



HEALTH

Can Information Technology Transform Health Care?

**The RAND Study of Potential Costs
and Benefits of Electronic Medical Record Systems**

Richard Hillestad, PhD

Background

- **A two year RAND Health study completed in Spring 05**
- **Results appear in 2 articles in September 05 *Health Affairs* and 4 RAND reports**
- **Funded by internal RAND funds and the private sector -- Cerner Corp., General Electric, Hewlett-Packard, Johnson & Johnson, and Xerox**
- **14 member steering group headed by Dr. David Lawrence, former CEO of Kaiser provided guidance and review**

The Problem in Context

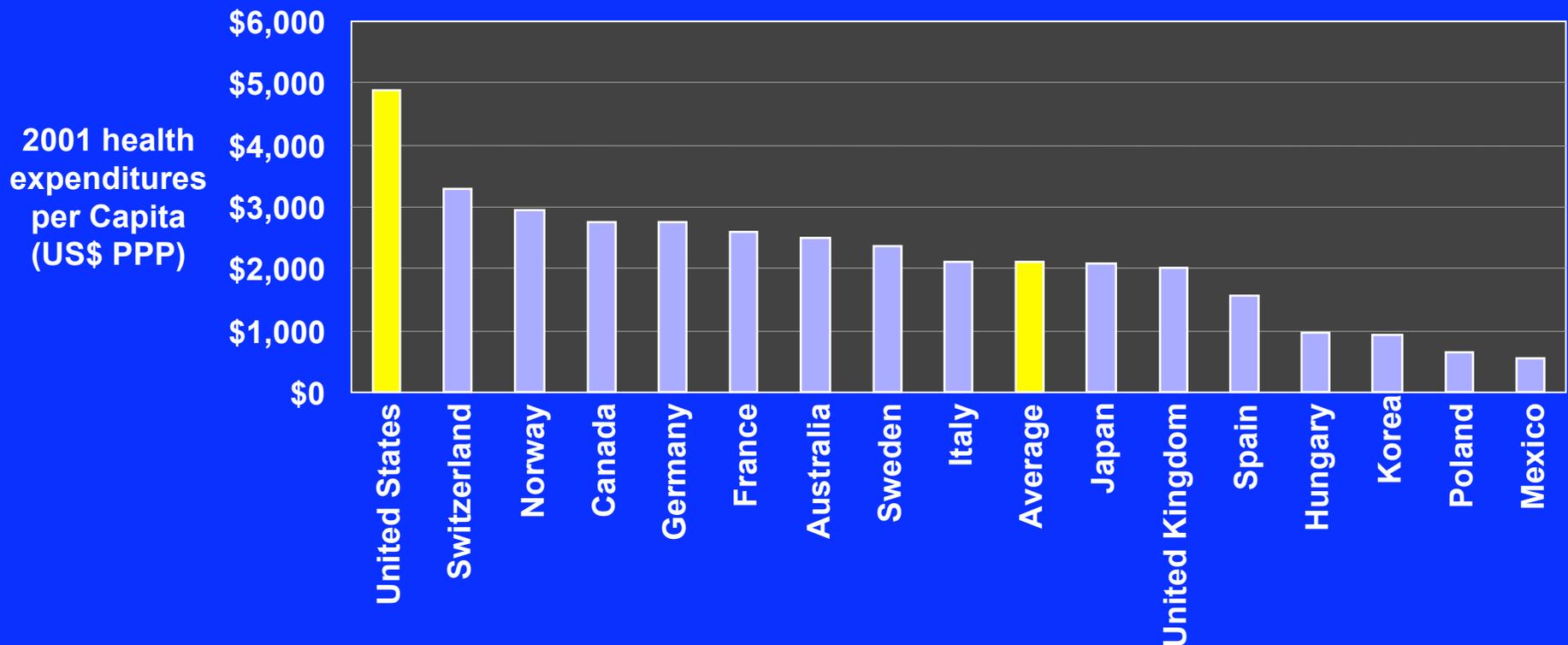
- U.S. health care is one of the largest and most inefficient information enterprises because it still operates mostly with paper records



The Problem in Context

- U.S. health care is one of the largest and most inefficient information enterprises because it still operates mostly with paper records
- Despite health spending over \$1.8 trillion nationally and projected to grow to over \$4 trillion in 10 years, it doesn't provide the best care
 - recommended care is provided only about 55% of the time
 - and, by a number of measures, health in the U.S. is worse than OECD averages

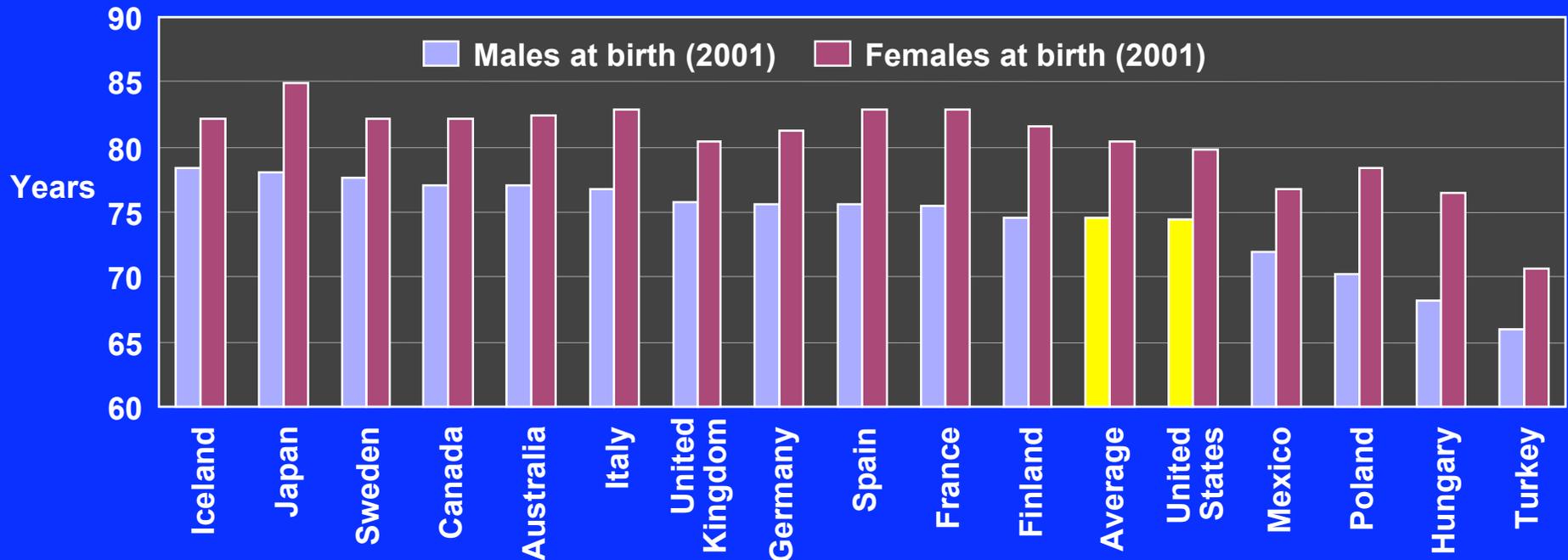
U.S. Health Expenditures Per Capita Are the Highest Among OECD Countries



