National Center for Health Statistics Research Data Center (NCHS RDC)

Identifying Co-Occurring Disorders among Opioid Users in National Hospital Care Survey Data

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Contents

Overview

This document describes the research dataset that identifies co-occurring disorders among opioid-involved hospital encounters in the 2016, 2019 - 2021 National Hospital Care Survey (NHCS) data. The algorithm developed for identifying co-occurring disorders among patients with opioid-involved encounters was created from the Patient-Centered Outcome Research Trust Fund (PCORTF) Fiscal Year 2019 (FY19) project. Opioid-involved hospital encounters were identified by the PCORTF FY18 project's Enhanced Opioid Identification Algorithm. The co-occurring dataset includes information on opioid-involved hospital encounters with a mention of mental health issues (MHI), substance use disorders (SUD), or both.

Details of the methodology used to build the Co-occurring Disorders Algorithm can be found in the methodology report, see: https://www.cdc.gov/nchs/data/series/sr_02/sr02-193.pdf. The dataset on co-occurring opioid-involved encounters are available in the Federal and National Center for Health Statistics (NCHS) Research Data Centers (RDC). Please visit the RDC website (https://www.cdc.gov/rdc/index.htm) for instructions on submitting a proposal.

This document provides a brief description of the source datasets, description of the definitions of MHIs and SUDs, a data dictionary for the RDC file, and instructions on how to access the data in the Federal and National Center for Health Statistics Research Dat Center (NCHS RDC).

Source Datasets

NHCS collects inpatient and emergency department (ED) Uniform Billing (UB)-04 administrative claims, state files, Vizient data, or electronic health record (EHR) data from participating hospitals. This dataset contains information captured during a hospital visit including diagnoses, services provided at the hospital, and discharge status. Due to the low response rate of sampled hospitals, the 2016 and 2019 NHCS were unweighted, and their estimates were not nationally representative. The response rates for the 2020 and a 2021 NHCS were high enough to produce national estimates. Nationally representative data for the 2020 NCHS is now available and the 2021 nationally representative data will be available in the near future. For general information about NHCS, see: https://www.cdc.gov/nchs/nhcs/index.htm.

- For information on the 2016 NHCS data available in the RDC, see: https://www.cdc.gov/rdc/data/b1/2016_NHCS_DATA-DICTIONARY.pdf
- For information on the 2019-2021 NHCS data available in the RDC, see: https://www.cdc.gov/rdc/data/b1/NHCS-RDC-Data-Dictionary.pdf

Enhanced Opioid Identification Dataset contains data from opioid-involved and opioid overdose hospital encounters in the 2016 and 2019-2021 NHCS data. The dataset also identifies mentions of 13 commonly used opioids and two opioid antagonists that can be used to reverse opioid overdose (naloxone) and to treat opioid use disorder (naltrexone). The Enhanced Opioid Identification algorithm searched for opioid involved hospital encounters using medical codes and Natural Language Processing (NLP) techniques to harvest opioid-involved encounters from hospital clinical notes. Information about the Enhanced Opioid Identification Dataset available in the RDC can be found here: https://www.cdc.gov/nchs/data/nhcs/Task-3-Doc-508.pdf.

Example of Data Types Available

Table 1 shows an example of the types of data available in the NCHS RDC from the 2016 and 2019-2021, the enhanced opioid-identification dataset, and the co-occurring disorders among opioid users dataset.

Table 1. Data Available in the National Hospital Care Survey and the supplemental data file containing improved identification of opioid-involved hospital encounters and co-occurring disorders.

National Hospital Care Survey (NHCS)	
Data Type	**Variables**
Hospital	
	Geographic region
	Urban/rural classification
	Type of ownership (e.g., government, non-profit)
	Type of service (e.g., general acute care, psychiatric, children's)
	Number of beds
Encounter	
	Setting (e.g. emergency department, inpatient)
	Age
	Sex
	Expected source of payment
	Diagnoses
	Procedures
	Medications
	Beginning service date
	Ending service date
	Length of stay
	Intensive care unit stays (inpatient only)
	Discharge status
	Died in hospital
Enhanced Opioid Identification	
	Identification of opioid-involved encounter
	Identification of opioid involved overdose
	Opioid-involved encounter identified by Natural Language Processing
	Opioid-involved encounter identified by medical codes and/or labels
	Specific opioids mentioned
Co-Occurring Disorders Among Opioid Users	
	Identification of a Mental Health Issue
	Identification of a Substance Use Disorder
	MHI identified by medical codes
	MHI identified by NLP

National Hospital Care Survey (NHCS)	
Data Type	**Variables**
	SUD identified by medical codes
	SUD identified by NLP

Note: Table 1 provides examples of the types of information available and does not include all variables in the datasets.

Co-Occurring Disorders Variables

The encounter-level file of the Co-Occurring Disorders dataset identifies opioid-involved hospital encounters with MHIs and/or SUDs in the ED and inpatient settings. Opioid-involved encounters were identified by the Enhanced Opioid Identification algorithm developed by the FY18 PCORTF project.

MHIs and SUDs were identified using an enhanced algorithm that used NLP techniques, including machine learning, and medical codes captured in the 2016 and 2019-2021 NHCS. The code-based component of the enhanced algorithm searched for MHI and SUD encounters using diagnosis and procedure codes. The NLP portion of the algorithm is designed to extract information from the text (i.e. the clinical notes) associated with the EHR portion of the NHCS.

Mental Health Issues Definitions and Search Terms

As part of the FY19 PCORTF project, an interdisciplinary team of clinicians and researchers under the guidance of the Technical Expert Panel (TEP) selected the MHIs that are identified by the enhanced algorithm. The TEP includes representatives from several federal agencies, including the NCHS, Food and Drug Administration, Substance Abuse and Mental Health Services Administration, and National Institute on Drug Abuse. The MHIs searched in the enhanced algorithm are categorized as Depression, Anxiety, Self-Harm, Obsessive Compulsive Disorder (OCD), and Trauma and Stressor Related Disorders. MHIs that were not in the listed categories were not searched by the code and NLP components of the enhanced algorithm.

The definition of the algorithm's MHI categories and classes are described below. Appendix I contains the complete list of the medical codes searched by the code component of the algorithm. Appendix II contains the keywords used to identify MHIs by the NLP component of the algorithm. Common misspellings were included in the keyword list.

Anxiety is defined as an individual expressing excessive fear and anxiety with behavioral disturbances (1). The enhanced algorithm identifies anxiety as having one or more of the following classes: generalized anxiety disorder, other anxiety disorder, panic disorders, social phobias, and/or unspecified anxiety disorder.

- *Generalized anxiety disorder* is identified as experiences of excessive worry and anxiety over several activities or events for at least six months (1).
- *Panic disorders* are characterized by recurrent panic attacks and the fear of having an expected or unexpected panic attack (1). The algorithm also identifies agoraphobia as a panic disorder.
- *Social phobias* are experiences of intense fear and anxiety during social situations where

the individual may face scrutiny by others (1).

- *Unspecified anxiety disorder* is applied by clinicians who choose not to specify the reason why an individual does not meet the criteria for a specific anxiety class, likely due to insufficient evidence during the encounter (1).
- *Other anxiety disorder* identifies experiences of anxiety that do not meet the criteria of an anxiety class (1).

Depression includes sad, empty, or irritable moods with cognitive changes that affect the individual's ability to function (1). The classes of depression identified by the algorithm are major depressive disorder single episode, recurrent episodes of major depressive disorder depression, or other depressive episodes.

- *Major Depressive Disorder Single Episode* The enhanced algorithm identifies the following classes:
    - Premenstrual Dysphoric Disorder
    - Single episode of Agitated Depression
    - Single episode of Depressive Reaction
    - Single episode of Major Depression
    - Single episode of Psychogenic Depression
    - Single episode of Reactive Depression
    - Single episode of Vital Depression
- *Major Depressive Disorder Recurrent Episode* The enhanced algorithm identifies the following classes:
    - Recurrent episodes of depressive reaction
    - Recurrent episodes of endogenous depression
    - Recurrent episodes of major depression
    - Recurrent episodes of psychogenic depression
    - Recurrent episodes of reactive depression
    - Recurrent episodes of seasonal depressive disorder
    - Recurrent episodes of vital depression
- *Other Depressive Disorder* The enhanced algorithm identifies the following classes:
    - Depressive episodes
    - Other Recurrent Depressive Disorders

Trauma and stressor related disorders are defined as acute stress reaction and post-traumatic stress disorder (PTSD).

- *Acute stress reaction* is a disorder where strong emotional or physical symptoms develop in response to an immediate exposure to a traumatic event. Symptoms last at least three days after the event but no longer than one month (1).
- *PTSD* can be the result of exposure to an actual or threat of injury, sexual violence, or death. Individuals may experience distressful moods, emotions, and/or behaviors. Unlike acute stress reactions, the symptoms are present for at least a month or longer (1).

