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Government Human Services Consulting

April 5, 2005

Current Application of Predictive Modeling in Medicaid: A National Overview

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Predictive Modeling

What is predictive modeling?

- Use of members' past information (diagnoses, pharmacy therapy classes, expenditures, demographics, self assessment predictive surveys) to predict
 - their expected costs in the future,
 - the likelihood of them being high cost cases in the future.

What models are available?

- Developers offer different risk predictor models, each best suited for some applications. Examples of models:
 - ACG, CDPS, DxCG, ETG, CRG,
 - neural networks, artificial intelligence based models,
 - other.

Predictive Modeling

What are the applications of predictive modeling?

- Patient profiling
 - identification of high-risk members
 - resource planning for care management programs (disease management and case management)
 - cost savings
- Provider profiling/Plan profiling
 - establish risk-adjusted baseline benchmarks for performance comparisons
 - enable apples-to-apples comparisons of clinical practices, quality outcomes and cost outcomes, and identify opportunities for operational efficiencies
- Risk adjustment (prospective risk assessment)
 - to better match State's payment to MCOs' relative risks
 - to better match MCO's payment to sub-capitated providers' relative risks



Predictive modeling: National Medicaid overview

Mercer's presentation today is a very brief walk-through of applications in Medicaid programs that are/may be provided through

- FFS, PCCM, ASO, or
- voluntary/mandatory managed care.

Different states and their health plans apply predictive modeling to varying degrees, and sometimes not at all.

FFS/PCCM/ASO Medicaid

Predictive modeling efforts in FFS/PCCM programs:

- Patient profiling
 - Disease management (DM) vendor in a FFS program
 - State may supplement vendor's member surveys/HRAs (health risk assessments), if any, and provide predictive modeling reports to assist targeting of patient care by DM vendor, or
 - DM vendor expected to identify high risk cases.
 - Carve-out of behavioral services from managed care to an ASO
 - State may provide predictive modeling reports based on health plan encounter data to assist the ASO in the initial year, and
 - ASO to assume the responsibility of predictive modeling in subsequent years.

Illustrations of current-year-profiling and future-year-predictive-modeling follow ———>

Inpatient Profiling Analysis

Observed Utilization by Type of Diabetes

Diabetes Category	Members	Member Months	Inp Days	Inp Days Per 1000 Members Per Year
Type 2 W/out	2,753	28,533	986	415
Type 2 With	230	2,462	510	2,486
Type 1 W/out	968	10,275	1,144	1,336
Type 1 With	215	2,361	1,116	5,672

Inpatient Profiling Analysis

Observed Utilization by Predictive Modeling (PM) Score

PM Group	Members	Member Months	Inp Days	Inp Days Per 1000 Members Per Year
0-.5	359,008	3,501,792	77,863	267
.51-.7	2,567	27,493	6,134	2,677
.71-.8	291	3,108	2,183	8,429
.81-.9	180	1,957	2,667	16,354
.9-high	88	889	2,521	34,029

Inpatient Profiling Analysis

Observed Utilization by PM Score – Year 2

Year 1 PM Group	Year 2 Members	Year 2 Member Months	Year 2 Inp Days	Year 2 Inp Days Per 1000 Members Per Year
0-.5	305,074	3,159,658	60,884	231
.51-.7	2,344	24,589	4,024	1,963
.71-.8	265	2,787	1,789	7,702
.81-.9	173	1,807	1,919	12,744
.9-high	87	899	2,489	33,224

Prevalence of Chronic Conditions

Condition	Members	PM Score > .8
Arthritis	2,474	34
Asthma	24,826	63
Diabetes	4,166	64
Hypertension	6,393	76
Ischemic Heart Disease	842	35
Congestive Heart Failure	294	39
Hyperlipidemia	4,689	25
Low Back Pain	15,089	81
Depression	9,575	54
Chronic Renal Failure	169	44
COPD	1,904	33

