

---

THE DARTMOUTH INSTITUTE  
FOR HEALTH POLICY & CLINICAL PRACTICE

---



# **Lessons learned from Medicare claims-based methods of studying digital health records**

Julie Bynum, MD MPH

Associate Professor

The Dartmouth Institute for Health Policy & Clinical Practice

Geisel School of Medicine at Dartmouth

# Medicare Administrative Data

- Medicare is the health insurance for all Americans over age 65
- Federal system so all data centralized
- Diagnosis required for every service delivered except for medications
- Complete capture of services because necessary for payment

# Where does the information come from?

## Physician Billing

### Advantages

- Collection streamlined into care
- Large, diverse population
- Long term outcomes less expensive to collect
- Outcomes relevant to clinical care and policy



The form is a complex medical billing document. It includes sections for:

- Patient Information:** Name, address, date of birth, sex, and insurance plan details.
- Physician Information:** Name, address, and contact details.
- Insurance Details:** Policy number, group number, and plan type.
- Medical History:** A section for recording medical history and current conditions.
- Procedures:** A section for recording medical procedures performed.
- Diagnosis:** A section for recording medical diagnoses.
- Signature and Date:** A section for the physician's signature and the date of service.

# **Historical Snapshot 2002**

## **Alzheimer's Disease**

### **Health Services Research**

- Debate: Less sick general older population?
- Limited to clinical registries & managed care
- Studies too small to fully adjust comorbidity

# The Relationship Between a Dementia Diagnosis, Chronic Illness, Medicare Expenditures, and Hospital Use

Characteristics of Fee-for-Service Medicare Patients with and without a Claim for Dementia in 1999, 5% National cross-sectional sample		
	Dementia Patients (n= <b>103,512</b> )	No Dementia (n= <b>1,135,383</b> )
Female, %	68	59
Age, mean	81.9	74.9
Age distribution, %		
65–74	18	54
75–84	44	36
85–94	34	10
≥95	4	1
Mortality, %	20	4
Chronic conditions, mean	4.2	1.9

*P*-values all <.001 dementia vs no dementia.

Stratum by Number of Chronic Conditions	All-Cause Hospitalization
	<u>Adjusted OR Associated with Dementia (95% CI)*</u>
0	5.92 (5.60–6.27)
1	3.36 (3.24–3.49)
2	3.33 (3.22–3.44)
3	3.38 (3.27–3.50)
4	3.10 (2.97–3.23)
5	2.87 (2.71–3.04)

\*adjusted for age, sex, race, propensity to die

# The Relationship Between a Dementia Diagnosis, Chronic Illness, Medicare Expenditures, and Hospital Use

Characteristics of Fee-for-Service Medicare Patients with and without a Claim for Dementia in 1999, 5% National cross-sectional sample

	Dementia Patients (n=103,512)	No Dementia (n=1,135,383)
--	----------------------------------	------------------------------

## *Who “shows up” in Medicare claims with a disease?*

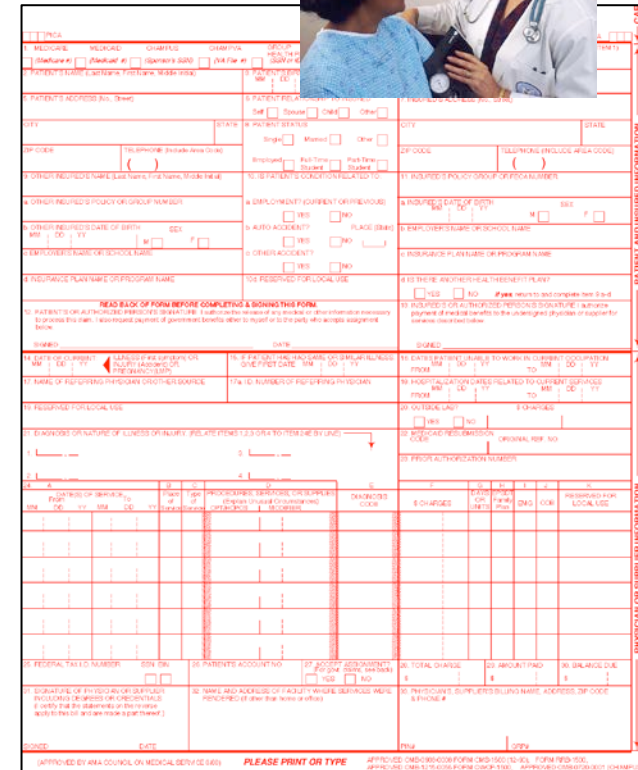
65–74	18	54
75–84	44	36
85–94	34	10
≥95	4	1
Mortality, %	20	4
Chronic conditions, mean	4.24	1.85

