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HEALTH

# ***Can Information Technology Transform Health Care?***

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

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**Presentation to Health-e-LA, June 1, 2007**

# ***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*

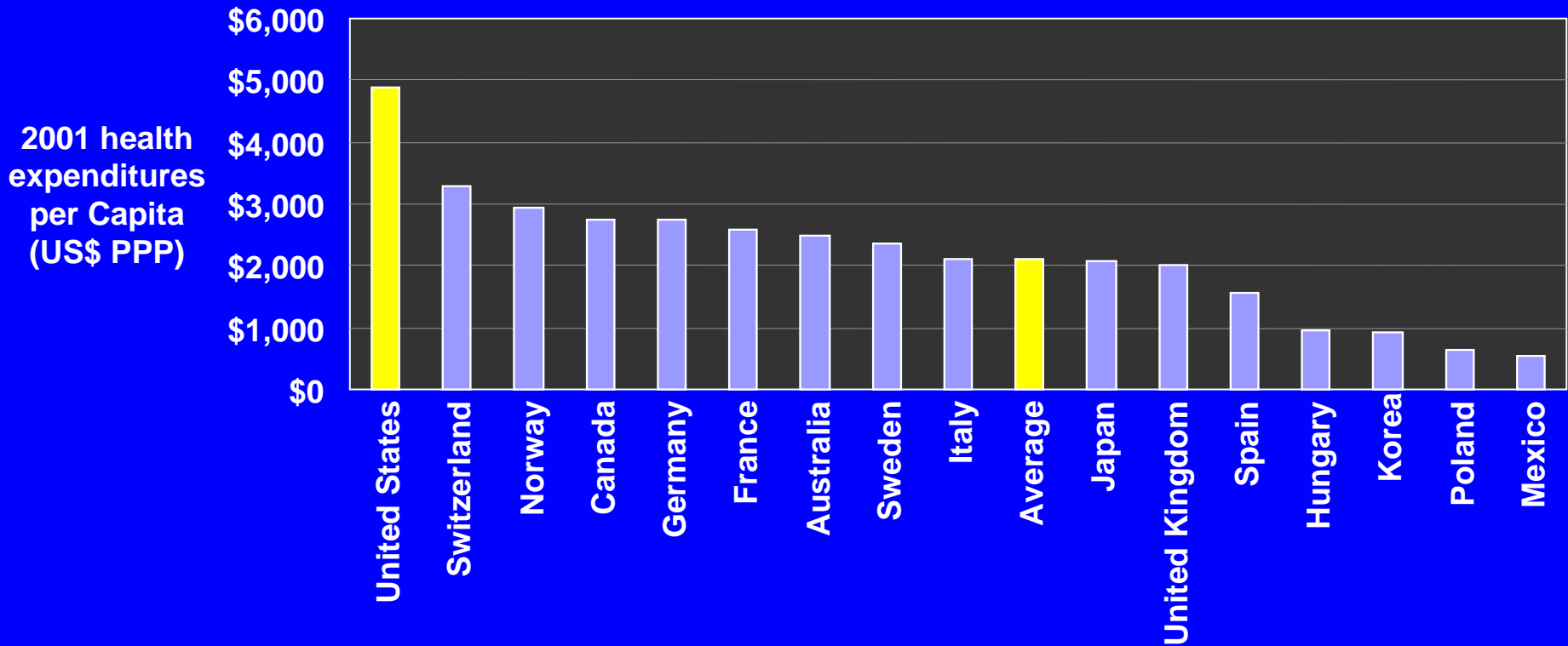
- U.S. health care is one of the largest and most inefficient information enterprises because it still operates mostly with paper records



# *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 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

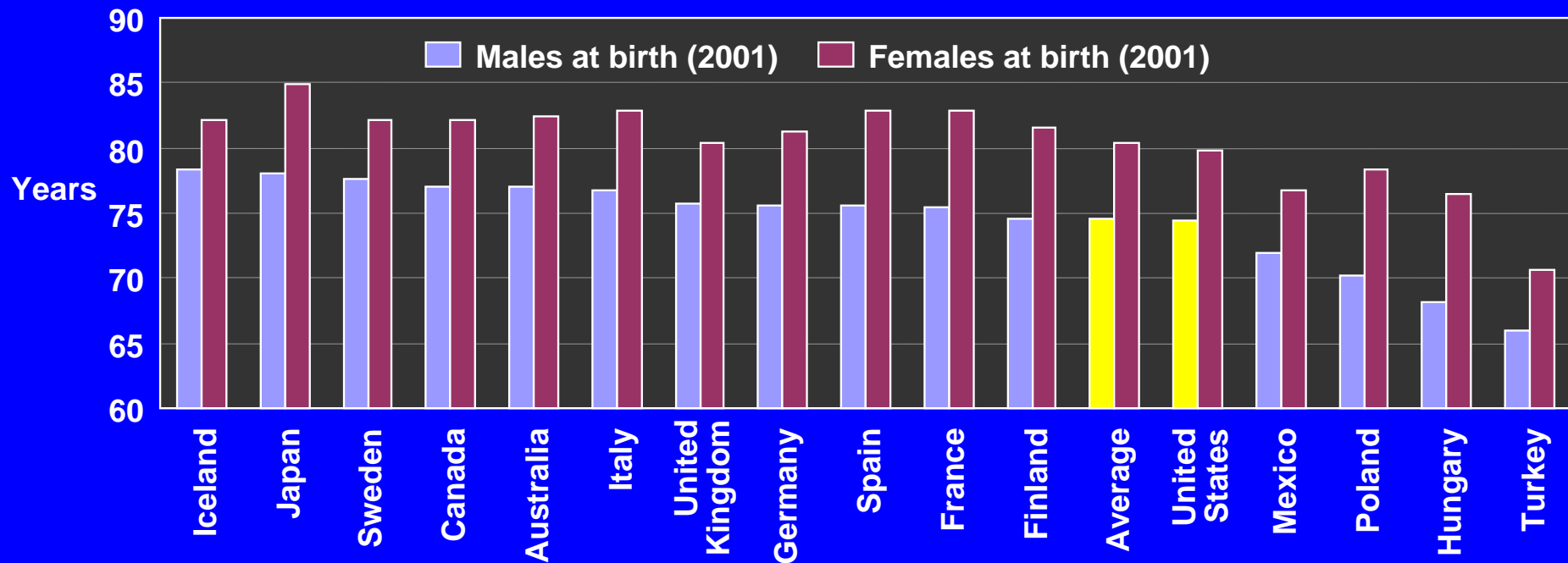
# U.S. Health Expenditures Per Capita Are the Highest Among OECD Countries



