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

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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.

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

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

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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.

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