Note: The presented countries represent the range of expenditures for OECD countries. Due to space limitations, all OECD countries are not presented, however the average was calculated from 29 countries. Turkey's data was not available.

Source: *OECD Health Data 2004*, 1st Edition, Table 9

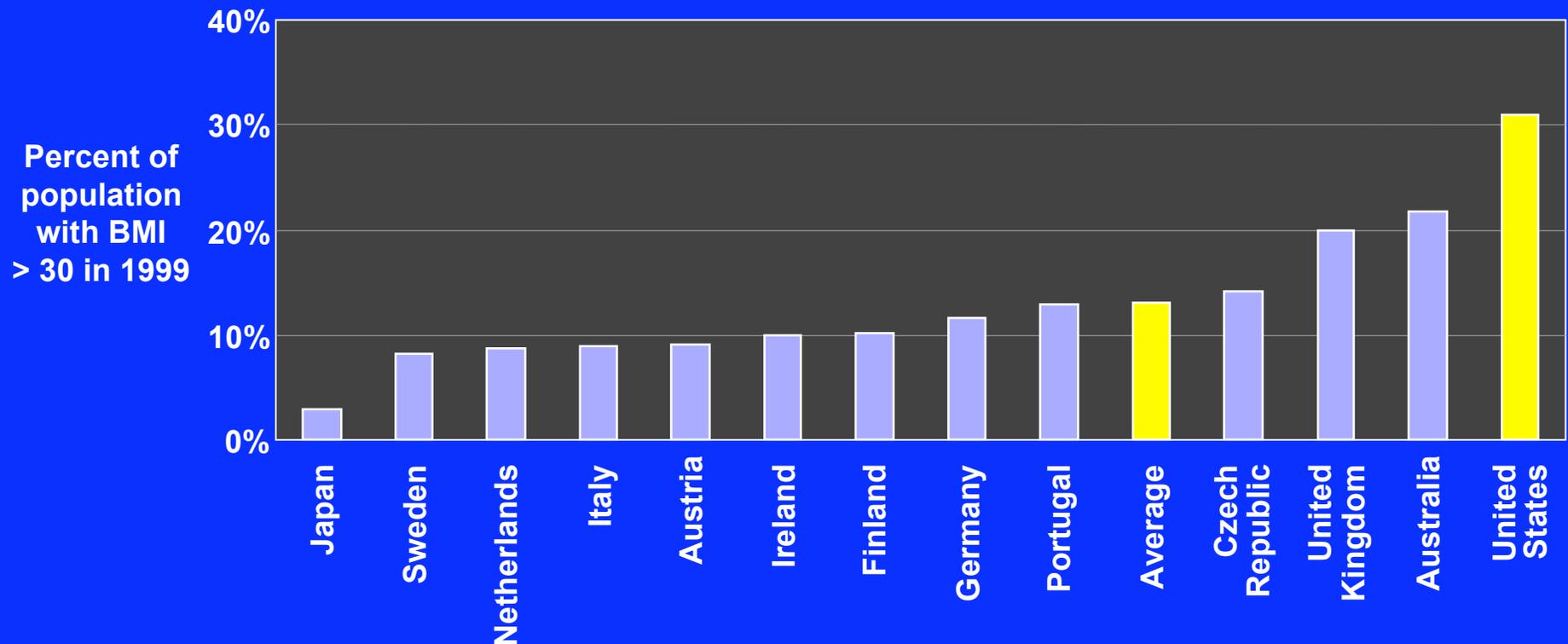
U.S. Life Expectancy Is Slightly Below the OECD Average



Note: The presented countries represent the range of life expectancies for OECD countries. Due to space limitations, all OECD countries are not presented, however the average was calculated from all OECD countries.

Source: *OECD Health Data 2004*, 1st Edition, Table 1

U.S. Obesity Rates Are the Highest Among OECD Countries



Note: BMI is body mass index, which equals a person's weight in kilograms divided by the square of the person's height in meters. A person with a BMI between 25.0 and 29.9 is considered overweight, and a person with a BMI over 30.0 is considered obese. Data is missing for many OECD countries.

Source: *OECD Health Data 2004*, 1st Edition, Table 20

The Problem in Context

- U.S. health care is one of the largest and most inefficient information enterprises because it still operates mostly with paper records
- Despite health spending of \$1.7 trillion nationally and projected to grow to over \$4 trillion in 10 years, it doesn't provide the best care
 - recommended care is provided only about 55% of the time
 - and, by a number of measures, health in the U.S. is worse than OECD averages
- How much could Electronic Medical Record Systems (EMR-S) help?

