

# An Informatics Architecture for Comparative Effectiveness and Practice Change

Michael Hogarth, MD

Professor, Pathology and Laboratory Medicine

Professor, Internal Medicine

UC Davis School of Medicine



# Overview

- Healthcare cost and performance in the U.S.
- Practice trends in the U.S.
- Comparative effectiveness and why now?
- How is that relevant to ‘informatics’?
- An informatics architecture for comparative effectiveness
- But is that enough?

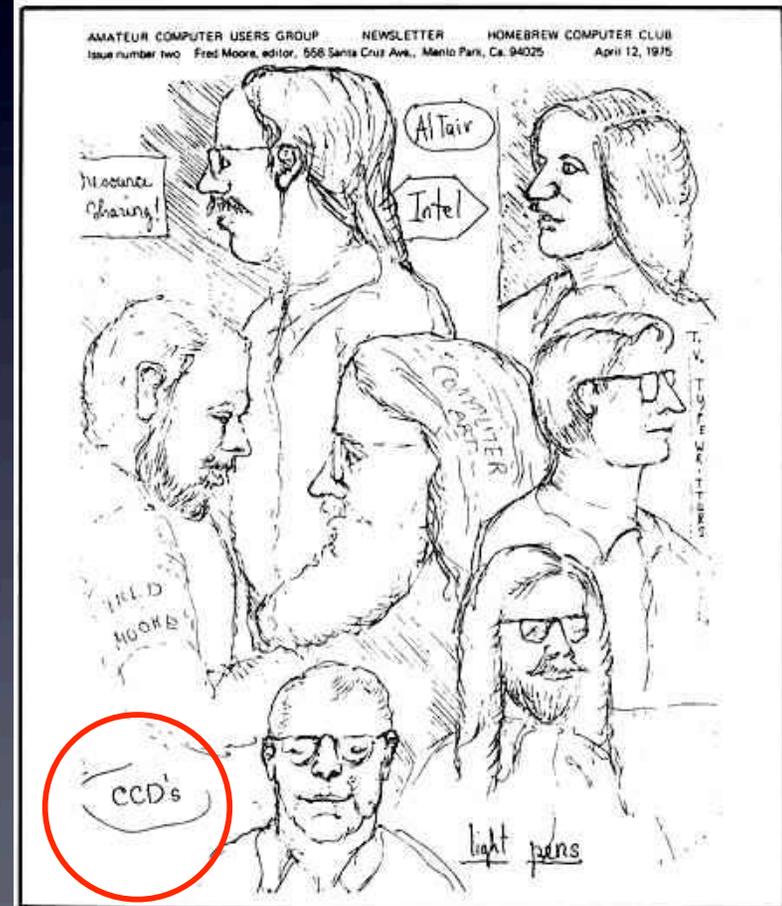
# Before I start: An observation about changing the world

## The Homebrew Computer Club - 1979



JOSH MARTIN

*The cover of the Homebrew Club's first newsletter.*



# National Health Care Spending

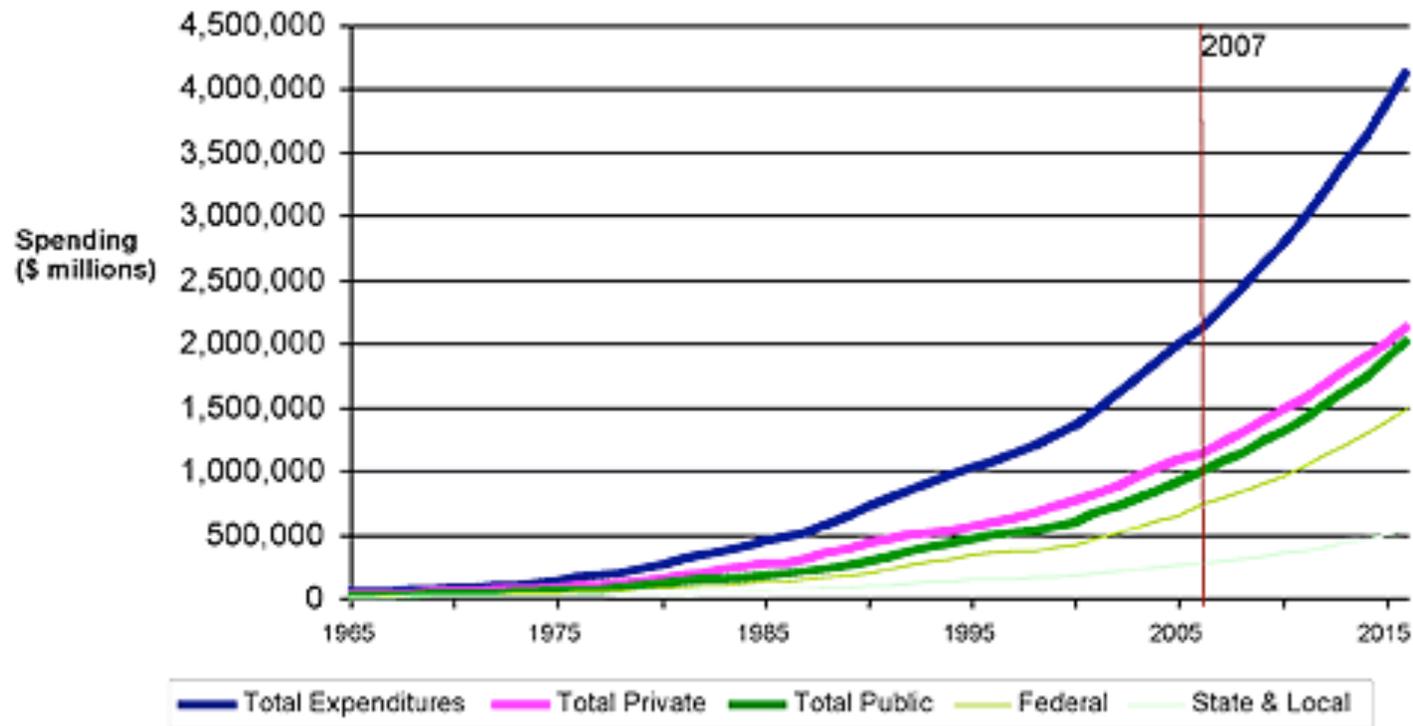
- 2008 - Total spending was \$2.4 TRILLION, or 17% of the Gross Domestic Product (GDP)\*
- Health care spending is 4.3 times the amount spent on national defense
- 46 million are uninsured (15% of the total population -- but higher in non-Medicare pop)
- 1.5 million lose their homes to foreclosure every year due to unaffordable medical costs (the impact is not just healthcare)

\* Keehan, et al. Health Spending Project Through 2017: The Baby-Boom Generation Is Coming to Medicare. HealthAffairs27, no. 2(2008): w145-w155

# Where are we headed?

**Figure 1. National Health Expenditures—Actual and Projected, 1965–2017**

[Click to Zoom](#)

