HHS Public Access

Author manuscript

J Subst Abuse Treat. Author manuscript; available in PMC 2018 September 01.

Published in final edited form as:

J Subst Abuse Treat. 2018 September ; 92: 35–39. doi:10.1016/j.jsat.2018.06.008.

US hospital discharges documenting patient opioid use disorder without opioid overdose or treatment services, 2011–2015

Cora Peterson[*], **Likang Xu**, **Christina A. Mikosz**, **Curtis Florence**, and **Karin A. Mack**

National Center for Injury Prevention and Control, Centers for Disease Control and Prevention (CDC), Atlanta, GA, USA

Abstract

Background—Understanding more about circumstances in which patients receive an opioid use disorder (OUD) diagnosis might illuminate opportunities for intervention and ultimately prevent opioid overdoses. This study aimed to describe patient and clinical characteristics of hospital discharges documenting OUD among patients not being treated for opioid overdose, detoxification, or rehabilitation.

Methods—We assessed patient, payer, and clinical characteristics of nationally-representative 2011–2015 National Inpatient Sample discharges documenting OUD, excluding opioid overdose, detoxification, and rehabilitation. Discharges were clinically classified by Diagnostic Related Group (DRG) for analysis.

Results—Annual discharges grew 38%, from 347,137 (2011) to 478,260 (2015), totaling 2 million discharges during the study period. The annual discharge rate increased among all racial/ethnic groups, but was highest among the non-Hispanic black population until 2015, when non-Hispanic whites had a slightly higher rate (164 versus 162 per 100,000 population). Female patients and Medicaid and Medicare as primary payer accounted for an increasing annual proportion of discharges. Just 14 DRGs accounted for nearly 50% of discharges over the study period. The most prevalent primary treatment received during OUD inpatient stays was for psychoses (DRG 885; 16% of discharges) and drug and alcohol abuse or dependence symptoms (including withdrawal) or (non-opioid) poisoning (DRG 894, 897, 917, 918; 12% of discharges).

Conclusions—Now nearly half a million yearly US hospital discharges for a range of primary treatment include patients' diagnosis of OUD without opioid overdose, detoxification, or rehabilitation services. Inpatient stays present an important opportunity to link OUD patients to treatment to reduce opioid-related morbidity and mortality.

[*]Corresponding author at: Mailstop F-F62, 4770 Buford Highway, CDC National Center for Injury Prevention and Control, Atlanta, GA 30341, USA. cora.peterson@cdc.hhs.gov (C. Peterson).

Financial disclosures

The authors have no relevant financial relationships interest to disclose.

Declarations of interest

None.

Disclaimer statement

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Role of funding source

No external funding.

Keywords (MeSH)

Analgesics; Opioid; Substance-related disorders

1. Introduction

The number of US hospital discharges and emergency department visits documenting opioid abuse, dependence, or poisoning (overdose) combined was more than twice as high in 2014 compared to 1997 (Tedesco et al., 2017). Opioid-related overdose deaths nearly tripled during approximately the same period, reaching 42,249 deaths in 2016 (Centers for Disease Control and Prevention National Center for Health Statistics, 2016).

To reduce opioid overdoses, prevention efforts must reach at-risk patients. To date, we are not aware of reporting that quantifies US prevalence of opioid use disorder (OUD) separate from overdoses using health services data, nor analysis of health services contacts (e.g., inpatient stay) during which patients were diagnosed with OUD in the absence of opioid overdose (Guy Jr., Pasalic, & Zhang, 2018; Heslin et al., 2017; Hsu, McCarthy, Stevens, & Mukamal, 2017; Tedesco et al., 2017; Weiss et al., 2016). Using the most recent five years of US national hospital discharge data, this brief report aimed to describe patient and clinical characteristics of discharges during which providers documented OUD among patients who were not treated for opioid overdose, opioid detoxification, or opioid rehabilitation during the inpatient stay.

