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# Measurement-based care for Substance Use Disorders: A Platform for Promoting Patient-Centred Care, Quality Improvement, and Clinical Research

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# Acknowledgments

- Collaborators: Jean Costello, PhD; Brian Rush, PhD; Kim Corace, PhD; Shannon Remers, MSc

- Health Canada Substance Use and Addiction Program (SUAP)



Santé  
Canada

Health  
Canada

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- Grant funding from CIHR, NIH, ICRG, Health Canada
- Consultant to Clairvoyant Therapeutics, Inc.
- Principal and Senior Scientist at Beam Diagnostics, Inc.

# Objectives

- Objective 1: To understand how measurement-based care can be used to promote patient-centred SUD treatment
- Objective 2: To learn how measurement-based care can be used to support quality improvement and program evaluation
- Objective 3: To understand applications of measurement-based care for clinical research

# Prevalence of Substance Use Disorders

Lifetime  
Prevalence

**22%**  
Substance  
Use  
Disorders

**9%**  
Anxiety  
Disorders

**14%**  
Mood Disorders

12-Month  
Prevalence

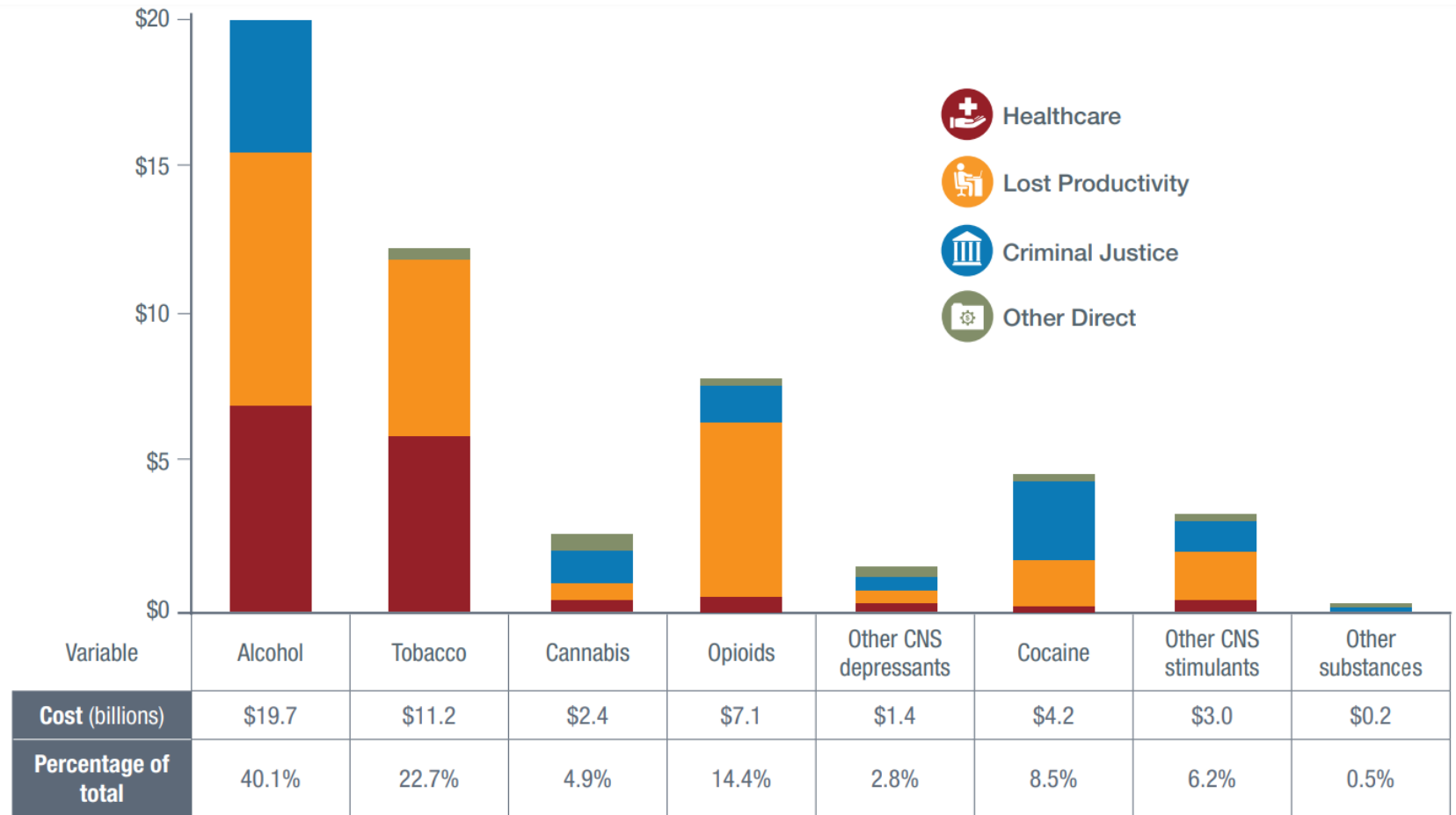
**10%**  
Substance  
Use  
Disorders

**4%**  
Anxiety  
Disorders

**5%**  
Mood  
Disorders

*Health Canada*

# Economic Burden of Substance Use in Canada



Canadian Centre on Substance Use and Addiction

# SUDs are Commonly Comorbid with Other Psychiatric Conditions

Drug and Alcohol Dependence 154 (2015) 1–13



Contents lists available at ScienceDirect  
Drug and Alcohol Dependence

journal homepage: [www.elsevier.com/locate/drugalcdep](http://www.elsevier.com/locate/drugalcdep)



## Review

### Prevalence of comorbid substance use, anxiety and mood disorders in epidemiological surveys, 1990–2014: A systematic review and meta-analysis



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## ABSTRACT

**Background:** Comorbidity is highly prevalent between substance use disorders (SUDs), mood and anxiety disorders. We conducted a systematic review and meta-analysis to determine the strength of association between SUDs, mood and anxiety disorders in population-based epidemiological surveys.

**Methods:** A comprehensive literature search of Medline, EMBASE, CINAHL, PsychINFO, Web of Science, and Scopus was conducted from 1990 to 2014. Sources were chosen on the basis that they contained original research in non-clinical populations conducted in randomly selected adults living within defined boundaries. Prevalence of comorbid SUDs, mood and anxiety disorders and odds ratios (ORs) were extracted.

**Results:** There were 115 articles identified by electronic searches that were reviewed in full text which yielded 22 unique epidemiological surveys to extract lifetime and 12-month prevalence data for psychiatric illness in respondents with an SUD. Meta-analysis indicated the strongest associations were between illicit drug use disorder and major depression (pooled OR 3.80, 95% CI 3.02–4.78), followed by illicit drug use and any anxiety disorder (OR 2.91, 95% CI 2.58–3.28), alcohol use disorders and major depression (OR 2.42, 95% CI 2.22–2.64) and alcohol use disorders and any anxiety disorder (OR 2.11, 95% CI 2.03–2.19). ORs for dependence were higher than those for abuse irrespective to diagnoses based on lifetime or 12-month prevalence.

**Conclusions:** This review confirms the strong association between SUDs, mood and anxiety disorders. The issue has now been recognised worldwide as a factor that affects the profile, course, patterns, severity and outcomes of these disorders.

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- Pts with SUDs have a much higher prevalence of mood disorders
- Pts with mood disorders have a much higher prevalence of SUDs

Lai et al. (2015) *Drug & Alcohol Dependence*

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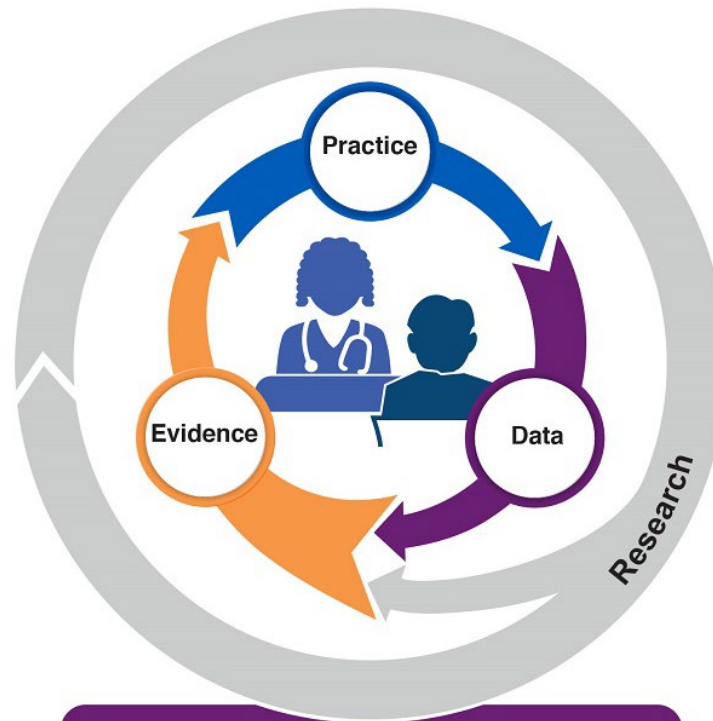
# What is Measurement-based Care for Substance Use Disorders?

