

## **Appendix A. Search Terms**

### **Pubmed**

((("Substance-Related Disorders/epidemiology"[Mesh]) OR "Drug Overdose/epidemiology"[Mesh]) AND "Comorbidity"[Mesh])  
AND ("North America/epidemiology"[Mesh])

### **Ovid Embase**

(AllFields:comorbidities) AND ((AllFields:substance use disorder) OR (AllFields:drug overdose)) AND (AllFields:north america)  
AND (AllFields:epidemiology)

### **MEDLINE**

1. exp Comorbidit\$/
2. exp North America/ep [Epidemiology]
3. exp Drug Overdose/ep [Epidemiology]
4. 1 and 2 and 3

### **Web of Science**

((ALL=(Substance-Related Disorders)) OR ALL=(Drug Overdose)) AND ALL=(Comorbidity)

Filtered to Canada or USA

**Appendix B. Characteristics of studies found ordered by date published.**

Author	Date	Country	Population	Comorbidity	Substance Use	Main Outcomes/Findings
Bunt et al. [1]	1990	USA	Psychiatric inpatients at large urban general hospital who met the DSM-III criteria for cocaine dependence	Schizophrenic disorders	Cocaine	Describing the diagnostic spectrum of psychiatric inpatients who used cocaine and specifically analyzing impact of cocaine on aggressive or psychotic behavior
Nace et al. [2]	1991	USA	First 100 patients to agree at a inpatient substance abuse program in a private psychiatric hospital	Personality Disorders	Alcohol, marijuana, amphetamines, cocaine, LSD, opiates	Prevalence of drug use among inpatients with personal disorders
Grant [3]	1995	USA	NLAES, national probability sample	Major Depressive disorder	All drug use (prescription drugs had highest prevalence)	Association between drug dependence and major depression
Grant and Harford [4]	1995	USA	Representative sample of the United States	Depression	Alcohol	Determining the association between alcohol use disorders and major depression based on three-time frames (the past year, prior to the past year and on a lifetime basis)

Kessler et al. [5]	1997	USA	Representative sample from National Comorbidity Survey	All NCS/DSM-III-R diagnoses	Alcohol	Lifetime co-occurrence of alcohol abuse and other psychiatric disorders
De Bernardo et al. [6]	2002	USA	Inpatients at private rehabilitation hospital	Major depression Bipolar depression	Alcohol Marijuana Cocaine	Determining personal history factors of those with comorbid diagnoses
Farris et al. [7]	2003	USA	Patient data from state-funded psychiatric hospital	Schizophrenia	Alcohol, all other substance use	How psychosocial characteristics, demographic, and treatment course differ in schizophrenic patients with and without SUD
Grant et al. [8]	2004	USA	Representative sample from NESARC wave I	All psychiatric disorders Major depression	Nicotine	Determine the prevalence co-occurring psychiatric disorders and nicotine dependence
Courbasson et al. [9]	2005	CAD	Patients seeking treatment for SUD at large urban addictions treatment center	Anorexia Bulimia	All drug use (Alcohol dependence most significant)	Categorizing the prevalence of eating disorders with different substance use disorders with the most prevalent being alcohol
Khan et al. [10]	2005	USA	Representative sample from multisite projects utilizing the population-based Virginia Twin Registry	Depression Anxiety Panic Phobia	alcohol dependence, any drug dependence	Prevalence of personality traits associated with comorbid mental illness disorder and substance abuse

				Antisocial personality disorder		
Wild et al. [11]	2005	Canada	Multisite sample of illicit opioid users	Depression	Opioids	Prevalence of comorbid depression along with needle usage, injection frequency, and prevalence of combined opiate and non opiate usage (cocaine, crack, cocaine and crack)
Conway et al. [12]	2006	USA	Representative sample from NESARC	All DSM-IV psychiatric disorders	All drug use (Opioid dependence most significant)	Describing the strength of association between mood and anxiety disorders and type of substance use. Depression and hallucinogen use had strongest association
Kertesz et al. [13]	2006	USA	Cocaine-dependent homeless patients at healthcare agency	Mood disorders Major depressive disorders Anxiety disorders	Cocaine	Whether patients enrolled in addictions treatment trial experienced a reduction in the prevalence of psychiatric disorders
Sullivan et al. [14]	2006	USA	Stratified probability sample from a nationwide telephone survey	Depression Anxiety	Opioids	Prevalence of opioid use among depression and anxiety