2. Material and methods

This study used publicly available data and no human subjects. Using 2011–2015 (most recent) survey-weighted annual national estimates of US hospital discharges (Healthcare Cost and Utilization Project National Inpatient Sample [HCUP NIS]), we identified discharges documenting any diagnosis (i.e., primary or non-primary) of opioid abuse or dependence, excluding discharges with any diagnosis indicating opioid overdose or any procedure code or Diagnosis Related Group (DRG) code indicating drug detoxification or drug rehabilitation services (see Table 1 notes for applicable International Classification of Diseases, Ninth Revision or Tenth Revision, Clinical Modification [ICD-9/10-CM] and DRG codes). Standard HCUP NIS survey weighting and Census population data made the discharges sample representative of all US discharges for age-adjusted estimates (Centers for Disease Control and Prevention, 2017).

We report selected patient (e.g., sex, average age, race/ethnicity), hospital stay (e.g., length of stay), and payer characteristics among analysis discharges. To summarize clinical characteristics of the analysis discharges, we classified discharges by DRG (n > 700 categories) and ranked discharges by DRG prevalence, reporting DRG categories with > 1% of discharges over the study period. DRG classifies patients based on clinical similarity and in terms of their consumption of hospital resources (US Centers for Medicaid and Medicare, 2016). Each discharge is identified by a single DRG, which typically is the basis for the hospital's payment. We further classified discharges for drug-related DRGs by primary ICD-9/10-CM diagnosis (n > 14,000 ICD-9-CM and n > 69,000 ICD-10 categories) and

reported ICD-9/10-CM categories with > 5% of discharges per drug-related DRG over the study period.

3. Study results

The survey-weighted number of discharges annually documenting patient OUD without opioid overdose, detoxification, or rehabilitation services increased by 38% over the study period (from 347,137 in 2011 to 478,260 in 2015) (Table 1). Diagnosis codes for opioid abuse or dependence appeared in the non-primary diagnosis position in the discharge record for over 98% of analysis discharges (data not shown).

3.1. Patient, hospital stay, and payer characteristics

Average patient age increased slightly (from 43.5 years old in 2011 to 45.1 in 2015) over the study period, as did average length of hospital stay (from 5.5 days in 2011 to 5.7 in 2015). Women accounted for a modestly higher proportion of these discharges at the end of the study period (49% in 2011 versus 50% in 2015). Medicaid and Medicare were the primary payers for 35% and 25% of discharges in 2011, respectively, and 44% and 29% of discharges in 2015. Self-pay discharges decreased from 14% in 2011 to 7% in 2015.

The age-adjusted population discharge rate among non-Hispanic Asian/Pacific Islander patients was 78% higher (15.3 versus 8.6 per 100,000 population) in 2015 versus 2011, 48% higher (164.1 versus 110.6) among non-Hispanic whites, 25% higher (70.2 versus 56.2) among Hispanics, and 21% higher (161.9 versus 134.2) among non-Hispanic blacks (Table 1). The 2011 rate among non-Hispanic American Indian/Pacific Islanders was not reportable based on limited sample size, although the rate was 41% higher (133.7 versus 95.0 per 100,000) in 2015 versus 2012. From 2011 to 2014, non-Hispanic blacks had the highest population discharge rate among all racial/ethnic patient categories, but this rate was not statistically significantly greater than non-Hispanic whites, except in 2012. In 2015, for the first time during the study period, non-Hispanic whites had a slightly higher—but not statistically significant—population discharge rate than non-Hispanic blacks (164.1 versus 161.9 per 100,000 population).

3.2. Clinical classification by Diagnostic Related Group

The estimated 2,002,257 discharges documenting OUD without opioid overdose, drug detoxification, or drug rehabilitation were classified by over 450 different DRGs during the study period (data not shown). However, just 14 DRGs each accounted for > 1% of discharges during the study period (Table 2). Together those 14 DRGs accounted for nearly 50% of total discharges during the 5-year study period.

The most prevalent DRG among analysis discharges indicated that primary treatment was for psychoses (DRG 885) (Table 2). This DRG appeared on 322,544 (or 16%) analysis discharges over the study period. DRGs indicating primary treatment for alcohol or non-opioid drug abuse or dependence or poisoning appeared on a combined 248,955 (or 12%) analysis discharges over the study period (number of discharges by DRG in Table 2: DRG 894, 897, 917, 918). Among such discharges without poisoning (DRG 897), primary diagnoses indicated treatment was frequently for drug (ICD-9-CM 292.0) or alcohol (ICD-9-

CM 291.81) withdrawal (combined 72,574 discharges) or drug-induced mood disorder (ICD-9-CM 292.84) (24,802 discharges). Opioid-type dependence (ICD-9-CM 304.0) was also frequently the primary diagnosis among discharges with this DRG (17,925 discharges).

