

Risk Adjustment Basics

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- This presentation is designed to acquaint the participants with broad concepts and uses of risk adjustment. It is not intended to convey a recommendation for you, or your organization.
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Session Purpose

- Describe risk adjustment and illustrate experiences and uses of risk adjustment
- Discuss the importance of complete and validated data to achieve the policy goals of risk adjustment
- Identify recent developments and risk adjustment in the context of actuarial soundness
- Summarize lessons learned from early adopters and keys to success



Risk Adjustment Definition

A process of adjusting:

- health plan payments, or
- health care provider payments, or
- premiums

to reflect the health status of plan members.

Risk Adjustment Definition

Risk adjustment is commonly described as a two-step process.

1. The first step involves risk assessment, which refers to the method used to assess the relative risk of each person in a group. The relative risk reflects the predicted overall medical claim dollars for each person relative to the claim dollars for an average risk person.
2. The second step in the risk-adjustment process is payment or rate adjustment, which refers to the method used to adjust payments or premium rates in order to reflect differences in risk, as measured by the risk assessment step. It is common to refer to a particular risk assessment method as a risk adjuster

Risk Adjustment Definition

Risk adjustment methods use different types of *data* and variety of **statistical models** to explain an outcome – risk, events, etc.



Risk Adjustment Begins with Individual-Level Risk Assessment

Risk Assessment creates individual clinical profiles:

- Minimally: Classifies medical codes or drugs into “condition groups or disease groups”; and sometimes,

Risk Adjustment Scores Risk at the Individual Level:

- Calculates relative risk for each condition, interaction of age/gender and co-morbidities
- Predict resource use or events, as dollars, days, visits, admissions, etc.

Risk Adjustment Starts with Risk Assessment

EXAMPLES:

- 1) John Smith
- 2) Dave Wave
- 3) Jane Jonson



EXAMPLE 1

John Smith* – Clinical Profile, Risk Score

Risk adjustment prediction produces one Relative Risk Score and Clinical Profile

Patient ID: 00001
Name: John Smith
Age: 53
Sex: M
Relative Risk Score:
10.94

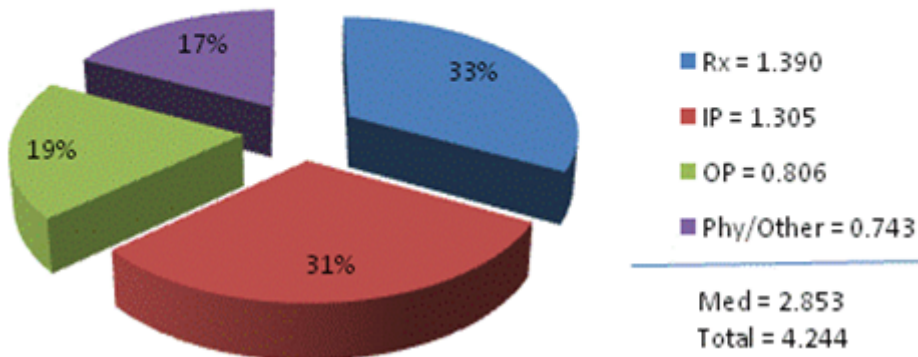
*A DCG-HCC model example

Diabetes with Chronic Complications
x diabetes w/other spec. complications
Chronic Ischemic Heart Disease
x pulmonary congestion/hypostasis
Hypertension
x essential hypertension
x chest pain
Endocrine, Nutritional and Metabolic
x disorders of lipid metabolism
Chronic Ulcer of the Skin
x cellulitis/abscess/other local skin
x disorders of the soft tissues
Bone Joint Infections
x gangrene
Other Lung Disease
x pleurisy/fibroids of lungs

