American Association of Psychiatric Pharmacists

AAPP Research Toolkit: Using the Core Outcome Set for Psychiatric Pharmacists (COS-PP)

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This toolkit is intended to highlight both the evidence-base, available literature as well as strategies of clinical decision making used by expert clinicians. The content reflects the views and practice of the authors as substantiated with evidence-based facts as well as opinion and experience. The opinions and recommendations in this document reflect those of the authors and do not necessarily reflect those of their employers or AAPP.

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American Association of Psychiatric Pharmacists (AAPP)

AAPP is a professional association representing psychiatric pharmacists nationwide. Our members integrate into teams of health care professionals, making a difference in overall costs, treatment efficiencies, patient recovery and quality of life. Learn more at aapp.org/psychpharm.

Background

Psychiatric pharmacists are uniquely trained to provide valuable knowledge in the management of psychiatric disorders and are an integral medication expert within team-based care. However, previous work by AAPP assessing best practices and reviewing the literature has noted a paucity of data demonstrating the value of psychiatric pharmacists on the health care team. Although there are a few well designed studies published, it has been challenging to aggregate the results due to significant variations in practice and innovation over the last 40 years. (Werremeyer, Goldstone) Existing studies are inconsistent in the outcome measures examined, most lack statistical significance, and there are few attempts to replicate promising outcomes. In order to justify expansion of clinical services and the creation of psychiatric pharmacist positions to enhance patient care, publications must clearly demonstrate the contribution of psychiatric pharmacists to the healthcare team and their impact on meaningful outcomes. This data is necessary to show payers, legislators, and administrators how psychiatric pharmacists improve the quadruple health care aim of better care, reduced cost, improved patient experience, and provider well-being. Following an extensive review of the existing literature describing psychiatric pharmacy practice and the impact of a psychiatric pharmacist on the quadruple aim, (Werremeyer) AAPP developed a consensus-based set of outcomes and measures to improve research standardization. The measures in this Core Outcome Set for Psychiatric Pharmacists (COS-PP) are intended to be utilized to study the impact of psychiatric pharmacists in caring for individuals living with psychiatric disorders through consistent, measurable, reportable, and reproducible population specific outcomes that are primarily medication-related. (MANUSCRIPT REFERENCE) While this is not an exclusive list, it does support gaps identified in the literature.

Intended Audience

The COS-PP toolkit is intended to provide guidance and support for research related to psychiatric pharmacist impact. Students, residents, pharmacists, and faculty can use the COS-PP to help design clinical trials. Utilization of a unified core outcome set will ultimately benefit the patients by providing robust evidence of the value of having psychiatric pharmacists on the team to improve access to care, quality of care, and patient satisfaction. The benefits of the COS-PP also extend to other healthcare providers through demonstrating improved patient outcomes, improved access to care as psychiatric pharmacists increase the capacity of the health care team, and provider satisfaction reducing burnout and turnover. It benefits payers by providing clear evidence of the value of psychiatric pharmacists on the team - improving patient access to care, quality of care, team satisfaction, and health care costs.

How to Use the COS-PP

The COS-PP is organized by the categories of the quadruple health care aim – better care, reduced cost, improved patient experience, and provider well-being.

First choose the outcome(s) you would like to measure, then choose the measure(s) for each outcome. Consider choosing multiple outcomes and measures from different quadruple aim categories. Measures may be general or disease state specific. Once measure(s) are chosen then use rating scales and other tools recommended for each measure, found in the appendix. Practice site measures required for quality improvement, by payers, regulators, or accrediting bodies, and how pharmacists can impact those measures, must also be taken into consideration when choosing additional medication-focused measures.

The COS-PP can be applied for multiple purposes. It can be used by an individual pharmacist to measure impact at a practice site. It can assist residents or new practitioners in developing research projects. It can be used by advanced practitioners or academics to guide research design. It can help generate ideas for a group of

collaborating pharmacists to develop multi-site research. It can be used to replicate research by others or used by teams and administrators to identify roles for pharmacists on the team.

Limitations

This toolkit does not constitute a complete list of measures, but is suggested by the COS team as the best measures to use in practice and research to measure the impact of psychiatric pharmacists on the health care team. Some measures may be more relevant to BCPPs and others more aimed toward care teams. It is intended to be a living document that will continue to evolve as experience and research progresses.

