

The logo for REWARD Health Sciences is a blue rounded rectangle with the word "REWARD" in large, white, serif capital letters on the top line, and "Health Sciences" in smaller, white, sans-serif capital letters on the bottom line.

REWARD
Health Sciences

Analytic Models Focused on Key Health Plan Decisions

**3rd Annual Predictive Modeling Congress for
Health Plans**

Orlando, Florida

Richard E. Ward, MD, MBA

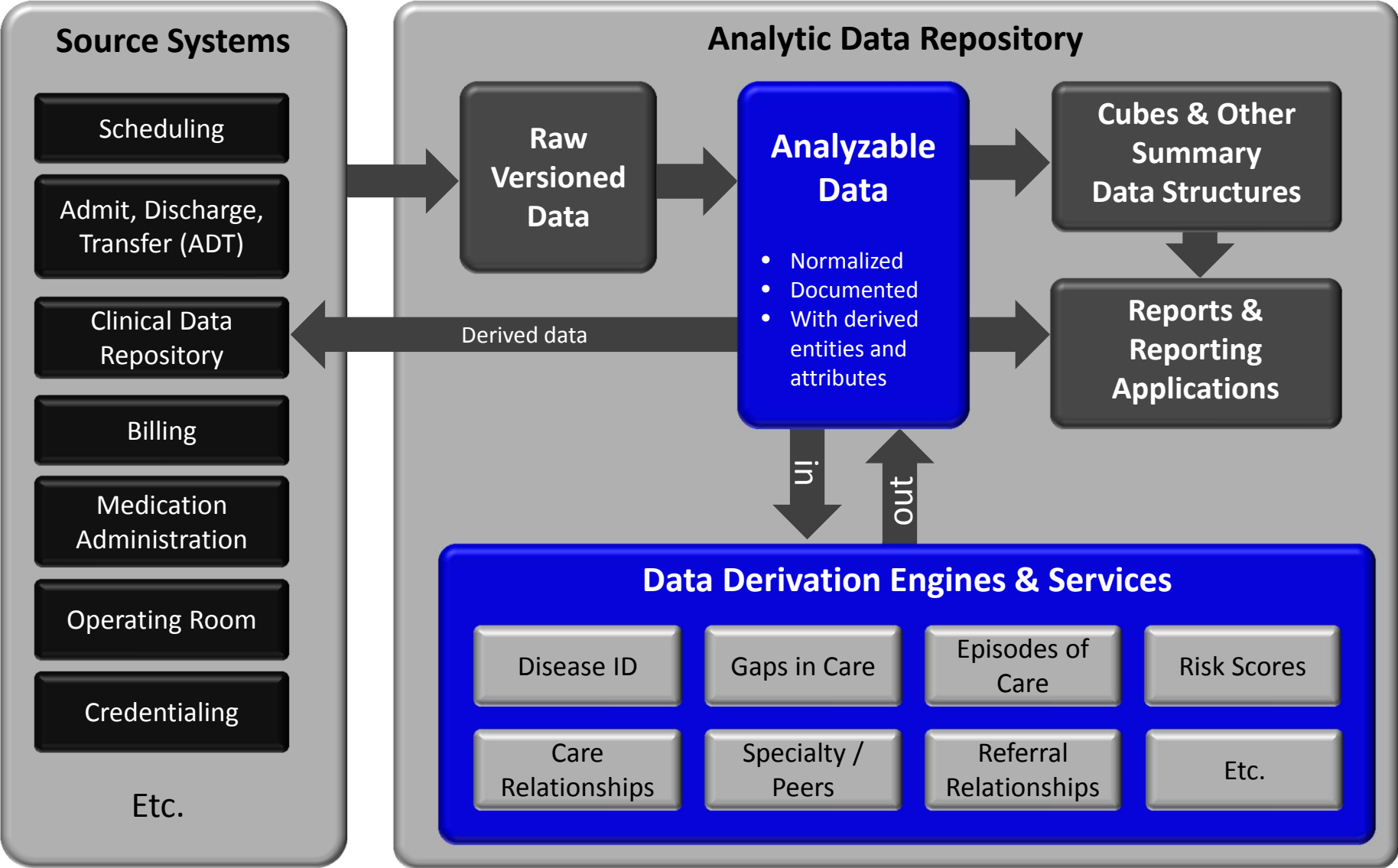
Reward Health Sciences, Inc.

January 31, 2012

Outline

- Creating analytic infrastructure
- Using analytic models
- Measuring program effectiveness

Analytic Data Repository Framework to Support ACOs



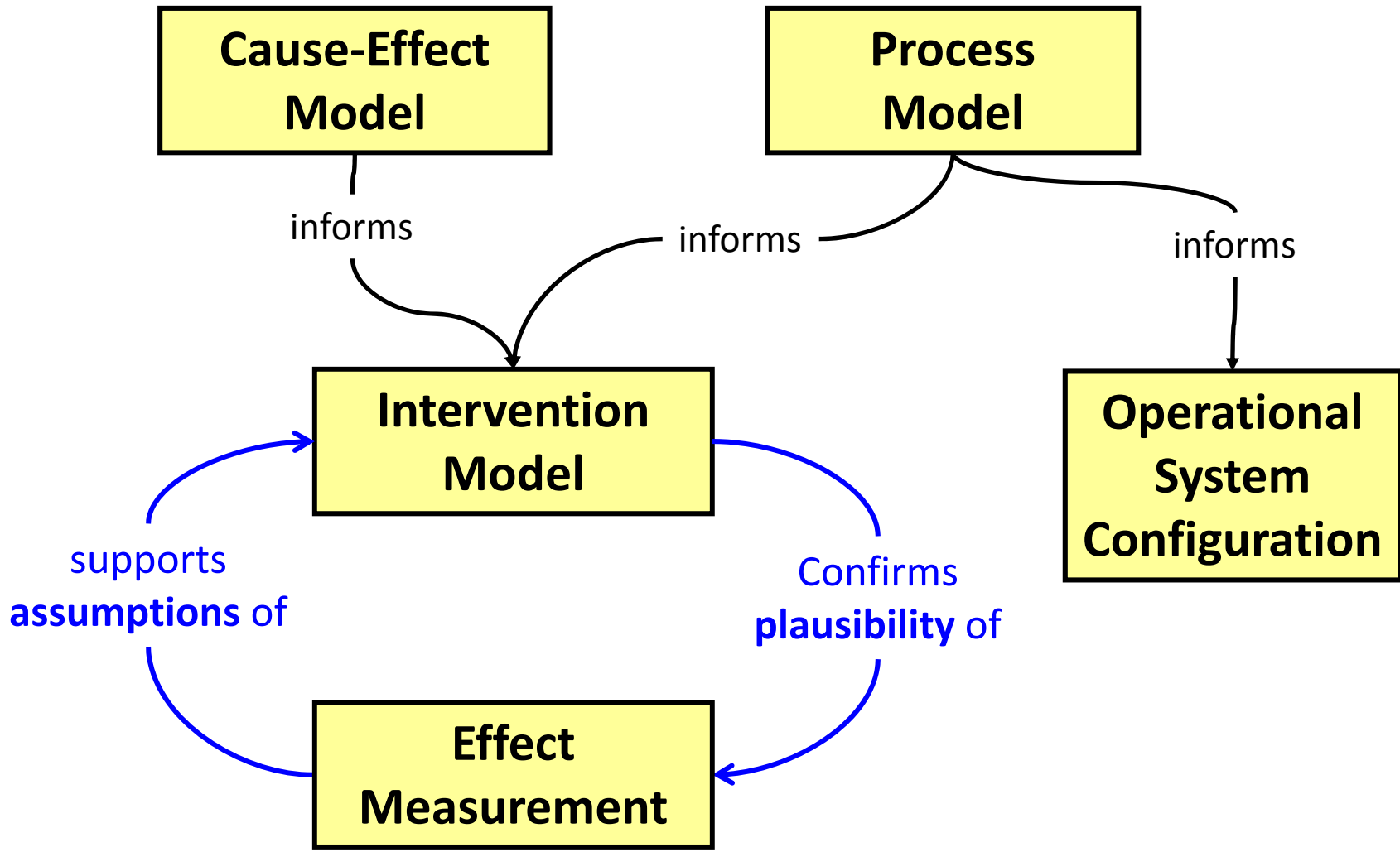
REPORTS &
MEASURES

vs.

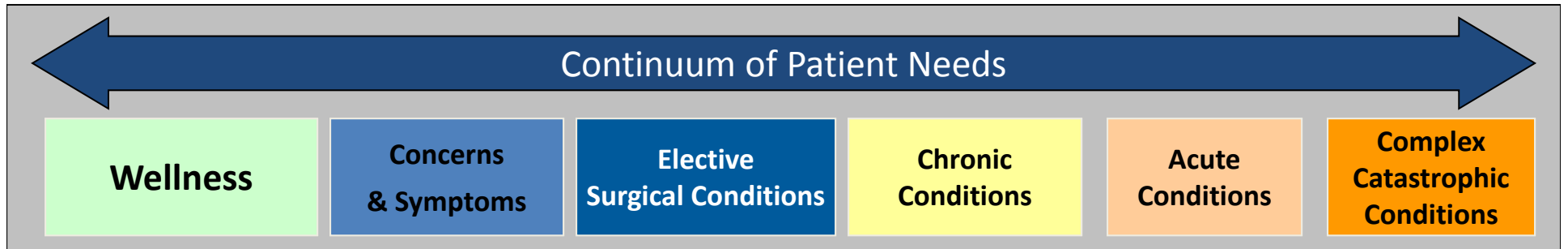
MODELS

Looking back

Looking ahead



Using Models for Care Management



Is Care Management Effective?

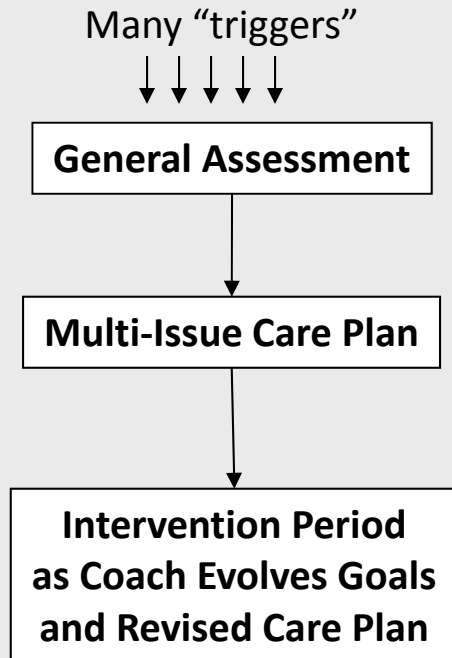
- Are drugs effective?
- Is a scalpel effective?

It depends

- Which population?
- What point in time?
- What intervention?
- What outcomes of interest?
- What time horizon?
- What evidence threshold?

Competing Intervention Design Philosophies

HOLISTIC



- Easier to design
- Respects professionalism
- Addresses patient complexity
- Difficult to evaluate

TARGETED

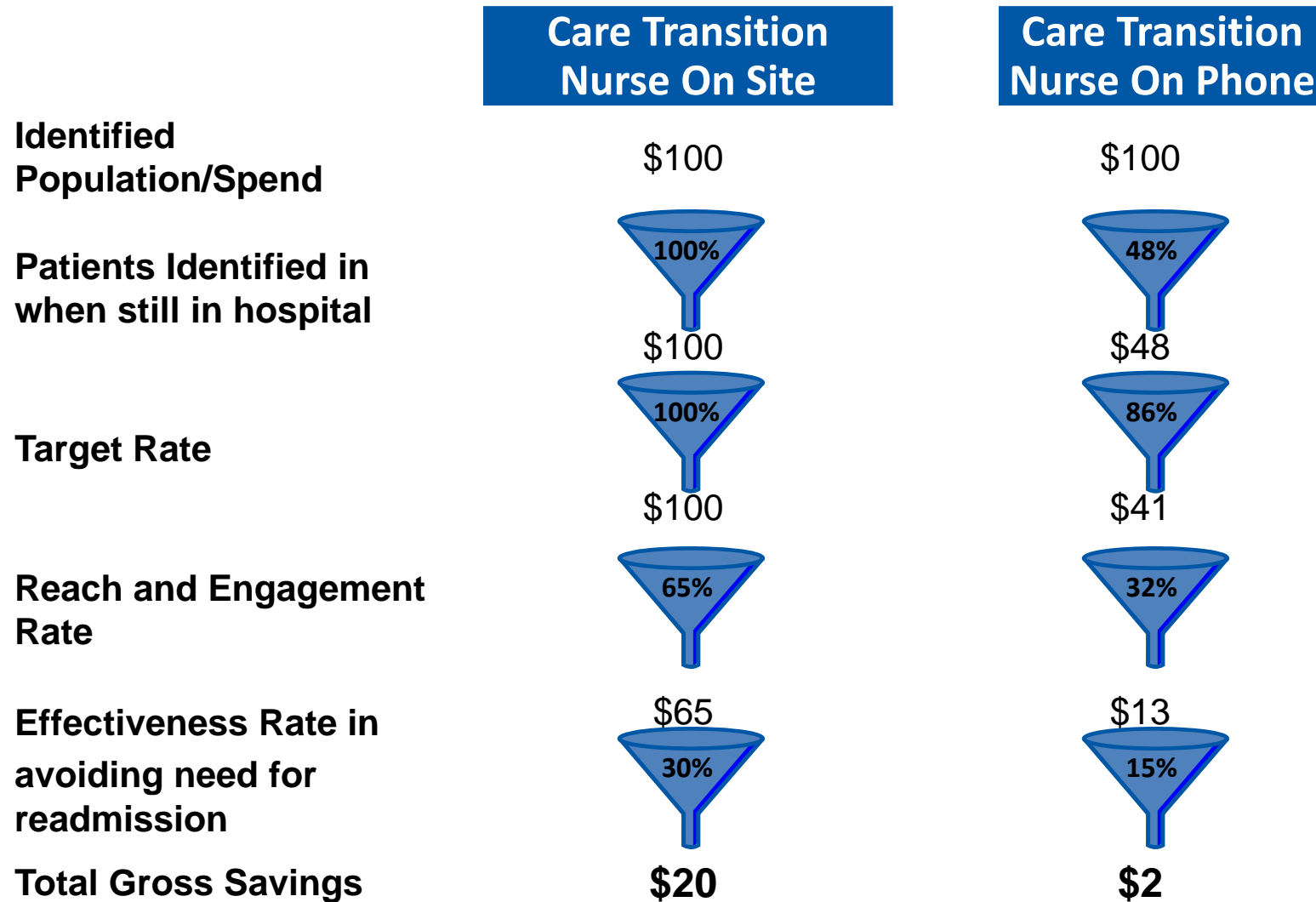
**Targeting of Patients
Based on Objective Criteria
Based on Opportunity to
Benefit from a
particular intervention**

