Predictive Modeling in Medicaid

Thomson Healthcare's Expertise and Practical Application

Overview

- Context
  - What is Predictive Modeling?
  - Practical Applications of Predictive Modeling
- How it Works
  - Predictive Modeling Basics
  - A Useful Approach to Predictive Modeling and Targeting
- Case Studies: Applications in Medicaid
- Future Directions

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What is Predictive Modeling?

- Use of demographic, diagnostic, and utilization information, with analytic models to predict:
  - Beneficiaries who will be high-risk in the future
  - Future costs, and
  - Future utilization

… in order to better intervene, manage risk, ensure quality and set rates

* The use of health risk prediction methods based on administrative data continues to grow, especially with the growth of consumer-driven healthcare.

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Practical Applications of Predictive Modeling

- Proactive Medical Management
- Identify high cost beneficiaries
- Health Plan Comparison
- Rate Setting
- Provider Profiling
- Health Plan Reporting

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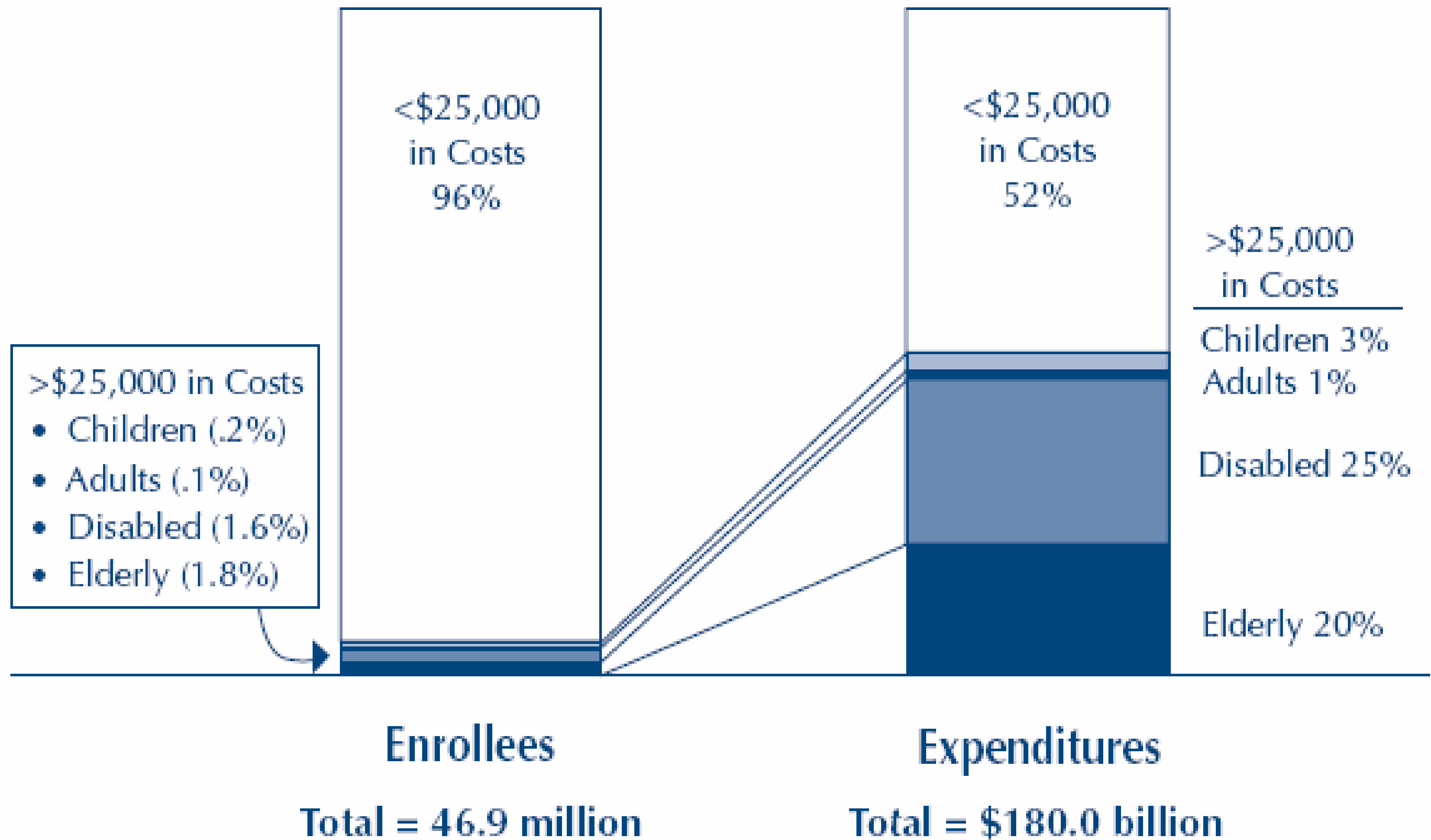
4% of the Medicaid Population Accounted for 48% of Expenditures in 2001



