



The Johns Hopkins University's

 2010 ACG International
Risk Adjustment Conference



MAY 10-12 
Tucson, Arizona
Loews Ventana Canyon

Transforming Healthcare: Predictive Modeling and Advanced Analytics Under US Healthcare Reform

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My goals for this session

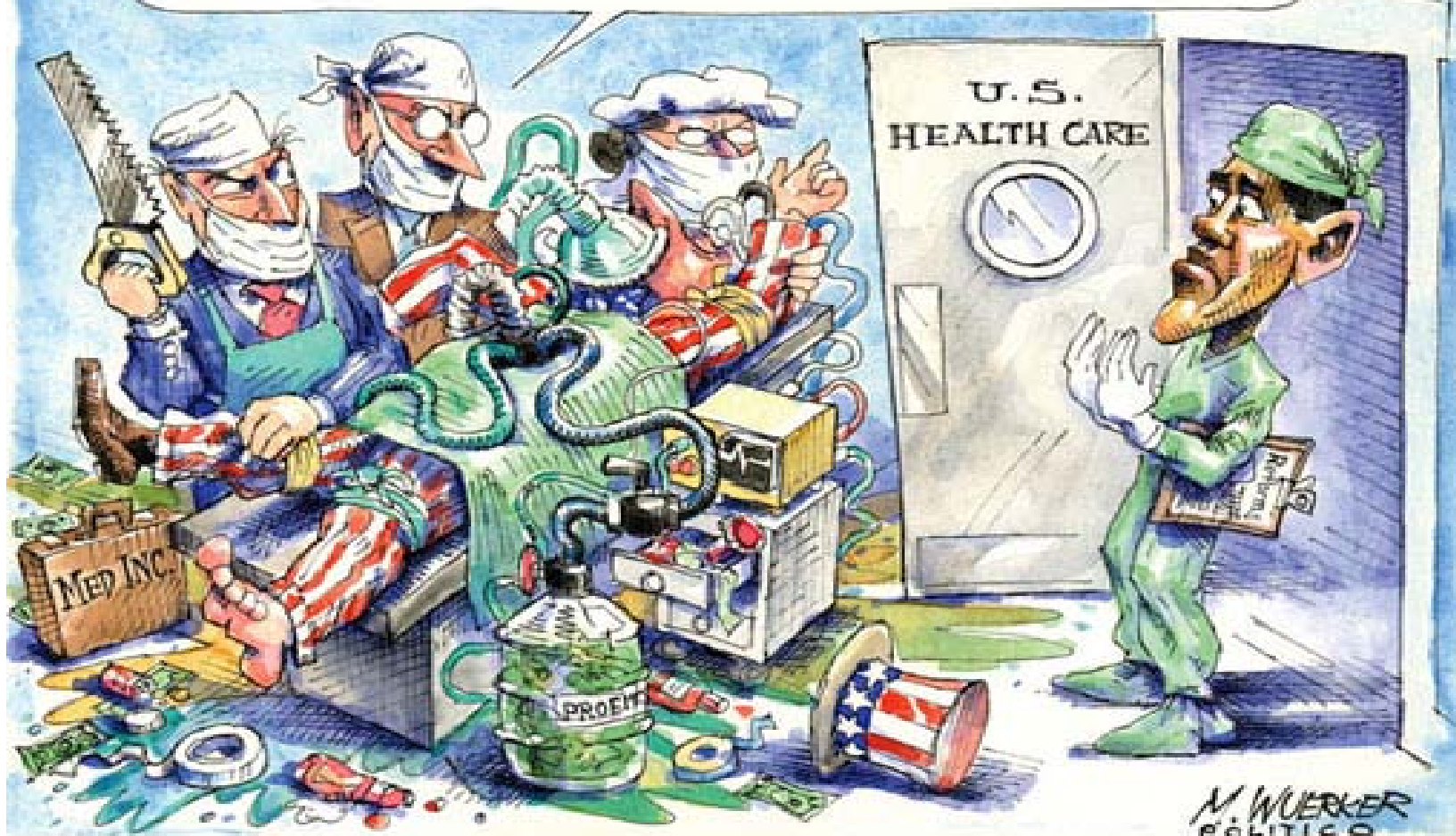
- To describe key provisions of the landmark US healthcare reform legislation passed in March of 2010.
- To discuss reform's implications for health IT supported “advanced analytics” with an emphasis on predictive modeling (PM) and risk adjustment (RA).
- To identify new opportunities and challenges related to PM & RA and other advanced analytics.



Art by Wash Post Writers Group
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REFORM? NO WAY. YOU COULD MAKE A REAL MESS OF THINGS.





Subtitle E—Affordable Coverage Choices for All Americans

PART I—PREMIUM TAX CREDITS AND COSTSHARING REDUCTIONS

Subpart A—Premium Tax Credits and Cost sharing Reductions

SEC. 1401. REFUNDABLE TAX CREDIT PROVIDING PREMIUM ASSISTANCE FOR COVERAGE UNDER A QUALIFIED HEALTH PLAN.

(a) IN GENERAL.—Subpart C of part IV of subchapter A of chapter 1 of the Internal Revenue Code of 1986 (relating to refundable credits) is amended by inserting after section 36A the following new section:

“SEC. 36B. REFUNDABLE CREDIT FOR COVERAGE UNDER A QUALIFIED HEALTH PLAN.

“(a) IN GENERAL.—In the case of an applicable taxpayer, there shall be allowed as a credit against the tax imposed by this subtitle for any taxable year an amount equal to the premium assistance credit amount of the taxpayer for the taxable year.

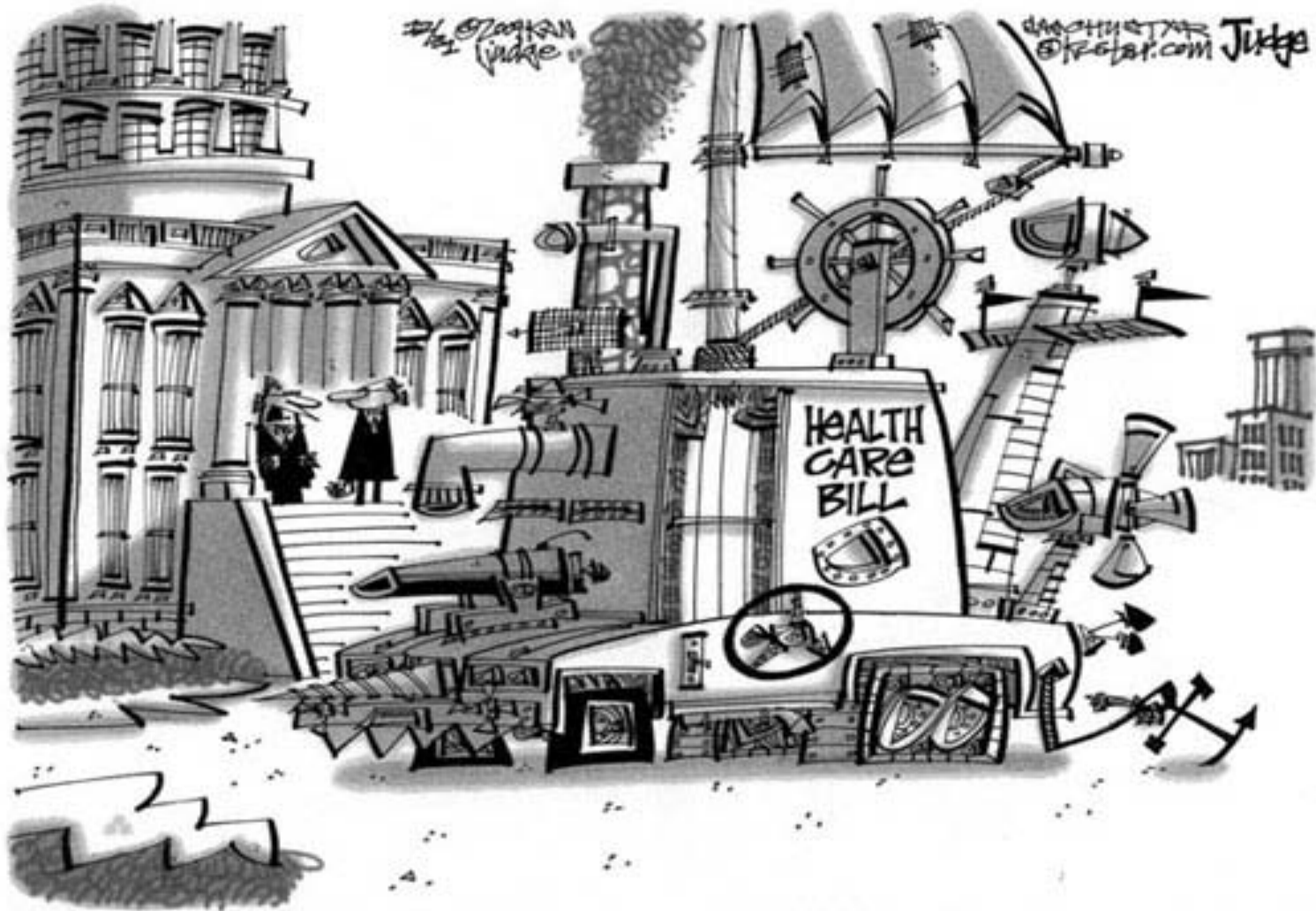
“(b) PREMIUM ASSISTANCE CREDIT AMOUNT.—For purposes of this section—

