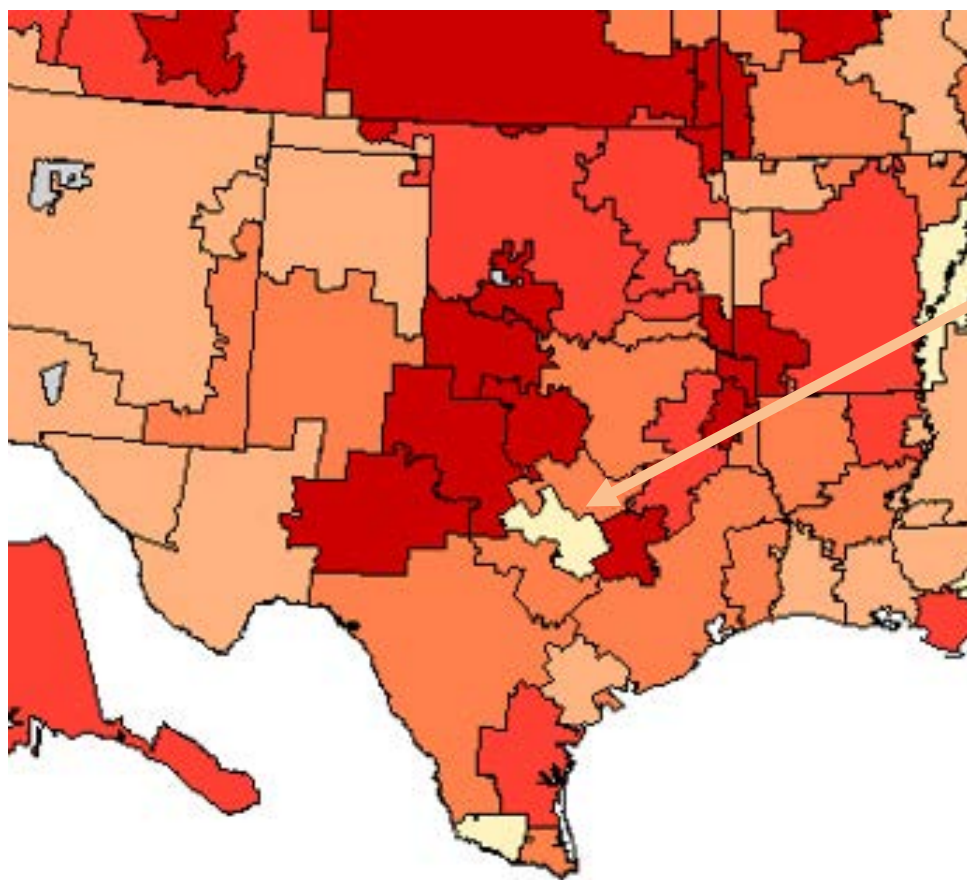
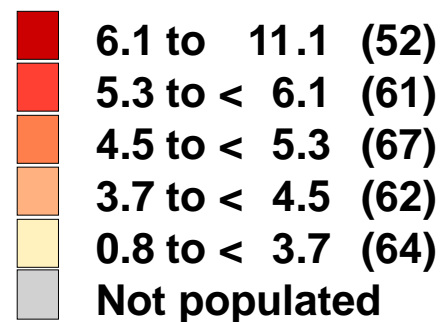


