

Supplementary Online Content

Follman S, Arora VM, Lyttle C, Moore PQ, Pho MT. Naloxone prescriptions among commercially insured individuals at high risk of opioid overdose. *JAMA Netw Open*. 2019;2(5):e193209. doi:10.1001/jamanetworkopen.2019.3209

eTable 1. *ICD-10* Codes for Opioid Misuse, Dependence, and Overdose

eTable 2. MarketScan Codes Used to Identify Emergency Department Visits

eTable 3. MarketScan Codes Used to Identify Outpatient Providers

eTable 4. *ICD-10* Codes Used to Identify Other Substance Use Disorders and Mental Health Diagnoses

eTable 5. Red Book Naloxone Medications

This supplementary material has been provided by the authors to give readers additional information about their work.

eTable 1. ICD-10 Codes for Opioid Misuse, Dependence, and Overdose

| Opioid Misuse & Dependence ICD-10 Codes: | |
|---|---|
| Opioid Misuse (Abuse): | |
| F1110 | Opioid abuse, uncomplicated |
| F11120 | Opioid abuse with intoxication, uncomplicated |
| F11121 | Opioid abuse with intoxication delirium |
| F11122 | Opioid abuse with intoxication with perceptual disturbance |
| F11129 | Opioid abuse with intoxication, unspecified |
| F1114 | Opioid abuse with opioid-induced mood disorder |
| F11150 | Opioid abuse with opioid-induced psychotic disorder with delusions |
| F11151 | Opioid abuse with opioid-induced psychotic disorder with hallucinations |
| F11159 | Opioid abuse with opioid-induced psychotic disorder, unspecified |
| F11181 | Opioid abuse with opioid-induced sexual dysfunction |
| F11182 | Opioid abuse with opioid-induced sleep disorder |
| F11188 | Opioid abuse with other opioid-induced disorder |
| F1119 | Opioid abuse with unspecified opioid-induced disorder |
| | |
| Opioid Dependence and Unspecified Use: | |
| F1120 | Opioid dependence, uncomplicated |
| F11220 | Opioid dependence with intoxication, uncomplicated |
| F11221 | Opioid dependence with intoxication delirium |
| F11222 | Opioid dependence with intoxication with perceptual disturbance |
| F11229 | Opioid dependence with intoxication, unspecified |
| F1123 | Opioid dependence with withdrawal |
| F1124 | Opioid dependence with opioid-induced mood disorder |
| F11250 | Opioid dependence with opioid-induced psychotic disorder with delusions |
| F11251 | Opioid dependence with opioid-induced psychotic disorder with hallucinations |
| F11259 | Opioid dependence with opioid-induced psychotic disorder, unspecified |
| F11281 | Opioid dependence with opioid-induced sexual dysfunction |
| F11282 | Opioid dependence with opioid-induced sleep disorder |
| F11288 | Opioid dependence with other opioid-induced disorder |
| F1129 | Opioid dependence with unspecified opioid-induced disorder |
| F1190 | Opioid use, unspecified, uncomplicated |
| F11920 | Opioid use, unspecified with intoxication, uncomplicated |
| F11921 | Opioid use, unspecified with intoxication delirium |
| F11922 | Opioid use, unspecified with intoxication with perceptual disturbance |
| F11929 | Opioid use, unspecified with intoxication, unspecified |
| F1193 | Opioid use, unspecified with withdrawal |
| F1194 | Opioid use, unspecified with opioid-induced mood disorder |
| F11950 | Opioid use, unspecified with opioid-induced psychotic disorder with delusions |