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

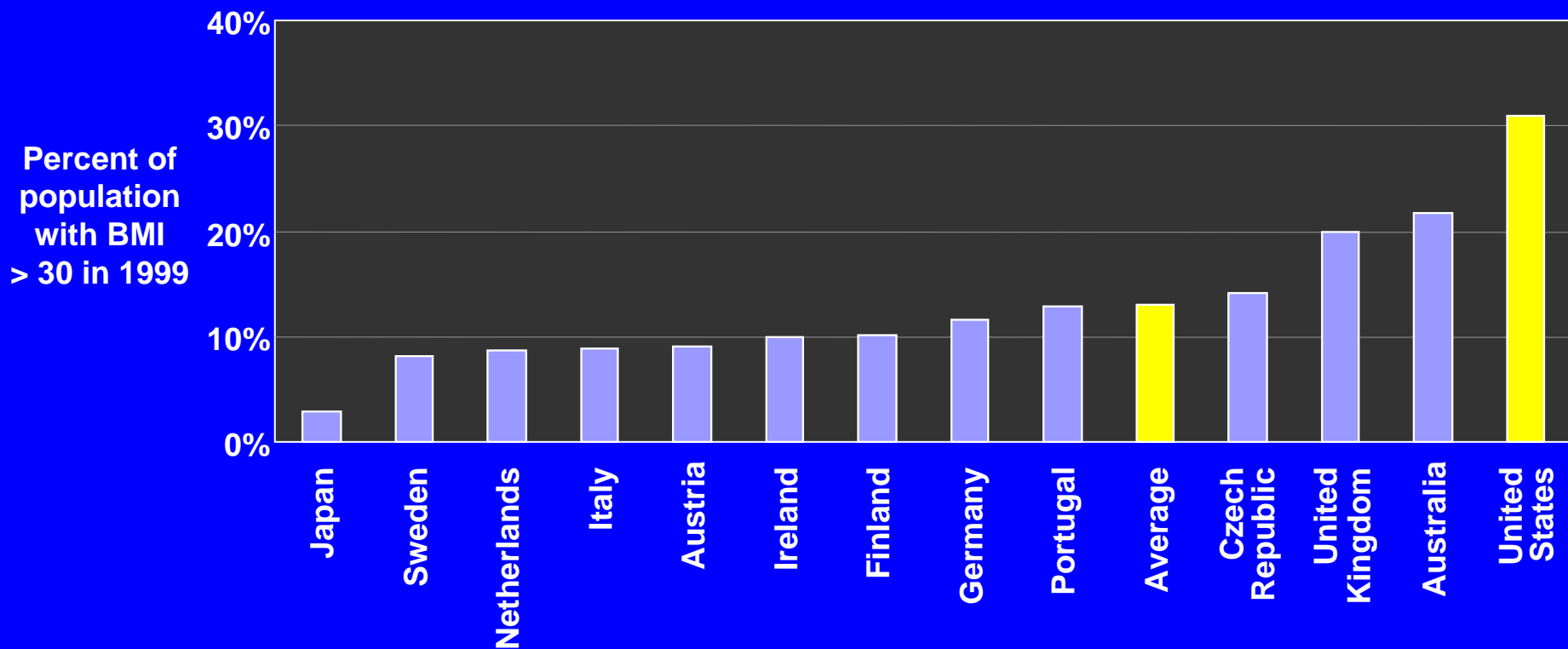
# U.S. Life Expectancy Is Slightly Below the OECD Average



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?

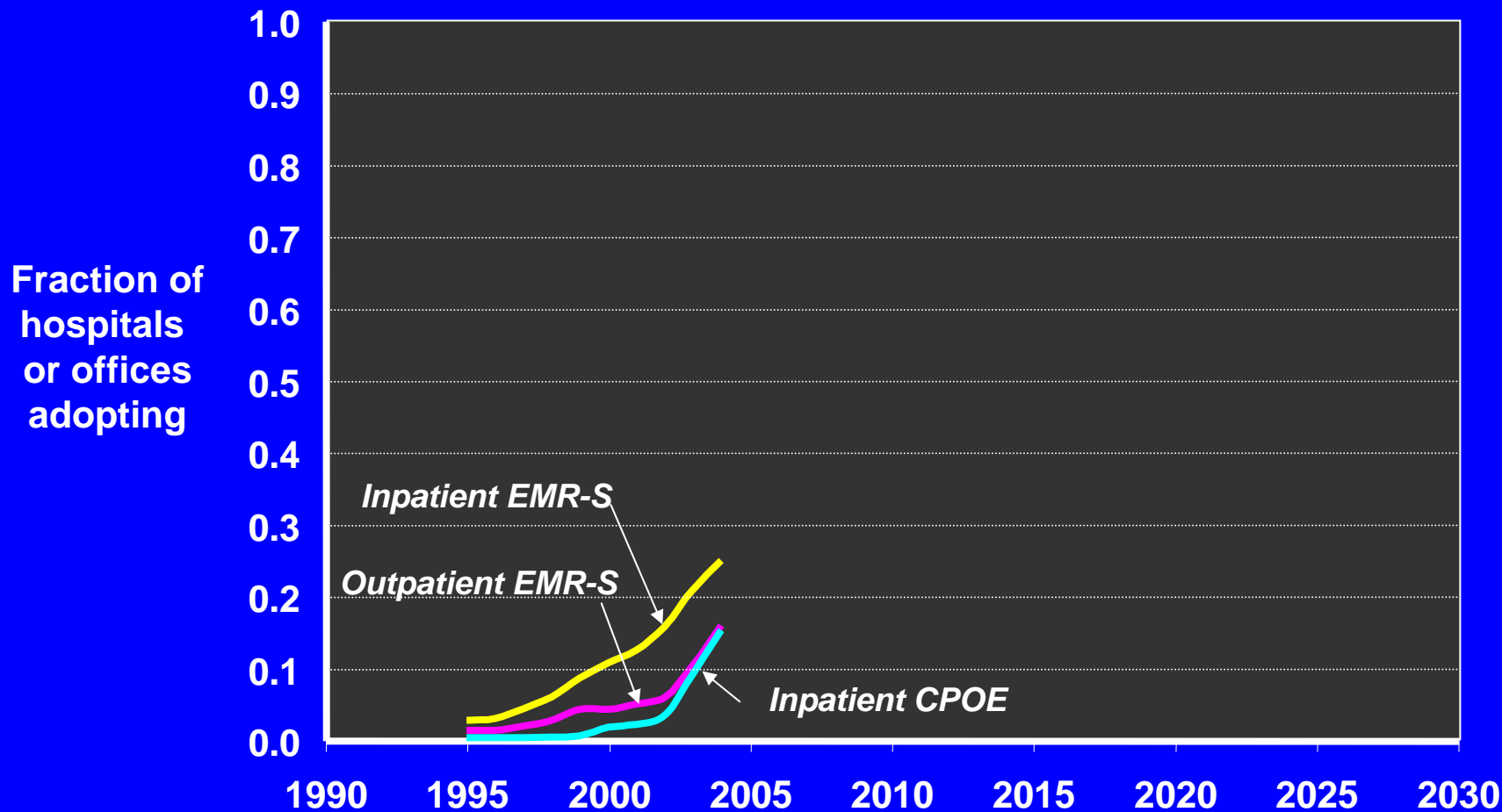
# ***What Is an Electronic Medical Record System?***