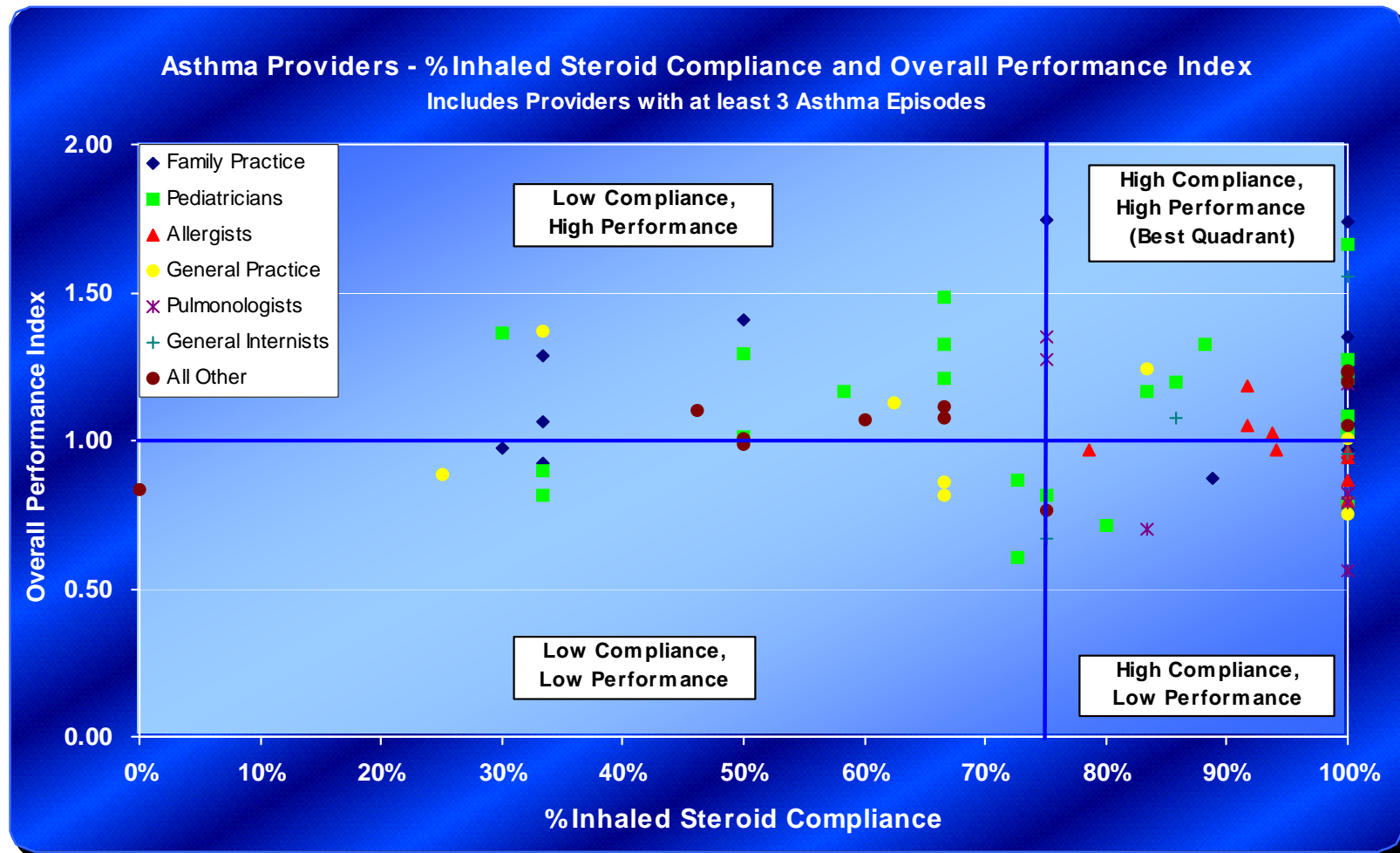
FFS/PCCM/ASO Medicaid (continued)

Predictive modeling efforts in FFS/PCCM programs (continued):

- Provider profiling
 - Provider best practices initiative in a PCCM program
 - develop risk-adjusted baseline benchmarks to measure effectiveness of the initiative
 - Use of homogeneous clinical episodes analysis to identify efficient provider networks
 - use episode treatment groups (ETGs) as predictive risk categories, conceptually similar to DRGs but include all services (inpatient, outpatient, physician, pharmacy, ancillaries)
 - compare providers' performances using a fixed distribution of patients across all ETGs, i.e., on a risk-adjusted basis.