| | |
|------------------------------------|--|
| F11951 | Opioid use, unspecified with opioid-induced psychotic disorder with hallucinations |
| F11959 | Opioid use, unspecified with opioid-induced psychotic disorder, unspecified |
| F11981 | Opioid use, unspecified with opioid-induced sexual dysfunction |
| F11982 | Opioid use, unspecified with opioid-induced sleep disorder |
| F11988 | Opioid use, unspecified with other opioid-induced disorder |
| F1199 | Opioid use, unspecified with unspecified opioid-induced disorder |
| | |
| | |
| OVERDOSE ICD-10 Codes: | |
| Adverse effects of Opioids: | |
| T400X5 A | Adverse effect of opium, initial encounter |
| T400X5 D | Adverse effect of opium, subsequent encounter |
| T400X5S | Adverse effect of opium, sequela |
| T402X5 A | Adverse effect of other opioids, initial encounter |
| T402X5 D | Adverse effect of other opioids, subsequent encounter |
| T402X5S | Adverse effect of other opioids, sequela |
| T403X5 A | Adverse effect of methadone, initial encounter |
| T403X5 D | Adverse effect of methadone, subsequent encounter |
| T403X5S | Adverse effect of methadone, sequela |
| T404X5 A | Adverse effect of other synthetic narcotics, initial encounter |
| T404X5 D | Adverse effect of other synthetic narcotics, subsequent encounter |
| T404X5S | Adverse effect of other synthetic narcotics, sequela |
| T40605A | Adverse effect of unspecified narcotics, initial encounter |
| T40605D | Adverse effect of unspecified narcotics, subsequent encounter |
| T40605S | Adverse effect of unspecified narcotics, sequela |
| T40695A | Adverse effect of other narcotics, initial encounter |
| T40695D | Adverse effect of other narcotics, subsequent encounter |
| T40695S | Adverse effect of other narcotics, sequela |
| | |
| Opioid Poisoning: | |
| T400X1 A | Poisoning by opium, accidental (unintentional), initial encounter |
| T400X1 D | Poisoning by opium, accidental (unintentional), subsequent encounter |
| T400X1S | Poisoning by opium, accidental (unintentional), sequela |
| T400X4 A | Poisoning by opium, undetermined, initial encounter |
| T400X4 D | Poisoning by opium, undetermined, subsequent encounter |

| | |
|-------------|--|
| T400X4S | Poisoning by opium, undetermined, sequela |
| T401X1 A | Poisoning by heroin, accidental (unintentional), initial encounter |
| T401X1 D | Poisoning by heroin, accidental (unintentional), subsequent encounter |
| T401X1S | Poisoning by heroin, accidental (unintentional), sequela |
| T401X4 A | Poisoning by heroin, undetermined, initial encounter |
| T401X4 D | Poisoning by heroin, undetermined, subsequent encounter |
| T401X4S | Poisoning by heroin, undetermined, sequela |
| T402X1 A | Poisoning by other opioids, accidental (unintentional), initial encounter |
| T402X1 D | Poisoning by other opioids, accidental (unintentional), subsequent encounter |
| T402X1S | Poisoning by other opioids, accidental (unintentional), sequela |
| T402X4 A | Poisoning by other opioids, undetermined, initial encounter |
| T402X4 D | Poisoning by other opioids, undetermined, subsequent encounter |
| T402X4S | Poisoning by other opioids, undetermined, sequela |
| T403X1 A | Poisoning by methadone, accidental (unintentional), initial encounter |
| T403X1 D | Poisoning by methadone, accidental (unintentional), subsequent encounter |
| T403X1S | Poisoning by methadone, accidental (unintentional), sequela |
| T403X4 A | Poisoning by methadone, undetermined, initial encounter |
| T403X4 D | Poisoning by methadone, undetermined, subsequent encounter |
| T403X4S | Poisoning by methadone, undetermined, sequela |
| T404X1 A | Poisoning by other synthetic narcotics, accidental (unintentional), initial encounter |
| T404X1 D | Poisoning by other synthetic narcotics, accidental (unintentional), subsequent encounter |
| T404X1S | Poisoning by other synthetic narcotics, accidental (unintentional), sequela |
| T404X4 A | Poisoning by other synthetic narcotics, undetermined, initial encounter |
| T404X4 D | Poisoning by other synthetic narcotics, undetermined, subsequent encounter |
| T404X4S | Poisoning by other synthetic narcotics, undetermined, sequela |
| T40601A | Poisoning by unspecified narcotics, accidental (unintentional), initial encounter |
| T40601D | Poisoning by unspecified narcotics, accidental (unintentional), subsequent encounter |
| T40601S | Poisoning by unspecified narcotics, accidental (unintentional), sequela |
| T40604A | Poisoning by unspecified narcotics, undetermined, initial encounter |
| T40604D | Poisoning by unspecified narcotics, undetermined, subsequent encounter |
| T40604S | Poisoning by unspecified narcotics, undetermined, sequela |
| T40691A | Poisoning by other narcotics, accidental (unintentional), initial encounter |
| T40691D | Poisoning by other narcotics, accidental (unintentional), subsequent encounter |