# Back surgery variations in Texas (2012)



Temple, Texas HRR



Dartmouth Atlas Project

# Spinal treatments in Temple, Texas: “Conservative”

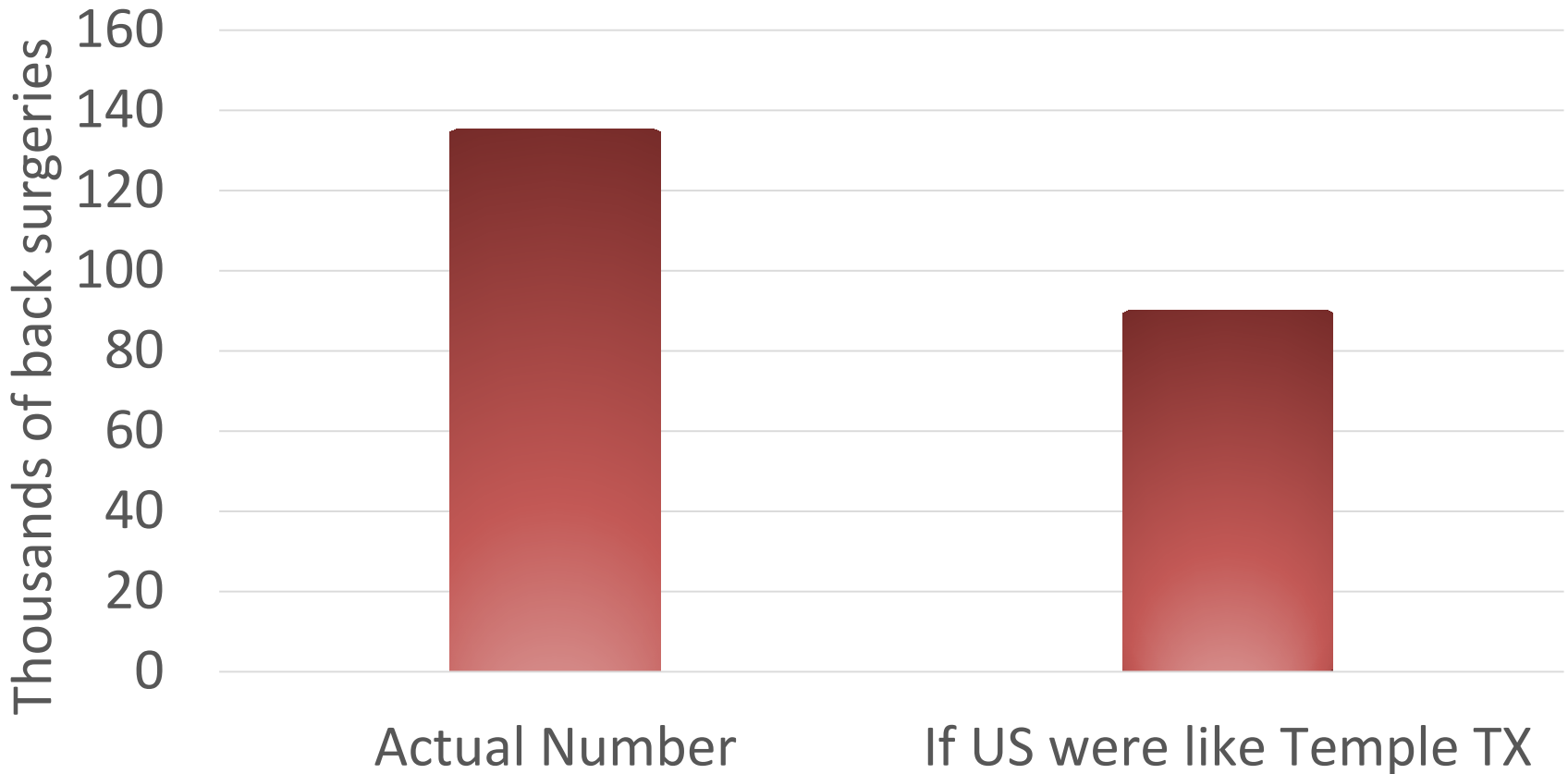
## SPINE CARE AT SCOTT & WHITE



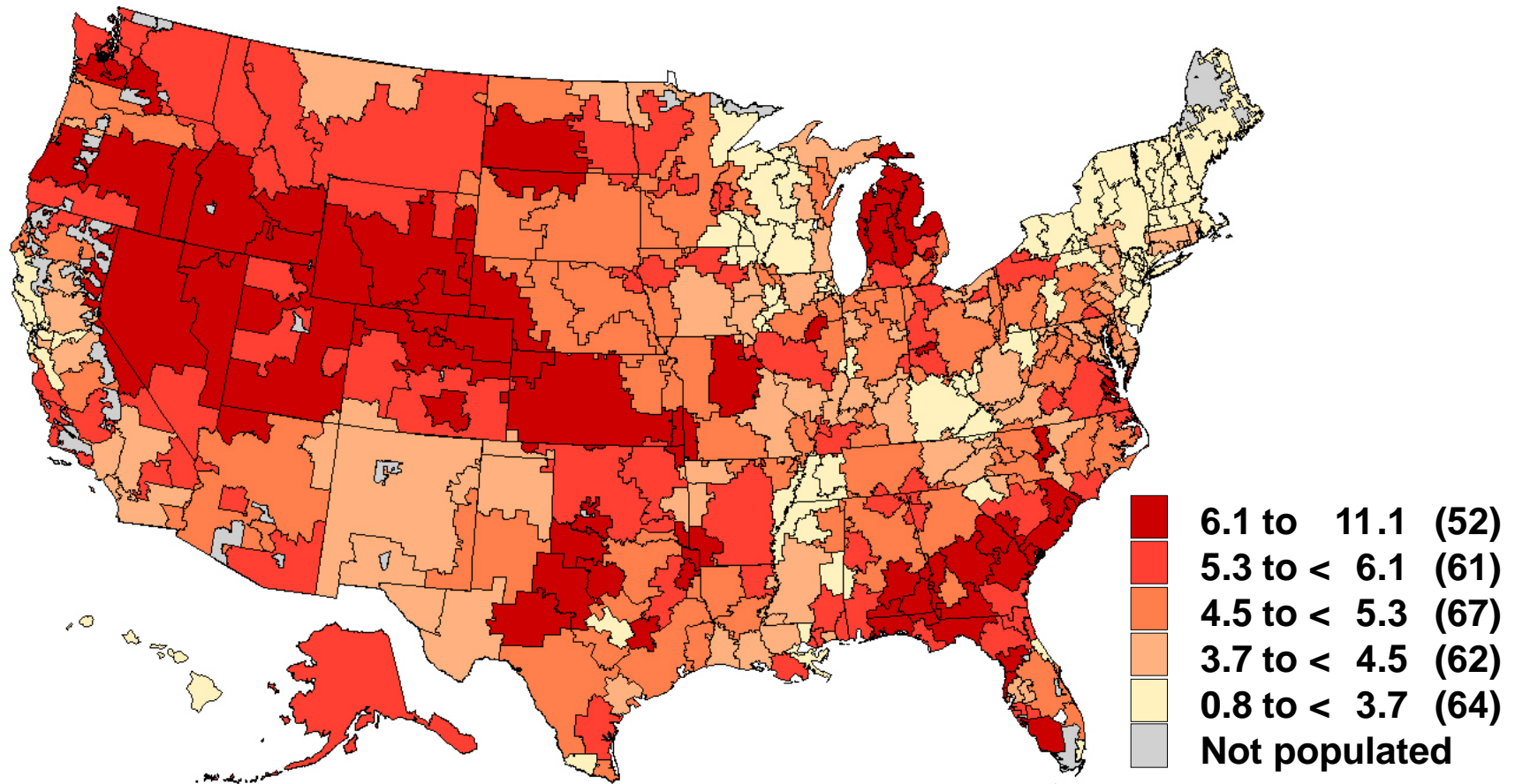
Through a collaborative process, each patient is matched with the specialists most appropriate for their specific care. This enables us to provide the most conservative, minimally invasive treatments whenever possible whether it involves surgery, rehabilitation or medication.

# What if US back surgery had grown like Temple TX?

Actual and Hypothetical Total Back Surgeries  
(at Temple TX rates), Medicare 65+, 2012