SECTION 1: Disease state measurements

Assessment Measurements for Attention-Deficit/Hyperactivity Disorder (ADHD)

Measurement Name	Hyperlink for Measurment
Adult ADHD Self-Report Scale (ASRS) Symptom Checklist	ASRS Symptom Checklist
Vanderbilt ADHD Diagnostic Rating Scale	Vanderbilt ADHD Assessment Scales
Conners' Rating Scale – Revised (Teacher/Parent)	Conners' Rating Scale
Conners' Adult ADHD Rating Scale (CAARS)	CAARS*

***Requires payment for access**

With any ADHD assessment, a scale should not be used alone in determining the presence of an ADHD diagnosis. The ASRS is an assessment used to assist screening adults for symptoms of ADHD. With the ASRS, 18 questions are administered which center around diagnostic criteria for ADHD and may suggest a further clinical interview to clarify the diagnostic impression. The Vanderbilt ADHD assessment scales are intended for pediatric use and consist of a parent and teacher component to complete – similar to the Conners' Rating Scale –Revised. In addition, the CAARS is available for use in adults, however requires payment prior to utilizing.

Assessment Measurements for Alcohol Use Disorder (AUD)

Measurement Name	Hyperlink for Measurment
Alcohol Use Disorders Identification Test (AUDIT)	AUDIT
Clinical Institute Withdrawal Assessment – Alcohol Revised (CIWA-Ar)	CIWA-Ar
CAGE Substance Abuse Screening Tool	CAGE Questionnaire

Screening for unhealthy alcohol use can be completed with the AUDIT or AUDIT-C; scores can assist in determining hazardous use or identifying alcohol use disorders (scoring cut-off are different for men and women). Likewise, the CAGE screening tool is a brief questionnaire that can be utilized in various settings (Primary Care, Specialty Care, etc.). In the screening and treatment of alcohol withdrawal, the CIWA-Ar may be administered to determine the severity of the withdrawal.

In addition, the Penn Alcohol Craving Scale has been used to help clinicians ask patients about cravings towards alcohol use over the past week.

Assessment Measurements for Anxiety Disorders

Measurement Name	Hyperlink for Measurement
Beck Anxiety Inventory (BAI)	Beck Anxiety Inventory*
Generalized Anxiety Disorder – 7 Item (GAD-7)	GAD-7*
Hamilton Anxiety Scale (HAM-A)	HAM-A
Zung Self-Rated Anxiety Scale (SAS)	Zung SAS*

***Provides hyperlink to journal publication associated with measurement**

The above measurements for anxiety disorders assist in determining the severity of the condition (e.g. mild, moderate, severe) and can be utilized to track progress in symptom management during course of treatment. Zung provides both a self-rated scale (above) and an interviewer-rated inventory (Anxiety Status Inventory).

Additional measurements for use include the Penn State Worry Questionnaire (PSWQ) and the Duke Anxiety and Depression Scale.

Assessment Measurements for Bipolar Disorder

Measurement Name	Hyperlink for Measurement
Mood Disorder Questionnaire (MDQ)	MDQ
Young Mania Rating Scale (YMRS)	YMRS*

***Provides hyperlink to journal publication associated with measurement**

While perhaps not utilized in daily practice (acute or ambulatory care), the Young Mania Rating Scale (YMRS) is widely utilized as a rating scale to assess for acute mania and has been important in objectifying clinical trial treatments in acute mania with bipolar disorder. The Mood Disorder Questionnaire (MDQ) allows patients to select "yes" or "no" to various questions which may aid a clinician in screening for bipolar disorder.

Additional measurements for use include: Manic State Rating Scale (MSRS), Clinical Global Impressions Scale for Bipolar Disorder (CGI-BP), Bech-Rafaelsen Mania Scale (MAS). Clinician-Administered Rating Scale for Mania (CARS-M), Altman Self-Rating Mania Scale (ASRM), and the Bipolar Depression Rating Scale (BDRS).

Assessment Measurements for Chronic Pain Conditions

Measurement Name	Hyperlink for Measurement
Headache Impact Test (HIT)	Headache Impact Test
Migraine Disability Assessment (MIDAS)	Migraine Disability Assessment

Two instruments which can be considered for measuring headache/migraine severity and disability are the Headache Impact Test (HIT) and Migraine Disability Assessment (MIDAS).

Additional measurements for use include: the Brief Pain Inventory, Chronic Pain Grade Questionnaire (CPG), Wong-Baker FACES® Pain Rating Scale, and the Functional Pain Scale.

Assessment Measurements for Delirium

Measurement Name	Hyperlink for Measurement
Delirium Rating Scale R-98 (DRS-R-98)	Delirium Rating Scale R-98
Confusion Assessment Method (CAM)	Confusion Assessment Method
Confusion Assessment Method for the Intensive Care Unit (CAM-ICU)	CAM-ICU

The Delirium Rating Scale R-98 (DRS-R-98) assesses 13 separate areas involving symptoms related to delirium (e.g. delusions, hallucinations, orientation, memory). The sum of the 13 areas will provide an overall severity score for the patient. The Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) is a measurement tool that was modified from the CAM to assess for delirium for patients admitted with intensive care units. CAM-ICU yields a result of either positive (delirium present) or negative (no delirium). In scoring the original CAM for a diagnosis of delirium, certain aspects are needed to be present and is similar in presentation to the CAM-ICU.