| | |
|---------|---|
| T40691S | Poisoning by other narcotics, accidental (unintentional), sequela |
| T40694A | Poisoning by other narcotics, undetermined, initial encounter |
| T40694D | Poisoning by other narcotics, undetermined, subsequent encounter |
| T40694S | Poisoning by other narcotics, undetermined, sequela |

eTable 2. MarketScan Codes Used to Identify Emergency Department Visits

| | | | |
|--|--|--|--|
| ED visits were defined based on 3 variable domains: | | | |
| 1. Attachment G: PROCGRP | | | |
| 111 | Emergency Department Visits | | |
| 114 | ER visits, Other | | |
| | | | |
| 2. Attachment H: REVCODE | | | |
| 450 | Emergency Room - general classification | | |
| 451 | Emergency room - emtala emergency room screening | | |
| 452 | Emergency room - ER beyond emtala screening | | |
| 456 | Emergency room - urgent care | | |
| 459 | Emergency room - other | | |
| 981 | Professional fees - emergency room | | |
| | | | |
| 3. Attachment K: STDPLAC | | | |
| 23 | Emergency room - Hospital | | |
| | | | |
| If patients were captured by any of these codes, they were included in the ED interaction flag | | | |

eTable 3. MarketScan Codes Used to Identify Outpatient Providers

| # visits with select outpatient providers were identified with the following codes: | | |
|--|-------------------------------|--|
| Attachment L - STDPROV | | |
| 140 | Pain mgmt/Pain medicine | |
| 202 | Osteopathic Medicine | |
| 204 | Internal Medicine | |
| 240 | Family Practice | |
| 320 | Obstetrics and Gynecology | |
| 365 | Psychiatry | |
| 400 | Pediatrician (general) | |
| 458 | Child Psychiatry | |
| 860 | Psychologist | |
| | | |
| "Surgery" included any of the following: | | |
| 500 | Surgeon (general) | |
| 505 | Surgical specialist | |
| 510 | Colon & Rectal Surgery | |
| 520 | Neurological Surgery | |
| 530 | Orthopedic Surgery | |
| 535 | Abdominal Surgery | |
| 520 | Cardiovascular Surgery | |
| 550 | General Vascular Surgery | |
| 555 | Head and Neck Surgery | |
| 560 | Pediatric Surgery | |
| 565 | Surgical Critical Care | |
| 570 | Transplant Surgery | |
| 575 | Traumatic Surgery | |
| 580 | Cardiothoracic Surgery | |
| 585 | Thoracic Surgery | |
| | | |
| "Chemical Dependency / Mental Health Tx" included: | | |
| 15 | Treatment Center | |
| 20 | Mental Health/Chemical Dep | |
| 21 | Mental Health Facilities | |
| 22 | Chem Depend Treatment Ctr | |
| 23 | Mental Hlth/Chem Dep Day Care | |
| 35 | Residential Treatment Center | |

eTable 4: ICD-10 Codes Used to Identify Other Substance Use Disorders and Mental Health Diagnoses