Outreach Protocol

Intervention Protocol

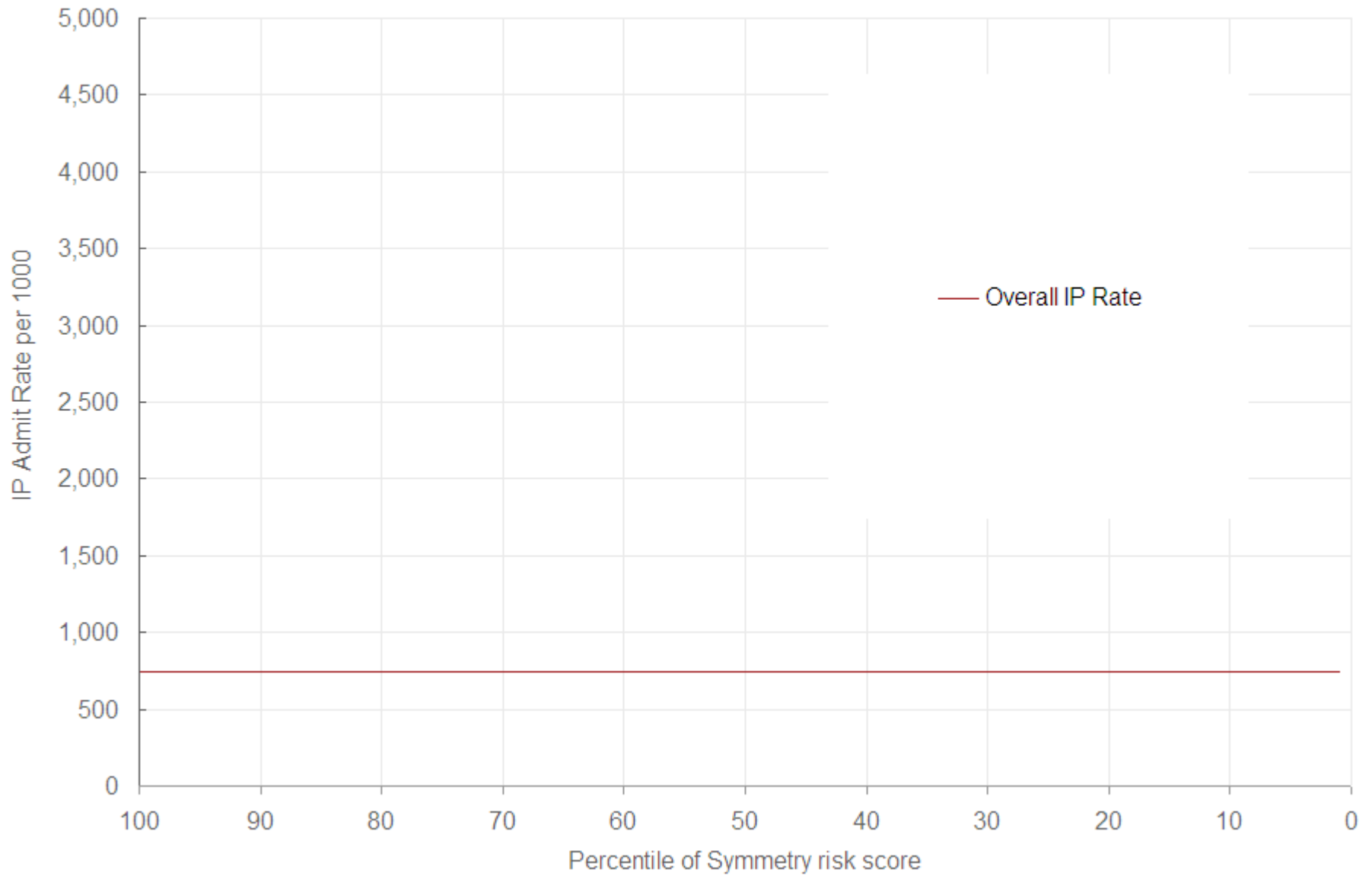
- Consistent intervention process enables process improvement
- Targeting protocol can be applied to comparison population for evaluation

Using Intervention Models to Explore Alternative Interventions

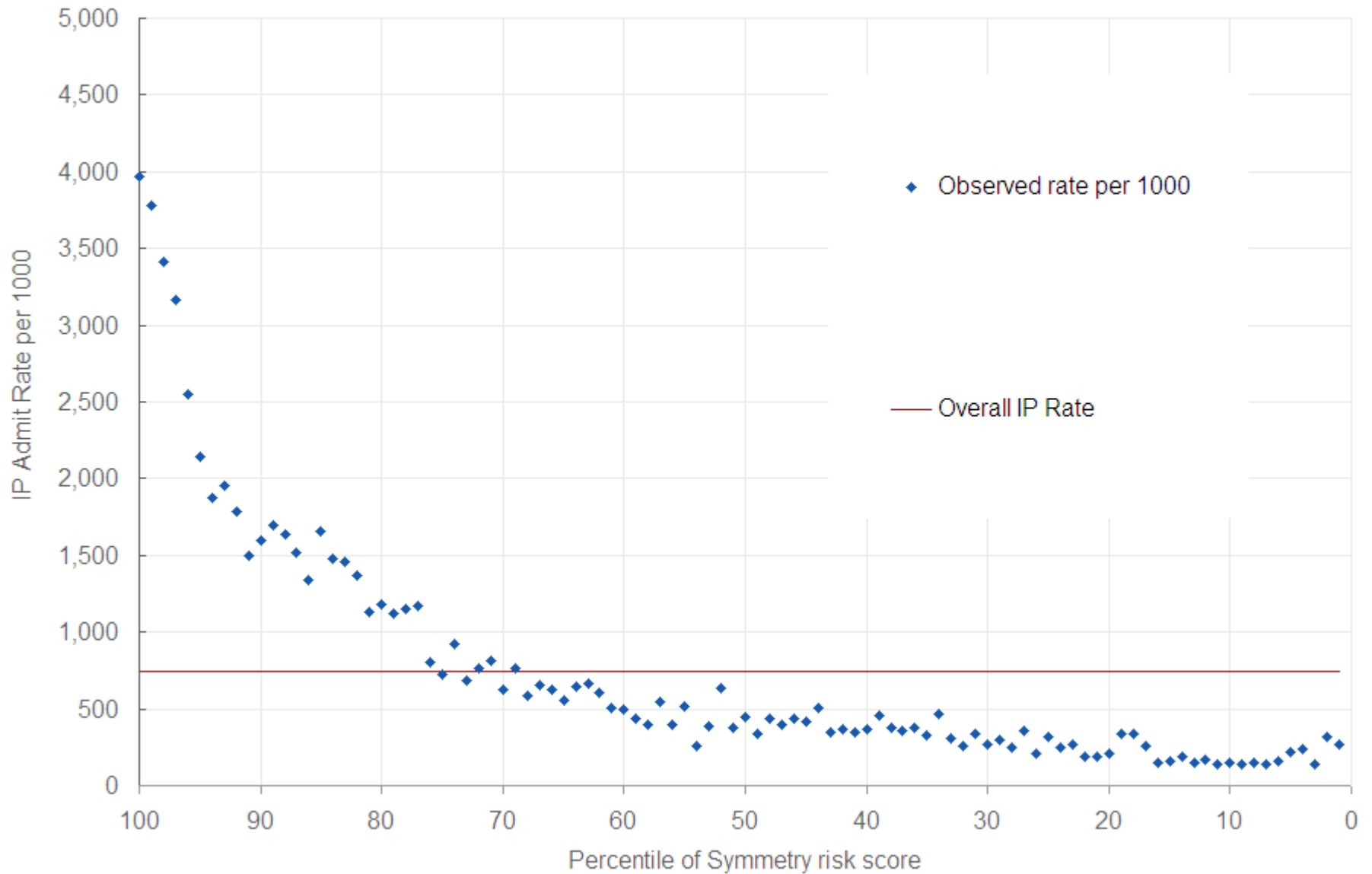


Illustrative

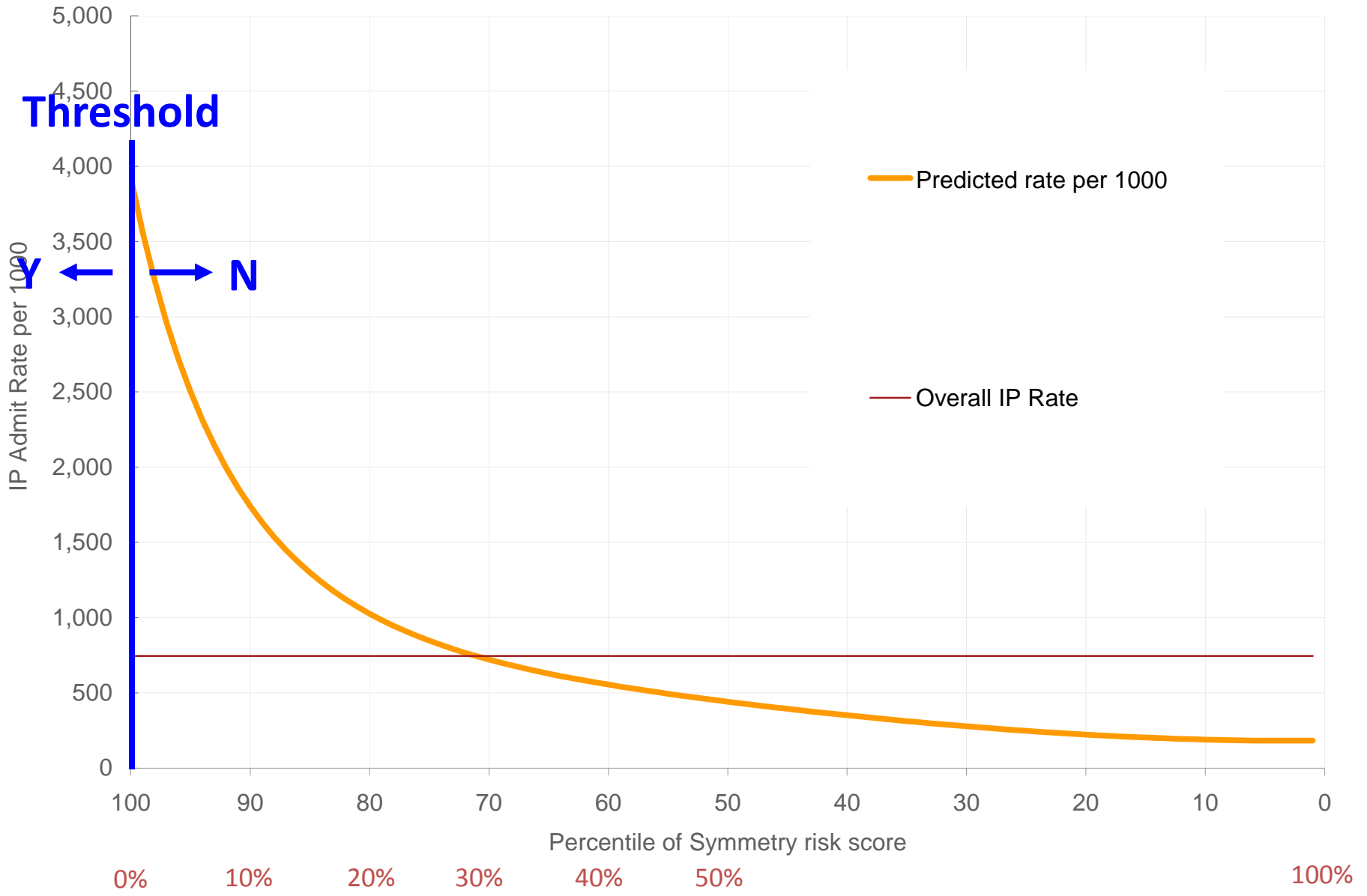
Number of IP admissions per 1000 members identified with CHF, by percentile of risk score



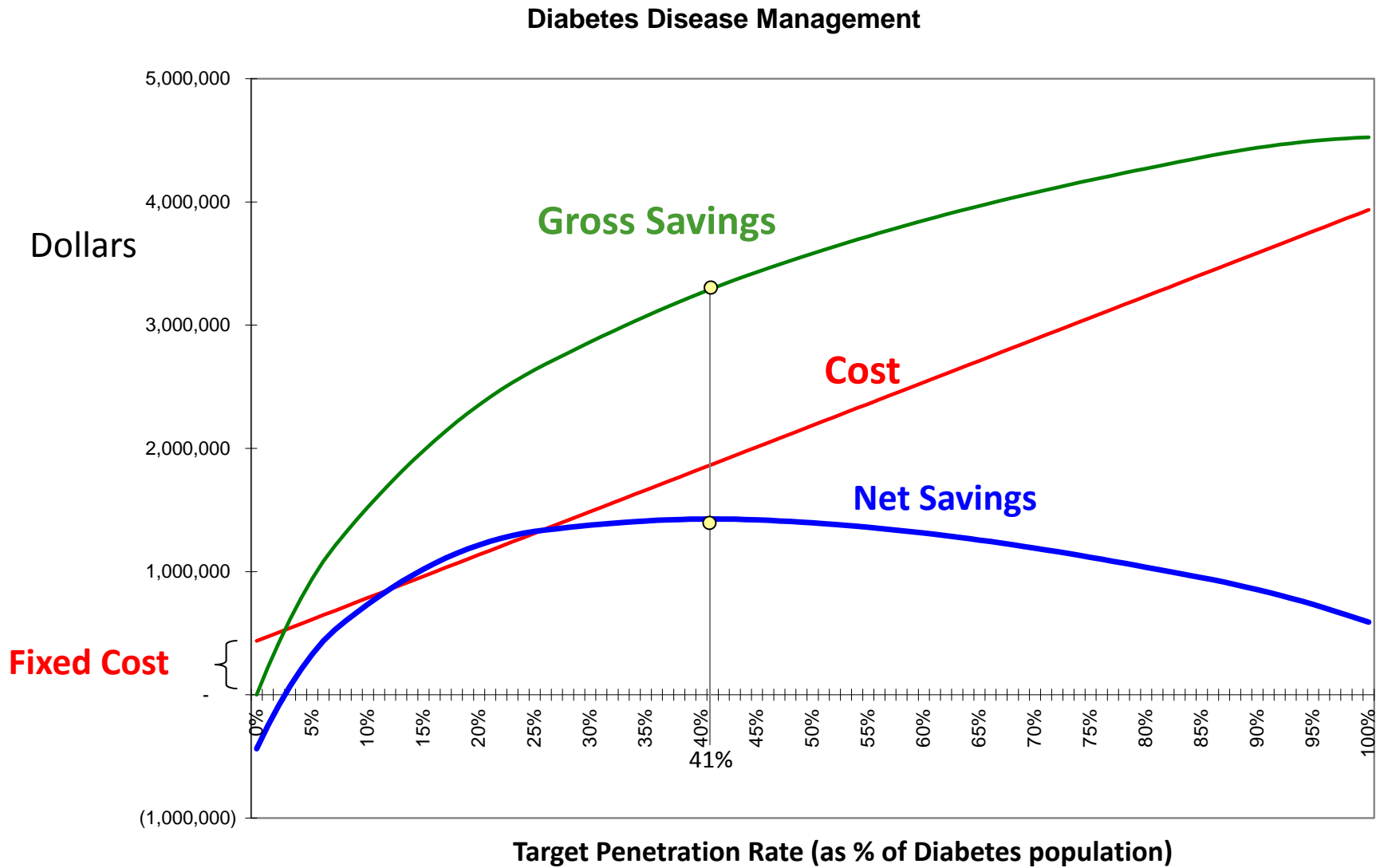
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Number of IP admissions per 1000 members identified with CHF, by percentile of risk score