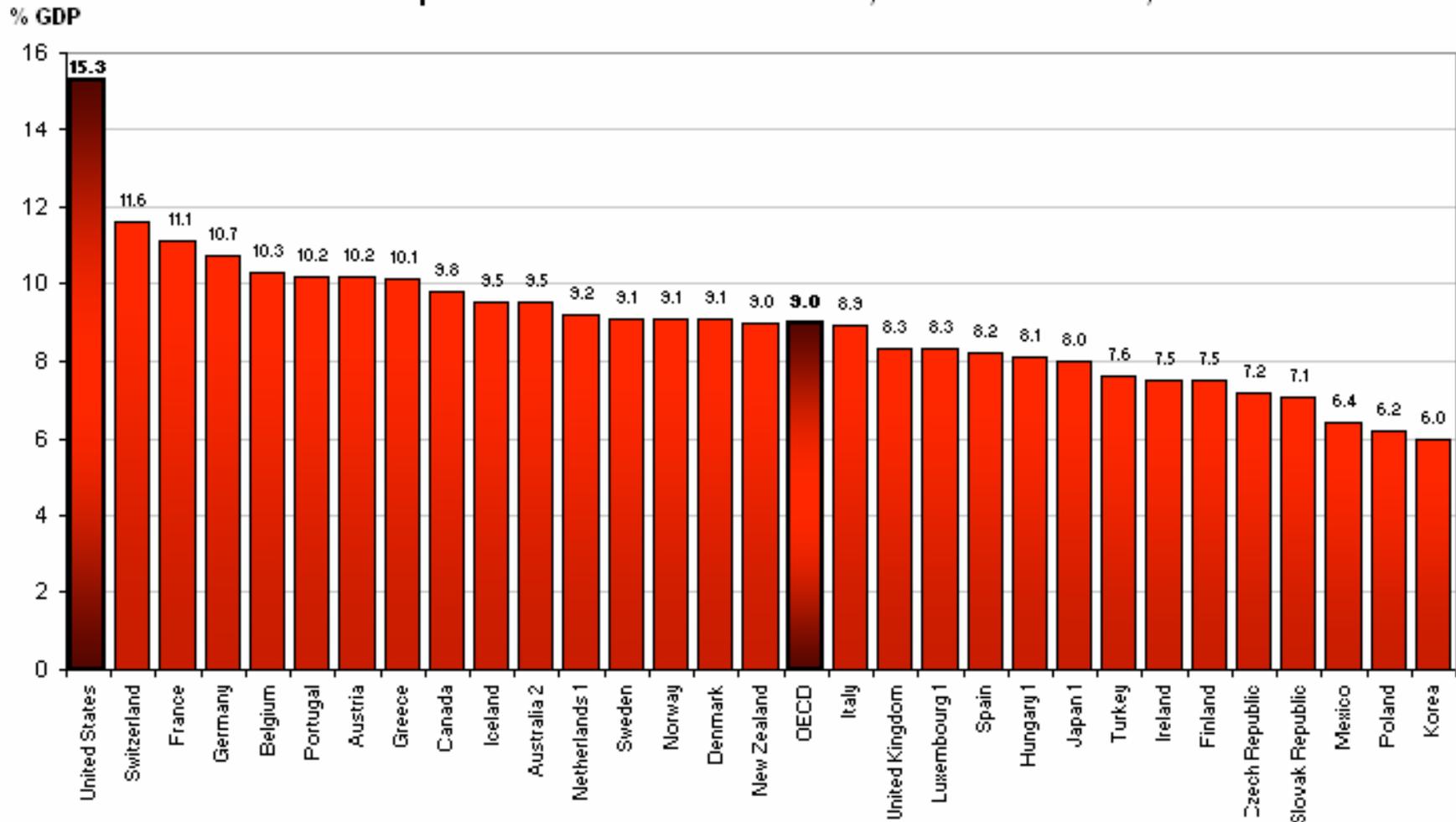


SOURCE: Centers for Medicare & Medicaid Services, Health and Human Services, "National Health Expenditures Accounts, 1965–2017."

<http://www.randcompare.org/current/dimension/spending>

# How do we compare on cost?

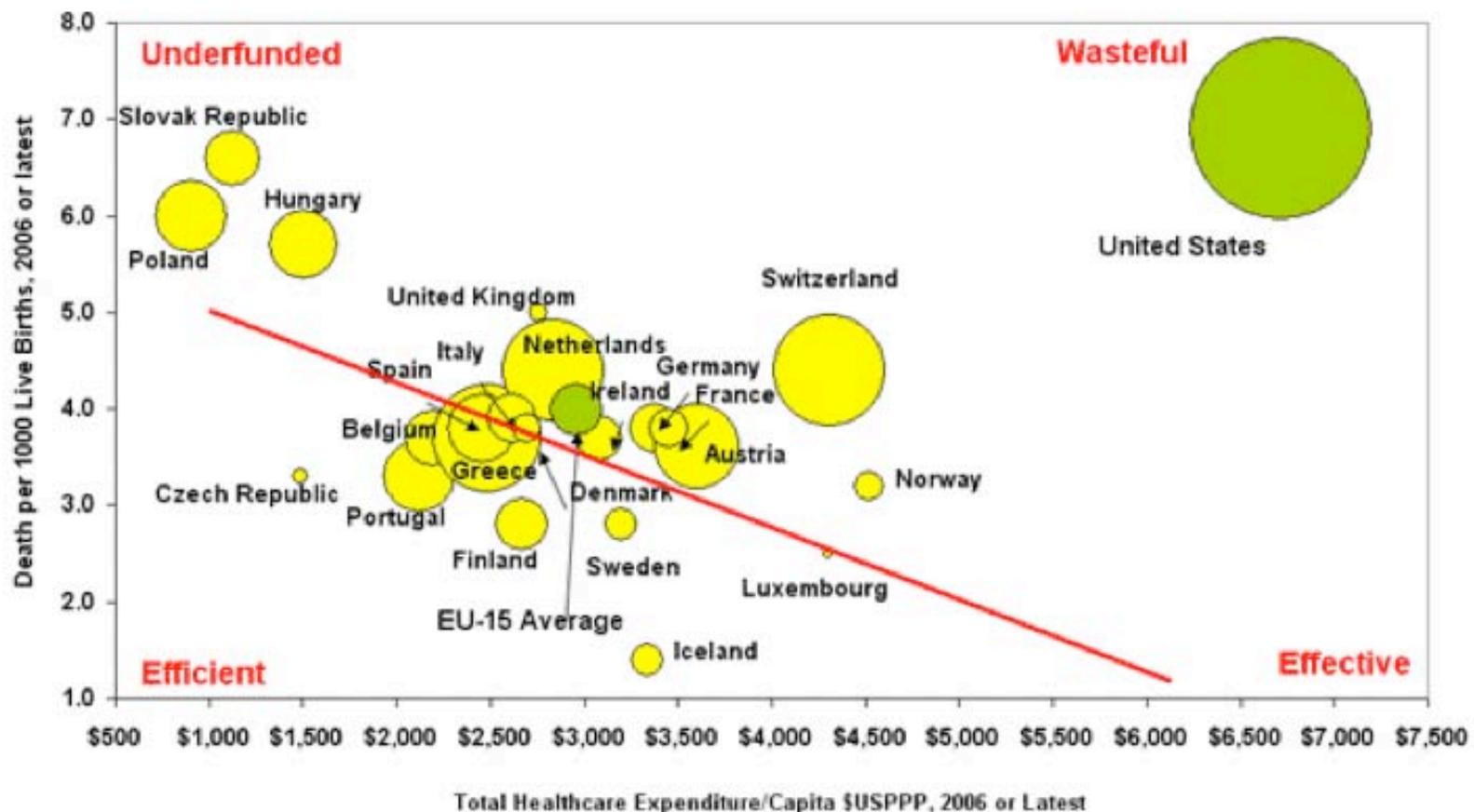
Health expenditure as a share of GDP, OECD countries, 2005



1. 2004. 2. 2004/5. Source: *OECD Health Data 2007*, July 2007.

# How do we compare on quality?

Figure 2: Infant Mortality and Total Healthcare Expenditure/capita, 2006 or latest



Source: OECD Health Database, June 2008 Version. U-15 average is the GDP weighted average

# Atul Gawande and the Cost Conundrum

- McAllen, TX has 100% higher Medicare expenditures than El Paso TX (800mi away)
- Critically ill patients in McAllen received 50% more specialist visits than El Paso
- Four states with the highest levels of spending are at the bottom in quality of patient care

ANNALS OF MEDICINE

## THE COST CONUNDRUM

*What a Texas town can teach us about health care.*

by Atul Gawande

JUNE 1, 2009

TEXT SIZE: A | A | A  
PRINT | E-MAIL | FEEDS | SINGLE PAGE

**I**t is spring in McAllen, Texas. The morning sun is warm. The streets are lined with palm trees and pickup trucks. McAllen is in Hidalgo County, which has the lowest household income in the country, but it's a border town, and a thriving foreign-trade zone has kept the unemployment rate below ten per cent. McAllen calls itself the Square Dance Capital of the World. "Lonesome Dove" was set around here.

McAllen has another distinction, too: it is one of the most expensive health-care markets in the country. Only Miami—which has much higher labor and living costs—spends more per person on health care. In 2006, Medicare spent fifteen thousand dollars per enrollee here, almost twice the national average. The income per capita is twelve thousand dollars. In other words, Medicare spends three thousand dollars more per person here than the average person earns.



*Costlier care is often worse care.*  
Photograph by Phillip Toledano.

### RELATED LINKS

Audio: An interview with Atul Gawande.  
Who pays the price when patients sue doctors?

### KEYWORDS

Health Care; McAllen, Texas; Mayo Clinic;

# A closer look

- US Medicare spending 1992-2006 (per capita)
  - \$5,110 (92) → \$8,304 (06): +3.53%/yr
- Worthy of further study...
  - McAllen TX \$4,891 → \$14,946(+8.31%/yr)
  - Miami FL \$8,266 → \$16,351 (+4.99%/yr)
  - Harlingen TX \$4,220 → \$11,991(+7.75%)