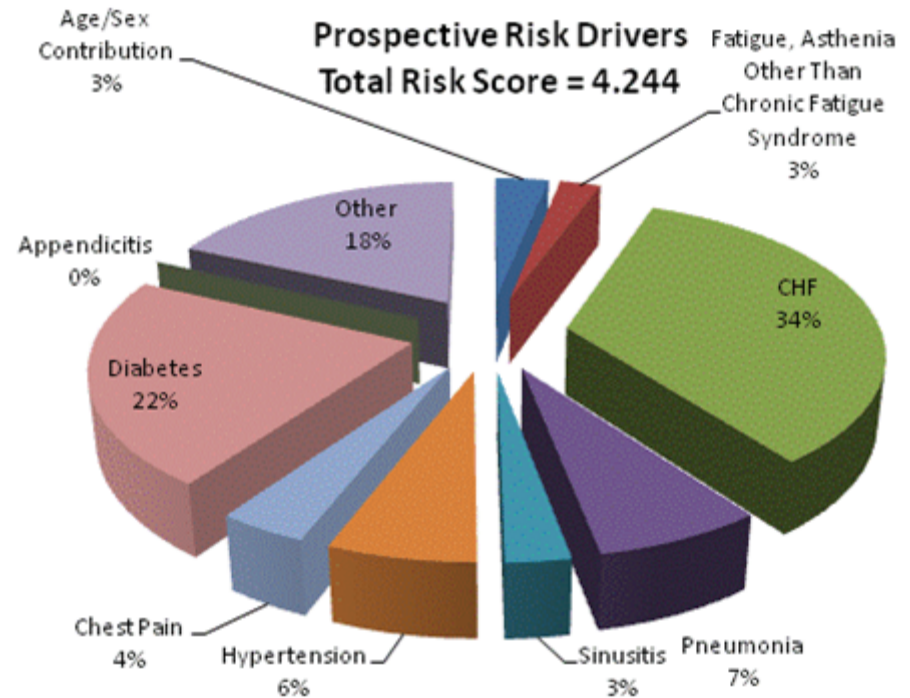
Example 2

Dave Wave's Risk Score Composition –

Risk Score Composition



Example using MARA - Milliman Advanced Risk Adjusters



Example using MARA - Milliman Advanced Risk Adjusters, providing SIX Relative Risk Scores, a Clinical Profile PLUS Conditions Driving Risk

EXAMPLE 1

Jane Jonson* – Risk-based Pharmacy Profile

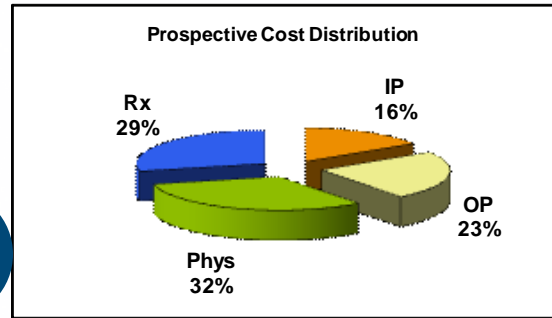
Risk Assessment based on NDC codes from claims

*MARA RxAdjuster - Relative Risk Scores by Category, Subtotal Medical and Total RRS

Demographics

Member ID	467743202
Age	59
Gender	Female
Dependent Status	Spouse
Exposure Months	12
Lag Months	3

Lag
Options
0/3/6



Risk Scores & Annual Cost Estimates

Hospital Inpatient	0.559
Hospital Outpatient	0.828
Physician/Other	1.118
Prescription Drugs	1.006
Subtotal Medical	2.506
Total	3.513
	\$14,582.46

Jane is 3.5 times sicker than average.

Drugs Observed

NDC	Product Name	Generic Name	Category
00149075202	ASACOL	Mesalamine	Inflammatory Bowel Agents
62175044601	PEG 3350 & ELECTROLYTES	K Cl/Na Bicarb/Na Cl/Na Sulf/PEG	Bowel Evacuant Combinations
63304040701	PROCTOSOL-HC	Hydrocortisone	Rectal Steroids
00378041510	ATROPINE SULFATE/DIPHENOXYLATE HCL	Atropine Sulfate/Diphenoxylate Hydrochloride	Antiperistaltic Agents
52152015502	HYOSCYAMINE SULFATE	Hyoscyamine Sulfate	Belladonna Alkaloids
00185070401	BISOPROLOL/HCTZ	Bisoprolol Fumarate/Hydrochlorothiazide	Beta Blocker & Diuretic Combinations
00069307075	ZITHROMAX TRI-PAK	Azithromycin	Azithromycin
00085119701	NASONEX	Mometasone Furoate	Nasal Steroids
00591555250	METRONIDAZOLE	Metronidazole	Misc. Anti-infectives
00597001314	COMBIVENT	Albuterol Sulfate/Ipratropium Bromide	Adrenergic Combinations
00009045003	COLESTID	Colestipol Hydrochloride	Bile Sequestrants
60432053716	NYSTATIN	Nystatin	Anti-infectives - Throat
00046086881	PREMARIN	Conjugated Estrogens	Estrogens
00378050301	BISOPROLOL/HCTZ	Bisoprolol Fumarate/Hydrochlorothiazide	Beta Blocker & Diuretic Combinations