Substance Use Disorders Definition and Search Terms

An interdisciplinary team of clinicians and researchers selected SUDs that are identified in the enhanced algorithm under the guidance of the TEP. The SUDs searched by the code component and NLP component of the enhanced algorithm are:

- Alcohol Use Disorder
- Cannabis Use Disorder
- Cocaine Use Disorder
- Hallucinogen Use Disorder
- Inhalant Use Disorder
- Nicotine Use Disorder
- Sedative Use Disorder
- Opioid Use Disorder
- Other Stimulants Use Disorder
- Other Psychoactive Use Disorder

The use of a substance is not strong enough evidence to be defined as a SUD. SUDs are defined as individuals who abuse a substance, are dependent on a substance, have or had a disease from substance abuse or dependence, and/or have encountered counseling or medical advice related to substance abuse or dependence. The terms used to identify SUDs are defined below.

Abuse: Non-medical use of a substance or misuse of a substance in a manner or dosage that is not considered "safe" or not used as prescribed. In addition, the use of the drug causes individuals to experience problems at home, school, or work. Individuals may regularly use substances, and drug abuse may cause individuals to experience repeated encounters with law enforcement. Substance use may continue despite the problems it may cause with friends or family (2).

Dependence: Characterized as physical dependence on a substance with symptoms of tolerance and withdrawal. Symptoms also include using the substance in greater quantities or for a longer time than intended, spending considerable time related to drug use, reduced or no participation in other activities due to substance use, and developed tolerance to the substance. Individuals may also experience repeated unsuccessful attempts to reduce use of the substance, continued use of the substance despite physical or emotional problems associated with use, and withdrawal symptoms when reducing or eliminating substance usage (2).

Substance Abuse Induced Disease: The development of a chronic disease where the etiology is attributed to substance abuse and dependence (e.g. Alcoholic Liver Disease). This is only applicable to Alcohol Use Disorder.

Substance Abuse Counseling: Health services for counseling and medical advice related to substance abuse or dependence. To reduce identification of false positives, nicotine use cessation codes were excluded in the identification of substance abuse counseling. Cessation alone does not meet the case definition for nicotine use disorder.

See Appendix III for the complete list of the SUD medical codes searched in the code component of the algorithm. See Appendix IV for keywords and queries used to search for SUDs in the NLP component of the enhanced algorithm.

Code Component of the Algorithm

The code component of the algorithm identified MHIs and SUDs from diagnoses and procedure codes. This includes disorders identified by ICD-10-CM diagnosis codes and/or HCPCS codes. MHIs and SUDs identified by text mentions or other diagnosis code systems (e.g. SNOMED, vendor/site specific code systems) are not searched by the code component of the algorithm. See Appendix I for a complete code list used to identify MHIs and Appendix III for a complete list of SUD codes.

Machine Learning and Natural Language Processing Component of the Algorithm

The machine learning and NLP component of the algorithm identifies mentions of MHI and SUD disorders mentioned in the clinical notes available in the 2016 and 2019-202 NHCS data. Only EHR data sources with clinical notes are searched by the NLP component of the enhanced algorithm.

The NLP algorithm used a list of keywords (either single phrases or phrase combinations) to search for MHIs and SUDs. Negation detection was employed to exclude keyword matches that were explicitly negated, e.g. "denies substance abuse." Initial results from the keyword searches were analyzed in conjunction with select encounters that had been labeled for MHI and SUD status by clinicians. A subset of the encounters for which there was a mismatch in what had been determined by the clinician and what the algorithm produced were analyzed, and that information was used to further refine keywords and negation detection methods.

Search terms were prioritized by their likelihood to find false positives. High priority search terms and keyword combinations were those that were more specific and less likely to yield false positives. For example, the phrase "amphetamine use disorder" was considered strong enough to be a priority search term and standalone keyword to identify the mention as a SUD. In addition to standalone keywords, combined search terms were used. For combined searches, search terms about use disorders (e.g. "abuse", "dependence") were searched along with drugs that could be abused (e.g. "benzos", "Xanax"). Combinations had to co-occur within the same sentence to be considered a viable mention of MHI or SUD. Low priority search terms were more general (e.g. "drug abuse") and would only be searched if no prioritized match occurred in the same sentence.

In the search of MHI and SUD disorders, the aim of the NLP component was to identify diagnostic level phrasing. Generic mentions of "anxiety" or "depression", when they occurred in note types that were unlikely to be specifically about diagnoses, were not considered a MHI because the language is too ambiguous to be considered diagnostic. Terms that refer to temporary or occasional moods like "anxious" or "depressed" were not identified as a MHI. Once search terms were identified and no exclusions were detected (e.g. "no history of") they were mapped to the SUDs and MHIs of interest. A complete list of MHI search terms is in Appendix II and a complete list of SUD search terms is in Appendix IV.

Identifying Co-Occurring Disorders Among Opioid Users

Table 2 reports the number of 2016 and 2019-2021 NHCS hospitalizations and ED encounters identified as opioid-involved by the Enhanced Opioid Identification algorithm and the number of opioid-involved encounters identified as only having an MHI, only having an SUD, or co-occurring disorders (MHI and SUD).

Table 2. Number of opioid-involved encounters with MHI only, SUD only, and co-occurring MHI and SUD in the 2016 and 2019-2021 NHCS.

Description	Total NHCS Records	NHCS Opioid-Involved Visits[1]	NHCS Opioid-Involved and MHI Only Visits[1,2]	NHCS Opioid-Involved and SUD Only Visits[1,2]	NHCS Opioid-Involved with Co-Occurring Visits (MHI and SUD)[1,2]
2016 NHCS	9,624,026	1,370,827	100,102	399,632	159,491
2019 NHCS	7,244,537	1,142,889	104,574	318,518	123,613
2020 NHCS	10,010,479	1,916,752	150,972	442,469	180,264
2021 NHCS	12,803,010	2,436,686	196,381	609,119	240,045

[1] See PCORTF FY18 RDC documentation for code lists and search terms that identified opioid-involved encounters.

[2] See Appendices I-IV for the code lists and search terms used to identify mental health issues and substance use disorders.

Table 3 reports the number of opioid-involved hospital encounters that had specific mental health issues identified in the 2016 and 2019-2021 NHCS data.

Table 3. Number of 2016 and 2019-2021 NHCS opioid-involved encounters with specific MHIs

Mental Health Issues[1,2]	2016 NHCS Opioid-Involved Visits	2019 NHCS Opioid-Involved Visits	2020 NHCS Opioid-Involved Visits	2021 NHCS Opioid-Involved Visits
Anxiety	159,476	143,826	210,890	296,362
Depression	153,548	134,159	189,287	219,983
Obsessive Compulsive Disorder	2,331	2,134	3,328	4,834
Self-Harm	25,079	17,532	36,494	45,618
Trauma and Stressor Related Disorders	19,392	18,586	28,768	38,950

[1] See Appendices I and II for the code lists and search terms used to identify mental health issues.

[2] Categories are not mutually exclusive.

The number of opioid-involved encounters with specific SUD is shown in Table 4.

Table 4. Number of 2016 and 2019-2021 NHCS Opioid-Involved encounters with specific SUDs.

Substance Use Disorders[1,2]	2016 NHCS Opioid-Involved Visits	2019 NHCS Opioid-Involved Visits	2020 NHCS Opioid-Involved Visits	2021 NHCS Opioid-Involved Visits
Alcohol Use Disorder	62,325	46,693	84,928	110,579
Cannabis Use Disorder	17,306	10,041	17,932	23,355
Cocaine Use Disorder	22,873	16,234	25,312	30,696
Hallucinogen Use Disorder	1,746	783	1,362	1,831
Inhalant Use Disorder	1,417	38	400	969
Nicotine Use Disorder	482,734	392,592	527,556	727,970
Opioid Use Disorder	111,442	70,501	105,240	125,155
Sedative Use Disorder	12,883	6,080	10,005	11,632
Other Stimulant Use Disorder	10,749	8,666	18,997	26,103
Other Psychoactive Use Disorder	24,249	8,648	27,323	39,473

[1] See Appendices III and IV for the code lists and search terms used to identify substance use disorders.

[2] Categories are not mutually exclusive.

The Co-Occurring Disorders dataset is an encounter level file that includes variables for MHI classes and SUDs. Additional variables identify whether the MHIs and SUDs were identified using codes (MHI_CODE or SUD_CODE) or NLP (MHI_NLP and SUD_NLP). The value of the variables are binary, one (1) indicates there was a MHI and/or SUD in the hospital encounter from the enhanced algorithm, and zero (0) indicates a MHI and/or SUD was not identified by the algorithm. Missing values (.) are opioid-involved encounters that do not have evidence of an MHI or SUD.