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The systematic use of validated patient-reported outcomes to improve diagnosis, treatment planning, and clinical outcomes



# A Measurement-based Care Learning Health System

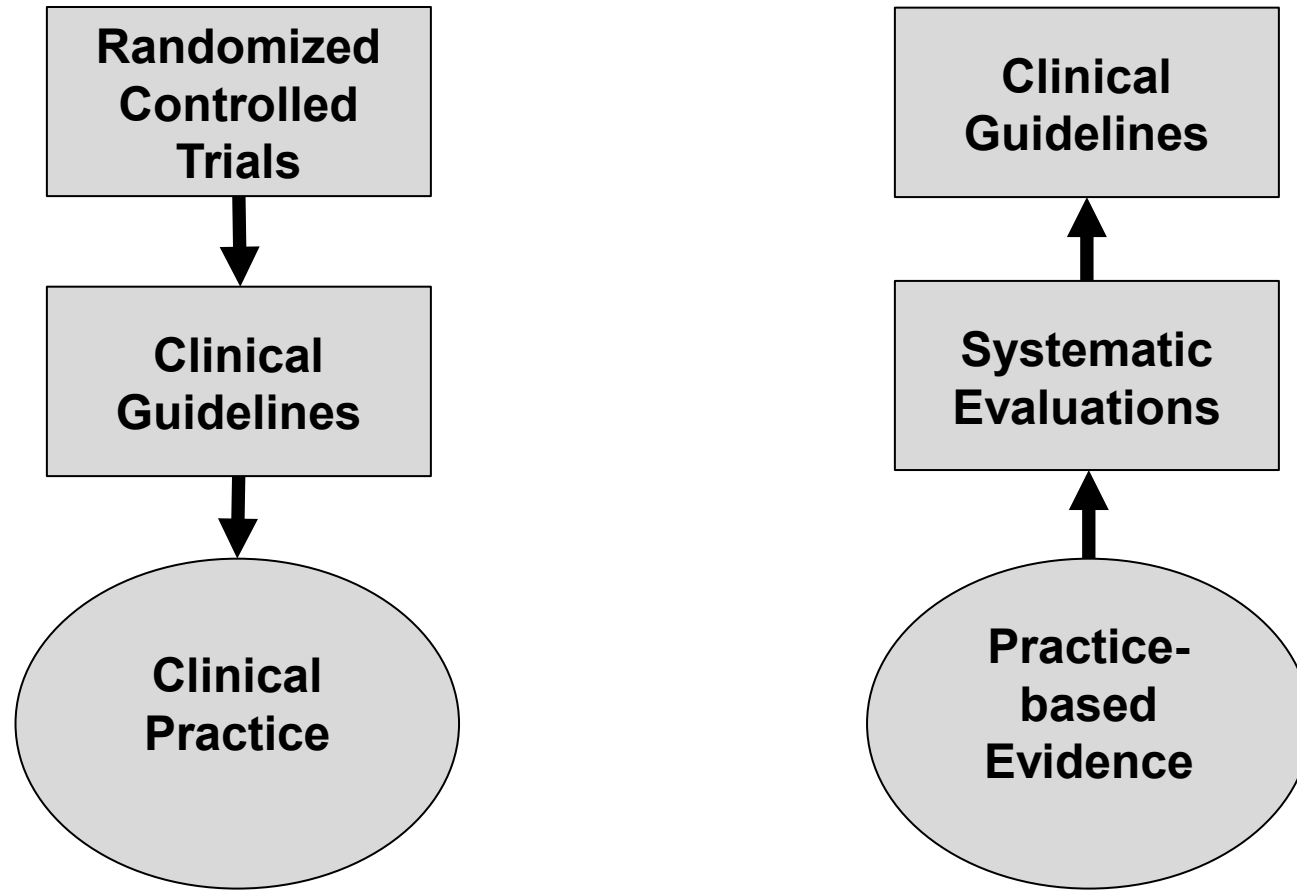


**Systematically gather and  
create evidence.**

**Apply the most promising evidence  
to improve care.**

*Agency for Healthcare  
Research and Quality*

# Evidence-based Medicine vs. Practice-based Evidence



# MBC Implementations at St. Joseph's Healthcare Hamilton

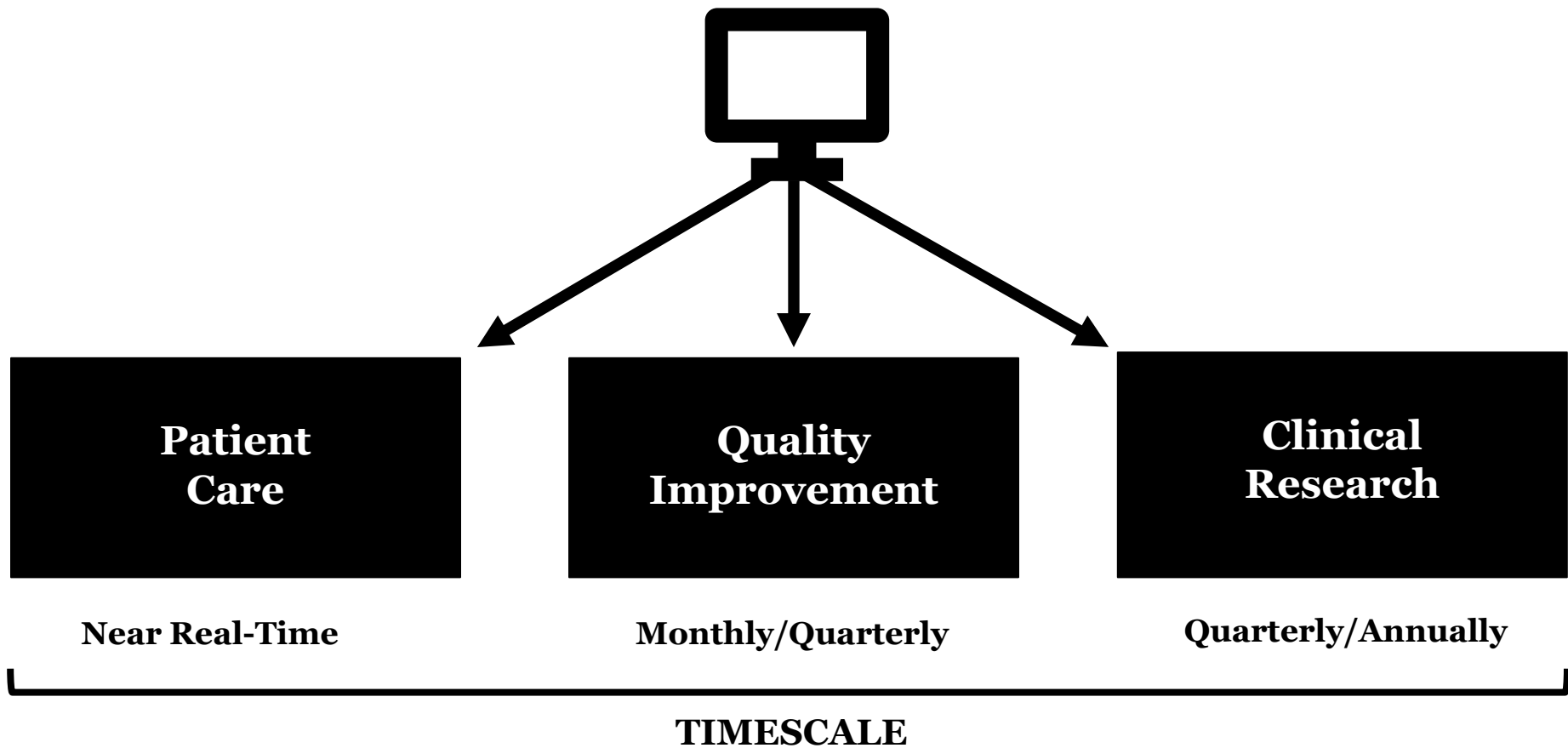
## ■ Active Implementations

- ☐ Concurrent Disorders Outpatient Program
- ☐ WomanKind Addiction Services
- ☐ Men's Addiction Services
- ☐ Young Adult Substance Use Program

