

BACKGROUND

- Opioids are a common medication prescribed for acute pain in the United States (US) due to their effectiveness.¹
- However, the use of opioids carries serious risks, including misuse, overdose, and the development of opioid use disorder (OUD). OUD is associated with increased healthcare resource utilization (HCRU), costs, and mortality, impacting individuals, healthcare systems, and society.^{2,3}
- In 2022, it was estimated that 6.1 million people aged 12 or older had evidence of OUD, leading to 81,806 opioid-related overdose deaths.^{4,5}
- The societal economic burden of the opioid crisis was estimated to be \$180 billion (B) in 2018, which included \$60B of direct health care costs.²
- While recent studies have evaluated the incidence and economic burden of OUD due to prescription opioids, there is limited data on the incidence by payer type (Commercial, Medicare, and Medicaid).⁶

OBJECTIVES

- To evaluate the incidence of OUD among patients newly prescribed opioids for the management of acute pain across different payer types in the US.
- To estimate all-cause HCRU and associated payer costs among patients with acute pain with and without OUD diagnoses across the different payer types.

METHODS

Study Design and Patient Selection

- A retrospective, longitudinal, observational study was conducted using the Merative™ MarketScan® Commercial, Medicare, and Multi-State Medicaid databases (January 1, 2015 through December 31, 2019 (“Study period”)) to describe patients newly initiating prescription opioids (first prescription date = opioid treatment date) for the management of acute pain; the study period was selected to exclude the impact of COVID-19 on changes in prescription opioid administration or the potential for misuse.
- Patients aged 18 years or older on opioid treatment date, who had at least one pharmacy or medical claim for an opioid medication between January 1, 2016 through December 31, 2018, and without a pharmacy or medical claim for an opioid in the 12 months before the opioid treatment date were included; patients were also required to have no medical claims for OUD in the 12 months before the opioid treatment date.
- Based on the International Association for the Study of Pain (IASP) definition, patients with <3 months of continuous or recurrent use of prescription pain medication within a year of opioid initiation were classified as patients with acute pain and were included in the analysis.^{7,8}
 - Pain medications considered in the analysis included opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), anti-convulsants (only pregabalin and gabapentin), local anesthetics, and other non-opioid analgesics (e.g., acetaminophen).
- Subgroups of patients with and without a diagnosis of OUD were identified via the presence or absence of International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) diagnosis codes for opioid abuse (F11.1x) or opioid dependence (F11.2x).

Outcomes and Analyses

- The incidence of OUD was evaluated from the opioid initiation date through the earlier of disenrollment or end of the study period.
- All-cause HCRU and associated direct healthcare payer costs were evaluated for a fixed 12-month period following the first OUD diagnosis.
 - For patients without an OUD diagnosis, a start date for a fixed 12-month period was randomly assigned based on the distribution of time from the first opioid treatment date to OUD diagnosis observed in the subgroup of patients with OUD.
- All payer costs were inflated to 2023 using the Medical Care Component of the Consumer Price Index (CPI).⁹
- Results were reported separately for each payer cohort (Commercial, Medicare, and Medicaid) and further stratified by the subgroups of patients with and without an OUD diagnosis.
- Descriptive analyses were conducted for all outcomes; no statistical comparisons were made between payer types.
- No matching was performed between patient subgroups in the analysis.

RESULTS

Study Population and Characteristics

- The patient populations identified across the different payer types are described in **Table 1**.
- The demographics and clinical characteristics of the Commercial, Medicare, and Medicaid populations, stratified by those with and without OUD diagnosis, are shown in **Table 2**.
 - The Medicaid population had a lower mean age and a higher proportion of patients who were female compared to Commercial and Medicare.
 - Patients diagnosed with OUD had a higher prevalence of substance abuse, anxiety, tobacco use, and depression (known risk factors of OUD) compared to those without OUD for all payer types.