Assessment Measurements for Depressive Disorders

Measurement Name	Hyperlink for Measurement
Beck Depression Inventory (BDI)	Beck Depression Inventory
Patient Health Questionnaire – 9 (PHQ-9)	PHQ-9*
Geriatric Depression Scale (GDS)	GDS*
Hamilton Rating Scale for Depression (HAM-D)	HAM-D*
Montgomery-Åsberg Depression Rating Scale (MADRS)	MADRS*
Children's Depression Rating Scale – Revised (CDRS-R)	CDRS-R

***Provides hyperlink to journal article/website associated with measurement**

There are numerous assessments available to assess depression symptom severity for adults, children, and the elderly. Essentially all of the above measurements for depressive disorder may be utilized in ambulatory clinics, in addition to acute care settings.

Additional measurements for use include: Center for Epidemiologic Studies Short Depression Scale (CES-D), Hopkins Symptom Checklist Depression Scale (HSCL-D), Quick Inventory od Depressive Symptomatology (QIDS), Patient Health Questionnaire-2 (PHQ-2), and the Zung Self-Rating Depression Scale (SDS).

Assessment Measurements for Epilepsy and Seizure Disorders

Measurement Name	Hyperlink for Measurement
National Hospital Seizure Severity Scale (NHS3)	NHS3*

***Provides hyperlink to journal article associated with measurement**

To help quantify the severity of seizures and measure outcomes associated with antiepileptic drugs (AEDs), the National Hospital Seizure Severity Scale (NHS3) may serve as a valid measurement for seizure severity. The scale assesses seven seizure-related factors and has a total score range from 1 to 27.

Additional measurements include: Liverpool Seizure Severity Scale and Neurological Disorders Depression Inventory in Epilepsy (NDDI-E)

Assessment Measurements for Insomnia Disorders

Measurement Name	Hyperlink for Measurement
Insomnia Severity Index (ISI)	Insomnia Severity Index*
Pittsburgh Sleep Quality Index (PSQI)	PSQI
Epworth Sleepiness Scale (ESS)	ESS

***Provides hyperlink to journal article associated with measurement**

The Insomnia Severity Index (ISI) is a brief (7-item) instrument utilized to help identify insomnia and can be used across the spectrum of patient care. The Pittsburgh Sleep Quality Index (PSQI) is a self-rated measurement that rates sleep quality/disturbances over a one-month period; with the grading of the PSQI separated into seven components with a total of 19 self-rated questions. The Epworth Sleepiness Scale (ESS) may also be utilized in various settings as the instrument is brief (8-item questionnaire) and provides a subjective severity rating for daytime sleepiness.

Additional measurements include: Stanford Sleepiness Scale and Fatigue Severity Scale

Assessment Measurements for Opioid Use Disorder

Measurement Name	Hyperlink for Measurement

Clinical Opiate Withdrawal Scale (COWS)	COWS
Current Opioid Misuse Measure (COMM)	COMM

There are validated measures to screen for opioid misuse and for measuring the severity of opioid withdrawal symptoms. The Current Opioid Misuse Measure is a 17-item questionnaire to screen for opioid misuse. Although it was developed in the context of screening prior to intervention, especially in patients on chronic opioid therapy, this measure could potentially be used post-intervention. The Clinical Opiate Withdrawal Scale focuses on the severity of opioid withdrawal symptoms and can be used pre- and post- intervention to measure improvement in symptoms.

Assessment Measurements for Parkinson's Disease

Measurement Name	Hyperlink for Measurement
Modified Hoehn and Yahr Scale	Modified Hoehn and Yahr Scale
Schwab and England Activities of Daily Living Scale	Schwab and England Activities of Daily Living Scale

There are numerous assessment measures for Parkinson's Disease. Some measures focus on the severity on the disease on movement or functionality, whereas some assessments focus on the cognitive effects of the disease. The Modified Hoehn and Yahr Scale assesses for the severity of movement dysfunction and its effect on daily living. The Schwab and England Activities of Daily Living Scale focuses specifically on the severity of the disease as it effects daily living. Both of these measures can be used pre- and post-intervention.

Other rating scales include the Unified Parkinson's Disease Rating Scale (UPDRS), the Parkinson Psychosis Rating Scale (PPRS), the Scale for Assessment of Positive Symptoms for Parkinson's Disease (SAPS-PD), and the Parkinson Psychosis Questionnaire.