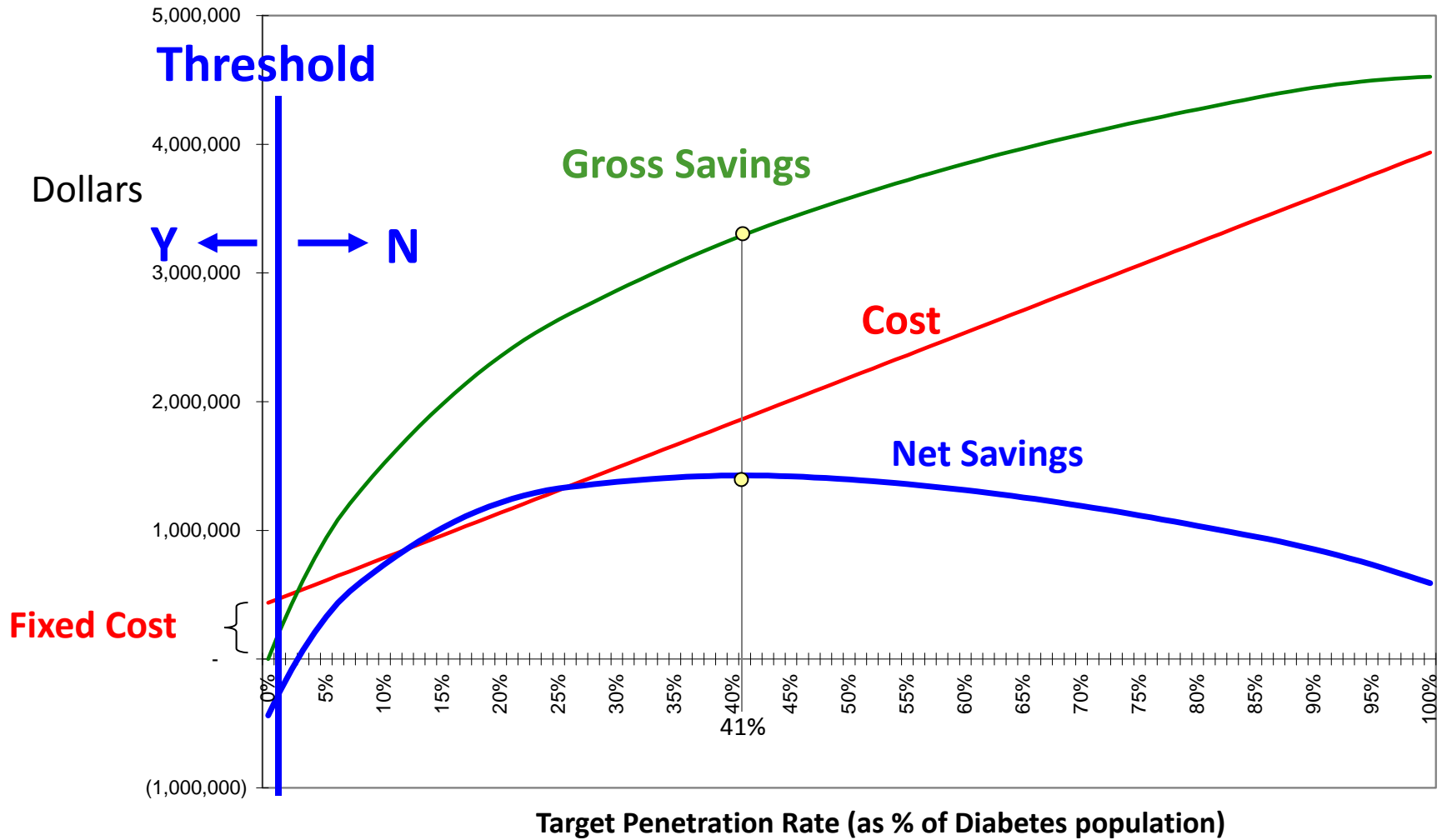


Finding Target Penetration that Yields Max Net Savings: Maximizing Beneficial Impact for Members for the Amount Spent

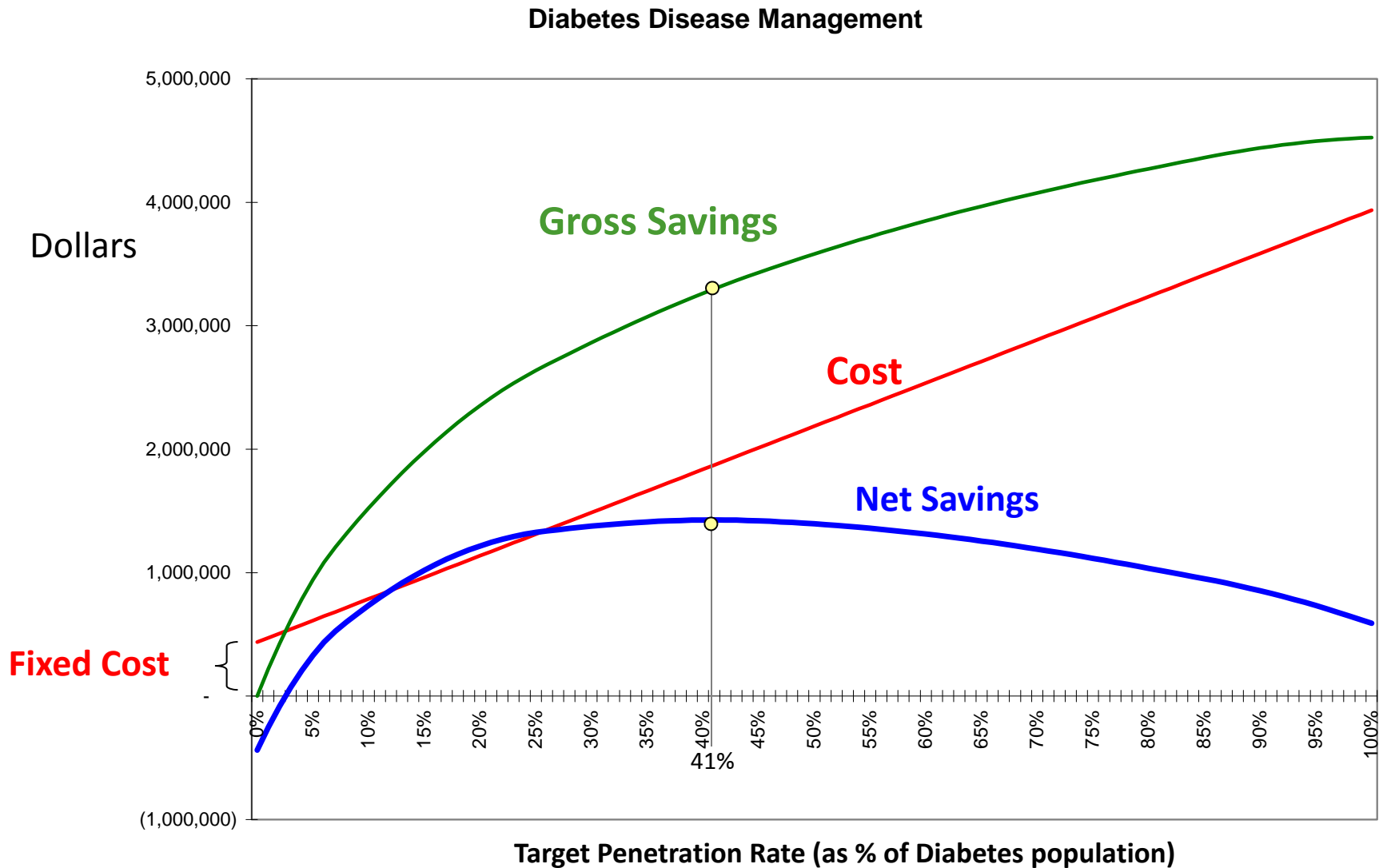


Finding Target Penetration that Yields Max Net Savings: Maximizing Beneficial Impact for Members for the Amount Spent

Diabetes Disease Management

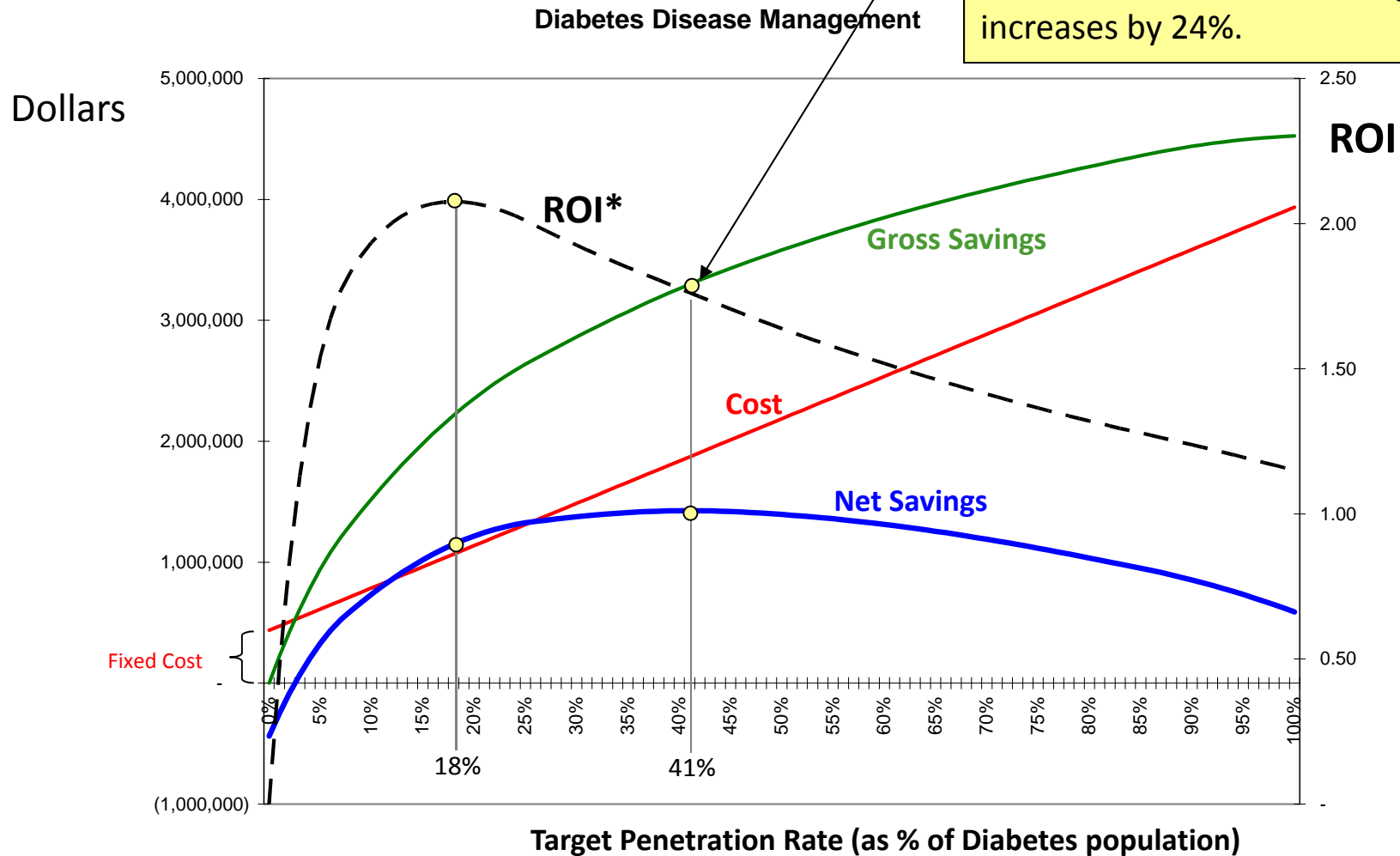


Finding Target Penetration that Yields Max Net Savings: Maximizing Beneficial Impact for Members for the Amount Spent



Highest ROI Does Not Yield Maximum Net Savings or Maximum Penetration Rate for Member Impact

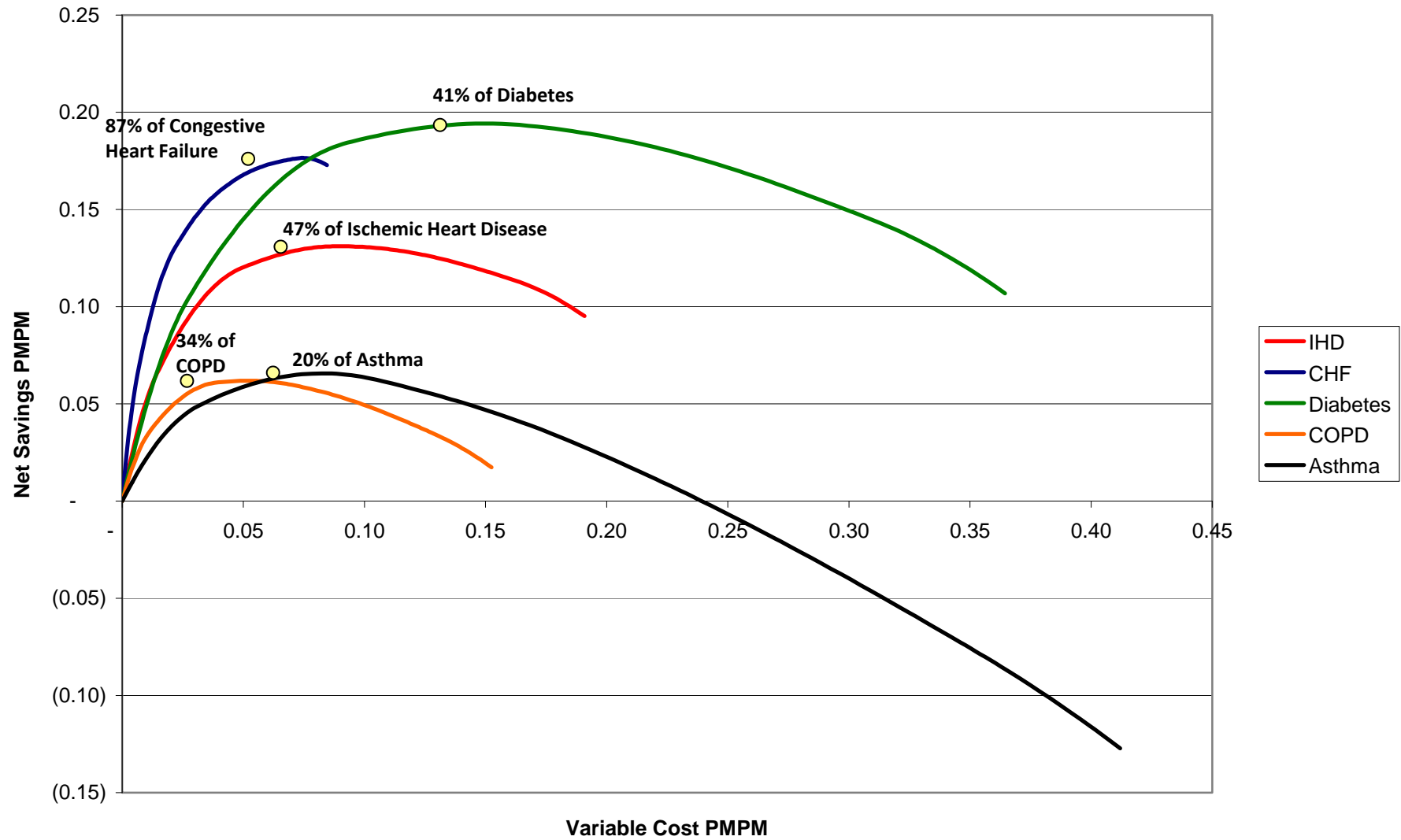
Increasing the target penetration rate from 18% to 41% leads to a lower ROI, but the net savings increases by 24%.



