



## *Risk Adjustment and Reinsurance Regional Collaborative*

August 9, 2012  
2:00 – 3:00 PM



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### **Agenda**

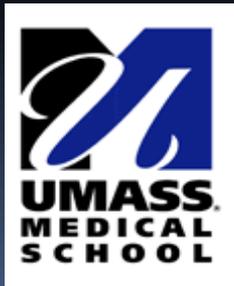
- **2:00-2:05 PM – Welcome, Introductions and Review Agenda - *David Huffman, NESCSO***
- **2:05-2:15 PM – APCD Progress: State Spotlight – *Stefanie Pawluk, New York***
- **2:15-2:45 PM – Presentation on Approaches to Risk Adjustment – *Dr. Arlene Ash, UMass***
- **2:45-3:00 PM – Discussion, Open Forum, & Next Steps - *Kim Paull, Rhode Island***

# *Approach to Risk Adjustment*

**Arlene S. Ash, PhD**

University of Massachusetts Medical School  
Department of Quantitative Health Sciences

August 9, 2012



# Who Am I?

- Math PhD in health services research (HSR)
- 20+ yrs @ BU in Medicine & Public Health
- Developed models used by CMS to make fully capitated payments in Medicare Advantage
  - With Randy Ellis, PhD, BU health economist
- Founded DxCG, Inc.
  - Has become Verisk Health, with which I consult
- Since 2009, Professor and Division Chief in Quantitative Health Sciences (QHS) at Univ. of Massachusetts Medical School, Worcester, MA
  - <http://www.umassmed.edu/QHS>
  - Director of UMass CCTS Biostatistics, Epidemiology and Research Design (BERD) key function committee

# Problem - “Cherry Picking” Patients

- A provider can look good by avoiding sick patients and taking on healthy ones
- A provider can look bad due to high expenses and poor outcomes from taking on more difficult patients
- Without adjusting for illness burden or “needs”, the most needy consumers will be underserved

# How to Adjust for “Needs”?

- Calculate, *for a specific panel of patients*,
  - What resource use is expected for, e.g.,
    - Total cost
    - Comprehensive primary care (in a PCMH)
    - Hospital care
  - What outcomes to expect under good care, e.g.,
    - Emergency department use
    - Mortality
    - Diabetic control
- Such calculations, at the individual level, are commonly called risk adjustment

# What is Risk Adjustment?

- Risk adjustment refers to the process of quantifying differences in health status among populations
  - When setting budgets or capitation rates, evaluating provider performance, or assessing outcomes of care
- This can also be called “case-mix adjustment”

# Why Risk-Adjust?

- Finite budget for health care services
- Resource allocation
- Health risk of population influences cost of services
- Variation in illness burden of patient panels explain why a provider's costs differ from peers
  - Responds to "my patients are sicker"

# What Factors Does Risk Adjustment Include?

- It currently includes:
  - Age, gender
  - Morbidity (based on diagnoses recorded in administrative claims)
- It may also include a fuller spectrum of important risk determinants:
  - Education level
  - Primary language
  - Race/ethnicity
  - Socioeconomic status (e.g., income, homelessness)
  - Health literacy

# What it does not and should not include.....

- Provider propensity to treat
  - Procedure codes
  - Drug codes
- Consumer propensity to seek care
- Contracting (pricing per unit of care)

# Deliberate Alignment of Model Design with Intended Use

- Predictions based on morbidity/wellness
  - E.g., morbidity captured by recorded diagnoses
- Not “contaminated” by variables that reflect provider practice patterns or fee structures
  - E.g., discretionary treatments, prior cost
- Contaminated variables create perverse incentives for over- (under-) supply of services

# Use Example – Without Risk Adjustment

Provider	Actual Cost/Patient	Predicted Cost/Patient	Ratio (Actual/Expected)
Dr A	\$4,190	\$3,950	1.06
Dr B	\$4,840	\$5,925	0.82
Dr C	\$4,270	\$3,710	1.15
Dr D	\$10,275	\$11,350	0.91
Dr E	\$7,328	\$6,540	1.12