Assessment Measurements for Post-Traumatic Stress Disorder (PTSD)

Measurement Name	Hyperlink for Measurement
PTSD Checklist (PCL-5)	PCL-5

A popular assessment measure for PTSD is the PTSD Checklist (PCL-5), which is a 20-item self-reported rating scale. The PCL-5 can be used both as a screen and as a measure for improvement over time post-intervention. Other assessment measures for PTSD include the Posttraumatic Diagnostic Scale (PDS-5) and the Clinician Administered PTSD Scale (CAPS-5).

Assessment Measurements for Antipsychotic-Induced Movement Disorders

Measurement Name	Hyperlink for Measurement
Abnormal Involuntary Movement Scale (AIMS)	AIMS
Barnes Akathisia Rating Scale (BARS)	BARS
Extrapyramidal Symptoms Rating Scale (ESRS)	ESRS
Modified Simpson Angus Scale (MSAS)	MSAS

There are multiple validated assessment measures for antipsychotic-induced movement disorders that can all be used pre- and post-intervention to measure improvement in symptoms. Of note, some measures focus on a specific movement disorder, such as the Abnormal Involuntary Movement Scale or the Barnes Akathisia Rating Scale. Others will measure symptoms of a variety of movement disorders, such as the Extrapyramidal Symptoms Rating Scale and Modified Simpson Angus Scale. Choice of which measure to use should take specific movement disorders of interest into consideration.

Other assessment measures include the Dyskinesia Identification System-Condensed User Scale (DISCUS) and the Unified Dystonia Rating Scale (UDRS).

Assessment Measurements for Neurocognitive Disorders

Measurement Name	Hyperlink for Measurement
Alzheimer's Disease Assessment Scale-Cognitive (ADAS-Cog Subscale)	ADAS-COG Subscale
Functional Assessment Staging Test (FAST)	FAST
Mini-Mental State Examination (MMSE)	MMSE
Montreal Cognitive Assessment (MoCA)	MoCA
Saint Louis University Mental Status (SLUMS) Exam	SLUMS

There are a number of instruments used for a variety of neurocognitive disorders and depending on the instrument, can be used to screen or measure severity of the disorder. Although many of these instruments overlap in what they measure, there are nuances for when an instrument should be used. The Mini-Mental State Examination, Montreal Cognitive Assessment, and Saint Louis University mental Status Exam can be used for detecting the presence of cognitive impairment and/or dementia. Although usually used for detection, in some circumstances a clinician could look at scores post-intervention. The Alzheimer's Disease Assessment Scale-Cognitive and Functional Assessment Staging Test are used primarily to assess the severity of dementia and can be used to track change in severity of dementia over time.

Other measures used in neurocognitive disorders include the BEHAVE-AD Assessment System, the Consortium to Establish a Registry for Alzheimer's Disease, the Delirium Rating Scale R-98, the Alzheimer's Disease Assessment Scale, the Dementia Effects on Activities of Daily Living, the Severe Impairment Battery, and the Neuropsychiatric Inventory.

Assessment Measurements for Schizophrenia Spectrum Disorders

Measurement Name	Hyperlink for Measurement
Brief Psychiatric Rating Scale (BPRS)	BPRS
Positive and Negative Symptoms Scale (PANSS)	PANSS

The assessment measures for schizophrenia spectrum disorders vary in scoring, focus, and length. Most assessment measures will focus on positive and/or negative symptoms related to schizophrenia. The Brief Psychiatric Rating Scale is an 18-item rating scale that measures positive and negative symptoms. The Positive and Negative Symptoms Scale is a longer 30-item rating scale that also measures positive and negative symptoms. These measures can be assessed pre- and post-intervention to measure change in severity of schizophrenia-related symptoms.

Other rating scales to consider using are the Scale for the Assessment of Positive Symptoms (SAPS), the Scale for the Assessment of Negative Symptoms (SANS), the Clinical Global Impression (CGI), and the Calgary Depression Scale for Schizophrenia (CDSS).

Assessment Measurements for Developmental Disorders

Measurement Name	Hyperlink for Measurement
Yale Global Tic Severity Scale	Yale Global Tic Severity Scale
Modified Overt Aggression Scale	Modified Overt Aggression Scale

There are a wide range of developmental disorders and instruments utilized for screening and measuring severity of the disorder in patients. The Yale Global Tic Severity Scale and Modified Overt Aggression Scale can be utilized pre- and post-intervention to assess severity of symptoms associated with various developmental disorders.

Other instruments used for the screening and measuring of severity of various developmental disorders like autism spectrum disorder include the Autism Diagnostic Observation Scale-2 (ADOS-2), the Autism Diagnostic Interview-Revised, the Vineland Adaptive Behavior Scale-II, the Aberrant Behavior Checklist (ABC), and the Childhood Autism Rating Scale-2 (CARS 2).

