

***TAKING THE RISK OUT OF RISK ADJUSTMENT***  
***Using Case Mix Differences and Risk Assessment***  
***For Quality Improvement***

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***OHIO CLUSTER-BASED PLANNING ALLIANCE***

A Joint Initiative of Synthesis, Inc. & the Ohio Council of Behavioral Healthcare Providers  
*An ODMH Designated Coordinating Center of Excellence*

# TODAY, WE WILL

- 1. Describe The Results Of A Study Conducted To Develop Statistical Models To Adjust Outcomes For Consumers With Severe Mental Disabilities**
- 2. Provide Some Background On The ODMH Consumer Outcomes System And The Context For The Study.**
- 3. Briefly Review The Concept Of Risk Adjustment**
- 4. Describe Common Proposed And Contradictory Uses For Risk Adjustment**
- 5. Review The Two Major Study Goals**
- 6. Discuss How The Statistical Method (Recursive Partitioning) Was Chosen**
- 7. Describe The Actual Study, The Outcomes Adjusted And The Risk Adjustment Variables Used**
- 8. Discuss The Results Of The Risk Adjustment Model Building Efforts**
- 9. Discuss Additional Information That Was Developed For Continuous Quality Improvement**
- 10. Discuss Future And Related Efforts**

# **BACKGROUND AND CONTEXT**

## **THE OHIO CONSUMER OUTCOMES SYSTEM**

**10 ½ YEARS AND COUNTING**

# **OUTCOMES TASK FORCE**

**(1996 TO 1998)**

- Values Re: Outcomes & Measurement**
- Defined The Outcomes To Be Measured**
- Values Re: Instrument Selection**
- Selected Instruments**

# UNDERLYING CONCERNS

- **“How Are People Going To Use The Data (Against My Agency)?”**
- **“We Have The Worst Clients.”**

# **OUTCOMES PILOT WORK GROUP**

**(1998-2000)**

- **Designed And Tested The Entire Process**
- **Developed Procedural Manual**
- **Comprehensive Evaluation**
- **Finalized Consumer Outcomes System**
- **Voluntary For Community Agencies**

# **OUTCOMES INCENTIVE GRANTS**

**(2000 – 2001)**

**\$ To 192 Agencies To Begin  
Outcomes System Data Collection**

# **DATA REPORTS WORK GROUP**

**(2002)**

**Designed The Reports Series ODMH Is  
Producing Now From The Statewide  
Outcomes Database**

# **OUTCOMES SYSTEM BECOMES STATE LAW (September 2003)**

## **MANDATED:**

- **Data Collection & Submission By  
September 2004**
- **Data Use In Treatment Planning  
And Quality Improvement By  
September 2006**

# **DATA MART DESIGN GROUP**

**(2003-2004)**

- **Web-based System**
- **Aggregate Outcomes Data Reports**
- **Agency, Board, Or State Level**
- **Lots Of Cross-tabs**

# UNDERLYING CONCERNS

- **“How Are People Going To Use The Data (Against My Agency)?”**
- **“We Have The Worst Clients.”**

# **OUTCOMES SYSTEM QUALITY IMPROVEMENT GROUP (2005-2006)**

- **Review Implementation Of The Outcomes System**
- **Focus On Improving Data Use**
- **Advise ODMH On How To Improve Outcomes System Implementation**

# IN SUMMARY

- **Very Long And Careful Process**
- **Constituents Always At The Table**
- **Attempted To Address All Concerns**

# THE NEED FOR RESEARCH ON RISK ADJUSTMENT

- **Agencies Were Concerned That Outcomes Data Would Be Used Against Them**
- **Some Agencies Felt They Had Clients With More Complex And Difficult Problems**
- **Desire For Risk Adjustment**
- **ODMH-OPER Funded Two Pieces Of Research To Explore Possibilities**

# THE ORIGINAL RESEARCH QUESTION

**Can Descriptive Variables In The Outcomes System Be Used To Meaningfully Risk-adjust Outcomes Data To Achieve A More Fair Comparison Among Agencies?**

