

# Hierarchical Clustering of Mental Disorders Based on Prescription Opioid Non-Medical Use History

J.D. Swanson<sup>1</sup>, J.C. Black<sup>1</sup>, C.M. Haynes<sup>1</sup>, K. Rockhill<sup>1</sup>, K.P. May<sup>1</sup>, E. Amioka<sup>1</sup>, R. Dart<sup>1</sup>  
<sup>1</sup>Rocky Mountain Poison & Drug Center - Denver Health, Denver, CO

## Background

There is a known association between mental disorders and higher rates of opioid misuse, however, research has scarcely compared the associations among mental illnesses. Such comparisons could be used:

- 1) To identify subpopulations among individuals already at risk for opioid misuse who may be at an even further increased risk
- 2) As a discriminating feature of mental health disorders, and could aid diagnostic assessments and treatment planning
- 3) To elucidate mental disorder etiologies by signaling disruptions to the endogenous opioid system

## Methods

The Survey of Non-Medical Use of Prescription Drugs (NMURx) Program administers cross-sectional surveys examining the non-medical use (NMU) of prescription medication as part of the Researched Abuse, Diversion and Addiction Related Surveillance (RADARS<sup>®</sup>) System.

In the 3<sup>rd</sup> quarter of 2017, data from 30,010 respondents were collected. Post-stratification weighting was used so that respondents represented the 249,485,228 adults in the US.

Respondents were asked about:

- 1) Their lifetime, last 12 month, last 90 day, last 30 day, and last 7 day NMU of prescription opioid medications
- 2) Whether they had ever been told by a healthcare professional that they had one or more mental disorders

NMU was defined as use of a medication without a doctor's prescription or for any reason other than what was recommended by a doctor.

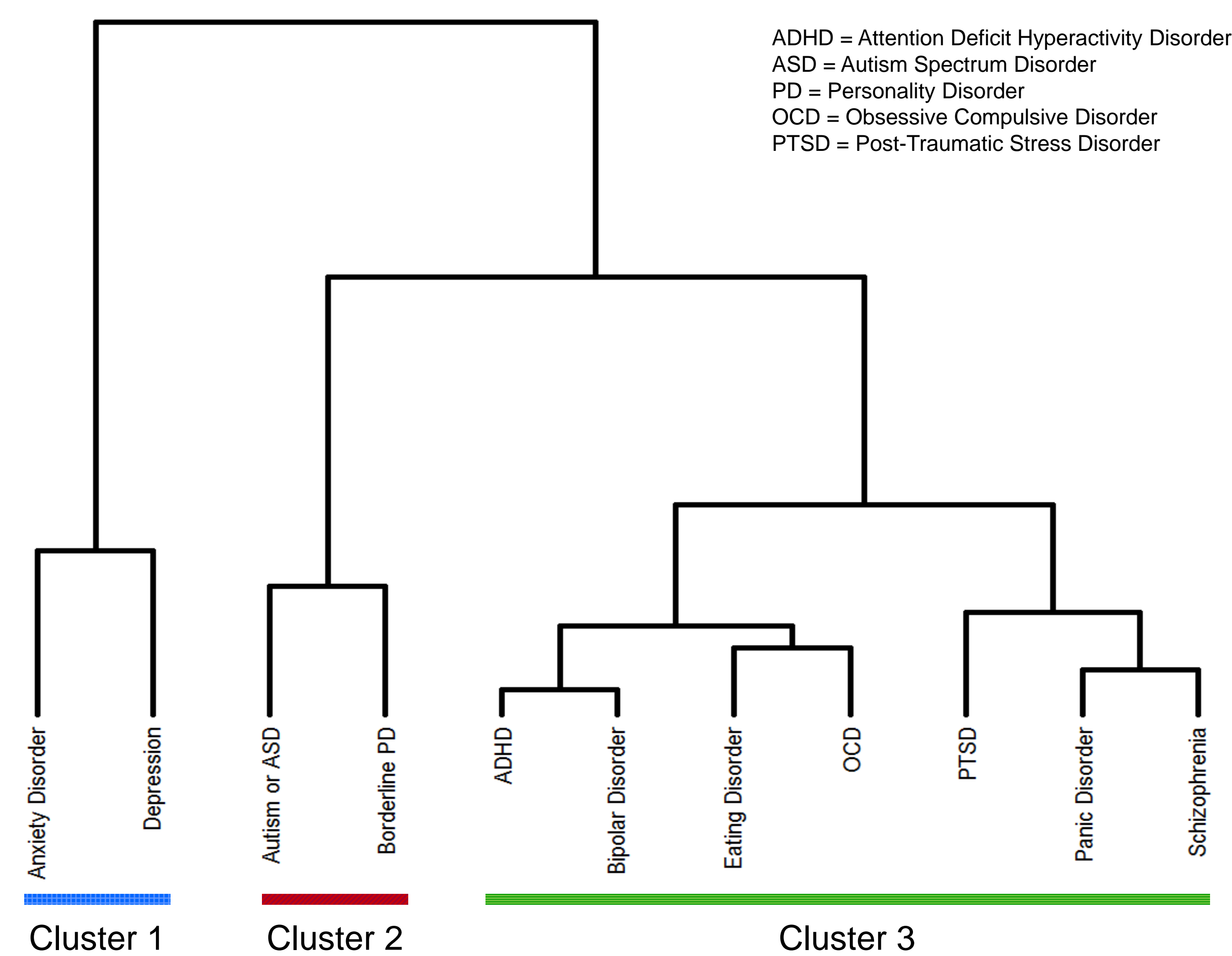
Using Rao-Scott chi-square tests, the relation between each disorder and prescription opioid NMU at each time-frame was examined. Hierarchical clustering using the standardized residuals from each test was used to determine which diagnoses clustered together based on association with prescription opioid NMU. Prevalence and 95% CI of the mental disorders, and opioid NMU among the mental disorder clusters, were calculated.