Assessment Measurements for Nicotine Use Disorder

Measurement Name	Hyperlink for Measurement
Fagerstrom Test for Nicotine Dependence (FTND)	FTND

Assessment measurements for nicotine use disorder generally include standardized tests to measure nicotine dependence prior to intervention, or standardized measures to quantify abstinence rates. The Fagerstrom Test for Nicotine Dependence is a standardized instrument designed to provide an ordinal measure of nicotine dependence related to cigarette smoking. It can be used to determine an indication for nicotine cessation pharmacotherapy.

Other instruments to measure abstinence include the Point Prevalence Abstinence Rate or Prolonged Abstinence Rate and the Richmond Test to predict likelihood of abstinence success.

SECTION TWO: Outcomes measurements

Quadruple Aim: Improved Patient Care

Outcome 1: Increased completion of accurate medication history or reconciliation		**Example Calculation**
Measurement	1.1 Patients with complete and accurate medication reconciliation completed by pharmacy within 24 hours of health care encounter initiation	**X% = 100 x A/B** **A** = # of patients with completed medication reconciliation by pharmacy **B** = # of patients with a health care encounter
	1.2 Patients on psychotropics being appropriately restart after dose reduction or discontinuation in a specified time period	**X% = 100 x A/B** **A** = # of patients appropriately continue or restarted on [Medication] in hospital **B** = # of patients on [Medication] prior to admission
Outcome 2: Improved prescriber adherence to evidence-based pharmacotherapy		
Measurement	2.1 Patients on evidenced-based pharmacotherapy	**X% = 100 x A/B** **A** = # of patients on evidence-based pharmacotherapy **B** = # of patients on pharmacotherapy
	2.2 Patients with a psychiatric disorder initiated on pharmacotherapy recommended by a pharmacist	**X% = 100 x A/B** **A** = # of patients with a psychiatric disorder initiated on pharmacy-recommended medication **B** = # of patients with psychiatric disorders
Outcome 3: Optimized medication therapy through deprescribing		
Measurement	3.1 Discontinuation of potentially inappropriate medications (PIMs)	**X% = 100 x A/B** **A** = # of PIMs discontinued **B** = # of PIMs identified
Outcome 4: Optimized patient safety through surveillance		
Global Measures		
Measurement	4.1 Anticholinergic Risk Scale (ARS)	
	4.2 Patients with appropriate safety monitoring and screening for interactions per treatment guidelines or FDA labeling	**X% = 100x A/B** **A** = # of patients monitored or screened **B** = # of patients on psychotropics
	4.3 Patients on psychotropics who receive suicide screening within three months of initiation	**X% = 100 x A/B** **A** = # of patients screened for suicide **B** = # of patients initiated on psychotropics
	4.4 Patients on psychotropics screened for sexual dysfunction within three months of initiation	**X% = 100 x A/B** **A** = # of patients screened for sexual dysfunction **B** = # of patients initiated on psychotropics

	4.5 Percentage of patients on psychotropics with appropriate gradual dose reduction (e.g. as per Center for Medicare & Medicaid Services)	**X% = 100 x A/B** **A** = # of patients with appropriate gradual dose reduction documentation **B** = # of patients on psychotropics
Antipsychotics		
Measurement	4.6 Patients on antipsychotics with appropriate metabolic monitoring (e.g. as per American Psychiatric Association [APA] guideline)	**X% = 100 x A/B** **A** = # of patients on antipsychotics with metabolic monitoring **B** = # of patients on antipsychotics
	4.7 Patients on antipsychotics with appropriate abnormal involuntary movement monitoring (e.g., as per APA guideline)	**X% = 100 x A/B** **A** = # of patients on antipsychotics with abnormal involuntary movement monitoring **B** = # of patients on antipsychotics
Mood Stabilizers		
Measurement	4.8 Patients on mood stabilizers with appropriate therapeutic drug monitoring (TDM)	**X% = 100 x A/B** **A** = # of patients on mood stabilizers with TDM completed **B** = # of patients on mood stabilizers
	4.9 Patients who can become pregnant receiving a pregnancy test prior to being prescribed mood stabilizer	**X% = 100 x A/B** **A** = # of patients who can become pregnant on mood stabilizers with pregnancy test completed prior to initiation **B** = # of patients who can become pregnant prescribed mood stabilizers
	4.10 Patients on mood stabilizer receiving appropriate laboratory monitoring (per medication label)	**X% = 100 x A/B** **A** = # of patients on mood stabilizers with monitoring completed **B** = # of patients on mood stabilizers
Antidepressants		
Measurement	4.11 Patients receiving screening for bipolar disorder prior to initiation of an antidepressant	**X% = 100 x A/B** **A** = # of patients receiving screening for bipolar disorder **B** = # of patients initiated on an antidepressant
Benzodiazepines/Hypnotics		
Measurement	4.12 Patients on benzodiazepines/hypnotics taking more than prescribed	**X% = 100 x A/B** **A** = # of patients taking more benzodiazepines/hypnotics than prescribed **B** = # of patients on benzodiazepines/hypnotics
	4.13 Patients on benzodiazepines/hypnotics screened for substance use disorders	**X% = 100 x A/B** **A** = # of patients screened for SUDs **B** = # of patients on benzodiazepines/hypnotics