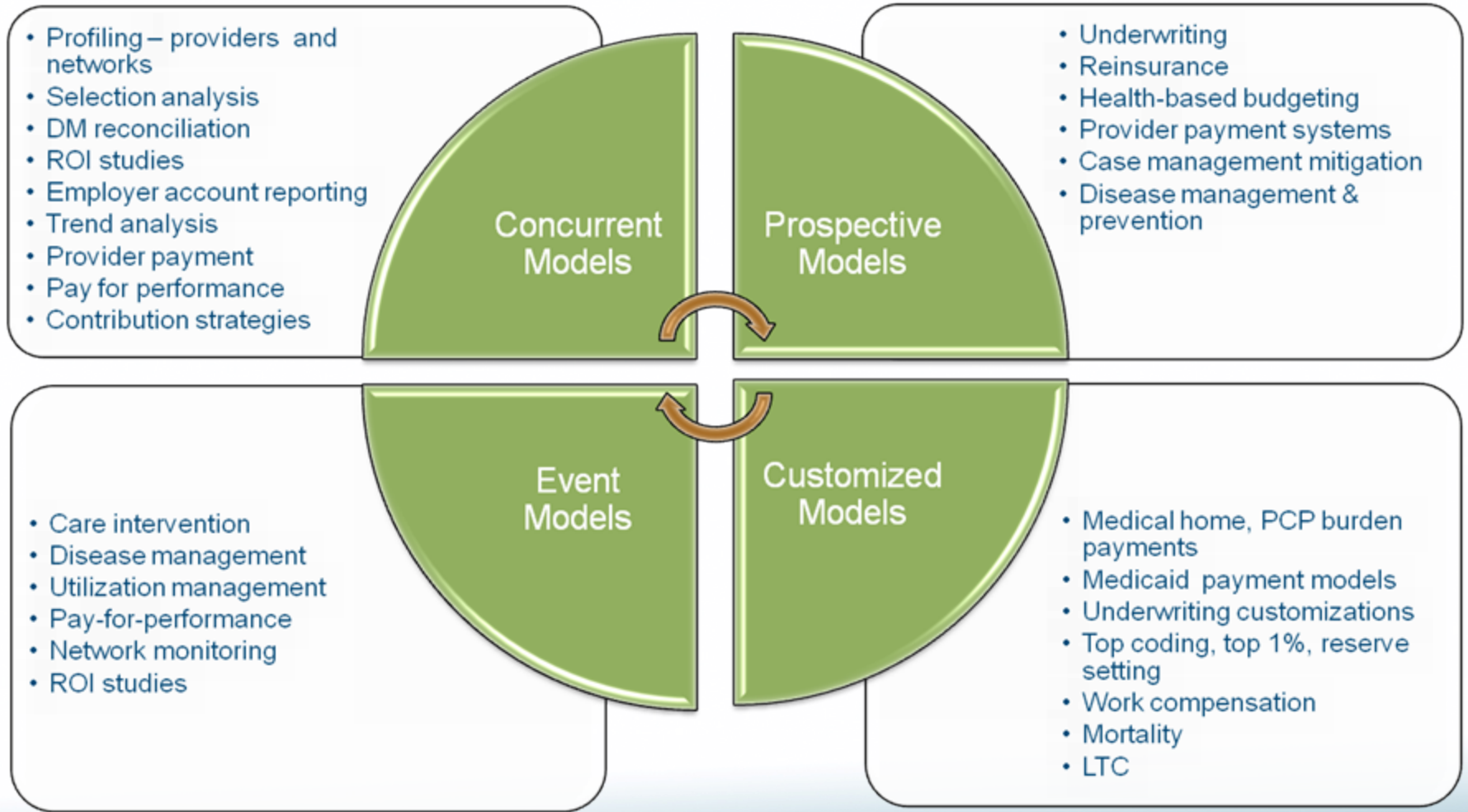
Value of Risk Adjustment

- You can not make fair comparisons from observational data without adjusting for illness burden
- Risk Adjustment is a tool for learning what factors affect outcomes

