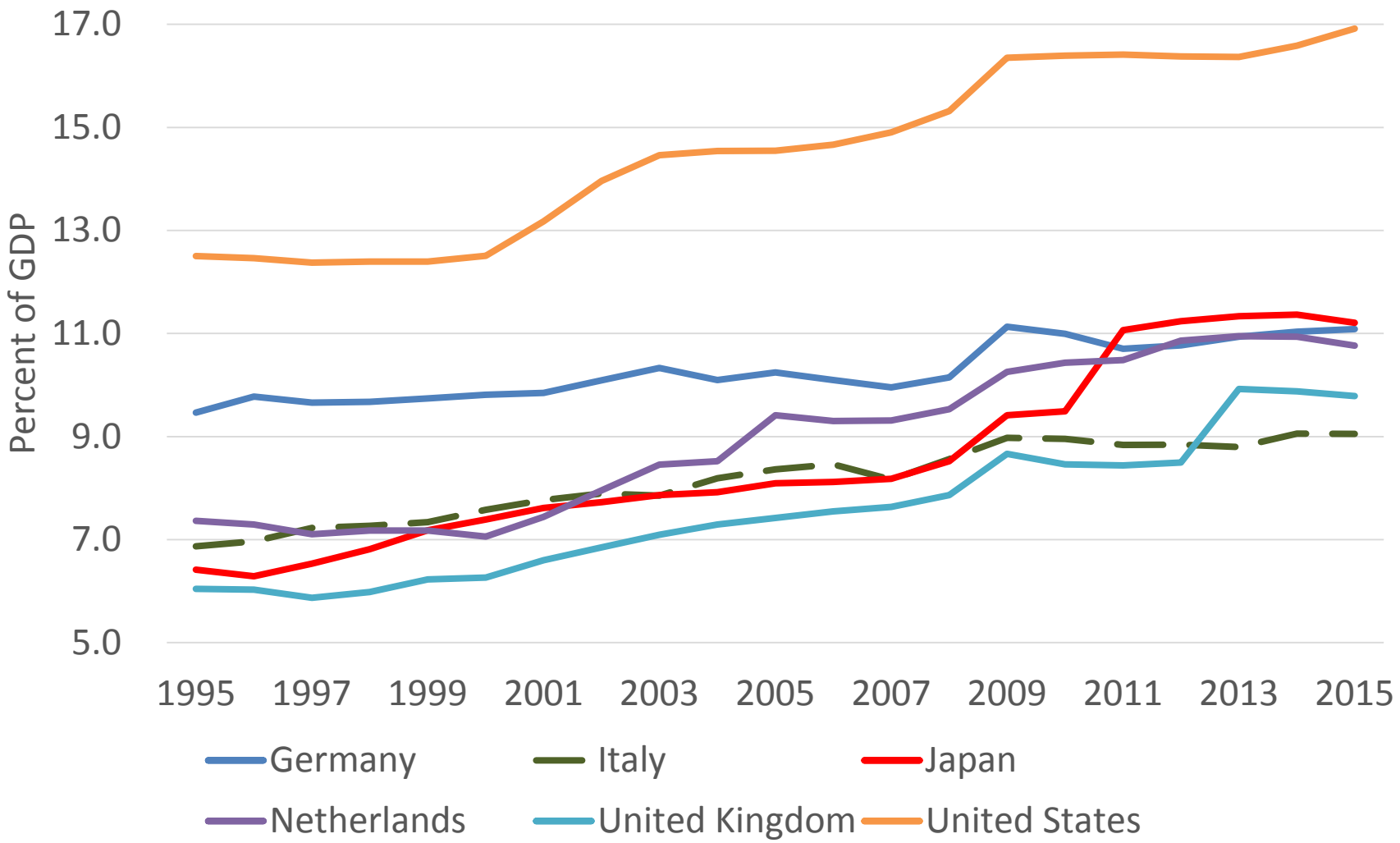
Two question addressed in this talk

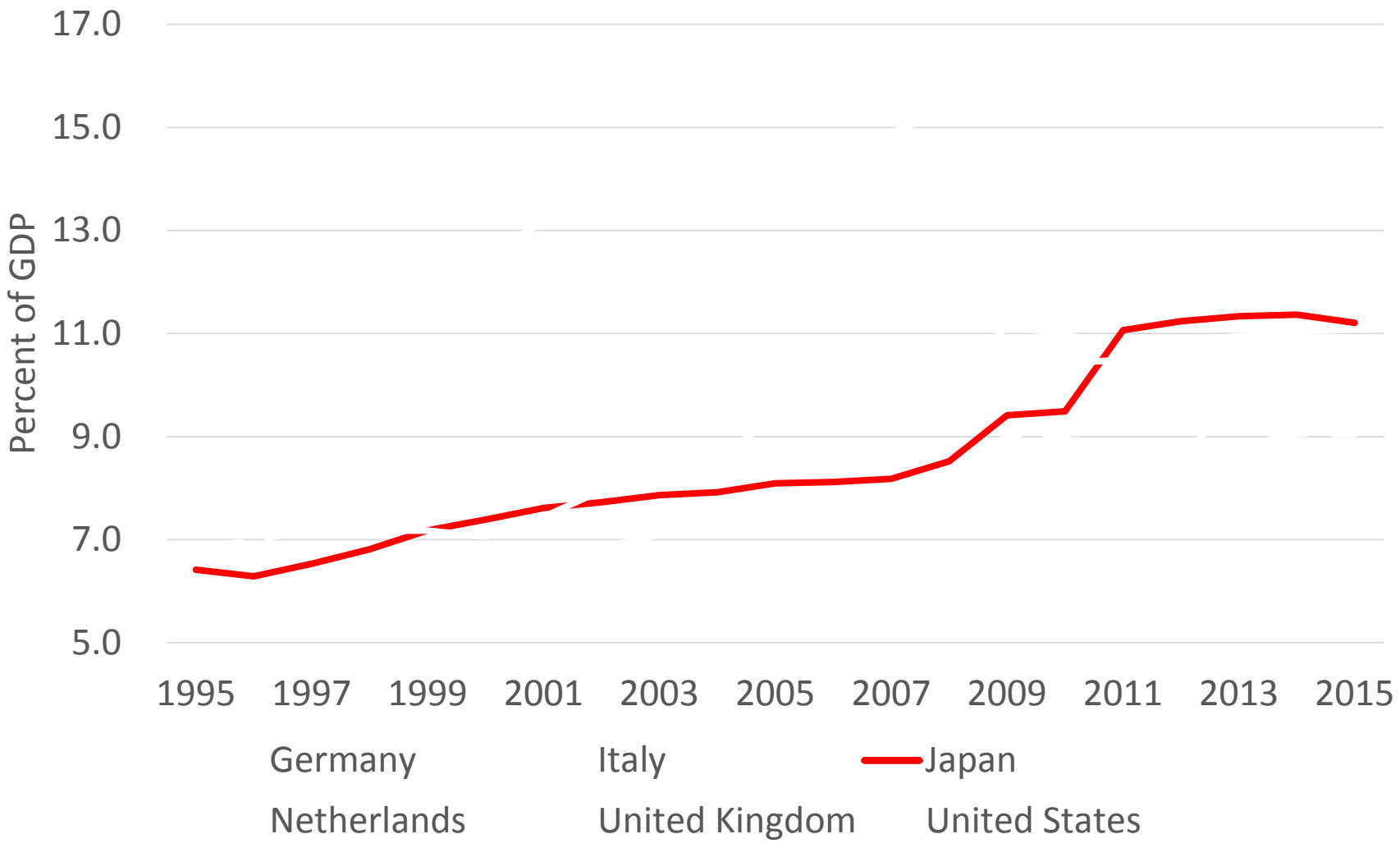
- Why are health care costs growing so rapidly around the world?
- What can be done to slow the growth in spending without adversely affecting health?

Health Expenditures as % of GDP, 1995-2005



Source: OECD

Long-term care included in Japanese data 2010+

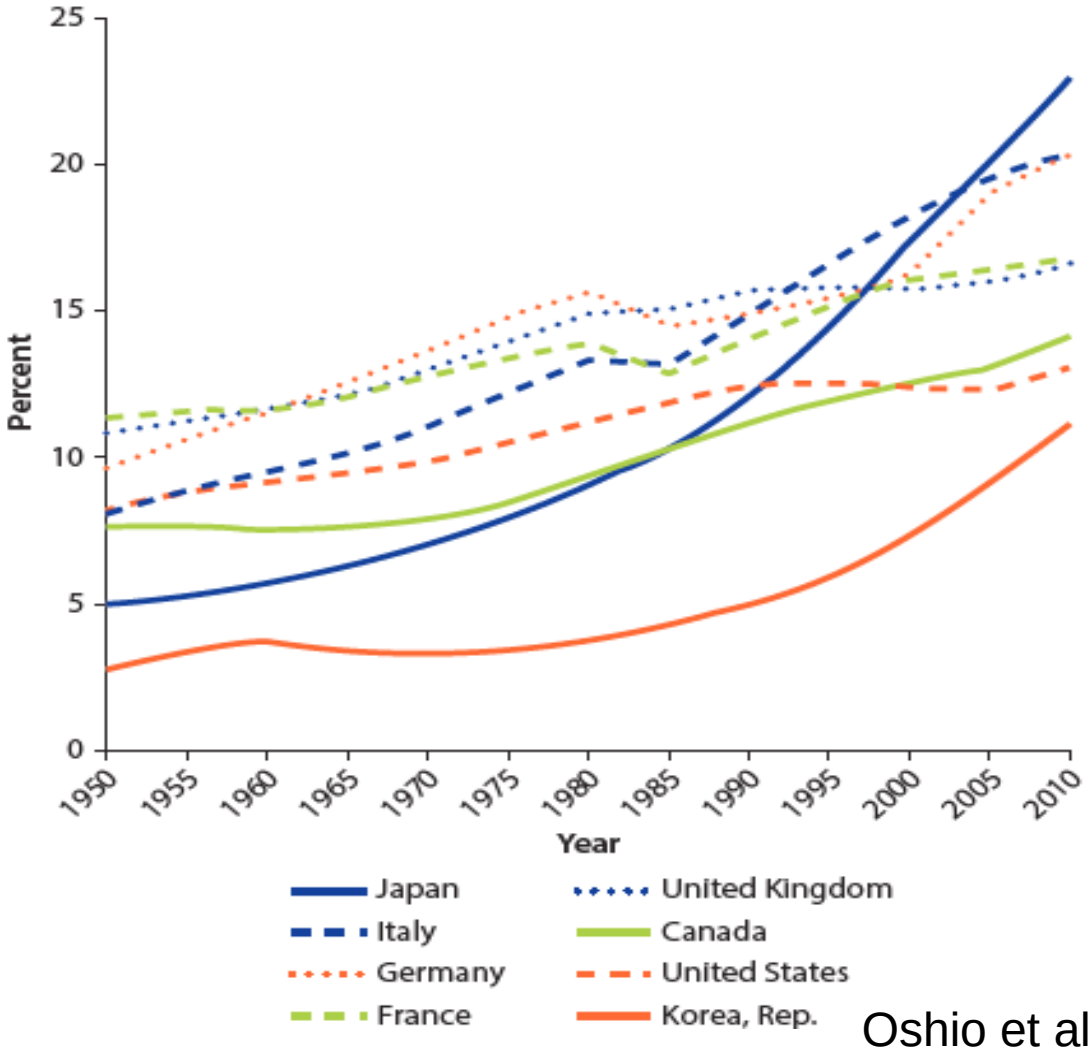


Source: OECD

Prime suspects in healthcare cost growth

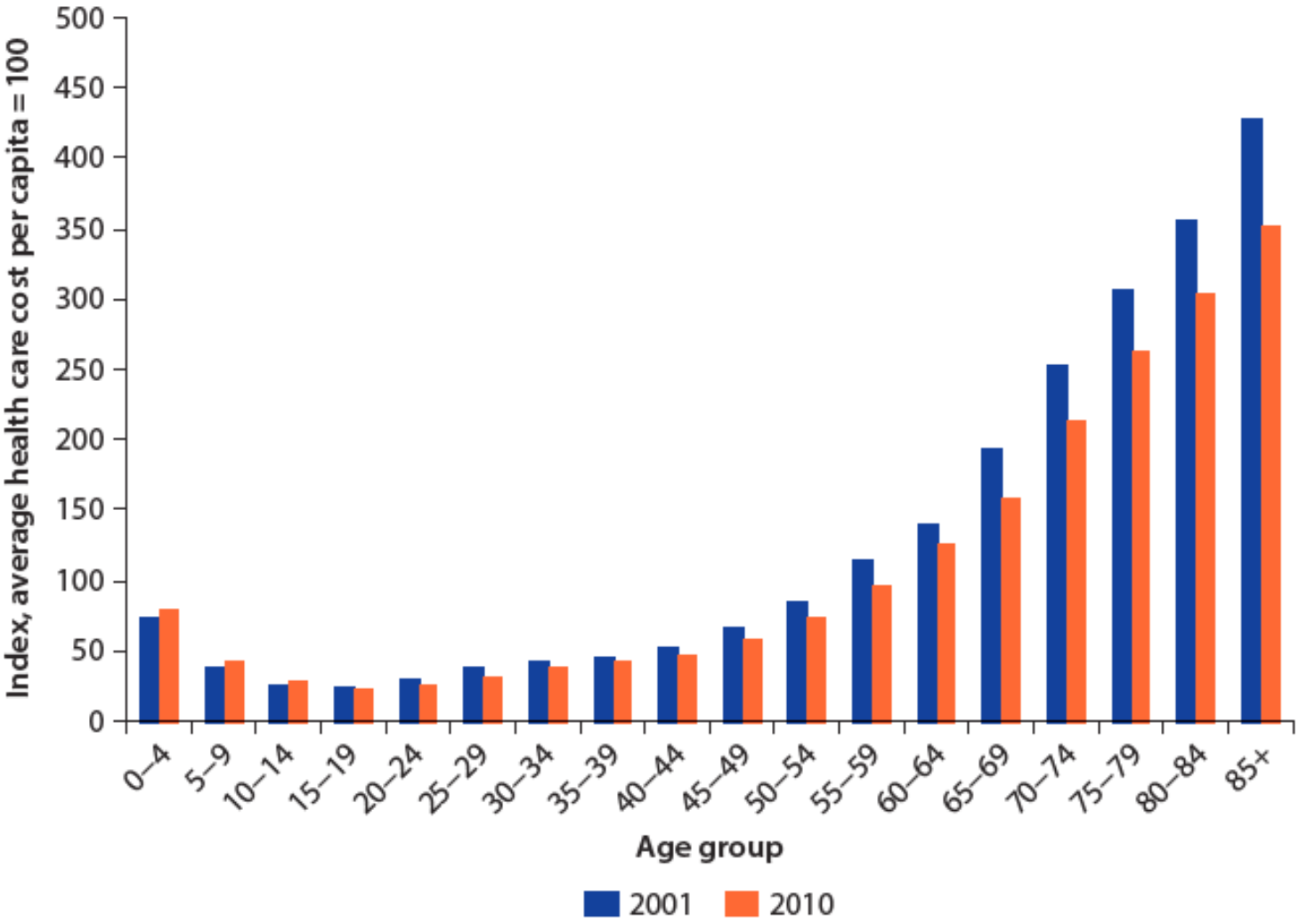
- Aging of the population
- Diffusion of medical innovations
- Sluggish “exnovation” of low-value treatments