- **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**

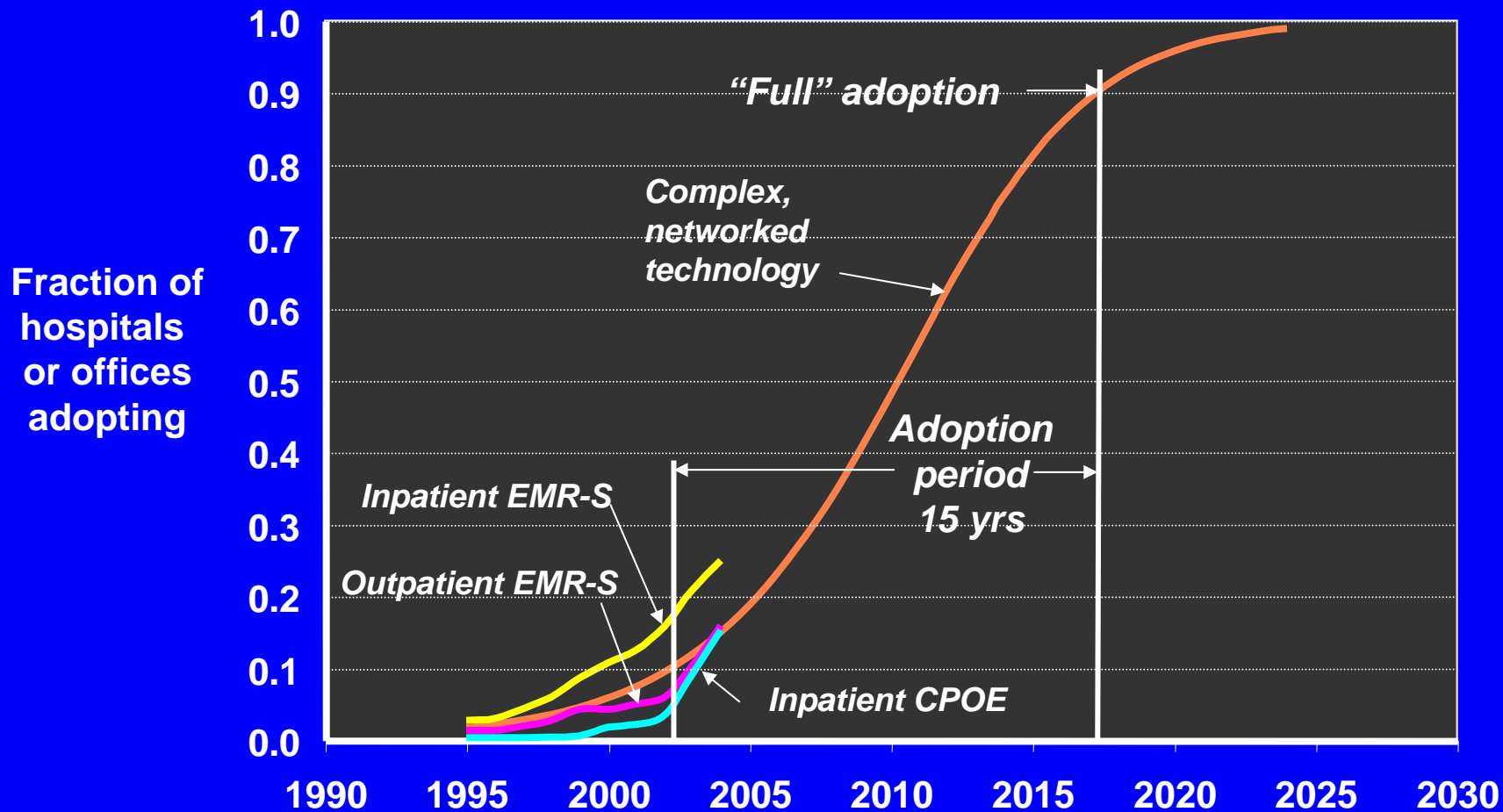
# *Key Findings*

- Efficiency savings enabled by EMR-S could reach ~\$80B/year at 90% 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 400,000 deaths avoided and 40M added workdays
- 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 20-25% of Hospitals and 10-15% of Physicians' Offices*