## Mental Disorder Prevalence

Mental Disorder	% (95% CI)	Mental Disorder	% (95% CI)
Anxiety Disorder	28.1% (27.6, 28.6)	Eating Disorder	2.4% (2.3, 2.6)
ADHD	6.3% (6.0, 6.6)	OCD	4.0% (3.7, 4.2)
Autism or ASD	1.6% (1.5, 1.8)	Panic Disorder	6.0% (5.7, 6.2)
Bipolar Disorder	5.3% (5.0, 5.5)	PTSD	5.3% (5.1, 5.6)
Borderline PD	1.8% (1.6, 2.0)	Schizophrenia	1.1% (1.0, 1.3)
Depression	27.2% (26.7, 27.7)		

ADHD = Attention Deficit Hyperactivity Disorder; ASD = Autism Spectrum Disorder; PD = Personality Disorder; OCD = Obsessive Compulsive Disorder; PTSD = Post-Traumatic Stress Disorder

## Hierarchical Clustering Dendrogram



## Respondent Characteristics

Characteristic	% (95% CI)	Characteristic	% (95% CI)
<b>Age Category</b>		<b>Race</b>	
18-24	12.4 (11.9, 12.8)	White	82.7 (82.2, 83.1)
25-34	17.9 (17.5, 18.4)	Black	8.6 (8.3, 8.9)
35-44	16.2 (15.8, 16.6)	Asian	3.7 (3.5, 3.9)
45-54	17.1 (16.7, 17.6)	AI/AN	0.9 (0.8, 1.1)
55-64	16.6 (16.3, 17.0)	NH/PI	0.3 (0.2, 0.3)
65+	19.7 (19.2, 20.3)	Other	2.9 (2.7, 3.1)
<b>Sex</b>		<b>Region</b>	
Male	48.7 (48.1, 49.3)	Northeast	17.8 (17.3, 18.2)
Female	51.3 (50.7, 51.9)	Midwest	21.0 (20.5, 21.5)
<b>Hispanic/Latino</b>		South	37.7 (37.1, 38.2)
Yes	10.5 (10.2, 10.9)	West	23.6 (23.1, 24.1)
No	88.8 (88.4, 89.2)		

AI/AN: American Indian or Alaska Native; NH/PI: Native Hawaiian or Pacific Islander; CI: Confidence Interval; Weighted N = 249,485,228

## Results

Hierarchical clustering revealed three clusters of mental disorders based on opioid NMU history. These clusters were comprised of:

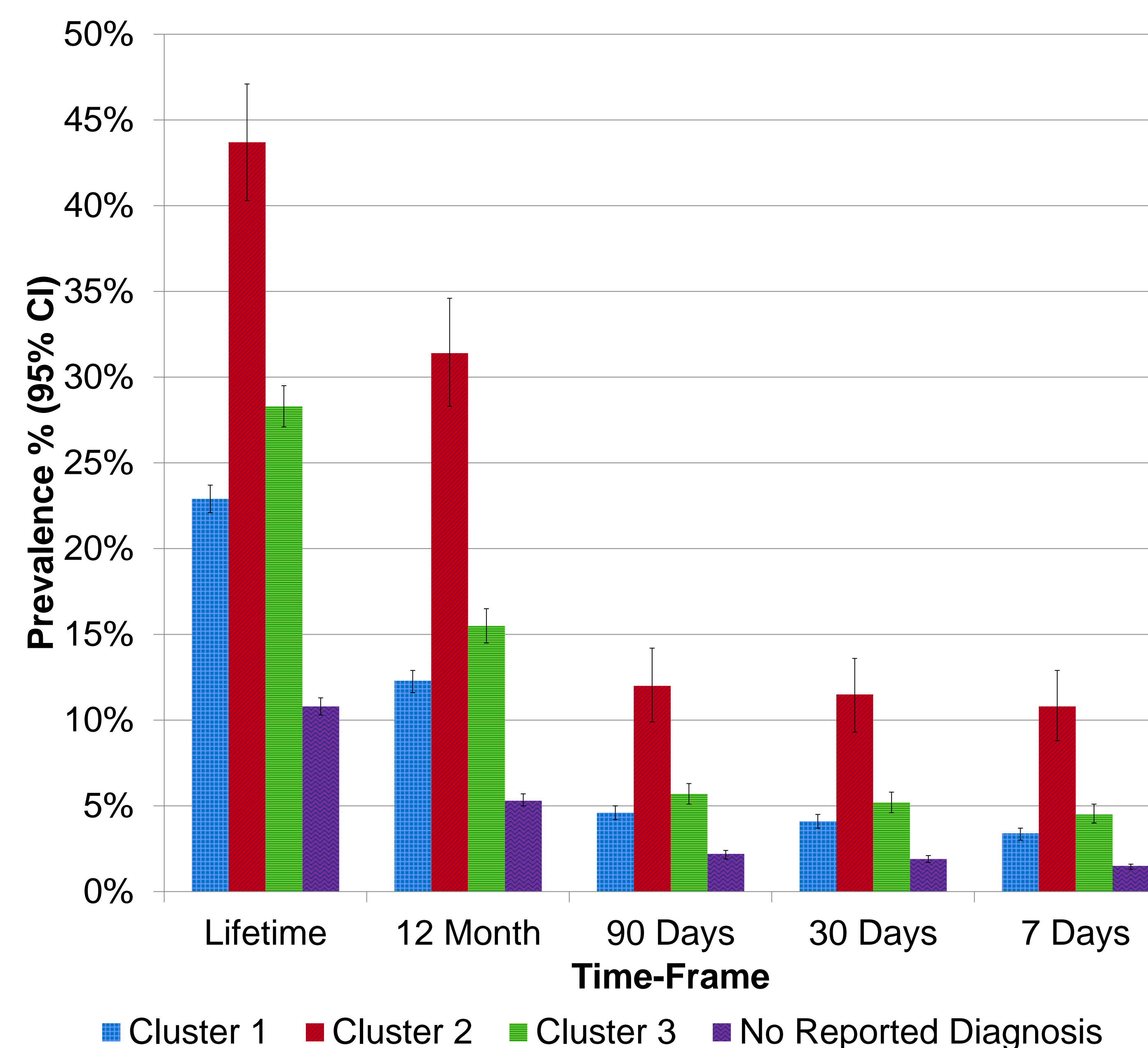
- 1) Anxiety Disorder and Depression
- 2) Autism or ASD and Borderline Personality Disorder
- 3) All remaining mental disorders

Cluster 1 had a lower prevalence of prescription opioid NMU relative to Clusters 2 and 3. Cluster 2 had the highest prevalence of prescription opioid NMU. All three clusters had a higher prevalence of prescription opioid NMU compared to adults who had never been given a mental health disorder diagnosis by a healthcare professional.

## Conclusions

Opioid NMU appears to be a behavior that can be discriminated among mental health disorders and used to identify certain subpopulations of individuals who may be at an increased risk for opioid NMU relative to other mental health conditions. These data show that individuals with a diagnosis of Borderline PD and Autism or ASD have a heightened prevalence of opioid NMU. This clustering may reflect commonalities between these disorders, such as possible endogenous opioid system dysregulation, marked relationship difficulties and social isolation, or other shared factors that influence NMU. Treatment efforts for drug use should consider a patient's history of opioid NMU and any potential differential risk associated with a specific mental health diagnosis.

## Opioid Non-Medical Use Prevalence



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