Source: Kaiser Commission on Medicaid and the Uninsured, Profiles of Medicaid's High Cost Populations, December 2006

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DCGs

- Thomson currently utilizes Diagnostic Cost Groups (DCGs)
  - DCGs are a population-based classification and risk adjustment methodology
  - Developed and licensed by DxCG® Inc.
  - Selected by CMS for the Medicare Choice Program

DCG Models in Advantage Suite

Population Group	Variant
Medicare	All - encounter
Medicaid	All - encounter
Commercial	All – encounter
	Rx Groups – Rx/Inpatient
	Rx Groups – Rx Only

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The DxCG models work by:

- Classifying raw administrative (medical and/or pharmacy claims as well as eligibility) data into coherent clinical groupings
- Applying clinically valid hierarchies and interactions to create an aggregated, empirically valid patient score at the individual beneficiary level
- Correlating the scores with the cost of the health burden carried by the beneficiary
- Aggregating individual scores by groups of interest creates group-level predictive results specific to many Medicare/Medicaid applications

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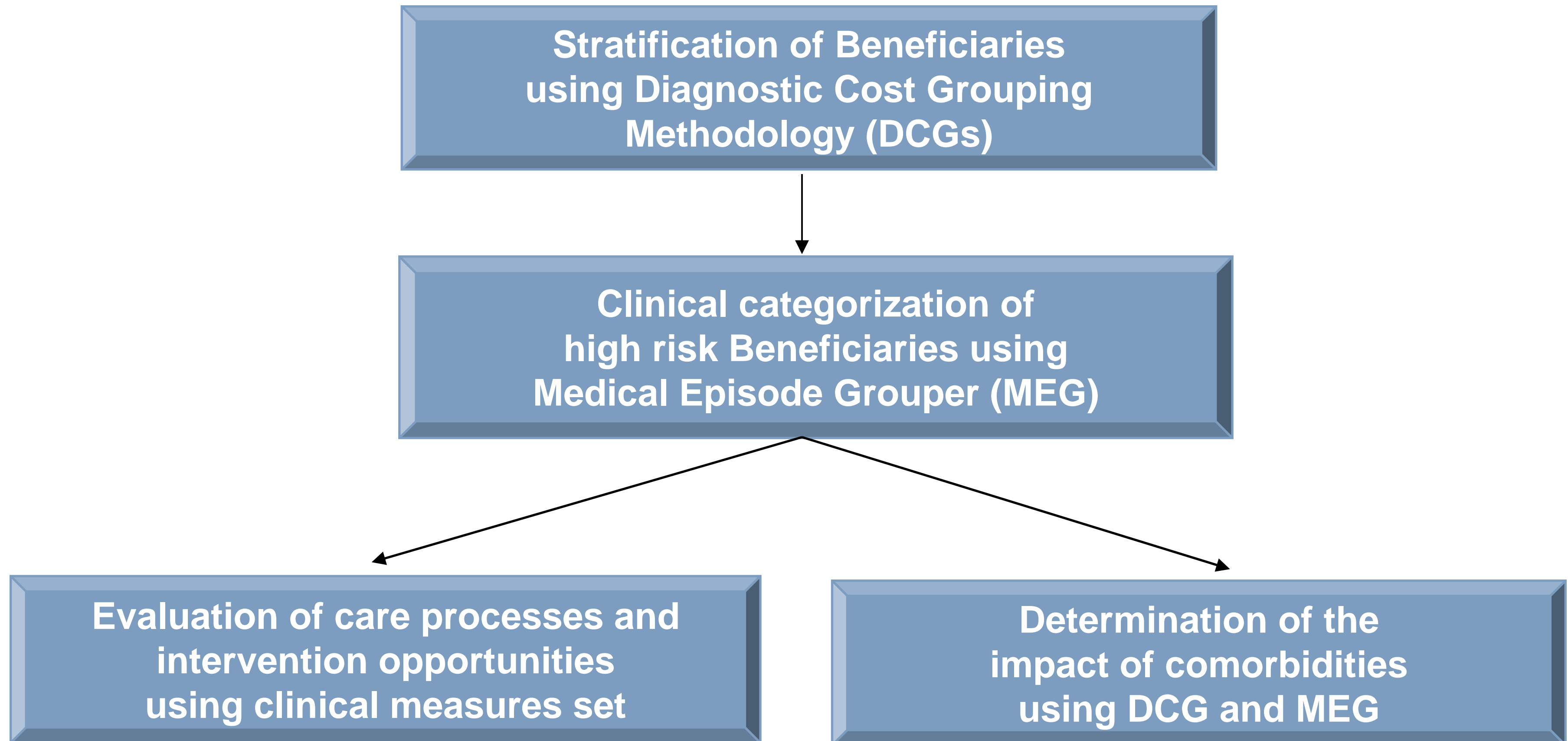
A Useful Approach to Predictive Modeling and Targeting



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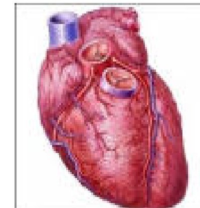
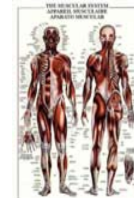
Using Methods Together

How sick is my population?- Now & Future	**DCG**	
How sick is this person?- Now & Future	**DCG**	
How severe is the episode?	**DS/MEG**	
How complex is the episode?	**DS/MEG/DCG**	

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Case Studies