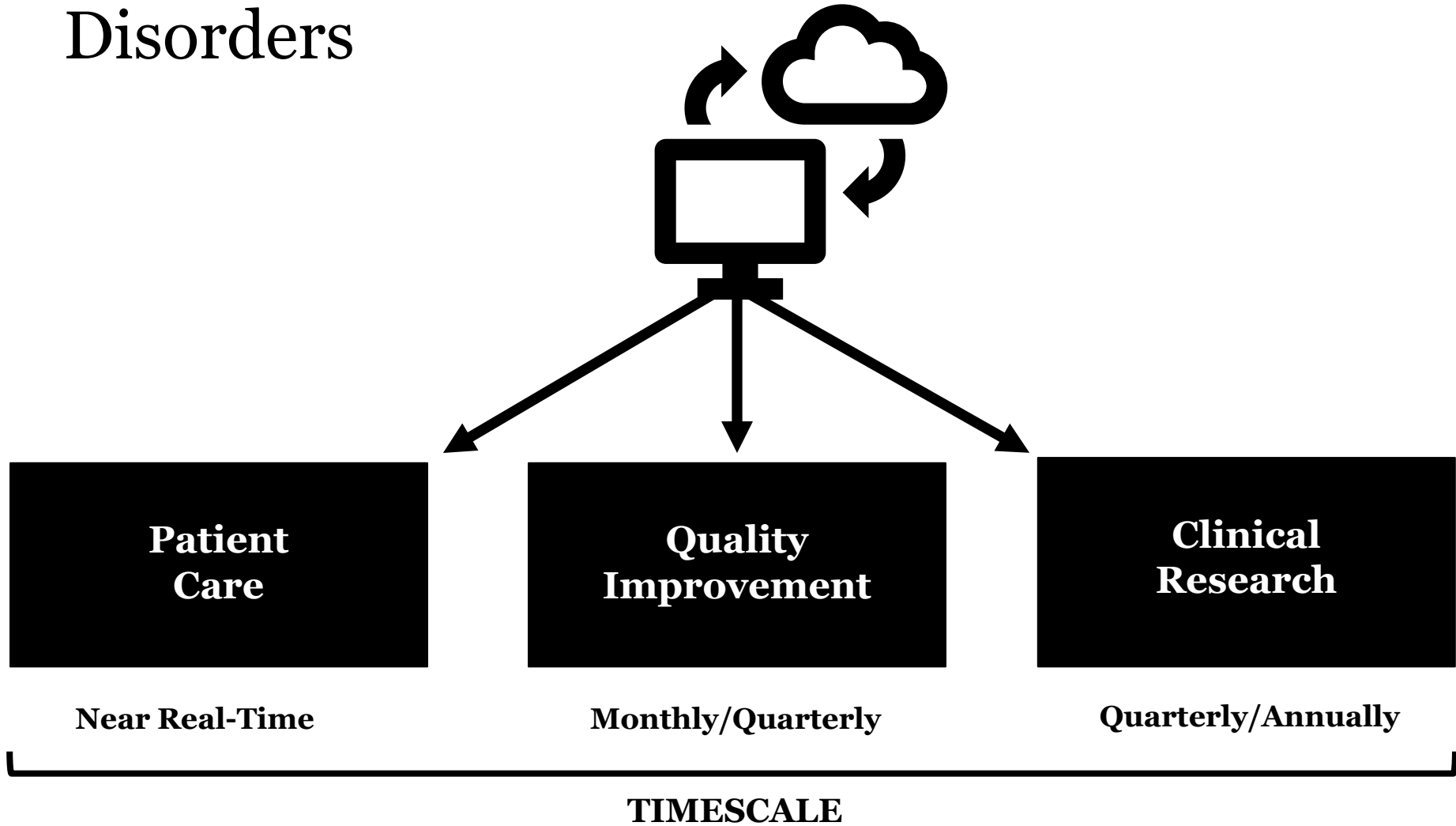
## ■ Future Implementations

- ☐ Rapid Access Addiction Medicine Clinic
- ☐ Borderline Personality Disorder Service
- ☐ Firestone Institute for Respiriology
- ☐ Seniors Mental Health
- ☐ Youth Wellness Centre

# Measurement-based Care for Substance Use Disorders



# Measurement-based Care for Substance Use Disorders



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# Improving Patient Care

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# Example Patient Report

## Demographics

## Substance Use Profile

## Psychiatric Screens + Self-Harm

## Head Injury

## Tobacco and Gambling

Patient Initials	Date Administered
0	January 19, 2021

### Guidelines/Considerations:

1. The data are from screening measures, but are NOT diagnostic. 2. Individual elevations in symptoms should be considered very carefully due to common overlap among domains. 3. The data are patient self-reports, meaning that impression management or low effort are possible.

### DEMOGRAPHIC INFORMATION

Client Initials	Gender Identity	Sex at Birth	Age
0	MTF (male-to-female)	Male	23

### ALCOHOL USE & MISUSE

Alcohol Use Frequency	AUDIT Cutoff Status	AUDIT Raw Score	AUDIT %
2-4 times a month	Above Threshold	20 / 40	50%
ALCOHOL MOTIVATION	Readiness	Importance	Confidence
	10	10	10

### CANNABIS USE & MISUSE

Cannabis Use Frequency	CUDIT Cutoff Status	CUDIT Raw Score	CUDIT %
2-4x a month	Above Threshold	16 / 32	50%
CANNABIS MOTIVATION	Readiness	Importance	Confidence
	10	10	10

### DRUG USE & MISUSE (NON-ALCOHOL/CANNABIS)

DUIT Cutoff Status	DUIT Raw Score	DUIT %
Above Threshold	22 / 44	50%

### DRUG USE FREQUENCY

Substance	Freq. Last 3 Mo.	Readiness
Cocaine (any form)	None/Never/Missing	10
Prescription Stimulants	1 Day	Importance
Methylphenidate	2-3 Days	10
Sedatives or Sleeping Pills	1-2 Days Weekly	Confidence
Opioids (heroin, oxy, perc, etc)	3-4 Days Weekly	10
Ecstasy	5-6 Days Weekly	
Hallucinogens	Daily	
Inhalants	Daily+	
Other Drugs	Daily+	

### Motivation Rulers Interpretation

Note: Motivation is rated from 0-10:  
0-2 Not Ready to Change/No Illicit Drug Use  
3-5 Unsure  
6-8 Ready to Change  
9-10 Trying to Change

### MENTAL HEALTH PROFILE

Mental Health Scales	Cutoff Status	Raw Score / Scale Max	%Max
Depression (PHQ-9)	Above Threshold	27 / 27	100%
Anxiety (GAD-7)	Above Threshold	21 / 21	100%
Social Phobia (OCHS)	Above Threshold	10	100%
Traumatic Exposure (BTQ)	Positive Endorsement	10 Potential Exposures	n/a
PTSD (PCL-5)	Above Threshold	80 / 80	100%
Psychosis (PQ-16)	Above Threshold	16 / 16	100%
Borderline Personality (MSI-BPD)	Above Threshold	10 / 10	100%
ADHD (WHO ASRS)	Above Threshold	24 / 24	100%
Bulimia Nervosa (PHQ)	Above Threshold	n/a	n/a
Binge Eating Disorder (PHQ)			
Oppositional Defiant Disorder (OCHS)	Above Threshold	12	100%
Conduct Disorder (OCS)	Above Threshold	22	100%

### SUICIDAL IDEATION / SELF-HARM (SINGLE ITEM ON PHQ-9)

Item wording: "Thoughts that you would be better off dead or of hurting yourself in some way"  
How Often in Last 2 Weeks: Nearly every day