# Where does the diagnostic info come from?

## Physician Billing

### Weaknesses

- Dependent on person presenting to medical system
- Accuracy of diagnosis
- Costs of start up to use
- Some populations missing (capitated insurance plans)

The form is a complex medical billing document. It includes sections for:

- Patient Information:** Name, address, date of birth, sex, and contact details.
- Insurance Information:** Policy number, group number, and insurance type.
- Physician Information:** Name, address, and contact details.
- Procedure Information:** Description of the procedure, date, and location.
- Billing Information:** Billing code, amount, and payment details.

The form is divided into several columns and rows, with various checkboxes and fields for data entry. It is a standard form used in medical billing to ensure accurate and complete information is recorded.



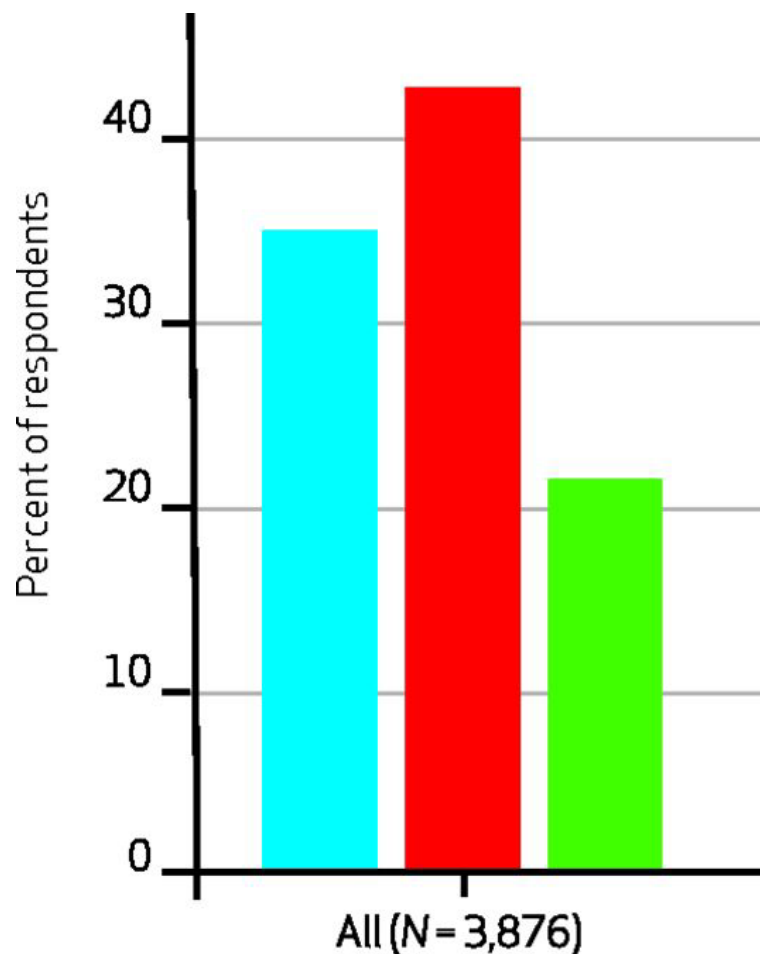
# Improvements in using Medicare data in current studies

- Linkage to other data sources with objectively measured cognition
  - Health & Retirement Study N=20,000
  - Current Grant - Nurse's Health Study linkage
    - N=20,000 approximately

Advantage: Moderate to large sample, more precise cognitive status, outcomes measureable from billing data

## Cognitive Functioning In 3,876 Health And Retirement Study Respondents With Linked Medicare Claims At Last Interview Before Dying In The Period 1998–2007.

● Normal cognition ● CIND/mild dementia ● Severe dementia



Two-thirds of people had at least some cognitive impairment in the period before death.