# WHAT IS RISK ADJUSTMENT?

***“a means of statistically controlling for group differences when comparing nonequivalent groups on outcomes of interest ..... They are nonequivalent in the sense that the persons in each group are assumed unequal in their opportunity for a good outcome for reasons beyond the control of the provider. In other words, risk variables are those that influence outcomes but are not a part of the treatment “*** (Hendryx, Beigel, and Doucette, 2001)

# WHAT IS RISK ADJUSTMENT?

- ***Risk Adjustment Is A Statistical Process That Is Used To Make It Possible To More Fairly Compare Agency Performance When Agency Case Mix May Differ Meaningfully.***
- ***Risk Adjusting Factors Are Characteristics That Individuals Bring With Them To The Treatment Setting (e.g. From Their Bio-psychosocial History)***

# WHY USE RISK ADJUSTMENT

***“The reason for developing risk-adjustment models where treatment outcomes are the dependent variables is to enable public treatment agencies and state mental health authorities to improve the quality of care.***

***Risk-adjustment models can contribute to quality improvement by enabling outcomes to be compared fairly across agencies, by providing outcome data for state mental health authorities (SMHAs) to use in imposing performance-based financial consequences on provider agencies, and by providing agencies with incentives to improve access for patients at the highest severity levels.***

***SMHAs are responsible for making providers accountable for outcomes of care delivered to publicly supported consumers. Such accountability is fair only if it can be defined in risk-adjusted terms.”* (Hendryx, Dyck, Srebnik, 1999)**

# CONTRAST WITH CQI

- ***Deming, one of the key founders of the quality improvement movement, believed “that effective management must be built upon respect and trust in human nature. Fear, mass inspection, use of quotas, management by objectives, and over-reliance upon extrinsic rewards must cease.”*** (Braughton, 1999)
- ***In Deming’s view, “continuous quality improvement meant providing employees (read agencies) with the training and resources to accomplish their tasks.”*** (Braughton, 1999).
- ***In addition, it means providing them with feedback about how the work was being accomplished and the outcome of the efforts. Deming’s focus was on cooperation not competition and he concluded that external incentives or consequences did little to improve the quality of the products.*** (Phillips-Carson & Carson, 1993).

# MOVING FROM RISK ADJUSTMENT TO RISK ASSESSMENT

- ***Risk Adjustment is used to modify outcomes scores so that agencies can be fairly compared. There is no commitment required to share the structure of the models or how they work.***
- ***Risk Assessment is used to identify the characteristics of individuals who may perform more poorly (or better) in order to inform service planning and continuous quality improvements efforts. It is transparent and allows for the sharing of best practice information.***
- ***The same statistical methods can be employed and the same data can often be used for both purposes.***
- ***However, Risk Assessment Requires Additional Steps. (sometimes substantial)***

# TWO COMPONENTS OF THE STUDY

- 1. To Build Precision Statistical Models To Risk Adjust Outcomes for Adults with Severe Mental Disabilities in Ohio as measured on the ODMH Consumer A And Provider A Outcomes Instruments**
- 2. To Identify Clinical Patterns That Would Be Useful For Continuous Quality Improvement. (We Called These “Golden Threads”.)**

# SELECTION OF STATISTICAL METHOD

- **Statistical Method Was Driven By Type Of Data, Phenomena Being Studied And Purpose Or Use Of The Information**
  - **Our Data Might Be Mixed (Categorical, Ordinal, Interval)**
  - **Our Phenomena Involved A Systematically Heterogeneous Population (8 Clusters of Adults with Severe Mental Disabilities)**
  - **Our Goals Involved Not Only Precision Risk Adjustment But Also Risk Assessment For Quality Improvement (Thus transparency and interpretability was important.)**
- **Recursive Partitioning Best Fit The Situation**

# RECURSIVE PARTITIONING WORKS BY:

- **Initially identifying an independent variable that yields maximum discrimination of the dependent variable (e.g. quality of life outcome by types of living situations).**
- **The data set is then partitioned into two or more smaller sets of subjects using the independent variable (e.g. living situations)**
- **The procedure is then repeated on the smaller data sets (the recursive step).**
  - **In this second step, the variable used to split each of the smaller data sets need not be the same variable for each of the smaller sets. If a different variable is identified, the result is a two-way interaction.**
- **This two-step procedure (variable identification and data set partitioning) is repeated, allowing a “tree” to be constructed, until some initial criteria are met or until a “node” of the tree is homogeneous (all individuals have a similar quality of life outcome score).**