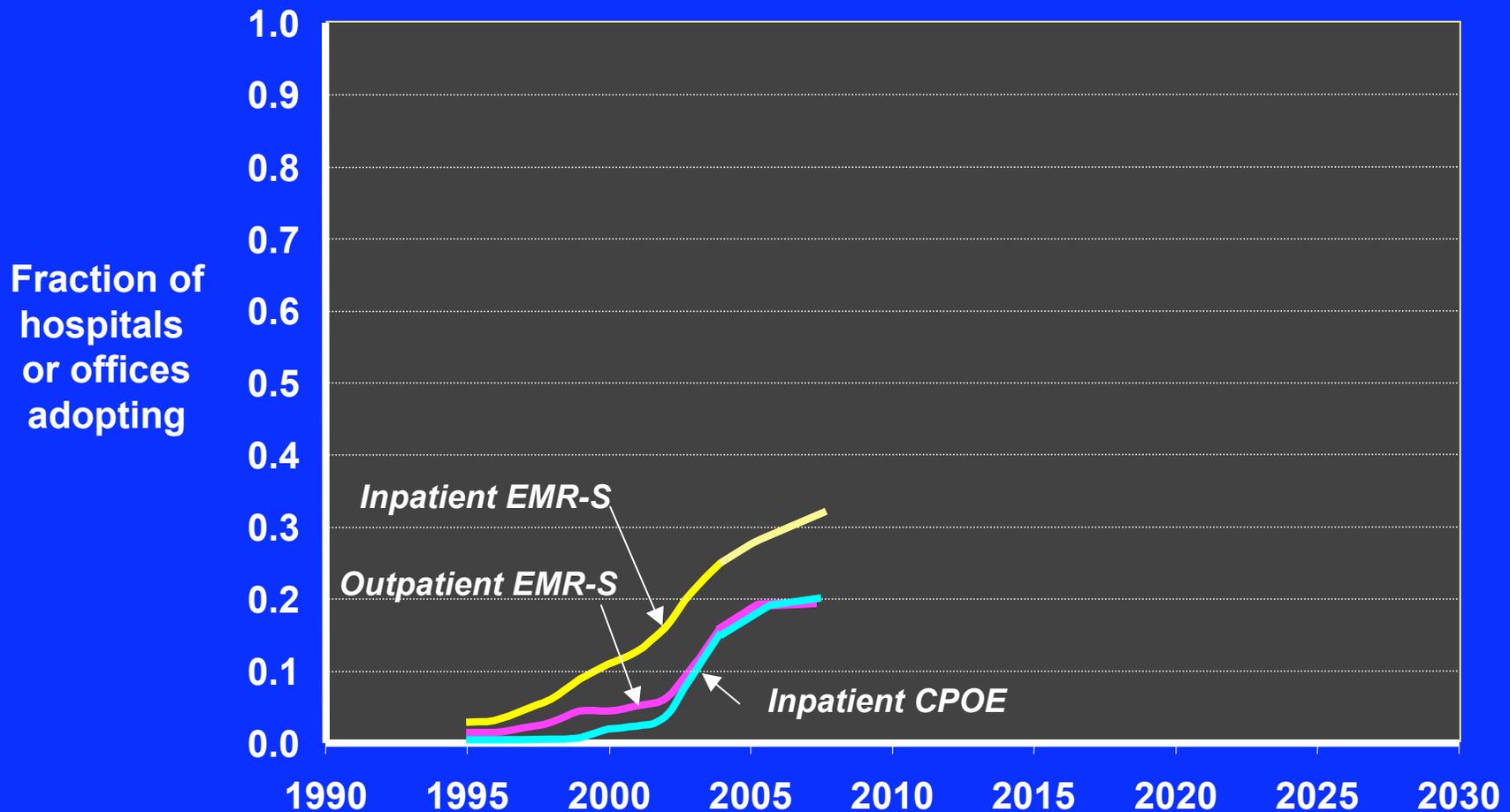
What Is an Electronic Medical Record System?

- EMR -- replaces the paper medical record
- EMR-S adds functions:
 - Clinical decision support
 - Patient tracking and reminders
 - Personal health records
 - Computerized physician order entry
 - Regional health information networks

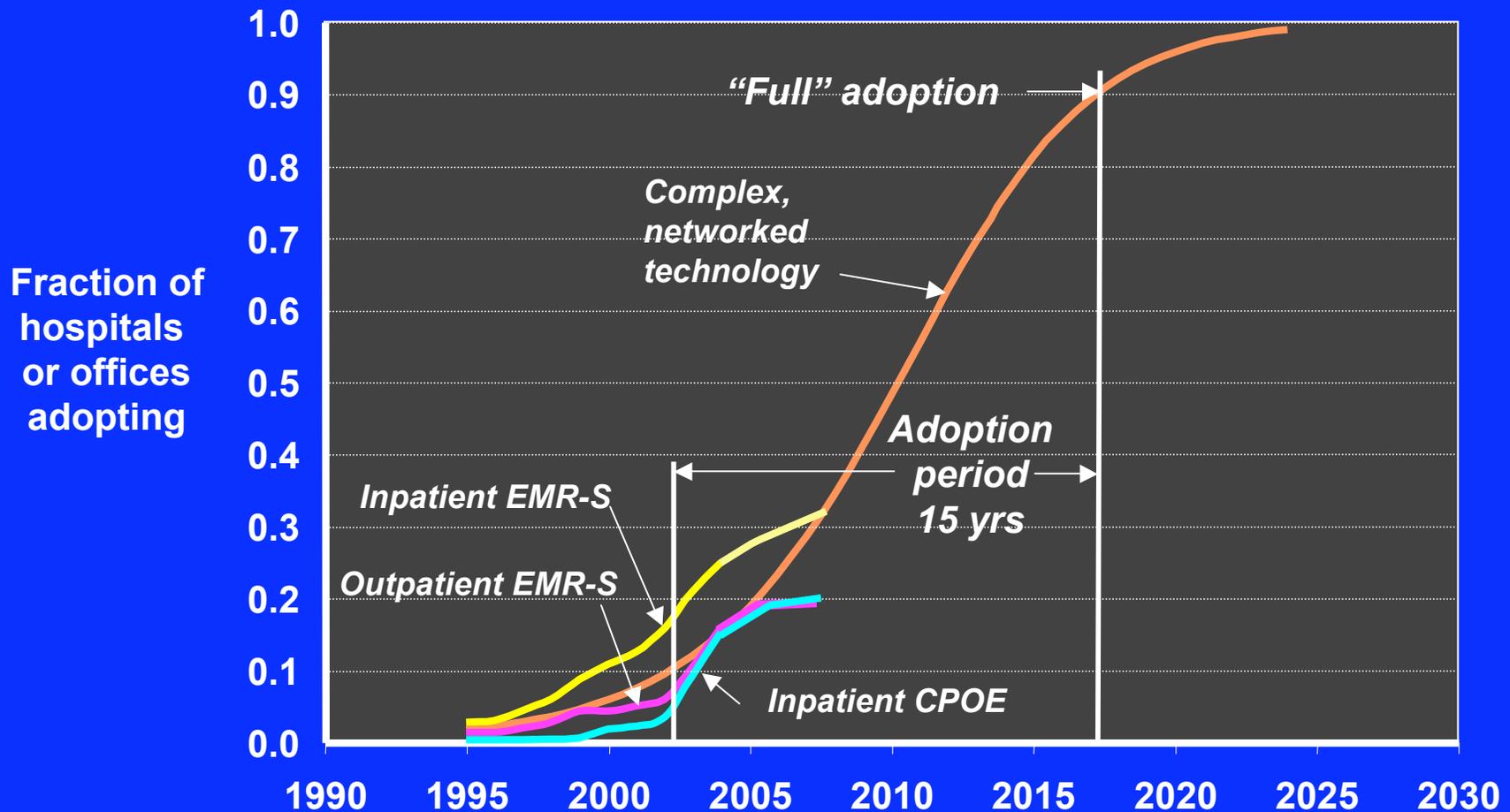
Key Findings(U.S. Basis)