Beyond Risk Adjustment

- Risk Adjustment may reveal the need for more controlled studies, or more comprehensive observational studies may be needed to resolve remaining questions
- However, more controlled studies may not be practical (or even possible)

Where To Apply Risk Adjustment



Example: To Stratify Members

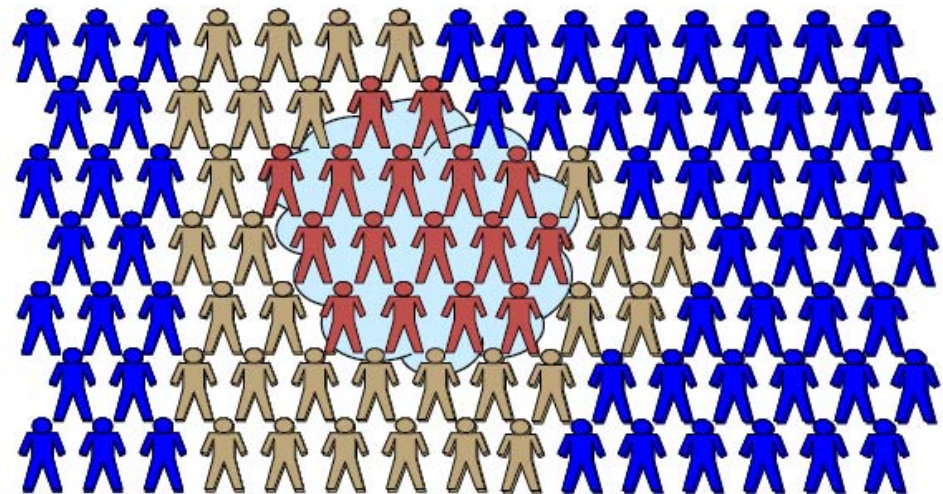
ID	Age	Gender	Individual Relative Risk Scores					
			Total RRS	Pharmacy RRS	SubTotal Medical RRS	Medical Relative Risk Scores		
						Inpatient RRS	Outpatient RRS	Professional RRS
467763702	65	Male	10.6	1.89	8.71	4.14	1.98	2.59
467751001	57	Male	4.09	1.39	2.7	1.04	0.82	0.84
467743202	59	Female	3.48	1.01	2.47	0.55	0.81	1.11
467749501	51	Male	2.08	0.54	1.54	0.48	0.46	0.6
467744301	65	Male	2.1	0.46	1.64	0.45	0.51	0.68
467743302	60	Female	4.03	1.42	2.61	0.42	0.82	1.37
467743301	61	Male	1.61	0.42	1.19	0.4	0.3	0.49
467745113	55	Female	1.54	0.09	1.45	0.39	0.46	0.6
467751002	43	Female	1.32	0.25	1.07	0.25	0.32	0.5
467745112	56	Male	1.01	0.13	0.88	0.2	0.28	0.4
467763701	57	Female	1.63	0.74	0.89	0.18	0.24	0.47
467744302	64	Female	0.8	0.06	0.74	0.17	0.22	0.35
467749502	49	Female	1.85	0.62	1.23	0.12	0.43	0.68
121231000	35	Male	0.24	0	0.24	0.03	0.08	0.13
467751003	19	Male	0.34	0.16	0.18	0.01	0.05	0.12