# Problem Is To Estimate Impact at Full Adoption



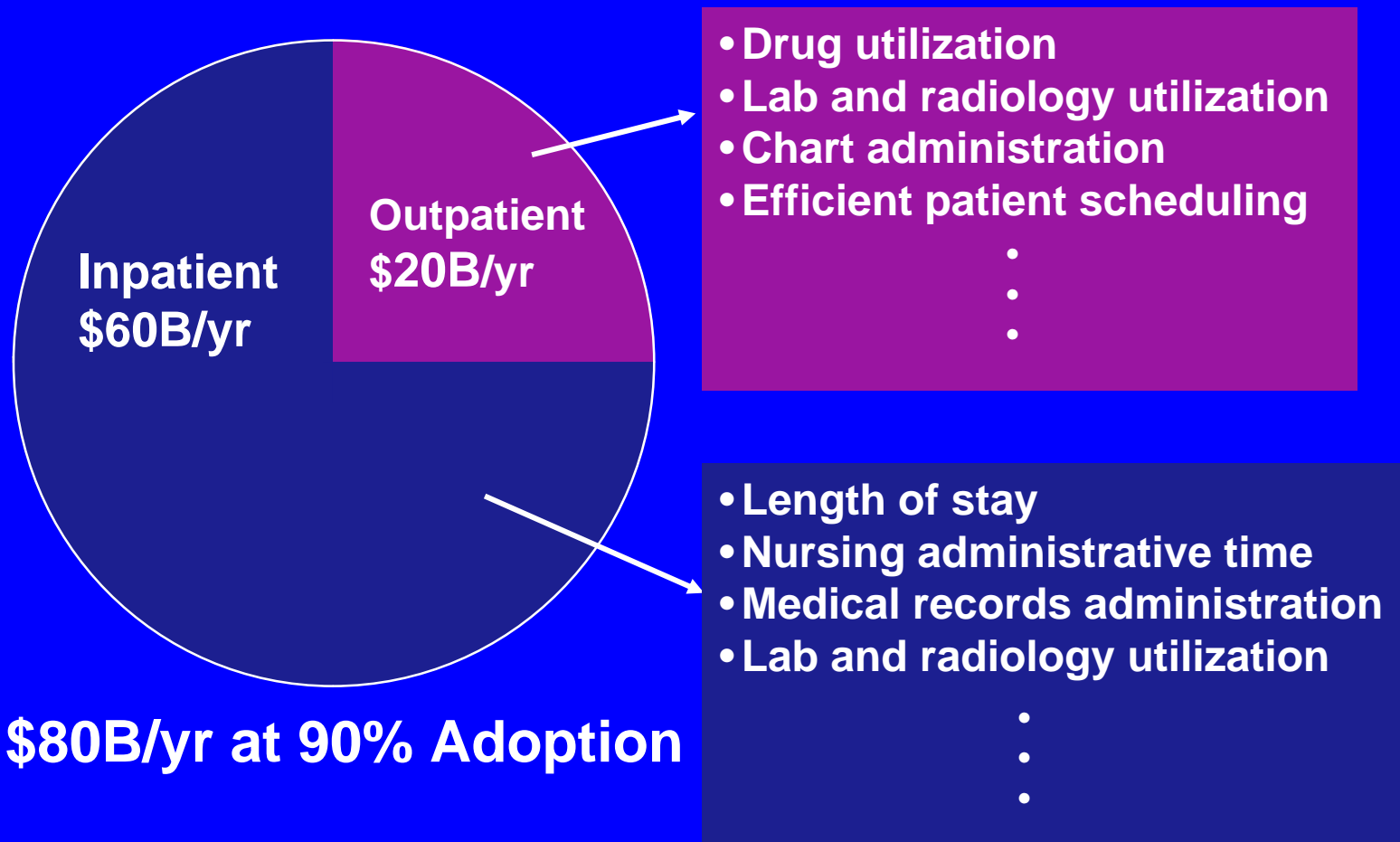
# *The RAND Study of EMR-S*

- 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

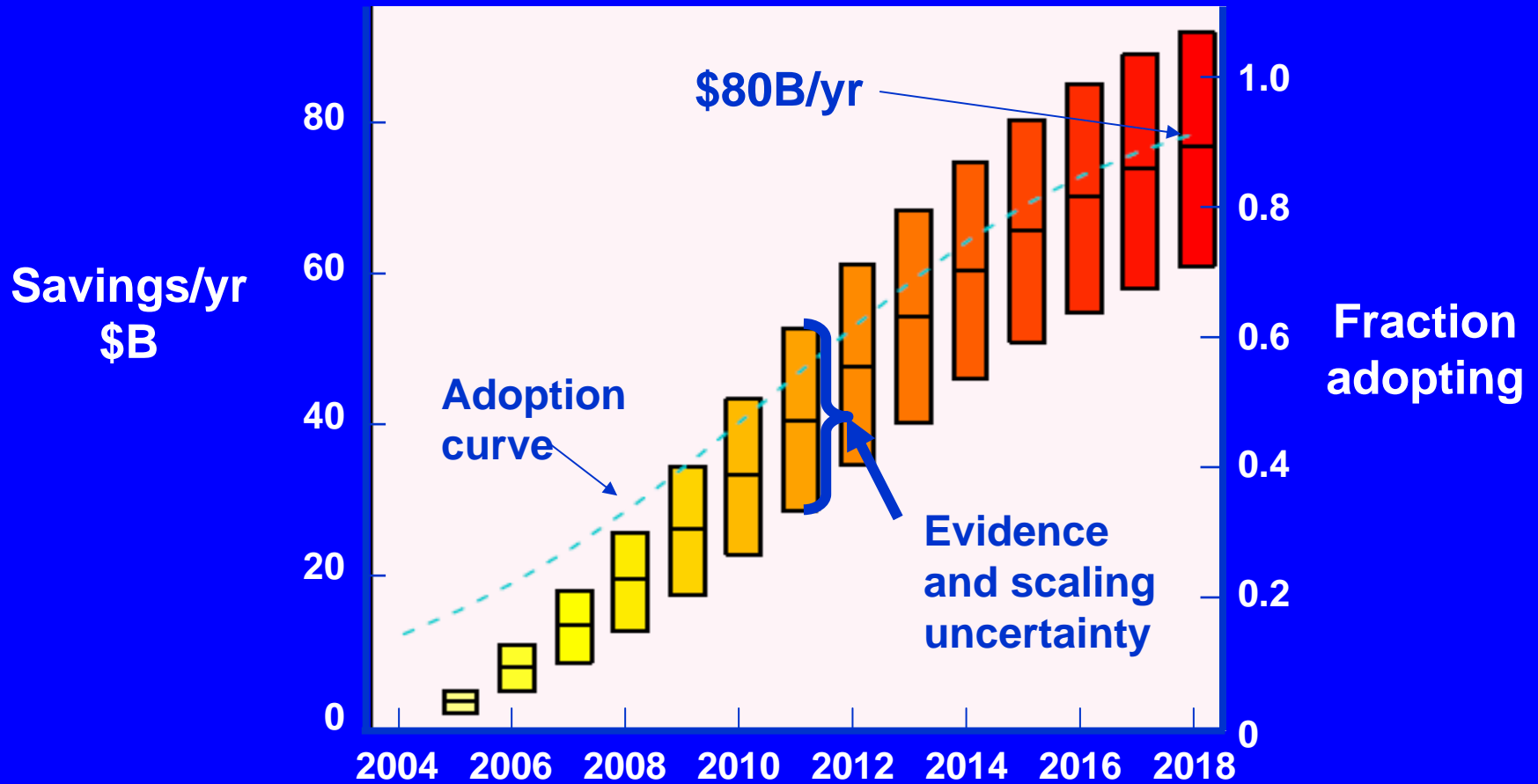
## ***Efficiency Savings Enabled by EMR-S***