“(1) IN GENERAL.—The term ‘premium assistance credit amount’ means, with respect to any taxable year, the sum of the premium assistance amounts determined under paragraph (2) with respect to all coverage months of the taxpayer occurring during the taxable year.

“(2) PREMIUM ASSISTANCE AMOUNT.—The premium assistance amount determined under this subsection with respect to any coverage month is the amount equal to the lesser of—

“(A) the monthly premiums for such month for 1 or more qualified health plans offered in the individual market within a State which cover the taxpayer, the taxpayer’s spouse, or any dependent (as defined in section 152) of the taxpayer and which were enrolled in through an Exchange established by the State under 1311 of the Patient Protection and Affordable Care Act, or “(B) the excess (if any) of— “(i) the adjusted monthly premium for such Month for the applicable second lowest cost silver plan with respect to the taxpayer, over....

One of the law's many thousands of provisions



"IT'S A REMINDER OF WHAT WE CAN DO WHEN WE ALL WORK TOGETHER."

Some Frames of Reference

- **The legislation (after 5 decades of attempts) is now in black and white, but as of May 2010, many aspects of final regulations are still unclear.**
- **There are a host of implications for the field of health care analytics and PM/RA; I will focus on a subset of key issues.**
- **I will use examples derived from research at the Johns Hopkins University.**

Some Working Definitions

- **Healthcare Analytics** - the leveraging of electronically available healthcare data to enable actions that improve health system effectiveness, efficiency or equity.
- **Case mix / risk adjustment** - taking health status / risk into consideration for health care finance, payment, provider performance assessment and patient outcome monitoring.
- **Predictive modeling** - prospective (or concurrent) application of risk measures and statistical technique to identify “high risk” individuals who would likely benefit from care management interventions.

Key Underlying Goals of US Healthcare Reform

- **Cover the Uninsured**
- **Contain Costs (“Bending the Curve”)**
- **Improve Quality / Equity**
- **Digitize & Modernize**

Patient Protection and Affordable Care Act Provisions that will Expand Coverage (by 2014)

- **Medicaid expansion to everyone with incomes under 133% of the federal poverty level (FPL)**
- **State Health Insurance Exchanges**
 - **Private insurance for individuals and small businesses**
 - **Subsidies for individuals between 133% - 400% FPL**
 - **Exchanges will offer private plans and possibly “cooperative” plans**
- **Prohibits the use of medical underwriting by private insurers**
 - **“Guaranteed issue” and “community rating”**
- **Moving towards full participation via tax code – “individual mandate” and employer “play or pay”**

Find Health Insurance Plans

How to Choose

About the Exchange

Exchange Criteria

Describe yourself.

Which State do you live in?

New Jersey

Which best describes you?

Married, no children

Health Insurance Plans

6 plans are available for you.

Plan Details	Type	Coverage	Care Rating	Cost	
<p>Blue Preferred Exchange Package Provider: Blue Cross / Blue Shield of NJ The Blue Preferred Exchange Package is ipsum dolor sit amet, odio ibidem usitas paratus, vindico quidne, mellor eum ymo accumsan appellatio.</p>	Non-Profit	High	Member Ratings: (21,006 ratings) ★★★★★ Independent Review: Consumer Reports, DoHHS	\$650 per month No Cost for each office visit and prescription	VIEW DETAILS
<p>Blue Preferred Ultimate Provider: Blue Cross / Blue Shield of NJ The Blue Preferred Ultimate Package is ipsum dolor sit amet, odio ibidem usitas paratus, vindico quidne, mellor eum ymo vulputate velit quis quia, facilisi.</p>	Private	Complete	Member Ratings: (23,456 ratings) ★★★★★ Independent Review: Consumer Reports, DoHHS	\$850 per month No Cost for each office visit and prescription	VIEW DETAILS
<p>Horizon Health Basic Provider: Horizon Healthcare The Horizon Health Basic plan is ipsum dolor sit amet, odio ibidem usitas paratus, vindico quidne, mellor eum ymo vulputate velit quis quia, facilisi. Humo, autem premo feugiat quibus.</p>	Private	Basic	Member Ratings: (104,456 ratings) ★★★★★ Independent Review: Consumer Reports, DoHHS	\$150 per month +\$30 for each office visit and prescription	VIEW DETAILS
<p>New Jersey Health Group - Limited Provider: Blue Cross / Blue Shield of NJ The New Jersey Health Group - Limited offers catastrophic is ipsum dolor sit amet, odio ibidem usitas paratus, vindico quidne, mellor eum ymo vulputate velit quis, facilisi.</p>	Non-Profit	Limited	Member Ratings: (3,456 ratings) ★★★★★ Independent Review: Consumer Reports, DoHHS	\$99 per month +\$50 for each office visit and prescription	VIEW DETAILS
<p>U.S. Public Basic Plan Provider: U.S. Government The U.S. Public Basic Plan offers low monthly rates with higher doctor and hospital visits. There is also a copay for each visit. The coverage complies with the Basic Coverage category of offerings.</p>	Public	Basic	Member Ratings: (31,456 ratings) ★★★★★ Independent Review: Consumer Reports, DoHHS	\$150 per month +\$30 for each office visit and prescription	VIEW DETAILS
<p>U.S. Public High-Level Plan Provider: U.S. Government The U.S. Public High-Level Plan is ipsum dolor sit amet, odio ibidem usitas paratus, vindico quidne, mellor eum ymo vulputate velit quis quia, facilisi. Humo, autem premo feugiat quibus.</p>	Public	High	Member Ratings: (22,456 ratings) ★★★★★ Independent Review: Consumer Reports, DoHHS	\$550 per month No Cost for each office visit and prescription	VIEW DETAILS

All Plans Meet These Criteria

- You Can't Be Dropped
- No Coverage Limits
- Switch Anytime
- Pre-Existing Conditions Accepted
- No Illness Penalties

[Learn More](#)

Coverage

The Health Exchange utilizes The U.S. Coverage Scale that groups plans into five categories.