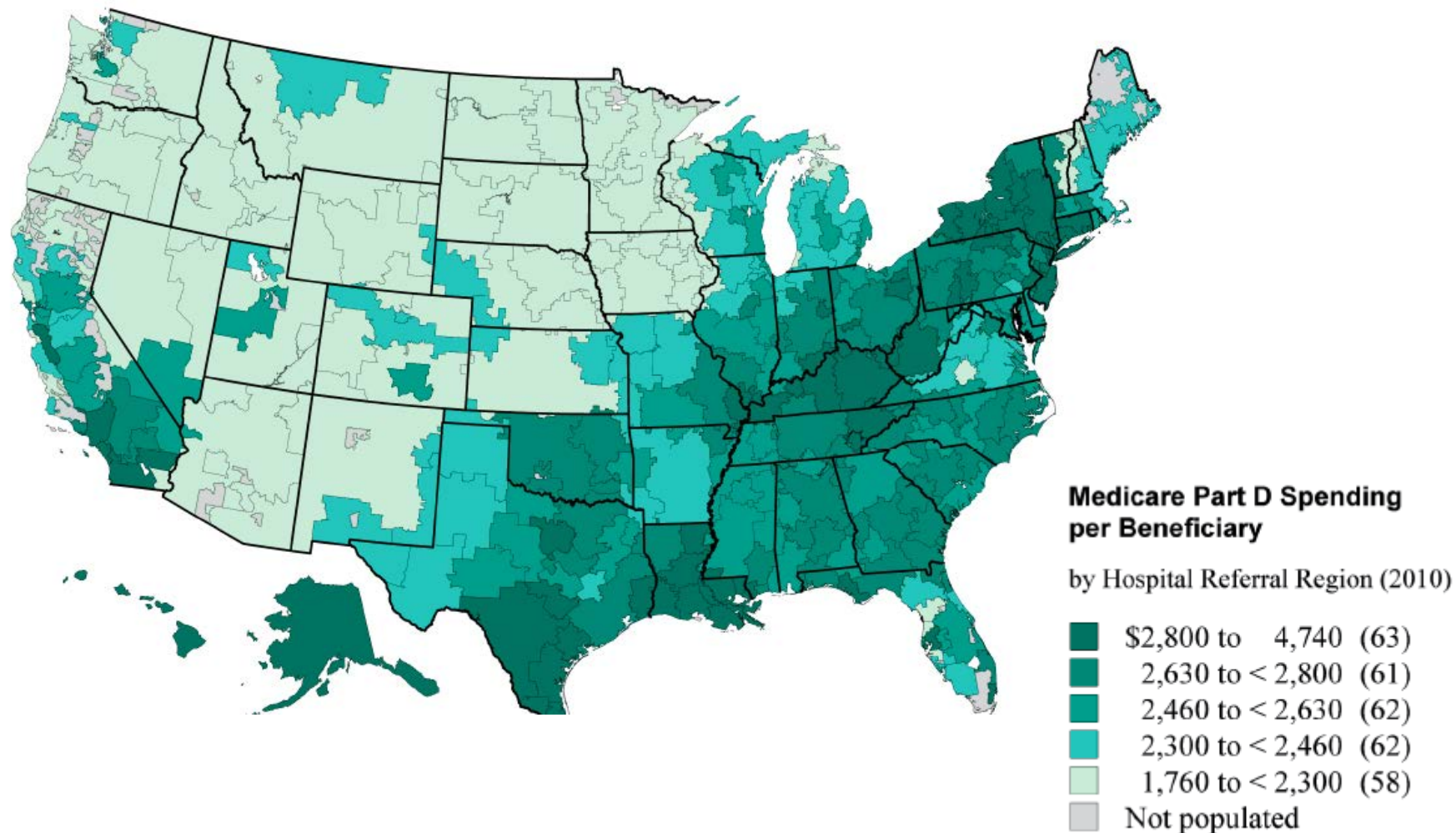


# Regional variations = Different rates of diffusion

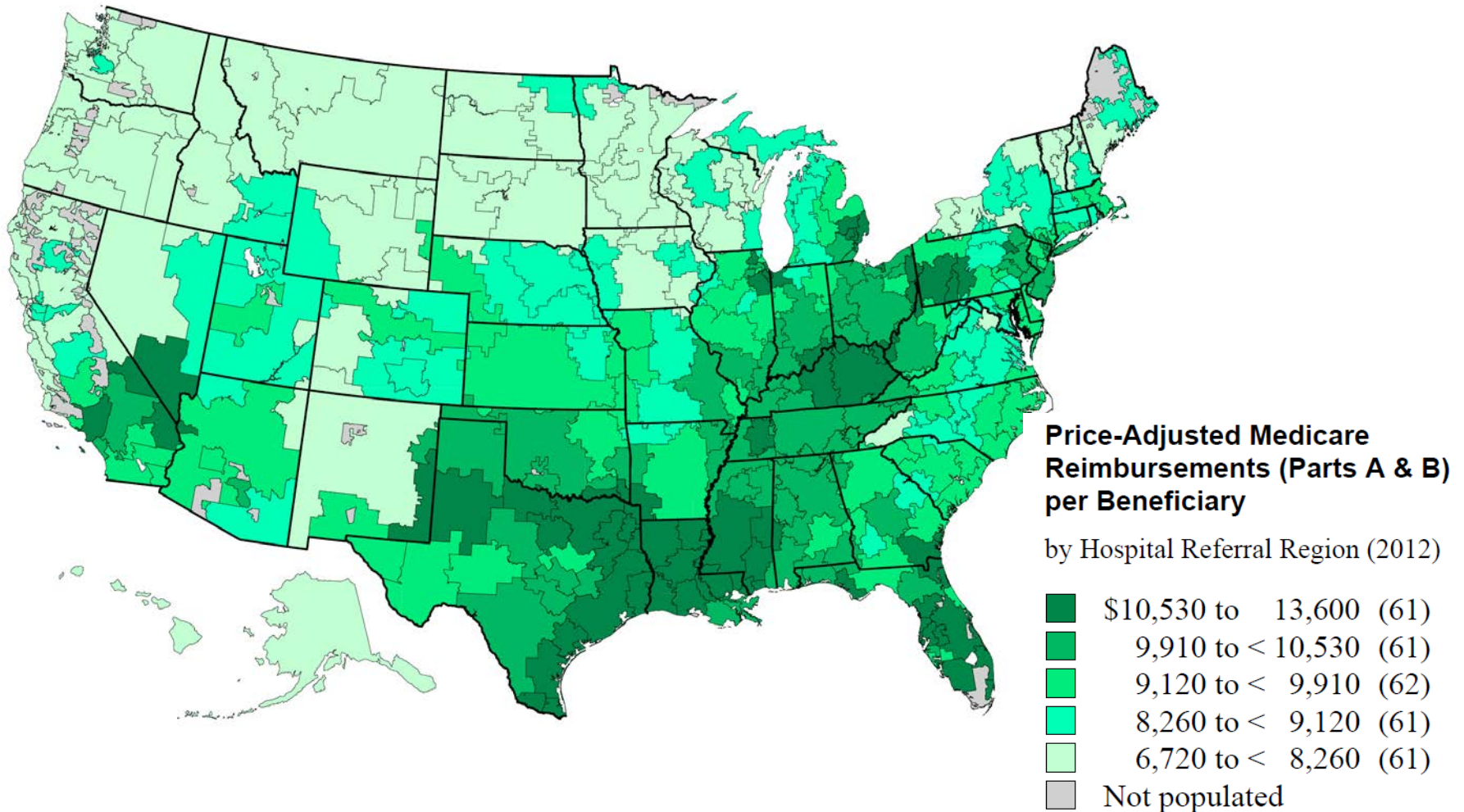


Dartmouth Atlas Project

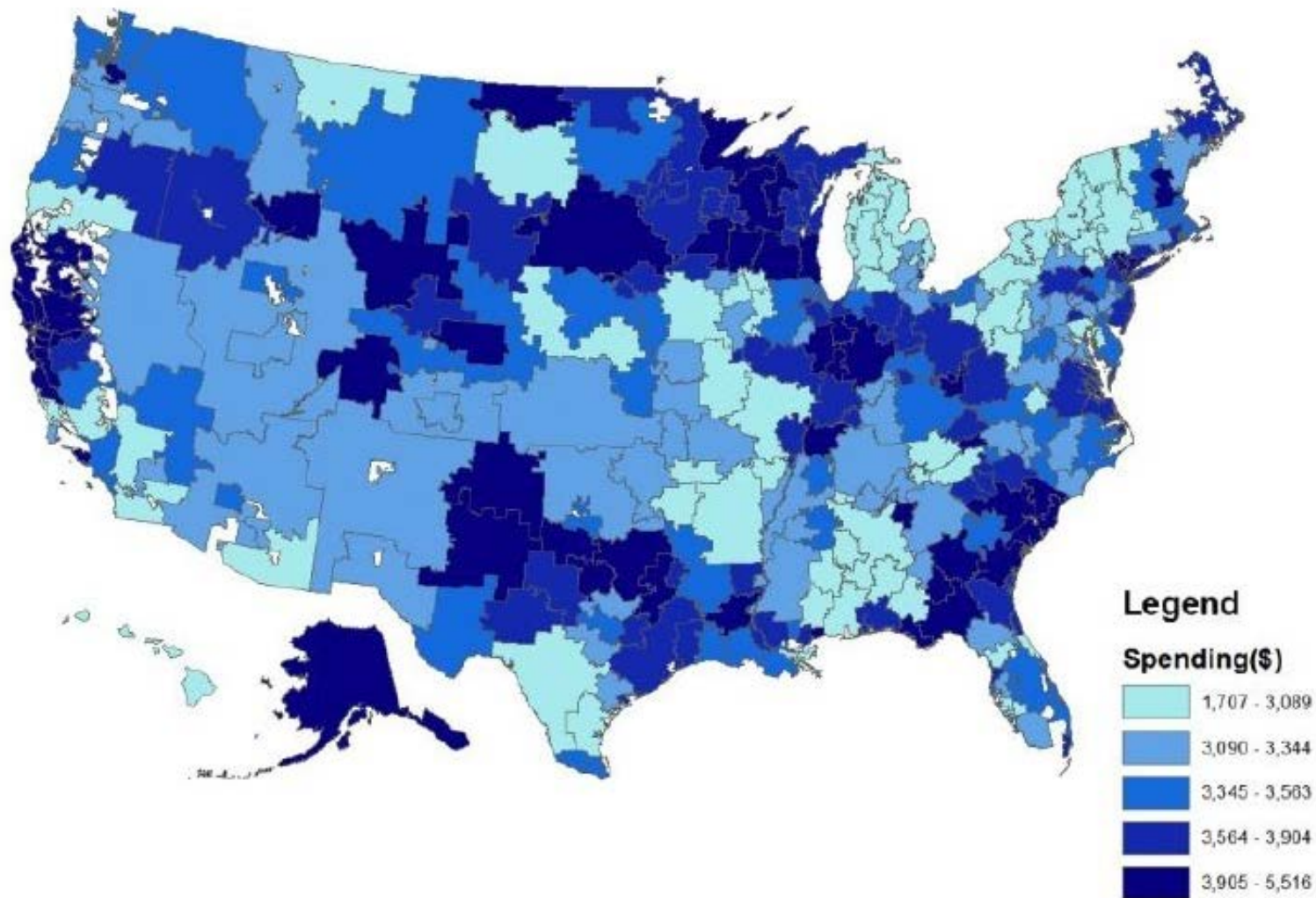
# U.S. Medicare prescription drug spending, 2010