Among discharges with DRGs for alcohol or drug-related poisoning (DRG 917, 918) (61,043 discharges), primary ICD diagnoses indicated treatment was for poisoning by a variety of non-opioid substances (benzodiazepine-based tranquilizer, aromatic analgesic, cocaine, unspecified drug or medicinal substance, unspecified sedative or hypnotic). DRGs for cellulitis (DRG 603), antepartum and labor (DRG 765, 775, 781), septicemia (DRG 871, 872) depressive neuroses (DRG 881), esophagitis, gastroenteritis and miscellaneous digestive disorders (DRG 392) and chronic obstructive pulmonary disease (DRG 191) were the remaining DRGs that comprised > 1% of analysis discharges during the study period.

4. Discussion

This study described patient, hospital stay, payer, and clinical characteristics of inpatient stays during which OUD was documented in the absence of opioid overdose, detoxification, or rehabilitation inpatient services. There are three important takeaways from this analysis. First, across the US, population survey data indicate that 2.1 million people aged 12 or older had OUD in 2016 (Substance Abuse and Mental Health Services Administration, 2017). This study's finding of nearly 500,000 hospital discharges documenting OUD (without overdose) in 2015 suggests a high proportion of the US population with OUD is treated in inpatient settings annually, highlighting a potentially key opportunity for inpatient service providers to link patients to treatment services and prevent overdose.

Second, the rising rate of opioid-related mortality among white, non-Hispanic men has received considerable media and research attention (National Public Radio, November 17, 2017; Song, 2017). However, this study demonstrated that approximately half of hospital discharges documenting OUD without overdose in recent years were for female patients and that the population rate of such hospital discharges among non-Hispanic blacks was at least as high or higher than for white non-Hispanics.

Third, characterizing discharges by DRG (and, in the case of drug-related DRGs, by primary ICD diagnosis) illuminated a reasonable degree of commonality among the > 2 million analysis discharges over the study period—in that nearly 50% of these discharges were billed under just 14 DRGs—and highlighted the co-occurring health challenges associated with the opioid overdose epidemic. For example, the high prevalence of cellulitis treatment among inpatients with OUD may be linked to rising injection drug use (Binswanger, Kral, Bluthenthal, Rybold, & Edlin, 2000). A high number of antepartum and delivery discharges noting OUD is consistent with recent research documenting increased prevalence of neonatal abstinence syndrome (Ko et al., 2016). The high prevalence of OUD discharges assigned to DRG 885 (titled "Psychoses" and including mental health diagnoses such as schizophrenia and major depressive disorder) likely reflects the heightened risk of opioid misuse among patients with mental health disorders. That diagnoses related to use, dependence, and withdrawal from other drugs and alcohol comprised the second largest OUD discharge category by DRG illustrates the high co-occurring prevalence of opioid misuse and other

substance use disorders. This DRG analysis also highlights a challenge for inpatient service providers that endeavor to link OUD patients to treatment services, in that such patients appear to attend inpatient settings for a wide variety of primary treatment—meaningful links to treatment services would likely therefore require casting a wide net over inpatient populations.

This analysis had several limitations. First, the use of administrative medical data for this analysis required an assumption that certain ICD-CM codes indicate OUD, which is formally defined not by such codes but by a series of symptoms described in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. This study followed physician guidance on coding OUD in administrative records indicating the use of ICD-CM codes titled “Opioid type dependence” (ICD-9-CM 304.0, ICD-10-CM F11.2) and “Opioid abuse” (ICD-CM 305.5 and F11.1), to identify OUD, contingent upon presence of certain patient symptoms as observed by the attending clinician (Providers Clinical Support System, 2018). The codes used in this study to identify analysis discharges are consistent with recent research on opioid abuse that, like this study, examined administrative medical records (Paulozzi, Zhou, Jones, Xu, & Florence, 2016).