# DATA USED IN THIS ANALYSIS

- **Cross-sectional Look At Clients Who Had Been On The Caseload For More Than 44 Days** (Length Of Time In Treatment Was Tested As A Risk Adjustor)
- **Risk Adjustment Studies Typically Develop Models For A Single Outcome**
- **Models Were Built For Each Of The 12 Scales Or Subscales Of The ODMH Consumer Outcomes System** (9 From The Consumer Self-report Instrument And 3 From The Provider Rating Instrument)

# AGENCIES AND OUTCOME MEASURES USED IN THE ANALYSES

AGENCY	ESTIMATED TOTAL AGENCY CASELOAD	PERCENT OF TOTAL	NUMBER OF PHASE 1 CONSUMER MEASURES	PERCENT OF TOTAL OUTCOME MEASURES
Agency A	903	16.39%	139	3.73%
Agency B	1,515	27.50%	1,231	33.06%
Agency C	584	10.60%	249	6.68%
Agency D	2,238	40.62%	2,010	53.98%
Agency E	269	4.88%	94	2.52%
<b>TOTALS</b>	<b>5, 509</b>	<b>100%</b>	<b>3,723</b>	<b>100%</b>

# OUTCOME SCALES TO BE ADJUSTED

## **FROM THE CONSUMER A FORM:**

- Quality of Life
- Financial Quality of Life
- Symptom Distress
- Overall Empowerment
- Community Activism and Autonomy
- Optimism & Control of the Future
- Self Esteem & Self Efficacy
- Power & Powerlessness
- Righteous Anger

## **FROM THE PROVIDER A FORM:**

- Activities of Daily Living
- Meaningful Activities
- Global Community Functioning