Illustrations of savings from pursuing efficient (tiered) provider networks follow —→

Hypothetical illustration: Cost performance versus quality performance across providers



Performance Index = Peers' Average Cost/Provider's Actual Cost, controlled for ETG case mix.

Cost savings from achieving improved performance indices

Provider Efficiency Opportunity Analysis - Based on Provider Performance Index

Provider Specialty	Number of Providers	Total Paid Amount	Input Parameter		24 months experience	
			Performance Index	Providers Impacted	Potential Savings	% Savings
Primary Care Providers						
Pediatrics	277	\$224,205,870	0.900	30	\$12,384,956	5.5%
OB/GYN	269	\$210,254,425	0.900	15	\$1,918,262	0.9%
General/Family Practice	781	\$189,544,201	0.900	123	\$15,246,833	8.0%
Internal Medicine	468	\$143,790,481	0.900	88	\$12,686,588	8.8%
Nurse Practitioners	14	\$1,129,128	0.900	1	\$35,219	3.1%
Primary Care - Subtotal	1,809	\$768,924,104		257	\$42,271,857	5.5%
Specialists (Top 10 by Paid Amount and All Other)						
Multi-Specialty	163	\$421,673,347	0.900	9	\$2,252,924	0.5%
Health Department/DEC	180	\$126,304,258	0.900	6	\$909,323	0.7%
Full-Time ER Physician	140	\$122,797,694	0.900	17	\$2,318,810	1.9%
General/Thoracic Surgery, Proctology	221	\$76,067,138	0.900	22	\$2,619,081	3.4%
Oncology	7	\$51,658,339	0.900	-	\$0	0.0%
Psychiatry	82	\$44,423,913	0.900	26	\$3,898,943	8.8%
Orthopedic/Hand Surgery	143	\$38,668,609	0.900	15	\$1,948,943	5.0%
Neurology	76	\$29,142,832	0.900	8	\$1,361,302	4.7%
ENT	97	\$27,981,426	0.900	15	\$832,893	3.0%
Cardiology	66	\$26,947,138	0.900	10	\$818,763	3.0%
All Other Specialties (31 others)	1,774	\$199,897,468	0.900	195	\$8,807,592	4.4%
Specialists - Subtotal	2,949	\$1,165,562,159		323	\$25,768,573	2.2%
Grand Total	4,758	\$1,934,486,264		580	\$68,040,430	3.5%

Key findings (from provider profiling for efficient networks in FFS/PCCM/ASO Medicaid)