Rising shares of elderly people around the world



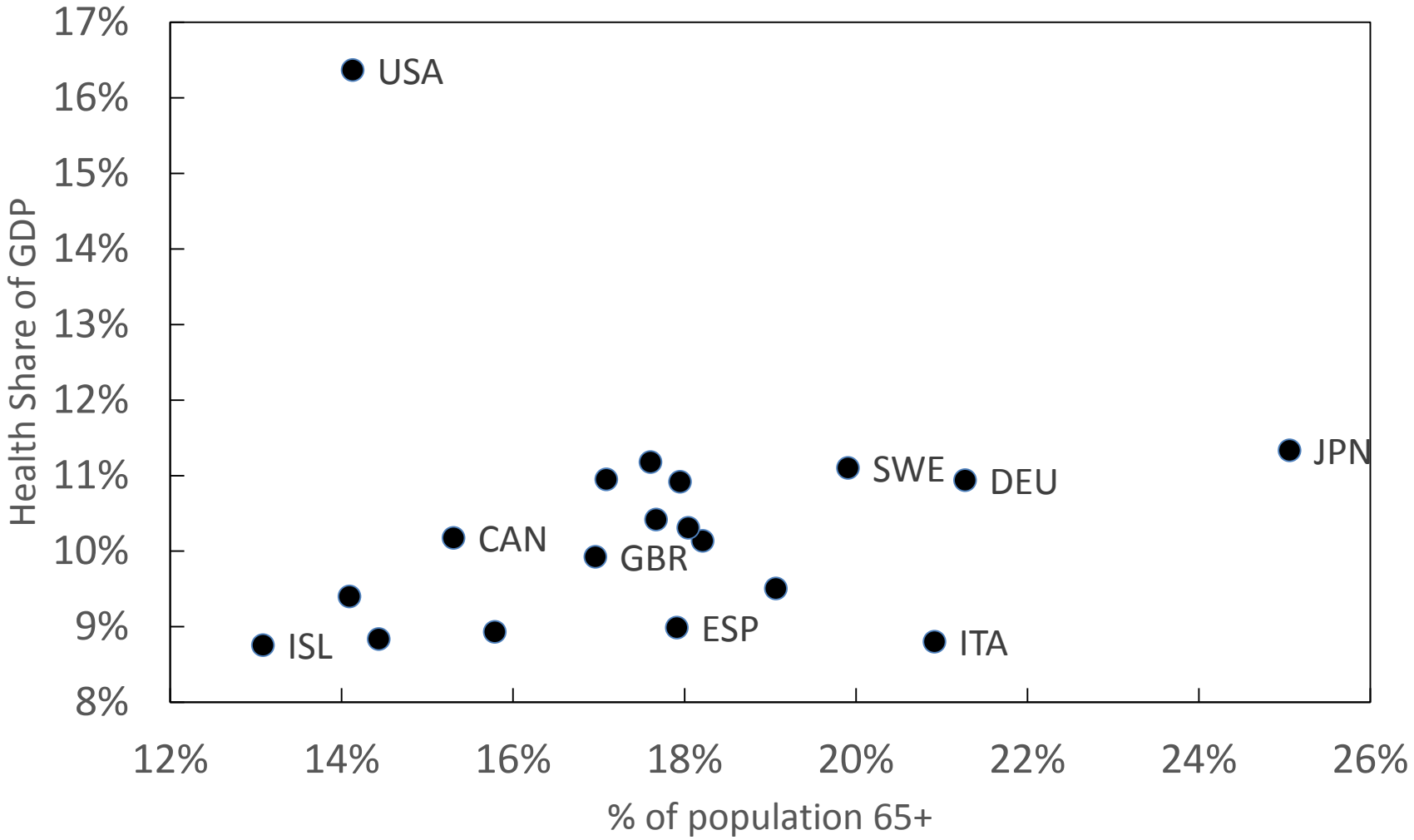
Oshio et al., in Ikegami, 2014

Healthcare spending by age in Japan, 2001 & 2010



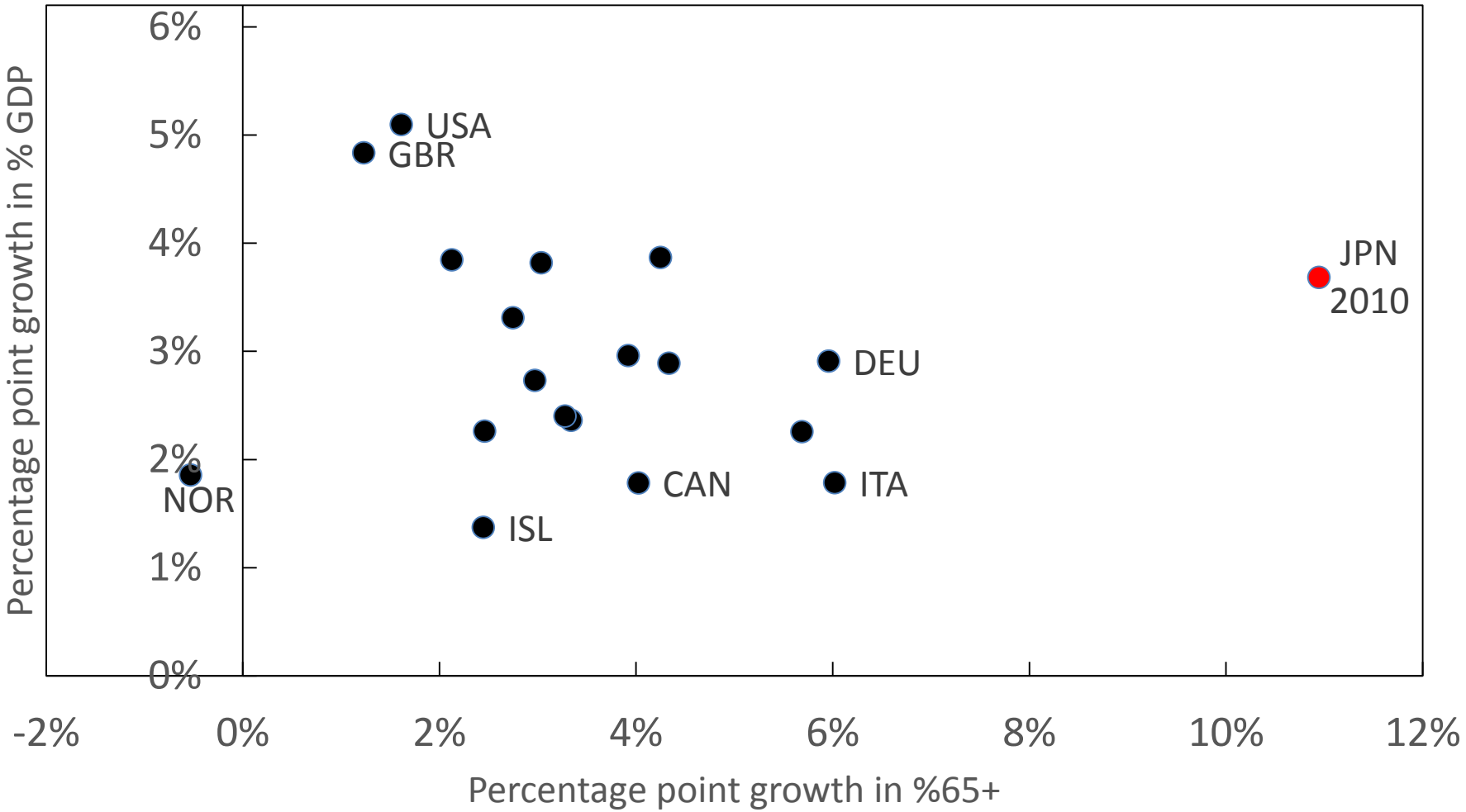
Oshio et al., in Ikegami, 2014

Health share of GDP and elderly share (65+): 2013



Source: OECD Health Statistics

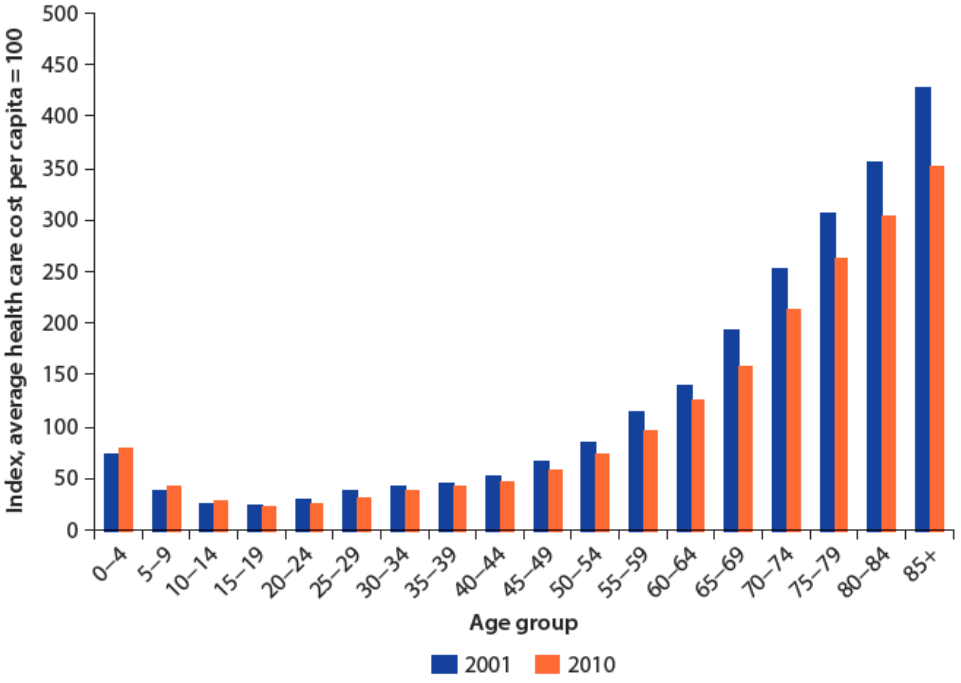
Change in elderly share & health spending, 1990-2013*



*Japan 1990-2010

Source: OECD Health Statistics

How can this puzzle be reconciled?



Population Aging and the Growth of Health Expenditures

Thomas E. Getzen

"Age affects the allocation of spending, but not the total amount of funds available. The increasing burden of health expenditures is largely a policy and cost management problem rather than a demographic one" (p. S98, 1992)

Aging: In sum….

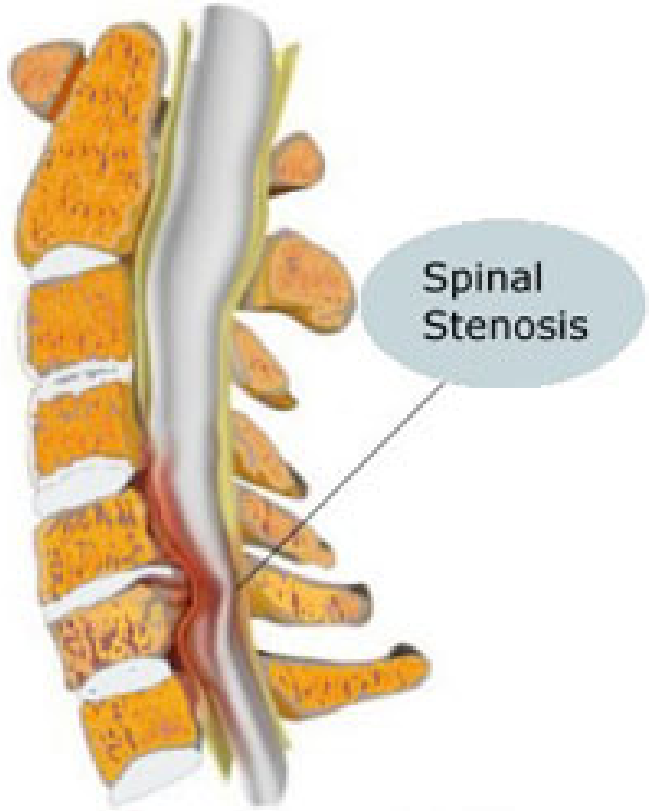
Across OECD countries, there is only a modest association between the age composition and healthcare spending as a percentage of GDP.

