



Is the Predictive Modeling Industry Reflecting What We Now Know about Healthcare? Debunking Common Myths

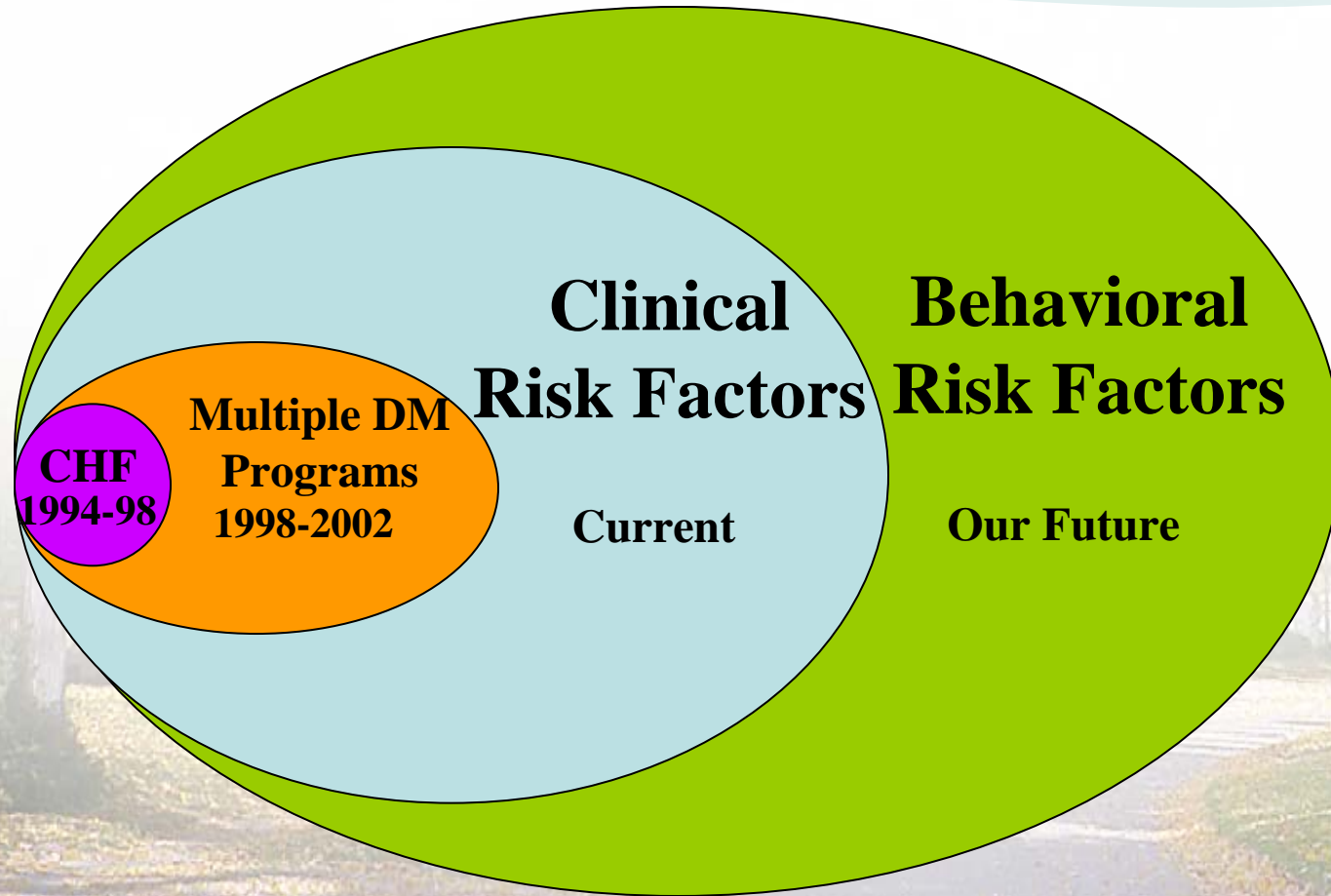
Monday, September 22, 2008
National Predictive Modeling Summit
Washington, DC

Dr. Julie A Meek
President, Meek Consulting, LLC

Agenda

- A bit of history...why does the quest for higher and higher levels of accuracy for predictive modeling matter?
- Dispelling common myths
- Concrete examples: Proof of the pudding...how does a great predictive model lead to great outcomes?