A second notable limitation is that we do not know how many of these discharges occurred among the same patients. Third, we were not able to observe whether patients had concurrent outpatient substance abuse treatment. Fourth, this study focused on OUD, although increasingly research demonstrates that multiple drug types are responsible for the overall increase in US drug-related mortality in recent years, which affects both men and women of multiple racial/ethnic groups (Shiels, Freedman, Thomas, & de Gonzalez, 2017). Fifth, this study classified discharges by DRG to investigate clinical commonalities. DRG is typically the basis for hospital payment and therefore it is possible that DRG designations for some discharges prioritized financial, rather than clinical, considerations. Sixth, we did not attempt to translate ICD-10 codes (which appeared in three months of this study’s 5-year timeline—October-December 2015) to ICD-9-CM codes when presenting the prevalence of primary diagnosis codes within drug-related DRG categories; therefore, our presentation of discharges by primary ICD codes likely modestly undercounts the prevalence of individual primary diagnoses. Seventh, it is possible that psychiatrists—the providers presumed to primarily manage inpatients with psychoses DRG designations—are more attuned to substance use disorders like OUD. This might bias hospital discharge records for mental health stays toward greater documentation of OUD and other substance disorders, which may be a contributing explanation of the high prevalence of DRG 885 among discharges documenting OUD. Finally, this descriptive study has not attempted to identify reasons for the changes observed in terms of number of discharges by patient and payer characteristics.

It was not possible to ascertain whether the increased number of discharges documenting OUD fully reflects an expanding affected population or whether some proportion of the increase reflects instead greater recognition and documentation of OUD by all providers given recent increased attention to opioid overdoses. Owing to social stigma surrounding substance abuse, differences in the rate at which patients by race/ethnicity receive an OUD diagnosis on a hospital discharge record quite plausibly might be driven by provider bias. Notably, the opioid-related mortality rate among non-Hispanic black men and women during

2012–2015 was far less than that of non-Hispanic white men and women, although the present study has demonstrated a similar or higher population prevalence of hospital admissions documenting patient OUD among non-Hispanic blacks during the same period (Shiels et al., 2017). Future research with longitudinal medical claims data might investigate which patients receive OUD treatment based on patient characteristics and clinical circumstances in which OUD is first documented.

Identifying patients with OUD without opioid overdose seems a straightforward way to target prevention services, such as meaningful links to substance abuse treatment that may ultimate reduce opioid-related morbidity and mortality. But ensuring appropriate and successful substance abuse treatment for such patients is undeniably complex. Analysis of 2010–11 medical claims data indicated that patients with opioid prescriptions and diagnosed OUD were substantially more likely to have an opioid overdose than patients with opioid prescriptions but no OUD diagnosis (Paulozzi et al., 2016). However, researchers that conducted that study also reported opioid prescribing did not change after patients received an OUD diagnosis (although researchers were not able to examine which clinicians provided the prescriptions before or after the OUD diagnosis) (Paulozzi et al., 2016). Programs to treat substance abuse disorders among inpatients have demonstrated success, although patients are often discharged without specific plans for treatment services and patient follow-up for post-discharge treatment is low (Naeger, Mutter, Ali, Mark, & Hughey, 2016; Rosenthal, Karchmer, Theisen-Toupal, Castillo, & Rowley, 2016; Trowbridge et al., 2017).

5. Conclusions

This study comprehensively described patient, hospital stay, payer, and clinical characteristics of the hundreds of thousands of US hospital discharges per year that document patient OUD without opioid overdose, detoxification, or rehabilitation services. Hospital and health systems administrators and public health officials might consider whether in their local areas sufficient policies and practices exist, first to treat substance abuse disorders among inpatients, and second to effectively link discharged patients to continuing treatment services. Further, given the range of primary treatment (observed by DRG in this study) dispensed to patients with OUD during hospital stays, it appears important to consider whether existing inpatient policies and practices related to drug treatment are reaching what appears to be a wide variety of patients diagnosed with OUD.