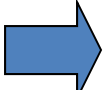
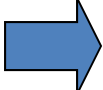
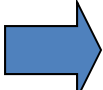
Max Net Savings Signature

Illustrative

Chronic Disease Management

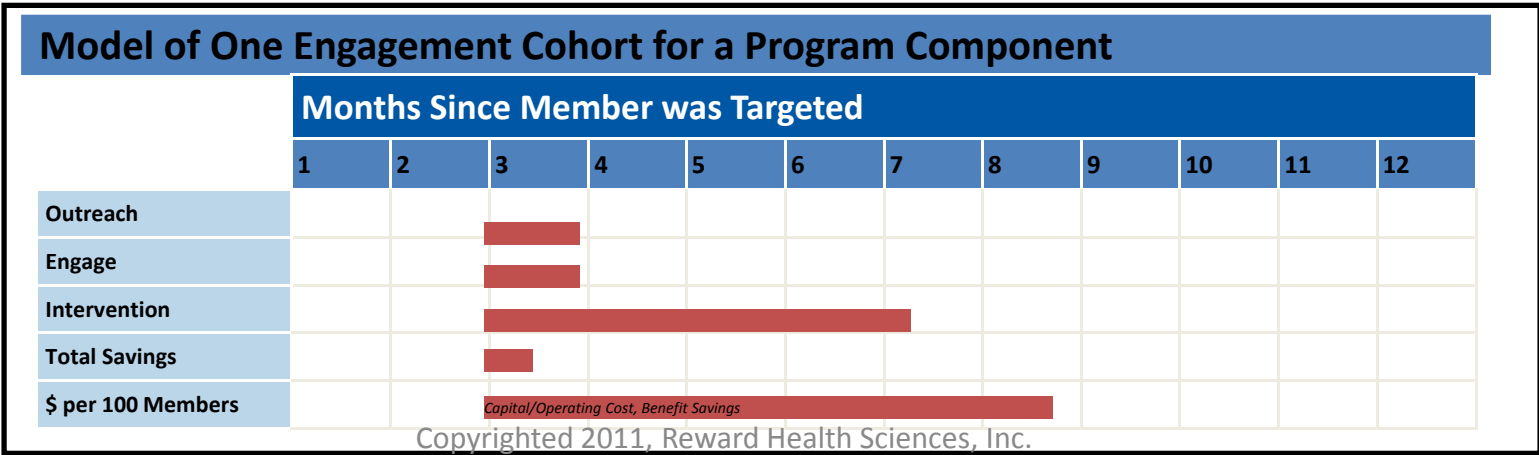
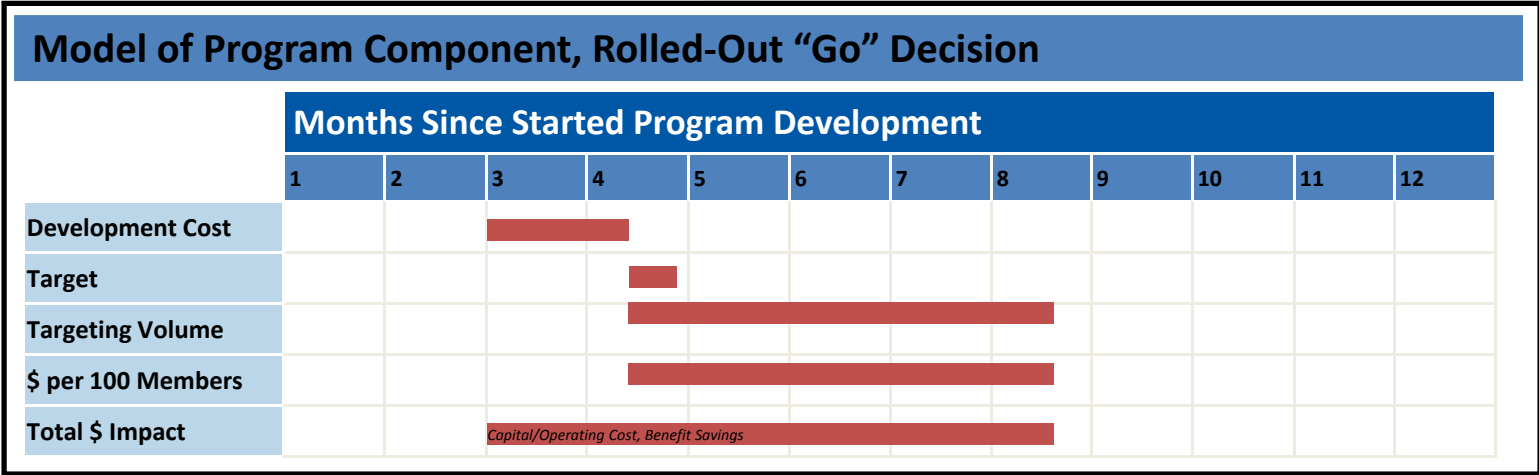
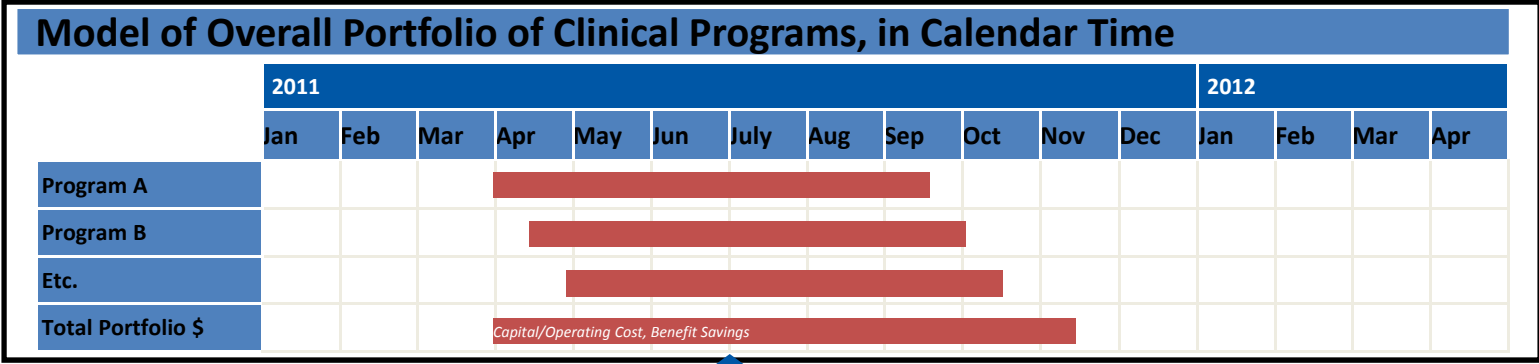


Does global opportunity score / stratification make sense with targeted interventions?

Intervention	Proxy for Return
Care Transition Program For Patients Admitted to Hospital	 Probability of Being Re-Admitted Within 30 days of Discharge to Home
Nurse Advice about Pros and Cons Of Spine Surgery	 Probability of Getting Back Surgery In Next Year
Nurse Coaching to Increase Chronic Condition Self-Management Motivation and Effectiveness	 Probability of Being Admitted to Hospital in Next Year for Chronic Disease