...and to Identify Populations for Interventions

Assess the health status of the population

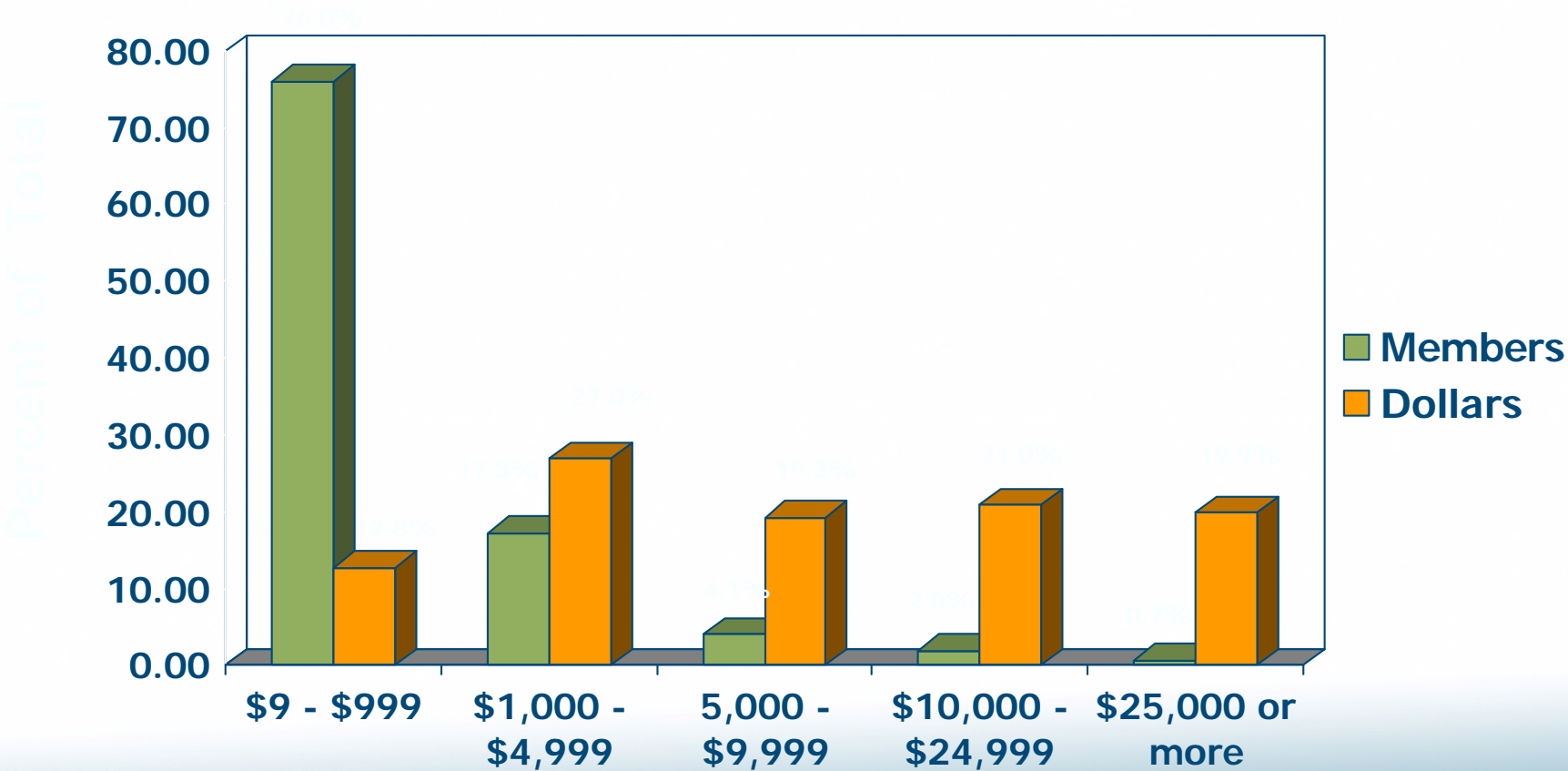
Identify the group of individuals at high risk of future utilization or poor health outcomes

Focus on the subset of people that case managers believe they can impact through a defined intervention



Risk Can be “Binned” by Cost or Severity Categories

To Segment (Stratify) for Pricing, for Case Management, and Profiling



Supports Comparisons of “Groups”

Plans, Employers, Funds, Providers, Cohorts, etc.

- Promotes transparency
- Provides credible and meaningful reports to constituents
- Focuses on variation in resource use and not profits or budget variances
- To understand contributing factors – prevalence of disease and efficiency of care
- Supports peer discussions/education
- For strategic decision-making – benefit changes, carve outs, intervention programs, etc.

Example: Observe Risk by Type of Health Plan, or Benefit Program Supports Risk-based Pricing

The traditional plan attracts a “sicker” than average population who are 37% sicker than the overall population. The POS Plan has the healthiest members.