Abbreviations

CI	Confidence interval
DRG	Diagnostic Related Group
ICD-9-CM	International Classification of Diseases, Ninth Revision, Clinical Modification
ICD-10	International Classification of Diseases, Tenth Revision
HCUP NIS	Healthcare Cost and Utilization Project National Inpatient Sample

OUD	Opioid use disorder
SE	Standard error

References

Binswanger IA, Kral AH, Bluthenthal RN, Rybold DJ, Edlin BR. High prevalence of abscesses and cellulitis among community-recruited injection drug users in San Francisco. Clinical Infectious Diseases. 2000; 30(3):579–581. DOI: 10.1086/313703 [PubMed: 10722447]

Centers for Disease Control and Prevention. Bridged-race population estimates - Data files and documentation. Jun 26, 2017. (Retrieved from December, 2017) https://www.cdc.gov/nchs/nvss/bridged_race/data_documentation.htm

Centers for Disease Control and Prevention National Center for Health Statistics. Multiple cause of death 1999–2016 on CDC WONDER online database, released December, 2017. Data are from the multiple cause of death files, 1999–2016, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. 2016. (Retrieved from January 18, 2018) http://wonder.cdc.gov/mcd-icd10.html

Guy GP Jr, Pasalic E, Zhang K. Emergency department visits involving opioid overdoses, U.S., 2010–2014. American Journal of Preventive Medicine. 2018; 54(1):e37–e39. DOI: 10.1016/j.amepre.2017.09.003 [PubMed: 29132953]

Heslin KC, Owens PL, Karaca Z, Barrett ML, Moore BJ, Elixhauser A. Trends in opioid-related inpatient stays shifted after the US transitioned to ICD-10-CM diagnosis coding in 2015. Medical Care. 2017; 55(11):918–923. DOI: 10.1097/mlr.0000000000000805 [PubMed: 28930890]

Hsu DJ, McCarthy EP, Stevens JP, Mukamal KJ. Hospitalizations, costs and outcomes associated with heroin and prescription opioid overdoses in the United States 2001–12. Addiction. 2017; 112(9):1558–1564. DOI: 10.1111/add.13795 [PubMed: 28191702]

Ko JY, Patrick SW, Tong VT, Patel R, Lind JN, Barfield WD. Incidence of neonatal abstinence syndrome - 28 states, 1999–2013. MMWR Morbidity and Mortality Weekly Report. 2016; 65(31):799–802. DOI: 10.15585/mmwr.mm6531a2 [PubMed: 27513154]

Naeger S, Mutter R, Ali MM, Mark T, Hughey L. Post-discharge treatment engagement among patients with an opioid-use disorder. Journal of Substance Abuse Treatment. 2016; 69:64–71. DOI: 10.1016/j.jsat.2016.07.004 [PubMed: 27568512]

National Public Radio. Why is the opioid epidemic overwhelmingly white?. Nov 17.2017

Paulozzi LJ, Zhou C, Jones CM, Xu L, Florence CS. Changes in the medical management of patients on opioid analgesics following a diagnosis of substance abuse. Pharmacoepidemiology and Drug Safety. 2016; 25(5):545–552. DOI: 10.1002/pds.3980 [PubMed: 26861165]

Providers Clinical Support System. Opioid use disorder diagnostic criteria. 2018. May 25, Retrieved from http://pcssnow.org/wp-content/uploads/2014/02/5B-DSM-5-Opioid-Use-Disorder-Diagnostic-Criteria.pdf

Rosenthal ES, Karchmer AW, Theisen-Toupal J, Castillo RA, Rowley CF. Suboptimal addiction interventions for patients hospitalized with injection drug use-associated infective endocarditis. The American Journal of Medicine. 2016; 129(5):481–485. DOI: 10.1016/j.amjmed.2015.09.024 [PubMed: 26597670]

Shiels MS, Freedman ND, Thomas D, de Gonzalez AB. Trends in U.S. drug overdose deaths in non-Hispanic black, Hispanic, and non-Hispanic White persons, 2000–2015. Annals of Internal Medicine. 2017.

Song Z. Mortality quadrupled among opioid-driven hospitalizations, notably within lower-income and disabled white populations. Health Affairs (Millwood). 2017; 36(12):2054–2061. DOI: 10.1377/hlthaff.2017.0689

Substance Abuse and Mental Health Services Administration. Key substance use and mental health indicators in the United States: Results from the 2016 National Survey on Drug Use and Health (HHS Publication No. SMA 17-5044, NSDUH Series H-52). Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration; 2017.