Applications in Medicaid

Case Study #1:
Proactive Medical Management

- Keystone Mercy Health Plan – a Medicaid Health Plan, with ~320,000 beneficiaries
- Goal was to develop a Complex Care Management Program (CCMP) for its sickest beneficiaries
- Utilized DCGs to determine a targeted population (n = 14,568)
  - 15% total medical and pharmacy costs
  - Higher than average utilization for all settings
  - 68% of target population had 2+ chronic conditions
  - Mean risk score = 418 (Plan average was 100)

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Case Study #1: Proactive Medical Management (cont.)

- Thomson Healthcare and KMHP developed a Pre/Post 12-month to 12-month comparison analysis
- Results:
  - Total costs decreased $44.49 pmpm (-4%)
    - Medical costs decreased $68.46 pmpm (-7%)
      - Inpatient costs decreased $60.21 pmpm (-11%)
    - Pharmacy costs increased $23.98 pmpm (+10%)
  - Utilization changes
    - Admissions/1000 decreased 13%
    - ER visits/1000 decreased 3%
    - PCP visits/1000 decreased 2%
    - Prescriptions/1000 increased 3%

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Case Study #2: Identifying High Cost Beneficiaries

- A dialysis services company in partnership with CMS for an End Stage Renal Disease (ESRD) Disease Management demonstration program
- Goal was to identify:
  - Who do they serve (population and prevalence analysis)?
  - What is wrong with the population (comorbidity analysis)?
  - What are services are we providing them?
  - Is the care making any difference?
- Maximum RRSc = 24.34, mean RRSc = 4.27
- RRSc of 1.00 = $6,477
- Results: Information allowed customer to stratify patients based on severity to allocate resources.