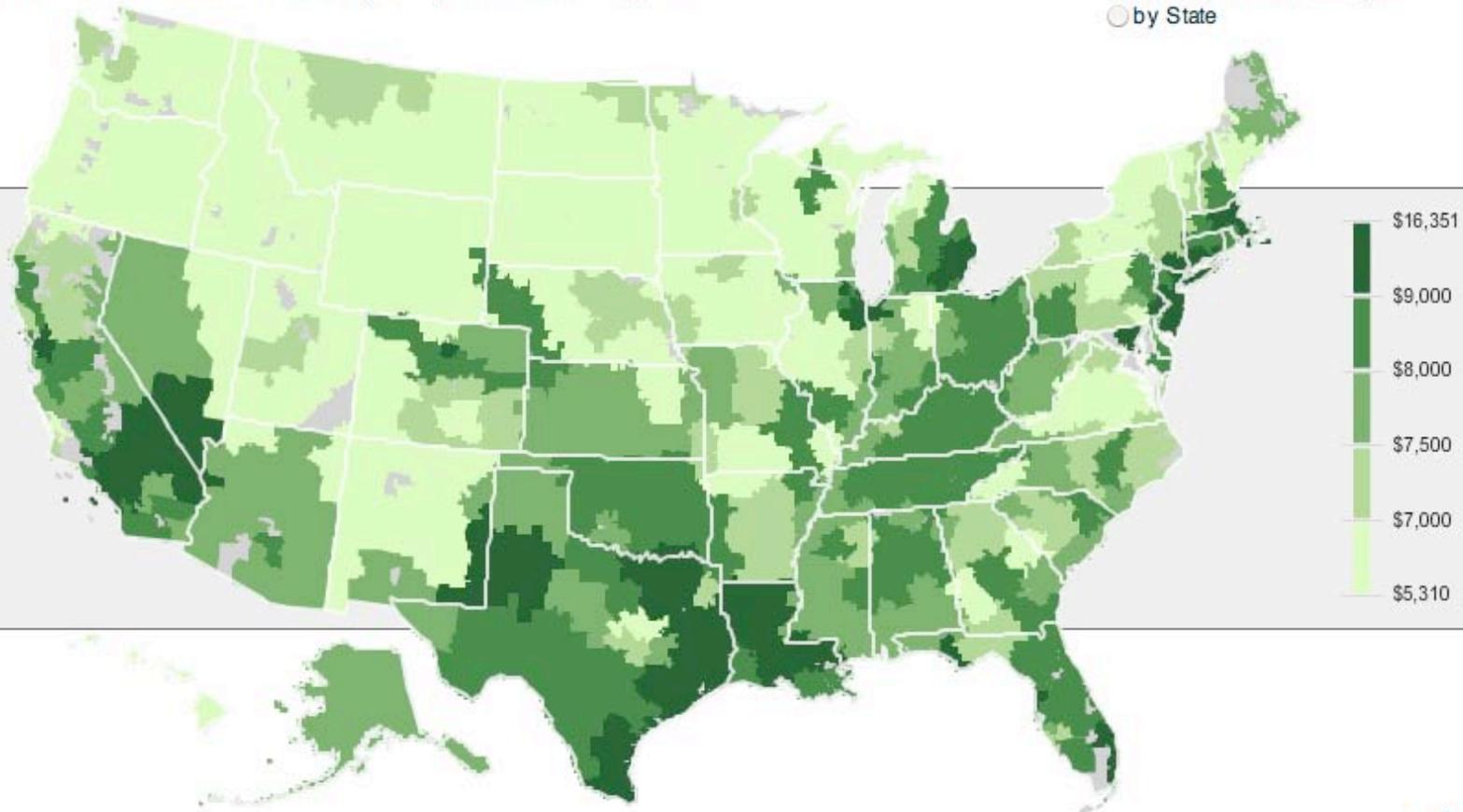
# Costs and Medical Practice by Hospital Referral Region

## Medicare Reimbursements Per Enrollee

2006 Medicare Reimbursements by Hospital Referral Region

Total Reimbursements (2006)

- by Hospital Referral Region
- by State

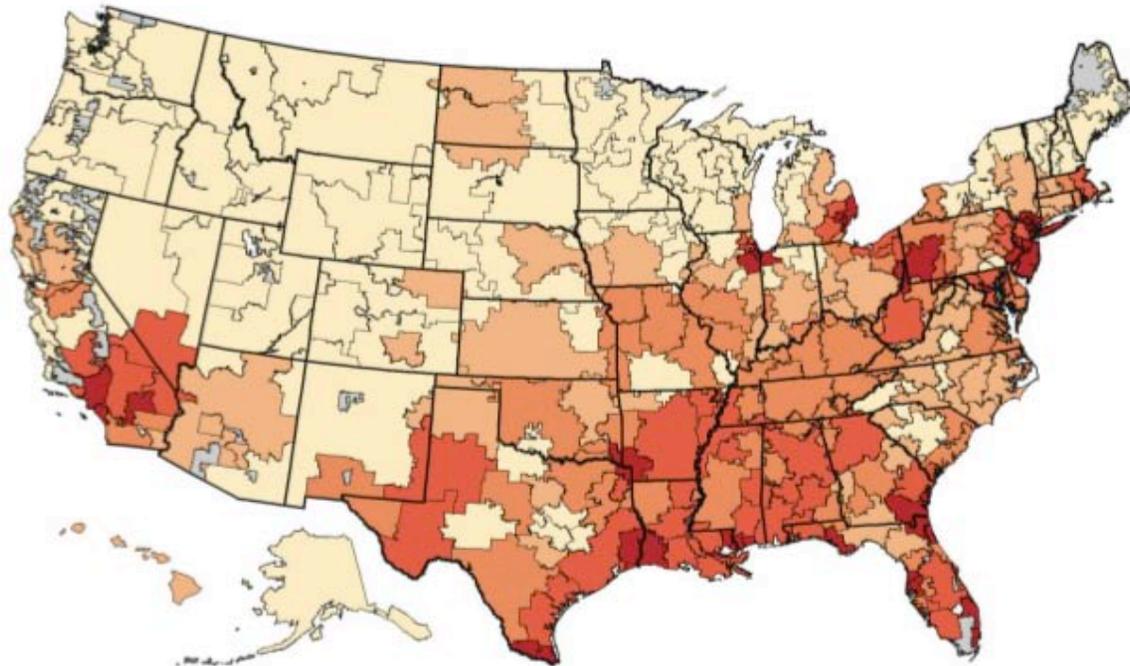


This interactive map demonstrates a vexing issue facing policymakers as they struggle with the cost of health care: Medicare spends vastly different amounts to care for its enrollees depending on where they live, and growth rates vary dramatically across U.S. states and regions. The data show average age-sex-race adjusted Medicare spending per enrollee by state and by hospital referral regions for 1992 and 2006 and the average annual growth rate for the period 1992 to 2006. Hospital referral regions represent regional health care markets for tertiary medical care. The data from the Center for Medicaid and Medicare Services is a 5 percent sample of Medicare spending for people over 65 years old and not enrolled in HMOs.

Graphic: [The Robert Wood Johnson Foundation](#). Source: [Dartmouth Atlas Project](#) at The Dartmouth Institute for Health Policy & Clinical Practice.



# End of Life (EOL) Expenditures by Hospital Referral Region



Attributes of U.S. HRRs in Different Quintiles of the EOL-EI\*

Variable	Quintile of EOL-EI					Ratio (Highest to Lowest)
	1 (Lowest)	2	3	4	5 (Highest)	
EOL-EI, \$ <sup>†</sup>	9074	10 636	11 559	12 598	14 644	1.61
Per capita Medicare spending, \$ <sup>†</sup>	3922	4439	4940	5444	6304	1.61
Hospital characteristics <sup>§</sup>						
Overall supply (beds per 1000), <i>n</i>	2.4	2.6	2.9	2.9	3.2	1.32
Beds in teaching hospitals, %	10.2	18.1	13.8	20.8	28.1	2.76
Beds in hospitals with > 300 beds, %	31.6	37.4	38.7	43.8	57.2	1.81
Physician supply (per 10 000), <i>n</i> <sup>§</sup>						
Medical specialists	184.8	189.4	184.4	204.6	242.4	1.31
General internists	26.9	28.8	28.6	34.8	44.4	1.65
Family practitioner/GP	21.3	23.4	22.6	28.5	37.3	1.75
Surgeons	35.9	31.3	29.6	25.9	26.5	0.74
All other specialties	43.8	45.6	46	50.3	56.4	1.29
Medicare enrollees in HMOs, %	56.8	60.3	57.5	65.1	77.7	1.37
Residents in metropolitan areas, %	12.1	6.8	7.3	7.7	15.3	1.26
	77.5	81.9	82.3	79.2	97.4	1.26

# Are patients sicker in high cost regions?

**Table 3. Characteristics of the Acute Myocardial Infarction Cohort according to Level of Medicare Spending in Hospital Referral Region of Residence\***

Characteristic	Quintile of EOL-EI					Test for Trend†
	1 (Lowest)	2	3	4	5 (Highest)	
Cohort members, <i>n</i>	28 441	32 193	33 727	33 449	31 583	
Demographic, %						
Age 65–74 y	44.5	46.0	46.3	45.9	41.9	↓
Age 75–84 y	40.3	39.4	38.6	39.2	40.8	>0.05
Age ≥85 y	15.2	14.6	15.0	14.9	17.3	↑
Women	46.6	48.5	49.2	49.1	49.9	↑
Black race	1.9	4.9	6.2	7.7	7.2	↑
Comorbid conditions, %						
Previous revascularization	17.5	17.0	17.1	18.2	16.5	↓
Previous MI	28.7	30.3	28.7	29.6	28.6	>0.05
History of congestive heart failure	19.9	21.4	20.4	21.2	22.2	↑
Diabetes	28.5	30.8	30.5	31.0	31.3	↑
History of angina	44.6	45.0	45.5	45.6	48.4	↑
Peripheral vascular disease	9.0	9.7	10.7	11.1	11.6	↑
Smoker	14.5	15.6	16.3	15.4	13.0	↓
COPD	19.4	20.6	21.2	21.1	19.1	>0.05
Characteristics of acute MI, %						
Non-Q-wave	37.4	39.5	38.9	40.2	42.4	↑
Anterior	31.8	30.7	31.2	31.3	31.1	>0.05
Inferior	21.3	20.7	20.3	19.4	18.0	↓
Other location	9.6	9.1	9.5	9.0	8.4	↓
Received CPR	3.8	3.3	3.6	3.9	3.5	>0.05
Congestive heart failure	25.7	27.9	28.1	28.1	30.9	↑
Shock	2.8	2.2	2.6	2.4	2.6	>0.05
Hypotension	4.1	3.9	3.8	3.6	3.7	↓
Peak creatine kinase level >1000 IU/L	32.1	31.3	31.7	30.2	30.1	↓
Social Security income, %‡						
<\$1700	17.5	18.2	17.9	22.4	18.4	↑
\$1700–\$2600	57.5	57.8	54.2	47.9	38.7	↓
>\$2600	25.1	24.0	27.8	29.7	42.9	↑
Burden of illness (predicted 1-year mortality rate), %	31.2	31.5	31.8	32.0	33.2	↑