Information for Pricing or Underwriting

By PLAN	Subscribers	Members	Contract Size	Projected Risk	Projected Rate
ALL PLANS	5,449	15,177	2.00	1.00	\$200
FFS	137	377	2.75	1.37	\$274
PPO	3,453	9,761	2.83	1.02	\$204
HMO	696	1,775	2.55	0.99	\$198
POS	1,163	3,264	2.81	0.89	\$178

Analyze risk in the FFS plan by group

	Subscribers	Members	Contract Size	Projected Risk	Projected Rate
ALL PLANS	5,449	15,177	2.00	1.00	\$200
FFS Members	137	377	2.75	1.37	\$274
Group A	2	4	2.00	7.41	\$1,482
Group B	34	58	1.71	5.14	\$1,028
Group C	15	51	3.4	1.21	\$242
Group D	3	9	3.00	0.84	\$168
Group E	8	19	2.38	0.78	\$156
Group F	17	69	4.06	0.53	\$106
Group G	20	57	2.85	1.00	\$200

Which PHO Cares for a “Sicker” Population?

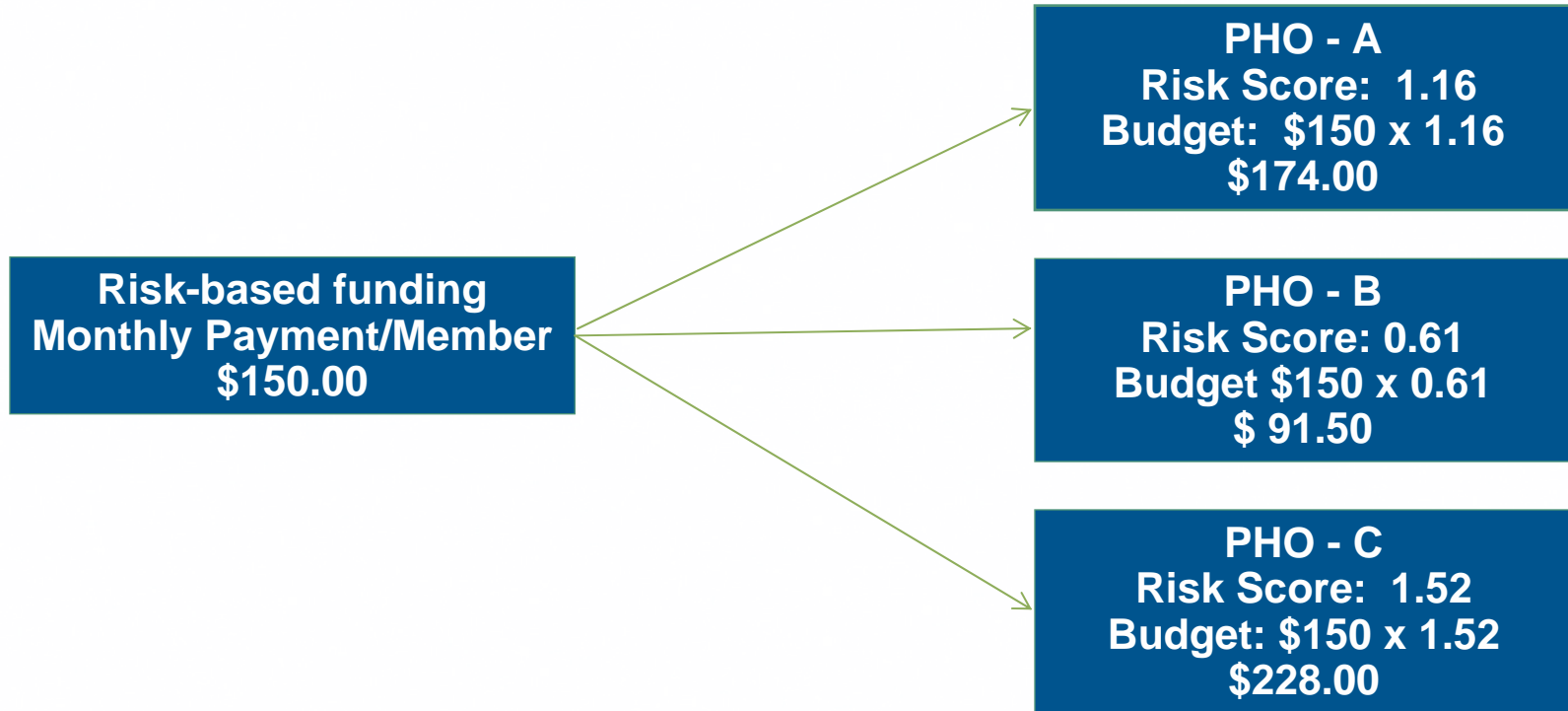
	Total	PHO A	PHO B	PHO C
PMPY Expend 1997	\$1,263	\$1,366	\$1,058	\$2,176
Age/Sex Relative Risk Score	1.00	1.15	0.64	1.22
Relative Risk Score	1.00	1.16	0.61	1.52

How does disease affect risk?