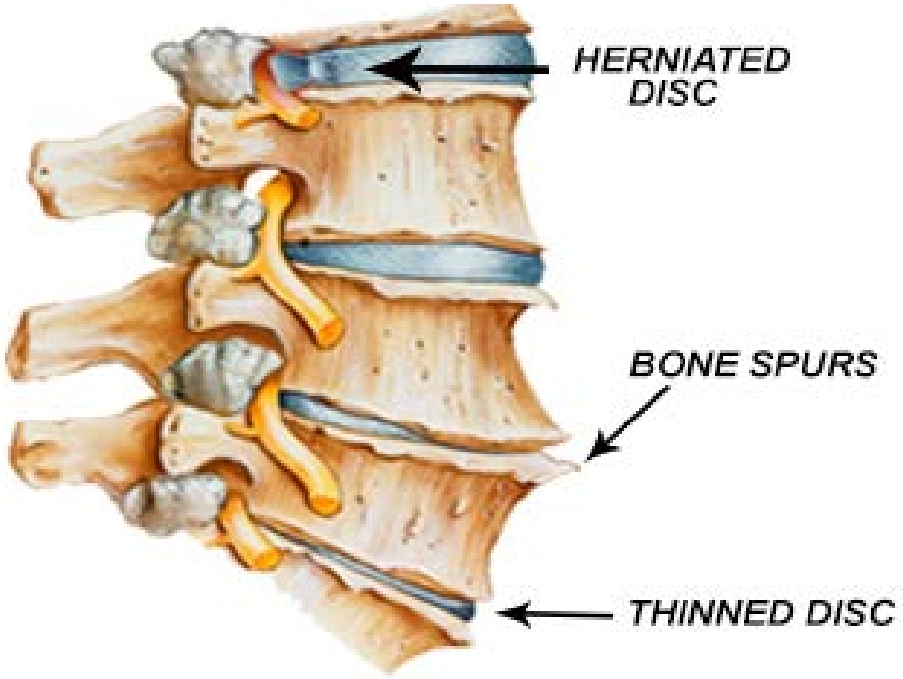
Prime suspects in healthcare cost growth

- Aging of the population
- Diffusion of medical innovations
- Sluggish “exnovation” of low-value treatments

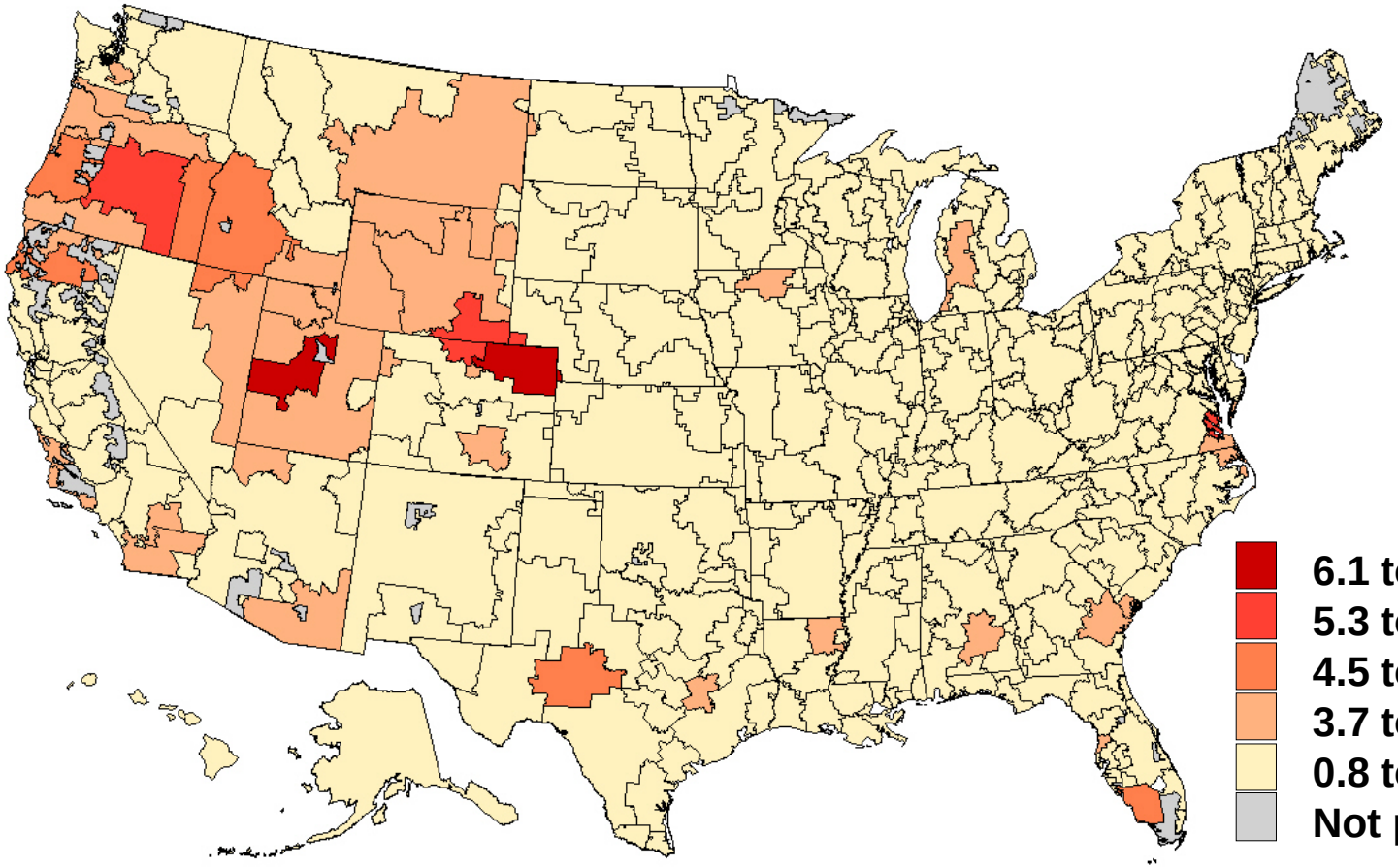
Large literature on the diffusion of new innovations

Example: Surgery for back pain



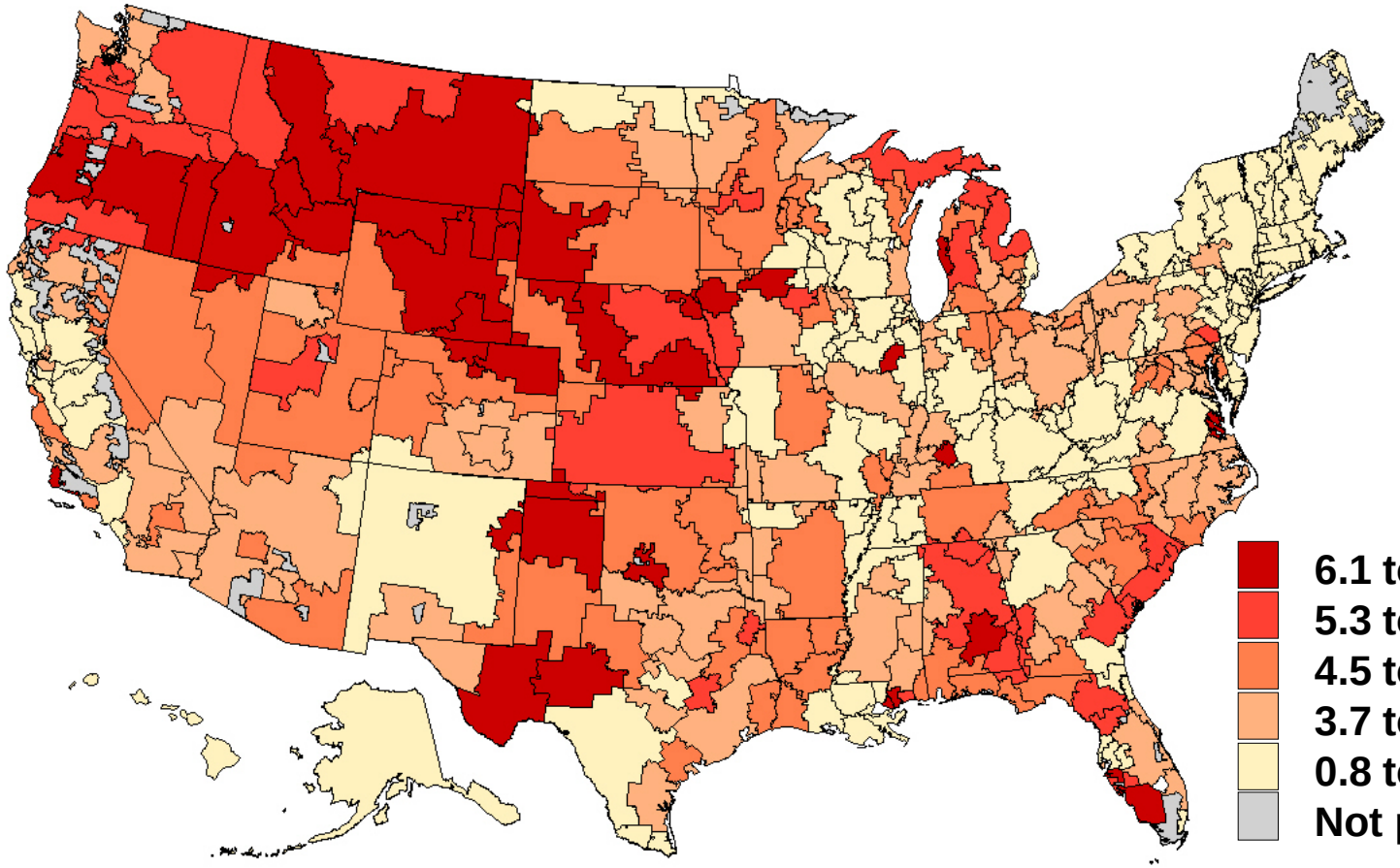


Back surgery per 1,000 Medicare enrollees (1992)

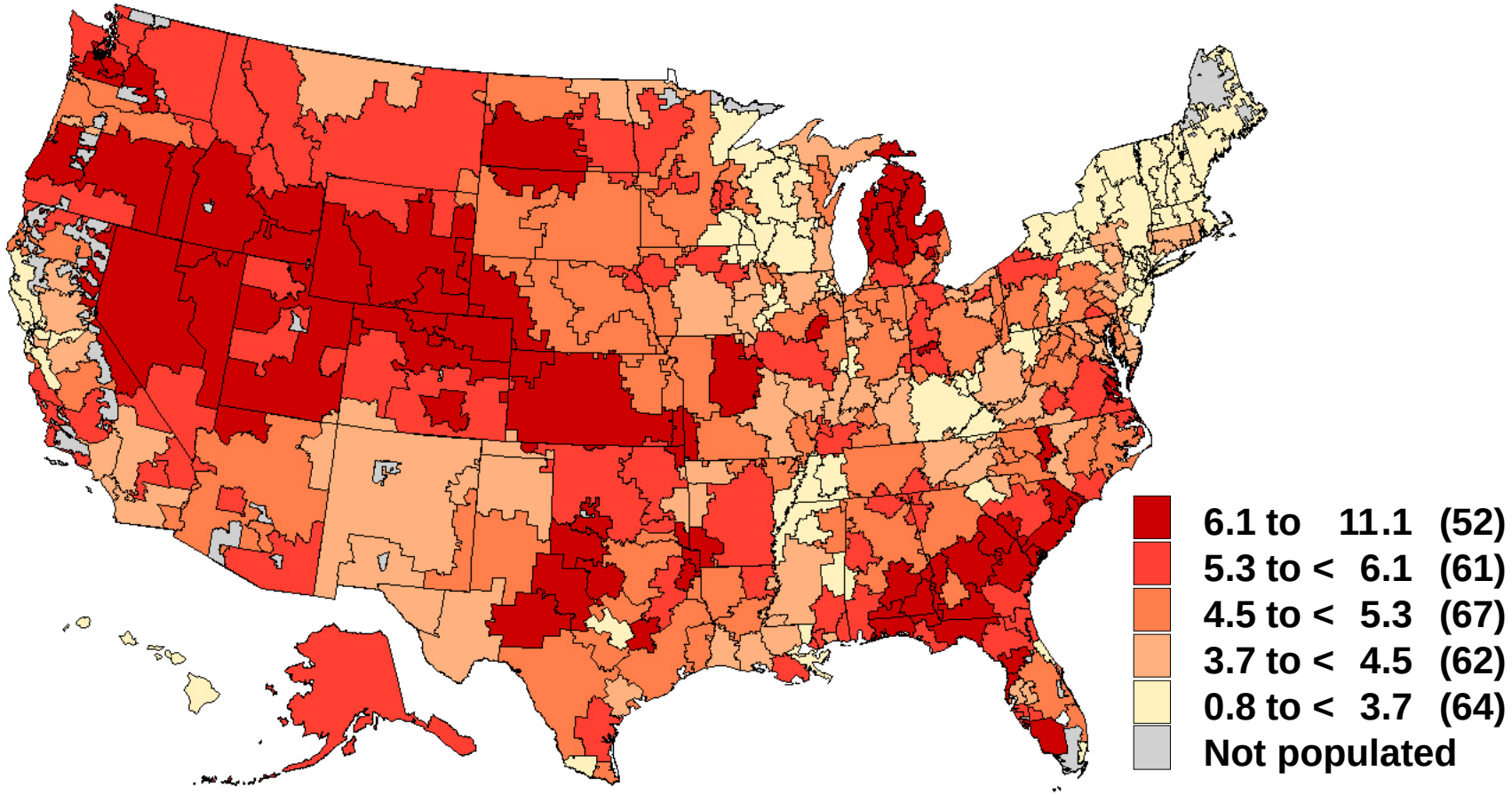


Dartmouth Atlas Project

Back surgery per 1,000 Medicare enrollees (2002)