- Complete** Highest Level
- High** Above Average
- Moderate** Average Plan
- Basic** Limited Plan
- Limited** Catastrophic

[Learn More](#)

Types of Insurance Plans

Private Plans
Private Insurance plans are offered by companies who are for-profit businesses answerable to their shareholders. They may offer different plans outside the Exchange.

Non-Profit Plans
The organizations offering Non-Profit Plans in the Exchange are prohibited from making profit and distributing earnings to shareholders. They may offer different plans outside the Exchange.

Public Plans
Public Insurance plans are offered directly from the Federal Government of the United States. They are funded entirely by membership fees and only offered through the Exchange.

[Learn More](#)

This is a concept design only. It does not reflect anything currently in development. It was conceived and designed by Edward Mullen in order to contribute to the current discussion on health care reform.

FOR DEMONSTRATION PURPOSES ONLY

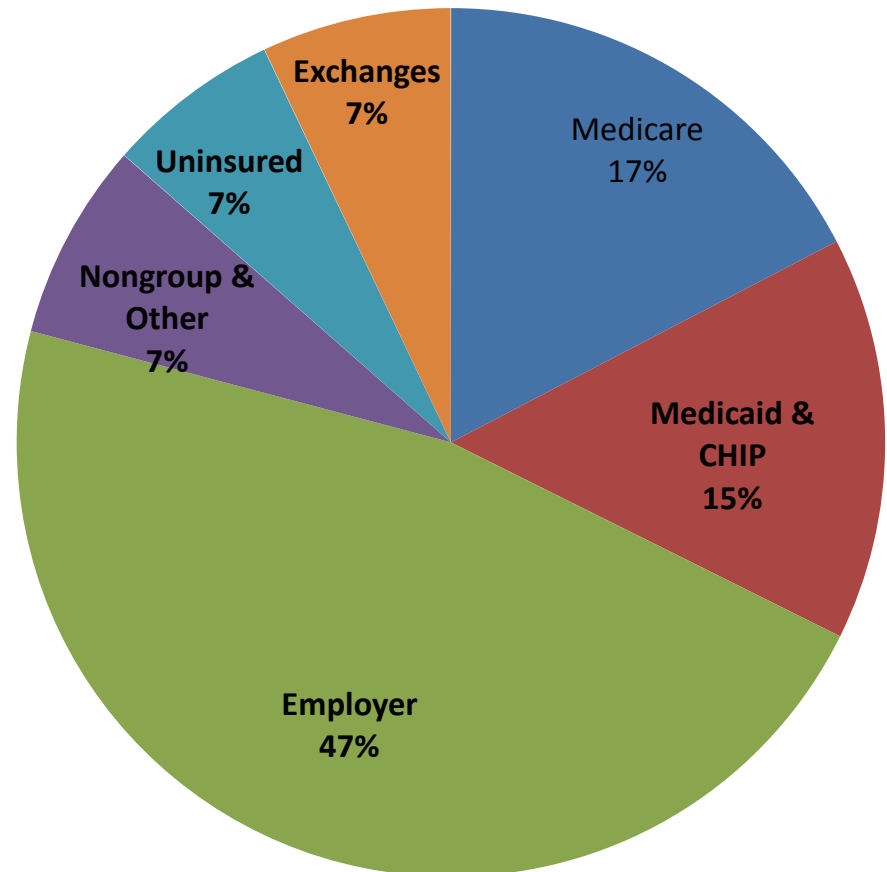
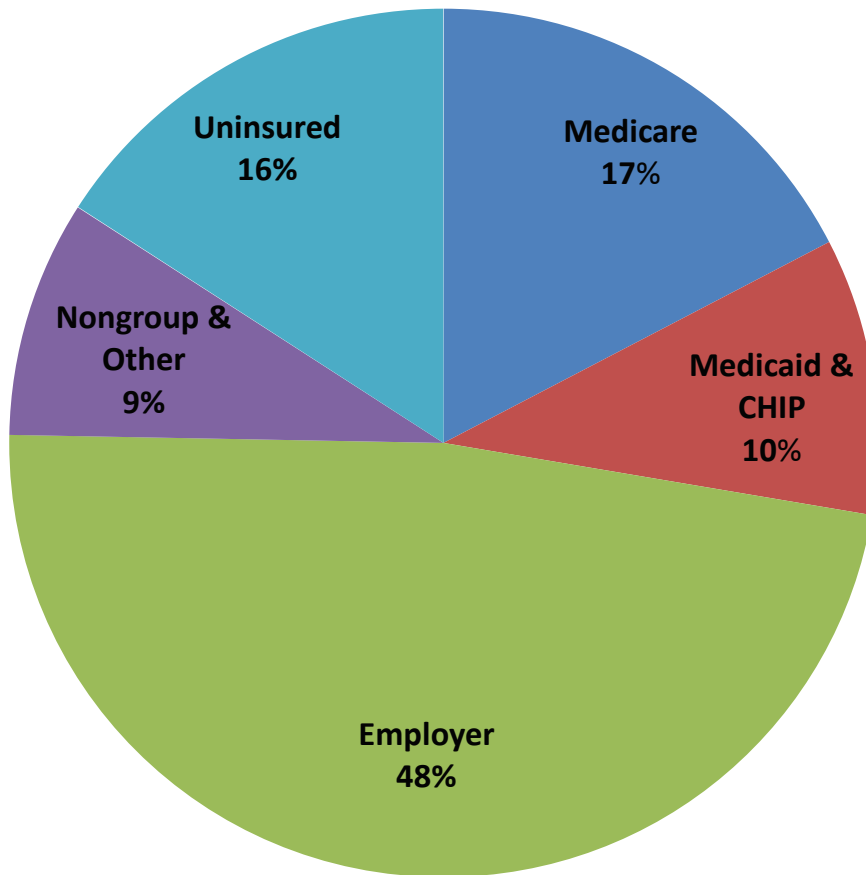
Concept visible online at http://makinggood.edmullen.com/index.php/article/health_insurance_exchange/

A prototype of an exchange's consumer web site

Reform's Expected Effect on Insurance Coverage

Projected 2019, Without Law

Projected 2019, With Law



Source: Congressional Budget Office's 3/20/2010 Letter to Speaker Pelosi.

Preliminary Provisions Starting Right Away

- Federal support of national or state high risk insurance pool (90 days)
- Extending dependent children's coverage up to age 26 (6 mos.)
- Eliminate pre-existing conditions for children's private insurance (6 mos.)
- Small business (25 worker/\$50K) tax credits (6 mos.)
- Part D discounts for "donut hole" drug benefit (1 year)
- **Though not part of Insurance Reform – the "HITECH" stimulus package is dispersing \$29 billion in doctor & hospital subsidies (via Medicare and Medicaid) for implementing electronic health records (EHRs).**

Where will the money come from?

- **Total cost of \$938B over ten years**
 - Medicare payroll tax increase: (22% of above)
 - Lower Medicare FFS increase: (21%)
 - Lower Medicare+Advantage (HMO) payments: (14%)
 - Fees (taxes) on drugs, devices, and insurers: (11%)
 - Excise tax on “Cadillac” (over\$27K value) private insurance plans (starting 2018): (3%)

Simultaneously Braking and Accelerating the **HEALTH-CARE** Vehicle



What will be the impact of health care expansion on medical inflation

Cost Containment Under Health Reform

- **Decreasing Medicare growth**
 - Medicare Advantage capitation cuts
 - Controlling payments to FFS providers
 - Medicare independent advisory board with “teeth”
 - Stop paying for hospital readmissions / infections
- **Ceiling on insurer “Medical Loss Ratio” (MLR) (amount for non health care)**
- **Increased waste fraud and abuse intervention for public programs**

Cost /Payment Pilot Projects Under Health Reform

- “Value Based” coverage (paying for what works)
- Pay for performance (P4P)
- New non FFS payment demos such as global or episode bundled payment

Why understanding risk is key to “bending” the cost growth curve

# Chronic Co-morbidities	% Pop.	Relative Cost (Per Pt.)	Est. % of Total Medicare Costs	Avg. # Unique MDs/Yr.	Avg. # Filled Rx / Yr.
5+	20%	3.2	66%	13.8	49
3-4	27%	.9	23%	7.3	26
0-2	53%	.1	11%	3.0	11

Data Source: G. Anderson et. al., Johns Hopkins Univ. (Derived from Medicare claims and beneficiary surveys.)