How many patients (per 10,000) have diabetes?

	PHO A	PHO B	PHO C
Diabetes with...			
Chronic Complications	16	8	169
Acute Complications	21	12	141
No Complications	166	68	410

Risk Adjusted Funding – risk selection impacts funding



* This example is for illustration purposes only. Funds would not be distributed based purely on risk scores. A number of actuarial adjustments would need to be made to account for benefit designs, trend, performance programs, carve-outs, stop-loss, reinsurance, etc.

From Risk Assessment to Risk Adjustment

Implementing Risk Adjustment – Applications and Uses of Risk Adjustment

RISK ADJUSTMENT MUST BE CONTEXT SPECIFIC

- For what purpose?
- Risk of what outcome?
- Over what time frame?
- For what population?
- With what data?

- Liza Iezzoni, MD

Source: Iezzoni, L. Risk Adjustment for Measuring Health Care Outcomes. Health Administration Press, Chicago, IL, 1997.

RISK ADJUSTMENT MUST FIT THE PURPOSE

- Consider Strengths & Weaknesses for each application
 - Risks that may be caused by the model
 - Completeness of the model, design
 - Stability of the model over time
 - Frequency and reliability of model updates
 - Costs of managing the model
 - Support to simulate, implement, educate and on-going use which may include recalibration, or customization

Context: Defining the Purpose

- To compare provider panels requires assessment of patients who make up the providers practice
- To compare risk by region requires identification of individual's residence, such as zip code
- To compare selection among health plans, such as HMO, PPO, POS, etc., risk is assessed and sorted by “plan type”
- Comparing patients who opt-in or –out of disease management programs, group by

Context: Defining the Outcome

What should the model predict:

- This year? Future Period?
With/without Lag?
- Risk relative score as compared to a benchmark?
- Dollars?
- Days?
- Visits?
- *Etc.*

Context: Time Frame

- **Concurrent** models use data from a particular year to predict the outcome for that *same* year
 - Predictions are based on episodic and chronic conditions
 - Used for profiling and outcomes analyses

- **Prospective** models use data from a particular year to predict outcomes the *following* year.
 - Predictions are based on chronic conditions.
 - Used for payment, budgeting, risk stratification, pricing, budgeting.

Context: Population

- Is there sufficient population for analysis to be meaningful, are “groups/panels” of sufficient size)
- Who will be assessed?
 - An entire population (everyone, regardless of coverage)
 - Commercially Insured
 - Medicaid (all, FFS, MCO, TANF, SSI, SHCIP)
 - Medicare (FFS, Medicare Advantage)
 - Uninsured (individuals, groups, special populations)
 - Disease subsets (intervention carve outs)

Context: Available Data

- Is there sufficient population for the analysis to be meaningful, are “groups/panels” of sufficient size)
- What are the data sources?
 - Administrative claims and enrollment data?
 - Pharmacy data?
 - EMR data (but what about eligibility data)?
 - Survey data

Medicaid Applications

- Academic studies, actuarial analysis, state and plan experiences in Medicaid managed care demonstrate that where states operate competing FFS plan types, variations in selection, or member risk varies when compared to managed care plans.
- Some of the variation can be explained by the type of provider networks offered by health plans in a given geographic area.
- Risk adjustment can improve the fairness of the state's capitation rate setting system
- Risk adjustment promotes plan and provider participation to serve a disproportionately sicker population

Since 2000...

Risk Adjustment for Medicaid

“Among people with disabilities, health expenditures are strongly related to recent diagnoses, and health plans are well aware that attracting too many people with costly problems can lead to large financial losses. If a State Medicaid program does not pay more to health plans whose members have above average levels of need, it will penalize plans attractive to people with greater needs and jeopardize quality of care. The greater predictability of expenditures among people with disabilities compared with a general population both increases the importance of health-based payment and makes it easier to do well.”