Table 1. Patient Attrition	Commercial N (%)	Medicare N (%)	Medicaid N (%)
Patients in the Merative MarketScan® Commercial, Medicare Supplemental, or Medicaid Multi-State Databases with ≥1 pharmacy or medical claim for an opioid during 1/1/2016 through 12/31/2018	9,414,050 (100.0)		2,861,226 (100.0)
≥18 Years of age on opioid treatment date	8,823,297 (93.7)		2,317,390 (81.0)
≥12 Months continuous enrollment with medical and pharmacy benefits before and after the opioid treatment date	4,126,144 (43.8)		1,019,897 (35.6)
Patients without evidence of opioid use or OUD in the 12 months before the opioid treatment date	3,288,633 (34.9)		632,099 (22.1)
Acute Pain Cohort: Patients with <90 days supply for acute pain prescription in the initial 12-months of post-treatment period	2,469,130 (26.2)	221,626 (2.4)	459,546 (16.1)
Acute Pain Cohort with ≥12 months follow-up after the first OUD diagnosis date: Patients with ≥12 months continuous enrollment with medical and pharmacy benefits after the first OUD diagnosis date	1,506,867 (16.0)	138,910 (1.5)	317,980 (11.1)
With OUD diagnosis: ≥1 medical claim for OUD	6,021 (0.1)	292 (0.003)	15,812 (0.6)
Without OUD diagnosis: No medical claim for OUD	1,500,846 (15.9)	138,618 (1.5)	302,168 (10.6)

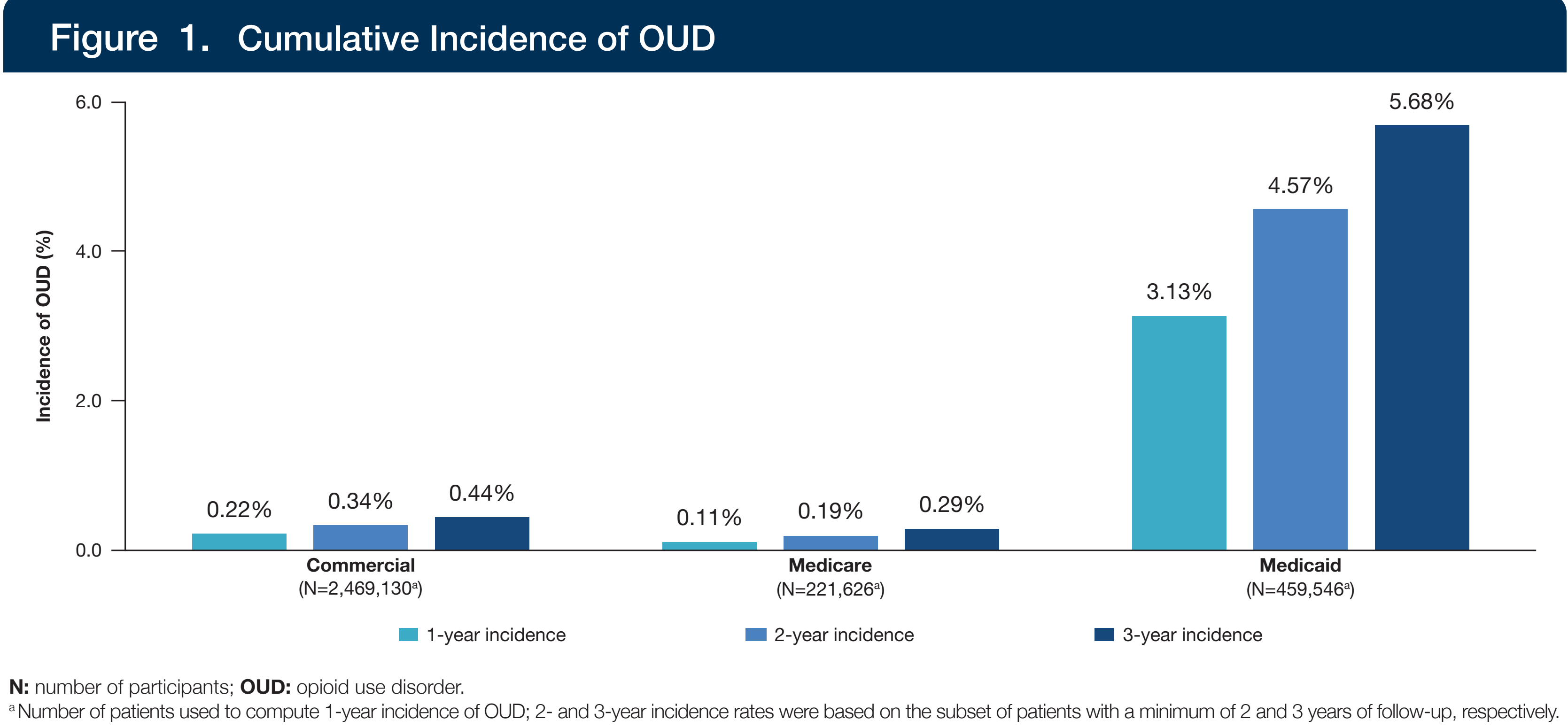
N: number of participants; **OUD:** opioid use disorder.