Variable Name	Variable Description	Data Values
ENCOUNTER_ID	**Char.** Hospital encounter identified associated with the hospital encounter. Researchers linking the NHCS should use ENCOUNTER_ID as the common key.	>0
ID_SETTING	**Char.** The code that indicates the hospital setting or settings in which the encounter occurred. Researchers linking to the NHCS should use ID_SETTING as the common key.	>0
SOURCE	**Char.** Data source of the hospital encounter. Researchers linking to the NHCS should use SOURCE as the common key.	>0
HOSPID_A	**Char.** The 4-digit ID associated with the NHCS hospital in which the encounter occurred. Researchers linking to the NHCS should use HOSPID_A as the common key.	>0
PATIENT_ID	**Char.** Patient identifier assigned by NCHS. Researchers linking to the NDI or DMI should use PATIENT_ID as the common key.	>0
OP_INVOLVED	**Numeric.** Identifies opioid-involved encounter that was found by the code component and Natural Language Processing (NLP) component of the enhanced algorithm.	0, 1
OP_INVOLVED_NLP	**Numeric.** Identifies opioid-involved encounter that was found by the NLP component of the enhanced algorithm.	0, 1
OP_INVOLVED_CODE	**Numeric.** Identifies opioid-involved encounter that was found by the code component of the enhanced algorithm	0, 1

Variable Name	Variable Description	Data Values
OP_TOX	**Numeric.** Identifies opioid-involved encounter from positive toxicology results.	0, 1
'Opioids, Opioid Antagonists'	**Numeric.** Identifies if one or more of the 13 opioids, or two opioid antagonists were documented during the hospital encounter.	0, 1
OTH_OPIOID	**Numeric.** Identifies if an opioid- involved encounter mentions an opioid that is not one of the 13 opioids or two opioid antagonists.	0, 1
OTHER_OPIOID_LIST	**Char.** Lists the names of opioids identified in OTH_OPIOID.	>0
UNSPECIFIED_OPIOID	**Numeric.** Identifies general, unspecified opioid mentions of opioid use (e.g. "opioid" or "opiate" mention).	0, 1
OD	**Numeric.** Encounter identified as an opioid-involved overdose.	0, 1
OD_CODE	**Numeric.** Opioid-involved overdose encounter identified by medical codes or free text search.	0, 1
OD_NLP	**Numeric.** Opioid-involved encounter identified by the NLP component of the enhanced algorithm.	0, 1
MHI	**Numeric.** Identifies mental health issues (MHI) in the opioid-involved encounter that were found by the code component and NLP component of the enhanced algorithm.	0, 1, .
MHI_CODE	**Numeric.** MHI encounter identified by medical codes from the code component of the algorithm.	0, 1, .
MHI_NLP	**Numeric.** MHI encounter identified by the NLP component of the algorithm.	0, 1, .

Variable Name	Variable Description	Data Values
MHI_DEPRESSION	**Numeric.** Identifies if an encounter had mentions of single, recurrent, or other episodes of depression.	0, 1, .
DEPRESSION_SINGLE	**Numeric.** Identifies if an encounter had mention of a single episode of depression.	0, 1, .
DEPRESSION_RECURRENT	**Numeric.** Identifies if an encounter had mentions of recurrent episodes of depression.	0, 1, .
DEPRESSION_OTHER	**Numeric.** Identifies if an encounter had mention of other depression episodes.	0, 1, .
MHI_SELFHARM	**Numeric.** Identifies if an encounter mentions self-harm, suicidal ideation, or suicide attempt.	0, 1, .
SELF_HARM	**Numeric.** Identifies an encounter that had a mention of self-harm.	0, 1, .
SUICIDE_IDEATIONS	**Numeric.** Identifies an encounter that had a mention of suicide ideation.	0, 1, .
SUICIDE_ATTEMPT	**Numeric.** Identifies an encounter that had a mention of suicide attempt.	0, 1, .
MHI_OCD	**Numeric.** Identifies if an encounter mentions OCD.	0, 1, .
MHI_TRAUMA	**Numeric.** Identifies if an encounter mentions trauma or stressor related disorders.	0, 1, .
TRAUMA_PTSD	**Numeric.** Identifies if an encounter mentions PTSD.	0, 1, .
TRAUMA_ACUTE	**Numeric.** Identifies if an encounter mentions acute stress reaction.	0, 1, .
MHI_ANXIETY	**Numeric.** Identifies if an encounter mentions generalized anxiety disorder, panic disorders, social anxiety disorders and/or social phobias, other anxiety disorders, or unspecified anxiety disorders.	0, 1, .

Variable Name	Variable Description	Data Values
ANXIETY_GENERAL	**Numeric.** Identifies if an encounter mentions general anxiety disorder.	0, 1, .
ANXIETY_PANIC	**Numeric.** Identifies if an encounter mentions panic disorders.	0, 1, .
ANXIETY_SOCIAL	**Numeric.** Identifies if an encounter mentions social anxiety and/or social phobias.	0, 1, .
ANXIETY_UNSPECIFIED	**Numeric.** Identifies if an encounter mentions unspecified anxiety disorder.	0, 1, .
ANXIETY_OTHER	**Numeric.** Identifies if an encounter mentions other anxiety disorders.	0, 1, .
SUD	**Numeric.** Identifies if an encounter mentions any substance use disorders (SUD) found by the code and NLP component of the enhanced algorithm.	0, 1, .
SUD_CODE	**Numeric.** Identifies an SUD encounter found by the code component of the algorithm.	0, 1, .
SUD_NLP	**Numeric.** Identifies SUD encounters identified by the NLP component of the algorithm.	0, 1, .
SUD_ALCOHOL	**Numeric.** Identifies encounters that mention alcohol use disorder.	0, 1, .
SUD_CANNABIS	**Numeric.** Identifies encounters that mention cannabis use disorder.	0, 1, .
SUD_COCAINE	**Numeric.** Identifies encounters that mention cocaine use disorder.	0, 1, .
SUD_HALLUCINOGEN	**Numeric.** Identifies encounters that mention hallucinogen use disorder.	0, 1, .
SUD_INHALANT	**Numeric.** Identifies encounters that mention inhalant use disorder.	0, 1, .
SUD_OPIOID	**Numeric.** Identifies encounters that mention opioid use disorder.	0, 1, .

Variable Name	Variable Description	Data Values
SUD_SEDATIVE	**Numeric.** Identifies encounters that mention sedative use disorder.	0, 1, .
SUD_OTHER_STIMULANT	**Numeric.** Identifies encounters that mention other stimulant use disorder.	0, 1, .
SUD_OTHER_PSYCHOACTIVE	**Numeric.** Identified encounters that mention other psychoactive use disorder.	0, 1, .

Resources for Additional Information

National Hospital Care Survey. Available from: https://www.cdc.gov/nchs/nhcs/index.htm

National Center for Health Statistics Research Data Center National Hospital Care Survey 2016 Data Dictionary. Available from: https://www.cdc.gov/rdc/data/b1/2016_NHCS_DATA- DICTIONARY.pdf

References

1.   American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Arlington, VA, American Psychiatric Association, 2013.

2.   Key substance use and mental health indicators in the United States: results from the 2018 National Survey on Drug Use and Health. Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration, 2019.

Appendix I: Mental Health Issue Diagnosis and Service Codes

Anxiety

General Anxiety Diagnosis Codes

ICD-10-CM Code	Description
F41.1	Generalized anxiety disorder

Panic Disorder Diagnosis Codes

ICD-10-CM Code	Description
F41.0	Panic disorder [episodic paroxysmal anxiety]

Social Anxiety Diagnosis Codes

ICD-10-CM Code	Description
F40.1	Social phobias
F40.10	Social phobias, unspecified
F40.11	Social phobias, generalized

Unspecified Anxiety Disorder Diagnosis Codes

ICD-10-CM Code	Description
F41.9	Anxiety disorder, unspecified

Other Anxiety Disorder Diagnosis Codes

ICD-10-CM Code	Description
F41	Other anxiety disorders
F41.3	Other mixed anxiety disorder
F41.8	Other unspecified anxiety disorders

Depression

Depression Single Episode Diagnosis Codes

ICD-10-CM Code	Description
F32	Major depressive disorder, single episode
F32.0	Major depressive disorder, single episode, mild
F32.1	Major depressive disorder, single episode, moderate
F32.2	Major depressive disorder, single episode, severe without psychotic features
F32.3	Major depressive disorder, single episode, severe with psychotic features
F32.4	Major depressive disorder, single episode, in partial remission
F32.5	Major depressive disorder, single episode, in full remission
F32.81	Premenstrual dysphoric disorder
F32.9	Major depressive disorder, single episode, unspecified

Depression Recurrent Episode Diagnosis Codes

ICD-10-CM Code	Description
F33	Major depressive disorder, recurrent
F33.0	Major depressive disorder, recurrent, mild
F33.1	Major depressive disorder, recurrent, moderate
F33.2	Major depressive disorder, recurrent, severe without psychotic features
F33.3	Major depressive disorder, recurrent, severe with psychotic features
F33.4	Major depressive disorder, recurrent, in remission
F33.40	Major depressive disorder, recurrent, in remission, unspecified
F33.41	Major depressive disorder, recurrent, in partial remission
F33.42	Major depressive disorder, recurrent, in full remission
F33.9	Major depressive disorder, recurrent, unspecified

Other Depression Diagnosis Codes

ICD-10-CM Code	Description
F32.8	Other depressive episodes
F32.89	Other specified depressive episodes
F33.8	Other recurrent depressive disorders