### TRAUMATIC BRAIN INJURY (OHIO VALLEY SCREEN)

Cutoff Status	# Positive Items
Above Threshold	5 / 5

### TOBACCO USE & MISUSE

Cigarettes / Day	MOTIVATION TO CHANGE
0	

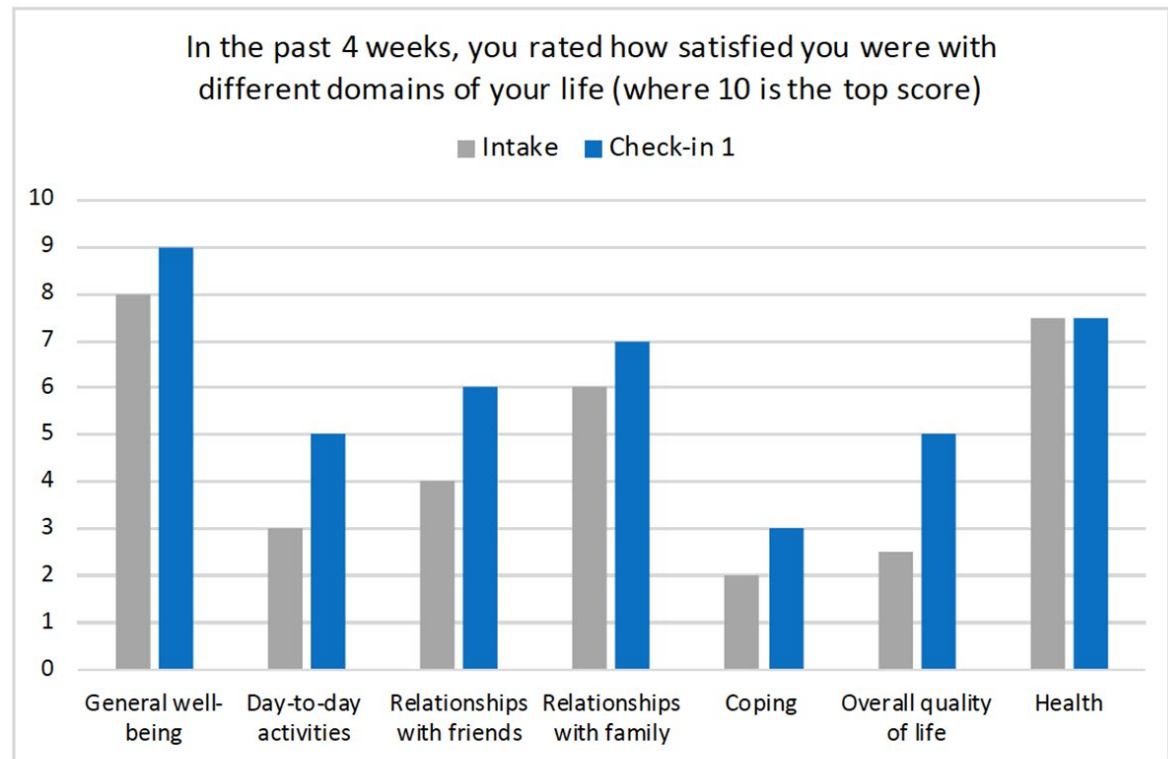
### GAMBLING BEHAVIOURS

Gambled for money in last 3 months?	PGSI Raw Score	PGSI %	Gambling Severity
Yes	27 / 27	100%	Problem gambling

# Example YASUP Patient Feedback Report

- Substance use
- Quality of Life
- SUD symptoms
- Depression
- Anxiety
- Valued Living

## Personalized Feedback Report Quality of Life





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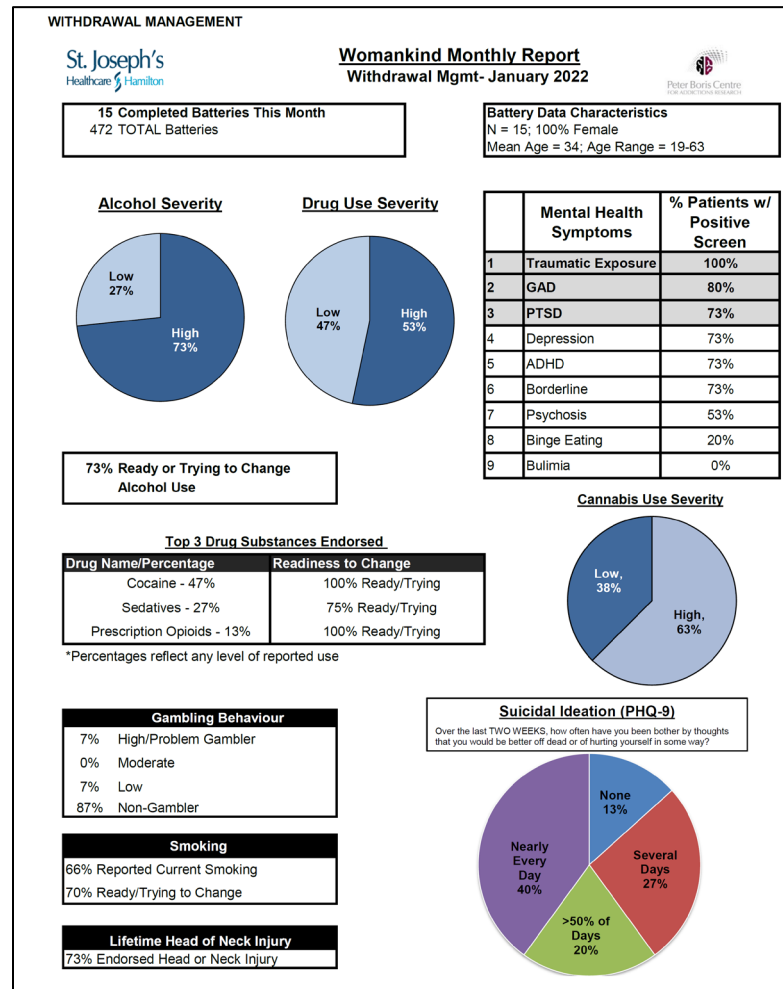
# Quality Improvement and Program Evaluation

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# Example Program Reports

## Substance Use Disorder Patterns, Severity, and Tx Motivation

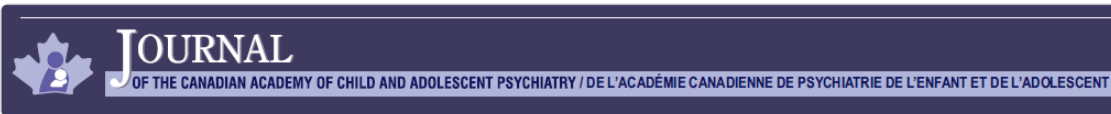
## Gambling, Smoking, and Head Injury



## Psychiatric Comorbidities

## Self-Harm

# Clinical Outcomes from the YASUP MBC Program



**CLINICAL ROUNDS: A focus on concurrent disorders**

**Initial insights from a quality improvement initiative to develop an evidence-informed young adult substance use program**

**Jillian Halladay RN, MSc, PhD<sup>1,2</sup>; Victoria Stead PhD<sup>3</sup>; Catherine McCarron RSW, MSW<sup>2</sup>; Marina Kennedy MSW, RSW<sup>2</sup>; Kyla King<sup>2</sup>; Michelle Venantius MD, FRCPC<sup>2</sup>; A. Carter, RSW<sup>2</sup>; Sabrina Syan PhD<sup>1,2</sup>; Mareena Matthews NP<sup>2</sup>; Saba Khoshroo BA, MSc<sup>1,2</sup>; Myra Massey BA<sup>1,2</sup>; Liah Rahman BA<sup>1,2</sup>; Jacinda Burns BA<sup>1,2</sup>; Kiran Punia MSc<sup>1,2</sup>; Emily MacKillop PhD, CPsych, ABPP<sup>3</sup>; Holly Raymond MHA, MSW, RSW<sup>1,2</sup>; James MacKillop PhD<sup>1,2,3</sup>**

Halladay et al. (2023) *J Can Acad Child Adolesc Psychiatry*

# Clinical Outcomes from the YASUP MBC Program

## YOUNG ADULT SUBSTANCE USE PROGRAM

### 12 Week Structure

#### Intake Appointment

To start in the program, we provide 2 one-on-one intake appointments ~1 week apart.

- Intake Part A: assessment of needs and goals
- Intake Part B: feedback on first assessment