- **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



# *It Will Take Some Time to Realize Such Savings*



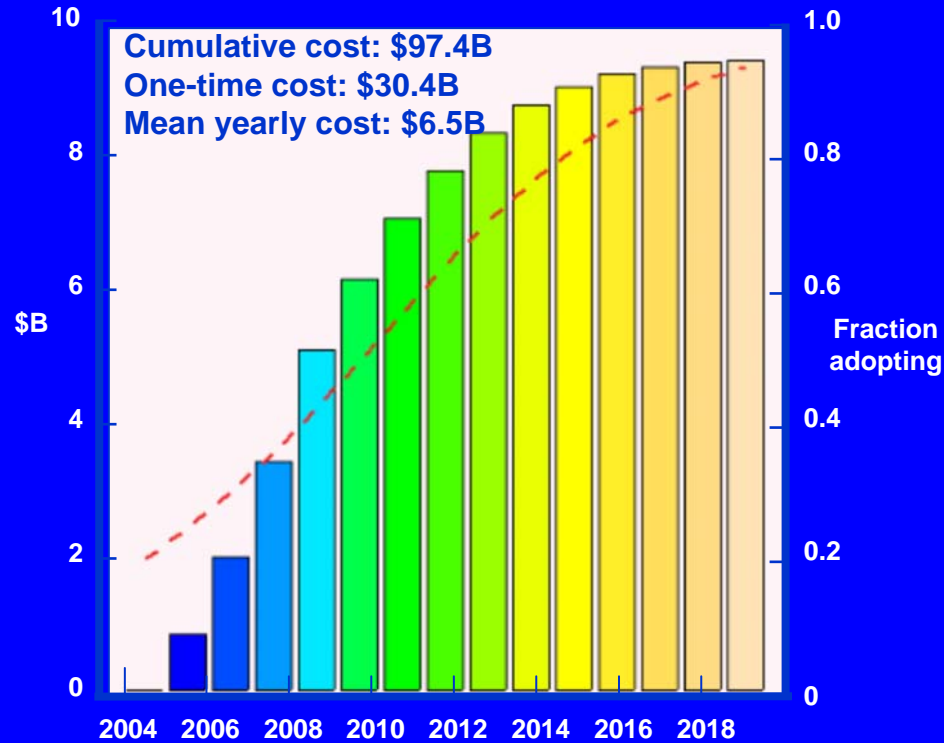
## ***Costs of EMR-S***

- **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***

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

# *... 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

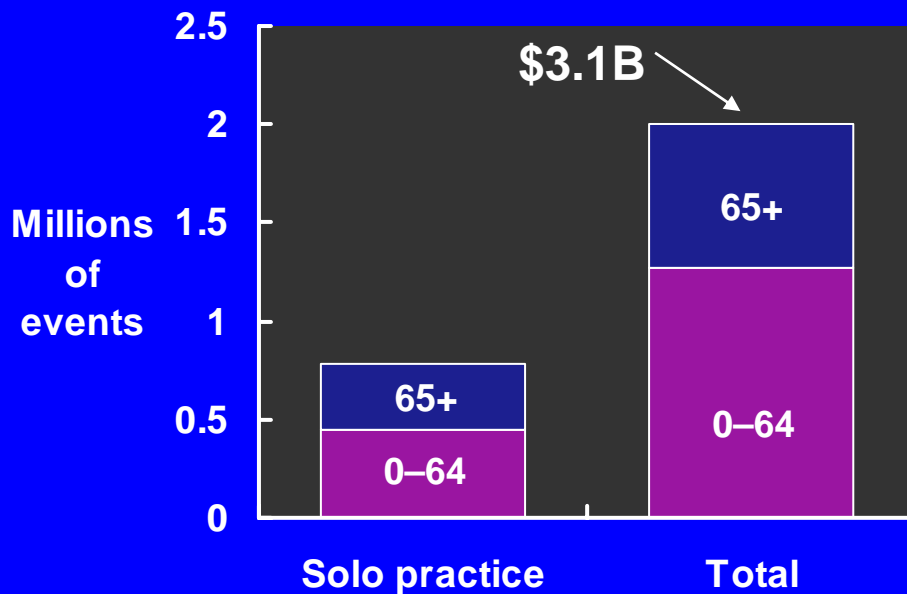
# ***Safety Benefits of EMR-S***

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

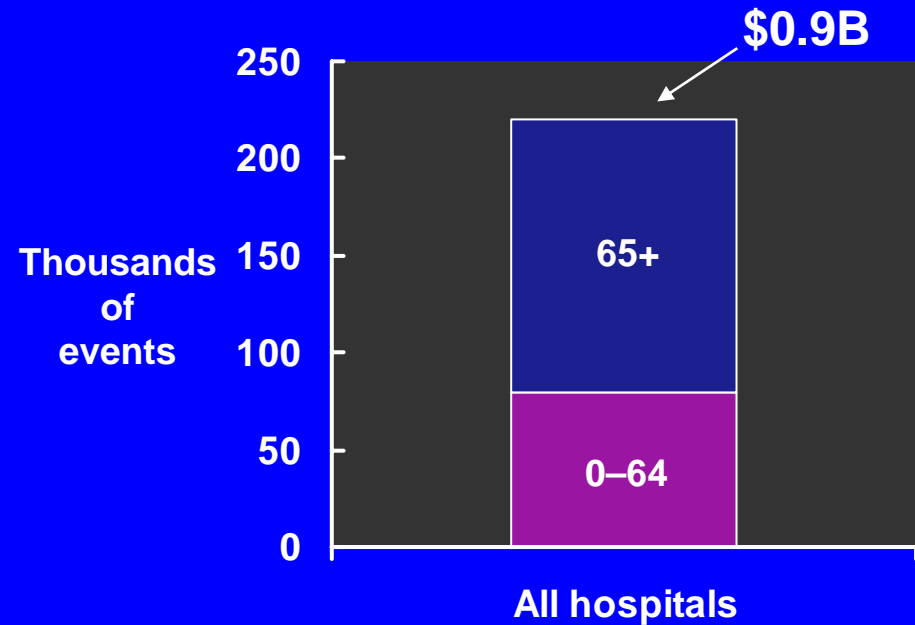