# VARIABLES USED TO ADJUST/ASSESS RISK

**Cluster**

**Primary Diagnostic Category**

**Age At Administration**

**Length Of Time In Treatment**

**Gender**

**Last School Year**

**High School Graduate**

**Race**

**Marital Status**

**Living Situation**

**Homelessness**

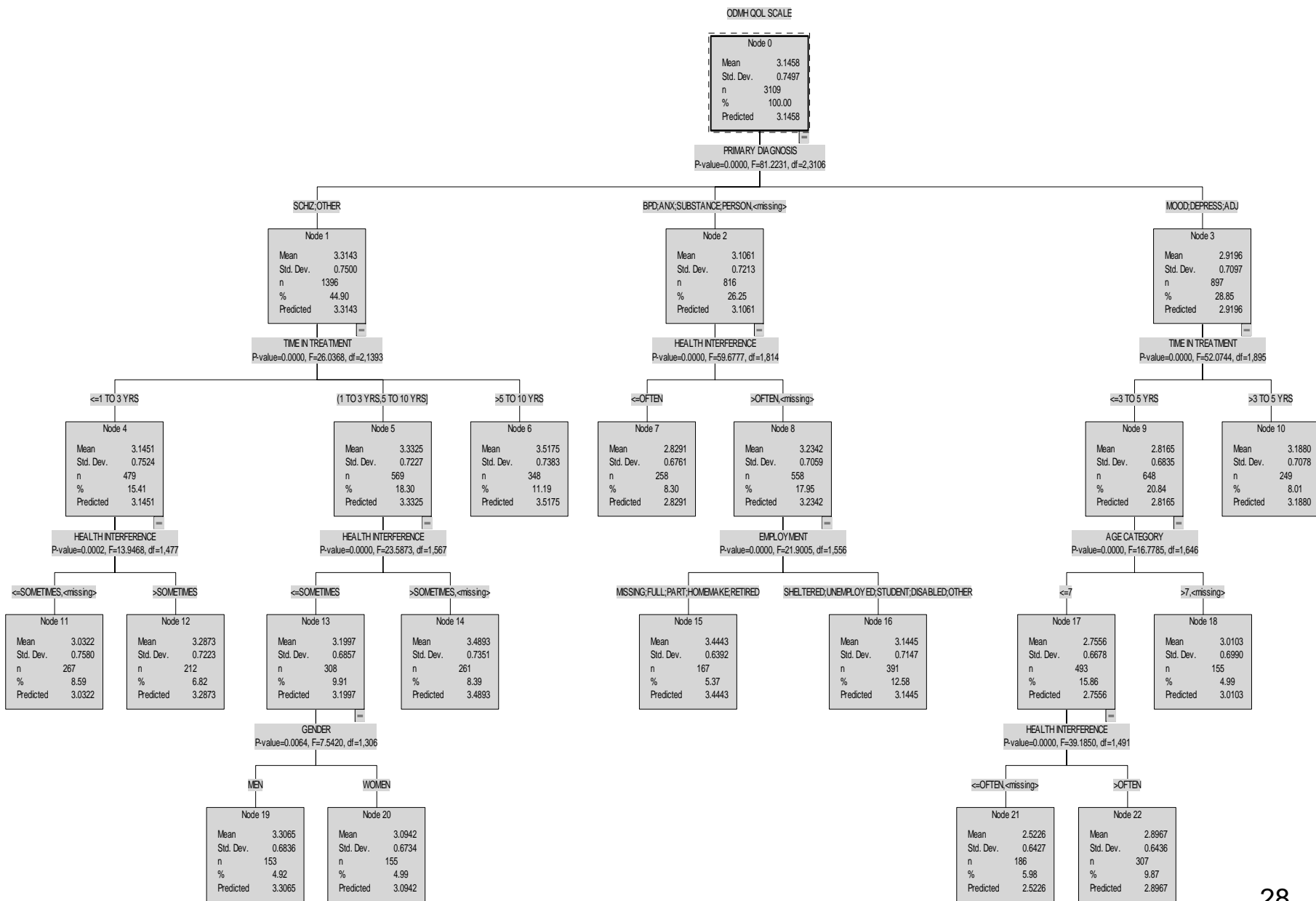
**Employment Status**

**Wanting To Be In  
Treatment**

**Interference From  
Physical Health  
Conditions**

**Urban/Rural**

# SAMPLE RECURSIVE PARTITIONING TREE FOR QUALITY OF LIFE OUTCOME



# VARIANCE ACCOUNTED FOR BY OPER RISK ADJUSTMENT/ASSESSMENT MODELS

<b>ODMH CONSUMER OUTCOMES</b>	<b>TOTAL SMD POPULATION OPER MODEL</b>
QOL	14%
FINANCIAL QOL	11%
SYMPTOM DISTRESS	22%
AUTONOMY	3%
OPTIMISM	7%
SELF ESTEEM	11%
POWER VS POWERLESS	7%
RIGHTEOUS ANGER	4%
OVERALL EMPOWERMENT	10%
<b>ODMH PROVIDER OUTCOMES</b>	
ACTIVITIES DAILY LIFE	13%
MEANINGFUL ACTIVITIES	7%
GLOBAL COMM. FUNCTIONING	11%

# WERE WE SUCCESSFUL IN ADJUSTING MEANS AND RANKINGS ? ( PHASE 1– QOL)

NAME OF RISK ADJUSTMENT RESEARCH STUDY PARTNER AGENCY	UNADJUSTED (RAW) MEAN SCALE SCORE	UNADJUSTED RANK ORDER HIGHEST TO LOWEST	CHAID ADJUSTED MEAN SCALE SCORE	ADJUSTED RANK ORDER HIGHEST TO LOWEST	UNADJUSTED MINUS ADJUSTED MEANS (**)
C1	3.421	1	3.365	1	0.056
C2	3.180	4	3.172	4	0.008
M1	3.282	3	3.240	3	0.042
S1	3.065	5	3.083	5	-0.018
M2	3.396	2	3.365	1	0.031
<b>GREATEST MEAN DIFFERENCE BETWEEN AGENCY SCORES</b>	<b>0.356</b>		<b>0.277</b>		
<b>COHEN'S d TEST VALUE (*)</b>	0.475		0.369		
<b>LEVEL OF IMPACT</b>	MODERATE		MODERATE TO LOW		

•Based on Sample Unadjusted Standard Deviation = .74970

•\*\* Positive values indicated downward adjustment, negative indicated upward adjustment