#### Check-In Sessions

We offer 5 individual check-in sessions with a mental health professional

- Ongoing support
- Personalized goals and progress monitoring

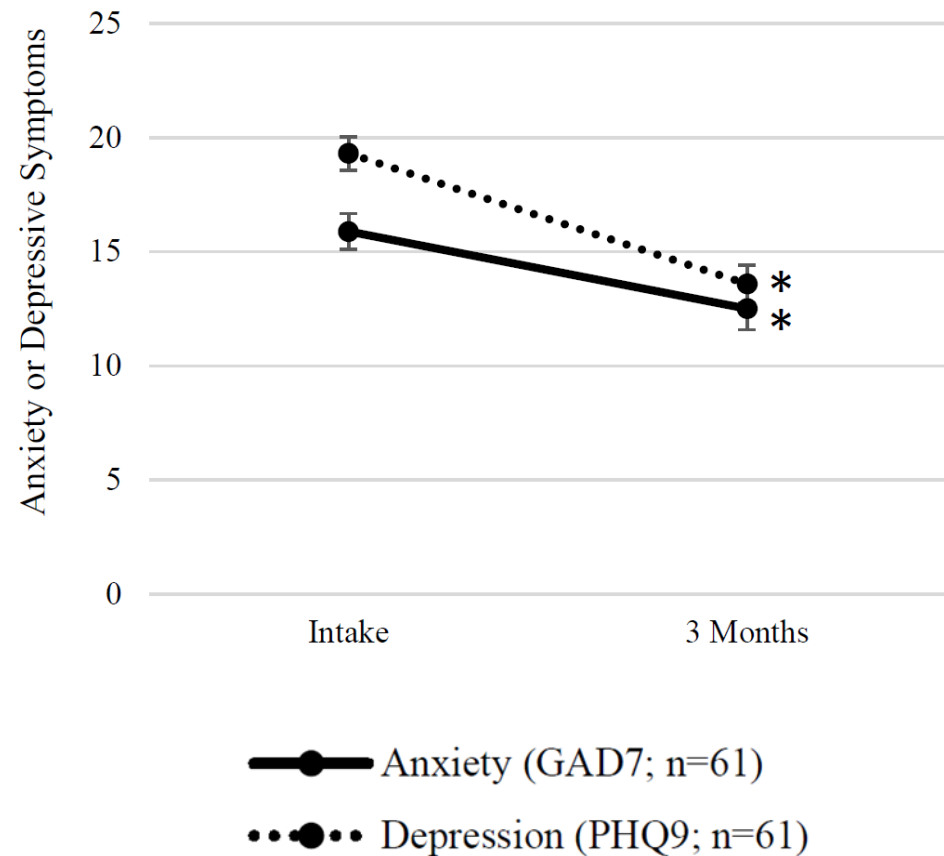
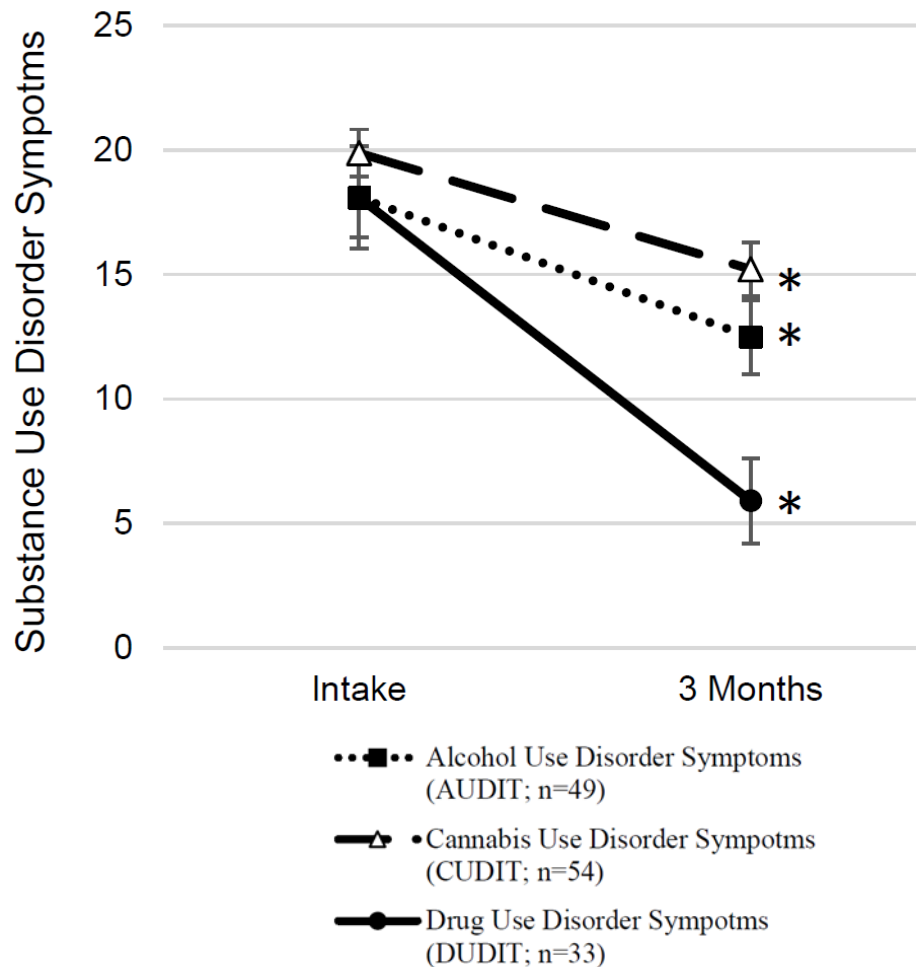
### Measurement Based Care

At the start of your first intake, we ask all young adults to complete a survey. This survey asks questions about your quality of life, mental health, and substance use. We go over your results with you during your one-on-one sessions. This survey is used to develop a care plan that fits your needs. We repeat these surveys a few times over the course of the program to track your progress. This lets us know what is working, or what is not working, to optimize your care. You can choose to contribute your survey data to our research studies.



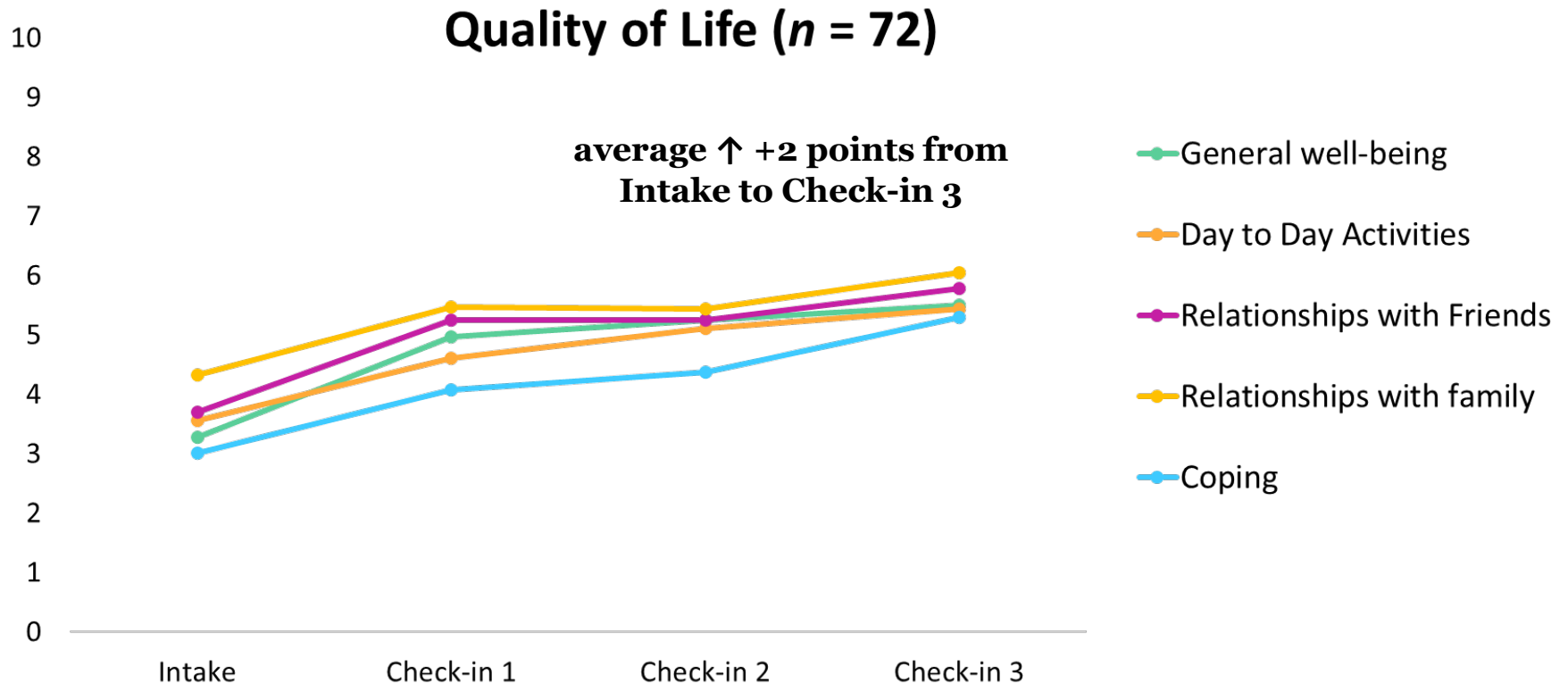
<https://www.cdcapacitybuilding.com/youth-program>

# Clinical Outcomes from the YASUP MBC Program



Halladay et al. (2023) *J Can Acad Child Adolesc Psychiatry*

# Clinical Outcomes from the YASUP MBC Program



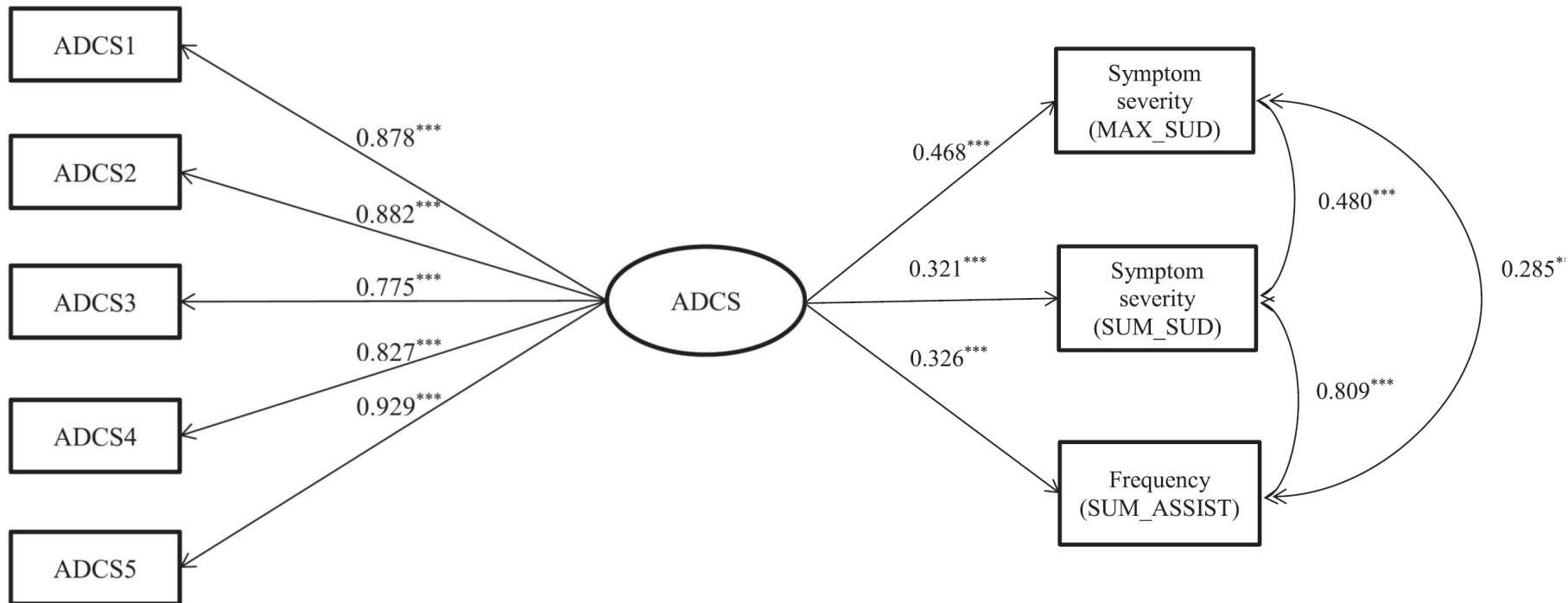
Halladay et al. (2023) *J Can Acad Child Adolesc Psychiatry*