Back surgery per 1,000 Medicare enrollees (2012)



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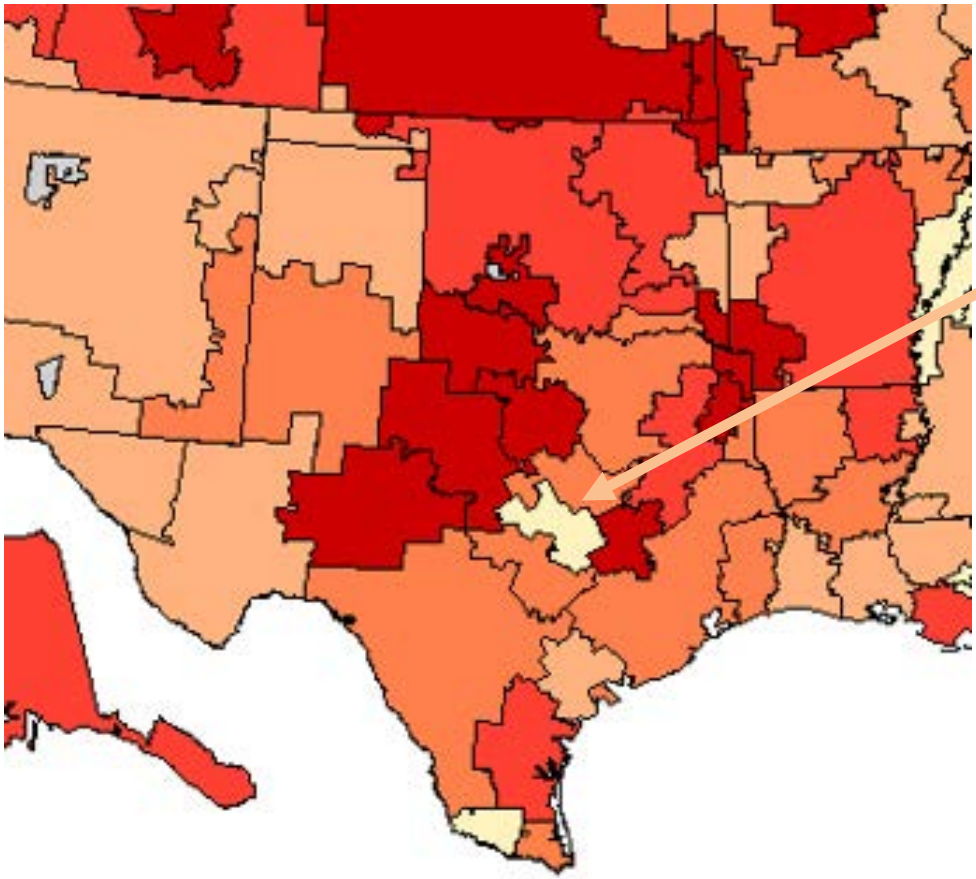
Back surgery variations in Texas (2012)



Temple, Texas HRR

6.1 to 11.1	(52)
5.3 to < 6.1	(61)
4.5 to < 5.3	(67)
3.7 to < 4.5	(62)
0.8 to < 3.7	(64)
Not populated	

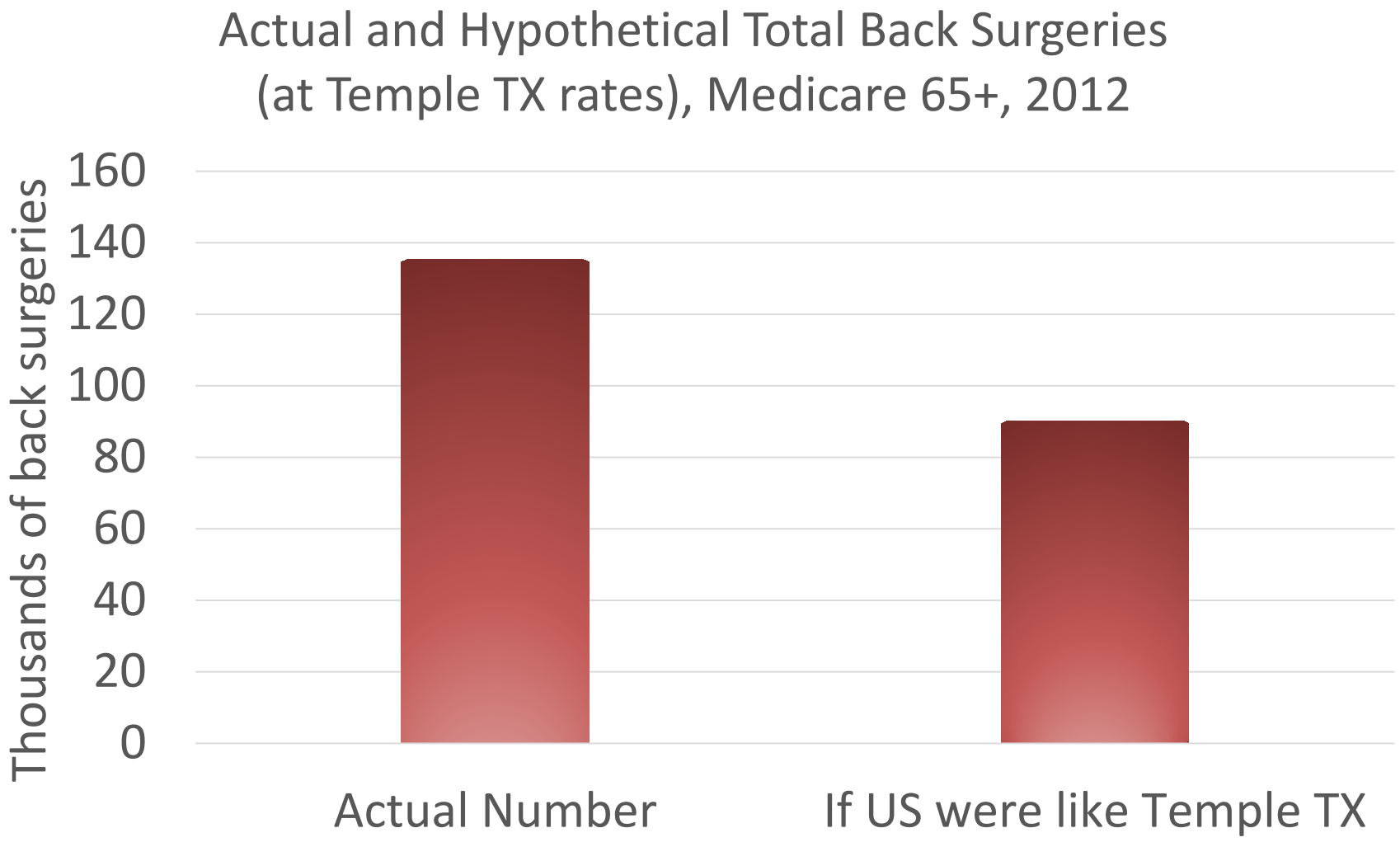
Dartmouth Atlas Project

Spinal treatments in Temple, Texas: "Conservative"

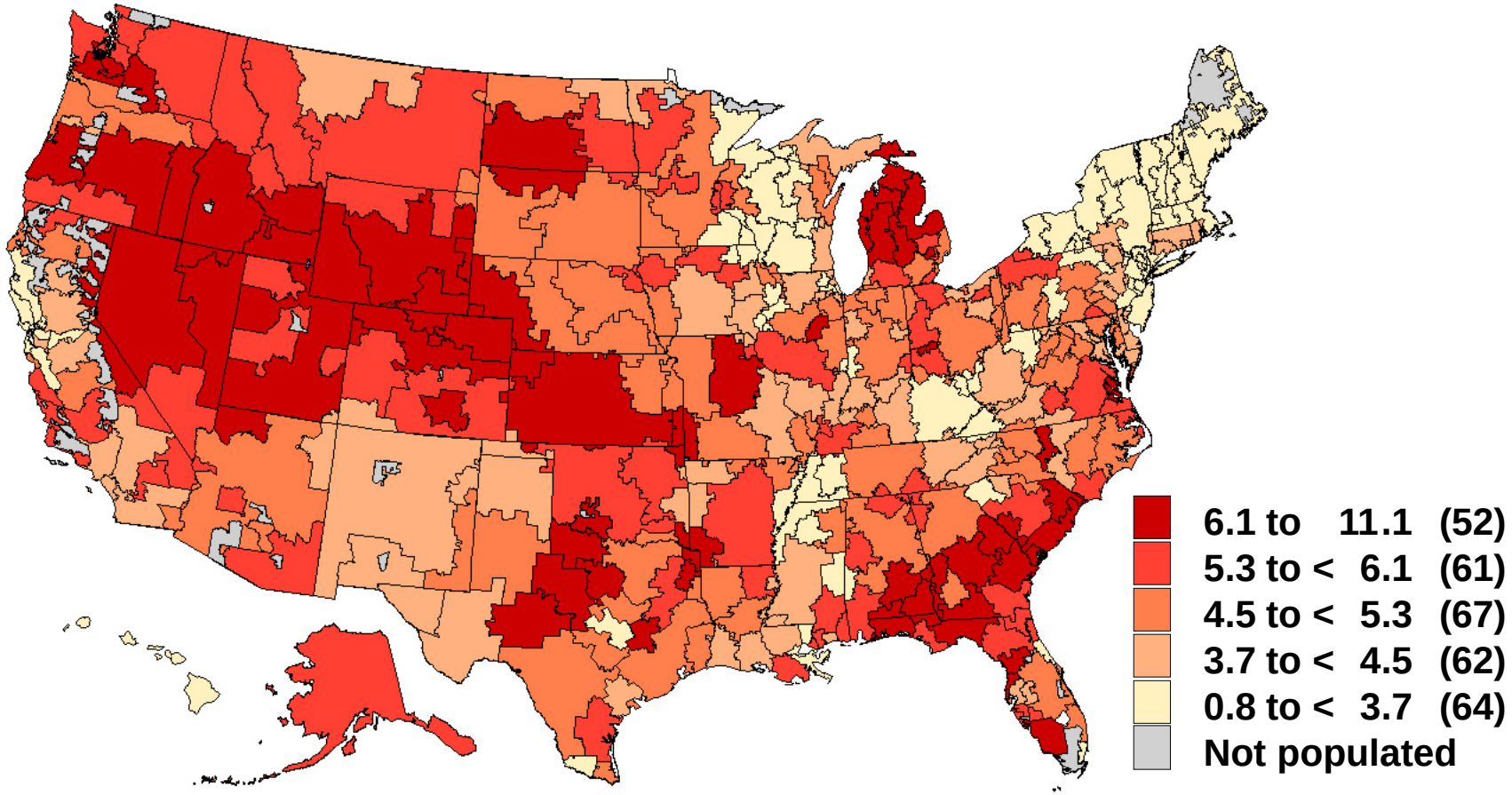
SPINE CARE AT SCOTT & WHITE

Through a collaborative process, each patient is matched with the specialists most appropriate for their specific care. This enables us to provide the most conservative, minimally invasive treatments whenever possible whether it involves surgery, rehabilitation or medication.

What if US back surgery had grown like Temple TX?