# 2012 Price-Adjusted Per Capita Medicare Spending



# Different patterns of spending in <65 age groups

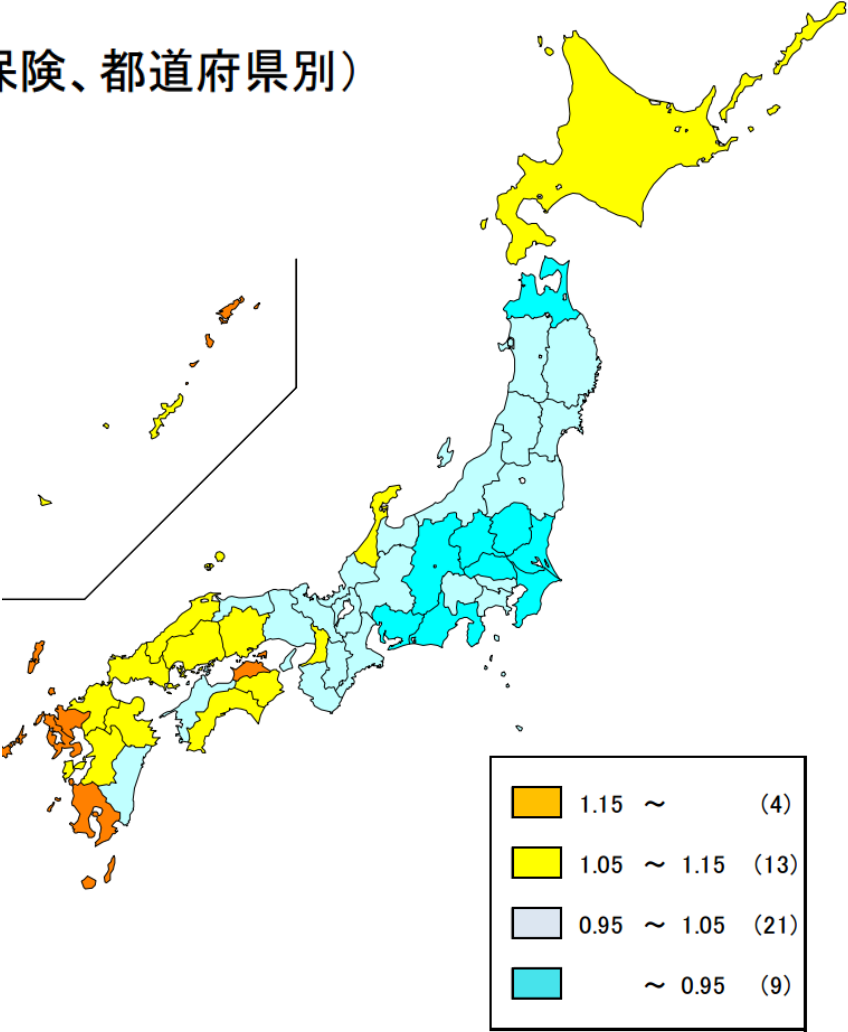


Source: Z. Cooper et al., 2015

# Japan: Healthcare spending variation

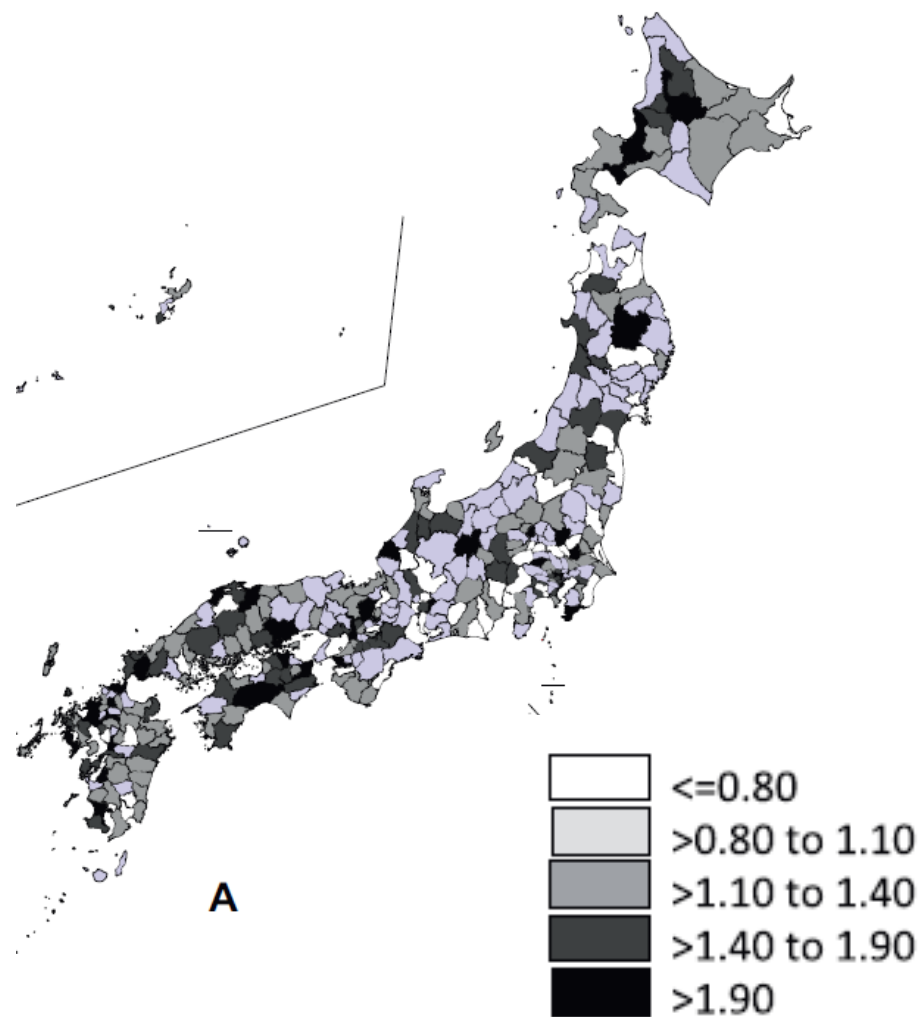
地域差指数(年齢補正後)

医療費マップ(市町村国民健康保険、都道府県別)