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# Clinical Research

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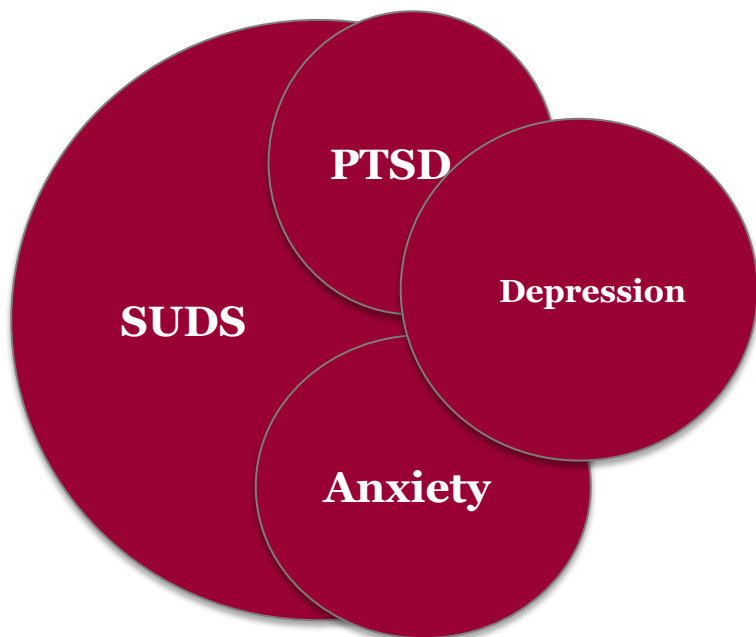
# Validating Patient-reported Measures



Costello et al. (2020) *Journal of Substance Abuse Treatment*



# Optimizing Patient-reported Screens



Receiver operating curve area under the curve analyses.

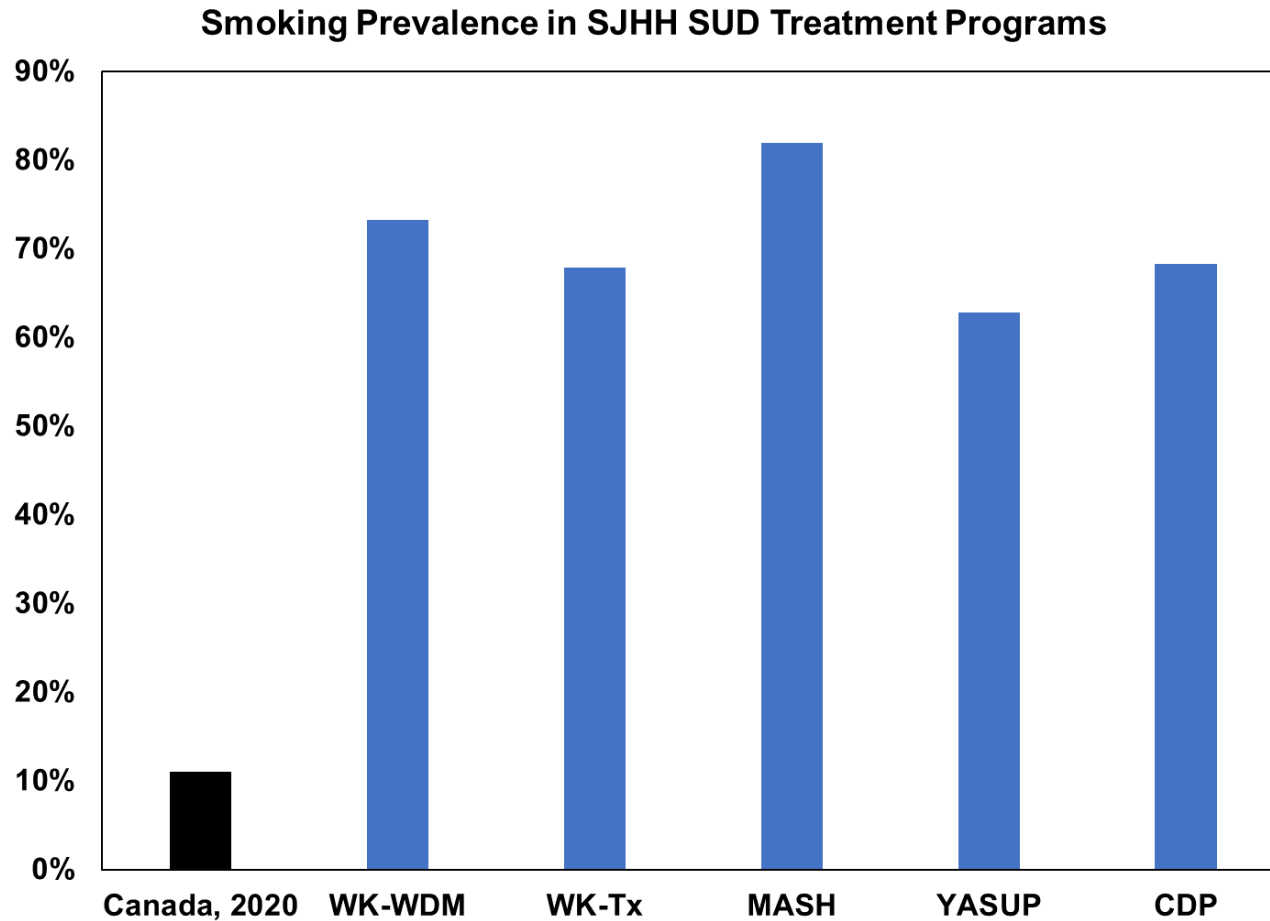
Measure	Area	SE	<i>P</i>	95% CI
PHQ-9	0.70	0.05	0.002	[0.59, 0.80]
GAD-7	0.74	0.05	< 0.001	[0.63, 0.84]
PCL-5	0.79	0.06	< 0.001	[0.66, 0.91]
Alcohol Sx checklist	0.87	0.05	< 0.001	[0.78, 0.96]
Cocaine Sx checklist	0.95	0.03	< 0.001	[0.90, 1.00]
Opioids Sx checklist	0.94	0.05	< 0.001	[0.85, 1.00]
Cannabis Sx checklist	0.89	0.05	< 0.001	[0.80, 0.99]

ROC curve optimal cutoff score for sensitivity and specificity based on the Youden index.