Depression Service Codes

HCPCS Codes	Description
G8431	Screening for depression is documented as being positive and a follow-up plan is documented
G8511	Screening for depression is documented as positive, and a follow-up plan is not documented, reason not given
G8940	Screening for depression is documented as positive, a follow-up plan is not completed, documented reason
G9193	Clinician documented that patient with a diagnosis of major depression was not an eligible candidate for antidepressant medication treatment or patient did not have a diagnosis of major depression
G8126	Patient with a diagnosis of major depression documented as being treated with antidepressant medication during the entire 84-day (12 week) acute treatment phase
G8127	Patient with a diagnosis of major depression not documented as being treated with antidepressant medication during the entire 84-day (12 week) acute treatment phase
G9194	Patient with a diagnosis of major depression documented as being treated with antidepressant medication during the entire 180-day (6 month) continuation treatment phase
G9195	Patient with a diagnosis of major depression not documented as being treated with antidepressant medication during the entire 180-day (6 months) continuation treatment phase
G8959	Clinician treating major depressive disorder communicates to clinician treating comorbid condition
G9212	DSM-IV-TM criteria for major depressive disorder documented at the initial evaluation
G8960	Clinician treating major depressive disorder did not communicate to clinician treating comorbid condition, reason not given
G9213	DSM-IV-TR criteria for major depressive disorder not documented at the initial evaluation, reason not otherwise specified
G9232	Clinician treating major depressive disorder did not communicate to clinician treating comorbid condition for specified patient reason (e.g., patient is unable to communicate the diagnosis of a comorbid condition; the patient is unwilling to communicate the diagnosis of a comorbid condition; or the patient is unaware of the comorbid condition, or any other specified patient reason)
G9621	Patient identified as an unhealthy alcohol user when screened for unhealthy alcohol use using a systematic screening method and received brief counseling

Obsessive Compulsive Disorder Diagnosis Codes

ICD-10-CM Code	Description
F42	Obsessive-compulsive disorder
F42.2	Mixed obsessional thoughts and acts
F42.3	Hoarding disorder
F42.4	Excoriation (skin-picking) disorder
F42.8	Other obsessive-compulsive disorder
F42.9	Obsessive-compulsive disorder, unspecified

Self-Harm

Personal History of Self Harm Diagnosis Codes

ICD-10-CM Code	Description
Z91.5	Personal history of self-harm

Suicidal Ideation Diagnosis Codes

ICD-10-CM Code	Description
R45.851	Suicidal ideations

Suicide Attempt Diagnosis Codes

ICD-10-CM Code	Description
T14.91	Suicide attempt
T14.91XA	Suicide attempt, initial encounter
T14.91XD	Suicide attempt, subsequent encounter
T14.91XS	Suicide attempt, sequela

Trauma and Stressor Related Disorders

Acute Stress Reaction Diagnosis Codes

ICD-10-CM Code	Description
F43.0	Acute stress reaction

Post-Traumatic Stress Disorder Diagnosis Codes

ICD-10-CM Code	Description
F43.1	Post-traumatic stress disorder (PTSD)
F43.10	Post-traumatic stress disorder, unspecified
F43.11	Post-traumatic stress disorder, acute
F43.12	Post-traumatic stress disorder, chronic

Appendix II: Mental Health Issue Natural Language Processing Search Terms

Anxiety

General Anxiety Standalone Keyword Search

Search Term
GAD
generalized anxiety disorder
generalized anxiety[1]

[1] Terms were de-prioritized, they were only searched for if no other MHI phrase was found in that sentence. For MHIs, single word de-prioritized terms were only searched if they occurred in a note type likely to contain diagnoses.

Panic Disorders Standalone Keyword Search

Search Term
panic attack
panic disorder

Social Anxiety Standalone Keyword Search

Search Term
anthropophobia
social anxiety disorder
social neurosis
social phobia

Other Anxiety Standalone Keyword Search

Search Term
anxiety with depression
anxiety depression
anxiety associated w depression
anxiety associated with depression
anxiety and depressive disorder
anxiety and depression
depression and anxiety
anxiety disorder[1]
anxiety[1]

[1] Terms were de-prioritized, they were only searched for if no other MHI phrase was found in that sentence. For MHIs, single word de-prioritized terms were only searched if they occurred in a note type likely to contain diagnoses.

Other Anxiety Combination Search

Phrase A	Phrase B
confirmed	recurrent
diagnos*	
disorder	
presents with	
suffers from	
suffer from	
suffering with	
suffering from	
PMHX	
personal medical history	
personal medical hx	

Depression

Depression Single Episode Standalone Keyword Search

Depression Single Episode Search Term
major depressive disorder, single
major depressive disorder single
premenstrual dysphoric disorder
pmdd

Depression Single Episode Combination Search

Phrase A	Phrase B
major depressive	single

Depression Recurrent Episode Standalone Keyword Search

Depression Recurrent Episode Search Term
major depressive disorder, recurrent
major depressive disorder recurrent
recurrent depressive disorder

Depression Recurrent Episode Combination Search

Phrase A	Phrase B
major depressive	recurrent

Other Depression Standalone Keyword Search

Other Depression Search Term
major depression
depressive episode
dysthymic disorder
anxiety and depression
depression and anxiety
depression[1]
depressive disorder[1]

[1]Terms were de-prioritized, they were only searched for if no other MHI phrase was found in that sentence. For MHIs, single word de-prioritized terms were only searched if they occurred in a note type likely to contain diagnoses

Other Depression Standalone Combination Search

Phrase A	Phrase B
confirmed	depression
diagnos[1]	
disorder	
presents with	
suffers from	
suffer from	
suffering with	
suffering from	
pmhx	
personal medical history	
personal medical hx	
personal history	

[1] Terms were searched without a word boundary on the right side (i.e. any word beginning with the letters followed by 0 or more unspecified characters)

Note: DEPRESSION_OTHER positive flags were deleted where in the same sentence any of the following phrases were found: "ST depression", "ST segment depression", "bipolar", "schizophrenia", "manic"

Obsessive Compulsive Disorder

Obsessive Compulsive Disorder Standalone Keyword Search

OCD Search Term
ocd
obsessive-compulsive disorder
obsessive compulsive disorder
hoarding disorder
excoriation (skin-picking) disorder
skin picking disorder
skin-picking disorder
obsessional thoughts and acts

Obsessive Compulsive Disorder Standalone Combination Search

Phrase A	Phrase B
disorder	obsessive-compulsive
	obsessive compulsive
	excoriation

Self-Harm

History of Self Harm Standalone Keyword Search

Search Term
self harm
self-harm

Suicide Ideations Standalone Keyword Search

Search Term
suicidal ideation

Suicide Ideations Standalone Combination Search

Phrase A	Phrase B
suicid[1]	thinking
	thought

[1]Terms were de-prioritized, they were only searched for if no other MHI phrase was found in that sentence. For MHIs, single word de-prioritized terms were only searched if they occurred in a note type likely to contain diagnoses. The term "suicid" would identify the terms "suicide" and "suicidal".

Suicide Ideations Attempts Standalone Keyword Search

Search Term
suicide ideation

Suicide Ideations Attempts Combination Search

Phrase A	Phrase B
suicid[1]	attempt

[1]Terms were de-prioritized, they were only searched for if no other MHI phrase was found in that sentence. For MHIs, single word de-prioritized terms were only searched if they occurred in a note type likely to contain diagnoses. The term "suicid" would identify the terms "suicide" and "suicidal".