The Industry's History



A bit of my history...my first experience with why accuracy matters

Predicted Health Care Use	Observed Health Care Use			
	0 = Low care use group		1 = High care use group	
Traditional Claims-Based Predictive Model	N	%	N	%
	True Negatives		False Negatives	
People with No Disease (N)	2,602	41.2%	2,603	41.2%
People with No Disease (encounters)	7,430	14.1%	33,104	62.6%
People with No Disease (\$)	\$ 393,119	7.3%	\$ 3,574,910	66.0%
	False Positives		True Positives	
People with Disease (N)	374	5.9%	735	11.6%
People with Disease (encounters)	1,234	2.3%	11,092	21.0%
People with Disease (\$)	\$ 73,392	1.4%	\$ 1,376,572	25.4%
	True Negatives		False Negatives	
One Care Street® Predictive Formula				
Probability = 0 (N)	1,508	23.9%	1,201	19.0%
Probability = 0 (encounters)	4,250	8.0%	15,009	28.4%
Probability = 0 (\$)	\$ 226,607	4.2%	\$ 1,691,932	31.2%
	False Positives		True Positives	
Probability = 1 (N)	1,468	23.2%	2,137	33.8%
Probability = 1 (encounters)	4,414	8.4%	29,187	55.2%
Probability = 1 (\$)	\$ 239,904	4.4%	\$ 3,259,550	60.2%
		Check		Check
Whole pop. N	6,314	6,314		6,314
Whole pop. Encounters	52,860	52,860		52,860
Whole pop. Dollars	\$ 5,417,993	\$ 5,417,993		\$ 5,417,993