Health Reform Activities Targeted at Quality / Equity

- **Obtaining evidence on what works - Comparative Effectiveness Research (CER)**
- **New innovations diffusion center at CMS**
- **Employee financial incentives for “wellness”**
- **Community and employer wellness pilots**
- **Primary care “Medical Homes”**
- **Health workforce training subsidies / incentives**

Reform will digitize and modernize

- **Huge investment in electronic health records (EHRs) / Health IT (HIT) for doctors and hospitals**
 - Providers receive P4P payments for “meaningful use.”
- **Accountable Care Organizations (ACOs)**
- **Administrative Simplification**
 - Standardized claims form and electronic data interchange for payment (Rules by 7/1/11, effective 4/1/14)

How might predictive modeling / risk adjustment analytics be applied within various components of US healthcare reform?



Applying PM / RA - 1: Expanding Coverage

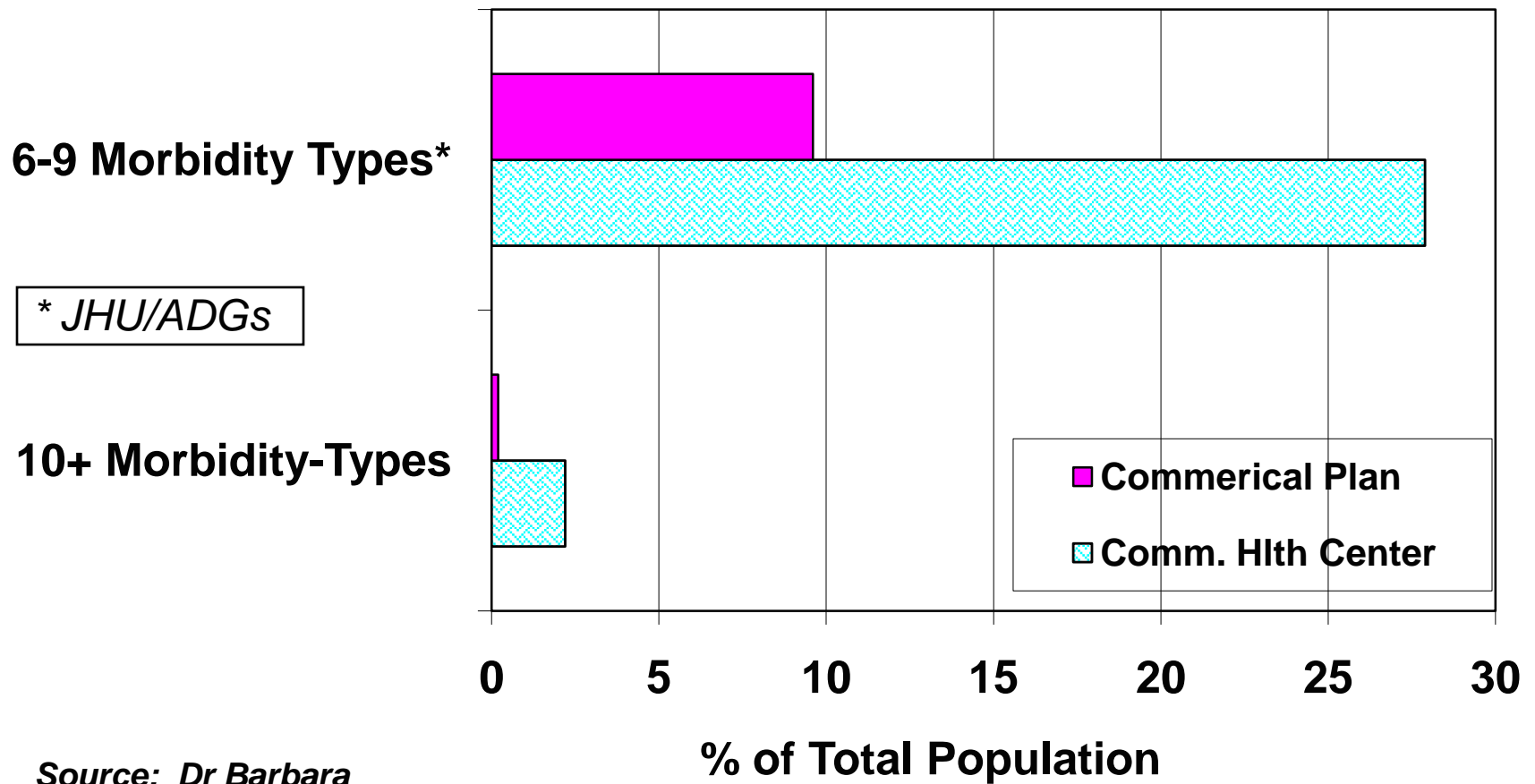
- **Premium adjustments to account for varying risk within plans offered by health insurance exchange (HIE)**
- **As part of Medicaid expansion. (Most Medicaid programs use risk adjusted capitation.)**
- **To help plans better manage needs of formerly uninsured.**
- **To help private plan actuaries better manage within the new rating environment.**
- **By regulators to monitor private health plans.**

Why risk adjustment is key for any financial exchange between government and health plans

<u>Distribution of Expenditures for US Medicare Enrollees (65+)</u>			
% of Enrollees	% of Medical Costs		% of Rx Costs for M+A (MCOs)
	(FFS)	(MCO)	
2%	24%	32%	11%
10%	60%	68%	36%
50%	96%	97%	91%

Sources of Data: FFS - CMS 5% file. MCO- sample of 180,000 enrollees from several Medicare Advantage plans .