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Case Study #3:
Health Plan Comparison

- A state Medicaid agency wanted to better understand how the level of beneficiaries' health risk relates to plan costs.
- Thomson Healthcare used DCGs and Advantage Suite to perform comparisons between FFS, PPO and self-insured HMO's plans to support decisions for a new rate structure.
- The indemnity plan had the highest illness burden, while the self-insured HMOs have the lowest illness burden.
- Cost differences among the plans are generally consistent with beneficiaries' health risk.
- Results: Analysis allowed for the development of risk-adjusted rates for rate setting more appropriate to who the plan was actually serving.

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Case Study #4:
Rate Setting

System Wide
Monthly Revenue per Beneficiary
$105.17

Provider Group A
Relative Risk Score: 1.16
Budget: $105.17 x 116/100
= $122.00

Provider Group D
Relative Risk Score: 0.61
Budget: $105.17 x 61/100
= $64.15

Provider Group E
Relative Risk Score: 1.52
Budget: $105.17 x 152/100
= $159.86

*Further adjustment needed for withholds, reinsurance,etc.

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Case Study #5:
Health Plan Reporting

- A State Medicaid agency, with more than 2 million beneficiaries routinely produces an health plan reporting package twice a year.
- Goal was to augment health plan reporting to include more clinical and predictive modeling information.
- Thomson Healthcare and the State Medicaid agency used Advantage Suite and DCGs, in determining plan risk, comparing risk to other health plans and assessed the sickness of individual beneficiaries.
- Results: The State Medicaid agency was able to more effectively monitor the effectiveness of the health plans that they currently contracted with.

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Predictive Modeling in Program Integrity

- There is no application that can "predict" future fraud and abuse
  - Providers and Beneficiaries cannot be prosecuted for future possibilities
- When are Program Integrity and Predictive Modeling linked?
  - By looking at past experience states can predict which types of provider services, which regions of the state, or other variables that predict more likely yields of fraud or abuse cases
    - This type of predictive modeling definition is currently being popularized in law enforcement for deployment of police to areas of the city that have a history of particular crimes at particular times.
  - Compiling several red flags or indicators of potential F&A and applying a score to a provider over the multiple indicators
  - Prepayment flags that scored providers in various levels of upcoding, unbundling, or improper billings only look at incoming claims and don't look at the whole picture of paid claims across all databases
  - Prepayment Editing predicts inappropriate billings and denies the claims before payment

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New Concepts in Medicaid Predictive Modeling

Severely disabled and chronically ill
(Waiver eligibles)

High healthcare costs

+ Waiver service costs *

Total Medicaid Cost

* Personal supports
Household adaptations
Chore services
Transportation
Service managers
Others

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New Concepts in Medicaid Predictive Modeling, cont.

Severely disabled and chronically ill

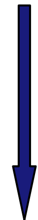
Predicting healthcare costs

Health Risk Variables:
Age/Gender
Primary Diagnosis
Secondary Diagnoses
Prescription Drugs
Others

Applied using:

DxCG
Disease Staging
Other models

Clinical risk score

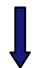


Predicting waiver service costs

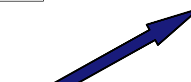
Other Risk Variables:
Cognitive deficits
Sensory deficits
Functional deficits
Socio-demographics
Informal supports
Other factors believed to be explanatory

Applied using:

National standard assessment tools



Ratings



Empirical models

Predict outcomes & cost

Person-specific

For example,

- **Lifetime cost**
- **ECF likelihood**

Population-wide

For example,

- **ECF beds needed**
- **Disease rates**
- **Frailty rates**

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