Dynamic Models

- Thinking like an accountant
analyzing accounts receivable

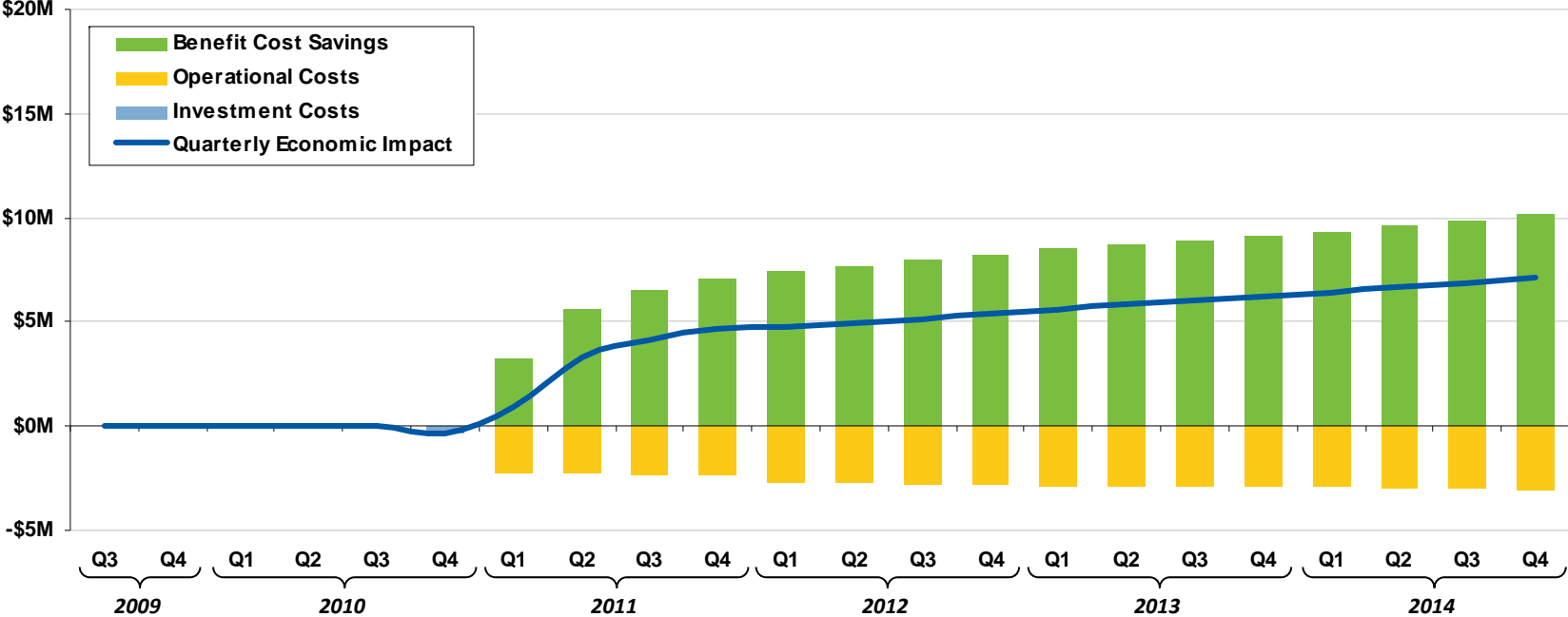


Dynamic Models

Illustrative

Case Management

Quarterly Economic Impact

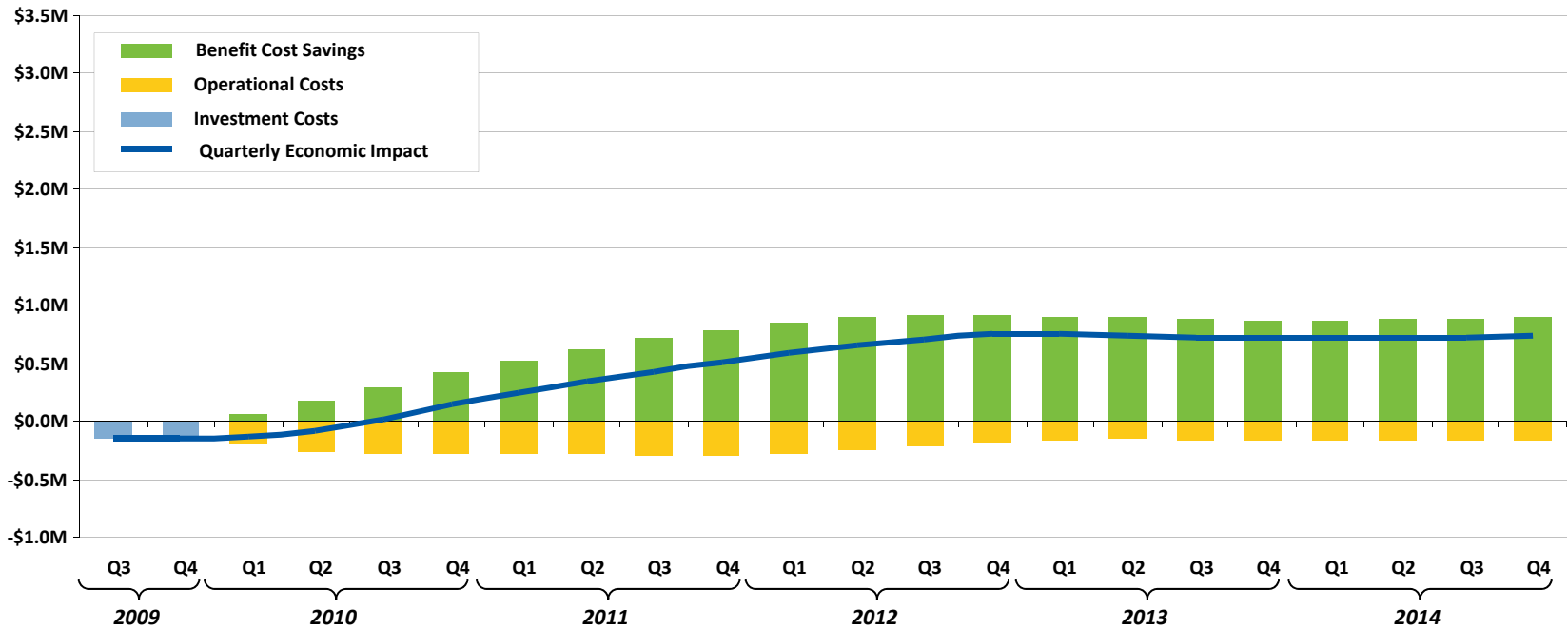


Dynamic Models

ILLUSTRATION

Chronic Condition Management

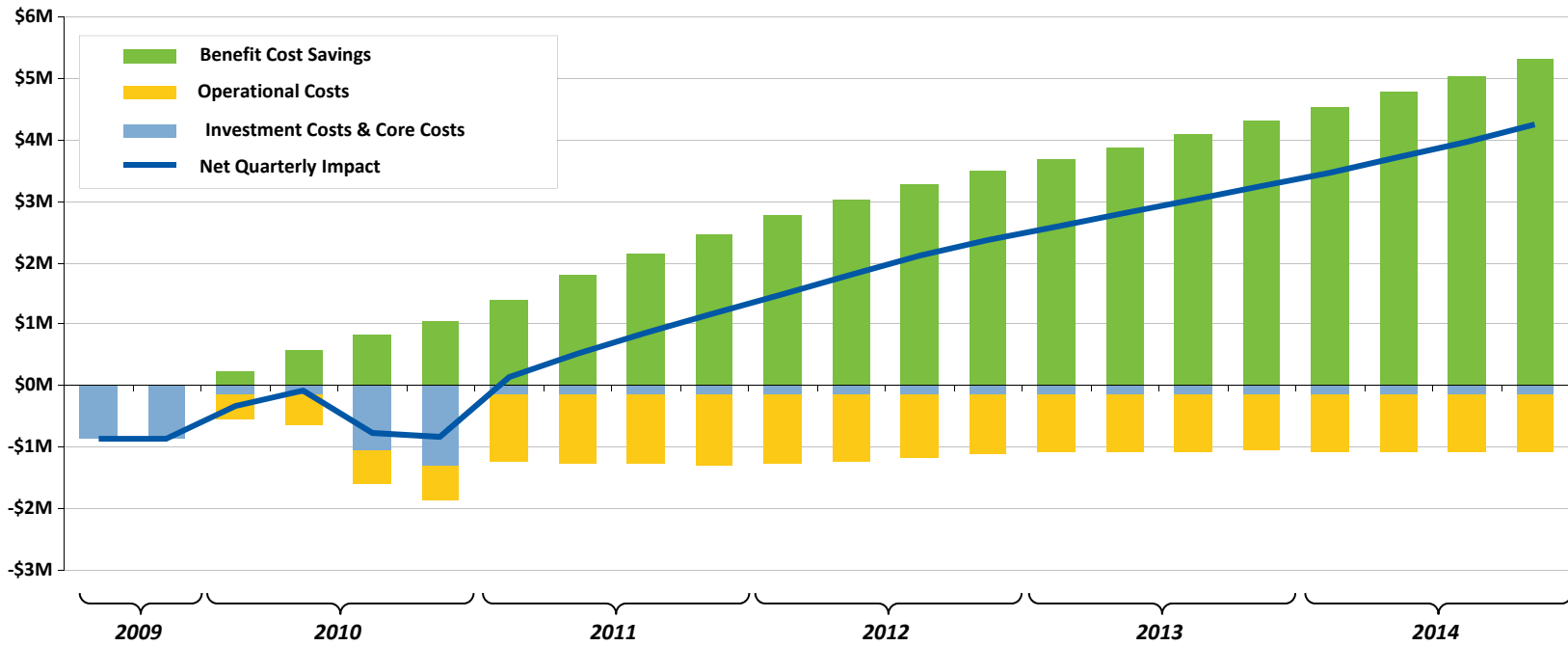
Quarterly Economic Impact



Dynamic Model of Entire WCM Solution

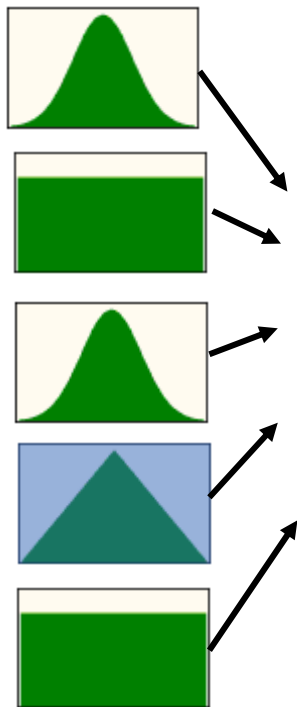
ILLUSTRATION

Quarterly Economic Impact

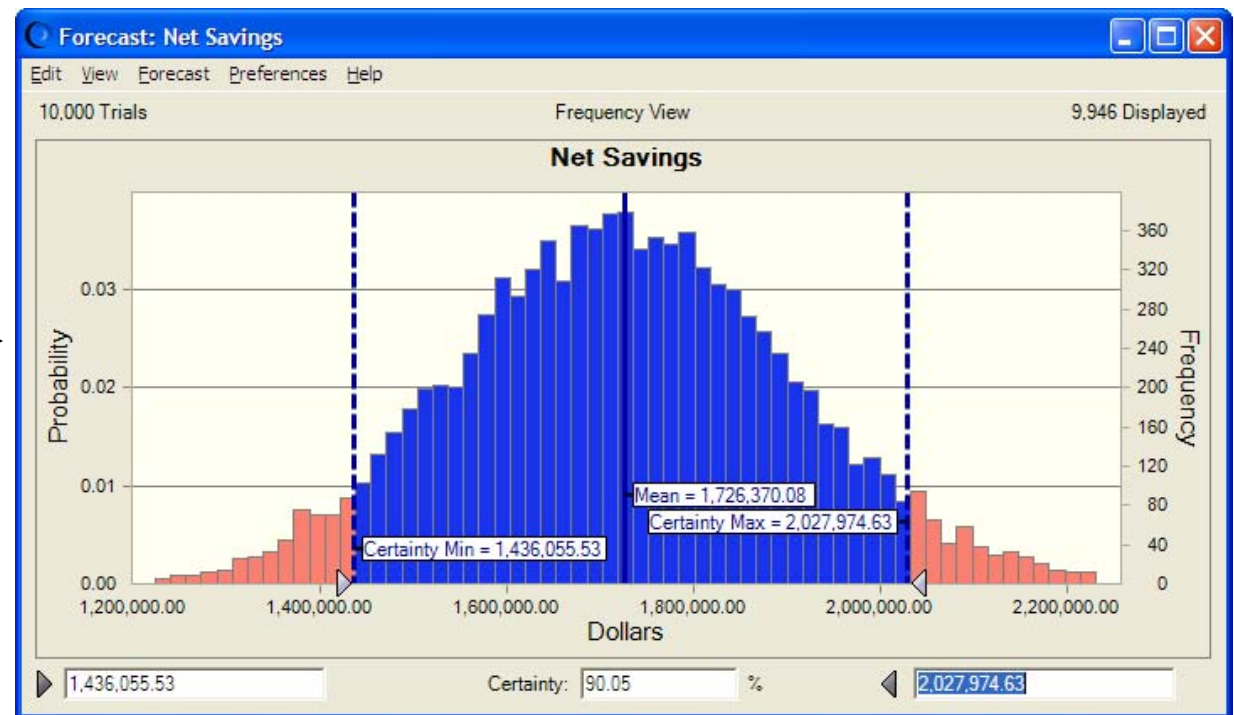


Analyzing Uncertainty Using Monte Carlo Simulation

Assumptions



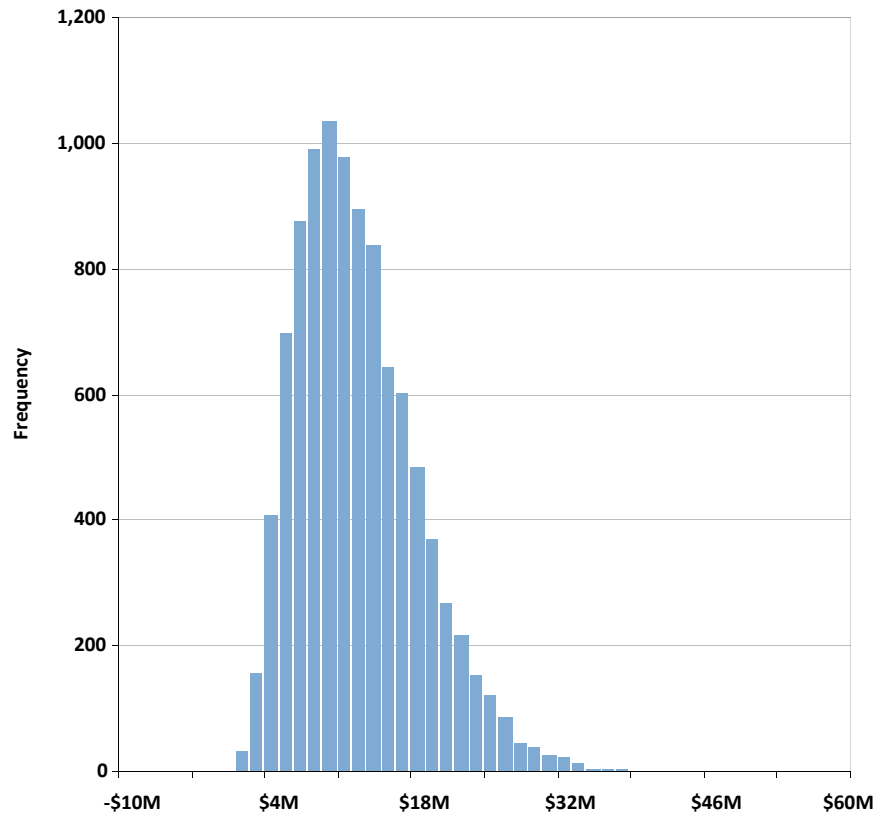
Calculations →



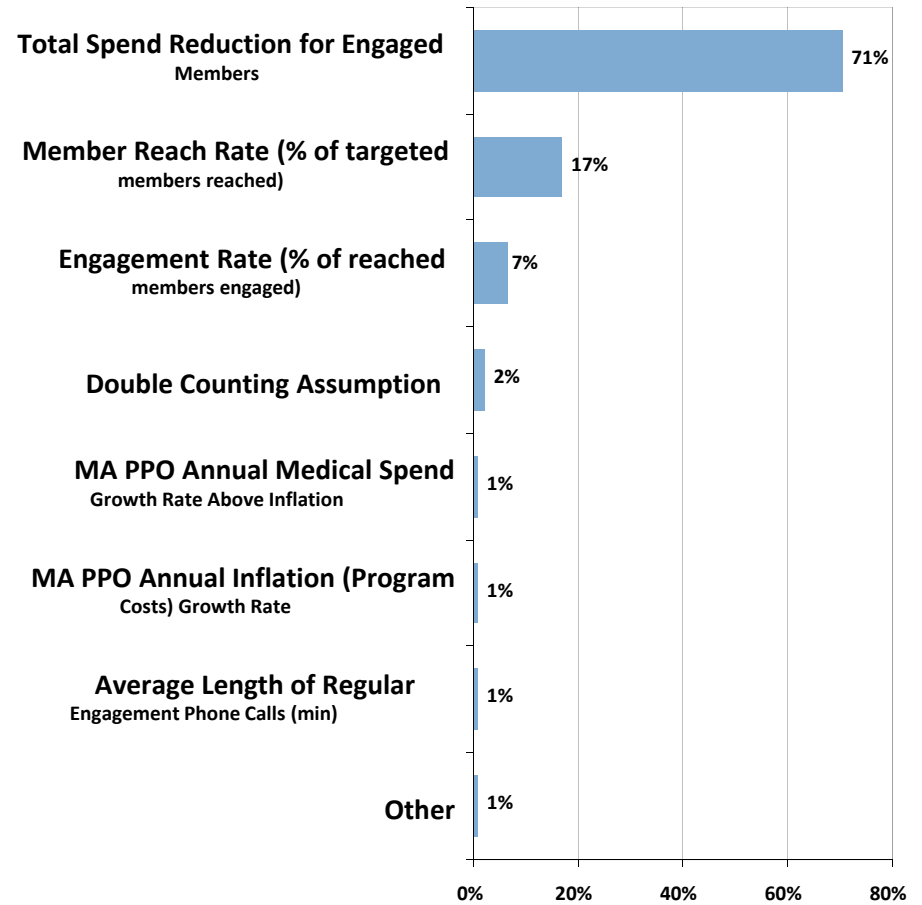
90% Interval of Uncertainty

Chronic Condition Management—Sensitivity Analysis

2014 Cumulative Net Savings Frequency Distribution



2014 Cumulative Net Savings Variable Sensitivity

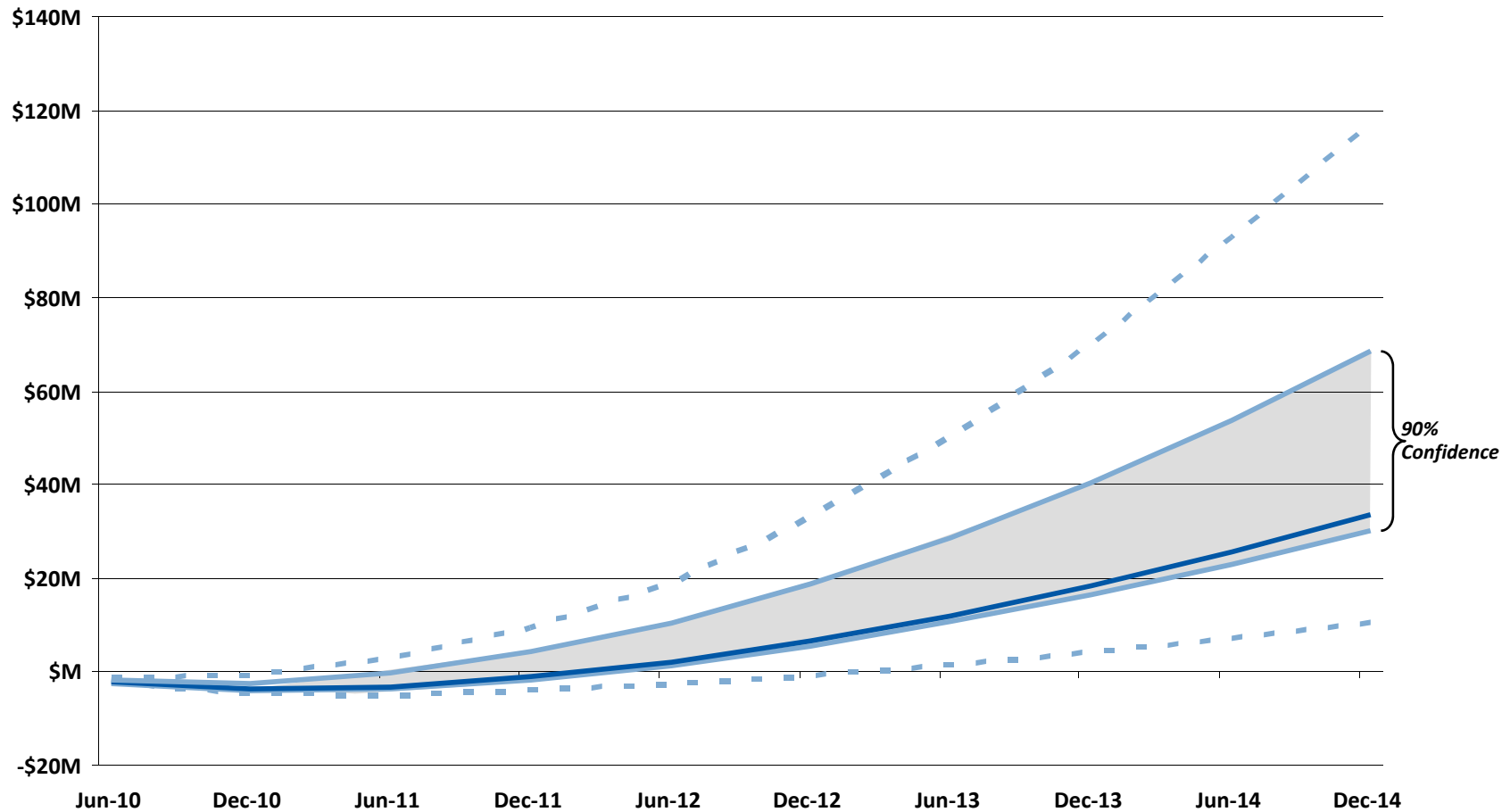


Example of “Hurricane Diagram”

WCM Solution Cumulative Net Savings

ILLUSTRATION

Range of Outcomes—Cumulative Portfolio Net Savings



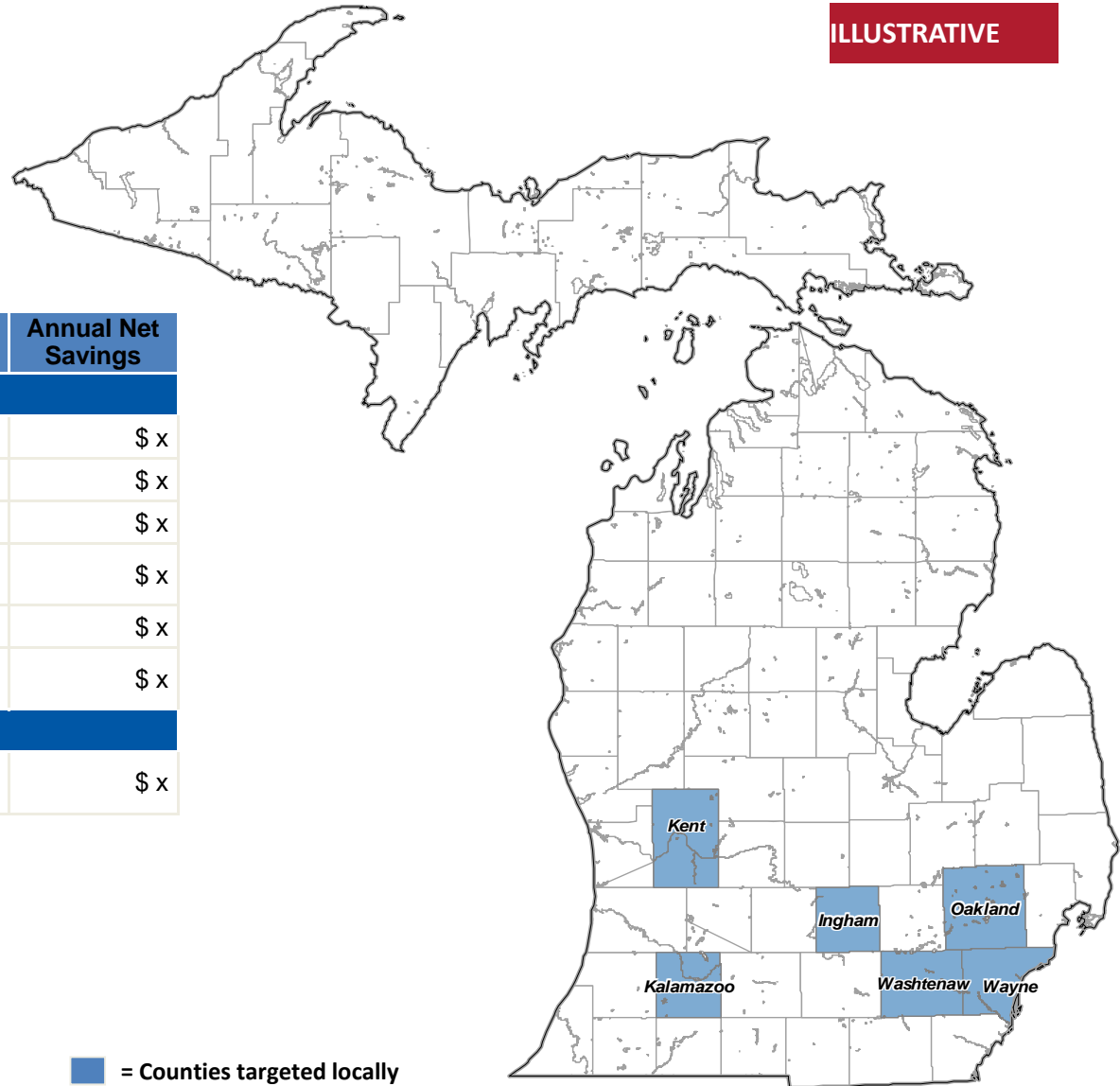
Note: Based on a Monte Carlo analysis with 10,000 trials, and triangular distributions on 72 input variables for entire portfolio

Modeling Geographically-Sensitive Interventions

In-Hospital
Discharge Planning

ILLUSTRATIVE

County	# Facilities	# Nurse Case Mgrs	Annual Net Savings
Engaged Locally			
Oakland County	85	10	\$ x
Wayne County	91	8	\$ x
Kent County	22	4	\$ x
Washtenaw County	19	3	\$ x
Ingham County	7	2	\$ x
Kalamazoo County	12	2	\$ x
Engaged Telephonically			
All Other Counties	364		\$ x