# ***EMR-S with Computerized Physician Order Entry Can Increase Safety***

***-- 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***

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

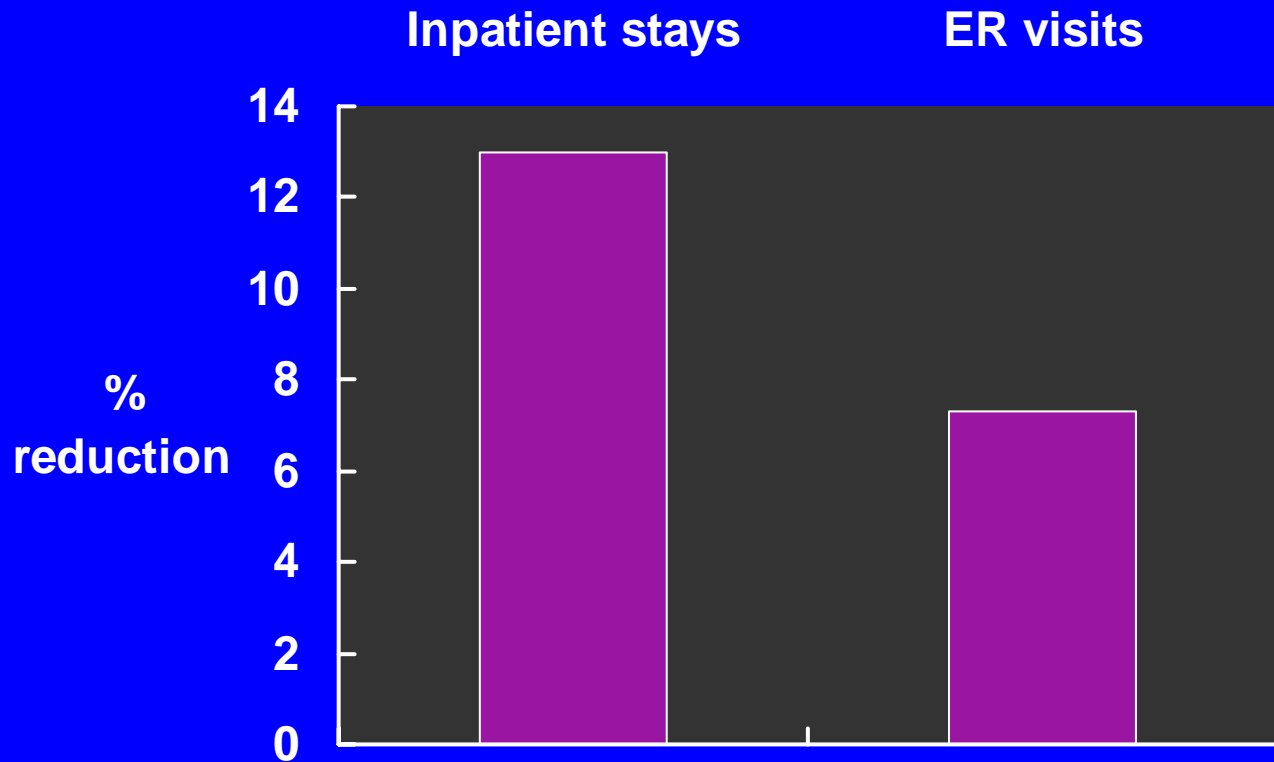
# ***Chronic Disease Management Is a High Leverage Application of EMR-S***

- **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 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

<b><u>Participation Rates</u></b>		
Disease Management	80%	50%
Lifestyle Change	50%	20%
<b><u>Days Affected (millions)</u></b>		
School days lost	-11	-7
Work days lost	-39	-21
Total days in bed	-270	-160
<b>Mortality (thousands of deaths)</b>	<b>-400</b>	<b>-250</b>