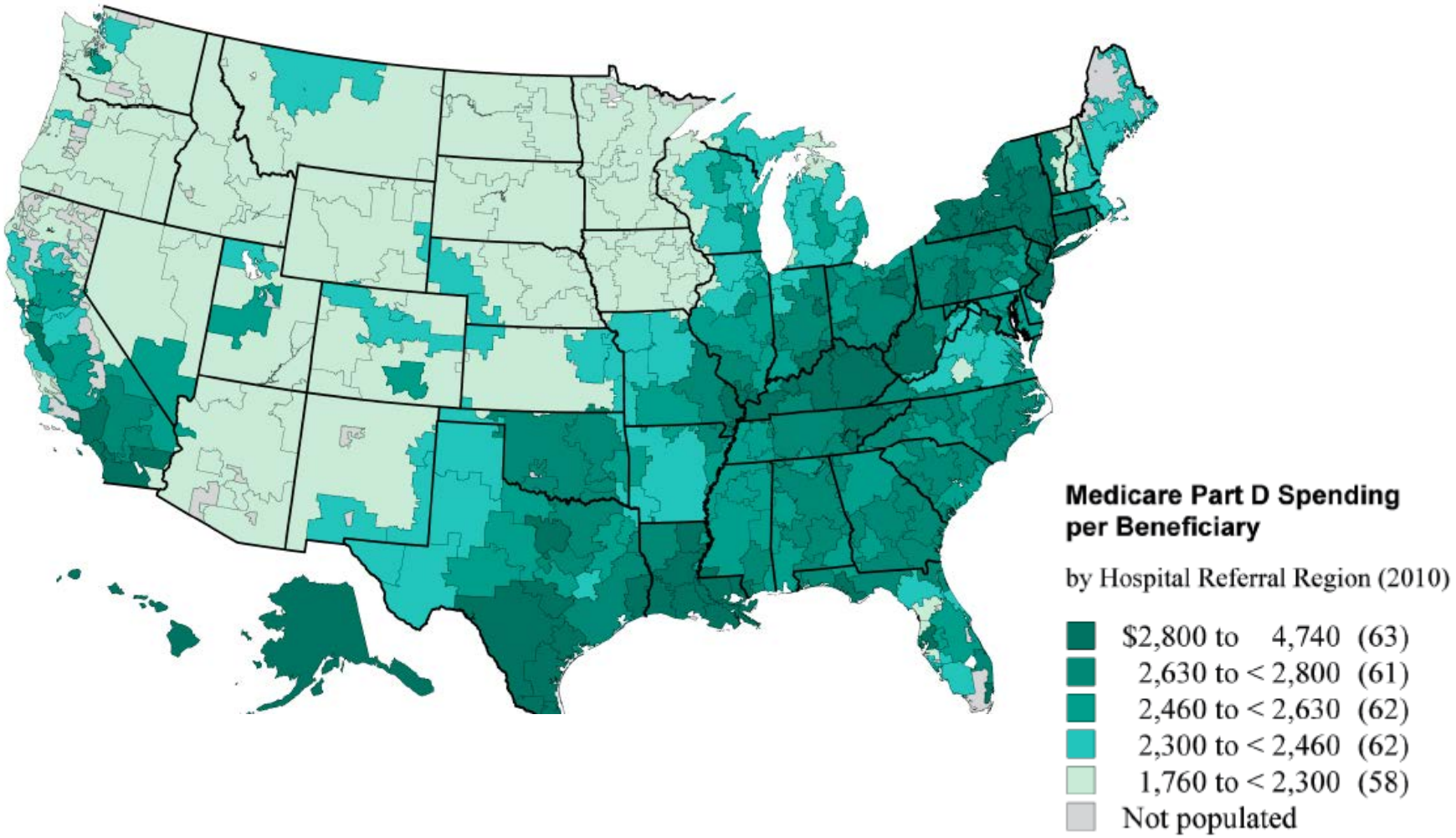


Regional variations = Different rates of diffusion

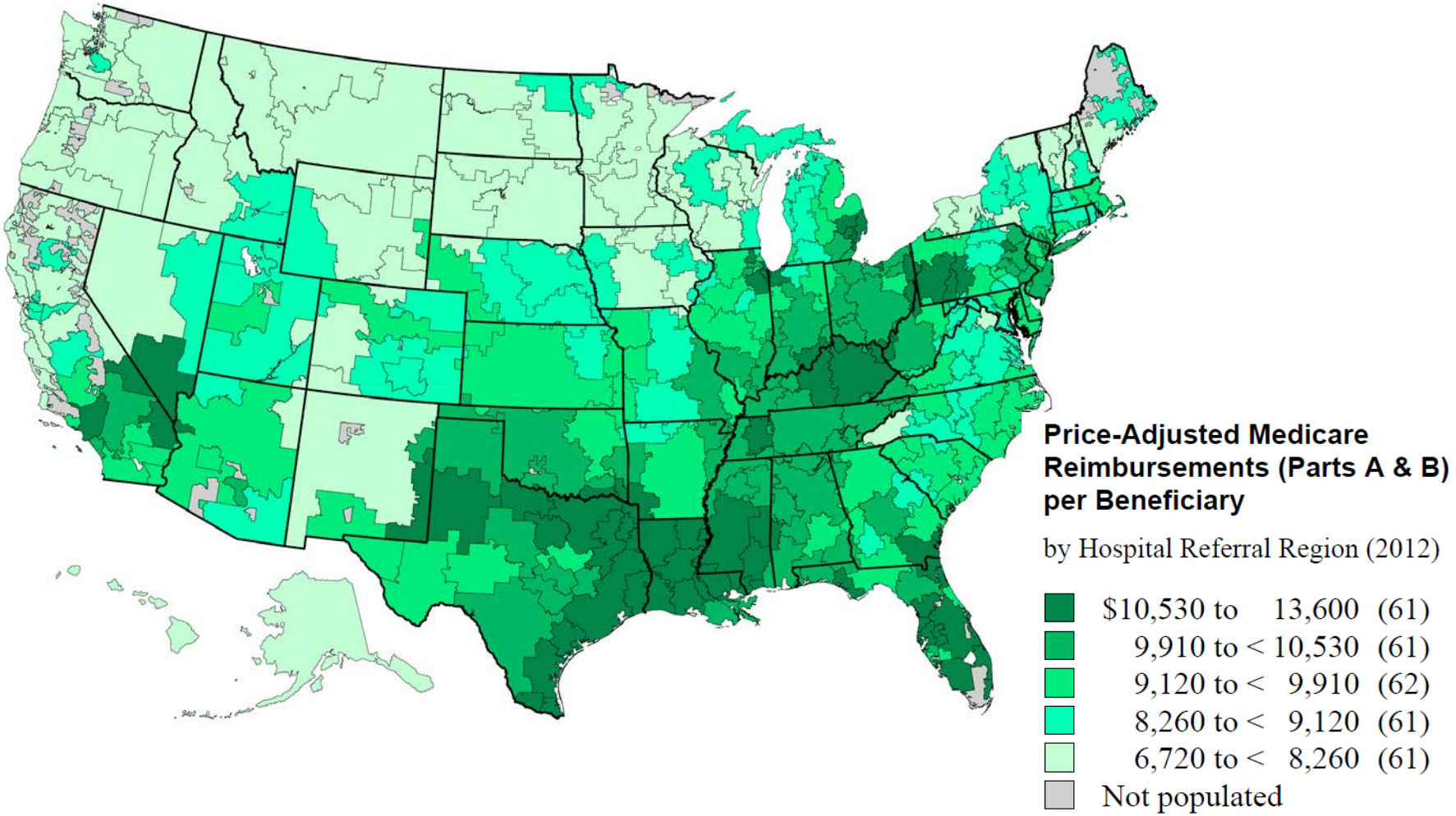


Dartmouth Atlas Project

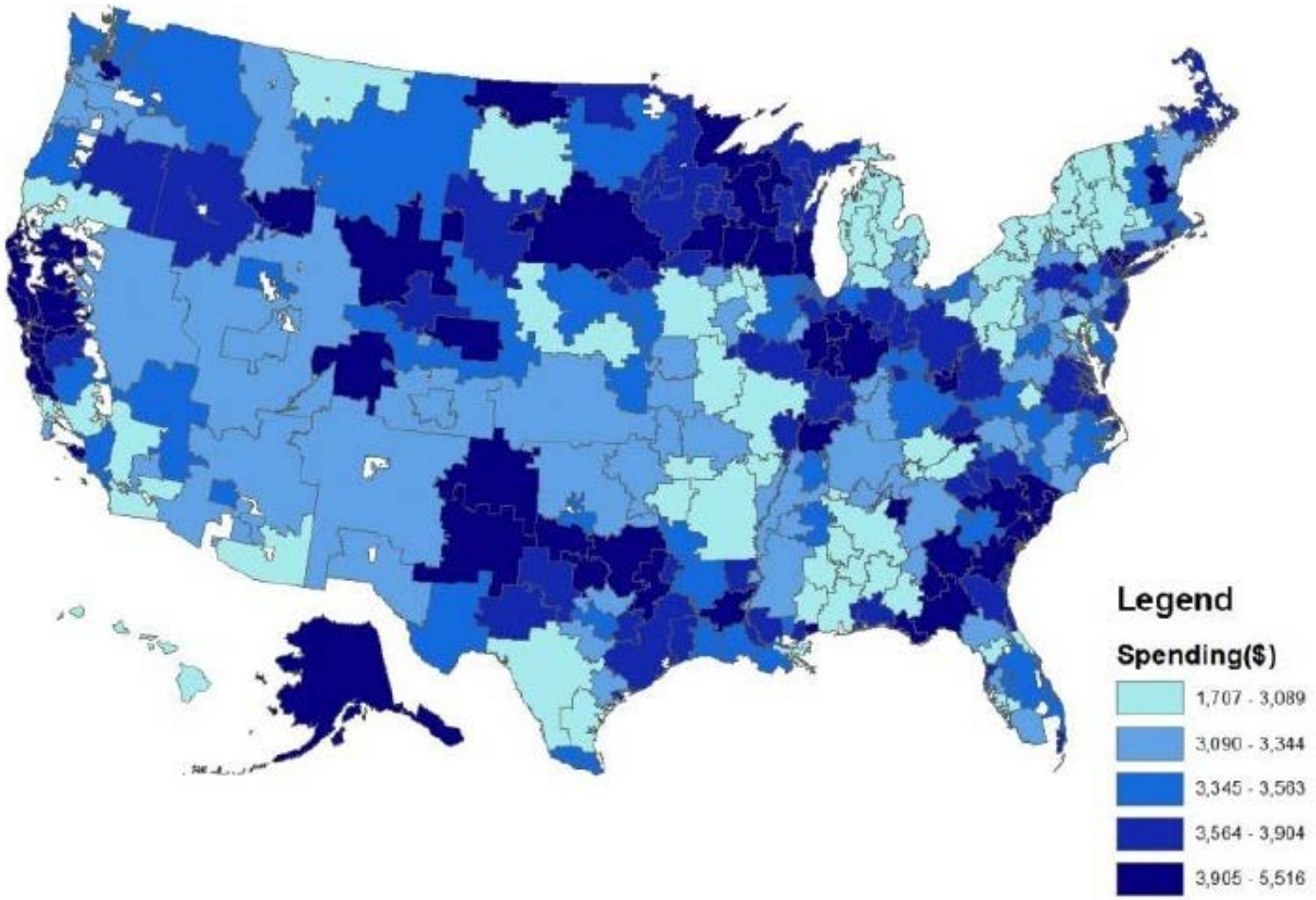
U.S. Medicare prescription drug spending, 2010