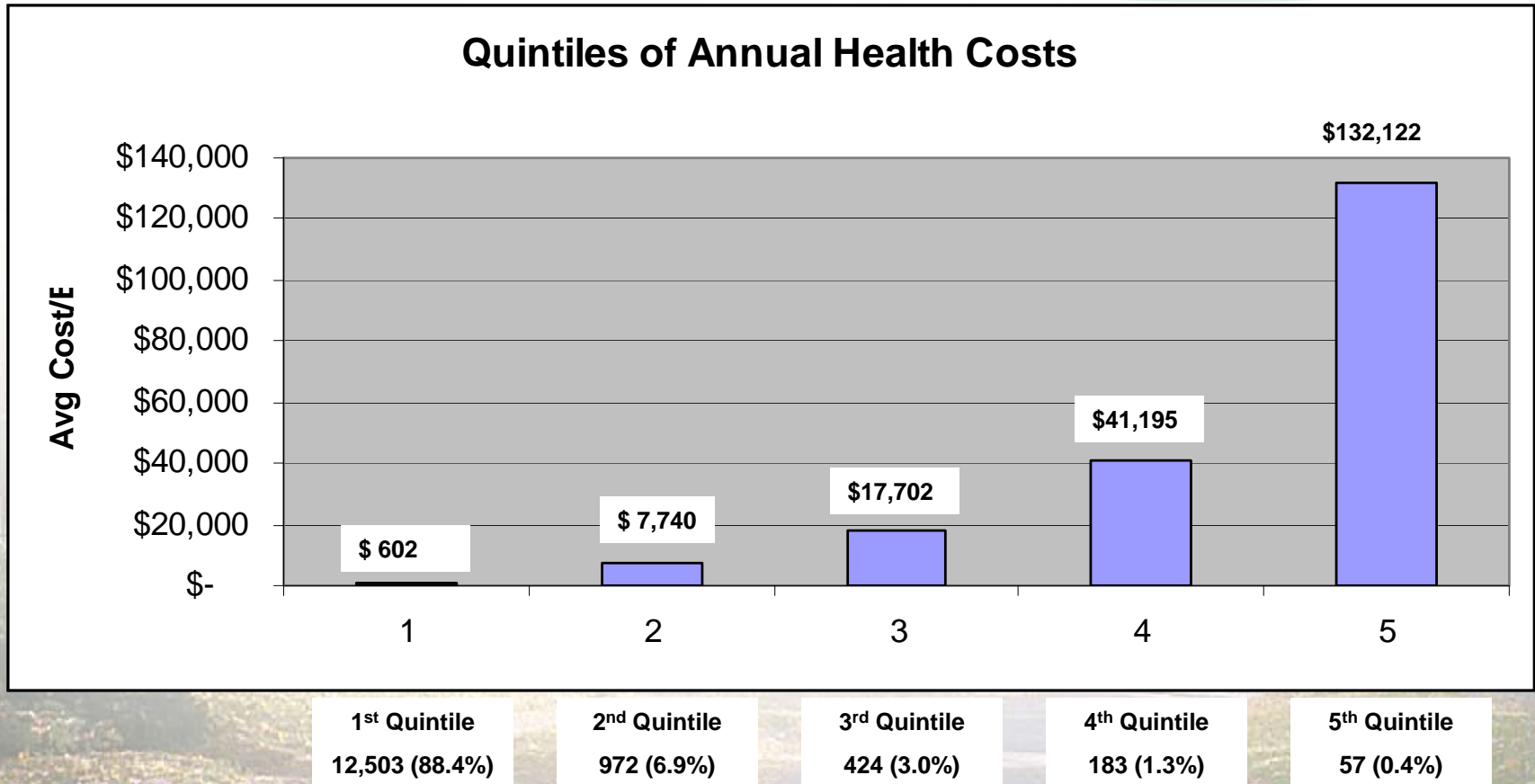
Source: Meek, JA, Momentum Health Solutions, Unpublished Research, 11/99.

Some Things Worth Knowing about Healthcare!

- We all know healthcare is expensive and that some diseases cost more than others
- What we don't know is that widely held beliefs often cause us to propose inadequate solutions
- The following slides dispel common misconceptions using analysis of a large employer data set

***Analysis results used with permission from CareGuide, LLC. All program results reflect use of CareGuide's One Care Street® services.**

Some Things Worth Knowing: Average Health Spend



What we hear: “On average, people spend >\$7,000 annually on healthcare costs.”

- 41% (N=5,770) of the study cohort had \$0 claims; 11.6% of this population incurred 80% of claims cost

What are the implications? Healthcare spend is relatively low for most people and is high for just a few. This data provides a compelling argument for the need for a real focus on predictive modeling.

Some Things Worth Knowing: Likelihood vs. Certainty

- **What we hear: “People with chronic conditions that are expensive in Year-1, stay expensive in Year-2.”**
 - In the study cohort (N=14,139), 10.19% (1,441 people) reported having diabetes
 - A Chi Square was performed to determine how many of the diabetics who were part of the high cost 20% group in the Pre-Year (Y1), stayed in the high cost 20% group in the OCS-Program Year (Y2)
- Results:**
- **20% (285) who were high cost Y1 stayed high Y2**
 - **59% (847) who were low cost Y1 stayed low Y2**
 - **11% (158) who were high cost Y1 became low Y2**
 - **10% (151) who were low cost Y1 became high Y2**
- **What we know: “Most people with chronic conditions that are expensive in Year-1, don’t stay expensive in Year-2.”**
 - In this population, only 20% of diabetics who were expensive in Year-1, stayed expensive in Year-2.
 - **What are the implications?** If you rely on conventional wisdom and use only claims-based stratification modeling vs. adding survey-based predictive modeling, lots of people who could have been helped will be missed. This is the most important differentiating value added by survey-based predictive modeling.