# Japan: Hospital physicians per 1000, 2008

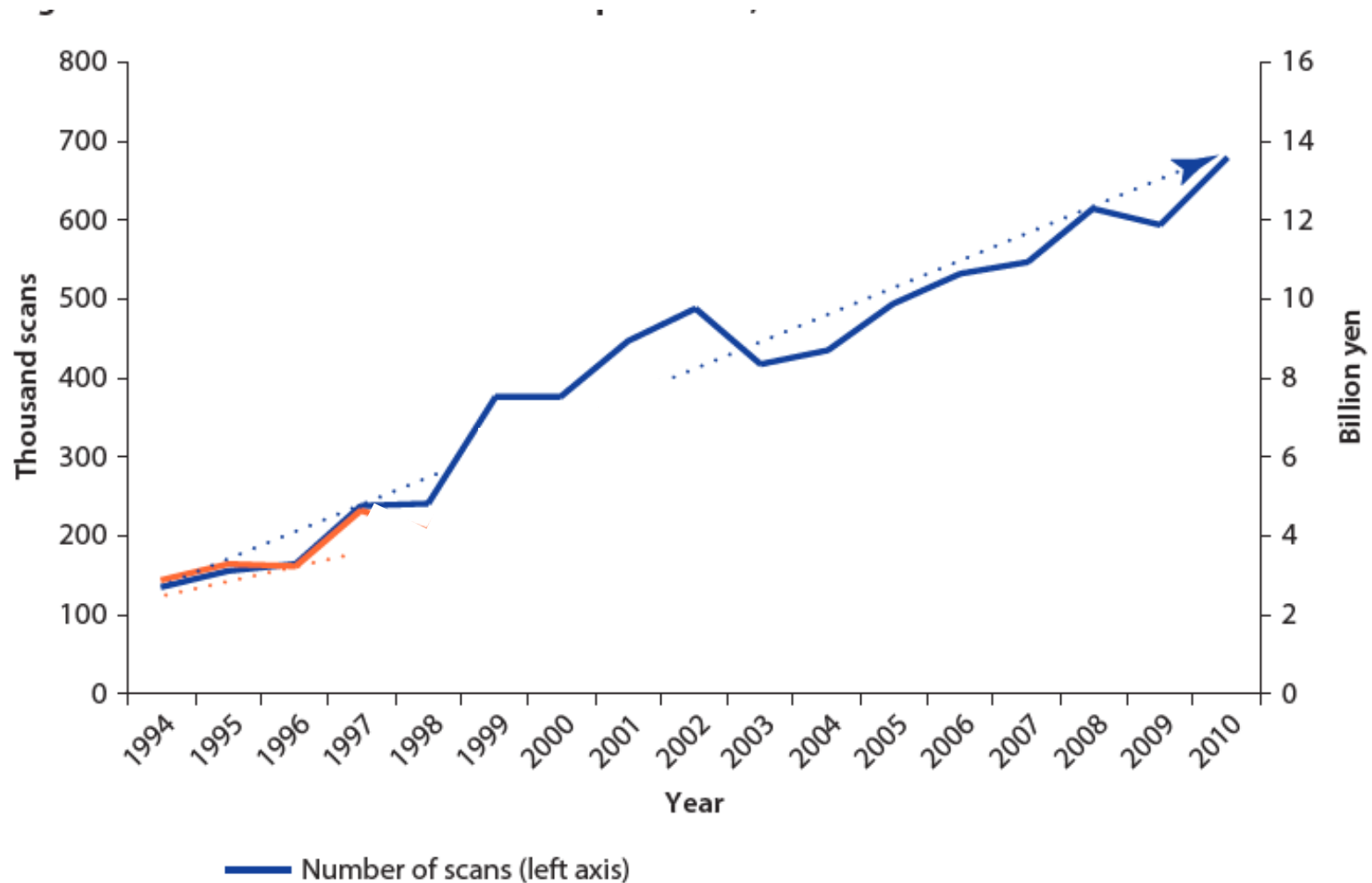


Shinjo and Aramaki, 2010

# An example of a new technology (circa 1990s)

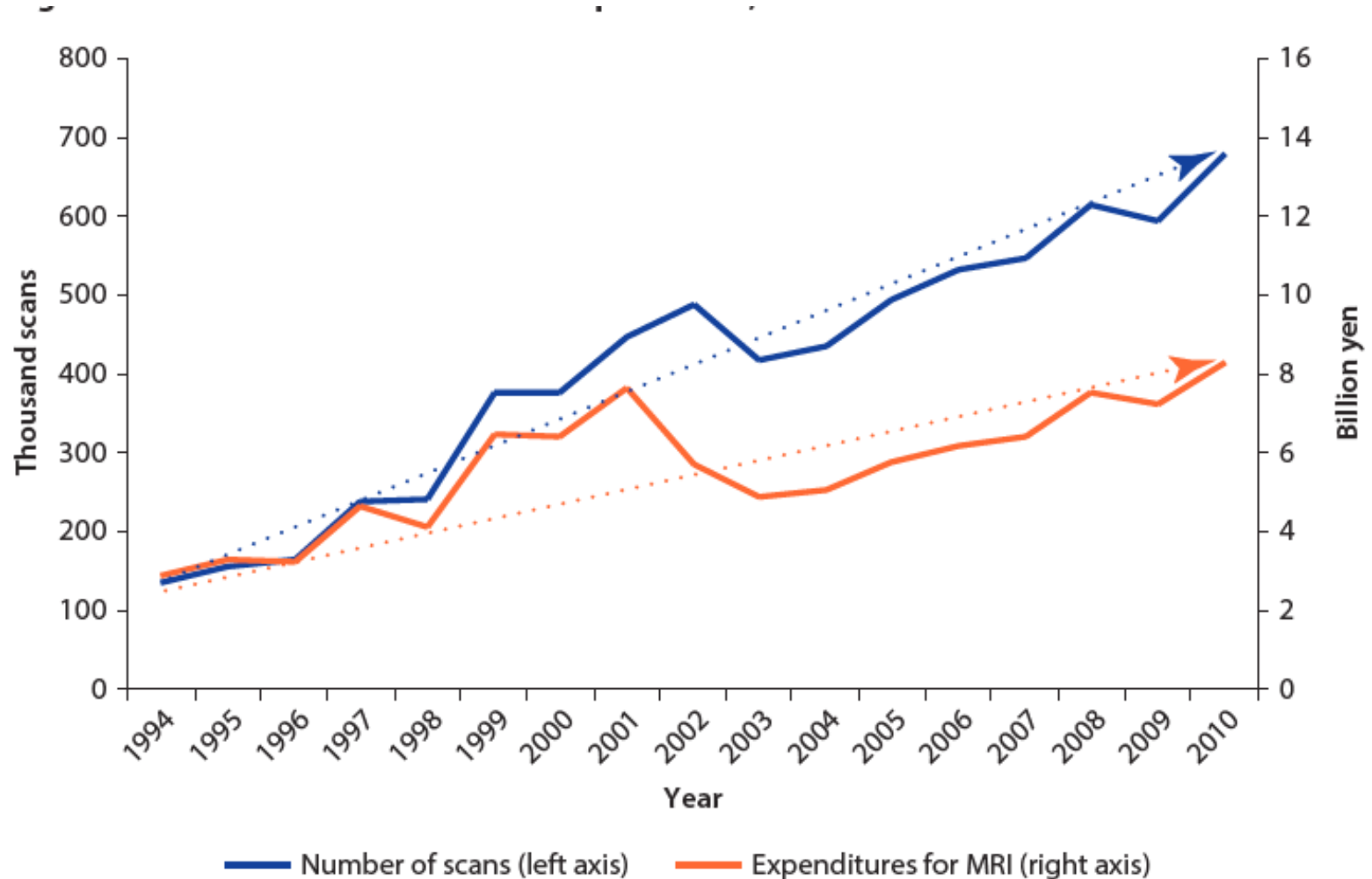
## Magnetic Resonance Imaging (MRIs)

# Number of MRI scans in Japan: 1994-2010



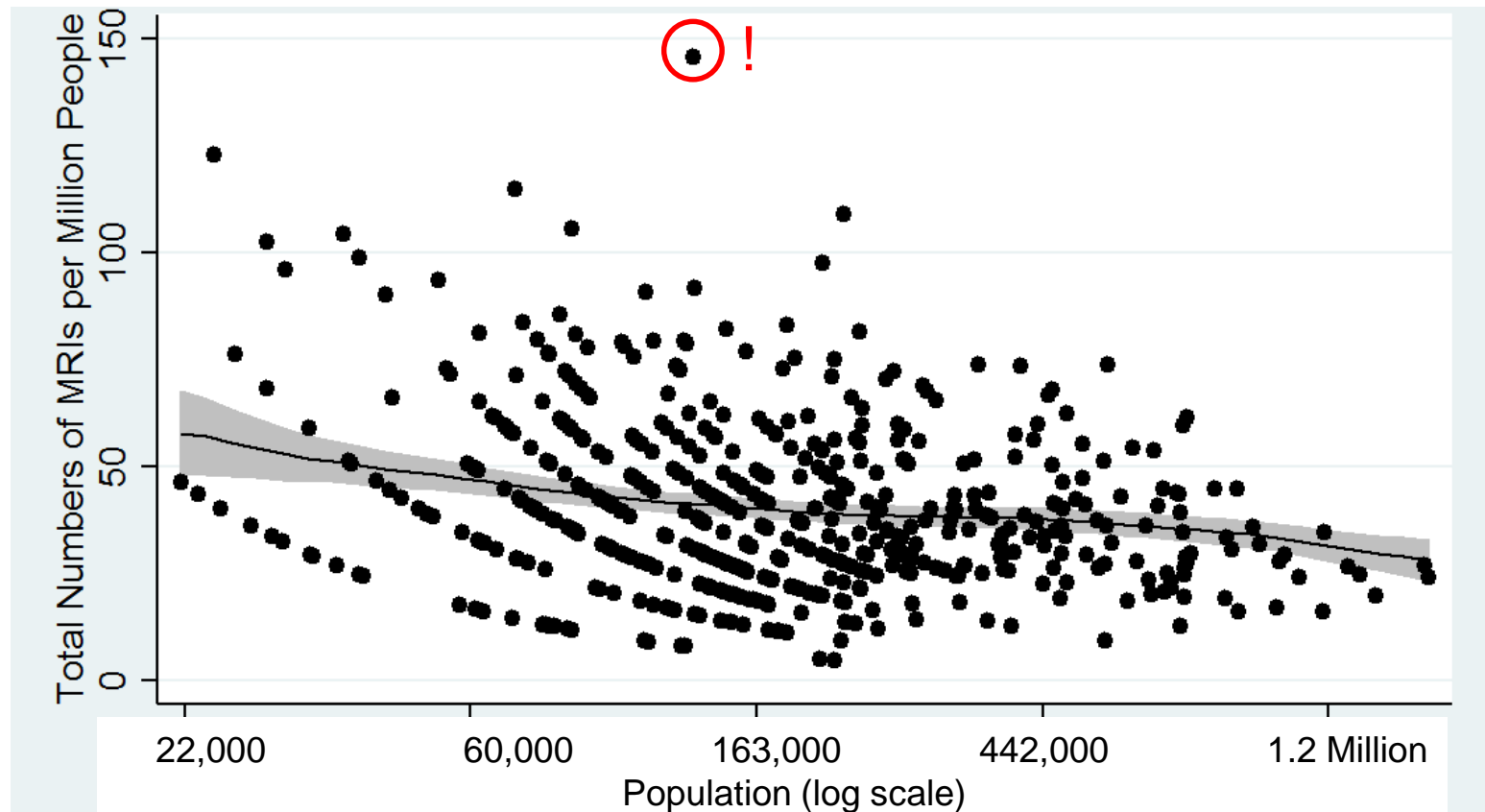
Ikegami, 2014, p. 75 (modified)