2012 Price-Adjusted Per Capita Medicare Spending

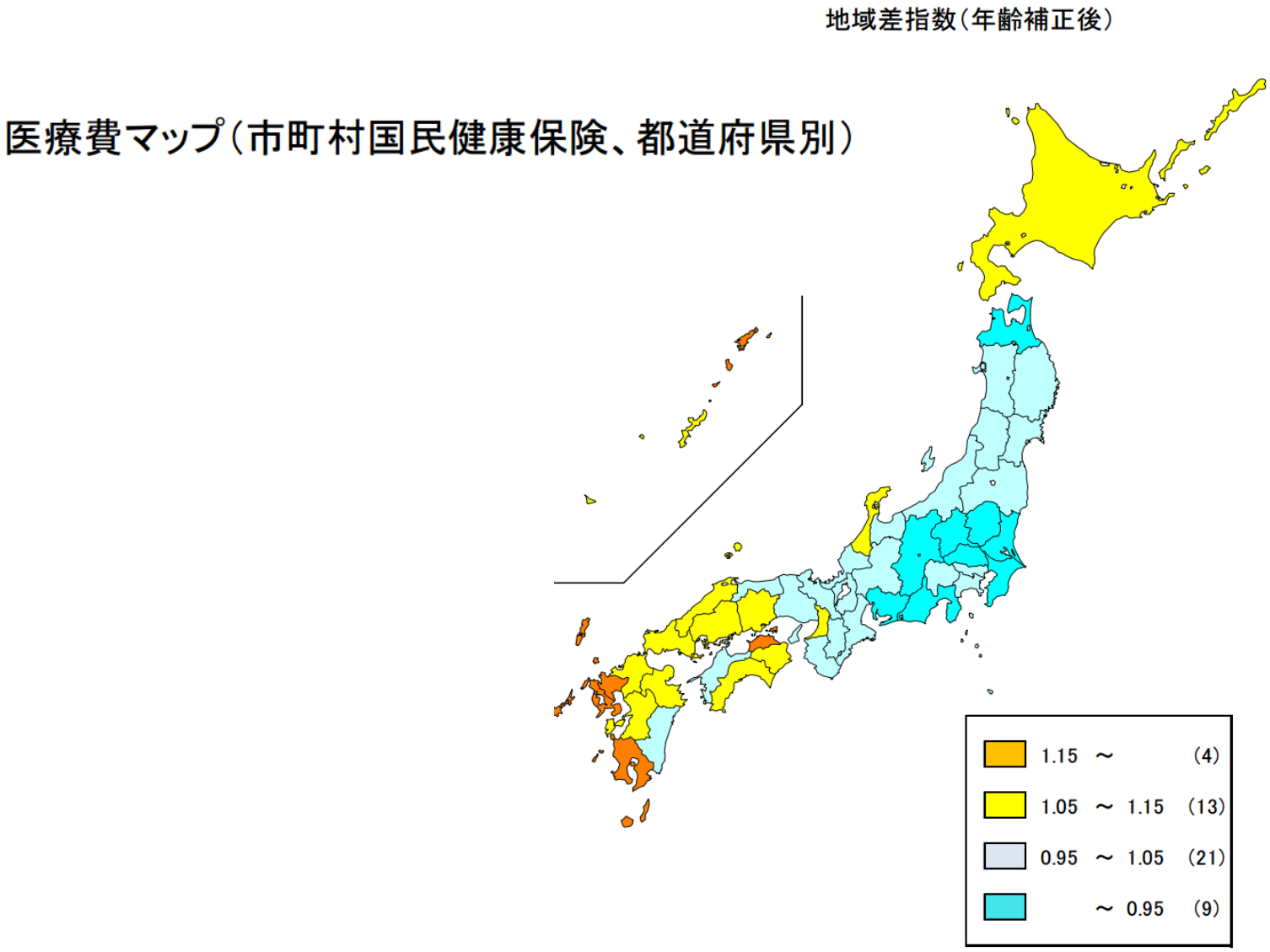


Different patterns of spending in <65 age groups

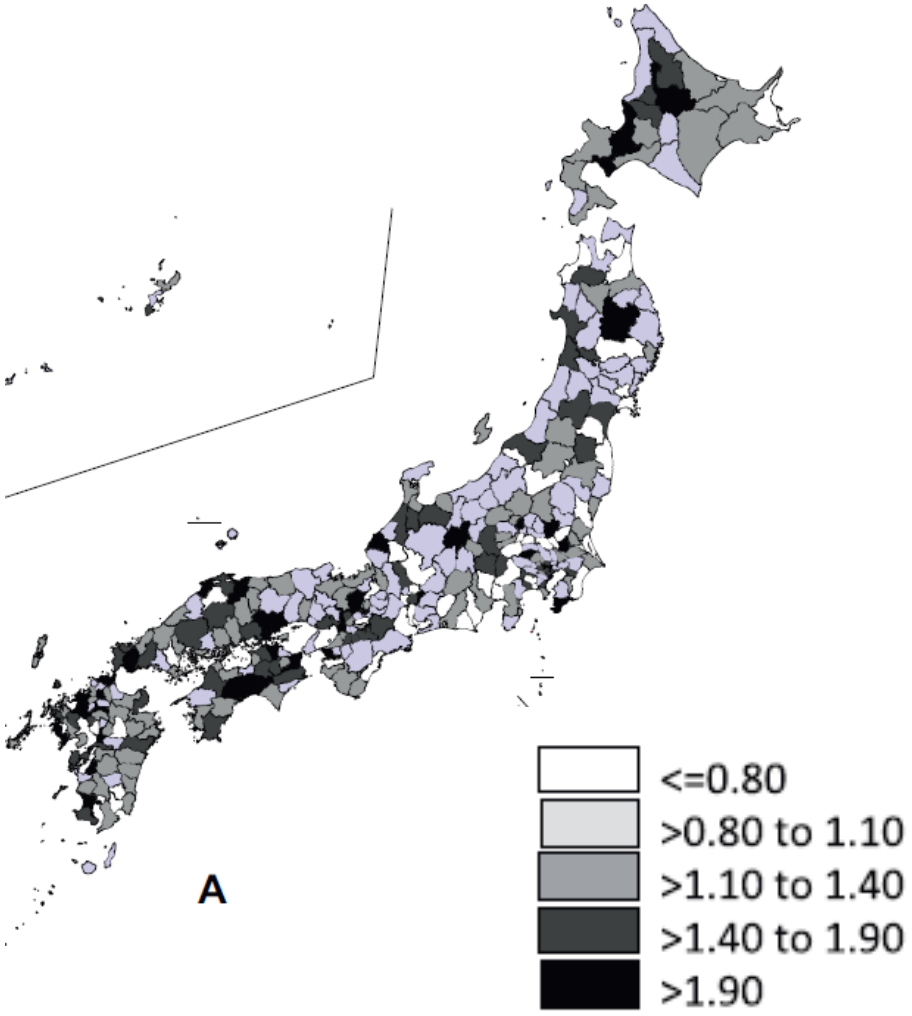


Source: Z. Cooper et al., 2015

Japan: Healthcare spending variation



Japan: Hospital physicians per 1000, 2008

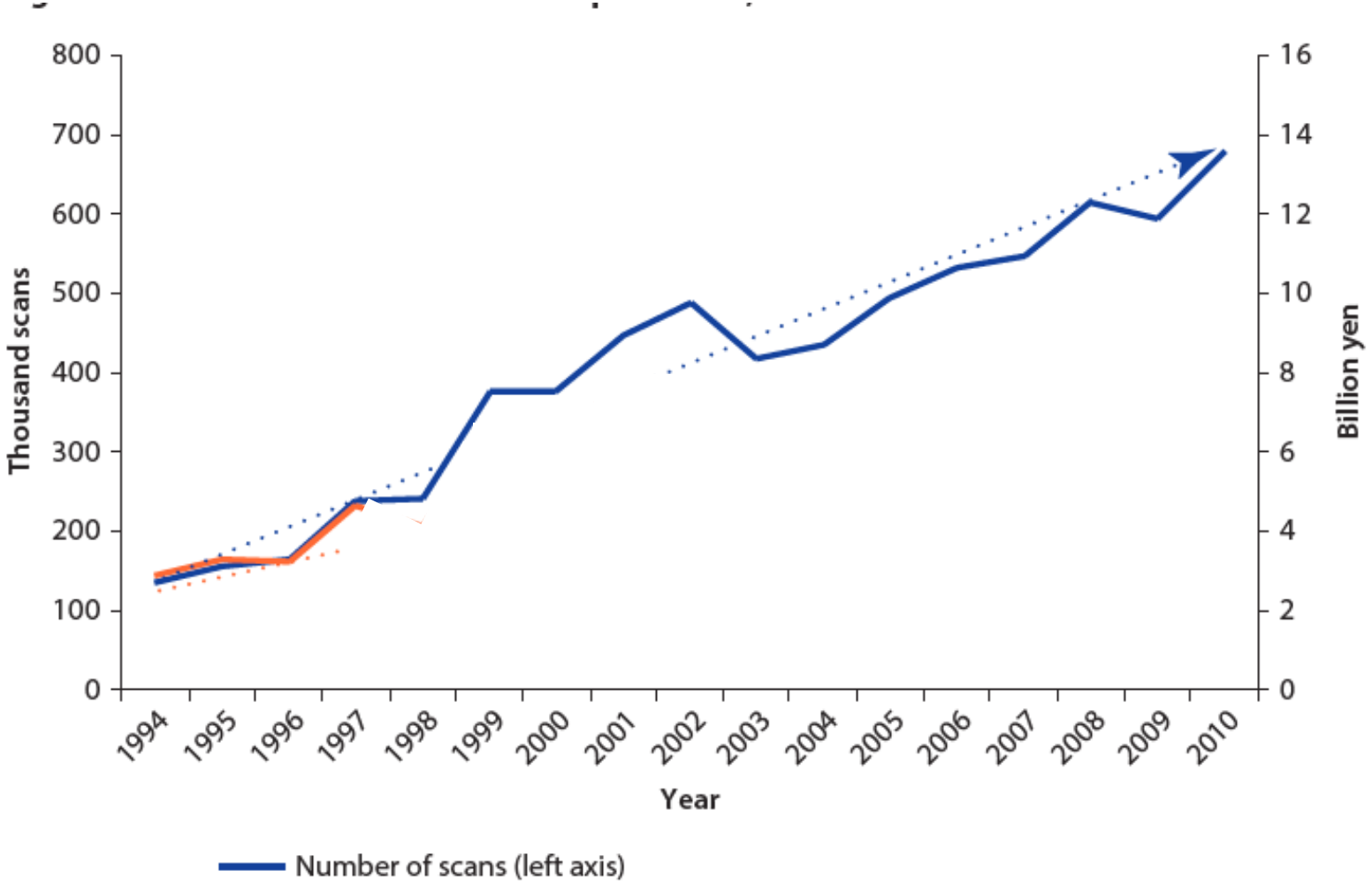


Shinjo and Aramaki, 2010

An example of a new technology (circa 1990s)

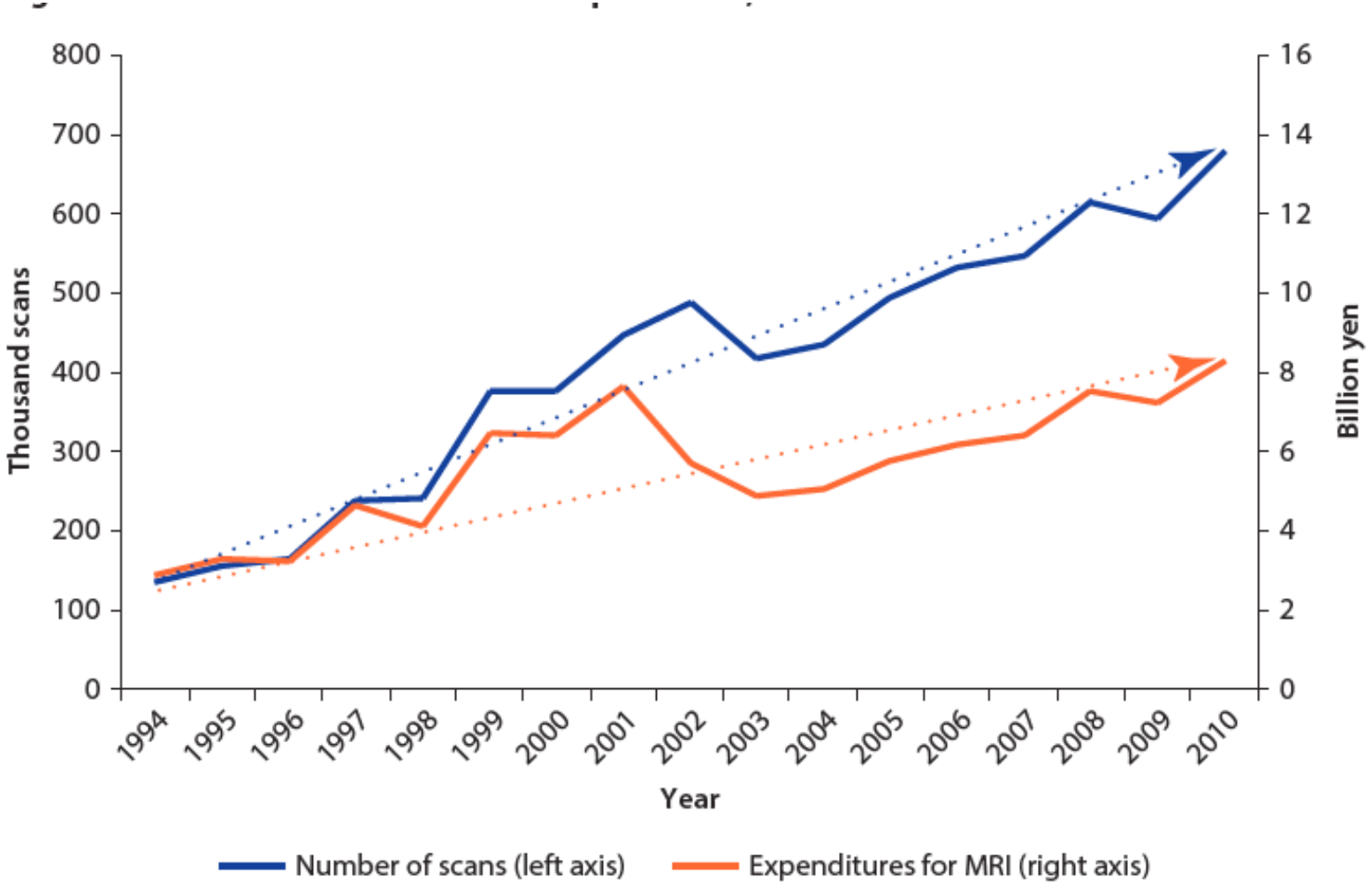
Magnetic Resonance Imaging (MRIs)

Number of MRI scans in Japan: 1994-2010



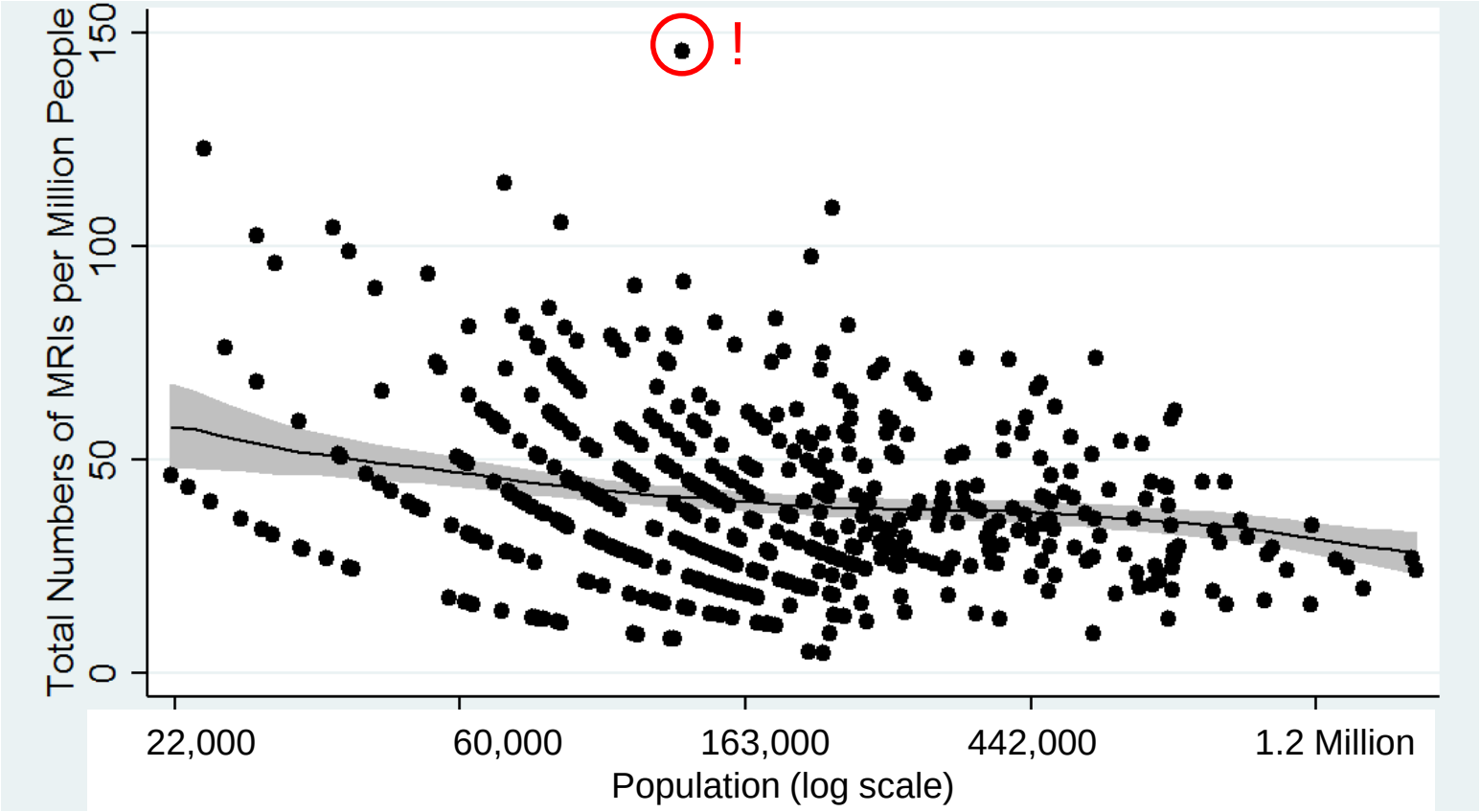
Ikegami,2014, p. 75 (modified)

Budget impact (orange line) cushioned by price cuts



Ikegami, 2014, p. 75

But: Large regional variation in Japan MRI capacity



Onishi, Wakamori, Hashimoto, & Bessho, 2016

Diffusion: In sum….