Incidence of OUD

- The 1-year, 2-year, and 3-year incidence of OUD among patients receiving prescription opioids for managing acute pain in the Commercial, Medicare, and Medicaid populations are shown in **Figure 1**.
- The mean number of days from initial opioid prescription to OUD diagnosis for patients with acute pain with OUD diagnosis were 349, 440, and 289 in the Commercial, Medicare, and Medicaid populations, respectively.

Table 2. Patient Demographic and Clinical Characteristics ^a	Commercial ^b		Medicare ^b		Medicaid ^b	
	With OUD Diagnosis N=6,021	Without OUD Diagnosis N=1,500,846	With OUD Diagnosis N=292	Without OUD Diagnosis N=138,618	With OUD Diagnosis N=15,812	Without OUD Diagnosis N=302,168
Age (years), mean (SD)	36.6 (13.9)	42.7 (13.4)	71.8 (8.2)	74.3 (7.4)	33.4 (9.7)	33.4 (12.2)
Male, n (%)	3,713 (61.7)	674,938 (45.0)	170 (58.2)	70,453 (50.8)	6,017 (38.1)	80,308 (26.6)
Most common clinical conditions,^c n (%)						
Substance abuse^{d,e}	4,077 (67.7)	21,340 (1.4)	181 (62.0)	2,032 (1.5)	12,530 (79.2)	22,516 (7.5)
Anxiety	2,082 (34.6)	165,077 (11.0)	66 (22.6)	14,151 (10.2)	5,022 (31.8)	46,354 (15.3)
Tobacco use^e	2,041 (33.9)	116,912 (7.8)	67 (22.9)	15,404 (11.1)	10,190 (64.4)	97,586 (32.3)
Depression	1,614 (26.8)	102,321 (6.8)	70 (24.0)	11,797 (8.5)	4,712 (29.8)	43,938 (14.5)
Hypertension	1,435 (23.8)	359,359 (23.9)	237 (81.2)	98,641 (71.2)	2,608 (16.5)	59,637 (19.7)
Sleep disorders	1,009 (16.8)	143,755 (9.6)	81 (27.7)	21,362 (15.4)	1,239 (7.8)	19,239 (6.4)
Obesity	771 (12.8)	229,436 (15.3)	65 (22.3)	22,293 (16.1)	1,212 (7.7)	48,606 (16.1)
Cancer	717 (11.9)	311,680 (20.8)	104 (35.6)	59,456 (42.9)	730 (4.6)	23,122 (7.7)
Osteoarthritis	646 (10.7)	131,186 (8.7)	128 (43.8)	42,373 (30.6)	673 (4.3)	13,420 (4.4)

N: number of participants; **n:** number of participants in the specified category; **OUD:** opioid use disorder; **SD:** standard deviation.
^aDemographics were summarized on opioid treatment date and clinical characteristics were summarized over the 12-month post-opioid treatment date.
^bPatients with ≥12 months continuous enrollment with medical and pharmacy benefits after the first OUD diagnosis date.
^cCategories are not mutually exclusive. Patients may have more than one clinical condition during the year.
^dThe most common forms of substance abuse include alcohol, prescription medication (depressants, opioids, and stimulants), and illicit drugs.
^eCurrent or history of substance abuse/tobacco use.