	4.14 Patients on benzodiazepines/hypnotics with a fall in a specified time period	**X% = 100 x A/B** **A** = # of patients with a fall **B** = # of patients on benzodiazepines/hypnotics
	4.15 Patients on benzodiazepines/hypnotics prescribed concomitant full-opioid agonist(s)	**X% = 100 x A/B** **A** = # of patients with concomitant full-opioid agonist **B** = # of patients on benzodiazepines/hypnotics
Attention-Deficit/Hyperactivity Disorder (ADHD) Medications		
Measurement	4.16 Patients prescribed stimulants taking more than prescribed	**X% = 100 x A/B** **A** = # of patients taking more stimulants than prescribed **B** = # of patients on stimulants
	4.17 Patients prescribed stimulants screened for substance use disorders	**X% = 100 x A/B** **A** = # of patients screened for SUDs **B** = # of patients on stimulants
	4.18 Patients on stimulants prescribed concomitant benzodiazepine(s)	**X% = 100 x A/B** **A** = # of patients with concomitant benzodiazepine **B** = # of patients on stimulants
Substance Use Disorder (SUD) Medications		
Measurement	4.19 Patients with a SUD prescribed or given take-home naloxone	**X% = 100 x A/B** **A** = # of patients receiving take-home naloxone **B** = # of patients with a SUD
Outcome 5: Improved progress towards treatment goals		
Global Measures		
Measurement	5.1 Patients with medication response based on a disease-specific validated rating scale	**X% = 100 x A/B** **A** = # of patients with response **B** = # of patients treated
	5.2 Patients in remission based on a disease-specific validated rating scale	**X% = 100 x A/B** **A** = # of patients achieving remission **B** = # of patients treated
	5.3 Patients with a clinically significant improvement on a global validated rating scale	**X% = 100 x A/B** **A** = # of patients with clinically significant improvement **B** = # of patients treated
	5.4 Patient reported symptom-free days	**X = A/B** **A** = # of symptom-free patient-days **B** = # of patients treated
ADHD		
Measurement	5.5 Utilize the global measures in conjunction with ADHD-specific validated rating scales, including: • Vanderbilt ADHD Diagnostic Rating Scale • Conner's Rating Scale – Revised (Parent/Teacher) • Adult ADHD Self-Report Scale (ASRS) Symptom Checklist • Conners' Adult ADHD Rating Scales (CAARS)	

Alcohol Use Disorder (AUD)		
Measurement	5.6 Utilize the global measures and consider using the Timeline Followback (TLFB) method to assess 5.7-5.11	
	5.7 Days abstinent from alcohol per month	**X = A/B** **A** = # of patient-days without alcohol use **B** = # of patients
	5.8 Drinking days per month	**X = A/B** **A** = # of patient-days with alcohol use **B** = # of patients
	5.9 Heavy drinking days per month (For men, consuming more than 4 drinks on any day or more than 14 drinks per week; for women, consuming more than 3 drinks on any day or more than 7 drinks per week)	**X = A/B** **A** = # of patient-days with heavy alcohol use **B** = # of patients
	5.10 Days to first drink	**X = A/B** **A** = total # of days to first drink for each patient **B** = # of patients
	5.11 Patients with undetectable blood alcohol levels (BAL)	**X% = 100 x A/B** **A** = # of patients with undetectable BAL **B** = # of patients
Anxiety Disorders		
Measurement	5.12 Utilize the global measures in conjunction with anxiety-specific validated rating scales, including: • Beck Anxiety Inventory (BAI) • Generalized Anxiety Disorder 7-item (GAD-7) • Hamilton Anxiety Scale (HAM-A) • Zung Self-rated Anxiety Scale (SAS)	
Bipolar and Related Disorders		
Measurement	5.13 Utilize the global measures in conjunction with bipolar affective disorder-specific validated rating scales, including: • Mood Disorder Questionnaire (MDQ) • Young Mania Rating Scale (YMRS)	
	5.14 Number of episodes per 6-month period	**X = A/B** **A** = # of mood episodes in a 6-month period **B** = # of patients
Chronic Pain		
Measurement	5.15 Utilize the global measures in conjunction with chronic pain-specific validated rating scales, including: • Headache Impact Test (HIT) • Migraine Disability Assessment (MIDAS)	
	5.16 Daily prescribed morphine milligram equivalents (MME)	**X = A/B** **A** = Total MME per day **B** = # of patients prescribed opioids
Delirium		
Measurement	5.17 Utilize the global measures in conjunction with delirium-specific validated rating scales, including: • Delirium Rating Scale R-98 (DRS-R-98) • Confusion Assessment Method (CAM)	