Morbidity burdens of uninsured likely to be different from insured



Source: Dr Barbara Starfield JHU

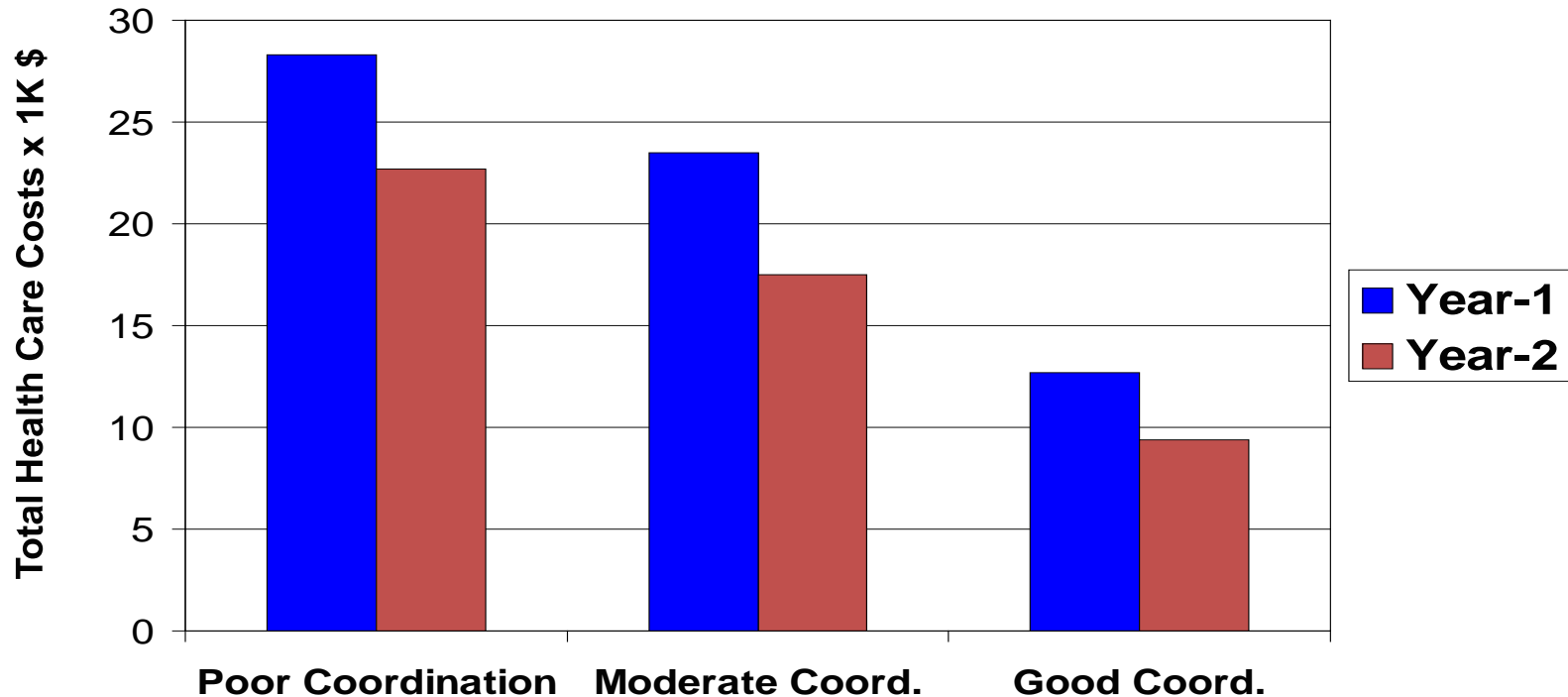
Applying PM / RA - 2: Paying Providers

- **Setting cap rates for Medicare, Medicaid, or public/co-op plans and paying doctors in plans.**
- **More accurate adjusted payment of Part D Rx plans (PDPs).**
- **Adjusting various P4P performance measures**
 - **Efficiency or outcomes.**
- **Adjusting payments to individual doctors / groups, as we move away from FFS**
 - **Episode / bundles , global budgets or FFS adjustment.**

Applying PM / RA - 3: Improving Quality

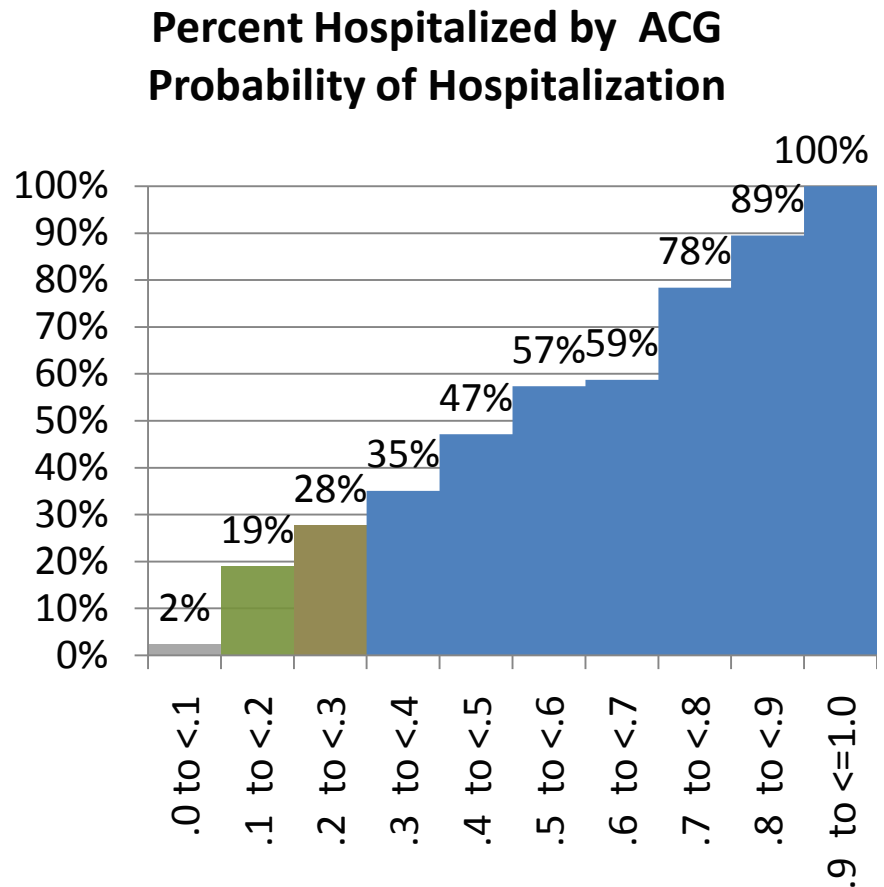
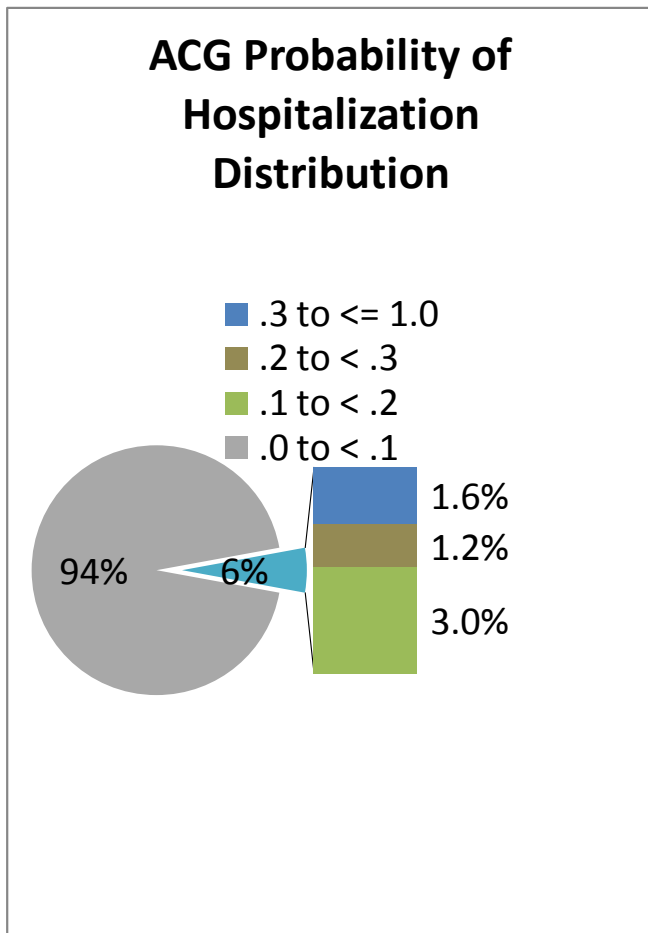
- **Many potential demos could apply innovative PM applications:**
 - **Medical homes (improving primary care)**
 - **Disparities – identifying persons in need of more care**
 - **Identifying individuals for improved end-of-life counseling.**
- **Population / integrated care initiatives could apply PM in many ways, for example ACOs.**
- **Propensity scores and other higher order statistical applications for “CER” research.**

Improving Care Coordination is Key: Cost of care in year 1&2 stratified by ACG markers of coordination in year 1



Coordination levels measured by ACG Version 9.0. Year-1 coordination markers include: count of unique MDs, presence of PCP, presence of “majority source.” Analysis based on 418,000 commercial health plan enrollees including M+A for 2005/06. This analysis is case-mix adjusted and includes only persons identified in (Yr-1) as being “high morbidity” based on ACG–Resource Utilization Bands (RUB).