Tedesco D, Asch SM, Curtin C, Hah J, McDonald KM, Fantini MP, Hernandez-Boussard T. Opioid abuse and poisoning: Trends in inpatient and emergency department discharges. Health Affairs (Millwood). 2017; 36(10):1748–1753. DOI: 10.1377/hlthaff.2017.0260

Trowbridge P, Weinstein ZM, Kerensky T, Roy P, Regan D, Samet JH, Walley AY. Addiction consultation services - Linking hospitalized patients to out-patient addiction treatment. Journal of Substance Abuse Treatment. 2017; 79:1–5. DOI: 10.1016/j.jsat.2017.05.007 [PubMed: 28673521]

US Centers for Medicaid and Medicare. Design and development of the Diagnosis Related Group. 2016. Nov 20, Retrieved from https://www.cms.gov/ICD10Manual/version34-fullcode-cms/fullcode_cms/Design_and_development_of_the_Diagnosis_Related_Group_(DRGs)_PBL-038.pdf

Weiss AJ, Elixhauser A, Barrett ML, Steiner CA, Bailey MK, O'Malley L. Opioid-related inpatient stays and emergency department visits by State, 2009–2014: Statistical brief #219 Healthcare Cost and Utilization Project (HCUP) statistical briefs. Rockville (MD): Agency for Healthcare Research and Quality (US); 2016.

Table 1

Selected characteristics for US hospital discharges documenting opioid use disorder without opioid overdose, detoxification, or rehabilitation[a].

	2011	2012	2013	2014	2015
n Discharges	**347,137**	**363,225**	**387,940**	**425,695**	**478,260**
Patient age, mean (SE) years	43.5 (0.35)	43.3 (0.17)	43.7 (0.17)	44.3 (0.18)	45.1 (0.19)
Patient sex, % discharges by column					
Male	50.8	50.4	50.0	49.8	49.7
Female	49.2	49.6	50.0	50.2	50.3
Length of stay, mean (SE) days	5.5 (0.09)	5.5 (0.05)	5.5 (0.05)	5.6 (0.05)	5.7 (0.05)
Age-adjusted discharges rate per 100,000 population (95% CI)					
Patient race/ethnicity					
Non-Hispanic white	110.6 (99.0–122.1)	119.7 (114.5–124.9)	129.3 (123.8–134.9)	144.9 (138.6–151.1)	164.1 (156.9–171.4)
Non-Hispanic black	134.2 (104.5–164.0)	144.5 (127.6–161.3)	140.6 (126.3–154.9)	147.7 (133.1–162.3)	161.9 (147.5–176.4)
Non-Hispanic American Indian/Alaska Native	*b*	95.0 (73.1–117.0)	94.9 (75.6–114.2)	113.4 (90.5–136.3)	133.7 (108.1–159.2)
Non-Hispanic Asian/Pacific Islander	8.6 (6.6–10.5)	10.8 (8.8–12.9)	10.9 (9.2–12.7)	13.9 (10.7–17.1)	15.3 (11.1–19.5)
Hispanic	56.2 (42.0–70.4)	61.6 (54.7–68.5)	64.4 (57.6–71.1)	64.2 (57.9–70.6)	70.2 (63.7–76.8)
Primary payer, n (% discharges by column)					
Medicare	87,319 (25.2)	91,695 (25.2)	101,295 (26.1)	116,245 (27.3)	136,860 (28.6)
Medicaid	121,571 (35.0)	132,970 (36.6)	138,535 (35.7)	182,750 (42.9)	208,610 (43.6)
Private	63,839 (18.4)	64,945 (17.9)	67,780 (17.5)	71,410 (16.8)	80,285 (16.8)
Self-pay	49,433 (14.2)	50,050 (13.8)	52,200 (13.5)	36,820 (8.6)	33,530 (7.0)
No charge	*b*	5305 (1.5)	9275 (2.4)	4470 (1.1)	3820 (0.8)
Other	17,871 (5.1)	18,260 (5.0)	18,855 (4.9)	14,000 (3.3)	15,155 (3.2)

Notes. CI confidence interval, DRG Diagnostic Related Group, SE standard error. Cases from Healthcare Cost and Utilization Project National Inpatient Sample.