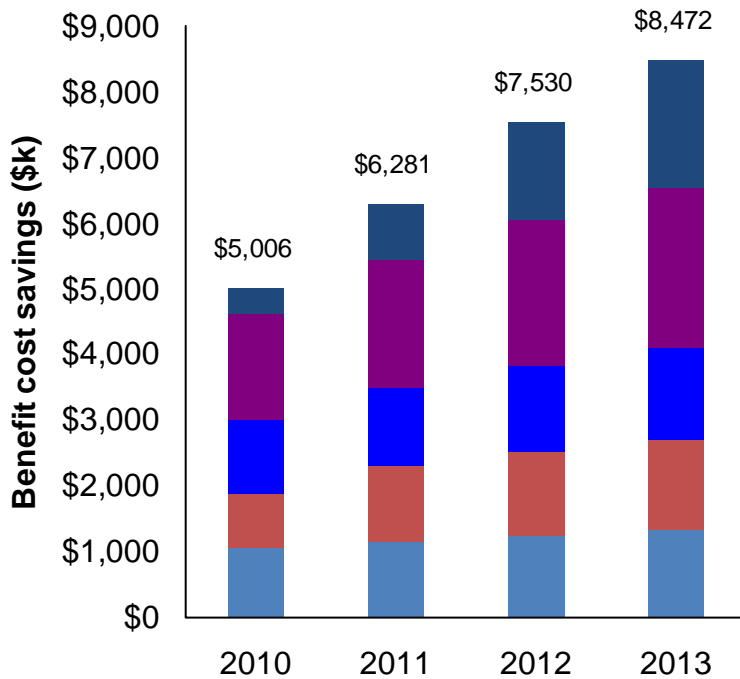


Modeling for Provider-facing Clinical Programs

Savings for Customer X for 41 Initiatives in the BCBSM Physician Group Incentive Program

Projected benefit cost savings

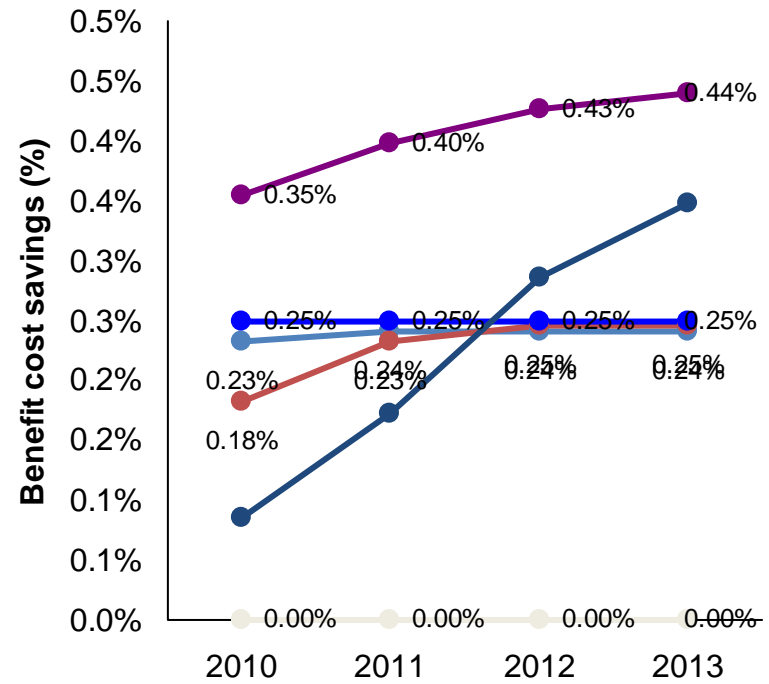
Annual savings by initiative category



- Service utilization
- Condition
- Clinical IT
- Core clinical process
- New group
- Planned

Projected benefit cost savings

Annual savings by initiative category as % of total benefit cost



- Service utilization
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**REPORTS &
MEASURES**

vs.

MODELS

Looking back

Looking ahead

Measurement of Outcomes

- Can only measure events that did not happen by comparison
- Two basic types of comparison groups:
 - Pre-Post
 - Concurrent

The Levels of Effect Measurement

Concurrent **Outcomes Monitoring**

- Outcome measure defined so as to be able to define the denominator population symmetrically for intervention and comparison group.
- Comparison could be historical or concurrent.
- Objective is to track actual results to determine if expected results are achieved.

Periodic Retrospective **Program Evaluation**

- Formal analysis uses more rigorous methods to deal with potential confounding variables and assess confidence interval.
- Iterative process requires methods expertise; impractical to do over and over for monthly reporting.

The Two Key Challenges to Measurement

VARIATION

- Noise > Signal
- Noise = “common cause” or “random” variation in people and their response to disease and treatment

BIAS

- Comparison group is not truly comparable

Methods to Address Variation

Reduce Variation

Increase sample size
("Power")

Tight
Eligibility
Criteria

More Consistent
Intervention
("Lab Conditions")

- ***Risk adjustment does not help.***

Addressing Bias

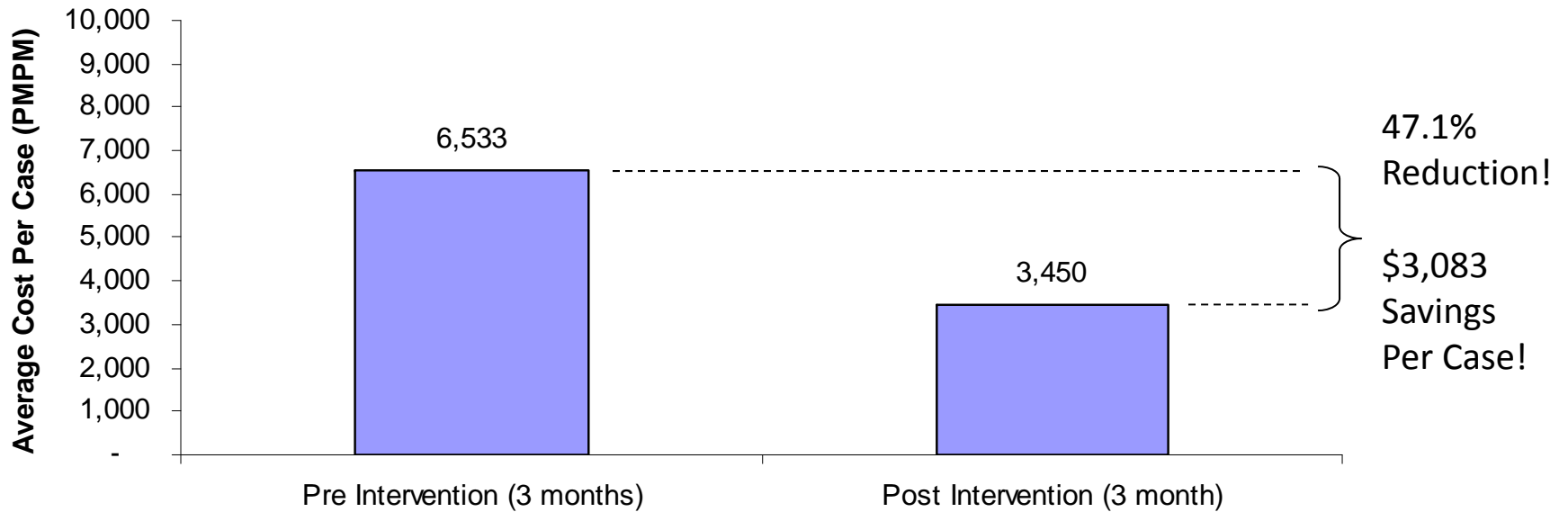
Top Five ROI Bias Issues

1. Regression to the Mean
2. Biased Secular Trend Adjustment
3. Once-chronic-always-chronic “migration bias”
4. Risk Factor Switcharoo
5. Volunteer Bias with “I did my best” control for confounding

Regression to the Mean

Case Management – Cost per Case before and after referral

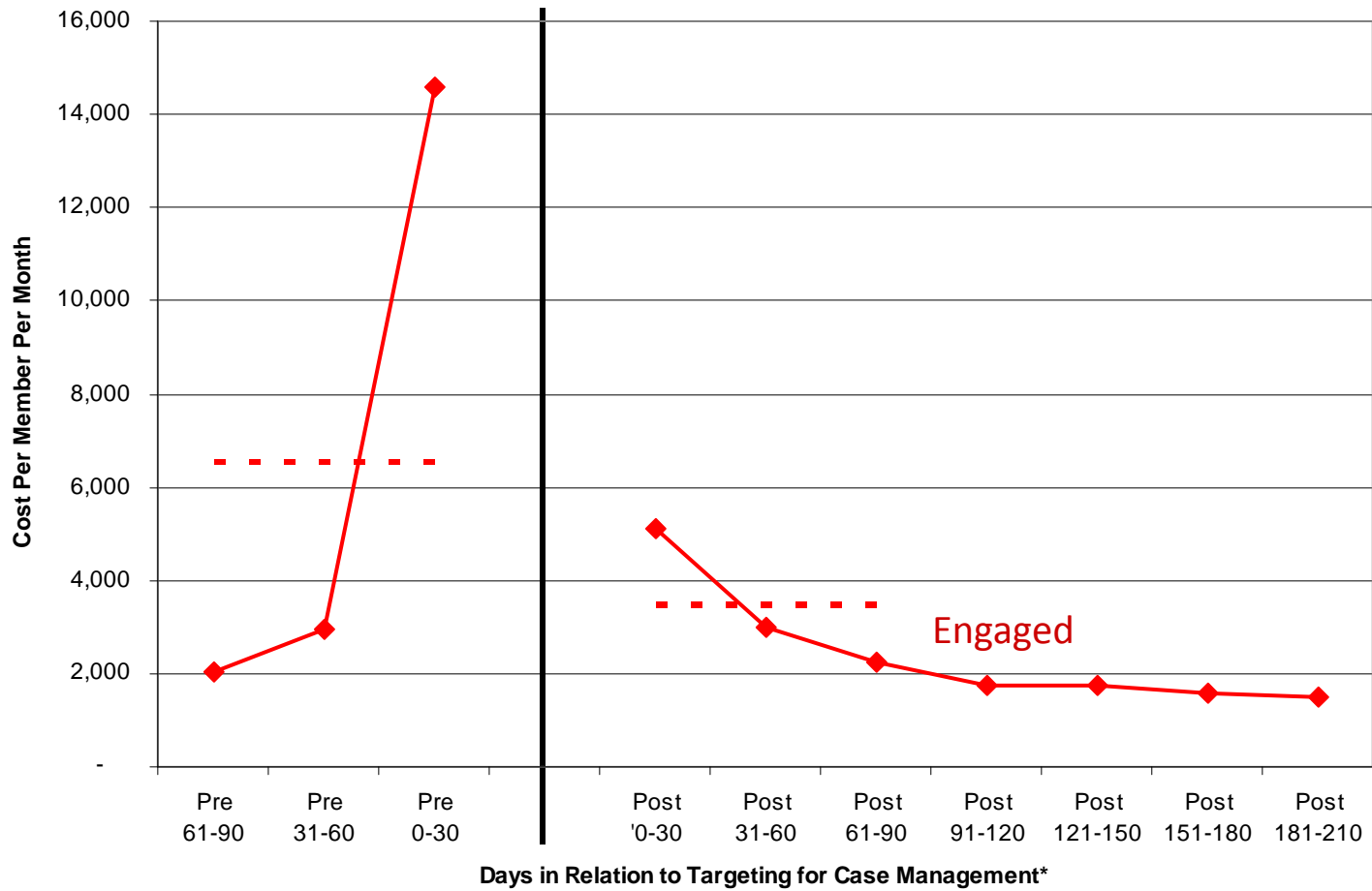
Medicare Advantage Cases referred between April 2007 - Dec 2008. n=11,768



Regression to the Mean

Case Management – Cost per Case before and after referral

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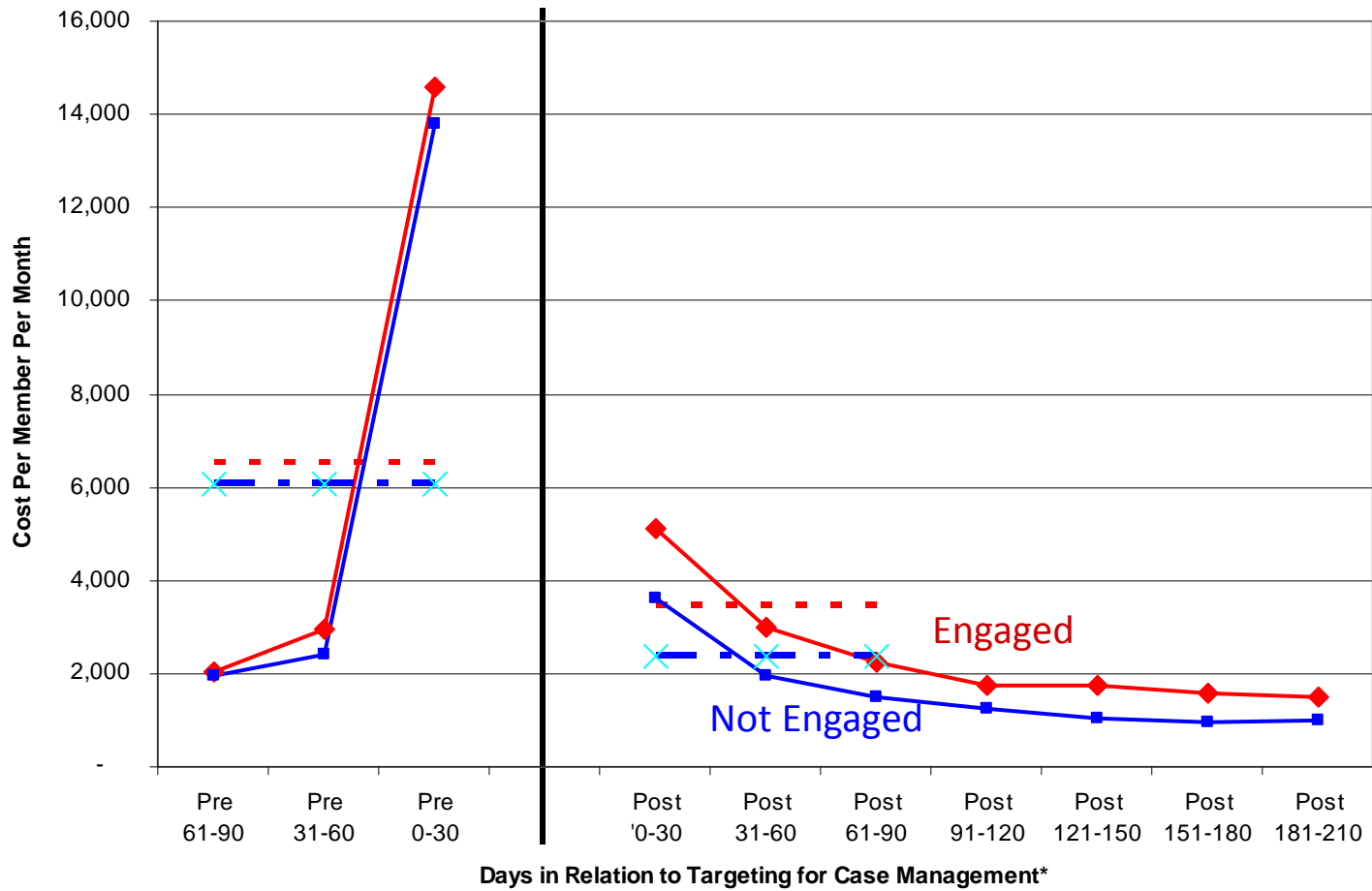


*Post date ranges in relation to 5-days after targeting.