Using ACG Predictive Models to Identify Patients at Risk for Future Hospitalization



ACG Version 9.0 Hospitalization Prediction Risk Model - This is for a Medicaid Cohort enrolled in private health plans

Using PM risk stratification derived only from several months of Rx experience to target and stratify disease management program participation

Condition of Interest	% Enrollees in ACG Rx-MG Risk Category			Resource Use of Cohort Relative to Total Population		
	Low	Med.	High	Low	Med.	High
Diabetes	44.97	42.1	11.9	1.34	4.90	7.44
Congestive Heart Failure	19.75	53.5	26.75	1.14	6.02	7.93



Tier 1 **Tier 2** **Tier 3**

How PM / RA and analytic will be expanded as healthcare is digitized

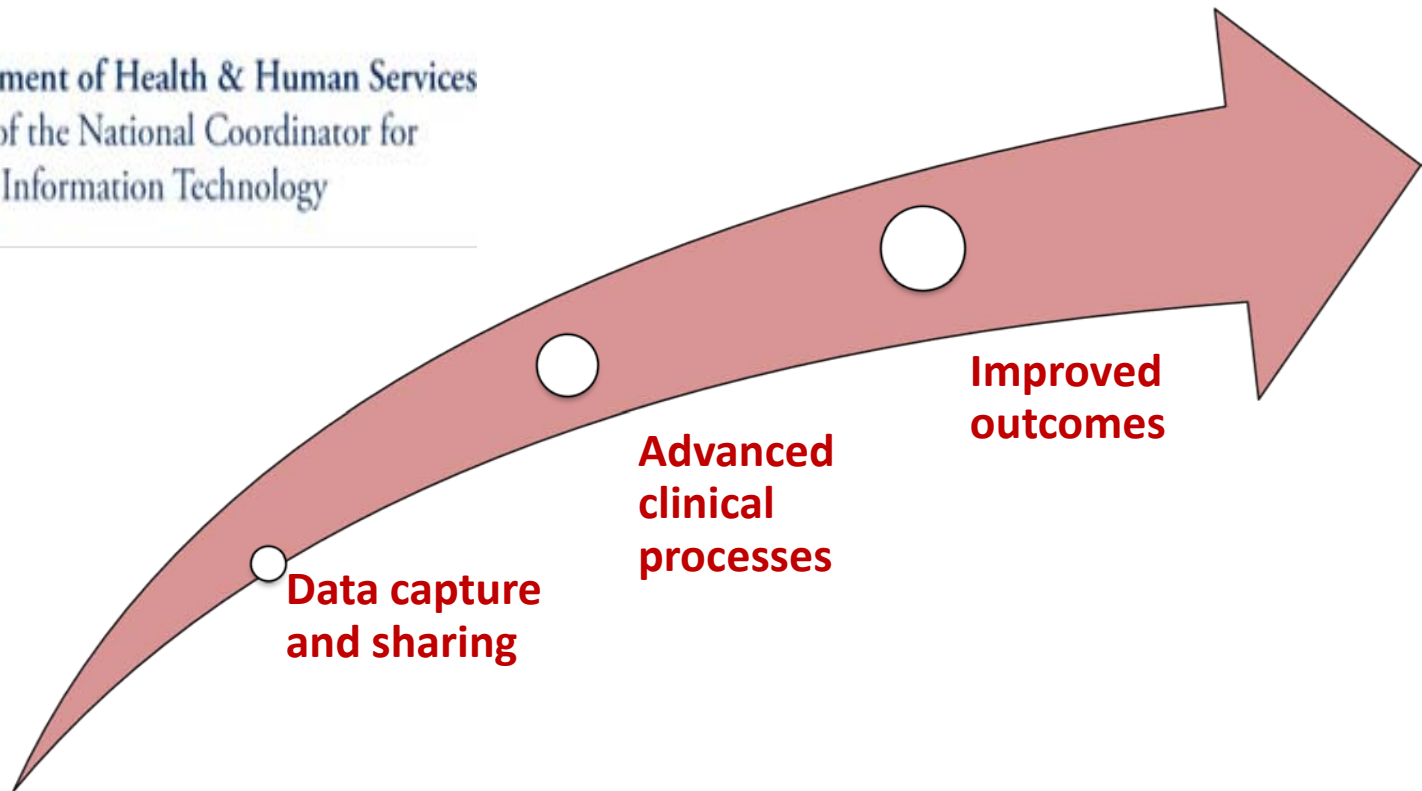
- As reform leads to eventual adoption of interoperable EHR / HIT, there will be numerous opportunities for advanced analytics and expansion of PM/RA techniques.
 - Integration of population level PM with patient level “clinical decision support systems” (CDSS). What I term “e-PM”
 - Next generation of advanced analytics moving beyond claims to embrace person and population data from EHRs and personal health records (PHRs)

The US DHHS ONC's plan to transform health care via the "meaningful use" of EHRs

They will pay providers accordingly



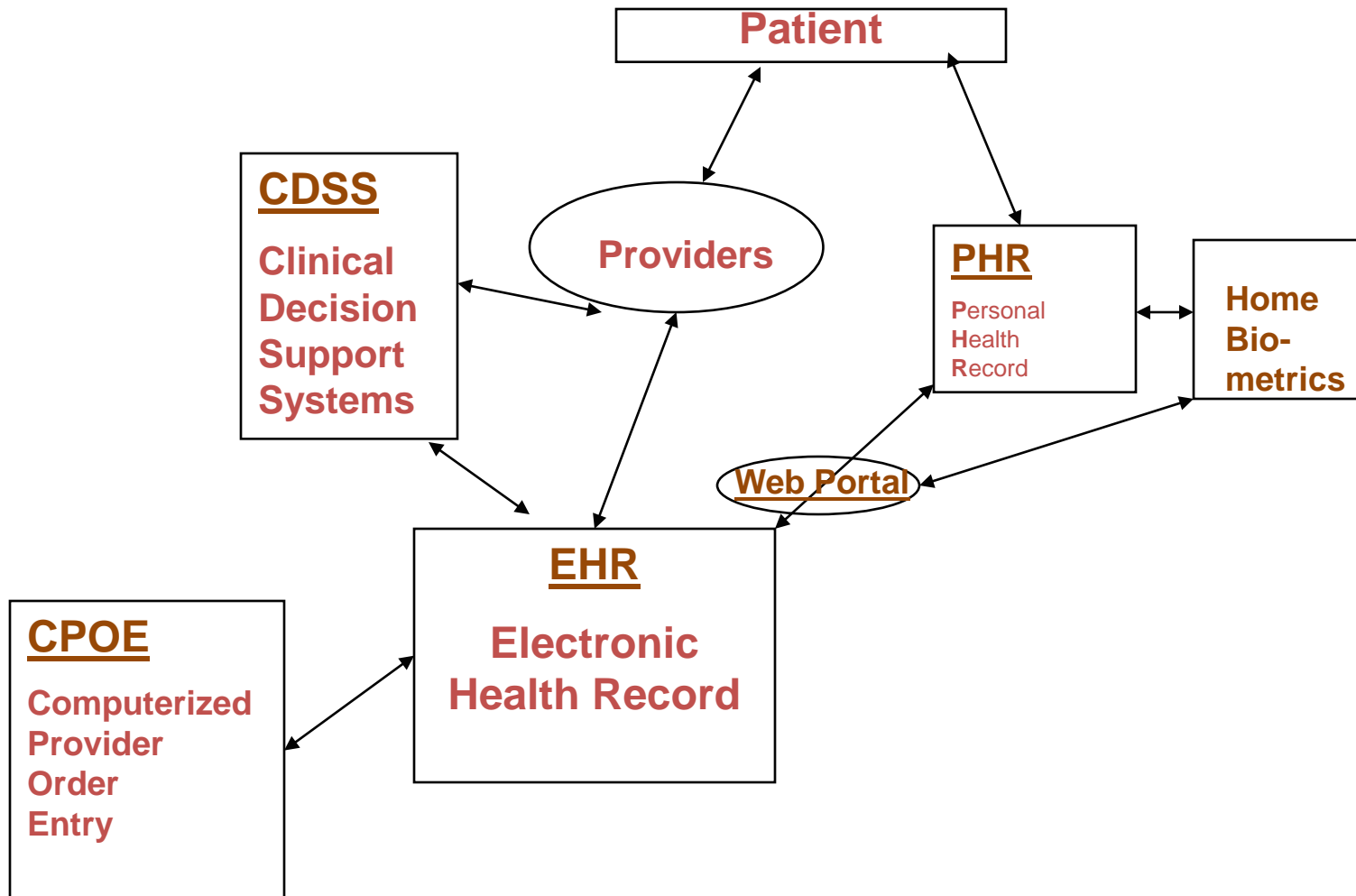
Department of Health & Human Services
Office of the National Coordinator for
Health Information Technology