Provider A is least expensive; whereas Provider D is most expensive

# Use Example – With Risk Adjustment

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Provider B is most efficient; whereas Provider C is least efficient

# Medical Classification: Data Sorting Before Risk Modeling





# What Does the DxCG Medical Classification System Do?

- It groups diagnoses codes in medical condition classes
- It segregates chronic versus non-chronic codes
- It finds the most significant level of a condition in a well-defined period of time

# The DxCG Medical Classification System Provides the Framework for Risk Adjustment

- Refined from what was originally developed for the Medicare program
- Validated by independent researchers as robust and predictive
- Diseases and health conditions (ICD codes) are organized using Hierarchical Condition Categories (HCCs)

# Principles for Classifying

- Condition categories (CCs) should:
  - Be clinically meaningful
  - Predict health care resources/costs
  - Include all ICD codes
  - Have adequate sample size
  - Encourage specific coding
  - Not reward coding proliferation
  - Not penalize for recording an additional diagnosis
  - Use hierarchies within related conditions



# RISK ADJUSTMENT MODELS - OVERVIEW



# Large Benchmark Database Used for Calibration

- Thomson Reuters MarketScan data
- Year 2007
- N = 20 million
- Representative of US regions and plan types



# Model Inputs

- Base period information (predictors)
    - Demographics including age, sex
    - Diagnoses from inpatient and outpatient encounters with all clinically trained professionals
  - Prediction period costs
- 



# Top-coding

- Assign a maximum actual spending limit
  - Reduce the influence of individuals with extreme expenditures when calibrating models
- 

# Underlying Model Structure

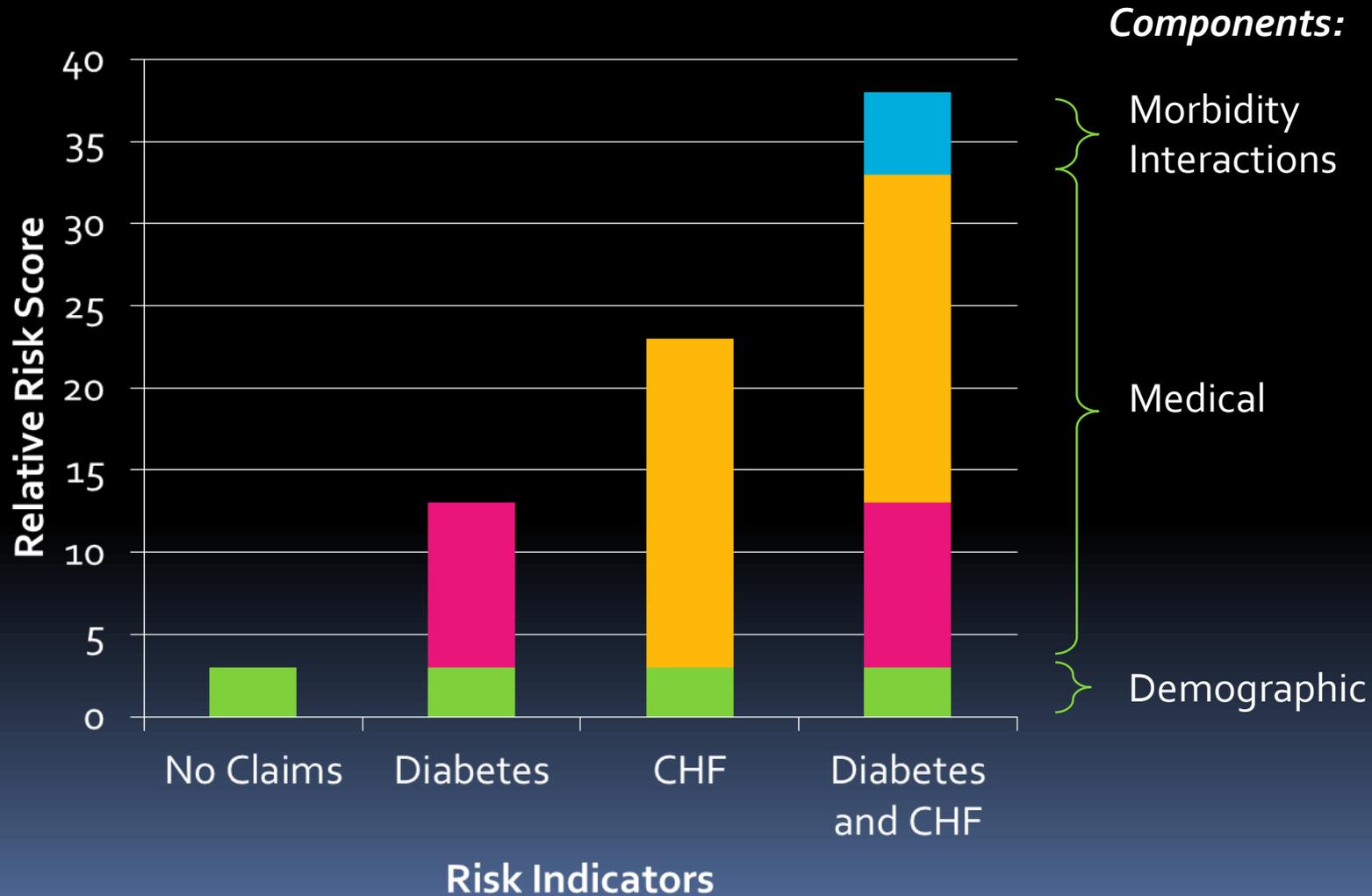
$$\text{RRS} = A + \text{RiskIndicator}_1 * \text{RiskWeight}_1 + \dots$$