Regional variations arise for a variety of reasons, but largely because of uneven diffusion of medical technologies and treatments

Can we afford the new effective treatments?

Annals of Internal Medicine

ORIGINAL RESEARCH

Cost-Effectiveness and Budget Impact of Hepatitis C Virus Treatment With Sofosbuvir and Ledipasvir in the United States

Jagpreet Chhatwal, PhD; Fasiha Kanwal, MD, MSHS; Mark S. Roberts, MD, MPP; and Michael A. Dunn, MD

Results of Base-Case Analysis: Sofosbuvir-based therapies added 0.56 QALY relative to the oSOC at an ICER of $55 400 per additional QALY. The ICERs ranged from $9700 to $284 300 per QALY depending on the patient's status with respect to treatment history, HCV genotype, and presence of cirrhosis. At a

Prime suspects in healthcare cost growth

- Aging of the population
- Diffusion of medical innovations
- Slow “exnovation” of low-value treatments

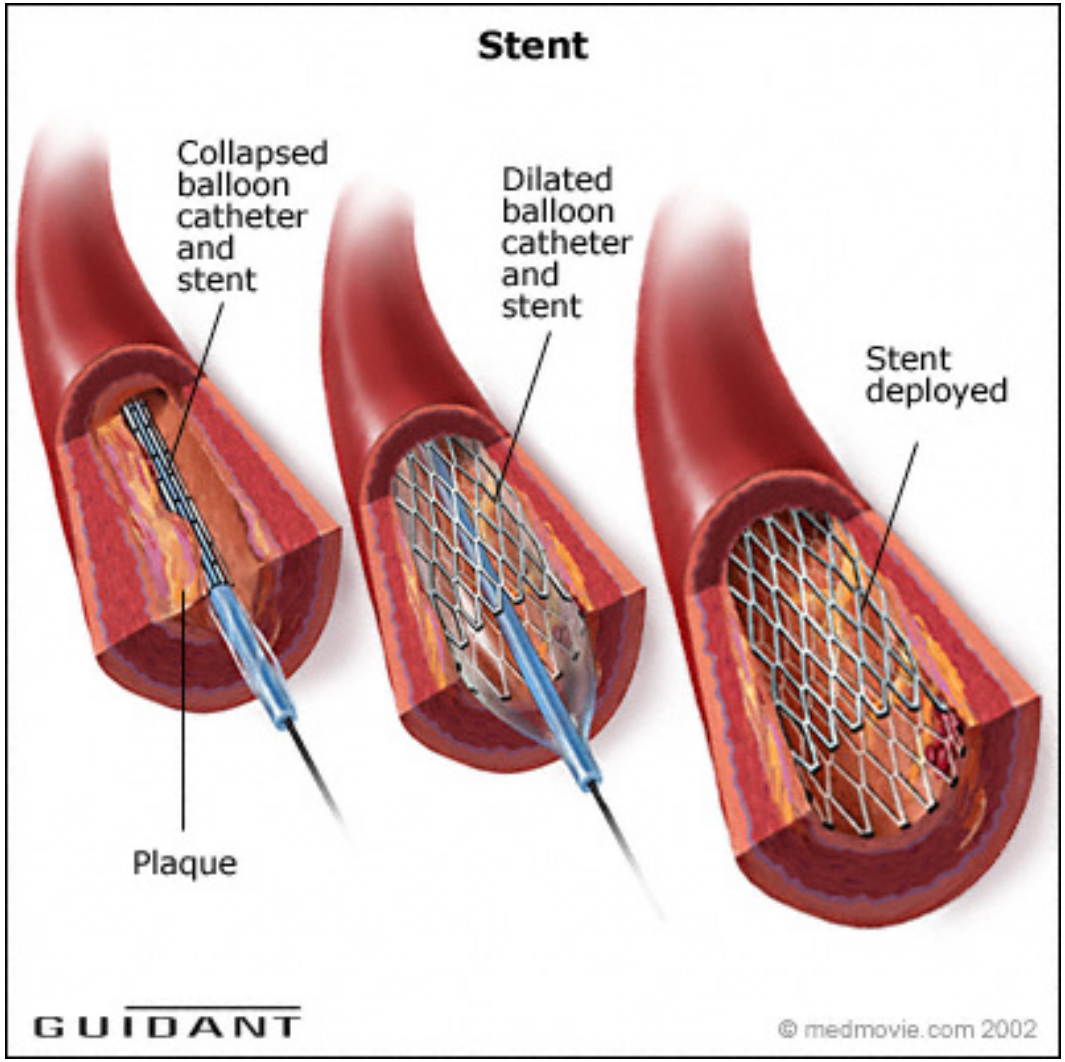
The other side of diffusion: "Exnovation"

- **Exnovation or de-diffusion occurs when:**
  - A treatment is deemed to be not useful or even harmful
  - A treatment is replaced by something better

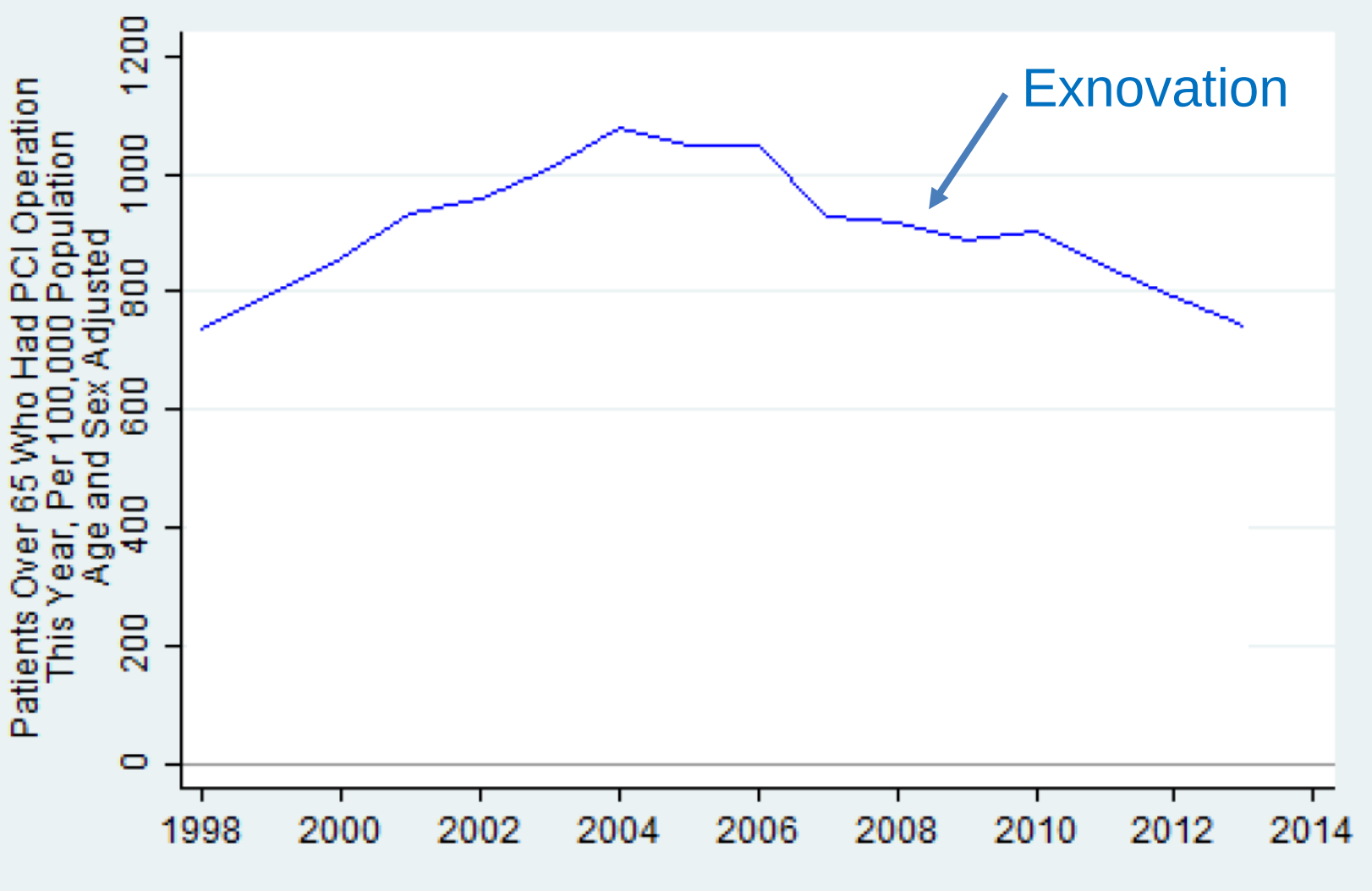
- **A different process from diffusion:**
  - Requires stopping what one has been doing for years
  - Rate for least-appropriate patients should decline the most

What are characteristics of efficient exnovators?