Trauma and Stressor Related Disorders

Acute Stress Reaction Standalone Keyword Search

Search Term
acute reaction to stress
acute stress disorder
acute stress reaction

Post Traumatic Stress Disorder Standalone Keyword Search

Search Term
ptsd
post traumatic stress disorder
post-traumatic stress disorder

Appendix III: Substance Use Disorder Diagnosis and Service Codes

Alcohol Use Disorder Diagnosis Codes

ICD-10-CM Code	Description
F10.1	Alcohol abuse
F10.10	Alcohol abuse, uncomplicated
F10.11	Alcohol abuse, in remission
F10.12	Alcohol abuse with intoxication
F10.120	Alcohol abuse with intoxication, uncomplicated
F10.121	Alcohol abuse with intoxication delirium
F10.129	Alcohol abuse with intoxication, unspecified
F10.130	Alcohol abuse with withdrawal, uncomplicated
F10.131	Alcohol abuse with withdrawal delirium
F10.132	Alcohol abuse with withdrawal with perceptual disturbance
F10.139	Alcohol abuse with withdrawal, unspecified
F10.14	Alcohol abuse with alcohol-induced mood disorder
F10.15	Alcohol abuse with alcohol-induced psychotic disorder
F10.150	Alcohol abuse with alcohol-induced psychotic disorder with delusions
F10.151	Alcohol abuse with alcohol-induced psychotic disorder with hallucinations
F10.159	Alcohol abuse with alcohol-induced psychotic disorder, unspecified
F10.18	Alcohol abuse with alcohol-induced disorders
F10.180	Alcohol abuse with alcohol-induced anxiety disorder
F10.181	Alcohol abuse with alcohol-induced sexual dysfunction
F10.182	Alcohol abuse with alcohol-induced sleep disorder
F10.188	Alcohol abuse with other alcohol-induced disorder
F10.19	Alcohol abuse with unspecified alcohol-induced disorder
F10.2	Alcohol dependence
F10.20	Alcohol dependence, uncomplicated
F10.21	Alcohol dependence, in remission
F10.22	Alcohol dependence with intoxication
F10.220	Alcohol dependence with intoxication, uncomplicated
F10.221	Alcohol dependence with intoxication delirium
F10.229	Alcohol dependence with intoxication, unspecified
F10.230	Alcohol dependence with withdrawal, uncomplicated
F10.231	Alcohol dependence with withdrawal delirium
F10.232	Alcohol dependence with withdrawal with perceptual disturbance
F10.239	Alcohol dependence with withdrawal, unspecified
F10.24	Alcohol dependence with alcohol-induced mood disorder
F10.25	Alcohol dependence with alcohol-induced psychotic disorder
F10.250	Alcohol dependence with alcohol-induced psychotic disorder with delusions
F10.251	Alcohol dependence with alcohol-induced psychotic disorder with hallucinations
F10.259	Alcohol dependence with alcohol-induced psychotic disorder, unspecified
F10.26	Alcohol dependence with alcohol-induced persisting amnestic disorder
F10.27	Alcohol dependence with alcohol-induced persisting dementia
F10.28	Alcohol dependence with alcohol-induced disorders

ICD-10-CM Code	Description
F10.280	Alcohol dependence with alcohol-induced anxiety disorder
F10.281	Alcohol dependence with alcohol-induced sexual dysfunction
F10.282	Alcohol dependence with alcohol-induced sleep disorder
F10.288	Alcohol dependence with other alcohol-induced disorder
F10.29	Alcohol dependence with unspecified alcohol-induced disorder
G62.1	Alcoholic polyneuropathy
G72.1	Alcoholic myopathy
I42.6	Alcoholic cardiomyopathy
K29.20	Alcoholic gastritis without bleeding
K29.21	Alcoholic gastritis with bleeding
K70	Alcoholic Liver Disease
K70.0	Alcoholic Fatty Liver
K70.1	Alcoholic Hepatitis
K70.10	Alcoholic Hepatitis without Ascites
K70.11	Alcoholic Hepatitis with Ascites
K70.2	Alcoholic Fibrosis and Sclerosis of Liver
K70.3	Alcoholic Cirrhosis of Liver
K70.30	Alcoholic Cirrhosis of Liver without Ascites
K70.31	Alcoholic Cirrhosis of Liver with Ascites
K70.4	Alcoholic Hepatic Failure
K70.40	Alcoholic Hepatic Failure without Coma
K70.41	Alcoholic Hepatic Failure with Coma
K70.9	Alcoholic Liver Disease, Unspecified
Z71.4	Alcohol abuse counseling and surveillance
Z71.41	Alcohol abuse counseling and surveillance of alcoholic

Alcohol Use Disorder Service Codes

HCPCS Codes	Description
G9621	Patient identified as an unhealthy alcohol user when screened for unhealthy alcohol use using a systematic screening method and received brief counseling

Cannabis Use Disorder Diagnosis Codes

ICD-10-CM Code	Description
F12.1	Cannabis abuse
F12.10	Cannabis abuse, uncomplicated
F12.11	Cannabis abuse, in remission
F12.12	Cannabis abuse with intoxication
F12.120	Cannabis abuse with intoxication, uncomplicated
F12.121	Cannabis abuse with intoxication delirium
F12.122	Cannabis abuse with intoxication with perceptual disturbance
F12.129	Cannabis abuse with intoxication, unspecified

ICD-10-CM Code	Description
F12.13	Cannabis abuse with withdrawal
F12.15	Cannabis abuse with psychotic disorder
F12.150	Cannabis abuse with psychotic disorder with delusions
F12.151	Cannabis abuse with psychotic disorder with hallucinations
F12.159	Cannabis abuse with psychotic disorder, unspecified
F12.18	Cannabis abuse with other cannabis-induced disorder
F12.180	Cannabis abuse with cannabis-induced anxiety disorder
F12.188	Cannabis abuse with other cannabis-induced disorder
F12.19	Cannabis abuse with unspecified cannabis-induced disorder
F12.2	Cannabis dependence
F12.20	Cannabis dependence, uncomplicated
F12.21	Cannabis dependence, in remission
F12.22	Cannabis dependence with intoxication
F12.220	Cannabis dependence with intoxication, uncomplicated
F12.221	Cannabis dependence with intoxication delirium
F12.222	Cannabis dependence with intoxication with perceptual disturbance
F12.229	Cannabis dependence with intoxication, unspecified
F12.23	Cannabis dependence with intoxication, with withdrawal
F12.25	Cannabis dependence with psychotic disorder
F12.250	Cannabis dependence with psychotic disorder, with delusions
F12.251	Cannabis dependence with psychotic disorder, with hallucinations
F12.259	Cannabis dependence with psychotic disorder, unspecified
F12.28	Cannabis dependence with other cannabis-induced disorder
F12.280	Cannabis dependence with cannabis-induced anxiety disorder
F12.288	Cannabis dependence with other cannabis-induced disorder
F12.29	Cannabis dependence with unspecified cannabis-induced disorder

Cocaine Use Disorder Diagnosis Codes

ICD-10-CM Code	Description
F14.1	Cocaine abuse
F14.10	Cocaine abuse, uncomplicated
F14.11	Cocaine abuse, in remission
F14.120	Cocaine abuse with intoxication, uncomplicated
F14.121	Cocaine abuse with intoxication with delirium
F14.122	Cocaine abuse with intoxication with perceptual disturbance
F14.129	Cocaine abuse with intoxication, unspecified
F14.14	Cocaine abuse with cocaine-induced mood disorder
F14.15	Cocaine abuse with cocaine-induced psychotic disorder
F14.150	Cocaine abuse with cocaine-induced psychotic disorder with delusions
F14.151	Cocaine abuse with cocaine-induced psychotic disorder with hallucinations
F14.159	Cocaine abuse with cocaine-induced psychotic disorder, unspecified
F14.18	Cocaine abuse with other cocaine-induced disorder

ICD-10-CM Code	Description
F14.180	Cocaine abuse with cocaine-induced anxiety disorder
F14.181	Cocaine abuse with cocaine-induced sexual dysfunction
F14.182	Cocaine abuse with cocaine-induced sleep disorder
F14.188	Cocaine abuse with other cocaine-induced disorder
F14.19	Cocaine abuse with unspecified cocaine-induced disorder
F14.2	Cocaine dependence
F14.20	Cocaine dependence, uncomplicated
F14.21	Cocaine dependence, in remission
F14.22	Cocaine dependence with intoxication
F14.220	Cocaine dependence with intoxication, uncomplicated
F14.221	Cocaine dependence with intoxication delirium
F14.222	Cocaine dependence with intoxication with perceptual disturbance
F14.229	Cocaine dependence with intoxication, unspecified
F14.23	Cocaine dependence with withdrawal
F14.24	Cocaine dependence with cocaine-induced mood disorder
F14.25	Cocaine dependence with cocaine-induced psychotic disorder
F14.250	Cocaine dependence with cocaine-induced psychotic disorder with delusions
F14.251	Cocaine dependence with cocaine-induced psychotic disorder with hallucinations
F14.259	Cocaine dependence with cocaine-induced psychotic disorder, unspecified
F14.28	Cocaine dependence with other cocaine-induced disorder
F14.280	Cocaine dependence with cocaine-induced anxiety disorder
F14.281	Cocaine dependence with cocaine-induced sexual dysfunction
F14.282	Cocaine dependence with cocaine-induced sleep disorder
F14.288	Cocaine dependence with other cocaine-induced disorder
F14.29	Cocaine dependence with unspecified cocaine-induced disorder

Hallucinogen Use Disorder Diagnosis Codes

ICD-10-CM Code	Description
F16.1	Hallucinogen abuse
F16.10	Hallucinogen abuse, uncomplicated
F16.11	Hallucinogen abuse, in remission
F16.12	Hallucinogen abuse with intoxication
F16.120	Hallucinogen abuse with intoxication, uncomplicated
F16.121	Hallucinogen abuse with intoxication with delirium
F16.122	Hallucinogen abuse with intoxication with perceptual disturbance
F16.129	Hallucinogen abuse with intoxication, unspecified
F16.14	Hallucinogen abuse with hallucinogen-induced mood disorder
F16.15	Hallucinogen abuse with hallucinogen-induced psychotic disorder
F16.150	Hallucinogen abuse with hallucinogen-induced psychotic disorder with delusions
F16.151	Hallucinogen abuse with hallucinogen-induced psychotic disorder with hallucinations
F16.159	Hallucinogen abuse with hallucinogen-induced psychotic disorder, unspecified
F16.18	Hallucinogen abuse with other hallucinogen-induced disorder