Some Things Worth Knowing: Likelihood vs. Certainty

- **What we hear: “On average, people with certain lifestyle practices are more expensive than others.”**
- In the study cohort (N=14,139), 15% (2,102) people reported smoking and 85% (12,037) reported nonsmoking
- A Chi Square was performed to determine how many smokers were part of the high cost 20% group in the OCS-Program Year (Y2)
- **What we know: “On average, people with certain lifestyle practices are more expensive than others.”**
- **What are the implications?** Most smokers are not more expensive; but a few are a lot more expensive, and the likelihood increases with age and duration over time. Think about the use of incentives vs. disincentives to create higher participation in smoking cessation classes vs. creating defensive-avoidant behavior.

Results:

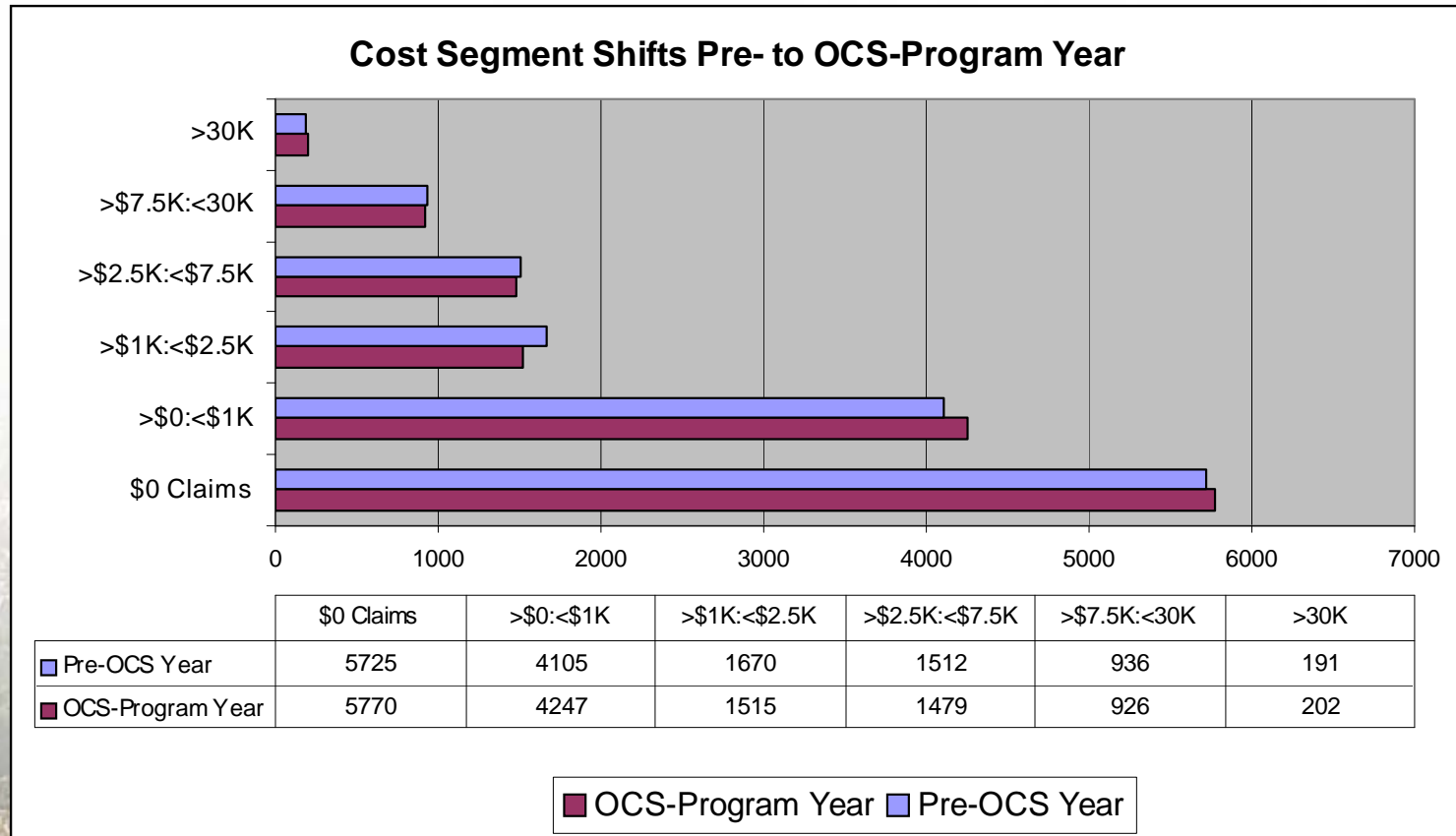
- **20% of smokers (421) part of high cost group in Y2 (avg cost = \$12,143)**
- **20% of nonsmokers (2,406) part of high cost group in Y2 (avg cost = \$12,026)**
- **80% of smokers (1,681) part of low cost group in Y2 (avg cost = \$274)**
- **80% of nonsmokers (9,631) part of low cost group in Y2 (avg cost = \$323)**