# SHIFTING TO RISK ASSESSMENT FOR CQI

- **We Needed To Look For Patterns Across The 12 Outcomes**
- **Summarized Results From Initial Models And Selected RAVs That Were Most Powerful** (Affected Most Outcomes At The Highest Level)
- **Re-ran Recursive Partitioning Models To Produce “Explanatory Models”**
- **We Looked At Patterns Across The 12 Outcomes Again To Find The Most Powerful Of The Powerful Risk Factors** (Golden Threads)

# MOVING TOWARD EXPLANATION: DATA REDUCTION

ODMH CONSUMER OUTCOME SCALES	CLUST	1ST DIAGCAT	LOTTX	PHYSICAL CONDITION INTERFERENCE	AGE CAT	GENDER	RACE 3 CAT	ODMH LAST SCHOOL YEAR	ODMH EMPLOY STATUS	ODMH MARITAL STATUS	ODMH LIVING SITUA.	HOME-LESS	HS GRAD?	WANTS TO BE IN TX	URBAN VS RURAL
QUALITY OF LIFE (QOL)															
ALLIANCE CLUSTER FIRST	# 1 (*)	<u>3</u>	<u>2,3</u>	<u>2</u>											
FINANCIAL QUALITY OF LIFE															
ALLIANCE CLUSTER FIRST	# 1 (*)	<u>2</u>	<u>3</u>	<u>3,4</u>					<u>3</u>		<u>4,5</u>				
SYMPTOM DISTRESS															
ALLIANCE CLUSTER FIRST	# 1 (*)			<u>2</u>					<u>3</u>						
COMMUNITY ACTIVISM & AUTONOMY															
ALLIANCE CLUSTER FIRST	# 1 (*)	<u>3</u>	<u>2</u>					<u>2,5</u>	<u>4</u>	<u>5</u>	<u>3</u>				
OPTIMISM & CONTROL OF THE FUTURE															
ALLIANCE CLUSTER FIRST	# 1 (*)	<u>3</u>	<u>3</u>	<u>2,4</u>		<u>3</u>									
SELF-ESTEM & EFFICACY															
ALLIANCE CLUSTER FIRST	# 1 (*)			<u>2</u>			<u>3</u>		<u>2</u>						
POWER/POWERLESS															
ALLIANCE CLUSTER FIRST	# 1 (*)	<u>3</u>	<u>4</u>					<u>2</u>	<u>3</u>	<u>3</u>					
RIGHTEOUS ANGER															
ALLIANCE CLUSTER FIRST	# 1 (*), 4	<u>3</u>				<u>3</u>	<u>4</u>	<u>2,3</u>			<u>2</u>				
EMPOWERMENT, OVERALL															
ALLIANCE CLUSTER FIRST	# 1 (*)	<u>2,3</u>		<u>2</u>					<u>3</u>		<u>3</u>				
<b>NUMBER OF FIRSTS</b>	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>NUMBER INCLUSIONS</b>	9	7	5	6	0	2	2	3	6	2	4	0	0	0	0
INCLUDE GIVEN CRITERIA:															
ENTERS 1ST AT LEAST ONCE	YES														
ENTERS AT LEAST 5 OF 9 MODELS	YES	YES	YES	YES											
GENDER, ETHNICITY, & LOTTX WAVER			YES			YES	YES		YES						

#1 (\*) Cluster entered first. Other numbers indicated level (s) a variable is found in the resulting tree.

# GOLDEN THREADS

- 1. The degree to which consumers experience Interference From Physical Health problems is consistently related to how they feel about other areas of their lives and often is related to how well providers view their functioning. The more interference from physical health, the lower the functioning on other outcomes.**
- 2. Psychiatric Diagnoses are often a factor in consumer outcomes. However the relationship between diagnoses and outcomes is complex.**
  - For example, on the Consumer A outcomes which are primarily indications of how clients feel about their lives, Schizophrenia is sometimes associated with more positive feelings and sometimes with more negative assessments of ones life.**
  - In contrast, when looking at ratings of community functioning made by providers, clients with a diagnosis of Schizophrenia are consistently seen as having lower levels of performance.**
- 3. Full-time (or part-time) Employment or more Education has a positive impact, even though few individuals have or are currently benefiting from these opportunities.**
- 4. When Race is a factor, African-Americans tend to be assessing their lives more positively and/or functioning at a higher level.**