ICD-10-CM Code	Description
F16.180	Hallucinogen abuse with hallucinogen-induced anxiety disorder
F16.183	Hallucinogen abuse with hallucinogen persisting perception disorder (flashbacks)
F16.188	Hallucinogen abuse with other hallucinogen-induced disorder
F16.19	Hallucinogen abuse with unspecified hallucinogen-induced disorder
F16.2	Hallucinogen dependence
F16.20	Hallucinogen dependence, uncomplicated
F16.21	Hallucinogen dependence, in remission
F16.22	Hallucinogen dependence with intoxication
F16.220	Hallucinogen dependence with intoxication, uncomplicated
F16.221	Hallucinogen dependence with intoxication with delirium
F16.229	Hallucinogen dependence with intoxication, unspecified
F16.24	Hallucinogen dependence with hallucinogen-induced mood disorder
F16.25	Hallucinogen dependence with hallucinogen-induced psychotic disorder
F16.250	Hallucinogen dependence with hallucinogen-induced psychotic disorder with delusions
F16.251	Hallucinogen dependence with hallucinogen-induced psychotic disorder with hallucinations
F16.259	Hallucinogen dependence with hallucinogen-induced psychotic disorder, unspecified
F16.28	Hallucinogen dependence with other hallucinogen-induced disorder
F16.280	Hallucinogen dependence with hallucinogen-induced anxiety disorder
F16.283	Hallucinogen dependence with hallucinogen persisting perception disorder (flashbacks)
F16.288	Hallucinogen dependence with other hallucinogen-induced disorder
F16.29	Hallucinogen dependence with unspecified hallucinogen-induced disorder

Inhalant Use Disorder Diagnosis Codes

ICD-10-CM Code	Description
F18.1	Inhalant abuse
F18.10	Inhalant abuse, uncomplicated
F18.11	Inhalant abuse, in remission
F18.12	Inhalant abuse with intoxication
F18.120	Inhalant abuse with intoxication, uncomplicated
F18.121	Inhalant abuse with intoxication, delirium
F18.129	Inhalant abuse with intoxication, unspecified
F18.14	Inhalant abuse with intoxication with inhalant-induced mood disorder
F18.15	Inhalant abuse with inhalant-induced psychotic disorder
F18.150	Inhalant abuse with inhalant-induced psychotic disorder, with delusions
F18.151	Inhalant abuse with inhalant-induced psychotic disorder, with hallucinations
F18.159	Inhalant abuse with inhalant-induced psychotic disorder, unspecified
F18.17	Inhalant abuse with inhalant-induced psychotic disorder with inhalant-induced dementia
F18.18	Inhalant abuse with other inhalant-induced disorders

ICD-10-CM Code	Description
F18.180	Inhalant abuse with inhalant-induced anxiety disorder
F18.188	Inhalant abuse with other inhalant-induced disorder
F18.19	Inhalant abuse with other inhalant-induced disorder with unspecified inhalant-induced disorder
F18.2	Inhalant dependence
F18.20	Inhalant dependence, uncomplicated
F18.21	Inhalant dependence, in remission
F18.22	Inhalant dependence with intoxication
F18.220	Inhalant dependence with intoxication, uncomplicated
F18.221	Inhalant dependence with intoxication, delirium
F18.229	Inhalant dependence with intoxication, unspecified
F18.24	Inhalant dependence with intoxication, unspecified with inhalant-induced mood disorder
F18.25	Inhalant dependence with inhalant-induced psychotic disorder
F18.250	Inhalant dependence with inhalant-induced psychotic disorder, with delusions
F18.251	Inhalant dependence with inhalant-induced psychotic disorder, with hallucinations
F18.259	Inhalant dependence with inhalant-induced psychotic disorder, unspecified
F18.27	Inhalant dependence with inhalant-induced psychotic disorder with inhalant-induced dementia
F18.28	Inhalant dependence with other inhalant-induced disorders
F18.280	Inhalant dependence with inhalant-induced anxiety disorder
F18.288	Inhalant dependence with other inhalant-induced disorder
F18.29	Inhalant dependence with other inhalant-induced disorder, with unspecified inhalant-induced disorder

Nicotine Use Disorder Diagnosis Codes

ICD-10-CM Code	Description
F17.2	Nicotine dependence
F17.20	Nicotine dependence, unspecified
F17.200	Nicotine dependence, unspecified, uncomplicated
F17.201	Nicotine dependence, unspecified, in remission
F17.203	Nicotine dependence unspecified, with withdrawal
F17.208	Nicotine dependence unspecified, with withdrawal with with other nicotine-induced disorders
F17.209	Nicotine dependence unspecified, with withdrawal with unspecified nicotine-induced disorders
F17.21	Nicotine dependence, cigarettes
F17.210	Nicotine dependence, cigarettes uncomplicated
F17.211	Nicotine dependence, cigarettes in remission
F17.213	Nicotine dependence, cigarettes with withdrawal
F17.218	Nicotine dependence, cigarettes with other nicotine-induced disorders

ICD-10-CM Code	Description
F17.219	Nicotine dependence, cigarettes with unspecified nicotine-induced disorders
F17.22	Nicotine dependence, chewing tobacco
F17.220	Nicotine dependence, chewing tobacco uncomplicated
F17.221	Nicotine dependence, chewing tobacco in remission
F17.223	Nicotine dependence, chewing tobacco with withdrawal
F17.228	Nicotine dependence, chewing tobacco with other nicotine-induced disorders
F17.229	Nicotine dependence, chewing tobacco with unspecified nicotine-induced disorders
F17.29	Nicotine dependence, other tobacco product
F17.290	Nicotine dependence, other tobacco product uncomplicated
F17.291	Nicotine dependence, other tobacco product in remission
F17.293	Nicotine dependence, other tobacco product with withdrawal
F17.298	Nicotine dependence, other tobacco product with other nicotine-induced disorders
F17.299	Nicotine dependence, other tobacco product with unspecified nicotine-induced disorders
O99.33	Tobacco use disorder complicating pregnancy, childbirth, and the puerperium
O99.330	Smoking (tobacco) complicating pregnancy, unspecified trimester
O99.33.1	Smoking (tobacco) complicating pregnancy, first trimester
O99.332	Smoking (tobacco) complicating pregnancy, second trimester
O99.333	Smoking (tobacco) complicating pregnancy, third trimester
O99.334	Smoking (tobacco) complicating childbirth
O99.335	Smoking (tobacco) complicating the puerperium
Z87.891	Personal history of nicotine dependence

Opioid Use Disorder Diagnosis Codes

ICD-10-CM Code	Description
F11.1	Opioid abuse
F11.10	Opioid abuse, uncomplicated
F11.11	Opioid abuse, in remission
F11.12	Opioid abuse with intoxication
F11.120	Opioid abuse with intoxication, uncomplicated
F11.121	Opioid abuse with intoxication delirium
F11.122	Opioid abuse with intoxication with perceptual disturbance
F11.129	Opioid abuse with intoxication, unspecified
F11.13	Opioid abuse with withdrawal
F11.14	Opioid abuse with opioid-induced mood disorder
F11.15	Opioid abuse with opioid-induced psychotic disorder
F11.150	Opioid abuse with opioid-induced psychotic disorder with delusions
F11.151	Opioid abuse with opioid-induced psychotic disorder with hallucinations
F11.159	Opioid abuse with opioid-induced psychotic disorder, unspecified
F11.18	Opioid abuse with other opioid-induced disorder

ICD-10-CM Code	Description
F11.181	Opioid abuse with opioid-induced sexual dysfunction
F11.182	Opioid abuse with opioid-induced sleep disorder
F11.188	Opioid abuse with other opioid-induced disorder
F11.19	Opioid abuse with unspecified opioid-induced disorder
F11.2	Opioid dependence
F11.20	Opioid dependence, uncomplicated
F11.21	Opioid dependence, in remission
F11.22	Opioid dependence with intoxication
F11.220	Opioid dependence with intoxication, uncomplicated
F11.221	Opioid dependence with intoxication delirium
F11.222	Opioid dependence with intoxication with perceptual disturbance
F11.229	Opioid dependence with intoxication, unspecified
F11.23	Opioid dependence with withdrawal
F11.24	Opioid dependence with opioid-induced mood disorder
F11.25	Opioid dependence with opioid-induced psychotic disorder
F11.250	Opioid dependence with opioid-induced psychotic disorder with delusions
F11.251	Opioid dependence with opioid-induced psychotic disorder with hallucinations
F11.259	Opioid dependence with opioid-induced psychotic disorder, unspecified
F11.28	Opioid dependence with other opioid-induced disorder
F11.281	Opioid dependence with opioid-induced sexual dysfunction
F11.282	Opioid dependence with opioid-induced sleep disorder
F11.288	Opioid dependence with other opioid-induced disorder
F11.29	Opioid dependence with unspecified opioid-induced disorder