Measure	Validated cutoff	Sensitivity	Specificity	Positive Predictive	Negative Predictive	Validated $\kappa$	Optimal cutoff	Sensitivity	Specificity	Positive Predictive	Negative Predictive	Optimal $\kappa$
PHQ-9 (GP)	$\geq 10$	1.000	0.29	37%	100%	0.19	$\geq 16$	0.72	0.64	46%	85%	0.31
GAD-7	$\geq 10$	0.75	0.66	73%	67%	0.41	$\geq 9$	0.78	0.66	74%	66%	0.44
PCL-5	$\geq 31$	0.81	0.51	24%	93%	0.22	$\geq 42$	0.81	0.77	41%	96%	0.42
Alcohol Sx	$\geq 2$	0.91	0.80	91%	80%	0.71	$\geq 4$	0.86	0.83	92%	71%	0.70
Cocaine Sx	$\geq 2$	0.91	0.80	94%	71%	0.65	$\geq 2$	0.91	0.80	94%	71%	0.65
Opioids Sx	$\geq 2$	0.92	0.94	100%	88%	0.89	$\geq 3$	0.92	0.95	99%	75%	0.89
Cannabis Sx	$\geq 2$	0.74	0.88	93%	54%	0.50	$\geq 1$	0.90	0.81	89%	71%	0.50

Levitt et al. (2021) *Addictive Behaviors*

# Prevalence and Correlates of Co-occurring Conditions



$n = 2259$

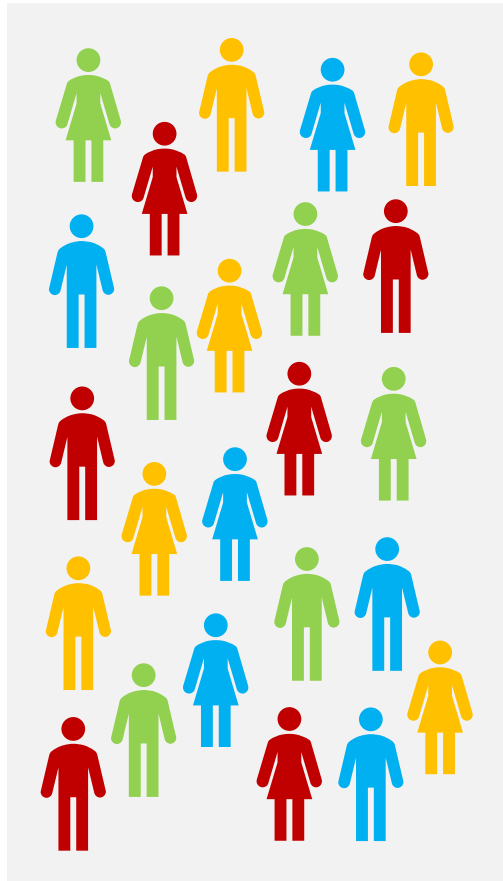
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**Latent profile analysis:**  
one member of a family of statistical techniques for  
identifying unobserved and qualitatively distinct  
subgroups in heterogenous data

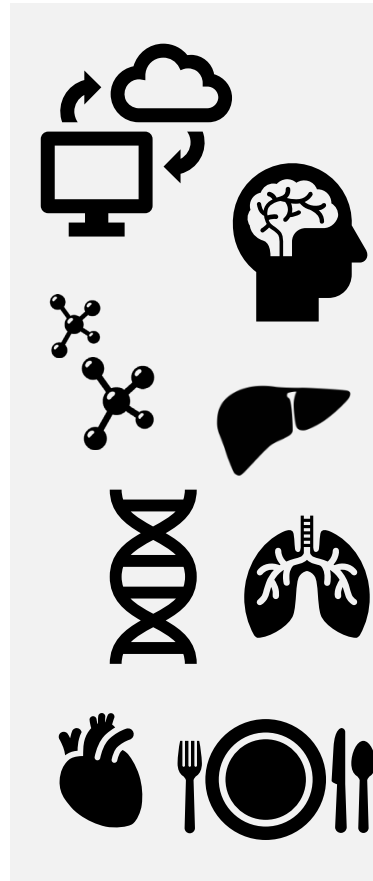
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# Developing More Personalized Care Paths