Angioplasty & stenting (PCI): Cardiovascular disease

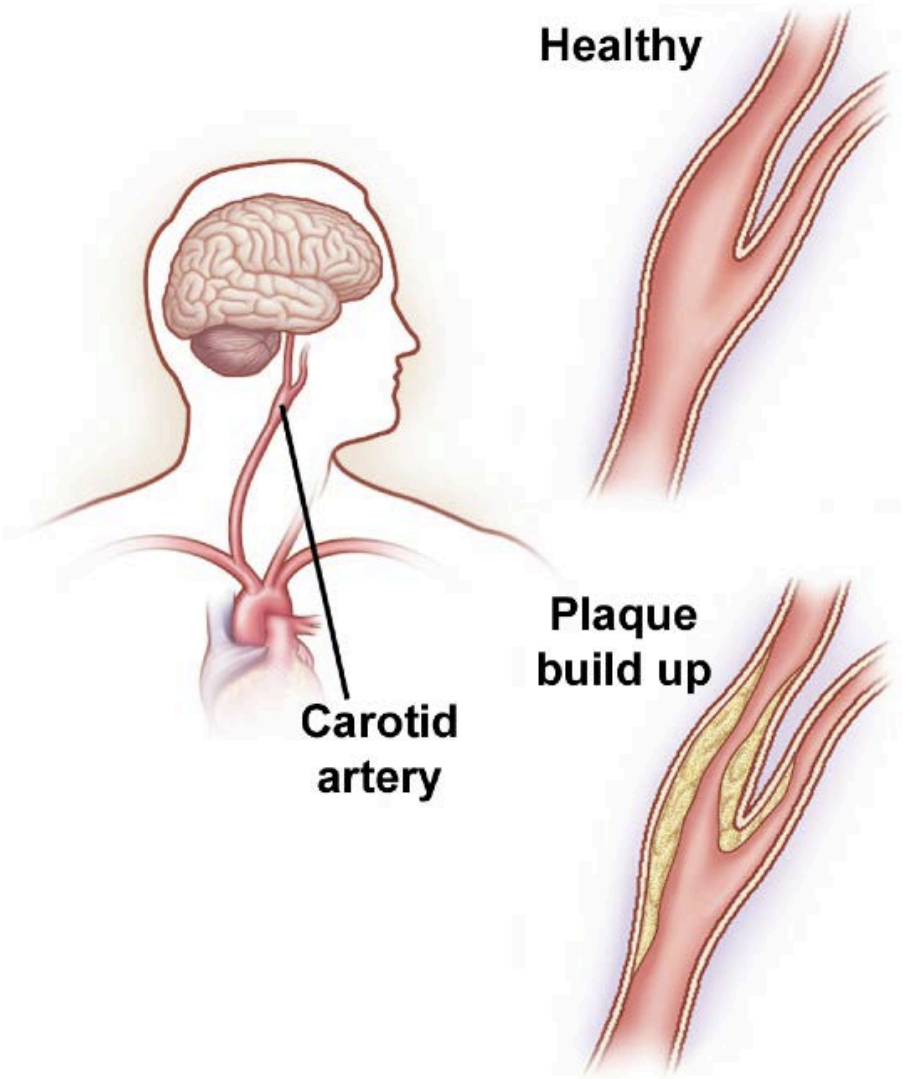


PCI (stent) rates per 100,000 65+, U.S., 1998-2013

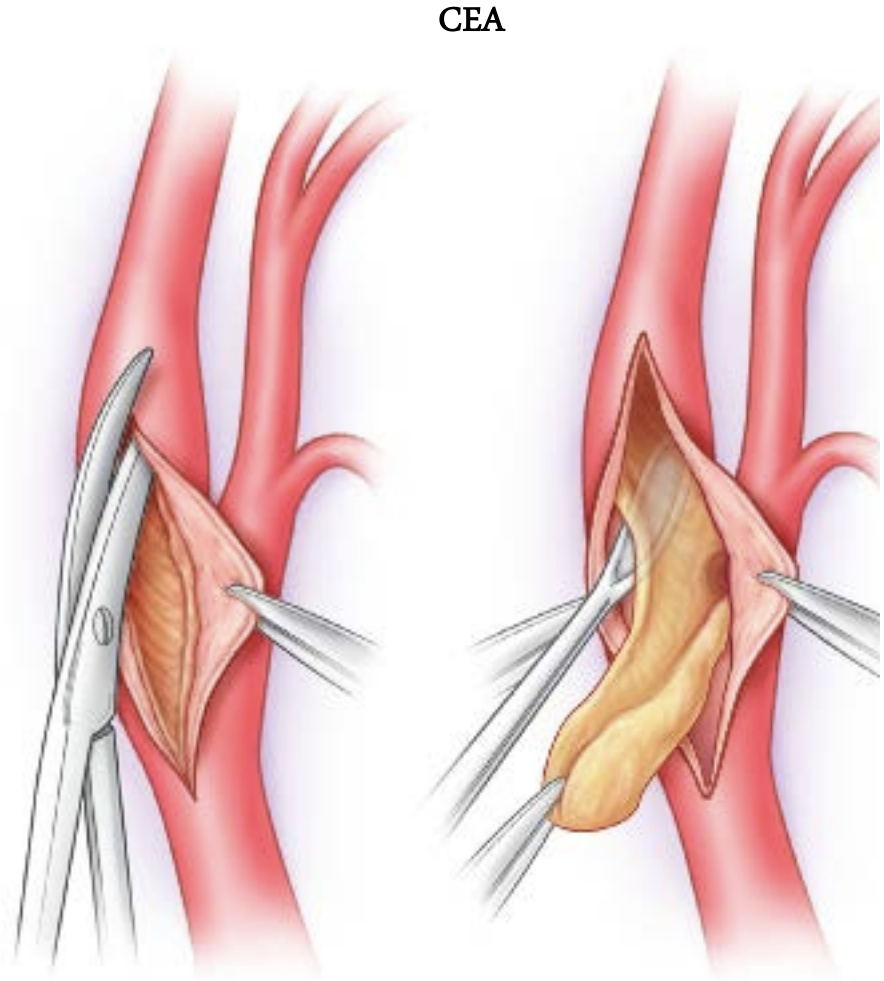


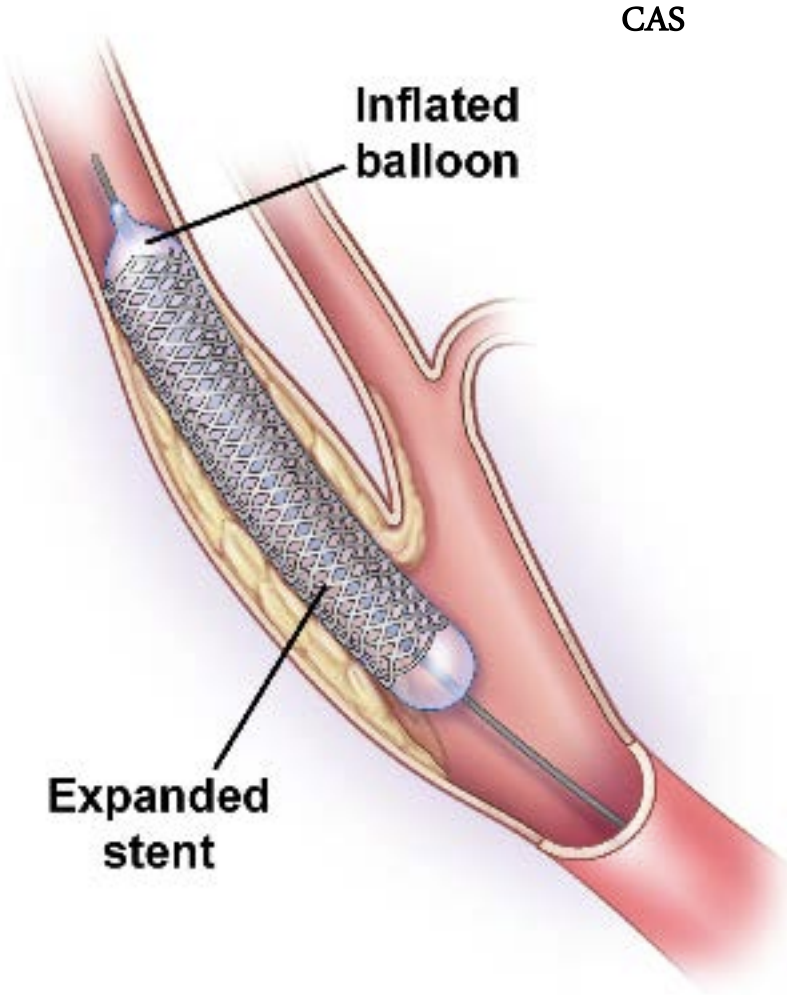
Source: Kelly et al., 2016

Carotid Atherosclerosis

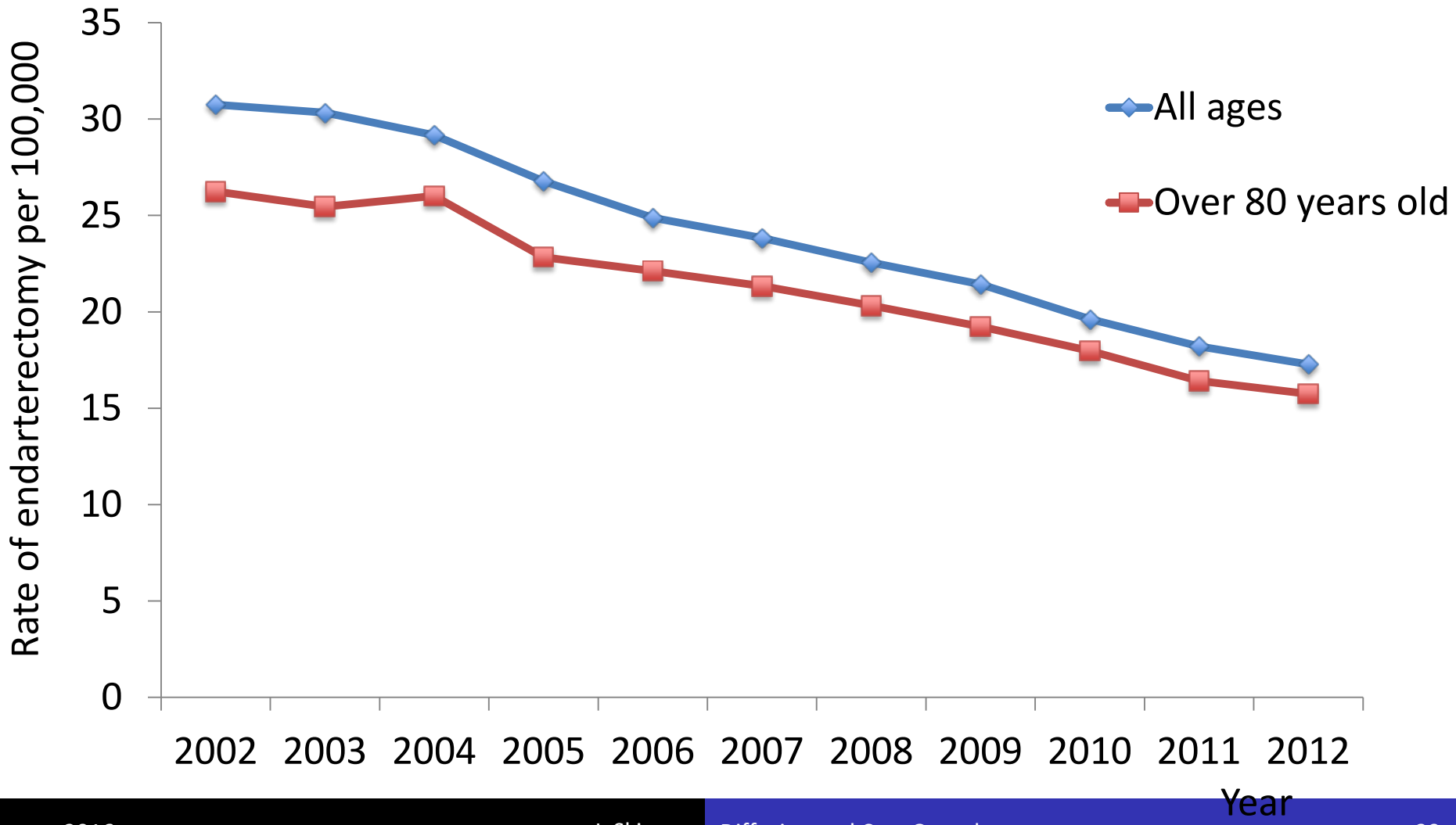


Carotid endarterectomy/stenting to remove plaque





Exnovation in the use of carotid surgery



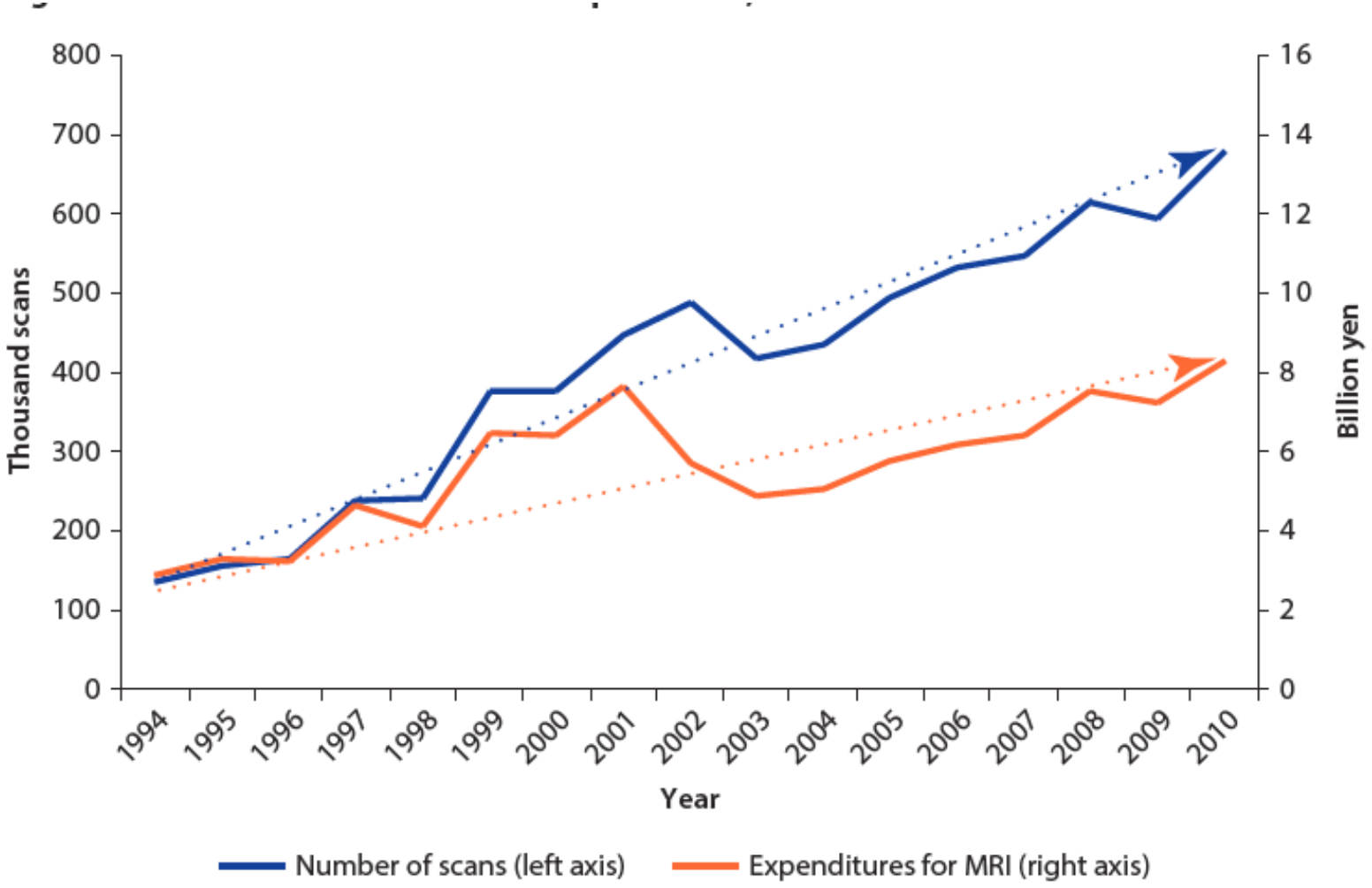
Exnovation: In sum…

- Exnovation is an under-studied but common process in health care
- Requires healthcare providers to scale back (sensibly) what they've been doing for years
- Potential "win-win": Better quality care at lower cost

Policy implications and suggestions

1. Real-time rapid data feedback at the institution and physician level to monitor diffusion and exnovation
2. Use “shared decision making” to make sure patients really want the new technologies
3. *Price* adjustment to blunt the revenue impact of new technologies
4. *Quantity* regulation of medical technologies across regions (and overall)

Japan used “best practice” MRI price adjustments



Ikegami, 2014, p. 75

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References

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