Some Things Worth Knowing: The Episodic Nature of Illness

- **What we hear: “People that are expensive, stay expensive.”**
- Dr. Wendy Lynch *et al.** performed segment migration analysis on 10,000 people across 4 years, where between 2 and 6% of people accounted for 40% of health costs in a given year
- **Results:**
 - **In each year, between 73%-83% were in the high-cost group for the first time**
 - **Only .4% to 1% of these people were expensive in two consecutive years**
 - **Only 3 of 10 people were expensive more than once in a 4 year period**
- **What we know: “People that are expensive, usually don’t stay expensive.”**
- **What are the implications?** Being expensive is very episodic. Having multiple conditions increases the likelihood that a person could be expensive, but in any given year, it would not be certain.
- A sound predictive model acts as an **“Early Warning System”** to provide help to the right people at the right time, much **EARLIER** than using other interventional models which sustains the lowest possible health cost trend.

* Lynch WE, Aligning Incentives, Information, and Choice. Health as Human Capital Foundation: 2008, p. 36-37.

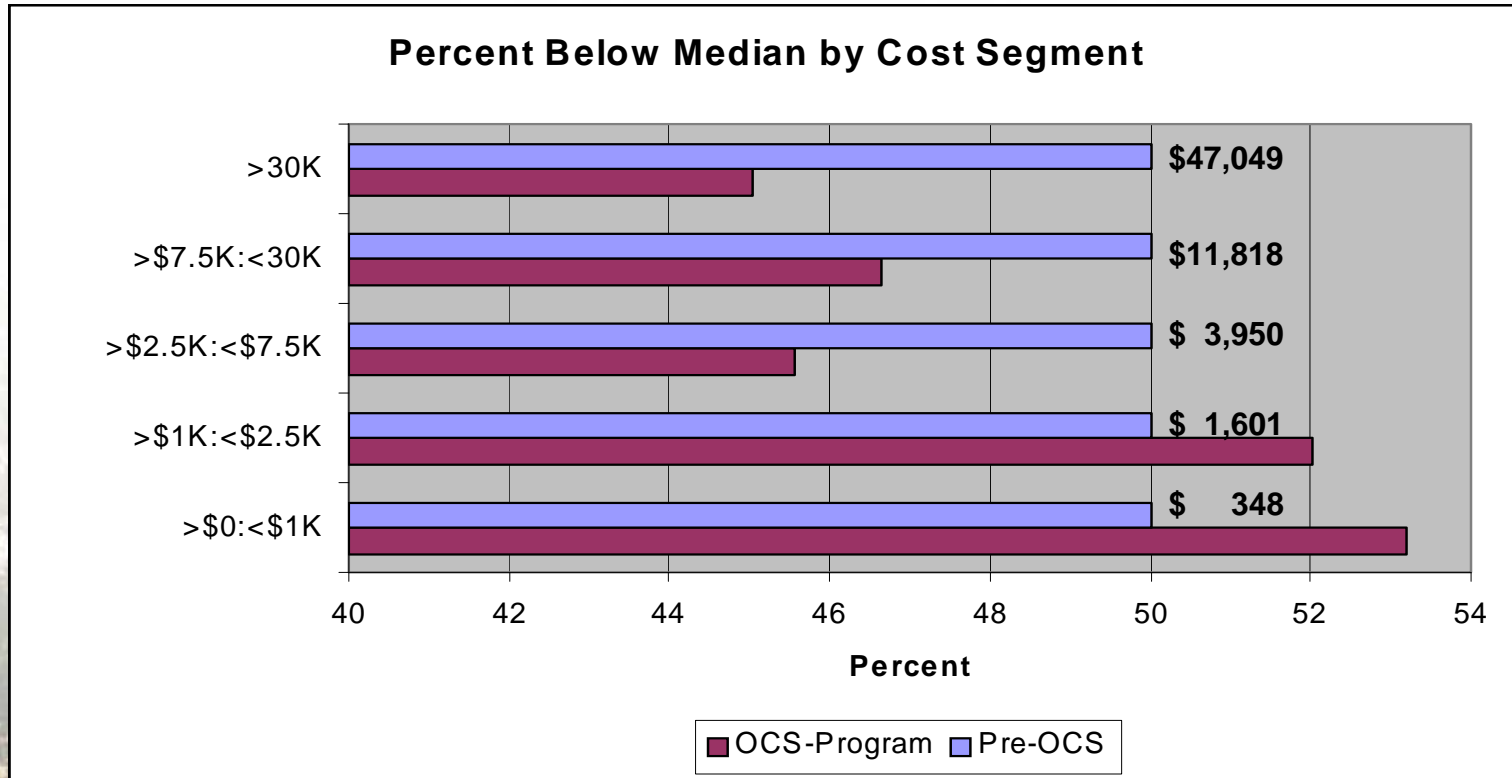
Some Things Worth Knowing: The Stability of Cost Segments