- Efficiency savings enabled by EMR-S could reach ~\$80B/year at 90% adoption (relative to 2005 baseline adoption)
- Costs to achieve that in 15 years average ~\$8B/yr
- Safety benefits include avoiding 2.2 million adverse drug events
- Health benefits from prevention and management of chronic diseases alone could be 20 million fewer hospital days, 5 million fewer emergency department visits, 9 million fewer physician office visits and 20 million added workdays per year
- The market is not leading to this result because of important barriers and disincentives
- Therefore, there is a clear role for government action

EMR-S Now in Only 30-35% of Hospitals and 10-20% of Physicians' Offices



Problem Is To Estimate Impact at Full Adoption



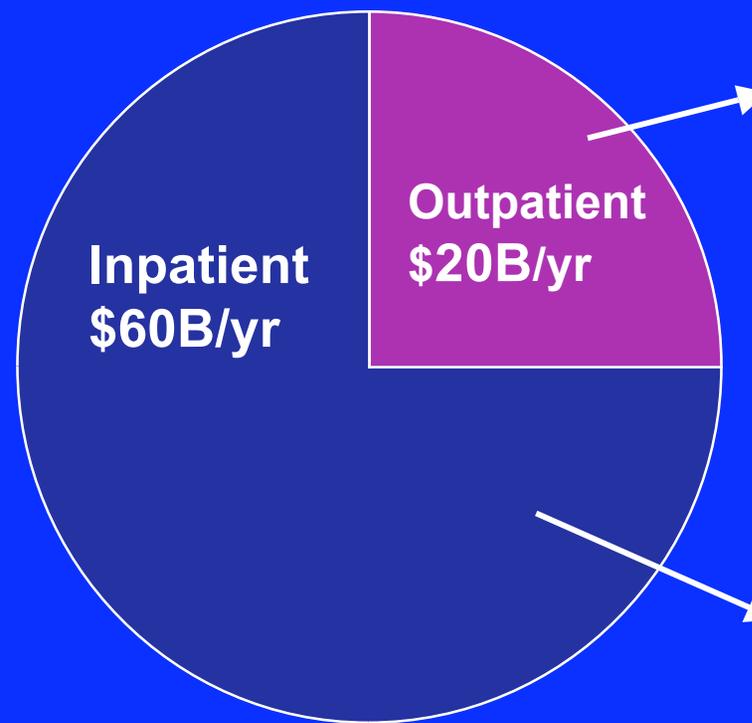
The RAND Study of EMR-S

- **RAND study developed computer simulation models to estimate potential benefits and costs, assuming**
 - **Widespread adoption (90%)**
 - **Interoperability (across providers)**
 - **Related health care process changes, for example:**
 - **Restructured hospital and physician office workflow**
 - **Increased preventative interventions**
 - **Team care for chronic disease**
- **Extrapolates limited published evidence of EMR-S benefits**

Efficiency Savings Enabled by EMR-S

- **Reduced waste, e.g., reduced duplication of tests**
- **Improved/changed processes, e.g., improved workflow and patient flow**
- **Fewer resources, e.g., reduced administration of paper records, better antibiotics usage**
- **Lower cost substitutions, e.g., generic drug utilization**