Richard Kronick, Ph.D., Todd Gilmer, Ph.D., Tony Dreyfus, M.C.P., and Lora Lee, M.S., Health Affairs, Spring 2000

Medicaid - Early Adopters

- Early adopters (states and health plans) experienced implementation challenges
- Incomplete coding, incomplete claims reporting (encounters), incomplete record storage
- Surprising results – material swings in risk, some due to changes in coding, or stability of the risk adjuster used, caused rate setting challenges and barriers to adoption
- A realization of the complexity and technical expertise required to successfully implement and apply risk adjustment

Ten years later...

- Risk adjustment is the predominant model for Medicare, Medicaid, Uninsured (states) and a growing list of health exchanges, ACOs, and plan-provider arrangements
- Used for strategic planning, budgeting, payment, profiling, care management and performance measurement
- Implementation issues prevail – learning curve is steep, picking the right risk adjuster still a huge concern, success stories still being written.
- Data are improving, and
- Risk adjustment models are improving

Lessons Learned

- Complete and valid data from providers to health plans' and the risk adjustment administrator's subsequent use of the data is essential. Stakeholders are better positioned to drive cost control and quality initiatives when data strengths and weaknesses are known in advance.
- States should work closely with health plans throughout the preparation and implementation phases.
- Simulations should be run to avoid surprises or business disruptions in the implementation. Data anomalies will be identified during simulation, some of which may not be easily remedied, but accounted for in the roll out.

Lessons Learned cont.

- Model “fit” is an important selection criteria. (does the model accurately describe risk for the target populations?)
- Model selection *should not* be based solely on the cost of the risk adjuster.
- Recognize that risk adjustment is part of a larger programming context, with complex financing and adequate measurements put in place to monitor changes in risk, trend and selection. The goal is to drive better quality care, and control costs for all residents.
- Risk adjustment alone does not solve rate inadequacy.

Model Selection – Evaluating Performance



Milliman - SOA Study 2007 Comparative Study of Risk Adjustment Tools

Offered, Prospective, Non-lagged, without Prior Costs, R-Squared and MAPE% for 250K Truncation Level

		R-Squared	MAPE%
Risk Adjuster Tool	Inputs	250K	250K
Milliman Advanced Risk Adjusters DxAdjuster	Diag	24.90%	86.40%
ACG	Diag	19.2%	89.9%
CDPS	Diag	14.9%	95.3%
Clinical Risk Groups	Diag	17.5%	90.9%
DxCG DCG	Diag	20.6%	87.5%
Milliman Advanced Risk Adjusters RxAdjuster	Rx	21.40%	83.10%
DxCG RxGroups	Rx	20.4%	85.3%
Ingenix PRG	Rx	20.5%	85.8%
Medicaid Rx	Rx	15.8%	89.6%
Milliman Advanced Risk Adjusters CxAdjuster	Med+Rx	28.80%	83.10%
ImpactPro (Ingenix)	Med+Rx+Use	24.4%	81.8%
Ingenix ERG	Med+Rx	19.7%	86.4%
ACG w/Prior Cost	Diag+\$Rx	N/A	N/A
DxCG UW Model	Diag+\$Total	N/A	N/A
MEDai (Service Vendor)	All	N/A	N/A

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NOTE: Higher R-Squared is better; Lower MAPE% is better

Model Evaluation

Deciding on the best fit for the purpose and population

R-Squared – Performance Measure

Simulation with 2 models	MA Medicaid FFS	MA Medicaid MC
DxCG DCG/HCC for Medicaid	25.21%	26.62%
CDPS unrecalibrated	2.42%	5.28%
CDPS recalibrated	17.74%	19.95%

The SOA 2007 Risk Adjustment Report has a similar finding.

Source: Ehcca, 2008, Risk adjustment and predictive modeling for Medicaid, Rong Yi, Ph.D.

Summary

- Risk Adjustment Starts with assessing individual risk
- Risk Adjustment is essential to be successful in today's medical care financing
- Pick your Risk Adjustment method carefully
- Context – purpose, data, outcome, population, timeframe, model fit



QUESTIONS?

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