# Improvements in using Medicare data in current studies

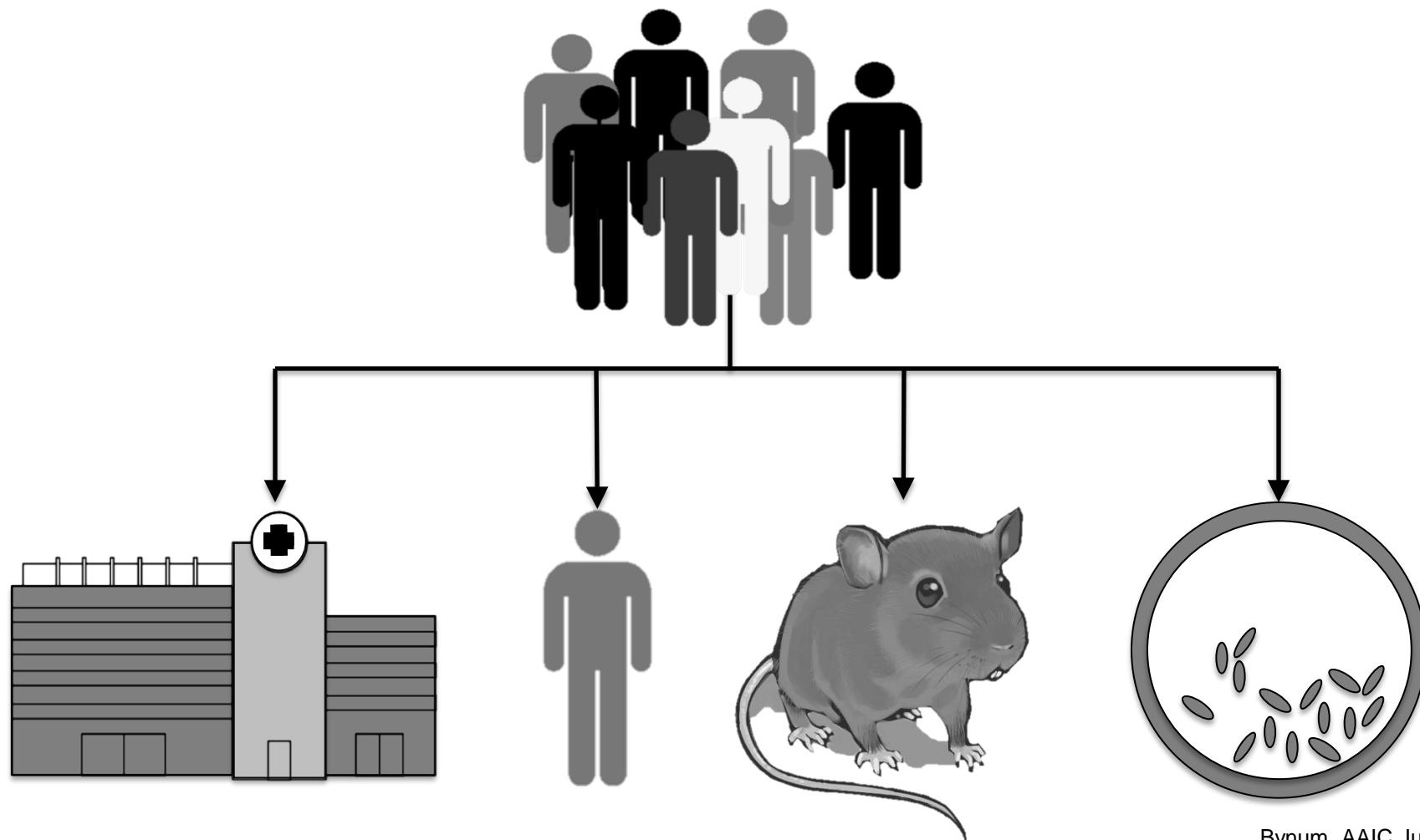
- Linkage to other data sources
  - Health & Retirement Study N=3,876
  - Current Grant - Nurse's Health Study linkage
    - N=20,000 approximately
- Use of the pharmaceutical use (Part D)
  - Current in-progress paper on use of anti-dementia drugs in clinical practice

# Medicare Benes\* with Dementia Diagnosis followed 1 Year Medication Use (2009)

<b>N</b>	433,559
<b>Age</b>	83.2
<b>Sex</b>	
Female	317,822 (73.3%)
<b>Part D low-income subsidy</b>	253,989 (58.6%)
<b>Newly diagnosed in 2009</b>	185,449 (42.8%)

\*enrolled in fee-for-service Medicare and Part D pharmacy benefit

Can population observations from billing data inform clinical and basic sciences?



# A Case for Reverse Translation: Study of Population Drug Effects?

Example:

- For approval, drugs are tested individually
- Testing exposure pairs expensive & time intensive
- Individual drugs have overlapping effect profiles & little is known about combined use
- Current study at Dartmouth of fracture risk associated with interaction between drugs

What are the possibilities for dementia studies with full population medication exposure data?

# Summary

- Billing data expands size and diversity (patient characteristics and geographic)
- Longer term outcomes relevant for families and policy with less expense
- Creatively linked data opportunity to find new, previously unobserved natural experiments