Efficiency Savings in the Inpatient and Outpatient Settings

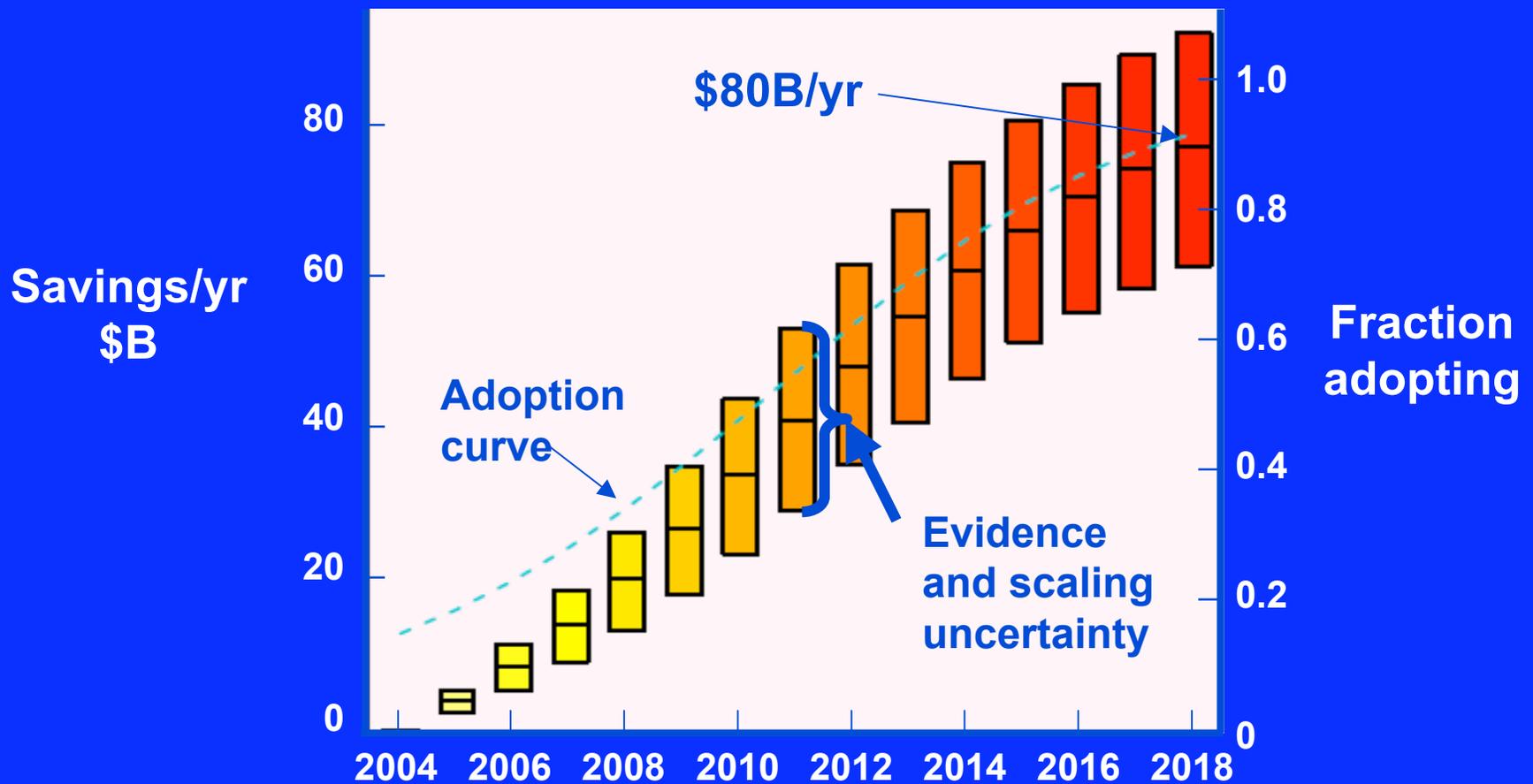


- Drug utilization
- Lab and radiology utilization
- Chart administration
- Efficient patient scheduling
-
-

- Length of stay
- Nursing administrative time
- Medical records administration
- Lab and radiology utilization
-
-

\$80B/yr at 90% Adoption

It Will Take Some Time to Realize Such Savings

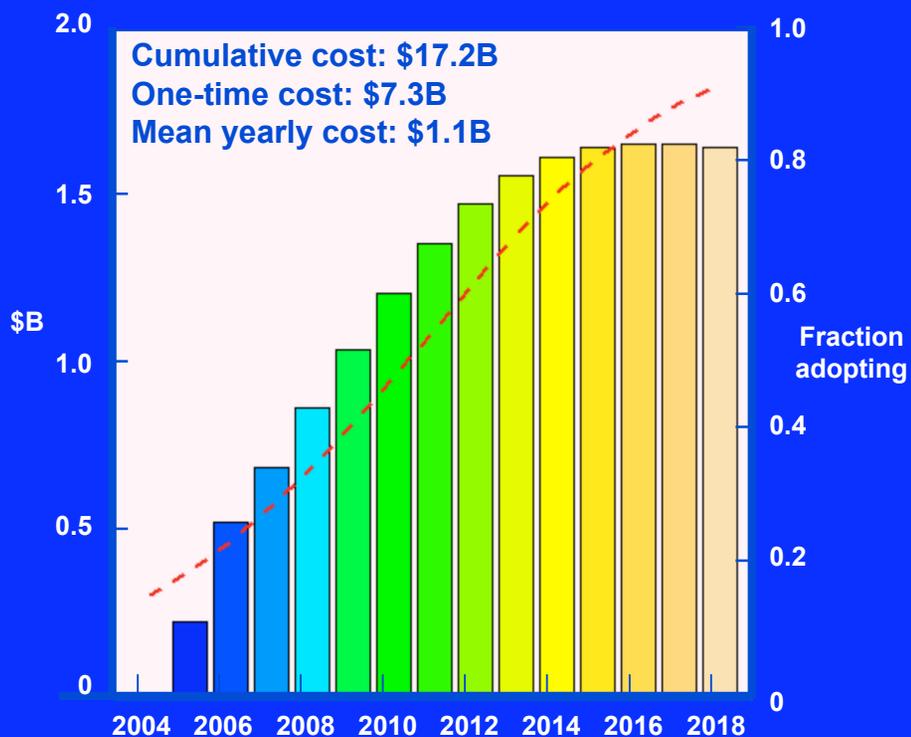


Costs of EMR-S

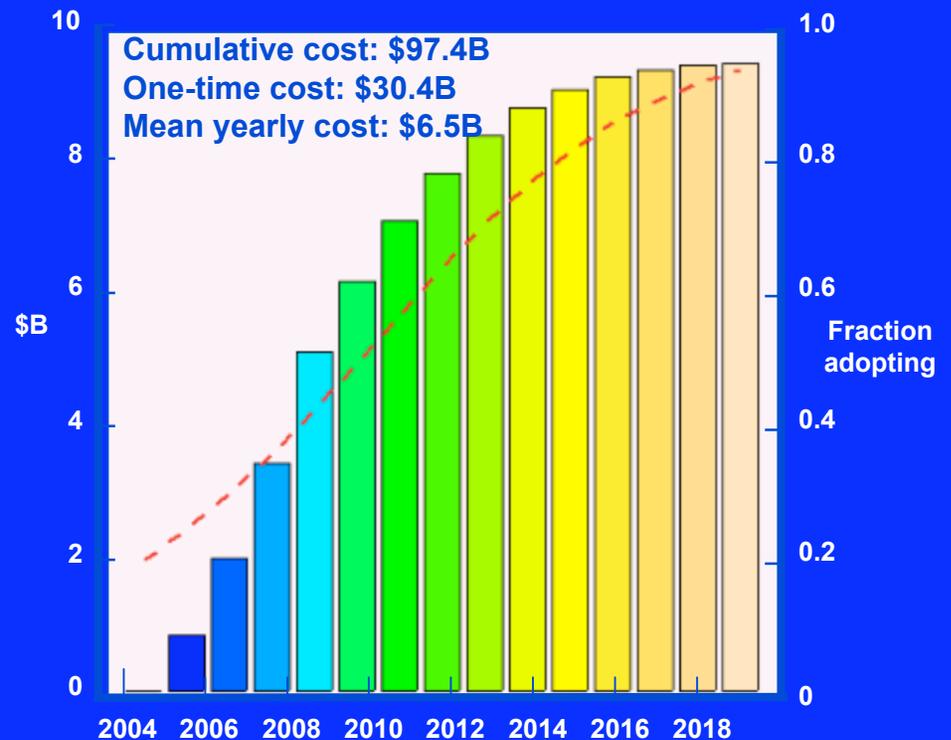
- **Costs include EMR-S software license, hardware and its maintenance**
- **As well as planning, training and implementation**
- **And reduced revenue or increased provider costs during implementation**

We Estimated the Cost of Adoption over Time by Simulating Adoption with Current Costs

Ambulatory EHR-S costs/yr



Inpatient EHR-S costs/yr



Although EMR-S Implementation Costs Are Substantial . . .