Sedative Use Disorder Diagnosis Codes

ICD-10-CM Code	Description
F13.1	Sedative, hypnotic or anxiolytic abuse
F13.10	Sedative, hypnotic or anxiolytic abuse, uncomplicated
F13.11	Sedative, hypnotic or anxiolytic abuse, in remission
F13.12	Sedative, hypnotic or anxiolytic abuse with intoxication
F13.120	Sedative, hypnotic or anxiolytic abuse with intoxication, uncomplicated
F13.121	Sedative, hypnotic or anxiolytic abuse with intoxication delirium
F13.129	Sedative, hypnotic or anxiolytic abuse with intoxication, unspecified
F13.130	Sedative, hypnotic or anxiolytic abuse with withdrawal, uncomplicated
F13.131	Sedative, hypnotic or anxiolytic abuse with withdrawal delirium
F13.132	Sedative, hypnotic or anxiolytic abuse with withdrawal with perceptual disturbance
F13.139	Sedative, hypnotic or anxiolytic abuse with withdrawal, unspecified
F13.14	Sedative, hypnotic or anxiolytic abuse with sedative, hypnotic or anxiolytic- induced mood disorder
F13.15	Sedative, hypnotic or anxiolytic abuse with sedative, hypnotic or anxiolytic- induced psychotic disorder

ICD-10-CM Code	Description
F13.150	Sedative, hypnotic or anxiolytic abuse with sedative, hypnotic or anxiolytic- induced psychotic disorder with delusions
F13.151	Sedative, hypnotic or anxiolytic abuse with sedative, hypnotic or anxiolytic- induced psychotic disorder with hallucinations
F13.159	Sedative, hypnotic or anxiolytic abuse with sedative, hypnotic or anxiolytic- induced psychotic disorder, unspecified
F13.18	Sedative, hypnotic or anxiolytic abuse with other sedative, hypnotic or anxiolytic-induced disorders
F13.180	Sedative, hypnotic or anxiolytic abuse with sedative, hypnotic or anxiolytic- induced anxiety disorder
F13.181	Sedative, hypnotic or anxiolytic abuse with sedative, hypnotic or anxiolytic- induced sexual dysfunction
F13.182	Sedative, hypnotic or anxiolytic abuse with sedative, hypnotic or anxiolytic- induced sleep disorder
F13.188	Sedative, hypnotic or anxiolytic abuse with other sedative, hypnotic or anxiolytic-induced disorder
F13.19	Sedative, hypnotic or anxiolytic abuse with unspecified sedative, hypnotic or anxiolytic-induced disorder
F13.2	Sedative, hypnotic or anxiolytic dependence
F13.20	Sedative, hypnotic or anxiolytic dependence, uncomplicated
F13.21	Sedative, hypnotic or anxiolytic dependence, in remission
F13.22	Sedative, hypnotic or anxiolytic dependence with intoxication
F13.220	Sedative, hypnotic or anxiolytic dependence with intoxication, uncomplicated
F13.221	Sedative, hypnotic or anxiolytic dependence with intoxication delirium
F13.229	Sedative, hypnotic or anxiolytic dependence with intoxication, unspecified
F13.23	Sedative, hypnotic or anxiolytic dependence with withdrawal
F13.230	Sedative, hypnotic or anxiolytic dependence with withdrawal, uncomplicated
F13.231	Sedative, hypnotic or anxiolytic dependence with withdrawal delirium
F13.232	Sedative, hypnotic or anxiolytic dependence with withdrawal with perceptual disturbance
F13.239	Sedative, hypnotic or anxiolytic dependence with withdrawal, unspecified
F13.24	Sedative, hypnotic or anxiolytic dependence with sedative, hypnotic or anxiolytic-induced mood disorder
F13.25	Sedative, hypnotic or anxiolytic dependence with sedative, hypnotic or anxiolytic-induced psychotic disorder
F13.250	Sedative, hypnotic or anxiolytic dependence with sedative, hypnotic or anxiolytic-induced psychotic disorder with delusions
F13.251	Sedative, hypnotic or anxiolytic dependence with sedative, hypnotic or anxiolytic-induced psychotic disorder with hallucinations
F13.259	Sedative, hypnotic or anxiolytic dependence with sedative, hypnotic or anxiolytic-induced persisting amnestic disorder
F13.27	Sedative, hypnotic or anxiolytic dependence with sedative, hypnotic or anxiolytic-induced persisting dementia
F13.28	Sedative, hypnotic or anxiolytic dependence with other sedative, hypnotic or anxiolytic-induced disorders

ICD-10-CM Code	Description
F13.280	Sedative, hypnotic or anxiolytic dependence with sedative, hypnotic or anxiolytic-induced anxiety disorder
F13.281	Sedative, hypnotic or anxiolytic dependence with sedative, hypnotic or anxiolytic-induced sexual dysfunction
F13.282	Sedative, hypnotic or anxiolytic dependence with sedative, hypnotic or anxiolytic-induced sleep disorder
F13.288	Sedative, hypnotic or anxiolytic dependence with other sedative, hypnotic or anxiolytic-induced disorder
F13.29	Sedative, hypnotic or anxiolytic dependence with unspecified sedative, hypnotic or anxiolytic-induced disorder

Other Stimulant Use Disorder Diagnosis Codes

ICD-10-CM Code	Description
F15.1	Other stimulant abuse
F15.10	Other stimulant abuse, uncomplicated
F15.11	Other stimulant abuse, in remission
F15.12	Other stimulant abuse with intoxication
F15.120	Other stimulant abuse with intoxication, uncomplicated
F15.121	Other stimulant abuse with intoxication delirium
F15.122	Other stimulant abuse with intoxication with perceptual disturbance
F15.129	Other stimulant abuse with intoxication, unspecified
F15.13	Other stimulant abuse with withdrawal
F15.14	Other stimulant abuse with stimulant-induced mood disorder
F15.15	Other stimulant abuse with stimulant-induced psychotic disorder
F15.150	Other stimulant abuse with stimulant-induced psychotic disorder with delusions
F15.151	Other stimulant abuse with stimulant-induced psychotic disorder with hallucinations
F15.159	Other stimulant abuse with stimulant-induced psychotic disorder, unspecified
F15.18	Other stimulant abuse with other stimulant-induced disorder
F15.180	Other stimulant abuse with stimulant-induced anxiety disorder
F15.181	Other stimulant abuse with stimulant-induced sexual dysfunction
F15.182	Other stimulant abuse with stimulant-induced sleep disorder
F15.188	Other stimulant abuse with other stimulant-induced disorder
F15.19	Other stimulant abuse with unspecified stimulant-induced disorder
F15.2	Other stimulant dependence, uncomplicated
F15.20	Other stimulant dependence, uncomplicated
F15.21	Other stimulant dependence, in remission
F15.220	Other stimulant dependence with intoxication, uncomplicated
F15.221	Other stimulant dependence with intoxication delirium
F15.222	Other stimulant dependence with intoxication with perceptual disturbance
F15.229	Other stimulant dependence with intoxication, unspecified
F15.23	Other stimulant dependence with withdrawal
F15.24	Other stimulant dependence with stimulant-induced mood disorder

ICD-10-CM Code	Description
F15.25	Other stimulant dependence with stimulant-induced psychotic disorder
F15.250	Other stimulant dependence with stimulant-induced psychotic disorder with delusions
F15.251	Other stimulant dependence with stimulant-induced psychotic disorder with hallucinations
F15.259	Other stimulant dependence with stimulant-induced psychotic disorder, unspecified
F15.28	Other stimulant dependence with other stimulant-induced disorder
F15.280	Other stimulant dependence with stimulant-induced anxiety disorder
F15.281	Other stimulant dependence with stimulant-induced sexual dysfunction
F15.282	Other stimulant dependence with stimulant-induced sleep disorder
F15.288	Other stimulant dependence with other stimulant-induced disorder
F15.29	Other stimulant dependence with unspecified stimulant-induced disorder

Other Psychoactive Use Disorder Diagnosis Codes

ICD-10-CM Code	Description
F19.1	Other psychoactive substance abuse
F19.10	Other psychoactive substance abuse, uncomplicated
F19.11	Other psychoactive substance abuse, in remission
F19.12	Other psychoactive substance abuse with intoxication
F19.120	Other psychoactive substance abuse with intoxication, uncomplicated
F19.121	Other psychoactive substance abuse with intoxication delirium
F19.122	Other psychoactive substance abuse with intoxication with perceptual disturbances
F19.129	Other psychoactive substance abuse with intoxication, unspecified
F19.130	Other psychoactive substance abuse with withdrawal, uncomplicated
F19.131	Other psychoactive substance abuse with withdrawal delirium
F19.132	Other psychoactive substance abuse with withdrawal with perceptual disturbance
F19.139	Other psychoactive substance abuse with withdrawal, unspecified
F19.14	Other psychoactive substance abuse with psychoactive substance-induced mood disorder
F19.129	Other psychoactive substance abuse with intoxication, unspecified
F19.15	Other psychoactive substance abuse with psychoactive substance-induced psychotic disorder
F19.150	Other psychoactive substance abuse with psychoactive substance-induced psychotic disorder with delusions
F19.151	Other psychoactive substance abuse with psychoactive substance-induced psychotic disorder with hallucinations
F19.159	Other psychoactive substance abuse with psychoactive substance-induced psychotic disorder, unspecified
F19.16	Other psychoactive substance abuse with psychoactive substance-induced persisting amnestic disorder
F19.17	Other psychoactive substance abuse with psychoactive substance-induced persisting dementia