# Medicare Reimbursement patterns in California (by HHR)

San Luis Obispo	CA	4,430	6,503	2,073	2.78%
Santa Rosa	CA	5,533	7,184	1,651	1.88%
Santa Barbara	CA	4,310	7,188	2,878	3.72%
Redding	CA	5,103	7,217	2,114	2.51%
Sacramento	CA	5,107	7,324	2,217	2.61%
Chico	CA	4,800	7,324	2,524	3.06%
Santa Cruz	CA	5,342	7,659	2,317	2.61%
Palm Springs/Rancho Mirage	CA	5,976	7,784	1,808	1.91%
Salinas	CA	5,681	7,790	2,109	2.28%
Fresno	CA	4,414	7,953	3,539	4.30%
San Mateo County	CA	5,233	7,976	2,742	3.06%
San Diego	CA	5,860	8,004	2,145	2.25%
Bakersfield	CA	5,335	8,031	2,696	2.97%
Modesto	CA	5,473	8,103	2,630	2.84%
Napa	CA	6,017	8,183	2,165	2.22%
San Francisco	CA	6,010	8,331	2,321	2.36%
Stockton	CA	6,113	8,360	2,247	2.26%
Ventura	CA	5,877	8,672	2,795	2.82%
San Jose	CA	5,557	8,819	3,262	3.35%
Alameda County	CA	6,067	9,060	2,993	2.91%
Contra Costa County	CA	6,286	9,389	3,103	2.91%
San Bernardino	CA	5,997	9,702	3,705	3.50%
Orange County	CA	6,491	9,864	3,373	3.03%
Los Angeles	CA	7,104	10,810	3,707	3.04%

# Explaining the differences

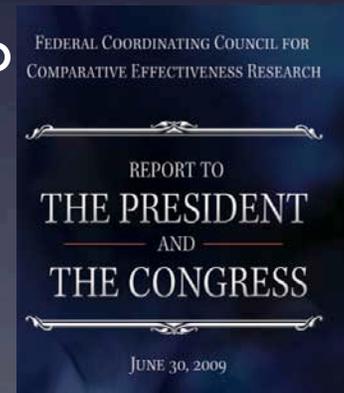
- NOT variation in 'technology' across regions - regions with widely varying costs had same medical technology available
- NOT the payment model (these are all the same fee-for-service patients). Miami is very high, and 50% are enrolled in capitated Medicare plans
- NOT poor care in low spending regions -- those in high and low spending areas equally recommended interventions where there was strong supporting evidence
- IT IS in how doctors respond to the availability to technology -- a study with standardized vignettes given to physicians in different regions showed that those in higher spending regions were more likely to recommend discretionary services such as a referral to a sub-specialist for GERD or stable angina

# Should we compare the effectiveness of approaches to medical problems?

- Costs are rising, but not evenly across the country
- More medicine/technology does not translate into lower mortality or better quality of life (actually may be lower...)
- We need tools and data to help inform practitioners on the comparative effectiveness of different diagnostic tools and therapeutic interventions and apply these in the context of the patient before

# Comparative Effectiveness Research (CER)

- “...the conduct and synthesis of research comparing the benefits and harms of different interventions ... to prevent, diagnose, treat, and monitor health conditions in ‘real world’ settings.”
- “The purpose of the research is to improve outcomes by developing and disseminating evidence-based information to patients and other decision makers...”



Federal Coordinating Council for Comparative Effectiveness Research, Report to The President and Congress. June 30, 2009

<http://www.hhs.gov/recovery/programs/cer/cerannualrpt.pdf>

# Comparative Effectiveness

The Recovery Act (ARRA) contains \$1.1 billion for comparative effectiveness research...

- “These funds are to support research assessing the comparative effectiveness of health care treatments and strategies, through efforts that:
- Conduct, support, or synthesize research that compares the clinical outcomes, effectiveness, and appropriateness of items, services, and procedures that are used to prevent, diagnose, or treat diseases, disorders, and other health conditions.
- Encourage the development and use of clinical registries, clinical data networks, and other forms of electronic health data that can be used to generate or obtain outcomes data.”

<http://www.hhs.gov/recovery/programs/ceer/index.html>

# What should we study?



INSTITUTE OF MEDICINE  
OF THE NATIONAL ACADEMIES

## 100 Initial Priority Topics for Comparative Effectiveness Research

The American Recovery and Reinvestment Act of 2009 called on the Institute of Medicine to recommend a list of priority topics to be the initial focus of a new national investment in comparative effectiveness research. The IOM's recommendations are contained in the report, *Initial National Priorities for Comparative Effectiveness Research*. The list of priority topics is provided below. The topics are listed by quartile (groups of 25). The first quartile is considered the highest priority group and the fourth quartile the lowest. Within each group, however, the order of individual topics does not indicate rank.

The list provides a starting point for what the report says should be a sustained effort to conduct comparative effectiveness research. As this research initiative progresses, the priorities will evolve as well. Ultimately, research on these and future topics will not yield real improvements unless the results are adopted by health care providers and organizations and integrated into clinical practice.

### First Quartile

Compare the effectiveness of treatment strategies for atrial fibrillation including surgery, catheter ablation, and pharmacologic treatment.

Compare the effectiveness of the different treatments (e.g., assistive listening devices, cochlear implants, electric-acoustic devices, habilitation and rehabilitation methods [auditory/oral, sign language, and total communication]) for hearing loss in children and adults, especially individuals with diverse cultural, language, medical, and developmental backgrounds.

Compare the effectiveness of primary prevention methods, such as exercise and balance training, versus clinical treatments in preventing falls in older adults at varying degrees of risk.

Compare the effectiveness of upper endoscopy utilization and frequency for patients with gastroesophageal reflux disease on morbidity, quality of life, and diagnosis of esophageal adenocarcinoma.

Compare the effectiveness of dissemination and translation techniques to facilitate the use of CER by patients, clinicians, payers, and others.

Compare the effectiveness of comprehensive care coordination programs, such as the medical home, and usual care in managing children and adults with severe chronic disease, especially in populations with known health disparities.

Compare the effectiveness of different strategies of introducing biologics into the treatment algorithm for inflammatory diseases, including Crohn's disease, ulcerative colitis, rheumatoid arthritis, and psoriatic arthritis.

Compare the effectiveness of various screening, prophylaxis, and treatment interventions in eradicating methicillin resistant *Staphylococcus aureus* (MRSA) in communities, institutions, and hospitals.

Compare the effectiveness of strategies (e.g., bio-patches, reducing central line entry, chlorhexidine for all line entries, antibiotic impregnated catheters, treating all line entries via a sterile field) for reducing health care associated infections (HAI), including catheter-associated bloodstream infection, ventilator associated pneumonia, and surgical site infections in children and adults.

# Major Gaps --Council on CER

- “Data sources are limited in terms of clinical robustness of data and longitudinal data”
- “Data capture and feedback loop at point of care often lacking”

Federal Coordinating Council for Comparative Effectiveness Research, Report to The President and Congress. June 30, 2009

<http://www.hhs.gov/recovery/programs/cer/cerannualrpt.pdf>

# Why is it relevant?

- Comparative Effectiveness requires a data capture process that allows comparison
- Comparison requires common data elements
- To be relevant in real world settings, this 'comparison' using common data elements should be done in \*real world settings\* -- this is highly relevant for us here today...
- To actually 'change' practice, evidence-based knowledge must be available \*at the point of care\* -- when we are making treatment decisions  
(and we wield the mighty pen! -- or keyboard)
- The HIE would be key part of enabling comparative effectiveness research -- and delivering knowledge to change practice

# An Informatics Model for Comparative Effectiveness Research and Knowledge Delivery

- Gathering the data -- the model should allow for regional data accumulation from 'real world clinical settings' without burdening practices
- Comparable data -- the system should acquire data that can indeed be "compared" across practices and regions
- Prioritizing data gathering -- the model should include a process for prioritizing what is collected -- don't just gather data because its there...