Costs

	Total cost (15 years)
Hospitals	97
Physician offices	17
Connectivity	6
Total	\$120B

... Costs Are Modest Compared to Potential Savings, Even During Implementation

Costs

	Total cost (15 years)
Hospitals	97
Physician offices	17
Connectivity	6
Total	\$120B

Efficiency Savings

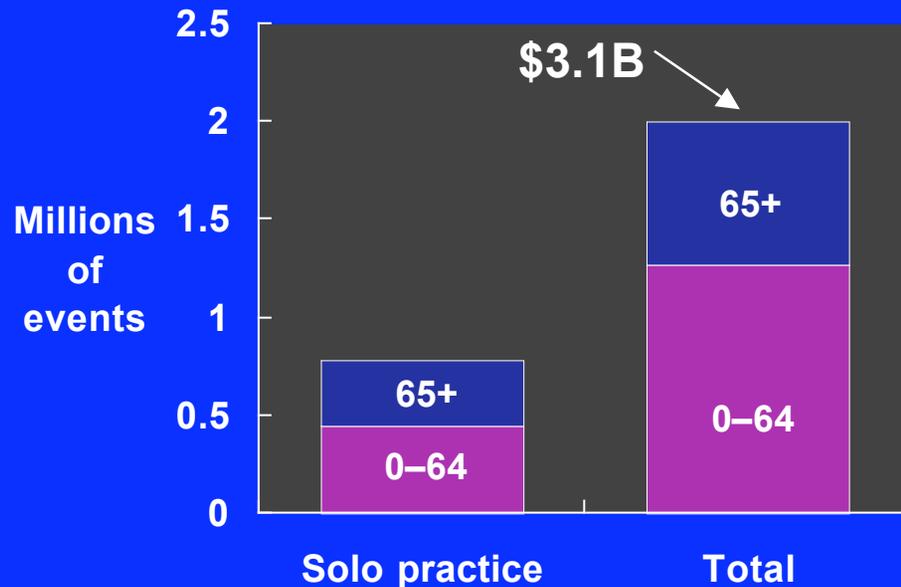
	Total savings (15 years)
Hospitals	470
Physician offices	160
Total	\$630B

Safety Benefits of EMR-S

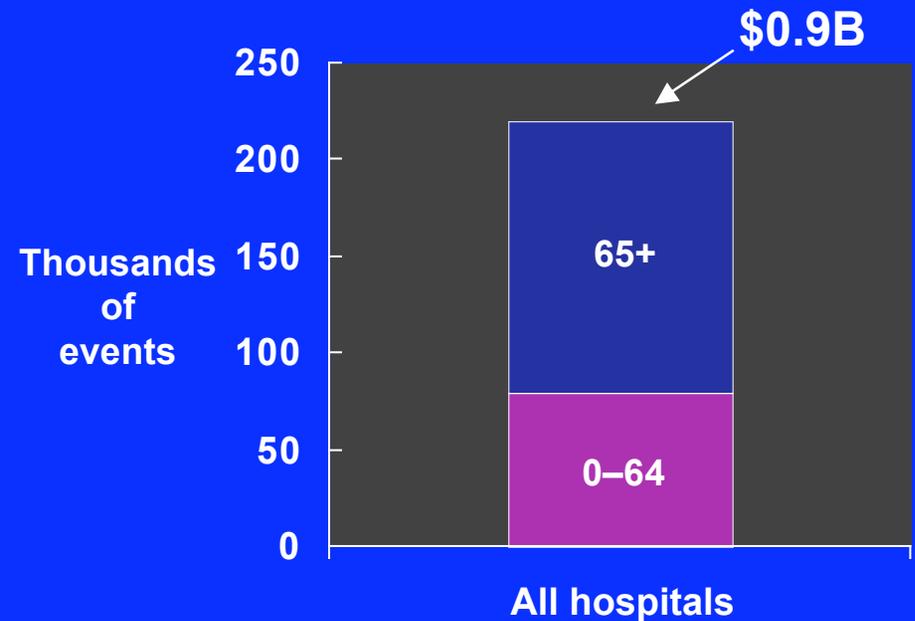
- **Reduced errors from handwriting**
- **Allergy warnings**
- **Warnings of drug-drug interactions**
- **Dosage monitoring**

EMR-S with Computerized Physician Order Entry Can Increase Safety ***-- Medicare Share ~40% --***

**Adverse Drug Events Avoided
in Physician Offices**



**Adverse Drug Events Avoided
in Hospitals**



Health Benefits Enabled by EMR-S

- **Improved compliance with prevention activities**
- **Better management and prevention of chronic diseases**
- **Coordination of care across providers**
- **Patient involvement in care and healthy life style**

EMR-S Can Promote Prevention with Guidelines, Reminders, and Outreach

	Target population	% Population not now compliant	Cost/yr for 100% compliance	Health benefits with 100% compliance
Breast cancer screening	Women 40 and older	30%	\$1.5B	50K cancers detected early, 4K fewer deaths/yr
Colorectal cancer screening	50 and older	66%	\$4.0B	23.5K fewer deaths
Influenza vaccination	65 and older	37%	\$0.2B	7.5K fewer deaths/yr
Pneumococcal vaccination	65 and older	47%	-\$0.1B	21K fewer deaths/yr