What we know: Even though people shift between segments from one year to the next, the % of the total population in each segment stays relatively stable.

Implications: The power of population health management is to shift more people into the lower end of each cost segment. The industry is looking closely at refining this metric.

Some Things Worth Knowing: Coaching Shifts Median



Analysis Result: More people were below the median in the OCS-Program Year in both the >\$0 - <\$1K and >\$1K - <\$2.5K segments as well as more people overall in the \$0 claims segment.

Implications: This is consistent with the highest impact being on Outpatient and Physician encounters/costs.

Some Things Worth Knowing: Clinical Risk vs. High Cost Risk

Clinical High-Risk Criteria

<u>Variable</u>	<u>Thresholds</u>
Systolic BP	140 or higher
Diastolic BP	90 or higher
Total cholesterol	240 or higher
HDL	39 or lower
LDL	160 or higher
Triglycerides	200 or higher
Glucose	126 or higher
BMI	30 or higher
Overall	High risk on any of the above variables

Some Things Worth Knowing:

% High-Cost also at High **Clinical** Risk

<u>Variable</u>	<u>2006</u>	<u>2007</u>	<u>Change</u>
Systolic BP	12.5	11.1	-1.4
Diastolic BP	14.3	11.1	-3.2
Total Cholesterol	14.3	3.6	-10.7
HDL	44.4	55.6	+11.2
LDL	15.7	4.1	-11.6
Triglycerides	30.4	28.3	-2.1
Glucose	12.5	15.4	+2.9
BMI	59.6	57.4	-2.2
Overall	77.2	77.2	0.0