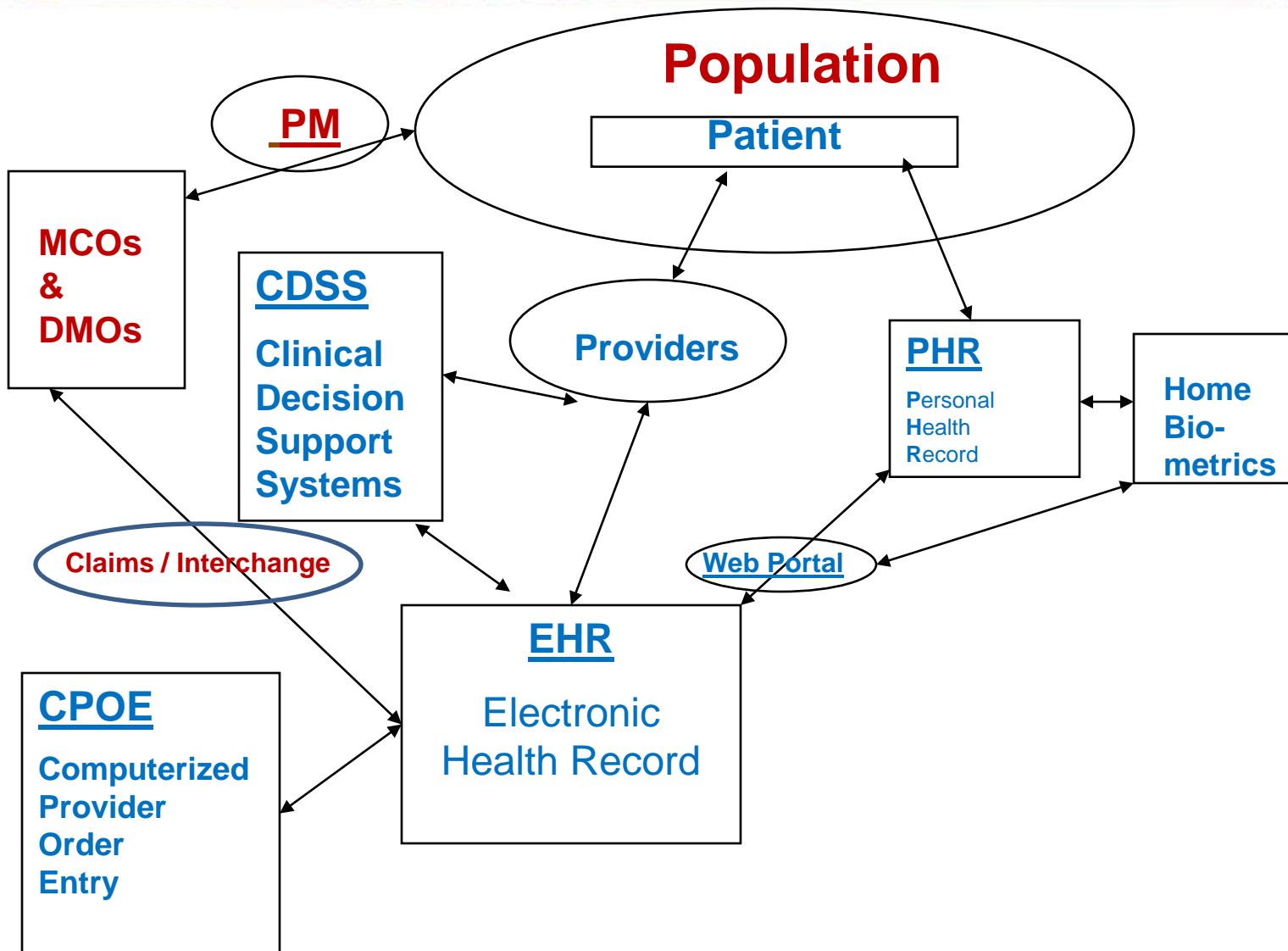
**Data capture
and sharing**

**Advanced
clinical
processes**

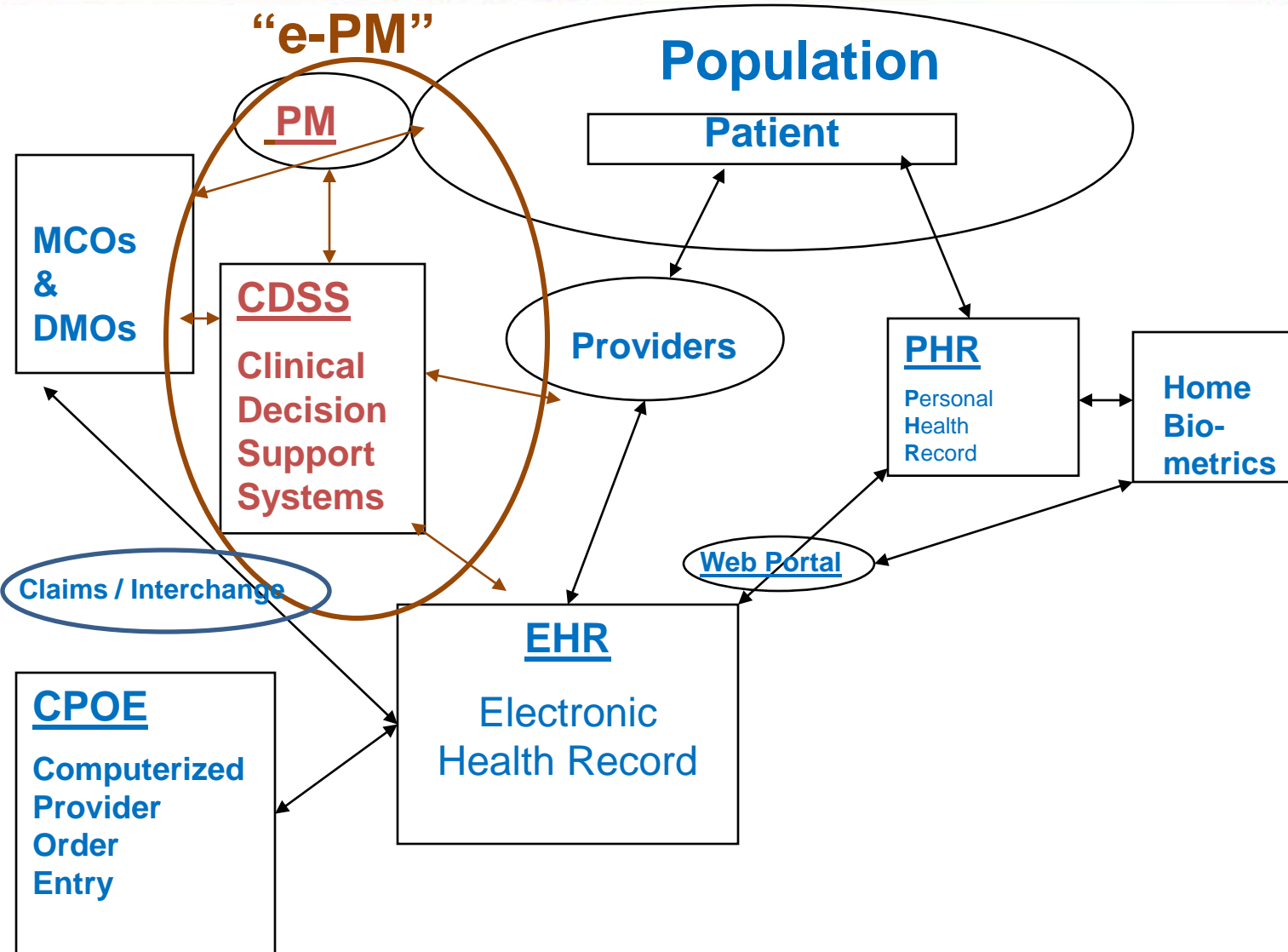
**Improved
outcomes**



HIT Enabled Healthcare – Clinical HIT support - 1



HIT Enabled Healthcare – Population Based PM - 2



"e-PM" = the Integration of current CDSS / PM

Some Next Steps, Implications and Challenges



Reform will lead to opportunities for the applied analytics / RA/ PM field

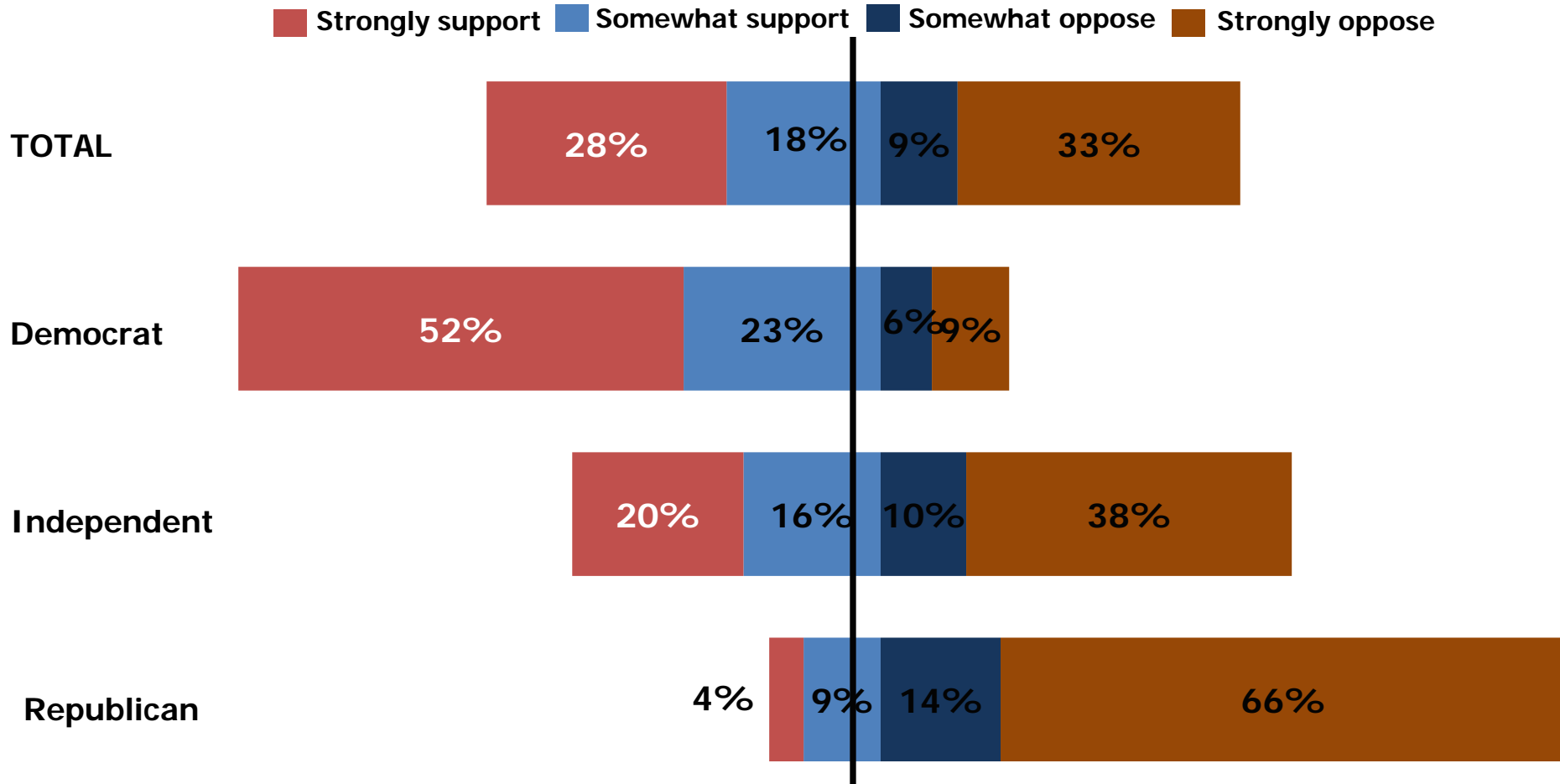
- **Opportunities to use tools to significantly improve care to those previously uninsured.**
- **Over next decade many private and public sector health plans, employers and regulators will have considerable need for RA / PM and analytics to support new models.**
- **New EHRs / PHRs / HIT data sources will be integrated with claims / administrative data and will allow for increased sophistication of PM and other analytic tools.**
- **Reform includes many shifts in healthcare paradigms that could enable analytics to have greater impact on system.**

Reform will lead to challenges for the applied analytics / RA/PM field

- Need to integrate PM / RA and other advanced analytics into dynamically changing clinical and fiscal operations.
- Several factors will raise the “stakes of the game:”
 - Need for transparency and accountability will lead to increased scrutiny;
 - Structural cost containment within reform is weak and cost pressures will likely be very significant moving forward;
 - New funding mechanism (e.g., P4P, bundling) may increase some provider’s degree of “skin in the game.”
- Reform is quite a “hot button.” In some camps expectation are high, in other camps it is low.

Americans are divided in their view of reform

As of right now, do you generally support or generally oppose the health care proposals being discussed in Congress? Is that strongly or somewhat?



Conducted March 10-15, 2010

So, where do we go from here?

- Even with these challenges, health IT based analytics will be necessary for numerous facets of reform to succeed.
 - Risk adjustment, predictive modeling and other advanced analytics will be essential to increase system equity, effectiveness, and efficiency.
- One way or the other, this reform is the biggest change in the US health care sector in 45 years and our work will be cut out for us!!

SOME ASSEMBLY REQUIRED



And who said we can't make pigs fly?



More Information

- **Information on health reform**

<http://healthreform.kff.org/>

- **Information on ACG risk adjustment / predictive modeling:**

www.acg.jhsph.edu

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