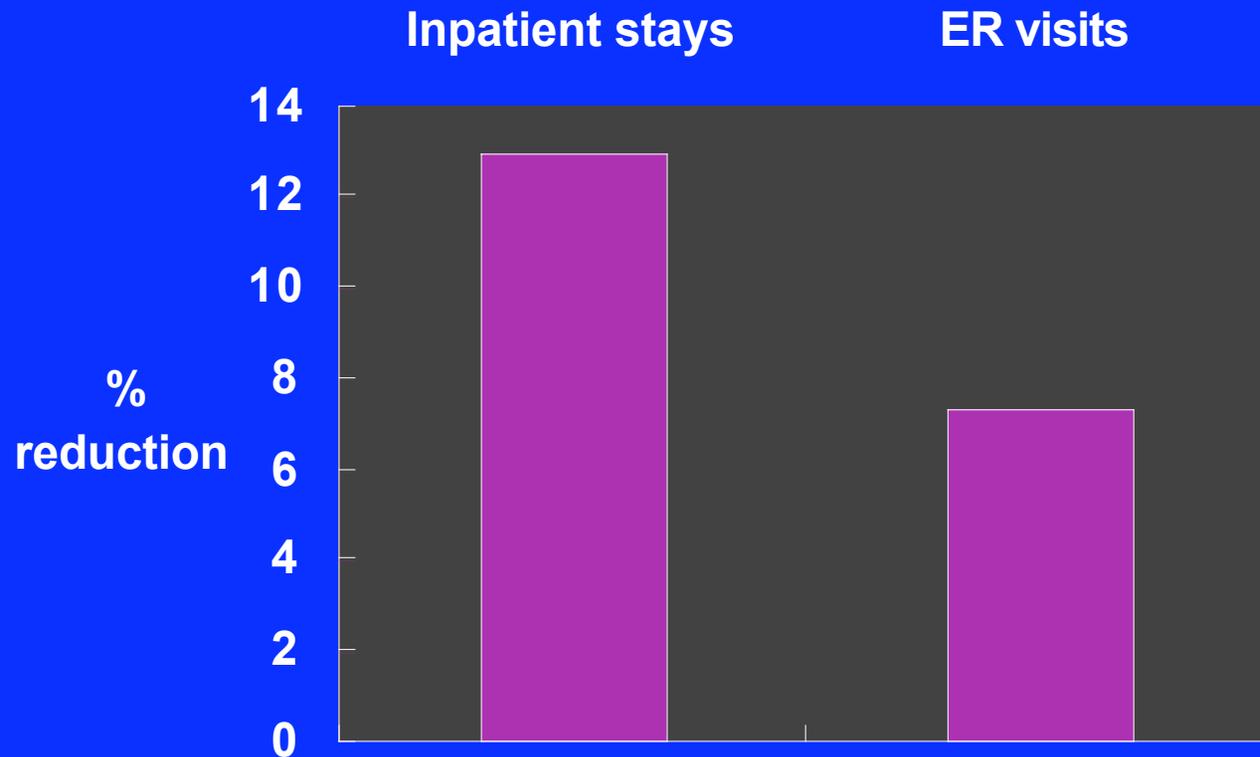
Chronic Disease Management Is a High Leverage Application of EMR-S

- **The chronically ill absorb about 75% of national health expenditure**
- **Chronic disease management requires**
 - **Community support and team care**
 - **Coordination and communication across providers, patient, and family**
 - **Patient monitoring and involvement**
- **Regional demonstration projects with EMR-S often focus on chronic disease management**

Disease Management Attempts to Reduce Acute Episodes

Upper Bound:
Assumes 100% participation in management of emphysema, asthma, CHF, and diabetes.

Reduced ER visits and hospital stays



EMR-S Enabled Prevention and Disease Management Can Reduce Mortality and the Economic Impact of Chronic Illnesses

Results for emphysema, asthma, CHF and diabetes

<u>Participation Rates</u>		
Disease Management	80%	50%
Lifestyle Change	50%	20%
<u>Days Affected (millions)</u>		
School days lost	-11	-7
Work days lost	-39	-21
Total days in bed	-270	-160
<u>Health Care Utilization (millions)</u>		
Hospital days	- 39	- 21
Emergency Department visits	- 9	- 5
Physician office visits	- 40	- 9