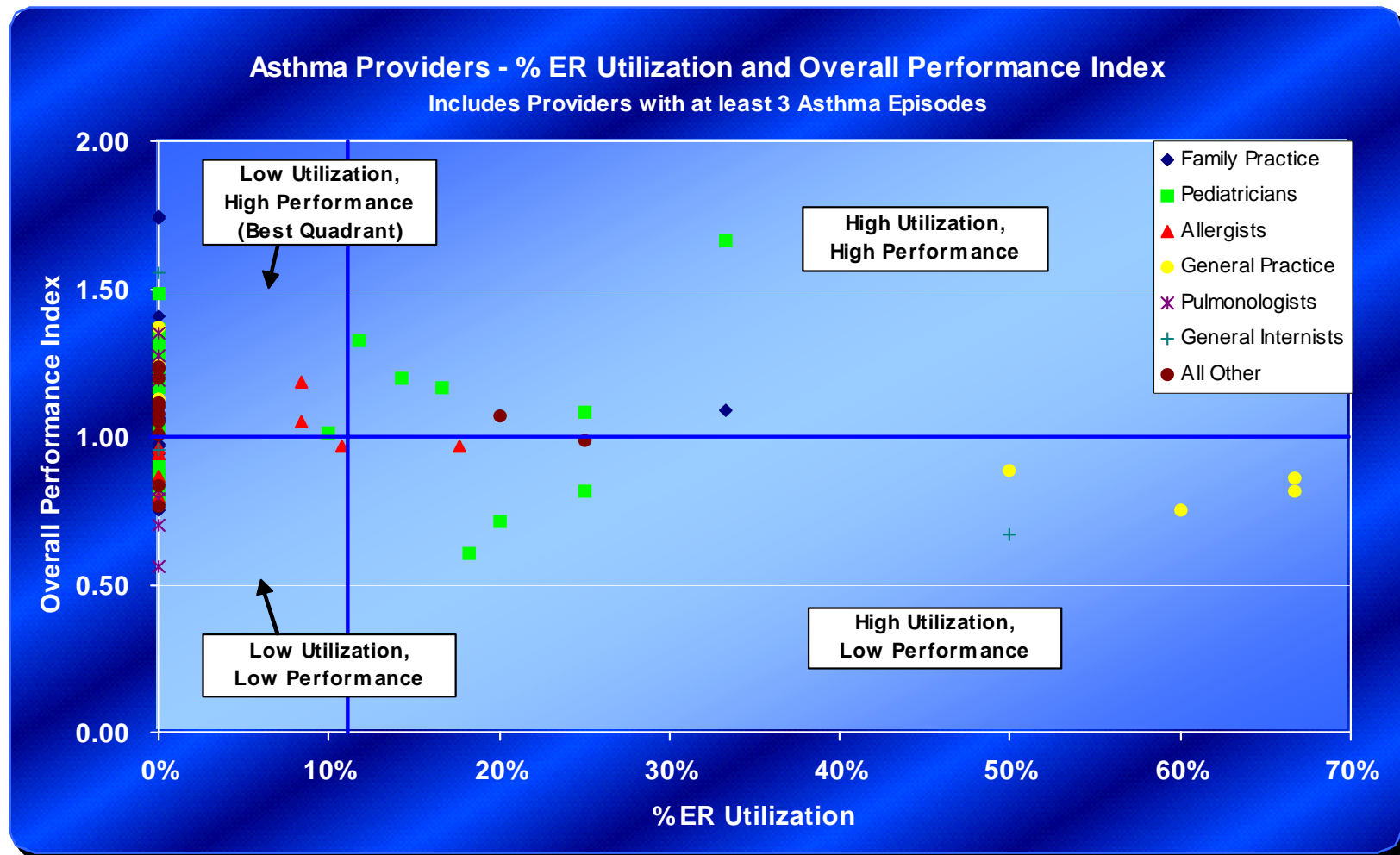
- On a risk-adjusted basis, significant variability observed in provider practice pattern, quality, and cost among
 - physicians
 - provider types
 - program types
 - geographic regions.
- With normalization of risk, easier to quantify potential savings.
- Supports the case for:
 - using predictive risk adjustment to analyze variability in provider practice patterns,
 - offering providers education relative to their peers,
 - following through with initiatives to improve the quality and cost effectiveness of FFS/PCCM/ASO Medicaid programs.