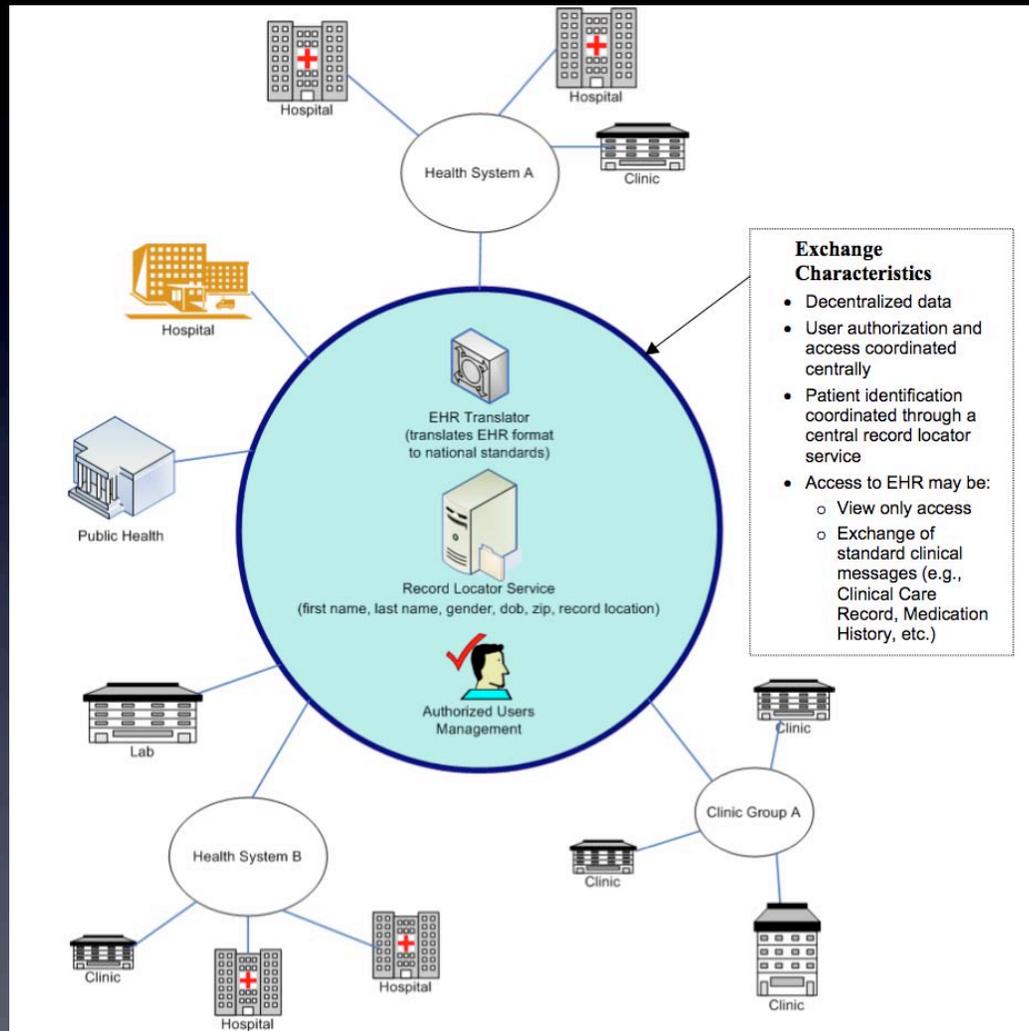
# What do we need?

- A healthcare community where practice-based data collection is agreeable to the practices (Sociology 101)
- A way to move clinical information electronically
- A regional collection point for this clinical data - distributed vs. centralized
- Small office healthcare information \*willing\* and capable of standardized data output
- A standardized approach to 'data' being transmitted (format, data elements, shared semantics)
- BUT data collection is not enough --- need a way to provide "evidence based" knowledge back into the point of care -- "what you need, when you need it"

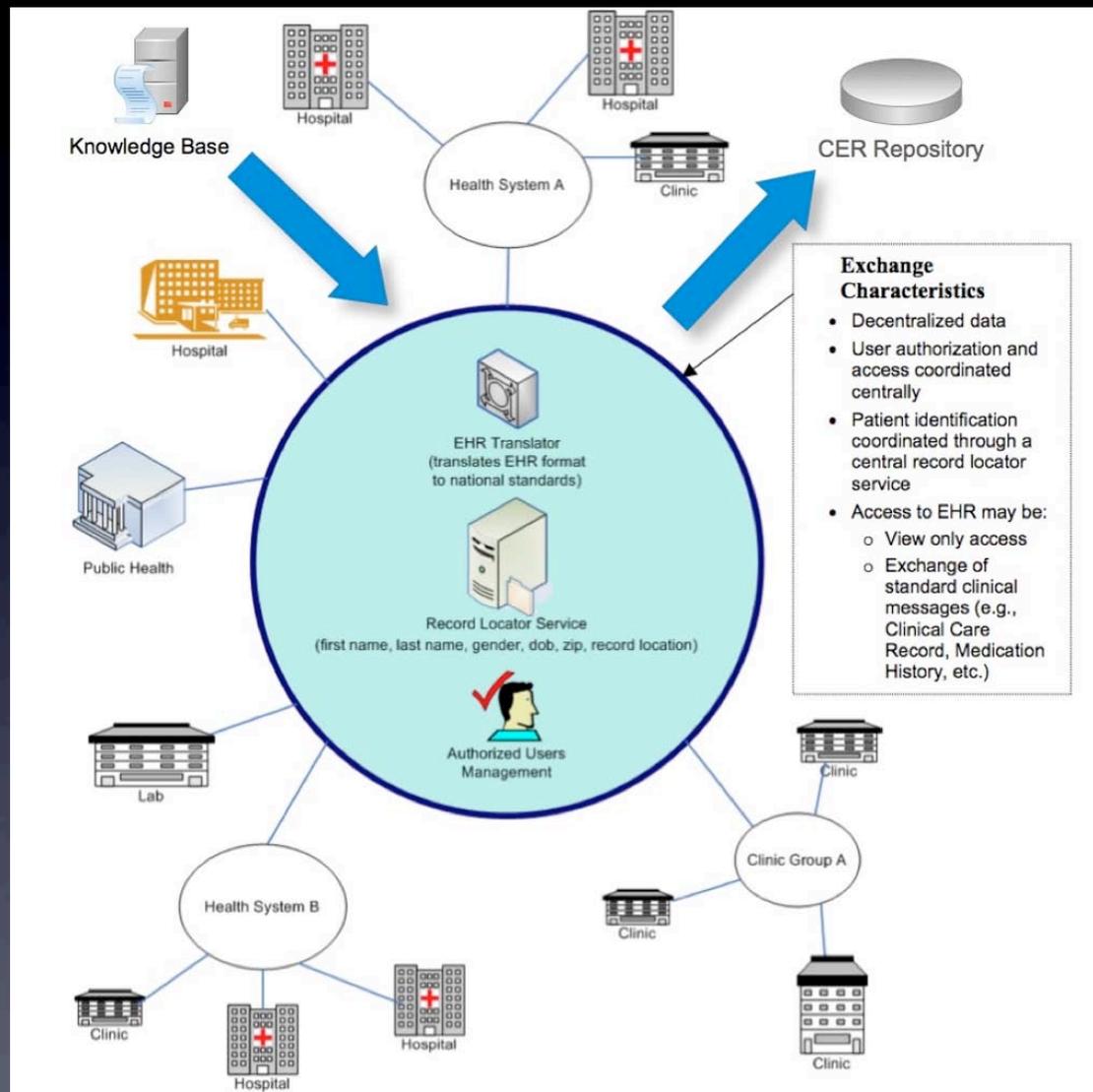
# What are we talking about?

- STANDARDized Data Exchange -- CCD, HL-7
- STANDARDized Data Elements and Model -- a standardized general information model that expresses data content and can be 'constrained' for specific clinical or administrative contexts - HL-7v3 (while retaining the original model)
- STANDARDized Data Encoding -- use the same coding systems to represent data values --- LOINC, SNOMED CT
- STANDARDized Access To Knowledge -- use a standardized approach to integrating access to evidence based knowledge into clinical systems -- the InfoButtons specification