[a]Discharge definition was include discharges with any diagnosis (ICD-9/10-CM) value 304.0x, 304.7x, 305.5x, F11.1xxx, F11.2xxx, but exclude discharges with any diagnosis value 304.03, 304.73, 305.53, F11.11xx, F11.21xx, 965.00-02, 965.09, 965.8, E850.0-2, E850.8, T40.1X1x-4x, T40.2X1x-4x, T40.3X1x-4x, or procedure (ICD-9/10-CM) value 94.45, 94.64-9, HZ2xxxx-3xxxx, HZ4xxxx, HZ5xxxx-6xxxx, HZ81xxx-82xxx, HZ84xxx-86xxx, HZ88xxx-89xxx, HZ91xxx-92xxx, HZ94xxx-96xxx, HZ98xxx-99xxx, or Diagnostic Related Group value 895.

[b]Small sample size, not statistically reliable.

Table 2

Most prevalent Diagnostic Related Group (DRG) classifications for US hospital discharges documenting opioid use disorder without opioid overdose, drug detoxification, or drug rehabilitation by year, 2011–2015.

Clinical classification (code),[a] n (%) discharges by column	2011 (n = 347,137)	2012 (n = 363,225)	2013 (n = 387,940)	2014 (n = 425,695)	2015 (n = 478,260)	2011–2015 (n = 2,002,257)
Psychoses (DRG 885)	61,064 (17.6)	63,460 (17.5)	64,815 (16.7)	66,770 (15.7)	66,435 (13.9)	322,544 (16.1)
Alcohol/drug abuse or dependence w/o rehabilitation therapy w/o MCC (DRG 897)	32,013 (9.2)	32,585 (9.0)	31,180 (8.0)	32,985 (7.7)	36,930 (7.7)	165,693 (8.3)
• Drug withdrawal (ICD-9-CM 292.0), n (% of DRG)	• 8288 (25.9)	• 12,400 (38.1)	• 10,270 (32.9)	• 11,865 (36.0)	• 10,705 (29.0)	• 53,528 (32.3)
• Drug-induced mood disorder (ICD-9-CM 292.84), n (% of DRG)	• 5372 (16.8)	• 4835 (14.8)	• 5150 (16.5)	• 5110 (15.5)	• 4335 (11.7)	• 24,802 (15.0)
• Alcohol withdrawal (ICD-9-CM 291.81), n (% of DRG)	• 3306 (10.3)	• 3335 (10.2)	• 3710 (11.9)	• 4545 (13.8)	• 4150 (11.2)	• 19,046 (11.5)
• Opioid-type dependence (ICD-9-CM 304.0), n (% of DRG)	• 5160 (16.1)	• 3480 (10.7)	• 3345 (10.7)	• 3140 (9.5)	• 2800 (7.6)	• 17,925 (10.8)
Cellulitis w/o MCC (DRG 603)	15,228 (4.4)	16,265 (4.5)	19,075 (4.9)	19,825 (4.7)	21,020 (4.4)	91,413 (4.6)
Depressive neuroses (DRG 881)	12,256 (3.5)	11,870 (3.3)	11,880 (3.1)	12,285 (2.9)	12,775 (2.7)	61,066 (3.0)
Septicemia or severe sepsis w/o MV > 96 h w MCC (DRG 871)	5360 (1.5)	6435 (1.8)	9175 (2.4)	13,220 (3.1)	17,780 (3.7)	51,970 (2.6)
Esophagitis, gastroent & misc. digest disorders w/o MCC (DRG 392)	10,024 (2.9)	9405 (2.6)	9640 (2.5)	10,005 (2.4)	10,355 (2.2)	49,429 (2.5)
Vaginal delivery w/o complicating diagnoses (DRG 775)	5544 (1.6)	7020 (1.9)	8115 (2.1)	9320 (2.2)	8905 (1.9)	38,904 (1.9)
Cesarean section w CC/MCC (DRG 765)	3870 (1.1)	4665 (1.3)	5630 (1.5)	6580 (1.5)	6820 (1.4)	27,565 (1.4)
Septicemia or severe sepsis w/o mv > 96 h w/o MCC (DRG 872)	2458 (0.7)	3325 (0.9)	4625 (1.2)	6530 (1.5)	9150 (1.9)	26,088 (1.3)
Poisoning & toxic effects of drugs w/o MCC (DRG 918)[b]	8114 (2.3)	7545 (2.1)	7300 (1.9)	6485 (1.5)	6570 (1.4)	36,014 (1.8)
• Poisoning by benzodiazepine-based tranquilizers (ICD-9-CM 969.4), n (% of DRG)	• 1774 (21.9)	• 1700 (22.5)	• 1415 (19.4)	• 1240 (19.1)	• 810 (12.3)	• 6939 (19.3)
• Poisoning by aromatic analgesics, not elsewhere classified (ICD-9-CM 965.4), n (% of DRG)	• 1023 (12.6)	• 915 (12.1)	• 765 (10.5)	• 660 (10.2)	• 445 (6.8)	• 3808 (10.6)
• Poisoning by cocaine (ICD-9-CM 970.81), n (% of DRG)	• 987 (12.2)	• 690 (9.1)	• 655 (9)	• 590 (9.1)	• 420 (6.4)	• 3342 (9.3)
Poisoning & toxic effects of drugs w MCC (DRG 917)[b]	4209 (1.2)	4365 (1.2)	4825 (1.2)	4895 (1.1)	6735 (1.4)	25,029 (1.3)
• Poisoning by benzodiazepine-based tranquilizers (ICD-9-CM 969.4), n (% of DRG)	• 918 (21.8)	• 1055 (24.2)	• 965 (20.0)	• 945 (19.3)	• 945 (14)	• 4828 (19.3)
• Poisoning by unspecified drug or medicinal substance (ICD-9-CM 977.9), n (% of DRG)	• 366 (8.7)	• 300 (6.9)	• 395 (8.2)	• 400 (8.2)	• 420 (6.2)	• 1881 (7.5)