Some Things Worth Knowing:

% Low-Cost also at High **Clinical** Risk

<u>Variable</u>	<u>2006</u>	<u>2007</u>	<u>Change</u>
Systolic BP	11.1	9.5	-1.6
Diastolic BP	10.0	6.2	-3.8
Total Cholesterol	14.0	8.2	-5.8
HDL	43.1	47.7	+4.6
LDL	16.7	10.6	-6.1
Triglycerides	25.4	22.8	-2.6
Glucose	2.5	6.0	+3.5
BMI	35.0	36.9	+1.9
Overall	70.0	67.5	-2.5

The Gaps in Any Single PM Tactic

- Case Management
 - What/who is being managed?
- Disease Management
 - What happens if I don't have a disease?
- Health Screenings
 - Logistics, resources... and then what?
- Health Risk Assessments
 - Predicting morbidity & mortality
 - (expense in the more distant future)
- Wellness Programs
 - Who is most attracted?
- Data Mining
 - Mining what already happened



Why Predictive Modeling Accuracy Matters: Case Study

Government Entity |

49,000 eligible employees and insured spouses

Challenges Influencing Strategy (2006)

- Highly distributed workforce all over the state
- New Governor and team implementing lots of change so high cultural resistance to any new program
- Historically employees have had rich benefits with little cost sharing

Communications Strategy (2006)

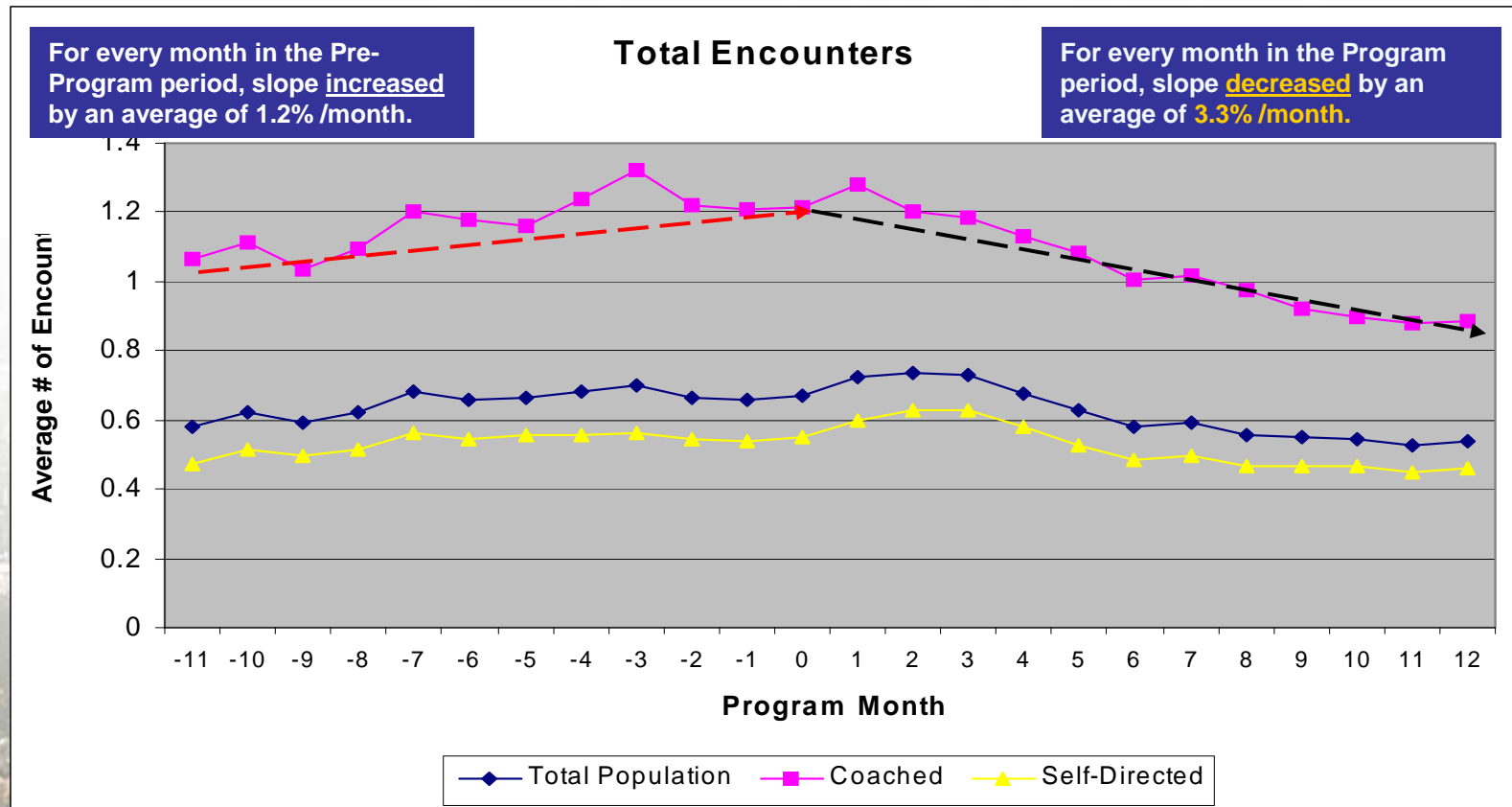
- Made the effort to get face-to-face with employee kick-off meetings so did 445 meetings in six months across the state
- Used every communication channel possible – streaming video off of employee website; multiple internal channels – garnering local HR support as kick-off meetings happen
- Did another “push” during/just prior to open enrollment when people were thinking about their contribution amounts and the incentive