# Typical HIE circa 2008



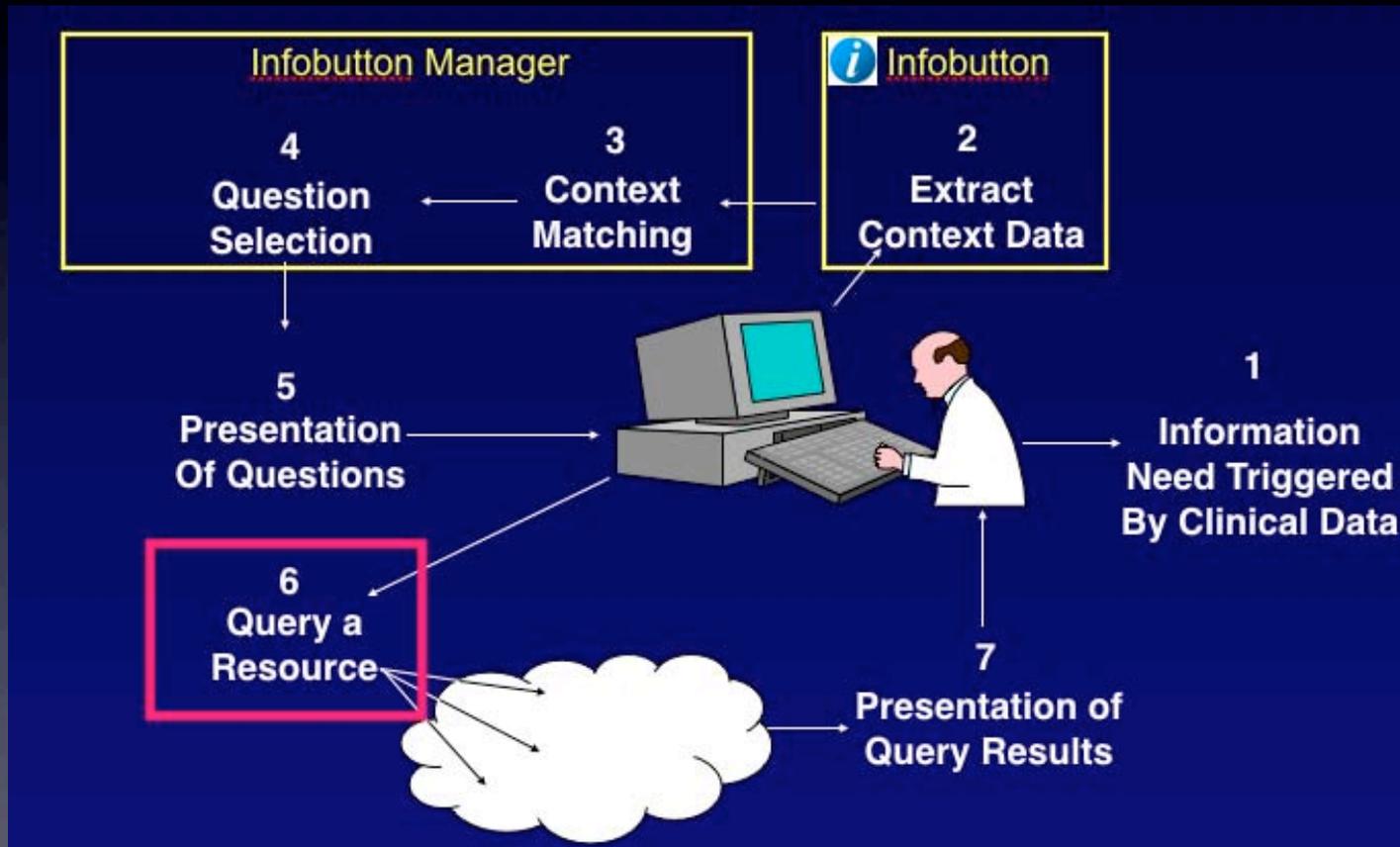
# Typical HIE c ~2010



# Knowledge at the point of care

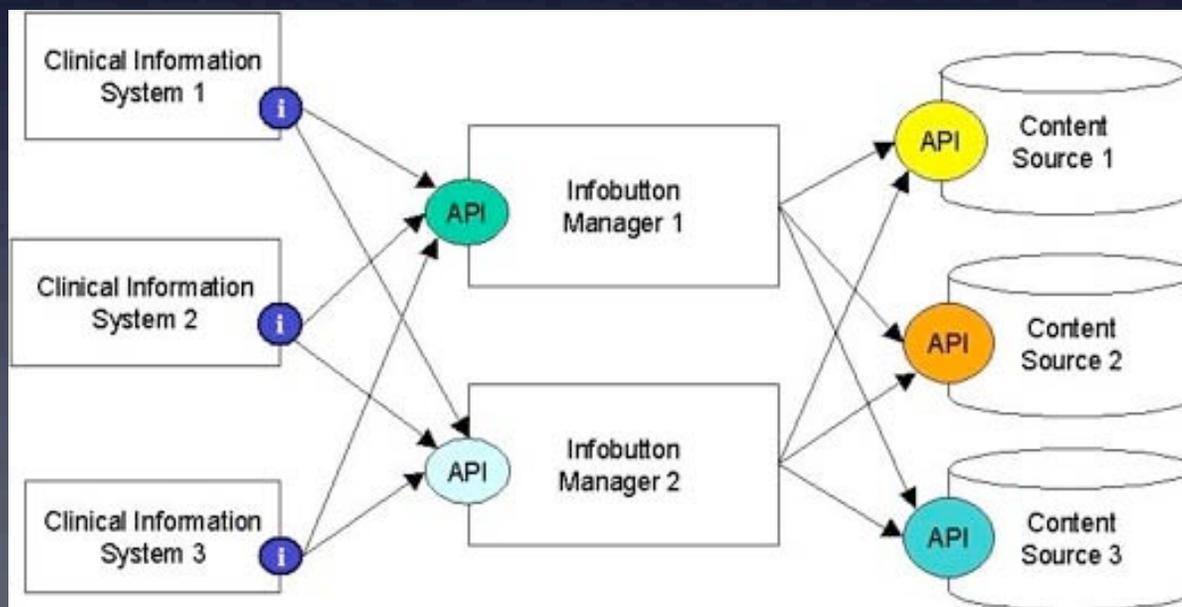
- We only seek information we know we need in routine practice about 30% of the time [Covell, et al. Ann Intern Med. 1985 Oct;103(4):596-9.]
- Only 1 in 5 'questions' are searched during clinical practice.[Gonzalez-Gonzalez. Ann Fam Med 2007;5:345-352]
- The most common reason for not seeking the information is the the perceived time and effort -- the confidence the information will be found with that effort and within the available time.

# Infobuttons - context aware information seeking for the EMR



# What are Infobuttons?

- “Infobuttons are context-sensitive links embedded within a Clinical Information System (CIS), which allow easy retrieval of relevant information.”



# How do InfoButtons work?

Test	Result	Range	Unit	Stat
PHENYTO	6.8	10.0-20.0	mg/l	
PBARB	29.7	20.0-40.0	mg/l	

Infobutton Manager Parameters			
Parameter	Name	Allowable Values	Required
info_institute	User's Institution	CPMC, RMRS, LDS	Yes
info_med	Concept of Interest	MED Code, LOINC Code or LOINC Name	Yes
info_context	Application Context	LabDetail, LabSummary, RadiologyReport, InPatientDrugs, OutPatientDrugs,	Yes
DOB	Date of Birth	YYYY-MM-DD	No
info_age	Age in Years	Integer	No
info_sex	Patient Gender	M or F	No
info_usertype	User Type	MD, RN, Other	No
info_mrn	Patient Identifier	Any string	No
info_user	User ID	Any string	No
info_other	Other patient data	Any string (interpreted by information resource)	No

## “GET” Method:

```
<a href="flux.cpmc.columbia.edu/webcisdev13/wc_infomanage.cgi?Info_institute=CPMC&info_med=1560&info_context=LabDetail" >
```

- OR -

## “POST” Method:

```
<form method="POST" TARGET="INFO" NAME="INFO"
action="flux.cpmc.columbia.edu/webcisdev13/wc_infomanage.cgi">
<input type="HIDDEN" name="info_institute" value="CPMC">
<input type="HIDDEN" name="info_med" value="1560">
<input type="HIDDEN" name="info_context" value="LabDetail">
<input type="HIDDEN" name="DOB" value="1951-05-26">
<input type="HIDDEN" name="info_age" value="52">
<input type="HIDDEN" name="info_sex" value="F">
<input type="HIDDEN" name="info_usertype" value="MD">
<input type="HIDDEN" name="info_mrn" value="3131313">
<input type="HIDDEN" name="info_user" value="ciminoj">
<input type="HIDDEN" name="info_other" value="1560|6.8|10.0-20.0|mg/l|1559|29.7|20.0-40.0|mg/l|">
</form>
```

Note that “1560” is the MED Code for Serum Phenytoin Test. Other acceptable values for info\_med include “14877-5” (the LOINC Code) and “PHENYTOIN”.

Questions of Interest  
From the Columbia University Infobutton Manager

Frequently Asked Questions:

- What information does the lab test, about PHENYTOIN?
- What container should I use to collect a specimen for PHENYTOIN?

Other Common Questions:

- Tell me about the laboratory test for PHENYTOIN.

General Questions:

- What does UpToDate say about PHENYTOIN?
- What does Harrison say about PHENYTOIN?
- What does Micromedex say about PHENYTOIN?
- What is the differential diagnosis of abnormalities of PHENYTOIN?
- Search PubMed for PHENYTOIN.
- Show me national guidelines about PHENYTOIN.

Lab Tests Online

Therapeutic Drug Monitoring

What is therapeutic drug monitoring?

Therapeutic drug monitoring is the measuring the level of some drugs in a laboratory the most effective dose or to avoid toxicity. Most drugs do not have side effects that you want to avoid. Some drugs have side effects in medication, there may be interactions between the drugs that affect the body's ability to metabolize one of them. Also, some patients do not metabolize as predicted or expected. Monitoring benefits these patients.