Hasin et al. [15]	2007	USA	Representative sample from NESARC wave I	Mood Anxiety Personality disorders	Alcohol	Determining prevalence of comorbid psychiatric disorders and DSM-IV alcohol abuse and dependence. Also evaluated impact on treatment seeking rates
Keyes et al. [16]	2008	USA	Representative sample from NESARC wave I	DSM-IV Axis I and II disorders	Ecstasy	Past 12 month and lifetime comorbidity of ecstasy and DSM-IV Axis I and II disorders
Sheu et al. [17]	2008	USA	Sample of patients attending an outpatient drug and alcohol treatment program	Chronic severe pain Pain	Alcohol, cocaine, marijuana, heroin, nicotine, other	Prevalence of pain and chronic severe pain among substance users
Eaton et al. [18]	2010	USA	Representative sample from NESARC waves I and II	Borderline personality disorder	Alcohol Nicotine Marijuana	Integrate BPD into the internalizing/externalizing structure of comorbidity.
Johnson et al. [19]	2010	USA	Representative sample of those receiving community mental health services	Schizophrenia spectrum disorders Mood disorders Anxiety disorders	Tobacco	Determining prevalence of nicotine dependence and psychiatric disorders.
Smith & Book [20]	2010	USA	Samples from 3 intensive outpatient substance abuse treatment programs	Anxiety Depression	Alcohol	Prevalence of different forms of anxiety and depression among alcohol abuse

Cranford et al. [21]	2011	USA	Representative sample from NESARC	Depression	Alcohol	Prevalence of co-occurrence of AUD and major depressive disorder compared to AUD alone
Martins & Gorelick [22]	2011	USA	Representative sample of patients from the National Epidemiological Survey on Alcohol and Related Conditions	Psychiatric disorders	Psychoactive substances; nicotine, alcohol, marijuana, cocaine, heroin, sedative, tranquilizer	Prevalence of psychoactive substance use among patients with psychoactive disorders
Zvolensky et al. [23]	2011	USA	Representative sample from National Epidemiologic Survey of Alcohol and Related Conditions	Personality disorders	Nicotine	Prevalence of nicotine dependence among personality disorder patients
Koola et al. [24]	2012	USA	Sample from multisite inpatient mental health facilities	Schizophrenia Schizoaffective disorders Psychosis	Cannabis	Relationship between cannabis use and various schizoaffective disorders
Blanco et al. [25]	2013	USA	Representative sample from NESARC wave II	PTSD	Alcohol	Lifetime prevalence of combined PTSD-AUD and risk factors for co-morbid development
Crum et al. [26]	2013	USA	Representative sample from NESARC waves I and II	Mood disorders	Alcohol	Association of alcohol self-medication of mood symptoms with incident and persistent DSM-IV alcohol dependence

Cullen et al. [27]	2013	USA	Representative sample from NESARC waves I	Anxiety	Alcohol	Investigated classes, of comorbid AUD and anxiety symptoms, and assessed the association of class membership with health-related quality of life.
Do & Mezuk [28]	2013	USA	Representative epidemiology survey conducted between 2001-2003	Bipolar disorders (hypomania)	nicotine alcohol cannabis cocaine, prescription drug use	Examine the prevalence of comorbid hypomania and substance use, assess the extent of this association, and whether this differs by race/ethnicity.
Goodwin et al. [29]	2013	USA	Representative sample from National Comorbidity Survey	Anxiety disorders	Alcohol, all other substance use	Determining the association between different types of anxiety disorders and alcohol dependence/SUD.
Dunne et al. [30]	2014	USA	Epidemiological study on drug users conducted between 2002-2012	ADHD	All drug use (injection drug use had to strongest association)	Whether those with ADHD follow the substance initiation hierarchy proposed by the Gateway Theory
Breslau [31]	2015	USA	Random sample of 1200 members of a Health Maintenance Clinic	Depression Anxiety	Nicotine	Prevalence of combined nicotine dependence and depression and anxiety