Medicaid managed care

Predictive modeling efforts in managed care programs:

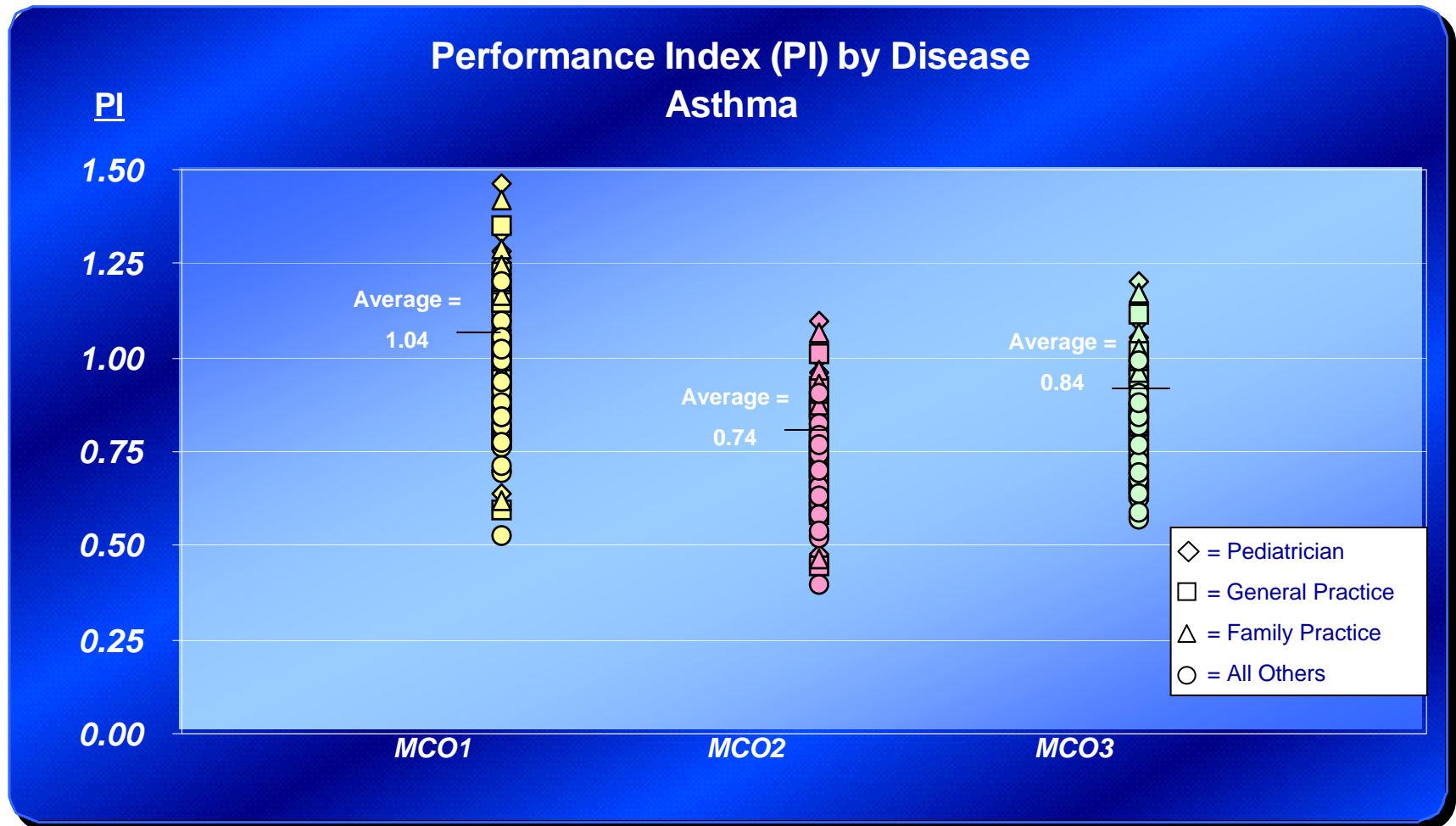
- Risk adjustment (CDPS, ACG to adjust MCO capitation payments)
- Patient profiling (identification of high cost enrollees for targeted care management)
 - assistance from states to health plans
 - example: **Wisconsin** – via predictive modeling reports
 - example: Maryland – via rate cell structure
 - independently by health plans
 - example: **Priority Partners**
- Provider profiling/Plan profiling (assessment by state of health plans' and their providers' efficiencies and effectiveness)
 - onsite reviews
 - retrospective predictive modeling
 - retrospective normalized analysis via clinical episodic grouping →

Hypothetical illustration (continued): Cost performance versus quality performance across providers within a health plan



Performance Index = Peers' Average Cost/Provider's Actual Cost, controlled for ETG case mix.