# 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

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

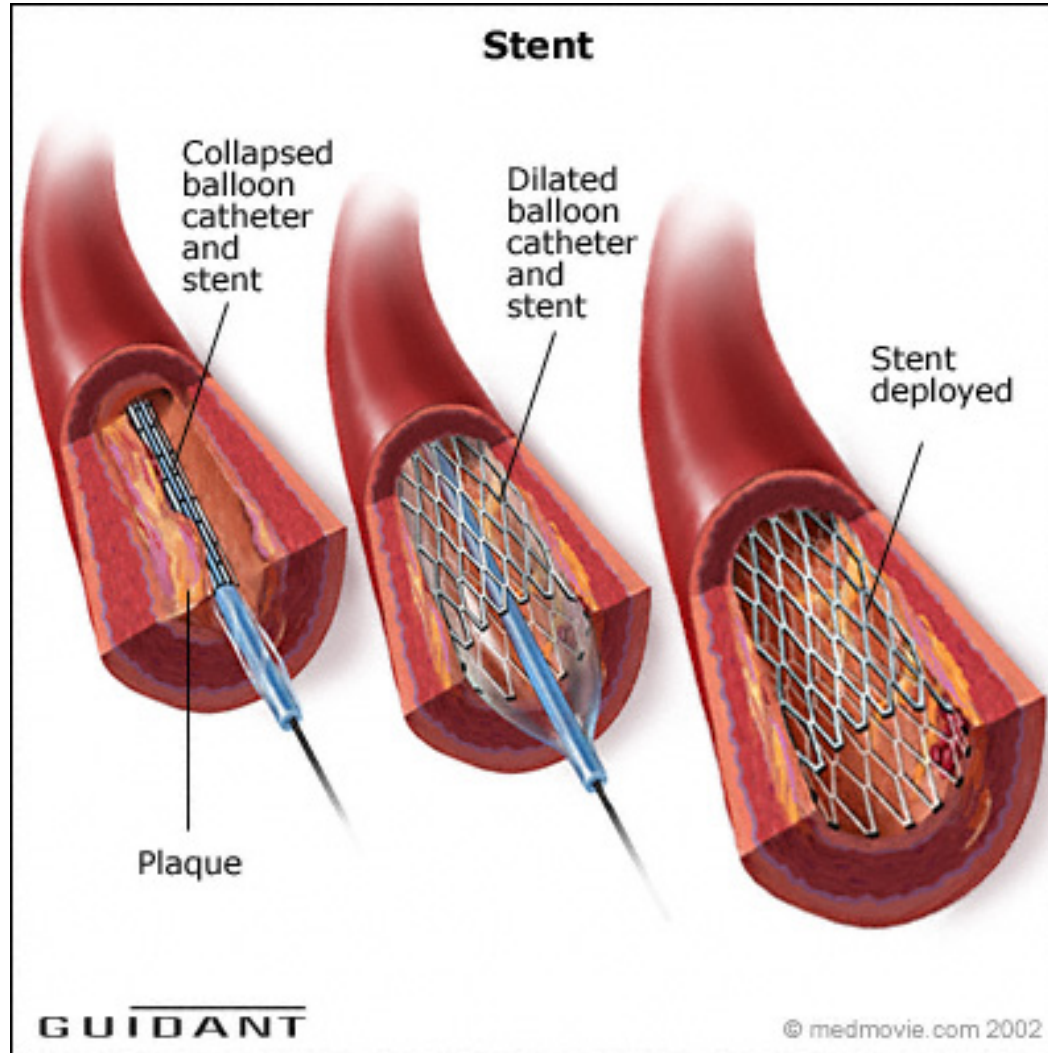


# The other side of diffusion: “Exnovation”

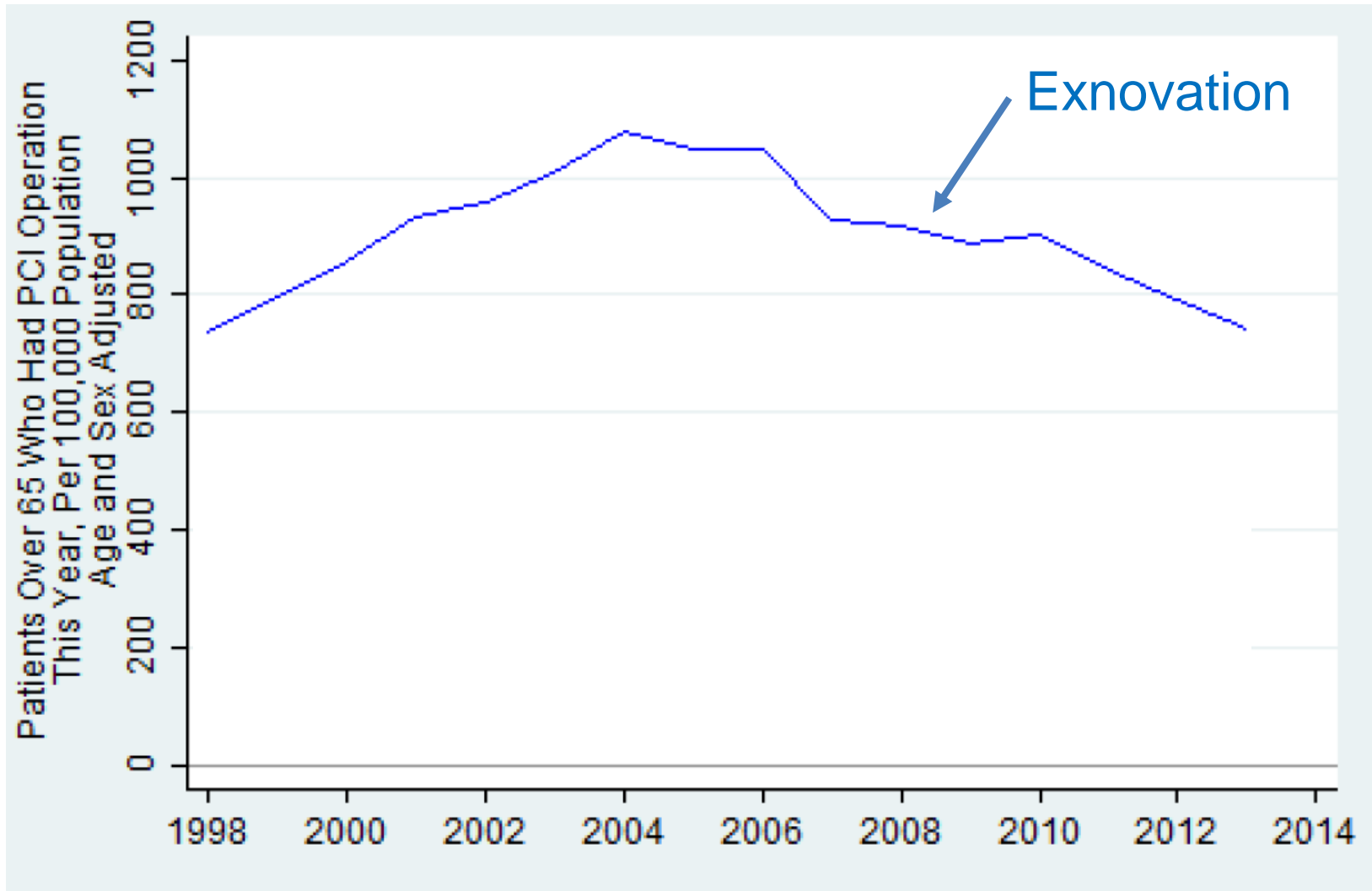
- **Exnovation or de-diffusion occurs when:**
  - A treatment is deemed to be not useful or even harmful
  - A treatment is replaced by something better
- **A different process from diffusion:**
  - Requires stopping what one has been doing for years
  - Rate for least-appropriate patients should decline the most