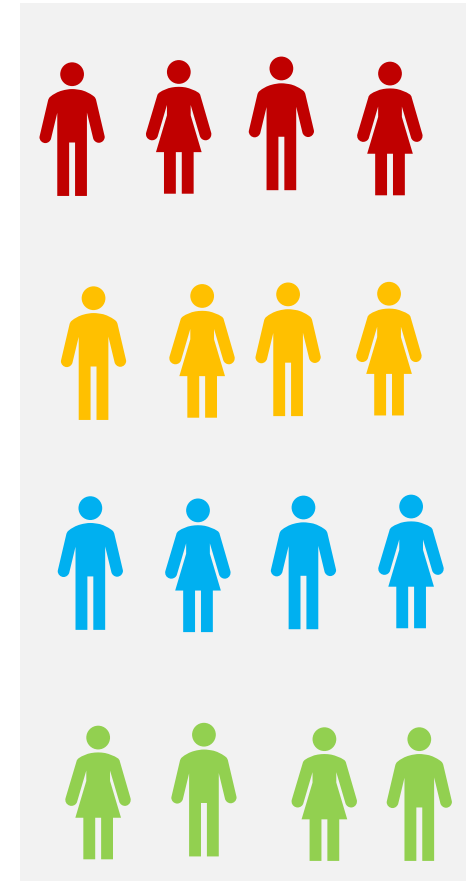
**Standard Care**



**One-size-fits-all**

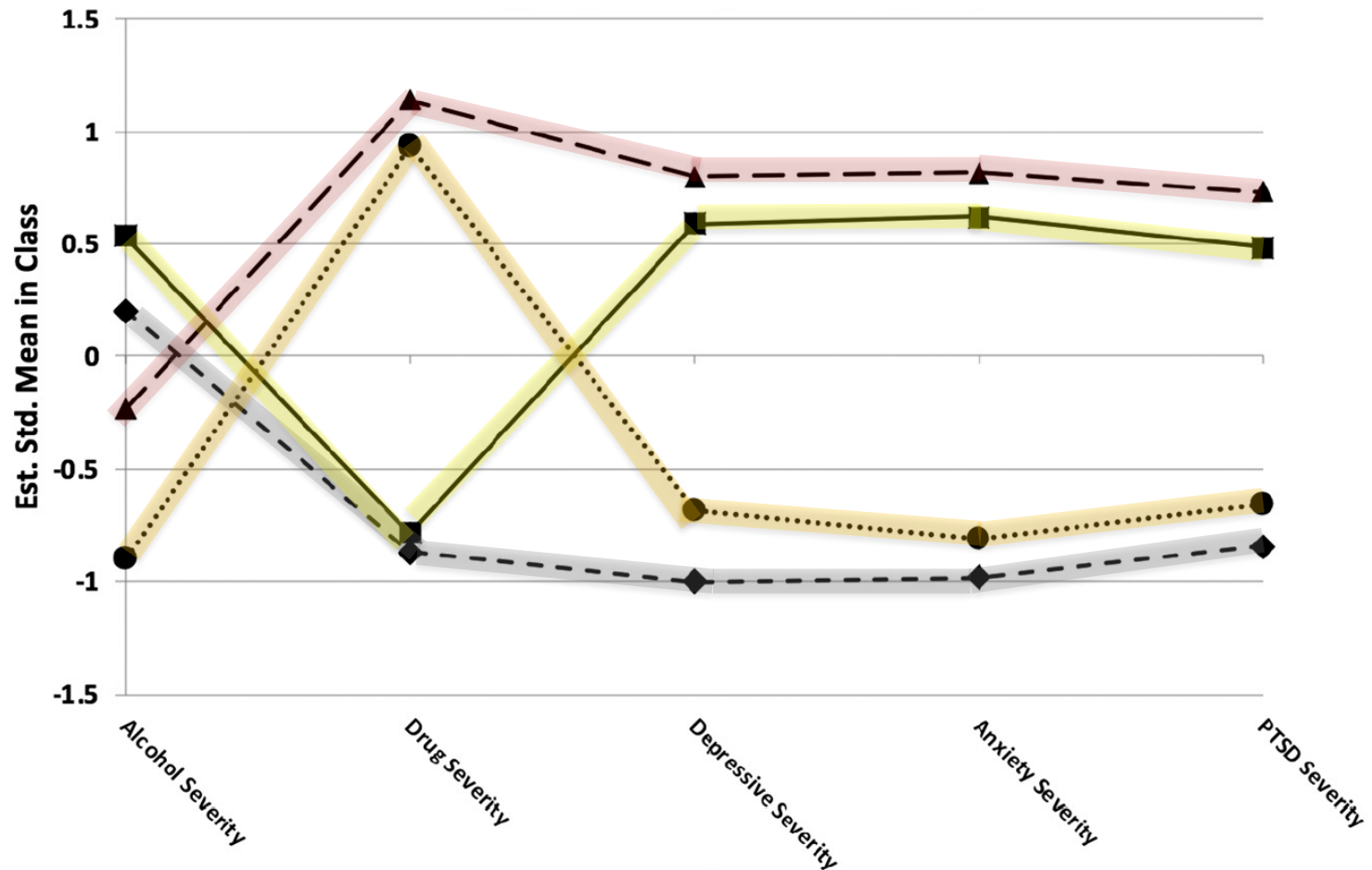


**Measurement-based Care**



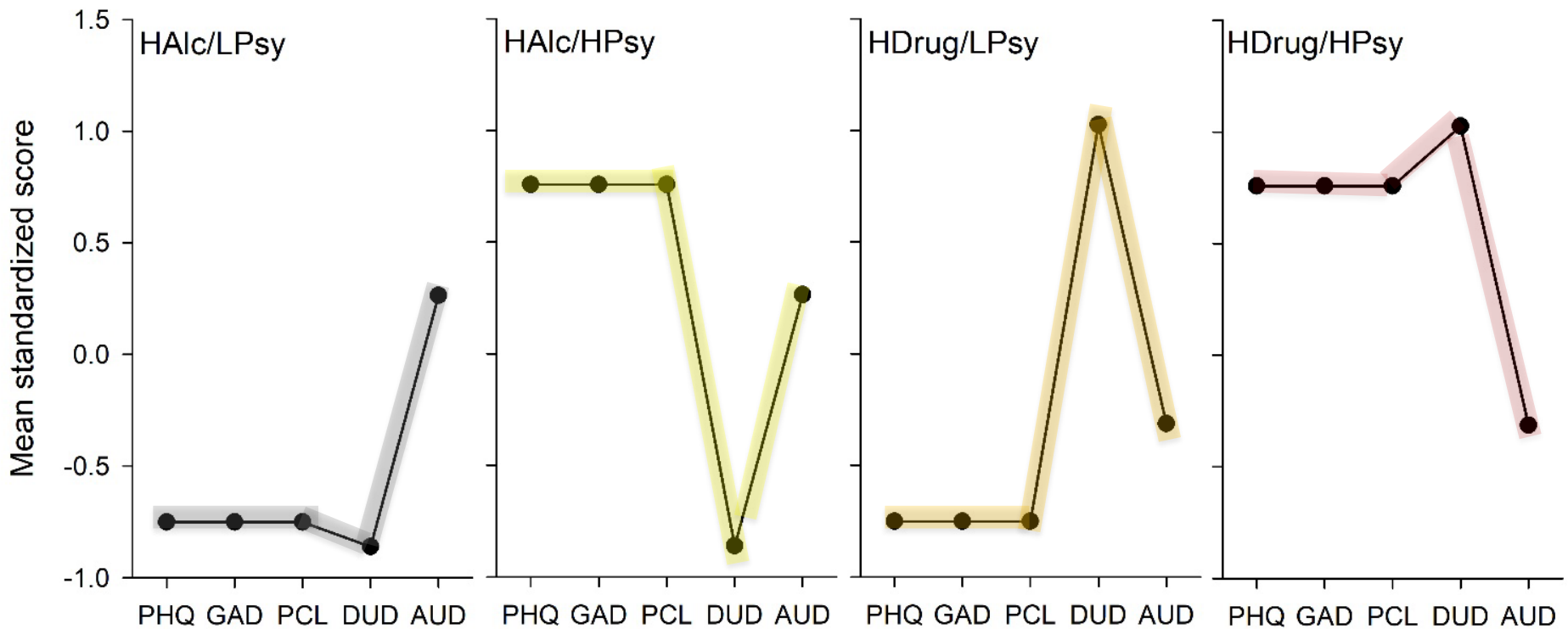
**Which size fits best?**

# Latent Profiles in Homewood's Addiction Medicine Program



Syan et al. (2019) *Journal of Substance Abuse Treatment*

# Latent Profiles in Homewood's Addiction Medicine Program



Minhas et al. (2021) *Substance Abuse: Research and Treatment*



# Research Ethics Considerations

- Opt-in Model

- ☐ Explicit Consent

- Opt-out Model

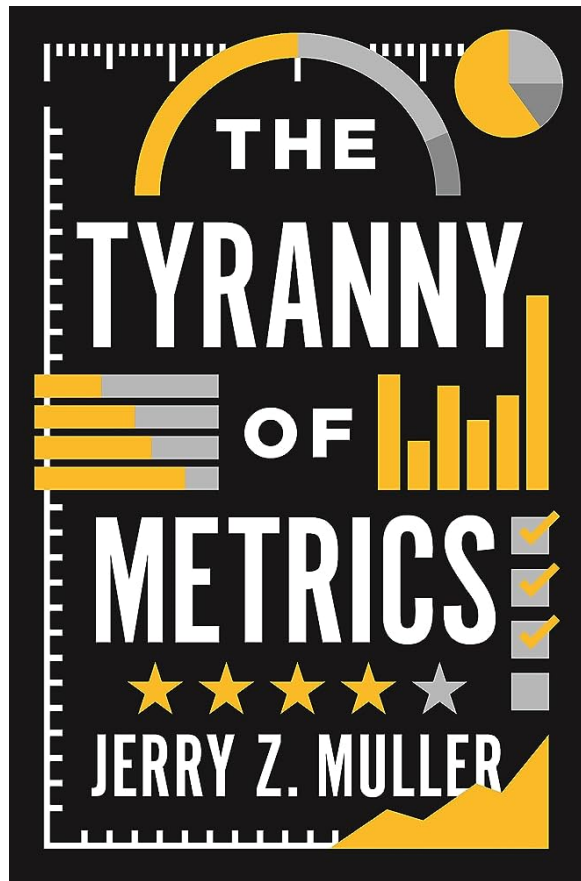
- ☐ Implicit Consent

- Retrospective Chart Review Model

- ☐ Archival Clinical Data Access



# Critical Thinking About Measurement-based Care in Psychiatry



## **Goodhart's Law:**

*"When a measure becomes a target, it ceases to be a good measure"*

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MBC for SUD is a powerful framework  
for improving care, promoting quality  
improvement, and conducting clinical  
research.

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# Recent Reviews

SUBSTANCE USE HEALTH AND ADDICTIONS



**M**easurement-based care (MBC), also referred to as progress and outcome monitoring or routine outcome monitoring, uses standardized measurement to guide and monitor progress and outcomes of treatment over time. Specifically, MBC is supported by an information system that collects, stores, analyzes, and reports on client-reported symptoms, functioning, and treatment response, along with clinical workflows that facilitate the use of these data. Despite a number of benefits, MBC remains underutilized in substance use disorder (SUD) treatment. In this article, we outline some key aspects of MBC and considerations for its implementation within SUD treatment.

## MBC AND SUD TREATMENT

MBC can enhance many aspects of SUD treatment including:

- **Initial assessment** – MBC typically begins with a comprehensive assessment of clients' substance use health, including type and frequency of substances used, severity of use, as well as measures of co-occurring disorders (e.g., major depressive disorder, post-traumatic stress disorder), global functioning, and quality of life. Many brief validated tools (e.g., Alcohol Use

## MEASUREMENT-BASED CARE FOR SUBSTANCE USE DISORDERS

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Current Psychiatry Reports  
<https://doi.org/10.1007/s11920-024-01495-3>



## Using Measurement-Based Care as a Precision Medicine Strategy for Substance Use Disorders

Andriy V. Samokhvalov<sup>1,2,3,4,5</sup> · Emily Levitt<sup>1,3,6</sup> · James MacKillop<sup>1,3,6</sup>

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### Abstract

**Purpose of Review** Precision medicine prioritizes characterization of individual patient parameters to optimize care and this review evaluates measurement-based care (MBC) as a strategy for doing so in the treatment of substance use disorders (SUD). Measurement-based care refers to the systematic use of validated assessments to inform diagnosis and treatment planning, with varying frequency of assessments. Despite the seemingly obvious grounds for the use of MBC in treating SUD, systematic implementation to date has been limited. Thus, the goal of this review is to evaluate efforts to date and to stimulate greater consideration of MBC models in addictions programs.

**Recent Findings** Data from two published randomized controlled trials and findings from pragmatic clinical research highlight the potential utility of MBC in the SUD treatment settings. Despite these findings, the existing literature indicates the high need for larger-scale clinical trials and quality improvement programs. Potential barriers to the implementation of MBC for SUD are outlined at the patient, provider, organization, and system levels, as well as the challenges associated with the use of MBC programs for clinical research. Critical thinking considerations and risk mitigation strategies are offered toward advancing MBC for SUD beyond the current nascent state.

**Summary** Collectively, the existing data confirm that MBC is a suitable and promising strategy for applying a precision medicine approach in SUD treatment, warranting further implementation efforts and scientific inquiry.

**Keywords** Precision medicine · Measurement-based care · Substance use disorder · Alcohol use disorder · Addiction · Care pathway · Review

### Introduction

The goal of precision medicine is to move away from one-size-fits-all models of healthcare, toward personalized treatment that specifically addresses individual features of

a patient's presentation. The essence of the approach is that, via trenchant assessments of biological or clinical features, the person's condition can be precisely characterized and more effectively treated. Often, proposals for the application of precision medicine emphasize the use of biological indicators, measures such as serum, DNA, or neuroimaging assays, but patient-reported outcomes may be equally viable, less invasive, and more cost-effective.

One strategy using patient-reported outcomes is measurement-based care (MBC), an emerging healthcare model that is based on a systematic use of quantitative measures for characterizing patient presentations, identifying treatment goals, and often iteratively employing therapeutic interventions to optimize outcomes [1–6]. The core principle of MBC is the active use of quantitative clinical assess-

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[https://cpa.ca/docs/File/Psynopsis/2023/Psynopsis\\_Vol45-3.pdf](https://cpa.ca/docs/File/Psynopsis/2023/Psynopsis_Vol45-3.pdf)

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# Thank you!



PLEASE fill out our program evaluation assessment!