*A* Intercept

*Risk Indicator* Demographic characteristics  
Clinical conditions (HCC)  
Disease interactions  
Age x disease interactions

*Risk Weights* Incremental risk assigned based upon the presence of a particular risk indicator

# Accruing Risk Weights



# Relative Risk Score

- Measure of resource use relative to the benchmark sample
  - A score of 1.00 represents the average annual resources for a member in the benchmark population
  - An individual with Relative Risk Score (RRS) of 6.35 is predicted to spend 6.35 times more in *annual* resources compared to the average person in the benchmark sample
- A score may be converted easily to a dollar prediction
- Clients may “normalize” scores and reference them to their own population average

# What is a Relative Risk Score?

- Measure of medical and/or pharmacy resources expected to treat a member with a particular health profile for one year.
- 1.00 indicates average resource consumption.



Member Profile

Demographic

Medical

Relative Risk Score

Medical Risk  
= 0.975

Jane is predicted to use 2.5% less medical resources than average

# Individual Profile



## Risk Adjustment

Age and Gender	3.250
All Medical	10.975

## Enrollment Information

60 Years Old

Male

Full Year of Enrollment

## Medical Claims

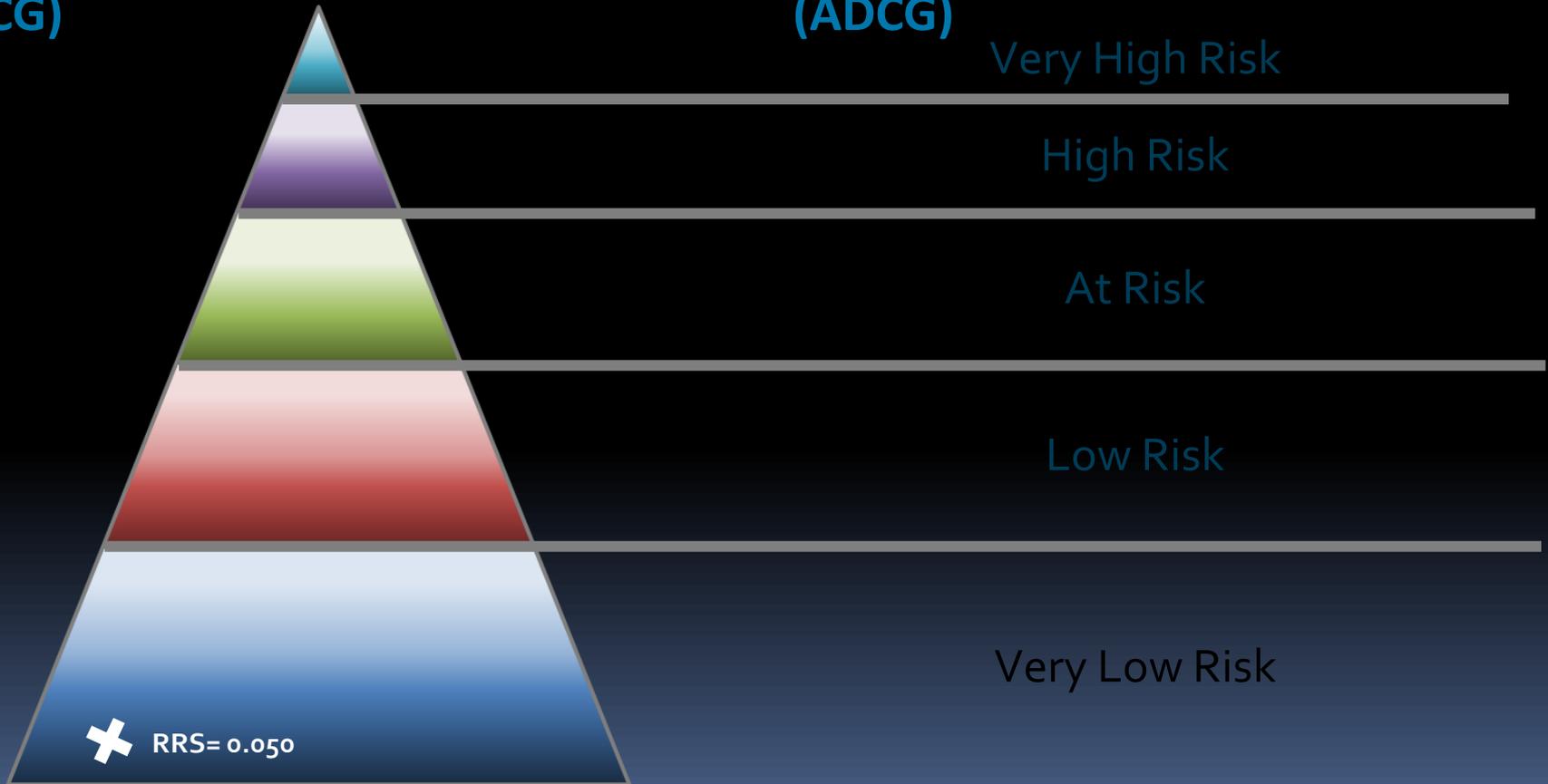
Regular Check Up \$100  
Uncomplicated Diabetes  
Congestive Heart Failure  
Diabetes w/ Renal Manifestation

Hospital Admission \$5,200  
Diabetes w/ Acute Complications  
Various Lab Tests  
Hospitalized for 3 days

# Severity Stratification

DxCG Cost Group  
(DCG)

Aggregated DxCG Cost Group  
(ADCG)



# In Summary

- Risk models are needed to distinguish more complex patient panels from healthier ones
- Claims data can be used to build “strong,” clinically-credible risk models
- I was a lead developer for Medicare’s risk tool (CMS-HCC)
  - I have worked in risk modeling and payment reform since 1984
  - Verisk Health licenses DxCG models that I helped develop
- DxCG-HCC models are more powerful and more versatile than the CMS-HCC model
  - I continue to consult for Verisk
- Good risk models are only part of the puzzle that must be solved
  - I am happy to share my expertise to help improve health care payment, health care and health

Thank you, Arlene Ash



## *Discussion, Open Forum & Next Steps*



***Thank you!***

*Join us, your peers, and thought leaders in public and private sectors of healthcare from across the nation at the 2012 Medicaid Enterprise Systems Conference (formerly known as the MMIS Conference) August 19-23, 2012 in Boston, MA.*

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