*What are characteristics of efficient exnovators?*

# Angioplasty & stenting (PCI): Cardiovascular disease

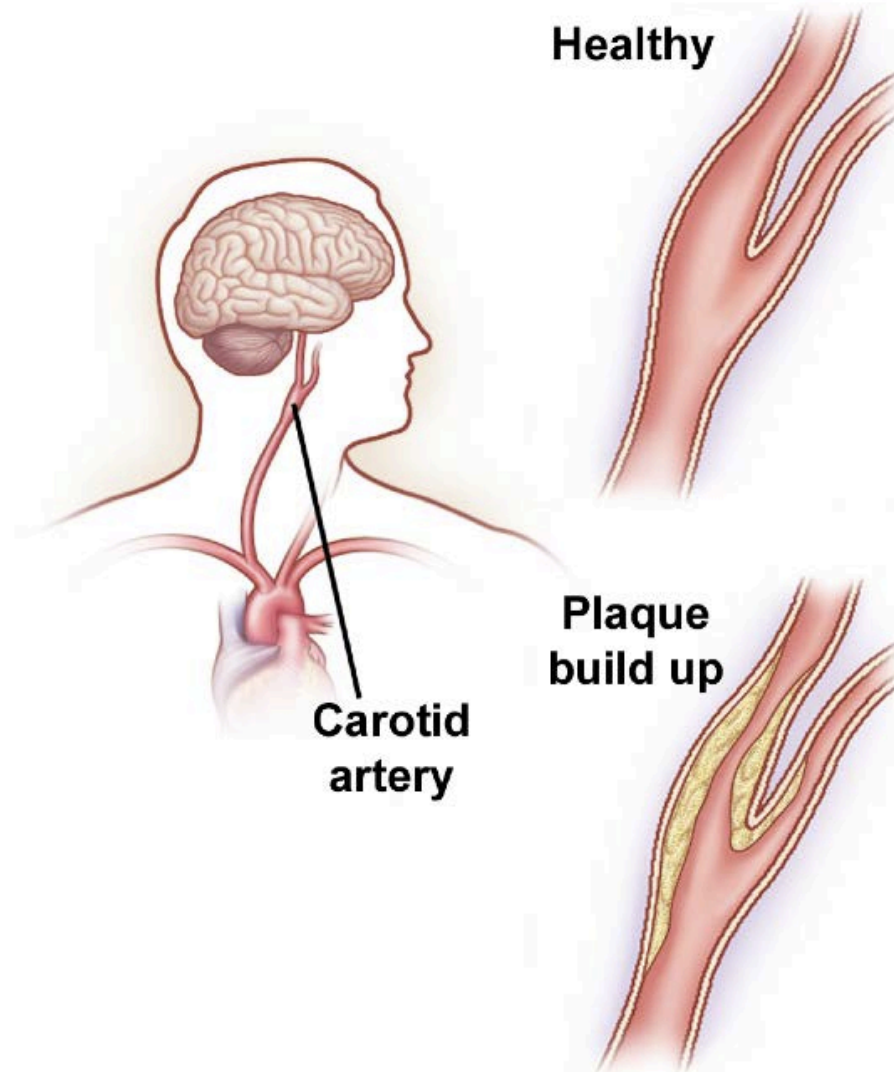


# PCI (stent) rates per 100,000 65+, U.S., 1998-2013



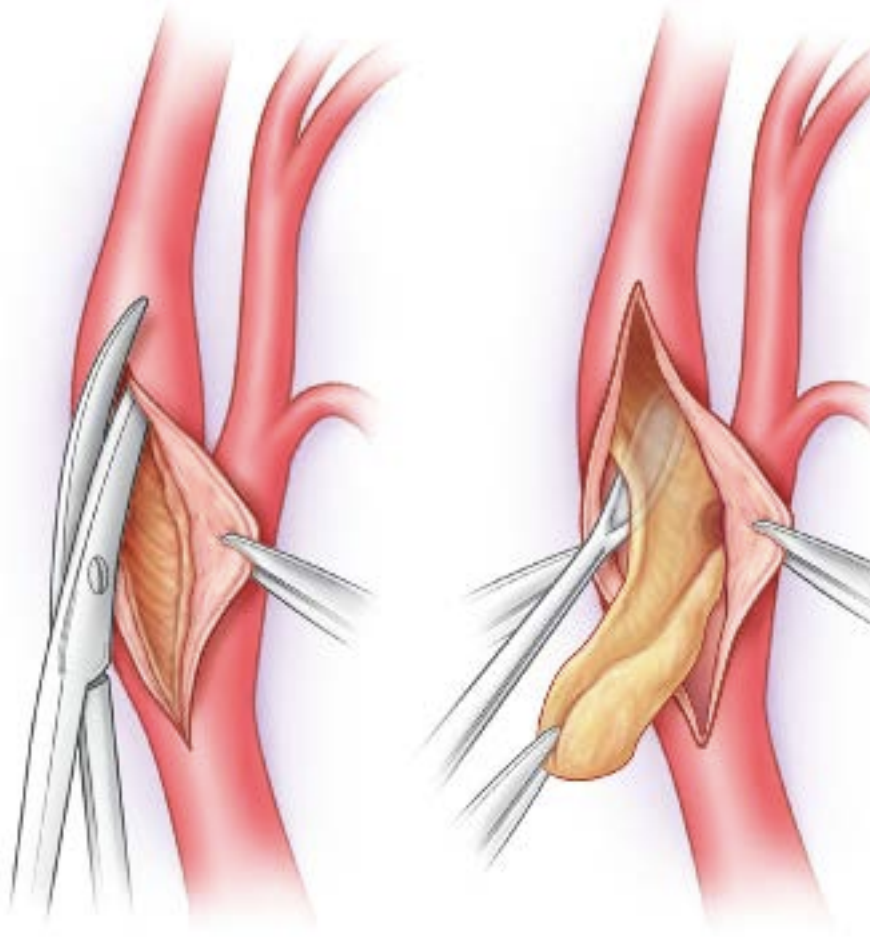
Source: Kelly et al., 2016

# Carotid Atherosclerosis

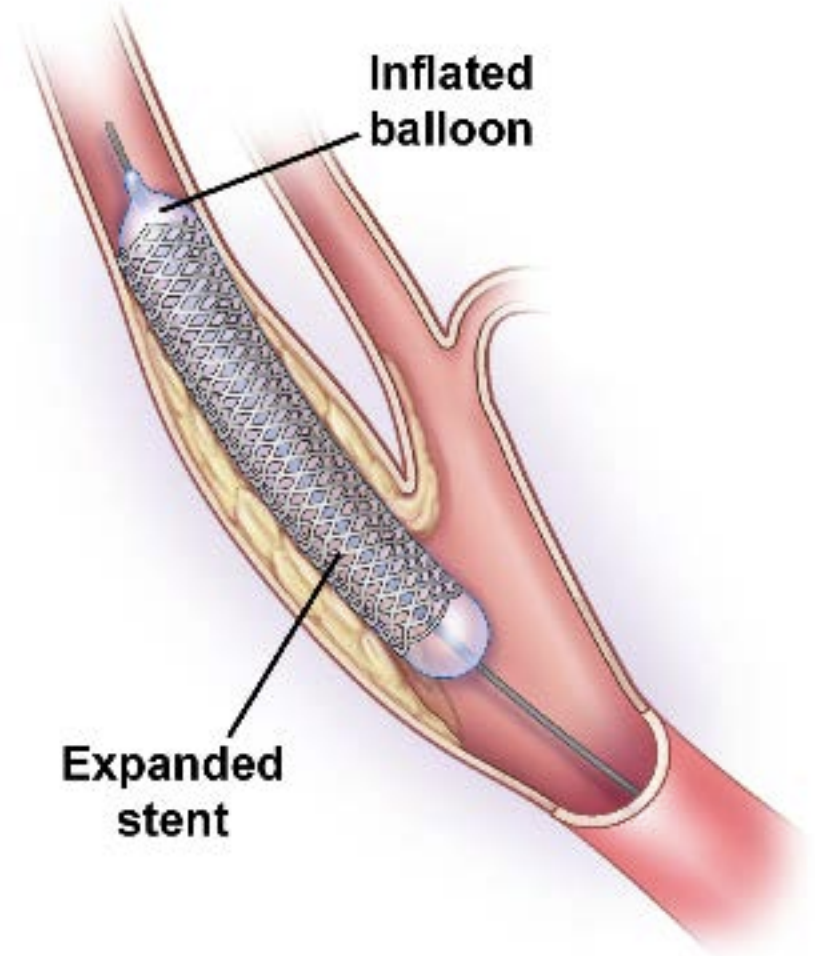


# Carotid endarterectomy/stenting to remove plaque

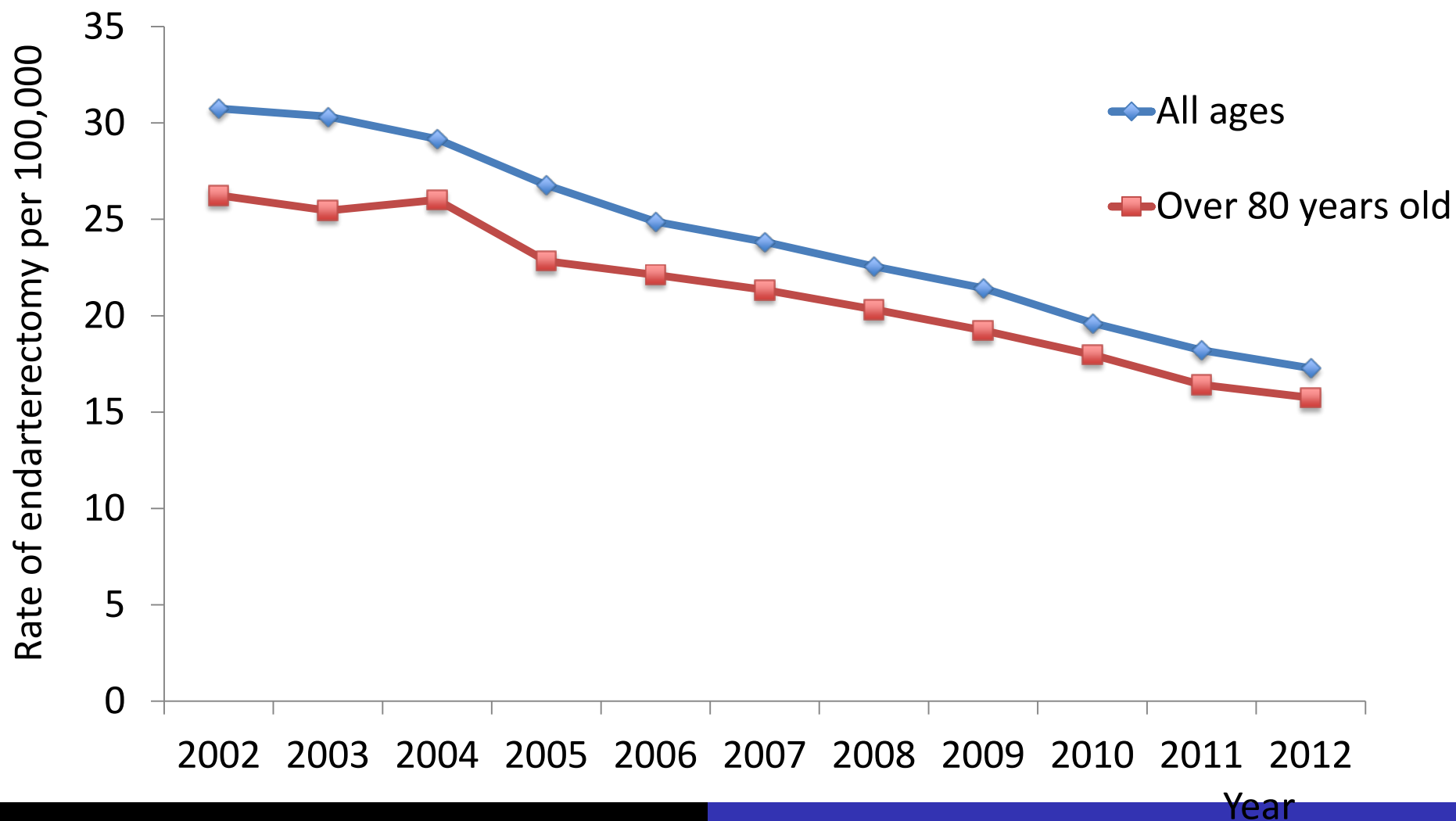
CEA



