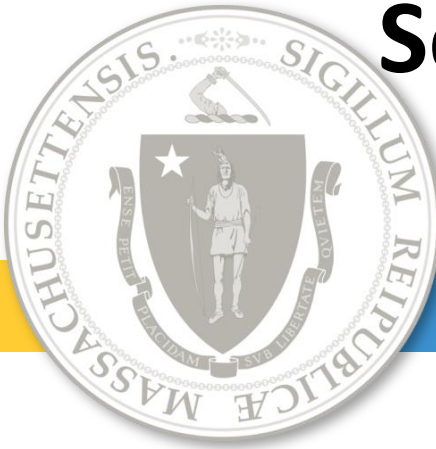# MassHealth
Risk Adjustment Model
Social Determinants of Health

Executive Office of Health & Human Services

October 14, 2016

Agenda for today

- Purpose of Today's Meeting

- Introduction of Principal Investigator

- Discussion of New Model

- Specific Topics Related to the New Model

- Questions

Purpose of Todays Meeting

➢ Present the development and the results of a new Risk Adjustment Model for Delivery Reform

➢ The new model incorporates several variables intended to capture the impact of social determinants of health on medical expense

➢ To be used for Total Cost of Care:
  ○ MCO rate setting
  ○ ACO rate and target setting

➢ Total Cost of Care includes all services covered in the MCO and ACO contracts

Introduction of Principal Investigator

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Discussion of New Model

- Objective: The MassHealth Social Determinants of Health project was to improve its DxCG medical-risk-based risk adjustment model by adding Social Determinants of Health (SDH) data

- Key Product: The new model predicts costs from
  – DxCG relative risk score and age-sex indicators
  – Markers for unstable housing, disability, agency relationships, SMI and substance use disorders
  – A summary measure of "neighborhood stress" based upon residence in a census block group

- We continue to conduct research in this area and expect to further improve the model over time

Specific Topics Related to the New Model

- New vs Old

- Modeling Approach

- Population Cost Characteristics

- Model Building

- Neighborhood Stress Score

- Illustration

New Versus Old

- Increments to payment for
  - Children
    - Mean payments now exceed costs by 11%
    - They are 33% higher than with the previous method
  - Categories of disability
  - Those with serious mental illness (SMI) and substance use disorders (SUD)
    - Mean payments are now 1% higher than recorded costs for those with SMI and 8% higher for SUD
  - Housing issues (personal & neighborhood-based)
- R^2 = 58% (concurrent), increase of > 10%
  - Est'd R^2 (when applied prospectively) ~ 38%

Modeling Approach

- Data
  - Calendar year 2013 PCC and MCO "claims" and administrative records
  - Use PCC member data as the development sample for "MCO" payment models

Modeling Approach

- Analyses
  - **Population**: members enrolled for at least 183 days
  - **Concurrent modeling**: use risk factors measured in one year to predict costs in the same year
  - **Outcome**: costs to be included in 2017 "global" payments, annualized then top-coded at $125,000
  - **Weighted regression**: weight = fraction of the year enrolled

Population Costs and Characteristics

	PCC CY2013			MCO CY2013		
Members	357,660			524,607		
Member years (11.2 mos PMPY in each program)	326,501			480,389		
Population statistics	**Mean**	**SD**	**Median**	**Mean**	**SD**	**Median**
Age in years	26.1	18.6	22.0	21.6	17.0	22.0
Top-coded COST*	6,371	12,913	2,038	5,179	11,004	1,811
Modeled COST**	**5,590**	**11,684**	**1,719**	**4,694**	**10,395**	**1,475**
Relative Risk Score (RRS)	1.16	2.29	0.42	0.89	1.88	0.33

* Prior to top-coding, costs are 1.8% and 3.9% higher than these, respectively

** **Modeled COST** has further removed costs that will be paid outside of the bundle, including those for most long-term supportive services (LTSS)

Model Building

- **DxCG v4.2 concurrent Medicaid RRS**
- **Age Specific Indicators**
  - 10 age categories (0-1, 2-5, 6-12, 13-17, 18-24, 25-34, 35-44, 45-54, 55-59, 60+), separately for male and female
- **Disability**
  - Department of Mental Health (DMH) client
  - Else, Department of Developmental Services (DDS) client
  - Else, Entitled to Medicaid due to disability

Model Building

- **Behavioral Health**
  - Serious Mental Illness, Substance Use Disorder
- **Housing Issues**
  - People with 3 or more addresses in a single calendar year **OR** with a V-code for homeless indicated on a claim or encounter record
- **Neighbor Stress Score**
  - A composite measure of "financial stress" from census data associated with addresses geocoded to the census block group (CBG)

Neighborhood Stress Score

- A measure of "economic stress" summarizing 7 census variables identified in a principal components analysis:

    % of families with incomes < 100% of FPL

    % < 200% of FPL

    % of adults who are unemployed

    % of households receiving public assistance

    % of households with no car

    % of households with children and a single parent

    % of people age 25 or older who have no HS degree

- NSS7 is standardized (Mean = 0; SD = 1)

New Model Illustrative Numbers

Variable	% of population with this characteristic (CY13)	Average cost of members in cohort*	Model coefficient, as compared to 1.0 average risk	Approximate incremental add for members in cohort*
All Managed Care		$5,000		
NSS7, standardized			0.01	$50
DMH client	0.4	$29,700	2.73	13,650
Not DMH but DDS client	1.1	11,450	0.51	2,550
All other disabled	10.7	13,650	0.28	1,400
Homeless, by ICD-9 coding^	0.02	29,050	0.11	550
3+ addresses in a year	11.5	7,400	0.11	550
Serious mental illness (SMI)	10.2	16,900	0.45	2,250
Substance use disorder (SUD)	6.2	15,300	0.40	2,000

*Assumes an average annual cost of 5,000 per member

Changes for Kids and LTSS Users

- **Kids**
  - **Old**: actual costs for kids (age <18) *exceeded* predicted costs by about 25%.
  - **New**: actual costs are ~10% *less than* predicted
- **LTSS Users**
  - LTSS can be difficult to address through risk adjustment
  - Current risk adjustment is for a payment model targeted towards the MCO scope of services, excluding many LTSS services such as PCA and Adult Day Health
  - We are committed to identifying an approach that will allow for including such costs in future bundled payments

Thank you
I am happy to take your questions

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on behalf of the UMass Medical School research team

SMI and SUD definitions use DxCG Condition Categories

Serious mental illness (SMI)

HCC Description

160 PSY.15 Acute Paranoid Reaction and Confusion

161 PSY.20 Schizophrenia

162 PSY.30 Other Nonorganic Psychosis

163 PSY.40 Delusional Disorder and Paranoid States

166 ANG.20 Bipolar Disorder

168 ANG.40 Major Depression

Substance use disorders (SUD)

HCC Description

148 SAD.15 Drug Induced Hallucinations, Delusions, and Delirium

149 SAD.20 Withdrawal and Other Specified Drug-Induced Mental Disorders

150 SAD.30 Drug Dependence

151 SAD.40 Drug Abuse without Dependence, Except Alcohol and Tobacco

152 SAA.20 Alcohol Psychosis

153 SAA.30 Alcohol Dependence

154 SAA.40 Alcohol Abuse, Without Dependence