# ***Barriers to Adoption of EMR-S 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**

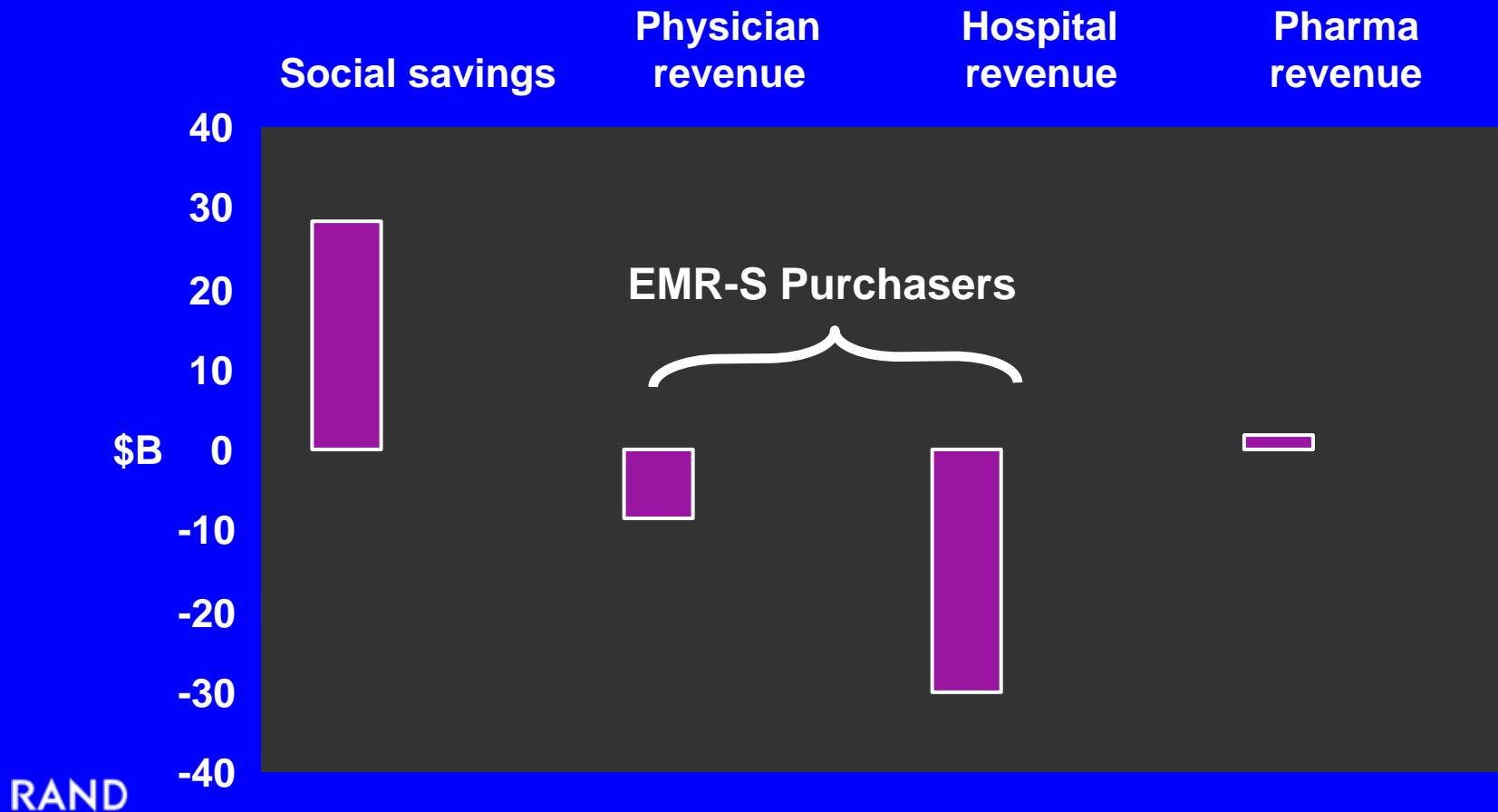
**Low EMR-S Investment**

**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



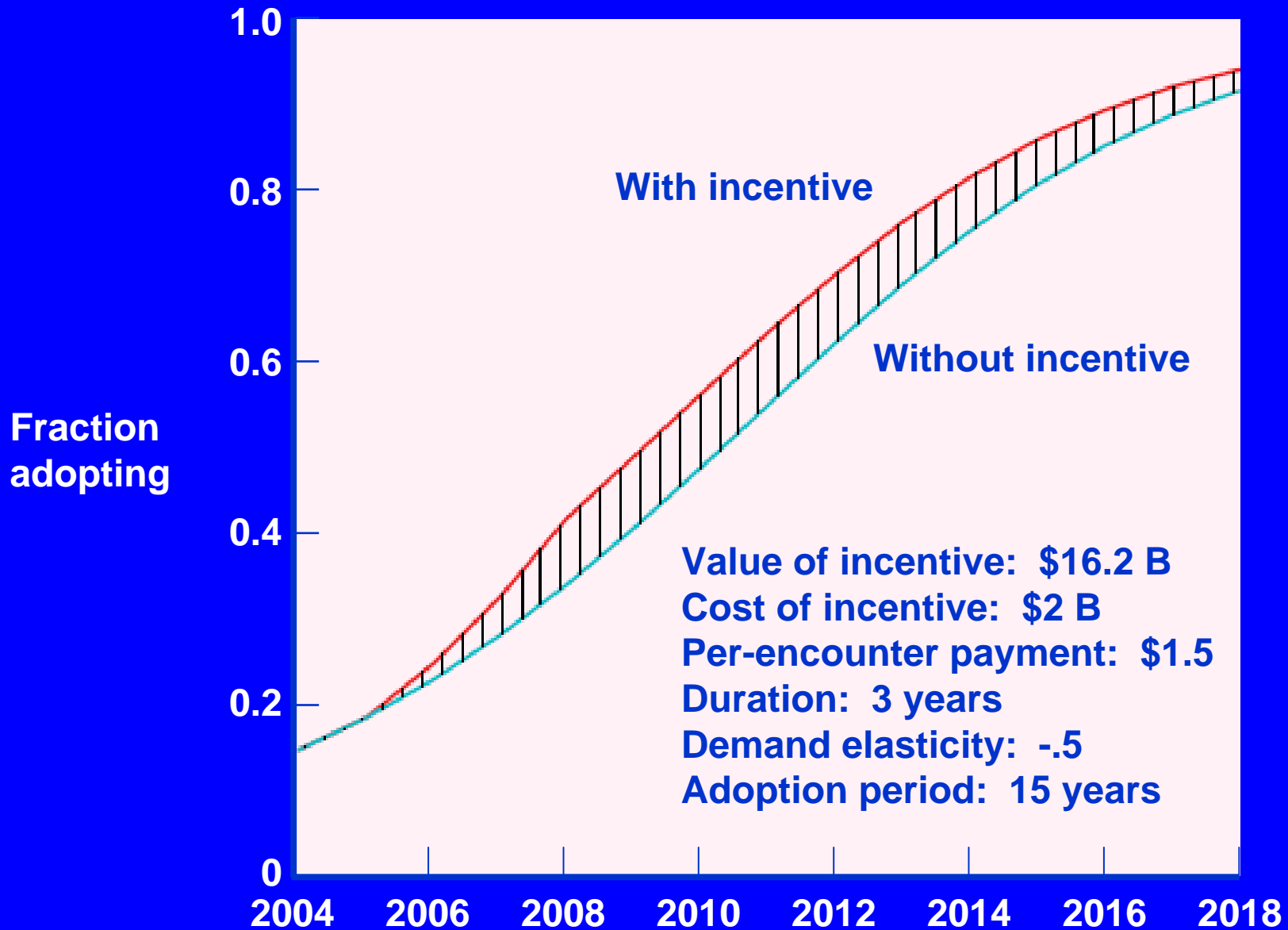
# ***The Government Should Intervene Now***