RAND

Barriers to Adoption of IT in Health Care

Other Industries

Champion Firm

Integrated System

Standards

High IT Investment

Market Forces

Consumer Involvement

Health Care Industry

No

Disaggregate System

Low Implementation

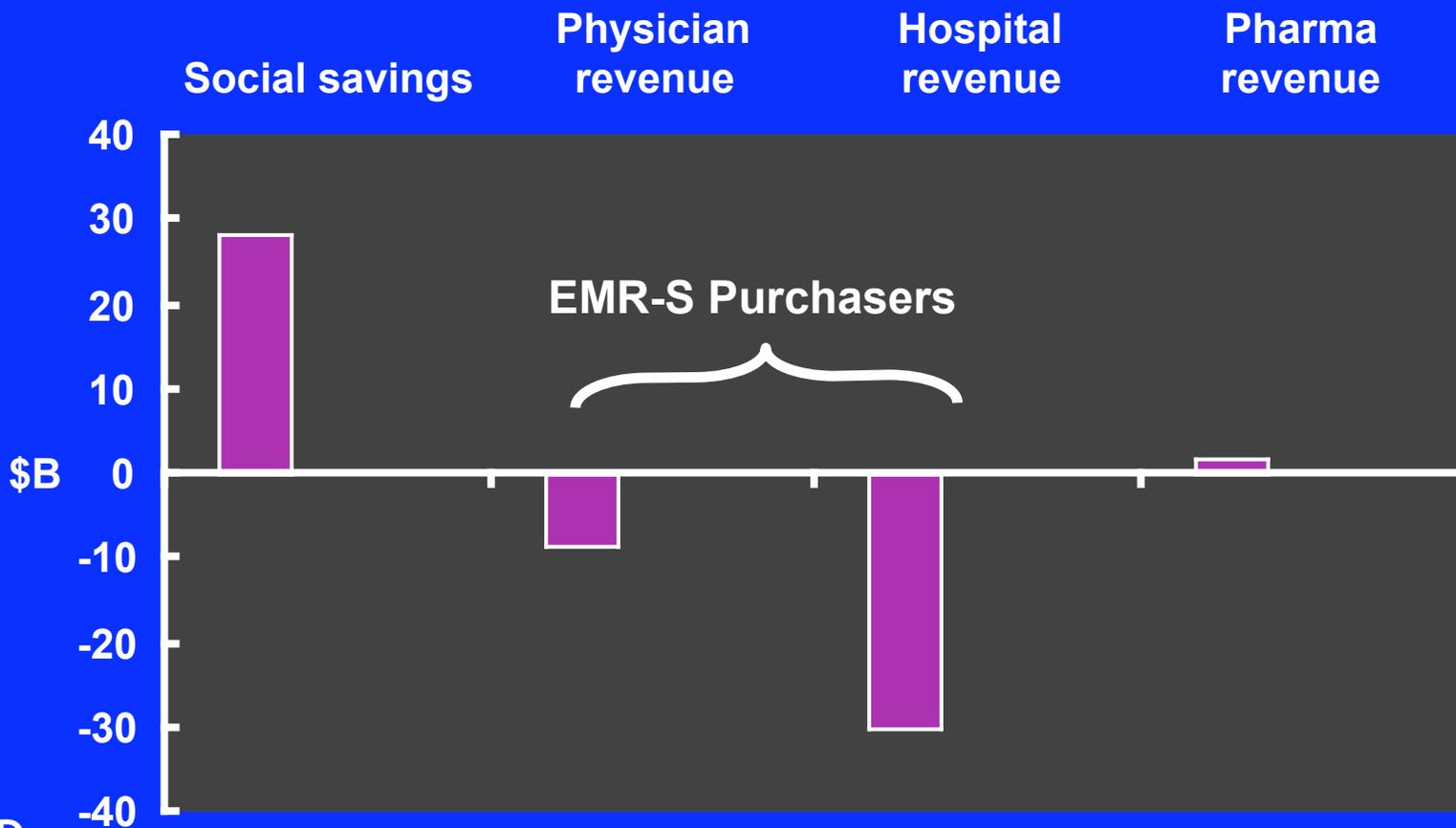
Low EMR-S Investment

Market Failure

No Consumer Involvement

The Most Significant Barrier: Physicians and Hospitals Do Not See Most Savings from EMR-S Investments

Revenue and Savings From Chronic Disease Management



RAND

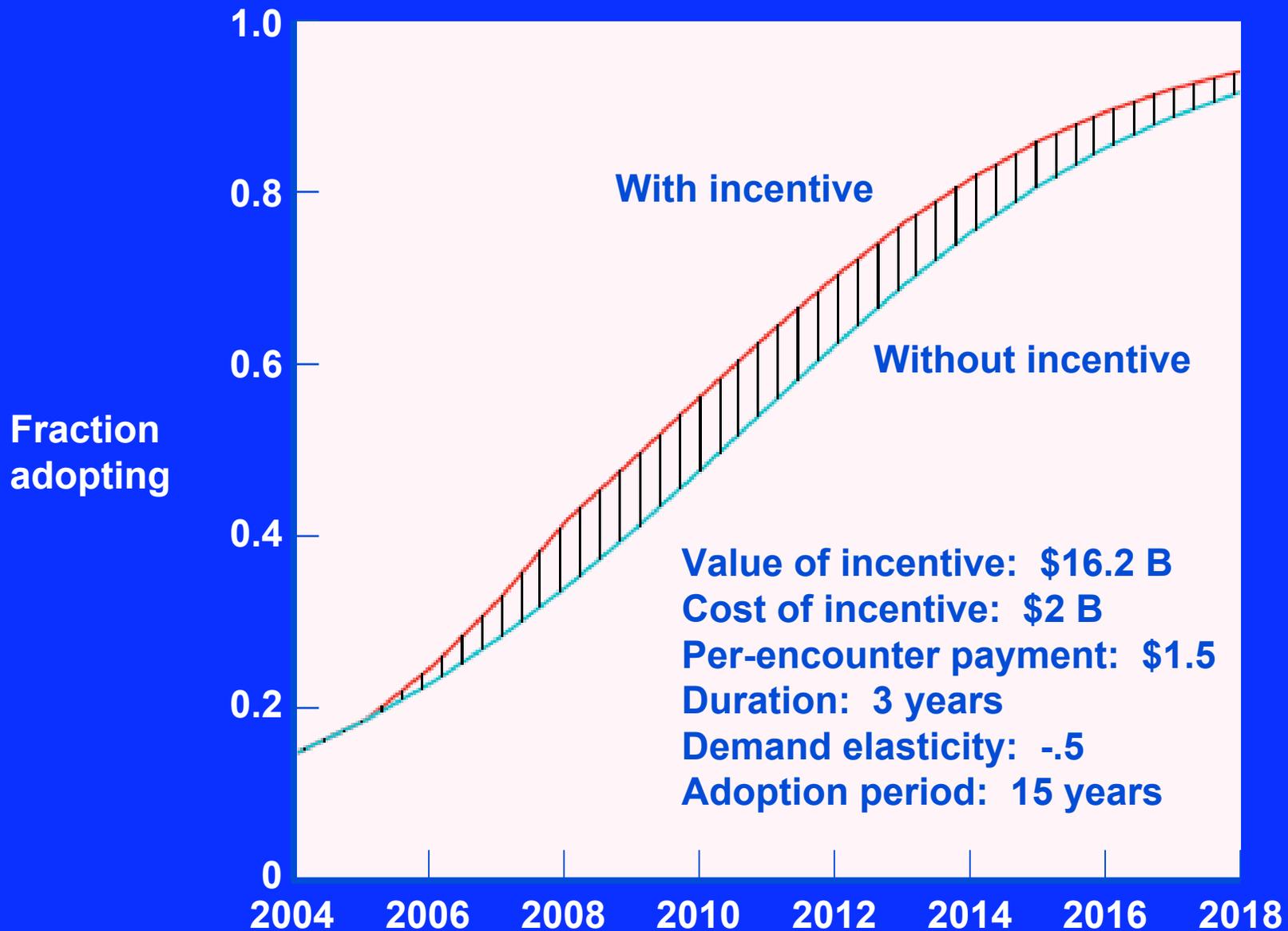
The Government Should Intervene Now

- ***The market is not working well***
 - Providers have little incentive or capability to institute standards-based, interconnected EMR systems
 - Current adoption process may lead to a 2-tiered health care system and inhibit future change
- ***The government is the largest employer and health care payer (and has considerable leverage on the industry)***
- ***EMR-S enabled changes could moderate unsustainable health care cost growth and improve quality***

Key Government Actions

- **Promote standards and EMR-S certification**
- **Implementation support**
- **Promote interoperability and regional connectivity (include provisions for privacy and security of networked health care information)**
- **Promote value of large, digitized clinical record databases for:**
 - **Comparative outcomes research**
 - **Public health**
- **Promote value for continuity of care in large scale emergencies**
- **Medicare/Medicaid leadership with incentives**
 - **Pay for use of EMR-S**
 - RAND – **Pay for quality measured by EMR-S**

Per Encounter Pay-for-Use Incentive



Can Information Technology Transform Health Care?

- **Yes, but --**
 - not without widespread adoption
 - not without standards and interoperability
 - not without associated process and health care system changes
 - not without measurement of quality and efficiency
- **And, probably not without government intervention**



HEALTH