	5.18 Days to resolution of delirium	**X = A/B** **A** = Total # of days to resolution of delirium **B** = # of patients with delirium
Depressive Disorders		
Measurement	5.19 Utilize the global measures in conjunction with depression-specific validated rating scales, including: • Beck Depression Inventory (BDI) • Children's Depression Rating Scale-Revised • Geriatric Depression Scale (GDS) • Hamilton Rating Scale for Depression (HAM-D) • Montgomery–Åsberg Depression Rating Scale (MADRS) • Patient Health Questionnaire-9 (PHQ-9)	
Epilepsy/Neurology		
Measurement	5.20 Utilize the global measures in conjunction with epilepsy-specific validated rating scales, including: • National Hospital Seizure Severity Scale	
	5.21 Seizures per specified time period	**X = A/B** **A** = Total # of seizures per specified time period **B** = # of patients
Insomnia Disorders		
Measurement	5.22 Utilize the global measures in conjunction with insomnia-specific validated rating scales, including: • Epworth Sleepiness Scale (ESS) • Insomnia Severity Index (ISI) • Pittsburgh Sleep Quality Index (PSQI)	
	5.23 Time to sleep onset	**X = A/B** **A** = total time to sleep onset in minutes **B** = # of patients
	5.24 Duration of sleep	**X = A/B** **A** = total time asleep in minutes **B** = # of patients
	5.25 Nocturnal awakenings	**X = A / B** **A** = total # of nocturnal awakenings **B** = # of patients
	5.26 Early morning awakenings	**X = A/B** **A** = total # of early morning awakenings **B** = # of patients
	5.27 Wakefulness after sleep onset	**X = A/B** **A** = total time awake after sleep onset in minutes **B** = # of patients
	5.28 Sleep efficiency	**X = A/B** **A** = (total sleep time (TST)/ total time in bed (TIB)) * 100 **B** = # of patients
Opioid Use Disorder (OUD)		
Measurement	5.29 Utilize global measures	

	5.30 Days in treatment	**X = A/B** **A** = total # of days in treatment **B** = # patients
	5.31 Drug screens with expected results	**X% = 100 x A/B** **A** = total # of drug screens with expected results **B** = # of drug screens
	5.32 Days to first use	**X = A/B** **A** = total # of days to first non-prescribed opioid use **B** = # of patients
	5.33 Patients with reduced non-prescribed opioid use in a specific time period	**X% = 100 x A/B** **A** = # of patients with reduced non-prescribed opioid use **B** = # of patients in treatment
Parkinson Disease		
Measurement	5.34 Utilize the global measures in conjunction with Parkinson's disease-specific validated rating scales, including: • Modified Hoehn and Yahr Scale • Schwab and England Activities of Daily Living Scale	
	5.35 Number of off episodes per day	**X = A/B** **A** = total # of off episodes/ total # of days **B** = # of patients
	5.36 Time spent in off episodes per day	**X = A/B** **A** = total time spent in off episodes in minutes **B** = # of days
	5.37 Time in dyskinesia per day	**X = A/B** **A** = total time in dyskinesia in minutes **B** = # of days
Posttraumatic Stress Disorder (PTSD)		
Measurement	5.38 Utilize the global measures in conjunction with PTSD-specific validated rating scales, including the PTSD Checklist (PCL-5)	
Antipsychotic-induced Movement Disorders		
Measurement	5.39 Utilize the global measures in conjunction with antipsychotic-induced movement disorder-specific validated rating scales, including: • Abnormal Involuntary Movement Scale (AIMS) • Barnes Akathisia Rating Scale (BARS) • Extrapyramidal Symptoms Rating Scale (ESRS) • Modified Simpson Angus Scale (MSAS)	
	5.40 Anti-EPS interventions	**X = A/B** **A** = # of interventions for EPS **B** = # of patients prescribed antipsychotics
Neurocognitive Disorders		