Hypothetical illustration: Cost performance across providers and health plans for a specific disease (asthma)



Performance Index = Peers' Average Cost/Provider's Actual Cost, controlled for ETG case mix.

Projected savings

MCO1	Number of Episodes	Total Paid	Average Cost Per Episode	Performance Index	Quartile 4 adjusted to Quartile 3	Projected Savings *
Quartile 1	202	\$ 234,942	\$ 1,163	1.49		
Quartile 2	456	\$ 610,152	\$ 1,338	1.29		
Quartile 3	86	\$ 153,854	\$ 1,789	0.97		
Quartile 4	122	\$ 230,580	\$ 1,890	0.92	-5%	\$ (12,322)
Total	866	\$ 1,229,528	\$ 1,420	1.22	-1%	\$ (12,322)

MCO2	Number of Episodes	Total Paid	Average Cost Per Episode	Performance Index	Quartile 4 adjusted to Quartile 3	Projected Savings *
Quartile 1	389	\$ 588,168	\$ 1,512	1.14		
Quartile 2	1,423	\$ 2,264,817	\$ 1,592	1.09		
Quartile 3	7,789	\$ 14,744,577	\$ 1,893	0.91		
Quartile 4	1,312	\$ 3,306,240	\$ 2,520	0.69	-25%	\$ (822,624)
Total	10,913	\$ 20,903,802	\$ 1,915	0.90	-4%	\$ (822,624)

MCO3	Number of Episodes	Total Paid	Average Cost Per Episode	Performance Index	Quartile 4 adjusted to Quartile 3	Projected Savings *
Quartile 1	2,311	\$ 3,038,463	\$ 1,315	1.32		
Quartile 2	3,214	\$ 4,499,600	\$ 1,400	1.24		
Quartile 3	753	\$ 1,347,117	\$ 1,789	0.97		
Quartile 4	763	\$ 1,538,208	\$ 2,016	0.86	-11%	\$ (173,201)
Total	7,041	\$ 10,423,388	\$ 1,480	1.17	-2%	\$ (173,201)

OB/GYN Zone Total	18,820	\$ 32,556,717	\$ 1,730	1.00	-3%	\$ (1,008,147)
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Savings Summary

Specialty	Projected Savings *
Family Practice	\$ (1,723,931)
Pediatricians	\$ (1,512,221)
Allergists	\$ (423,422)
General Practice	\$ (1,229,939)
Pulmonologists	\$ (756,110)
General Internists	\$ (1,018,228)
OB/GYN	\$ (1,008,147)
All Others	\$ (1,764,257)
Total	\$ (9,436,256)

Key findings (from provider profiling/plan profiling for efficient managed care)

States can follow through on

- onsite health plan reviews

by using clinically robust objective analyses based on

- retrospective predictive modeling, and
- retrospective normalized analysis via clinical episodic grouping

to identify

- practice pattern variations,
- opportunities for improving health care delivery for better quality and access outcomes, and
- opportunities for cost savings/basis for pay-for-performance.

In conclusion...

Applications of predictive modeling

■ Patient profiling

- identification of high-risk members
- resource planning for care management programs (disease management and case management)
- cost savings

Disease Management

FFS/MC,
State/MCO

■ Provider profiling/Plan profiling

- establish risk-adjusted baseline benchmarks for performance comparisons
- enable apples-to-apples comparisons of clinical practices, quality outcomes and cost outcomes, and identify opportunities for operational efficiencies

Effectiveness & Efficiency Analyses

FFS/MC,
State/MCO

■ Prospective risk assessment (risk adjustment)

- to better match State's payment to MCOs' relative risks
- to better match MCO's payment to sub-capitated providers' relative risks

Capitation Payments

MC,
State/MCO