# WHAT'S NEXT?

- **Cluster-Specific Risk Assessment Models**
- **Identification Of Cluster-Specific Risk Factors**

# 8 CLUSTERS OF ADULTS WITH SEVERE MENTAL DISABILITIES

The following clusters of adults with severe mental disabilities have been identified and are presently being used by the Ohio Cluster-Based Planning Alliance. Past experience indicates that 95% to 98% of adult consumers are members of one of these 8 clusters. A full page Cluster Description is used by agencies to determine cluster membership. When reviewing the results of the analyses, it is important to put them into the context of the specific cluster(s) being discussed. It is important to remember that cluster names cannot be relied upon to understand or assess cluster membership; it is necessary to appreciate the entire cluster description as a "whole", in order to accurately assess or understand the implications of cluster membership.

## **CLUSTER 1**

**Adults With Chronic Physical Health Conditions And Psychiatric Disabilities**

## **CLUSTER 2A**

**Adults With Serious Substance Abuse, Mental Health, And Community Living Problems**

## **CLUSTER 2B**

**Adults With Severe Substance Abuse Problems And Less Severe Mental Health Problems**

## **CLUSTER 3A**

**Adults Who Are Severely Disabled In Many Life Areas**

## **CLUSTER 3B**

**Younger Adults Who Are Severely Disabled But Are Not Convinced Of The Usefulness Of Treatment**

## **CLUSTER 4A**

**Adults Who Struggle With Anxiety And Depression, And Avoid New Opportunities**

## **CLUSTER 4B**

**Adults Who Struggle With Anxiety And Tend To Focus On Their Physical Health Conditions**

## **CLUSTER 5**

**Adults Who Have Functioned Well In Their Communities**

# VARIANCE ACCOUNTED FOR BY VARIOUS RISK ADJUSTMENT/ASSESSMENT MODELS

ODMH CONSUMER OUTCOMES	TOTAL SMD POPULATION OPER MODEL	TOTAL SMD POPULATION CLUSTER FIRST MODEL	ONLY CONSUMERS DIAGNOSED WITH SCHIZOPHRENIA	ONLY CLUSTER 1	ONLY CLUSTER 2A	ONLY CLUSTER 2B	ONLY CLUSTER 3A	ONLY CLUSTER 3B	ONLY CLUSTER 4A	ONLY CLUSTER 4B	ONLY CLUSTER 5
QOL	14%	11%	11%	34%	22%	40%	21%	41%	25%	34%	49%
FINANCIAL QOL	11%	11%		23%	28%	33%	16%	30%	24%	38%	32%
SYMPTOM DISTRESS	22%	17%	21%	36%	37%	44%	23%	42%	35%	39%	49%
AUTONOMY	3%	3%		16%	17%	17%	10%	21%	10%	35%	25%
OPTIMISM	7%	5%	7%	17%	18%	29%	16%	37%	17%	36%	18%
SELF ESTEEM	11%	8%		25%	24%	30%	14%	42%	23%	39%	33%
POWER VS POWERLESS	7%	5%		20%	18%	23%	13%	42%	15%	25%	39%
RIGHTEOUS ANGER	4%	3%		19%	17%	36%	11%	36%	11%	25%	30%
OVERALL EMPOWERMENT	10%	6%		17%	23%	23%	18%	39%	16%	31%	32%
<b>ODMH PROVIDER OUTCOMES</b>											
ACTIVITIES DAILY LIFE	13%	19%	12%	25%	16%	21%	21%	39%	13%	33%	39%
MEANINGFUL ACTIVITIES	7%	9%		17%	14%	19%	10%	27%	15%	25%	32%
GLOBAL COMM. FUNCTIONING	11%	16%		19%	19%	19%	14%	32%	16%	37%	25%

\*All percentages reported are based on the cross-validated (tenfold sample) values generated by Answer Tree CHAID Risk Estimates. The single exception is the Cluster First percentages where Risk Estimates cannot be cross-validated in such forced entry models.

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