Measurement	5.41 Utilize the global measures in conjunction with neurocognitive disorder-specific validated rating scales, including: • Alzheimer's Disease Assessment Scale-Cognitive (ADAS-Cog subscale) • Functional Assessment Staging Test (FAST) • Mini-Mental State Examination (MMSE) • Montreal Cognitive Assessment (MoCA) • Saint Louis University Mental States (SLUMS) Exam	
	5.42 PRN medication administrations for acute agitation per specified time period	**X = A/B** **A** = # of PRN medication administrations for acute agitation **B** = # of patients
Schizophrenia Spectrum		
Measurement	5.43 Utilize the global measures in conjunction with schizophrenia spectrum-specific validated rating scales, including: • Brief Psychiatric Rating Scale (BPRS) • Positive and Negative Symptoms Scale (PANSS)	
Developmental Disorders		
Measurement	5.44 Utilize the global measures in conjunction with developmental disorder-specific validated rating scales, including: • Aberrant Behavior Checklist (ABC) • Childhood Autism Rating Scale –2 (CARS-2)	
Tobacco Use Disorder		
Measurement	5.45 Utilize the global measures	
	5.46 Self-reported nicotine uses per specified time period	**X = A/B** **A** = # of patient-reported nicotine uses in specified time period **B** = # of patients
Outcome 6: Decreased all-cause mortality		
Measurement	6.1 Deaths	**X = A/B** **A** = # of patient deaths **B** = # of patients

Quadruple Aim: Reduced Cost

Outcome 7: Decreased utilization of urgent health care services		**Example Calculation**
Measurement	7.1 Inpatient: Psychiatric readmissions within 30 days	**X% = 100 x A/B** **A** = # of patients with psychiatric admission within specified time frame post discharge from inpatient psychiatry **B** = # of patients discharged from inpatient psychiatry in designated study period
	7.2 Outpatient: Psychiatric admissions	**X% = 100 x A/B** **A** = # of patients admitted to inpatient psychiatry in a specified time period

		B = # of patients served in clinic during the specified time period
	7.3 Psychiatric emergency department visits	**X% = 100 x A/B** **A** = # of patients with psychiatric ED visits in designated study period **B** = # of patients served in designated study period
Outcome 8: Decreased length of stay		
Measurement	8.1 Hospital days per patient	**X = A/B** **A** = total # of days in hospital **B** = # of patients
Outcome 9: Improved formulary management		
Measurement	*No recommended measure. Further research is encouraged.*	

Quadruple Aim: Improved Patient Experience

Outcome 10: Increased patient medication adherence		**Example Calculation**
Measurement	10.1 Medication Adherence Rating Scale (MARS)	
	10.2 Proportion of Days Covered	**X% = 100 x A/B** **A** = # of days in period covered with medication **B** = # of days in period
Outcome 11: Improved patient medication education (individual or group)		
Measurement	11.1 Satisfaction with Information about Medicines Scale (SIMS)	
Outcome 12: Improved coordination of patient transitions of care		
Measurement	12.1 Minutes spent by pharmacist coordinating transitions per patient	**X = A/B** **A** = total # of minutes spent on TOC **B** = # of patients served in designated study period
	12.2 Identification of Medication Therapy Problems (MTPs) per patient at transition of care	**X = A/B** **A** = # of MTPs identified **B** = # of patients evaluated in designated study period
Outcome 13: Improved patient satisfaction		
Measurement	13.1 Treatment Satisfaction Questionnaire for Medication (TSQM)	
Outcome 14: Improved caregiver quality of life		
Measurement	14.1 Caregivers with a clinically significant improvement on a validated caregiver burden rating scale, including: • Zarit Burden Interview • Caregiver Reaction Scale	**X% = 100 x A/B** **A** = # of caregivers with clinically significant improvement **B** = # of caregivers assessed
Outcome 15: Improved patient quality of life		
Measurement	15.1 Health Related Quality of Life (CDC)	
	15.2 PedsQL Measurement Model	
Outcome 16: Improved patient perceptions of care		
Measurement	16.1 Discrimination in the Medical Setting Scale (DMS)	
	16.2 Group-based Medical Mistrust Scale (GBMMS)	

Outcome 17: Improved patient medication access	
Measurement	*No recommended measure. Further research is encouraged.*

Quadruple Aim: Provider Well-Being

Outcome 18: Reduced care team burnout with clinical pharmacy support	
Measurement	*No recommended measure. Further research is encouraged.*
Outcome 19: Improved collaboration and respect among the health care team members	
Measurement	*No recommended measure. Further research is encouraged.*
Outcome 20: Increased care team utilization of pharmacists for drug information, education, and mentorship	
Measurement	*No recommended measure. Further research is encouraged.*
Outcome 21: Increased workplace engagement (e.g., leadership, committee service, program development)	
Measurement	*No recommended measure. Further research is encouraged.*