<http://www.dbmi.columbia.edu/cimino/Infobuttons.html>

# Strategies for success

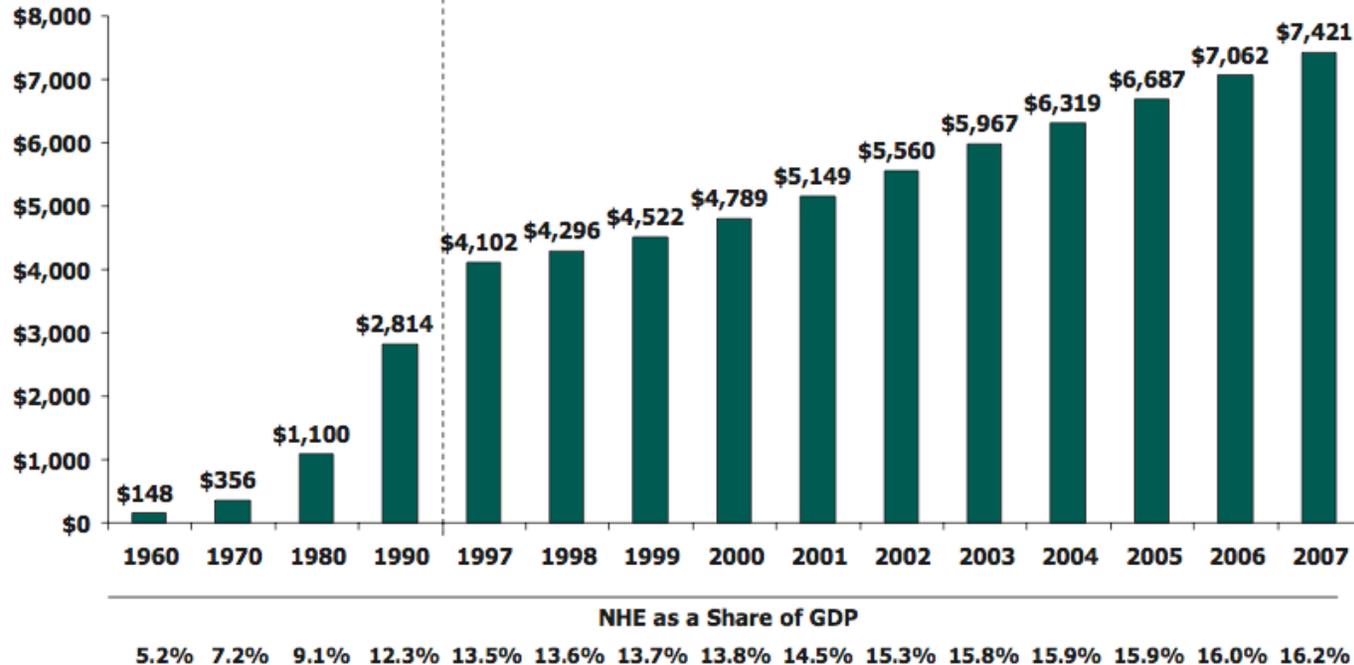
- Don't try to boil the ocean, eat the elephant one bite at a time.
- Use existing standards and infrastructure and let the shared use drive improvement (?build clinical exchange into your existing HIE)
- Achieve a shared community resource where everyone has a reason to contribute data (everyone gets something back)

# END -- Questions?



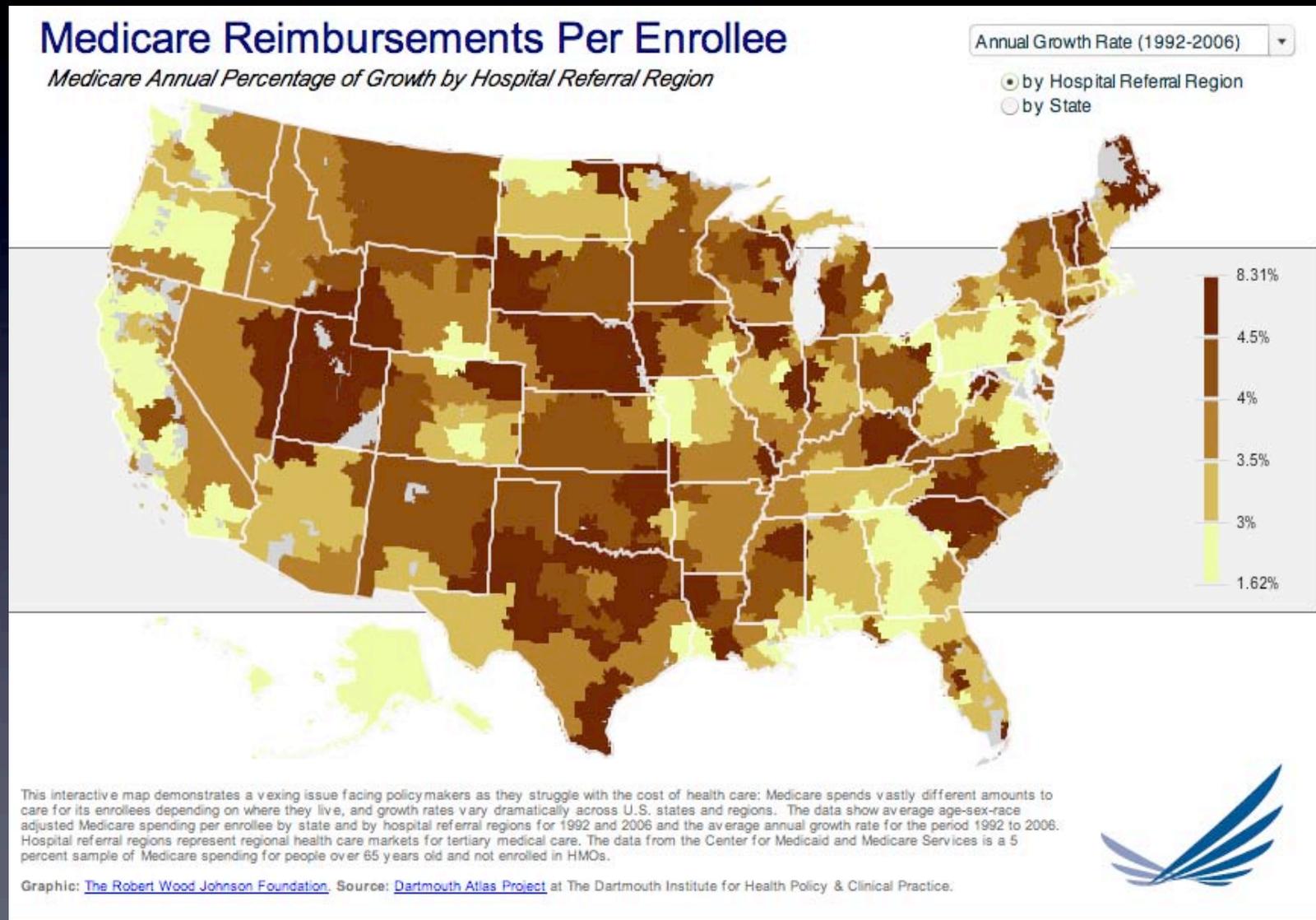
# Health care costs and GDP

**Figure 1: National Health Expenditures per Capita and Their Share of Gross Domestic Product, 1960-2007**



Source: Centers for Medicare and Medicaid Services, Office of the Actuary, National Health Statistics Group, at <http://www.cms.hhs.gov/NationalHealthExpendData/> (see Historical; NHE summary including share of GDP, CY 1960-2007; file nhegdp07.zip).