CAS



# Exnovation in the use of carotid surgery



# Exnovation: In sum...

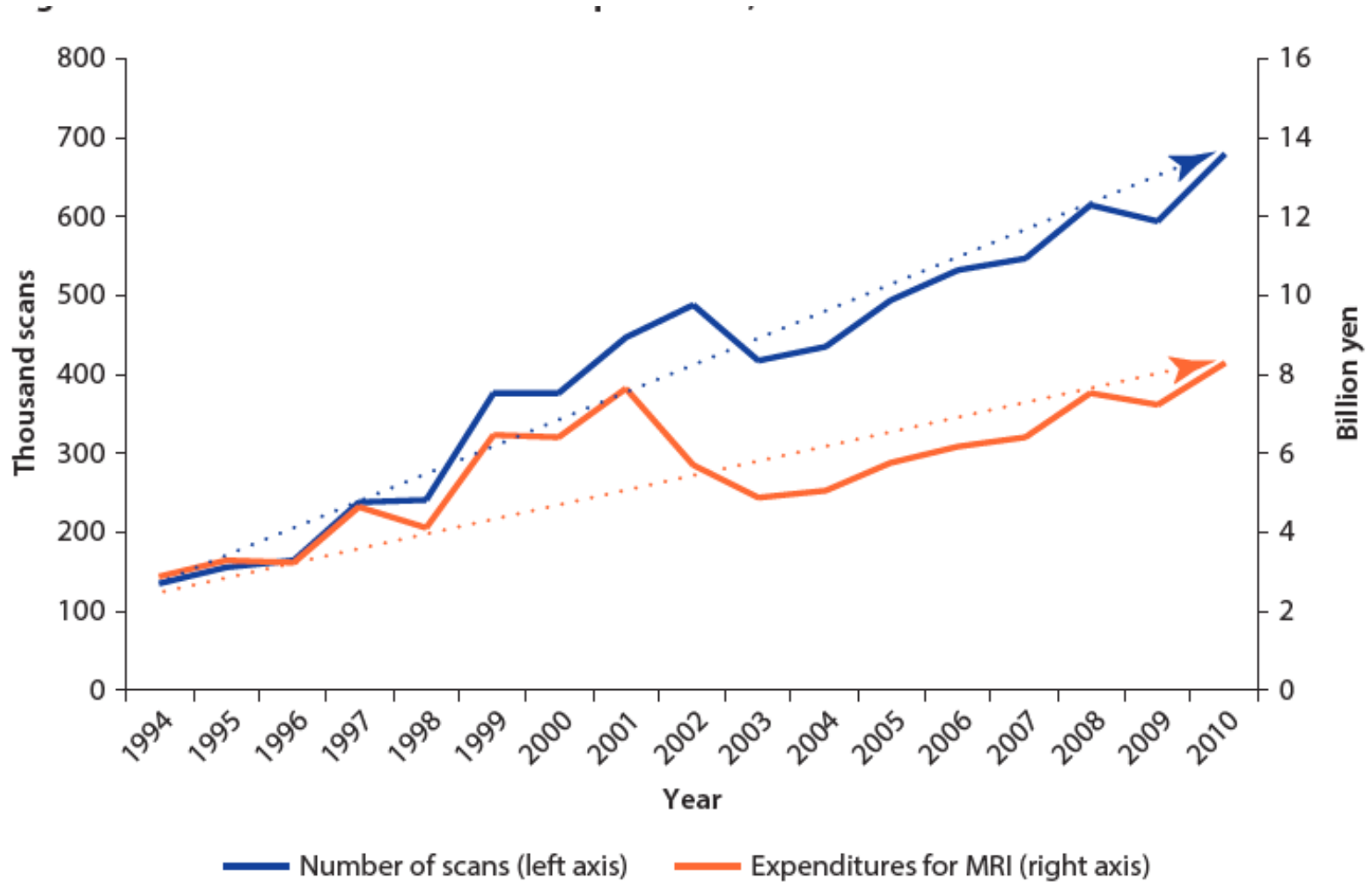
- Exnovation is an under-studied but common process in health care
- Requires healthcare providers to scale back (sensibly) what they've been doing for years
- Potential “win-win”: Better quality care at lower cost

# 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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