| Anxiety Disorders: | |
|--|--|
| F40 | Phobic Anxiety Disorders |
| F41 | Other Anxiety Disorders |
| F42 | Obsessive-compulsive disorder |
| | |
| F43.1 | Post-traumatic Stress Disorder (PTSD) |
| | |
| Mood Disorders: | |
| F30 | Manic Episode |
| F31 | Bipolar Disorder |
| F32 | Major Depressive Disorder, single episode |
| F33 | Major depressive disorder, recurrent |
| F34 | Persistent mood disorder |
| F39 | Unspecified Mood disorder |
| | |
| Other Substance Use Disorders: | |
| Alcohol: | |
| F10 | Alcohol Related Disorders |
| G62.1 | Alcoholic polyneuropathy |
| I42.6 | Alcoholic cardiomyopathy |
| K29.20 | Alcoholic gastritis without bleeding |
| K29.21 | Alcoholic gastritis with bleeding |
| K70.0 | Alcoholic fatty liver |
| K70.10 | Acute alcoholic hepatitis |
| K70.9 | Chronic alcoholic hepatitis |
| K70.30 | Alcoholic cirrhosis of liver without ascites |
| T51.0X1A T51.0X2A T51.0X3A T51.0X4A | Toxic effect of ethanol |
| T51.1X1A T51.1X2A T51.1X3A T51.1X4A | Toxic effect of methanol |
| T51.2X1A T51.2X2A T51.2X3A T51.2X4A | Toxic effect of 2-Propanol |
| T51.3X1A T51.3X2A T51.3X3A T51.3X4A | Toxic effect of fusel oil |
| T51.8X1A T51.8X2A T51.8X3A T51.8X4A | Toxic effect of other specified alcohols |
| T51.9X1A | Toxic effect of unspecified alcohol |

| | |
|----------------------------------|---|
| T51.9X2A T51.9X3A T51.9X4A | |
| Non-alcohol: | |
| F12 | Cannabis Related Disorders |
| F13 | Sedative, hypnotic, or anxiolytic related disorders |
| F14 | Cocaine related disorders |
| F15 | Other stimulant related disorders |
| F16 | Hallucinogen related disorders |
| F18 | Inhalant related disorders |
| F19 | Other psychoactive substance related disorders |

eTable 5. Red Book Naloxone Medications**The following medications were included in our analyses:**

| GENNME | PRODNME |
|------------------------|----------------------------|
| NALOXONE HYDROCHLORIDE | EVZIO |
| NALOXONE HYDROCHLORIDE | NALOXONE HCL |
| NALOXONE HYDROCHLORIDE | NALOXONE HCL NOVAPLUS |
| NALOXONE HYDROCHLORIDE | NARCAN |
| NALOXONE HYDROCHLORIDE | PREMIERPRO RX NALOXONE HCL |
| NALOXONE HYDROCHLORIDE | NALOXONE HCL ANHYDROUS |
| NALOXONE HYDROCHLORIDE | NALOXONE HCL DIHYDRATE |

The following medications were excluded in our analyses:

| GENNME | PRODNME |
|--|------------------------------|
| BUPRENORPHINE/NALOXONE | BUNAVAIL |
| BUPRENORPHINE/NALOXONE | BUPRENORPHINE-NALOXONE |
| BUPRENORPHINE/NALOXONE | SUBOXONE |
| BUPRENORPHINE/NALOXONE | ZUBSOLV |
| NALOXONE HYDROCHLORIDE/PENTAZOCINE HYDROCHLORIDE | NALOXONE/PENTAZOCINE |
| NALOXONE HYDROCHLORIDE/PENTAZOCINE HYDROCHLORIDE | PENTAZOCIN/NALOXONE |
| NALOXONE HYDROCHLORIDE/PENTAZOCINE HYDROCHLORIDE | PENTAZOCINE HCL-NALOXONE HCL |
| NALOXONE HYDROCHLORIDE/PENTAZOCINE HYDROCHLORIDE | TALWIN NX |
| NALOXONE HYDROCHLORIDE | NARCAN NEONATAL |