Moss et al. [32]	2015	USA	Representative sample from the National Epidemiologic Survey on Alcohol and Related Conditions	Mood disorders Anxiety disorders Lifetime personality disorders	Alcohol, nicotine, cannabis, cocaine, other illicit drugs	Prevalence of substance use, association with comorbid mood and anxiety disorders and lifetime personality disorders
Uebelacker et al. [33]	2015	USA	Multisite sample of HIV-infected patients	Acute, Mild Chronic, Chronic Pain	Crack, cocaine, methamphetamine, alcohol	Prevalence of depressive symptom severity with different levels of chronic pain in HIV-infected patients
Whitbeck et al. [34]	2015	USA	Random multisite sample of homeless women	Borderline personality disorder Axis I anxiety disorders Axis I mood disorders	Alcohol abuse, Alcohol dependence, Drug abuse, Drug dependence, Nicotine dependence	Prevalence of different combinations of comorbidities from 2 disorder prevalence, 3 disorder prevalence and prevalence of PTSD, mood, substance use and BPD
Kolla et al. [35]	2016	Canada	Sampled from an ongoing cross-sectional telephone survey	ADHD	Alcohol, Cannabis	Prevalence of ADHD symptom expression in alcohol and cannabis use
Paulus et al. [36]	2016	USA	Multisite representative sample from AIDS service organizations	Anxiety	Alcohol use	Assessing the relationship between anxiety sensitivity and alcohol use in persons living with HIV/AIDS



Rush et al. [37]	2016	USA	Sample from an internet-based universal alcohol abuse prevention program	Binge eating disorder	Alcohol use	Characteristics and prevalence of comorbid binge eating disorder and alcohol use
Wallace et al. [38]	2016	USA	Young adults with and without ADHD	ADHD	Alcohol problems, alcohol use, drug problems, drug use, marijuana problems, marijuana use	Prevalence of ADHD among substance use, direct and indirect effects of childhood ADHD symptoms associated with substance problems in adulthood
Hayley et al. [39]	2017	USA	Representative sample from NESARC wave III	DSM-5 psychiatric disorders	Cannabis	Determine the prevalence of co-occurring psychiatric disorders and cannabis use disorder
Smith et al. [40]	2017	USA	Sample of active drug users in ongoing study of social networks and HIV risk	Antisocial personality disorder	Alcohol, heroin, illegal and legal methadone, oxycontin, oxycodone, benzodiazepine, hydrocodone, powder and crack cocaine, methamphetamine, marijuana	Prevalence of antisocial personality disorder among substance users
Choi et al. [41]	2018	Canada	Sample of HIV+ patients from administrative health database	Depression	steroids, amphetamines, methamphetamines, cocaine, crack/freebase, club	How comorbid depression and drug use among HIV+ people affects ED services use

					drugs, heroin, opiates, tranquilizers	
Cook et al. [42]	2018	USA	Multisite sample of women with HIV	All DSM-IV psychiatric disorders	Alcohol General drug use	Describing affect of co-occurring psychiatric and substance use disorders on risky sexual behavior
Crawford & Thornton [43]	2018	USA	HIV patients seeking care at infectious disease clinic	Multiple chronic conditions	Alcohol	Determining the number of comorbid conditions for those with HIV and Alcohol use
Domenico et al. [44]	2018	USA	Inpatients at 6 substance abuse treatment facilities	Anxiety	Alcohol Marijuana Cocaine	Characterize demographic differences between inpatient SUD treatment-seekers reporting varying levels of anxiety symptoms
Bilevicius et al. [45]	2019	USA	Representative sample from NESARC-III	Chronic Pain PTSD	Cannabis	Prevalence of SUD among individuals with and without chronic pain and PTSD
Blevins et al. [45]	2019	USA	Young adult psychiatric partial hospital program patients	Depression Anxiety	Alcohol Cannabis	Categorizing cannabis and alcohol use patterns, psychiatric symptomatology, motives for use