- ***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***

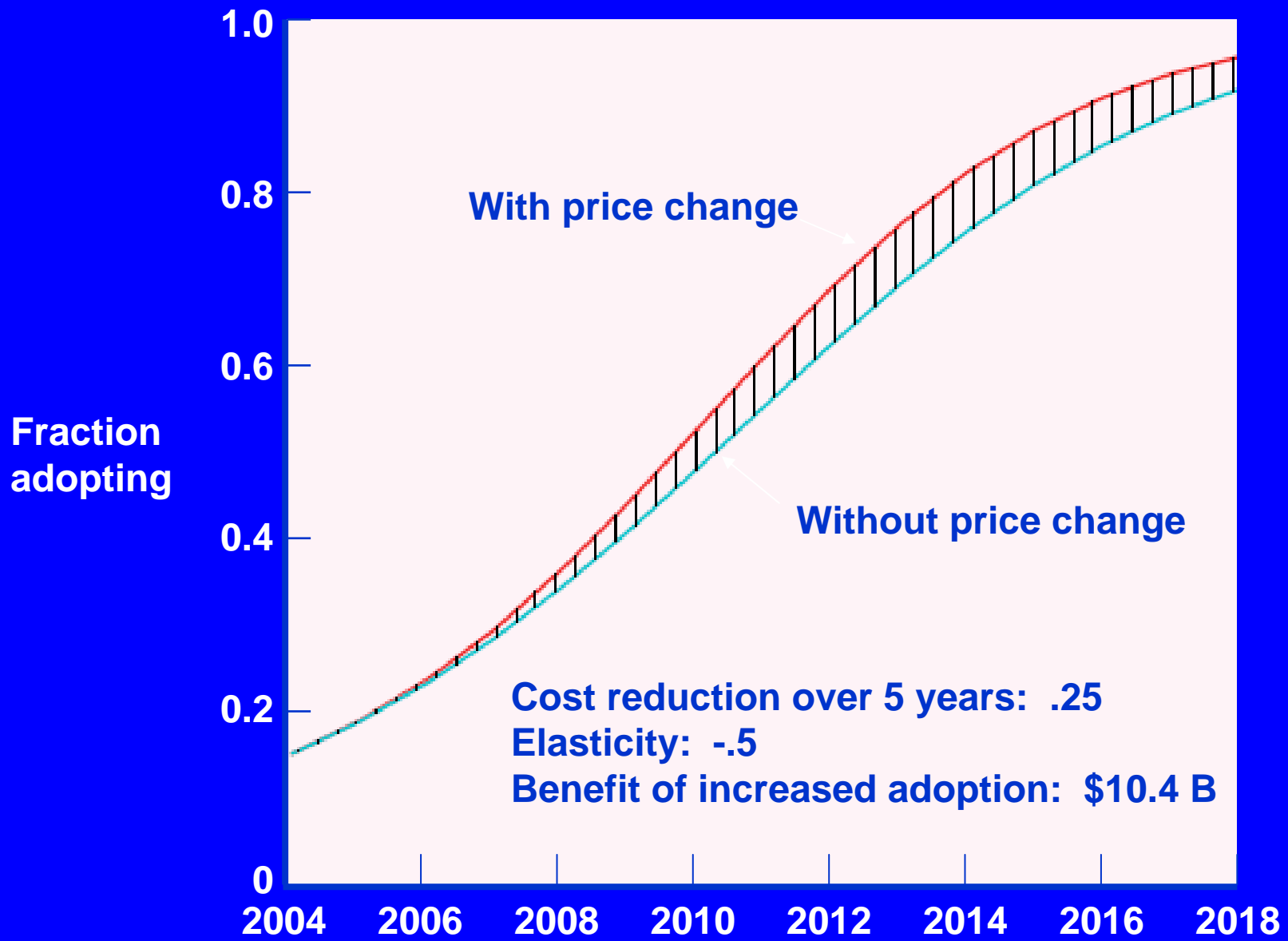
# *Key Government Actions*

- **Promote standards and EMR-S certification**
- **Implementation support**
- **Promote interoperability and regional connectivity**
- **Medicare leadership with incentives**
  - **Pay for use of EMR-S**
  - **Pay for quality measured by EMR-S**

# Per Encounter Pay-for-Use Incentive



# Impact of Options that Reduce Effective Cost



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# ***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

# ***Dissemination of These Findings***

- **Publications for multiple audiences**
  - 2 peer reviewed articles in *Health Affairs*
  - 4 RAND monographs
  - RAND Research Brief and Congressional Newsletter
- **Widespread media coverage with press releases by both *Health Affairs* and RAND**
- **Briefings for congressional and committee staff**
  - Alliance for Health Reform (Frist-Rockefeller Group) briefing (300+ attendees, 60 Congressional)
  - RAND Congressional briefing cosponsored by 21st Century Health Care Caucus (Reps. Murphy and Kennedy), 26 attendees
- **Briefing to CBO Health Advisory Committee**
- **Meetings with key committee staff**
  - Senate Finance Committee
  - Senate LHHS Appropriations Subcommittee
  - House Energy & Commerce Health Subcommittee
  - House Ways & Means Subcommittee
  - House LHHS Appropriations Subcommittee
  - House Armed Service Committee

## ***Dissemination (2)***

- **Meetings with Senators and staff**
  - Senator Max Baucus (D-MT)
  - Senator Pat Roberts' Staff (R-KS)
  - Senator Michael Enzi (R-WY)
  - Senator Orrin Hatch's Staff (R-UT)
- **Workshop on “Economic Impact of EHR Adoption Gap” with David Brailer, National Coordinator, Health Information Technology, HHS, at RAND, Santa Monica**
- **Briefings at private sector activities**
  - Hewlett-Packard Worldwide Health Symposium, Las Vegas
  - Cerner Health Care Leadership Forum, Orlando
  - Xerox Health Care Forum, Rochester
- **Briefings for other interest groups**
  - Institute for Behavioral Health Informatics