Incentive Strategy (2006)

- Used employee insurance contribution discount biweekly if employee & covered spouse took the survey and set a health goal, and if eligible for coaching, took the first coaching call.



Raw Data Change in Encounters at Total Population Level



Analysis results reveal that the Program Year slope is **statistically significantly different** from the “Pre-Program” slope for Coached, Self-Directed and Total Population Groups. This means it’s highly unlikely (p value 0.05; meaning <5 times in 100) that the slope change occurred by chance.

Contribution to Reduction in Total Encounters by Service & Group

Contribution by Service*

Category	\$	Contribution to Trend
Physician	\$ 15.28	18%
Outpatient	73.37	85%
ER	10.30	12%
Inpatient	(12.77)	-15%
Total:	\$ 86.18	100%

Category	Self-Directed	
	Coached Group % Contribution to Trend	Group % Contribution to Trend
Physician	8%	10%
Outpatient	74%	11%
ER	8%	4%
Inpatient	8%	-23%
Total:	98%	2%

- In rank order, savings accrued from Outpatient, then Physician, ER and Inpatient services
- There were Inpatient savings in the Coached Group, but a 23% higher Inpatient spend in the Self-Directed Group
- **98%** of the total population savings came **from the Coached Group**

* () indicates loss v savings

Summary of Key “Old Way” vs. “New Way” Strategies

- Not focusing your interventions on this year’s future high-cost group
- Relying on claims & pharmacy-based approaches
- Expecting that people will participate because “it’s the right thing to do”; weak or nonexistent incentives
- Poor timing and PM logistics
- Predictive modeling: You’ve got to focus your most powerful interventions on the right people!
- Most companies now realize the advantage of incorporating survey data
- Powerful incentives: Enough of the right people have to engage in the survey to produce enough benefit to SEE a positive benefit to cost ratio!
- The entire front-to-back PM process has to not only incorporate the best modeling, but have the right timing and ops logistics

Thank You! 

- For the opportunity to share this information with you
- For being an open-minded and critically thinking listener
- For translating what I've shared into your strategy for health management

Contact Information:

juliemEEK@meekconsulting.org

317-695-5083