Regression to the Mean

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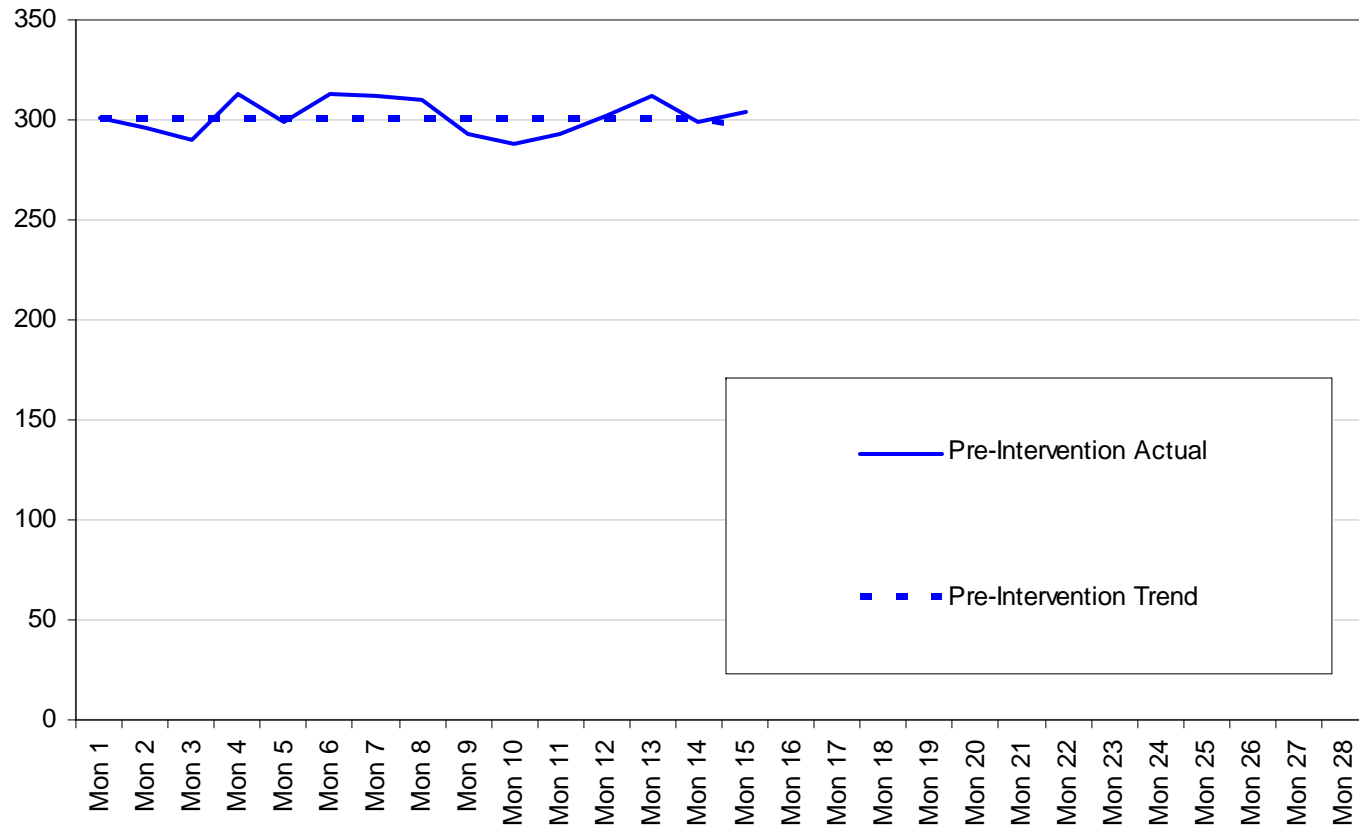
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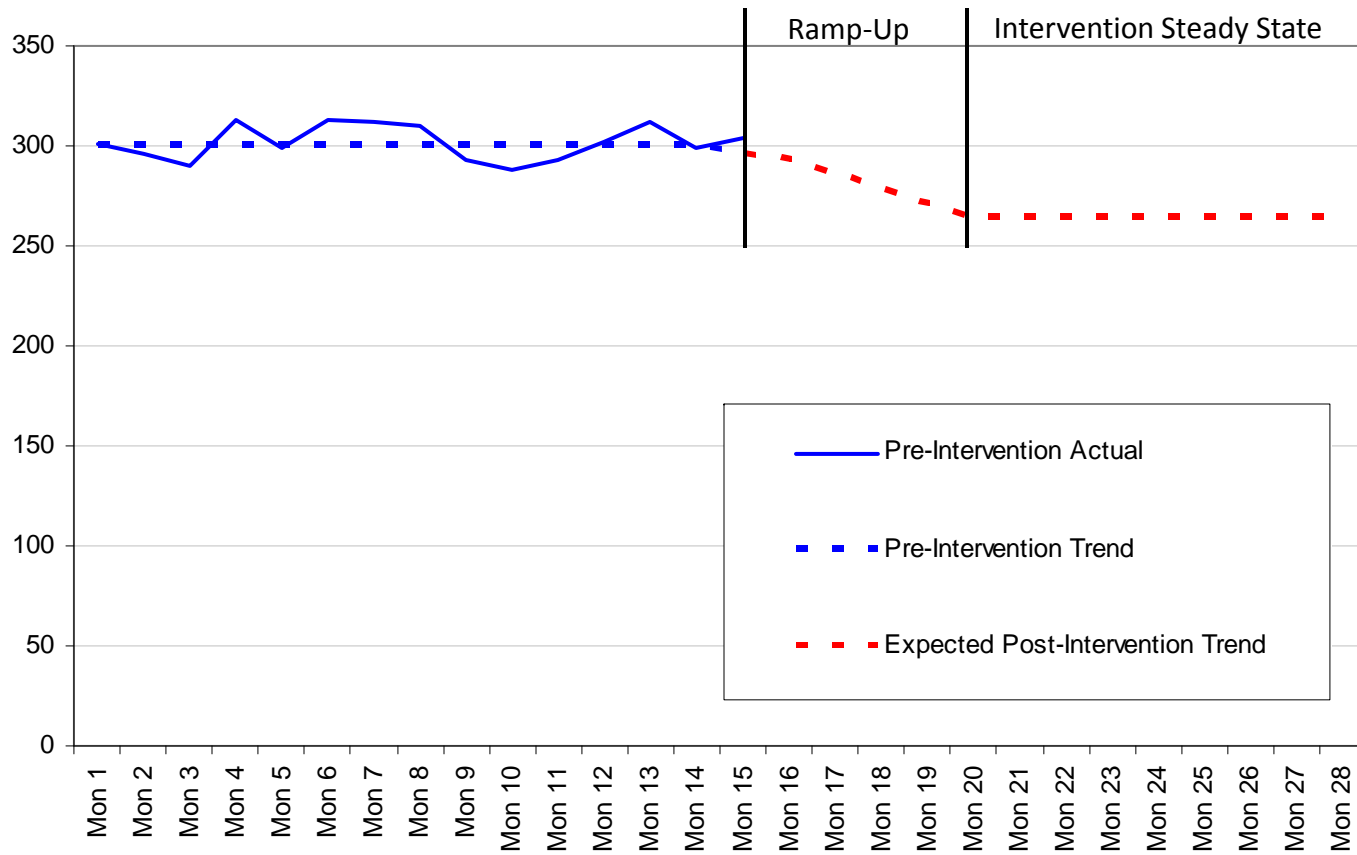
Regression to the Mean

Solution = Outcomes Monitoring with “Re-qualification”



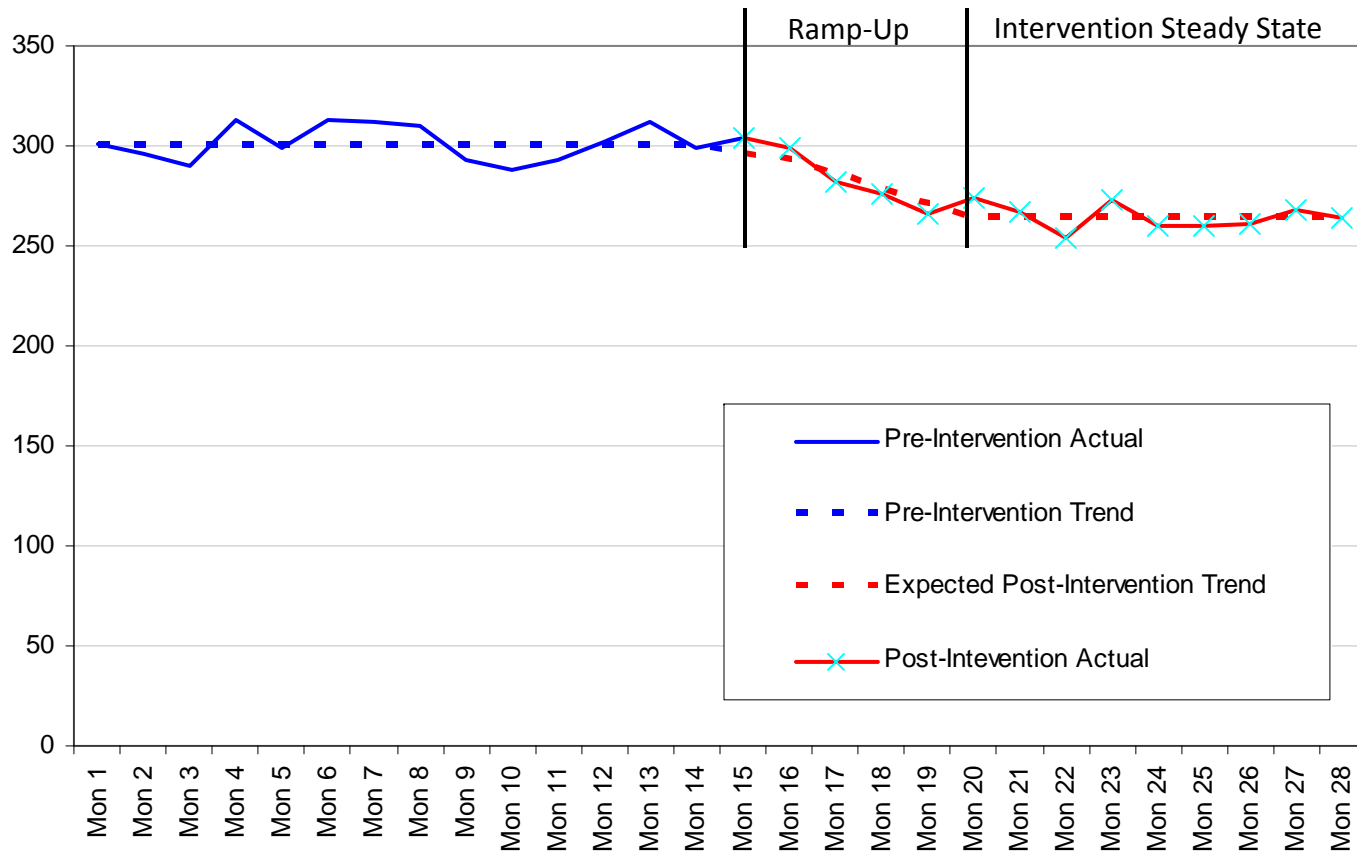
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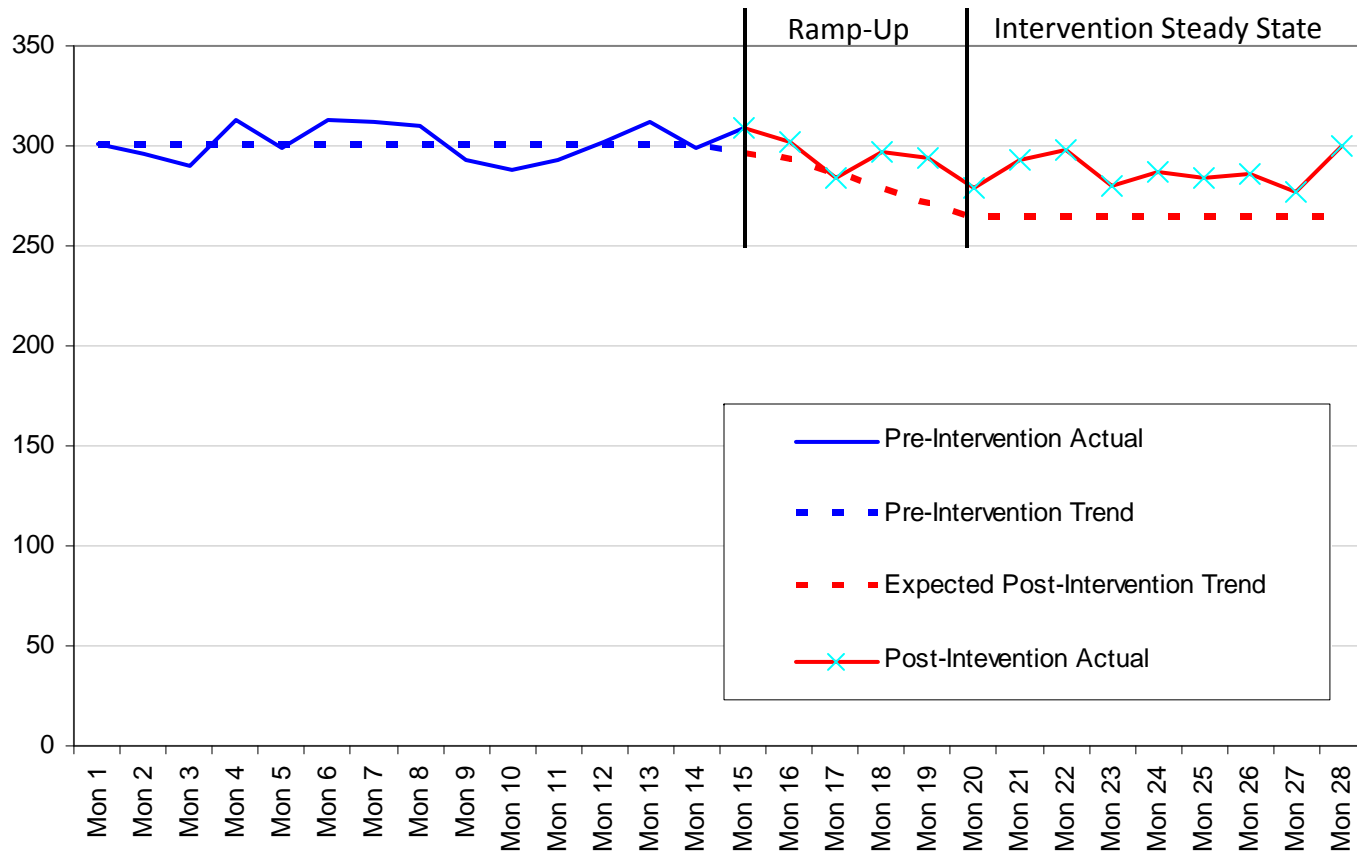
Regression to the Mean

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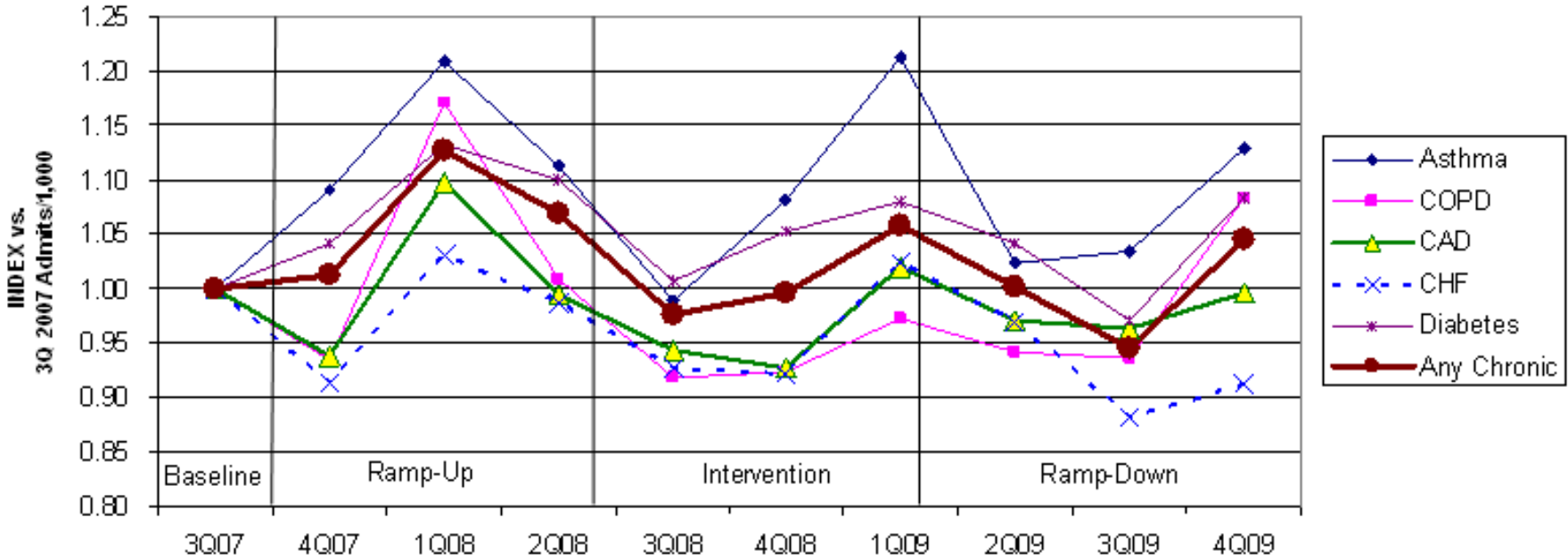