ICD-10-CM Code	Description
F19.18	Other psychoactive substance abuse with other psychoactive substance-induced disorders
F19.180	Other psychoactive substance abuse with psychoactive substance-induced anxiety disorder
F19.181	Other psychoactive substance abuse with psychoactive substance-induced sexual dysfunction
F19.182	Other psychoactive substance abuse with psychoactive substance-induced sleep disorder
F19.188	Other psychoactive substance abuse with other psychoactive substance-induced disorder
F19.19	Other psychoactive substance abuse with unspecified psychoactive substance-induced disorder
F19.2	Other psychoactive substance dependence
F19.20	Other psychoactive substance dependence, uncomplicated
F19.21	Other psychoactive substance dependence, in remission
F19.22	Other psychoactive substance dependence with intoxication
F19.220	Other psychoactive substance dependence with intoxication, uncomplicated
F19.221	Other psychoactive substance dependence with intoxication delirium
F19.229	Other psychoactive substance dependence with intoxication, unspecified
F19.23	Other psychoactive substance dependence with withdrawal
F19.230	Other psychoactive substance dependence with withdrawal, uncomplicated
F19.231	Other psychoactive substance dependence with withdrawal delirium
F19.232	Other psychoactive substance dependence with withdrawal with perceptual disturbance
F19.229	Other psychoactive substance dependence with intoxication, unspecified
F19.239	Other psychoactive substance dependence with withdrawal, unspecified
F19.24	Other psychoactive substance dependence with psychoactive substance-induced mood disorder
F19.25	Other psychoactive substance dependence with psychoactive substance-induced psychotic disorder
F19.250	Other psychoactive substance dependence with psychoactive substance-induced psychotic disorder with delusions
F19.251	Other psychoactive substance dependence with psychoactive substance-induced psychotic disorder with hallucinations
F19.259	Other psychoactive substance dependence with psychoactive substance-induced psychotic disorder, unspecified
F19.26	Other psychoactive substance dependence with psychoactive substance-induced persisting amnestic disorder
F19.27	Other psychoactive substance dependence with psychoactive substance-induced persisting dementia
F19.28	Other psychoactive substance dependence with other psychoactive substance-induced disorders
F19.280	Other psychoactive substance dependence with psychoactive substance-induced anxiety disorder

ICD-10-CM Code	Description
F19.281	Other psychoactive substance dependence with psychoactive substance-induced sexual dysfunction
F19.282	Other psychoactive substance dependence with psychoactive substance-induced sleep disorder
F19.288	Other psychoactive substance dependence with other psychoactive substance-induced disorder
F19.29	Other psychoactive substance dependence with unspecified psychoactive substance-induced disorder

Appendix IV: Substance Use Disorder Natural Language Processing Search Terms

Alcohol Use Disorder Standalone Keyword Search

Search Term
alcoholic
alcoholism
alcohlism
alcohol use disorder
banana bag
alcohol abuse
alcoholics anonymous
alcohol dependence

Alcohol Use Disorder Combination Search

Phrase A	Phrase B
abuse	ethanol
abusing	etoh
addict	alcohol
addiction	
addicted	
abused	
dependence	
dependent	
dependency	
withdrawal	
withdrawl	
use disorder	
relapse	
remission	

Cannabis Use Disorder Standalone Keyword Search

Search Term
cannabis use disorder
marijuana abuse
marijuana dependence
weed abuse
weed dependence
cannabis abuse
cannabis dependence

Cannabis Use Disorder Combination Search

Phrase A	Phrase B
abuse	cannabis
abusing	marijuana
addict	marihuana
addiction	marijuana
addicted	weed
abused	pot
dependence	
dependent	
dependency	
withdrawal	
withdrawl	
use disorder	
relapse	
remission	

Cocaine Use Disorder Standalone Keyword Search

Search Term
cocaine use disorder
cocaine addiction
cocaine abuse
cocaine dependence

Cocaine Use Disorder Combination Search

Phrase A	Phrase B
abuse	cocaine
abusing	cocain
addict	crack
addiction	
addicted	
abused	
dependence	
dependent	
dependency	
withdrawal	
withdrawl	
use disorder	
relapse	
remission	
IVDA	
IDU	
intravenous drug user	
intravenous drug abuser	

Hallucinogen Use Disorder Keyword Search

Search Term
hallucinogen use disorder
hallucinogen abuse
hallucinogen dependence

Hallucinogen Use Disorder Combination Search

Phrase A	Phrase B
abuse	Hallucinogen
abusing	hallucinogenic
addict	Phencyclidine
addiction	LSD
addicted	MDMA
abused	Ecstasy
dependence	ecstacy
dependent	Extasy
dependency	Extacy
withdrawal	DIOXYMETHAMPHETAMINE
withdrawl	Ketamine
use disorder	Dextromethorphan
relapse	
remission	
IVDA	
IDU	
intravenous drug user	
intravenous drug abuser	

Inhalant Use Disorder Keyword Search

Search Term
inhalant use disorder
inhalant abuse
inhalant dependence

Inhalant Use Disorder Combination Search

Phrase A	Phrase B
abuse	inhalant
abusing	inhalat
addict	glue
addiction	
addicted	
abused	
dependence	
dependent	
dependency	
withdrawal	
withdrawl	
use disorder	
relapse	
remission	

Nicotine Use Disorder Keyword Search

Search Term
Nicotine dependence
Tobacco use disorder
Tobacco abuse
Smoker (finding)
Tobacco dependence syndrome
Maternal tobacco use
Smoking (tobacco) complicating pregnancy
Smoking (tobacco) complicating childbirth
Smoking (tobacco) complicating the puerperium
Nicotine dependence
Tobacco use disorder

Note: Nicotine positive flags were deleted where anywhere in the encounter any of the following phrases were found: "never smoker", "never a smoker", "never smoked".

Opioid Use Disorder Keyword Search

Search Term
opioid use disorder
heroin addiction
PDMP
opioid abuse
opioid dependence
medication assisted treatment

Search Term
Suboxone
neonatal abstinence syndrome
neonatal withdrawal symptoms

Opioid Use Disorder Combination Search

Phrase A	Phrase B
abuse	narcotic
abusing	narcotics
addict	opiate
addiction	opiates
addicted	opioid
abused	opiod
dependence	opoid
dependent	heroin
dependency	heroine
withdrawal	hydrocodone
withdrawl	hydromorphone
use disorder	hydromophone
relapse	meperidine
remission	methadone
IVDA	methdone
IDU	morphine
intravenous drug user	oxycodone
intravenous drug abuser	oxycontin
	percocet
	percocoet
	percodan
	oxymorphone
	tramadol
	butorphanol
	opium

Sedative Use Disorder Keyword Search

Search Term
SHA use disorder
SHA withdrawal
anxiolytic abuse
sedative abuse

Sedative Use Disorder Combination Search

Phrase A	Phrase B
abuse	Sedative
abusing	
addict	
addiction	
addicted	
abused	
dependence	
dependent	
dependency	
withdrawal	
withdrawl	
use disorder	
relapse	
remission	

Other Stimulant Use Disorder Keyword Search

Search Term
stimulant use disorder
amphetamine use disorder
methamphetamine use disorder
other stimulant abuse
other stimulant dependence

Other Stimulant Use Disorder Combination Search

Phrase A	Phrase B
abuse	Stimulant
abusing	Amphetamine
addict	Methamphetamine
addiction	Meth
addicted	Methylphenidate
abused	Adderall
dependence	Dextroamphetamine
dependent	Ritalin
dependency	Provigil
withdrawal	Dexedrine
withdrawl	
use disorder	
relapse	
remission	
IVDA	
IDU	
intravenous drug user	
intravenous drug abuser	

Other Psychoactive Use Disorder Keyword Search

Search Term
psychoactive substance use disorder
psud
substance use disorder[1]
drug abuse[1]
drug addiction[1]
substance abuse[1]
substance addiction[1]
drug addict[1]
ivda[1]
intravenous drug user[1]
intravenous drug abuser[1]

[1]Terms were de-prioritized, they were only searched for if no other SUD phrase was found in that sentence. For SUDs, single word de-prioritized terms were only searched if they occurred in a note type likely to contain diagnoses.

Other Psychoactive Use Disorder Combination Search

Phrase A	Phrase B
abuse	polysubstance
abusing	psychoactive
addict	drug[1]
addiction	substance[1]
addicted	IV drug[1]
abused	Intravenous drug[1]
dependence	
dependent	
dependency	
withdrawal	
withdrawl	
use disorder	
relapse	
remission	
IVDA	
IDU	
intravenous drug user	
intravenous drug abuser	

[1]Terms were de-prioritized, they were only searched for if no other SUD phrase was found in that sentence. For SUDs, single word de-prioritized terms were only searched if they occurred in a note type likely to contain diagnoses.