# Rates of Annual Increase in Medicare Reimbursements by HRR

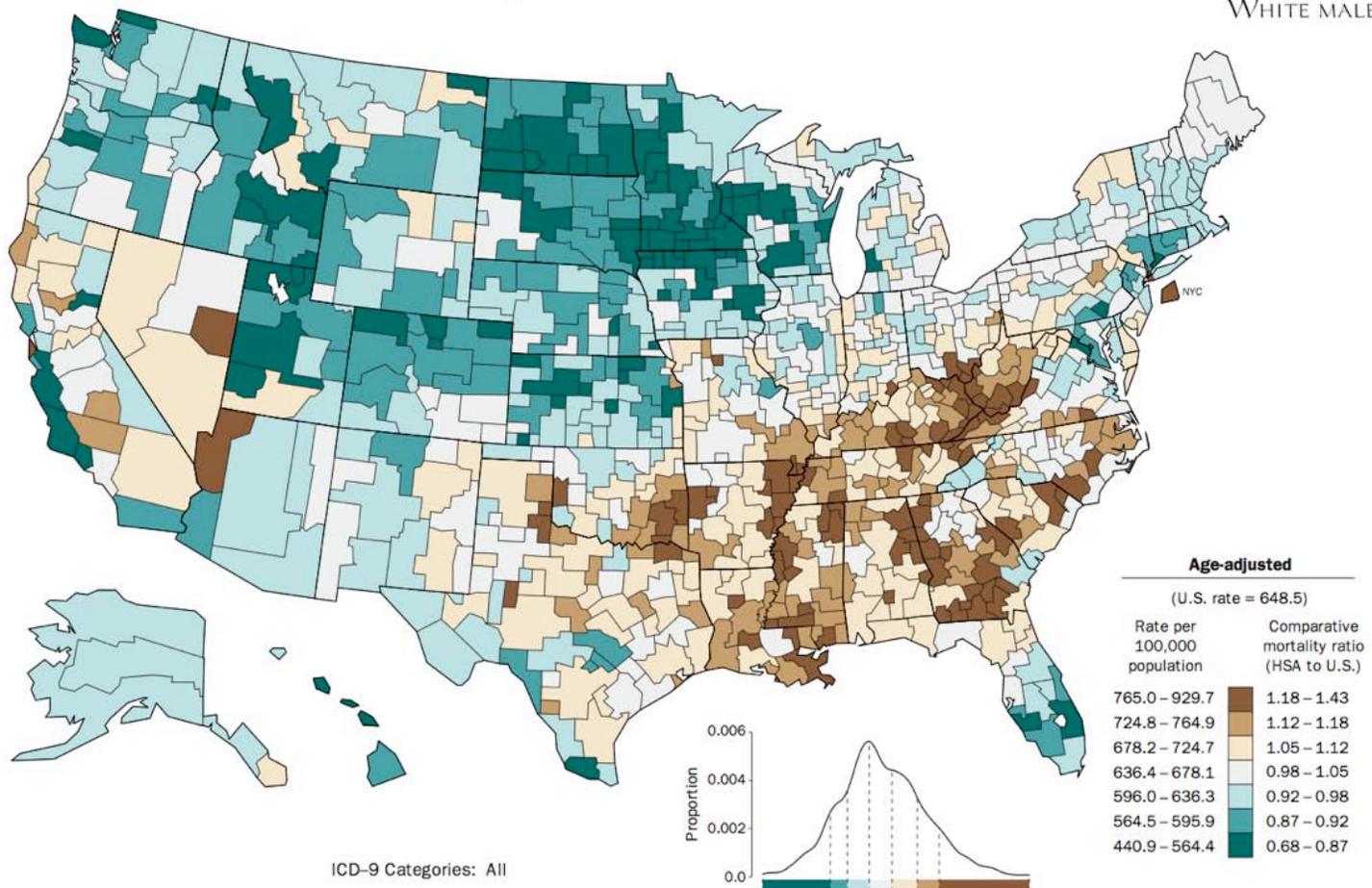


# Does more health care mean lower mortality?

168

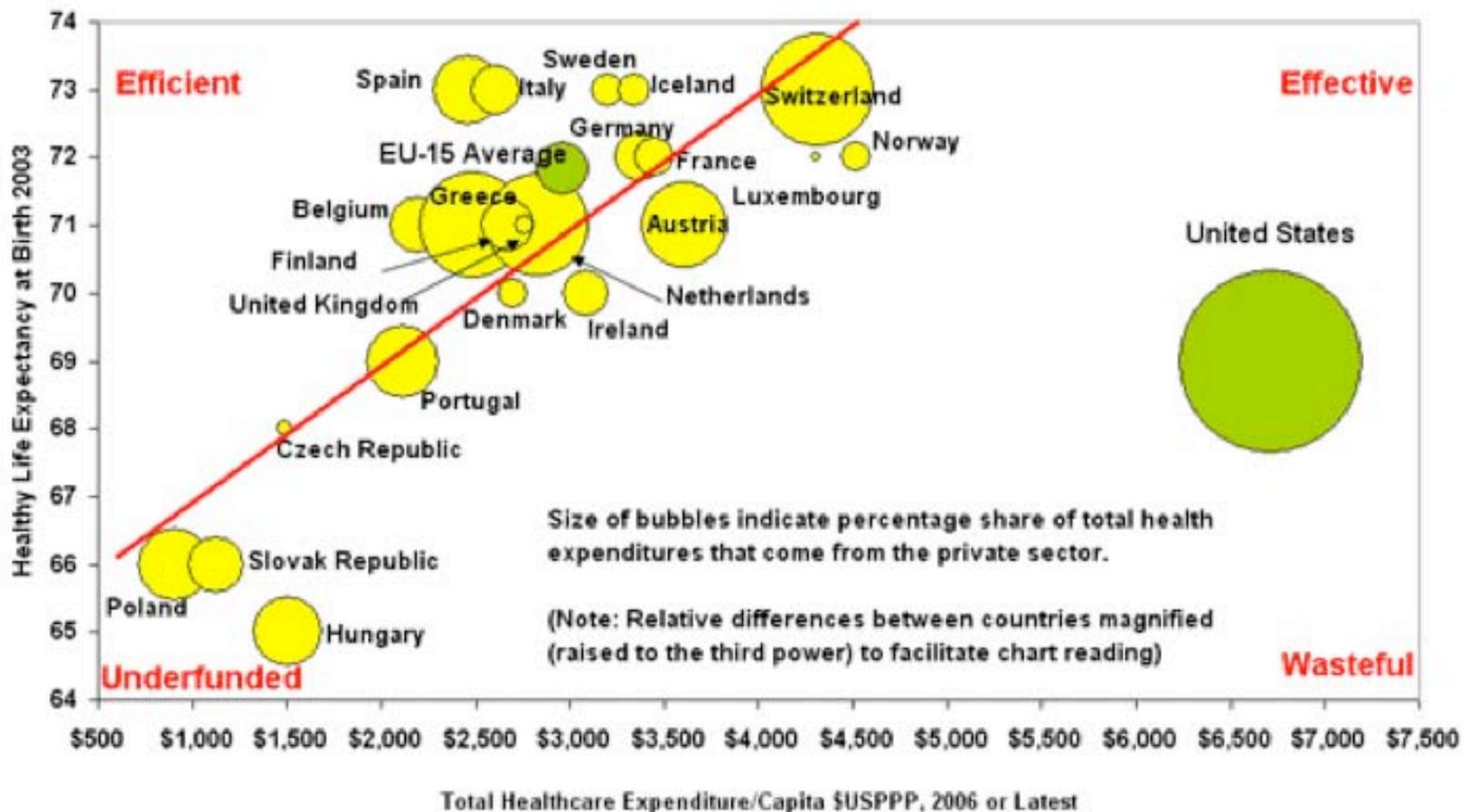
AGE-ADJUSTED DEATH RATES BY HSA, 1988-92

ALL CAUSES  
WHITE MALE



# How do we compare on performance?

Figure 1: Healthy Life Expectancy Total Population and Total Healthcare Expenditure/capita, 2003/2006



Source: OECD Health Database, June 2008 Version; WHO World Health Data 2008. EU-15 average is the GDP weighted average

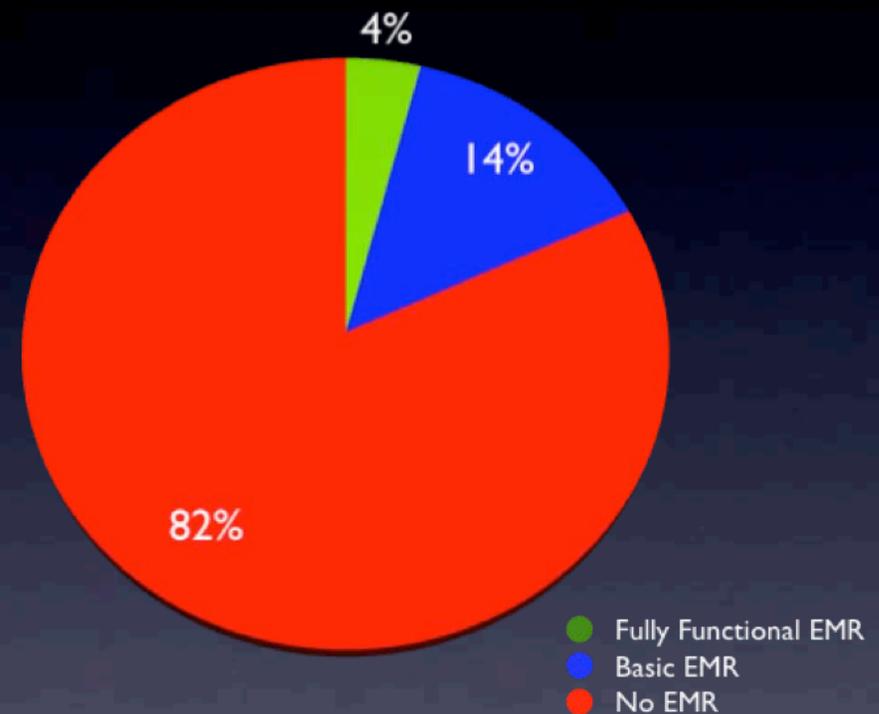
# Does more care mean better care?

- “In a 2003 study, another Dartmouth team, led by the internist Elliott Fisher, examined the treatment received by a million elderly Americans diagnosed with colon or rectal cancer, a hip fracture, or a heart attack. They found that patients in higher-spending regions received sixty per cent more care than elsewhere. They got more frequent tests and procedures, more visits with specialists, and more frequent admission to hospitals. Yet they did no better than other patients, whether this was measured in terms of survival, their ability to function, or satisfaction with the care they received. If anything, they seemed to do worse.”

# Where are we with the needed infrastructure? 2008: Adoption of Electronic Records Systems

**Table 1. Survey Items Defining the Use of Electronic Health Records.**

Survey Response	Basic System	Fully Functional System
<b>Does your main practice site have a computerized system for any of the following?</b>		
<b>Health information and data</b>		
Patient demographics	X	X
Patient problem lists	X	X
Electronic lists of medications taken by patients	X	X
Clinical notes	X	X
Notes including medical history and follow-up		X
<b>Order-entry management</b>		
Orders for prescriptions	X	X
Orders for laboratory tests		X
Orders for radiology tests		X
Prescriptions sent electronically		X
Orders sent electronically		X
<b>Results management</b>		
Viewing laboratory results	X	X
Viewing imaging results	X	X
Electronic images returned		X
<b>Clinical-decision support</b>		
Warnings of drug interactions or contraindications provided		X
Out-of-range test levels highlighted		X
Reminders regarding guideline-based interventions or screening		X



DesRoches et al.  
*Electronic Health Records in Ambulatory Care - A National Survey of Physicians*  
 N Engl J Med 2008;339:50-60

# Why don't doctors computerize their practices?

Major Barriers to Physician Adoption of Information Technologies by Practice Size, 2003

Barriers to Physician Adoption	Total (N= 1837)	Practice Size			
		1 Physician (N= 503)	2-9 Physicians (N= 757)	10-49 Physicians (N= 318)	50+ Physicians (N= 226)
Start-up costs*	56%	62%	59%	49%	43%
Lack of uniform standards*	44	53	45	42	33
Lack of time*	39	49	41	30	26
Maintenance costs*	37	48	38	27	25
Lack of evidence of effectiveness*	26	40	24	17	11
Privacy concerns*	21	30	17	19	15
Lack of training*	16	22	17	12	6

\*Significant difference between practice size at a 95% confidence level

Source: The 2003 Commonwealth Fund National Survey of Physicians and Quality of Care

MedGenMed. 2004; 6(4): 2.  
Published online 2004 December 6.

[Copyright](#) Medscape from WebMD