Regression to the Mean

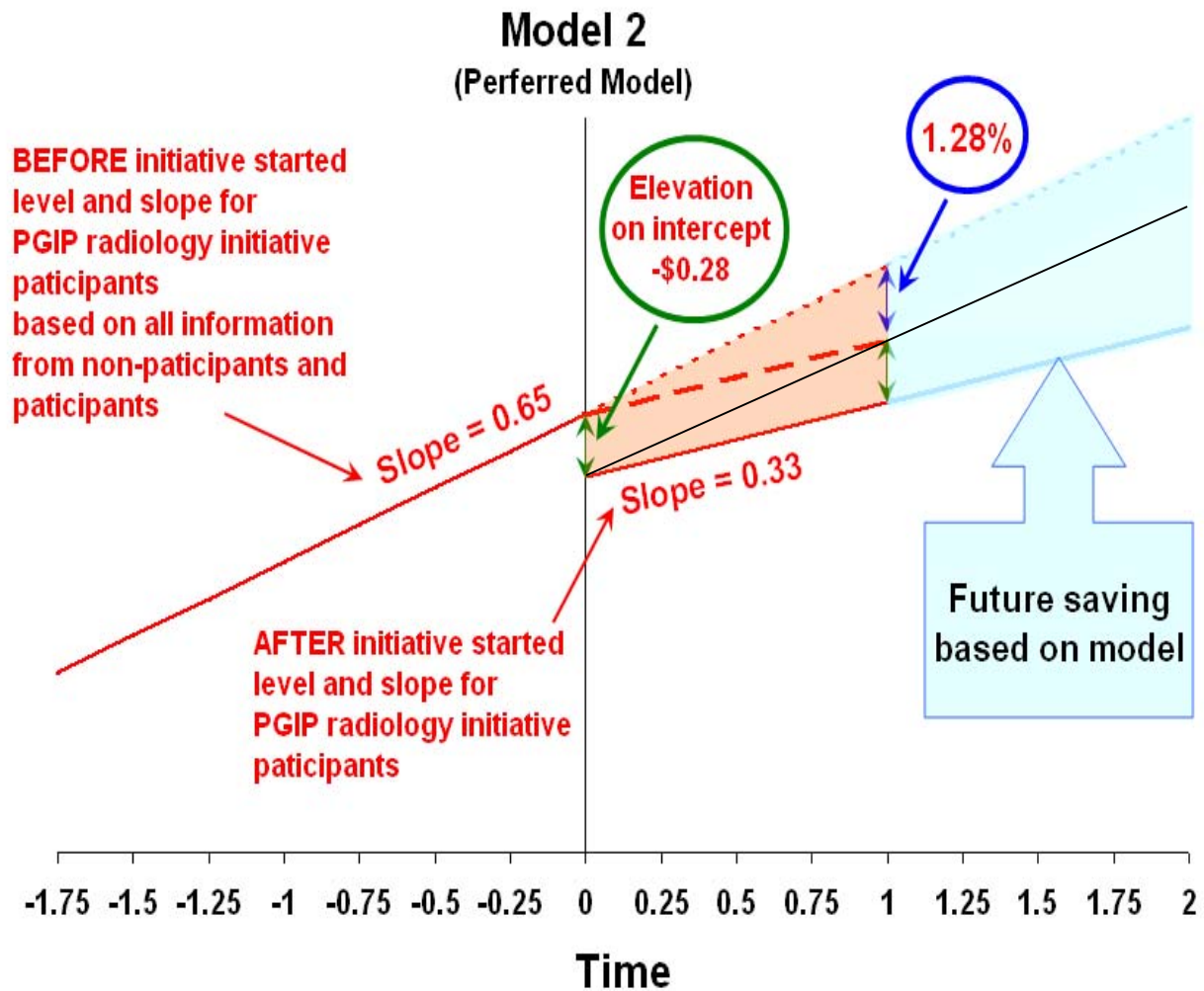
Solution = Outcomes Monitoring with “Re-qualification”



Applying Outcomes Monitoring to a Vendor-delivered Disease Mgmt Program

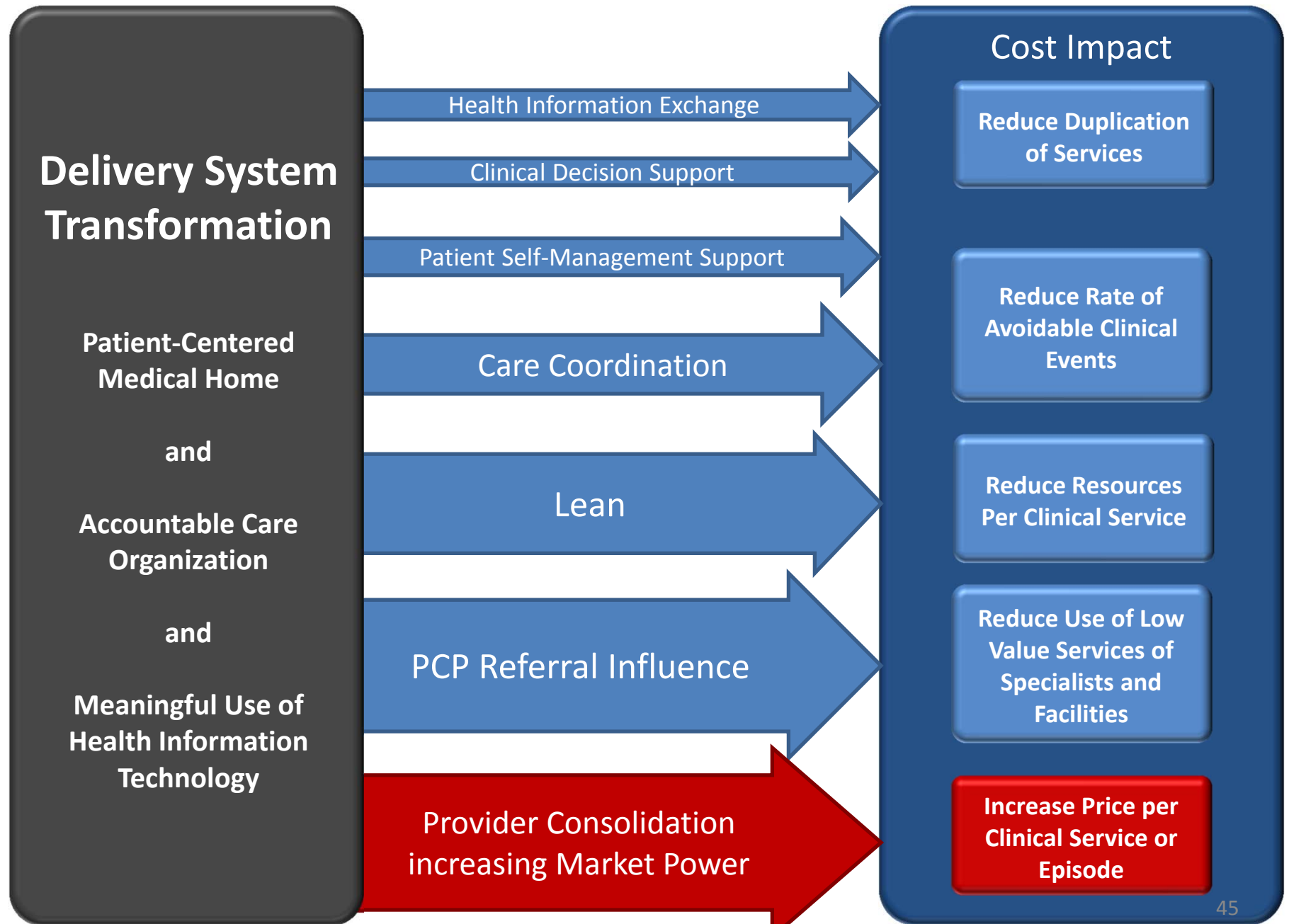


Using Statistical Models

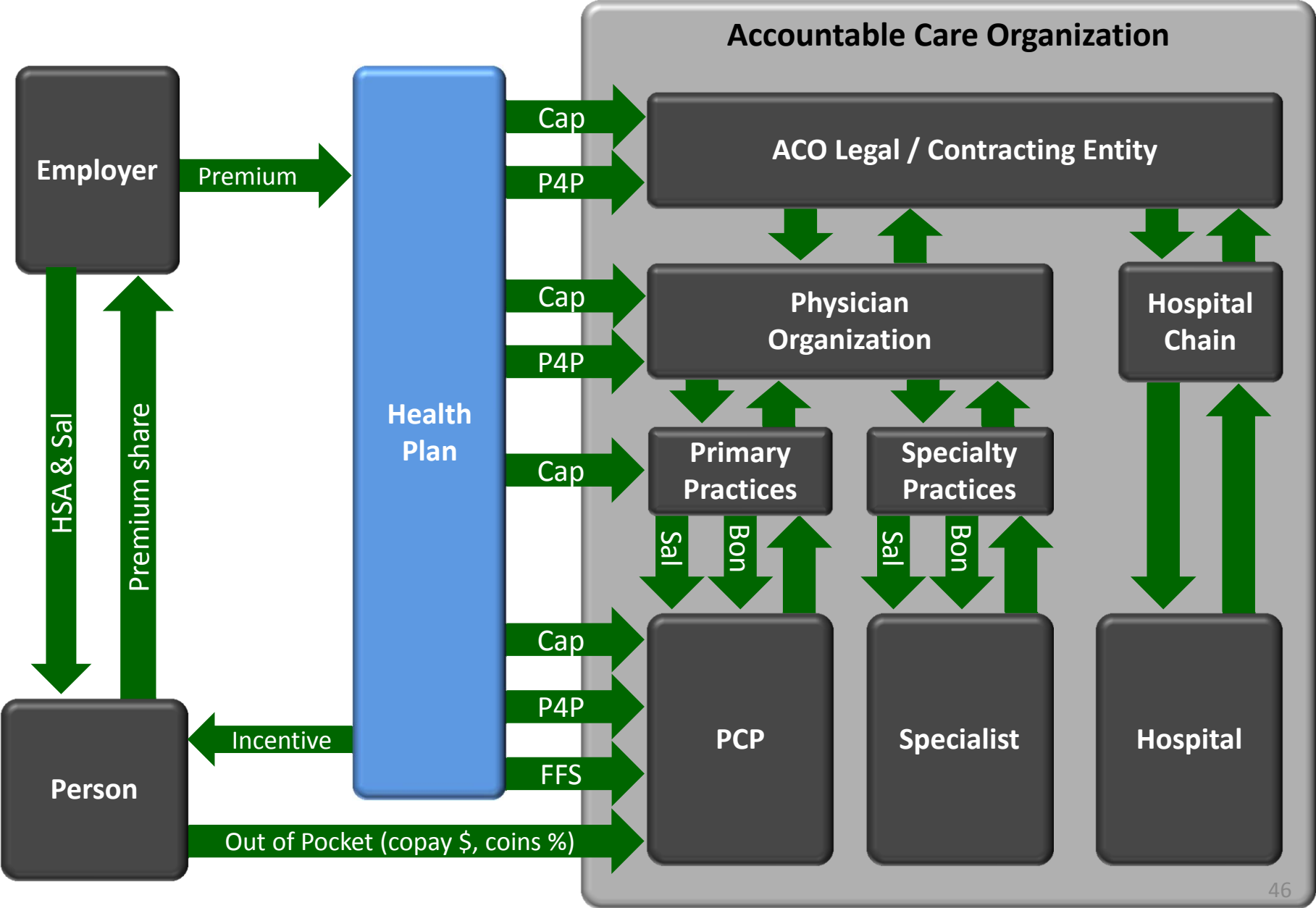


PROVIDER-FACING CLINICAL PROGRAMS

Sources of Cost Savings



Financial Model for Provider-facing Clinical Programs

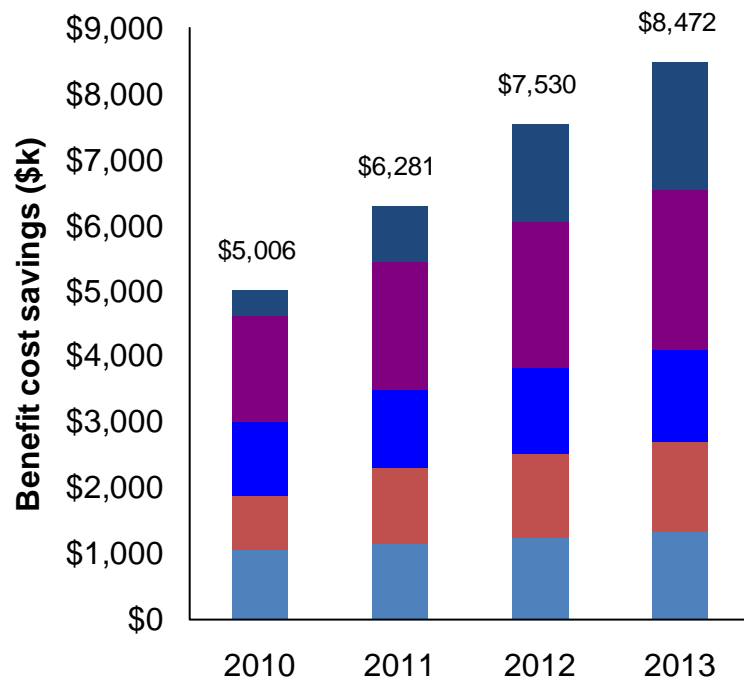


Modeling Provider Incentive Programs

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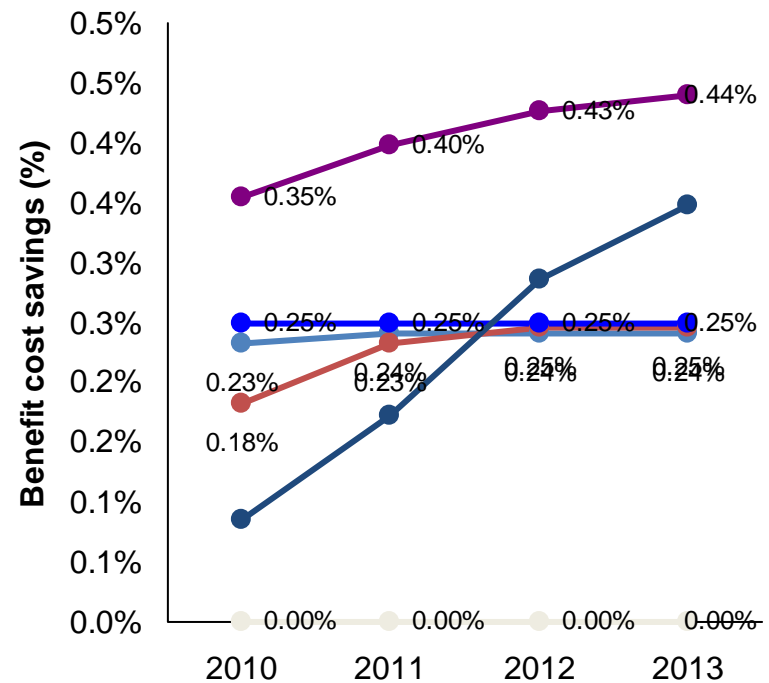
Annual savings by initiative category



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Projected benefit cost savings

Annual savings by initiative category as % of total benefit cost



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Key Conclusions

- Plans and Providers must prepare to **share risk**
- Systems should capture **Actively Structured Data**
- **Cause-Effect models** should be developed to support intervention design, prospective outcomes estimates and evaluation plan
- **Intervention Models** should be used to prospectively estimate outcomes of clinical programs and to determine optimal targeting
- **Engagement Cohort method** should be used to model the dynamics of program ramp-up and ramp-down.
- **Monte Carlo analysis** should be used to assess uncertainty
- **Pre-Post Analysis** without “requalification” is analytic malpractice

Thank You!

Questions

Contact Info:

Richard E. Ward, MD, MBA
rward@rewardhealth.com
519-817-8300