Clinical classification (code),[a] n (%) discharges by column	2011 (n = 347,137)	2012 (n = 363,225)	2013 (n = 387,940)	2014 (n = 425,695)	2015 (n = 478,260)	2011–2015 (n = 2,002,257)
• Poisoning by cocaine (ICD-9-CM 970.81), n (% of DRG)	• 498 (11.8)	• 395 (9.0)	• 435 (9.0)	• 365 (7.5)	• 365 (5.4)	• 2058 (8.2)
• Poisoning by aromatic analgesics, not elsewhere classified (ICD-9-CM 965.4), n (% of DRG)	• 396 (9.4)	• 345 (7.9)	• 390 (8.1)	• 310 (6.3)	• 315 (4.7)	• 1756 (7.0)
• Poisoning by unspecified sedative or hypnotic (ICD-9-CM 967.9), n (% of DRG)	• 232 (5.5)	• 225 (5.2)	• 275 (5.7)	• 295 (6.0)	• 380 (5.6)	• 1407 (5.6)
Other antepartum diagnoses w medical complications (DRG 781)	3805 (1.1)	4410 (1.2)	4535 (1.2)	4975 (1.2)	4810 (1.0)	22,535 (1.1)
Alcohol/drug abuse or dependence, left AMA (DRG 894)	4024 (1.2)	4115 (1.1)	3980 (1.0)	4765 (1.1)	5335 (1.1)	22,219 (1.1)
Chronic obstructive pulmonary disease w CC (DRG 191)	3757 (1.1)	4050 (1.1)	3925 (1.0)	4415 (1.0)	5040 (1.1)	21,187 (1.1)

Notes. AMA against medical advice, CC complications, DRG Diagnostic Related Group, MCC major complications. Code definitions from icd9data.com (accessed December 2017). Cases from Healthcare Cost and Utilization Project National Inpatient Sample.

[a]This table reports all DRGs with > 1% of analysis discharges annually during the study period.

[b]Discharges with drug-related DRGs are further reported in terms of most prevalent primary ICD-9-CM diagnoses within the DRG category (all diagnosis codes given for > 5% of discharges annually within the DRG category during the study period).