Denis et al. [47]	2019	USA	Patients who received HIV care based on electronic health records	Chronic pain	All drug use (Cocaine, alcohol, and opiates were most prevalent)	Impact of chronic pain and substance use on HIV-related health outcomes
Han et al. [48]	2019	USA	Representative sample from National Survey on Drug Use and Health	Chronic medical conditions	All drug use (cannabis was the most common)	Determine prevalence of SUD among those with chronic medical conditions, specifically adults with multimorbidity
Prince [49]	2019	USA	Representative sample from National Survey on Drug Use and Health	Depression Anxiety Psychiatric hospitalization	Opioid use disorder and other substance use disorder	Prevalence of depression and anxiety among opioid use disorder, prevalence of opioid use disorder among substance use disorders
Simpson et al. [50]	2019	USA	Representative sample from NESARC-III	PTSD (main), depression, bipolar I, dysthymia, panic, agoraphobia, social anxiety disorder, specific phobia, generalized anxiety disorder, antisocial personality disorder, borderline personality disorder, schizotypal	Alcohol, drug use	Prevalence of comorbid PTSD among alcohol use disorder, prevalence of PTSD among drug use disorder, prevalence of alcohol and drug use disorder among comorbidities

				personality disorder, attempted suicide.		
Balachandran et al. [51]	2020	USA	Representative sample from NESARC waves I and II	PTSD	Alcohol	Effect of past-year alcohol dependence on developing PTSD
Chiuve et al. [52]	2020	USA	Random sample from healthcare utilization and reimbursement claims database	Endometriosis	Opioids	Risk of developing chronic opioid use in women with and without endometriosis
Jairam et al. [53]	2020	USA	Cancer-related patient visits with a primary diagnosis of opioid overdose from the The Healthcare Cost and Utilization Project Nationwide Emergency Department Sample	Cancer	Opioids	Determine the incidence of opioid-related ED visits among cancer patients between 2006-2015. Throughout study period incidence increased two-fold
Morin et al. [54]	2020	Canada	Representative sample of patients enrolled in opioid agonist treatment	Mental disorders (gender dysphoria, neurodevelopment, conduct, stress/trauma, feeding/eating, anxiety/obsessive/compulsive, mood, schizophrenia spectrum or related disorders)	Opioid use disorders	Prevalence of mental disorders in individuals with opioid use disorder

Bryan et al. [55]	2021	USA	Community pharmacy patients who filled 1+ opioid prescriptions	Depressive symptoms Chronic pain	Cannabis	Describing the relationship between opioid prescription, cannabis use, and the prevalence and severity of depressive symptoms
Fuller-Thomson et al. [56]	2021	Canada	Nationally representative Canadian Community Survey-Mental Health (CCHS-MH)	ADHD	All drug use (Alcohol and cannabis were most prevalent)	Compare the prevalence of the following four types of SUD (alcohol, cannabis, other drug use disorder, any substance use disorder) in adults with and without ADHD
Smith et al. [57]	2021	Canada	Sample from a transitional care and medical respite program	Psychotic disorder, mood disorder, anxiety disorder	Alcohol use disorder, opioid use disorder, stimulant use disorder	Prevalence of low, high, and tri-morbidity, prevalence of alcohol use and medical illness among substance use and mental illness
Tormohlen et al. [58]	2021	USA	Retrospective sampling from electronic health records	Depression	Opioid use disorder	Prevalence of depression among opioid use disorder patients, prevalence of suicide among patients with opioid use disorder and comorbid depression

Voon et al. [59]	2021	Canada	Selected from The Vancouver Injection Drug Users Study and the AIDS Care Cohort to evaluate Exposure to Survival Services; recent HIV-seronegative or -seropositive illicit drugs users	Depression	Heroin, stimulant, nonmedical prescription opioid, cannabis, alcohol, overdose	Prevalence of depressive symptoms among substance users
Johnson et al. [60]	2022	USA	Representative sample from NESARC wave III	Subthreshold psychiatric symptoms of mood, anxiety, trauma, eating, and personality disorders	Alcohol	Determining the lifetime prevalence rates of those with subthreshold psychiatric symptoms and alcohol use disorder

## Appendix B References

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