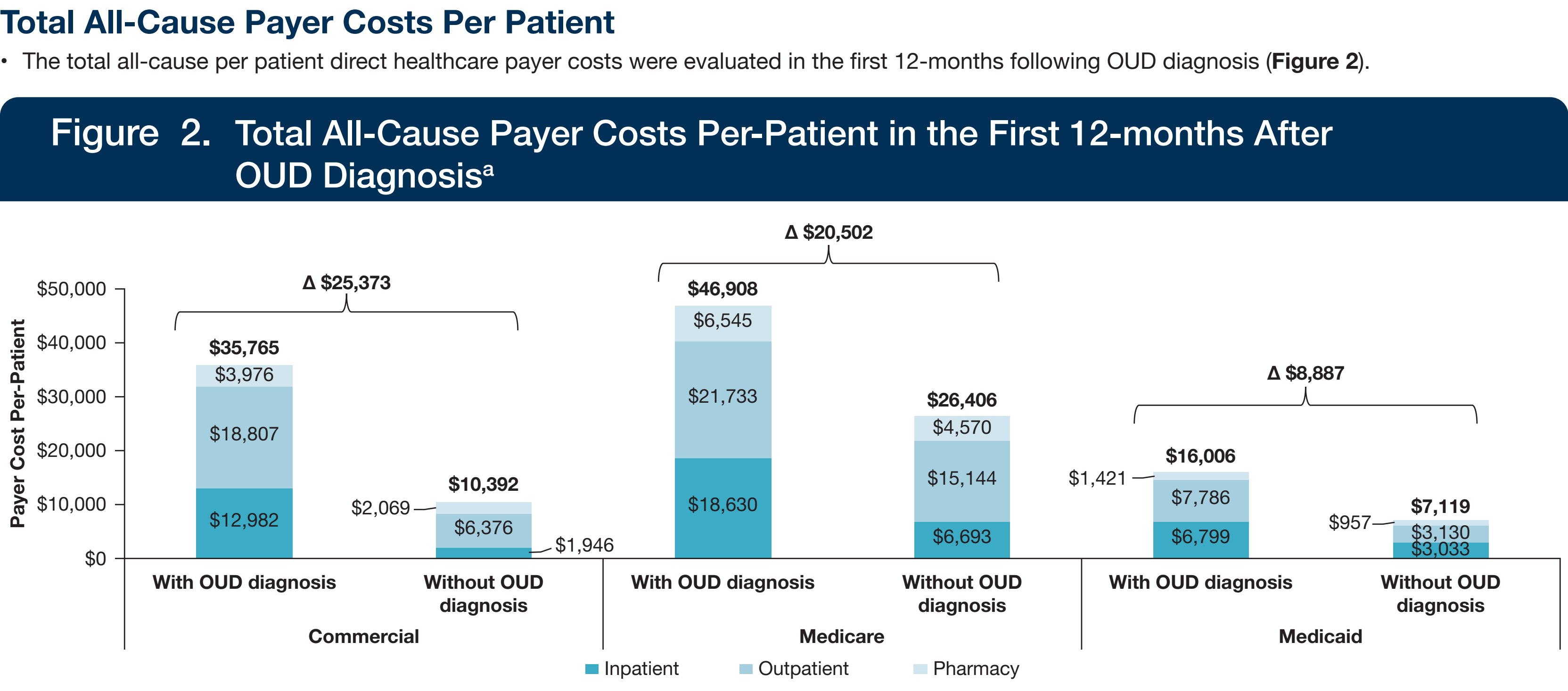


Healthcare Resource Utilization

- Among patients with acute pain treated with prescription opioids, those diagnosed with OUD had consistently higher HCRU than those without OUD diagnosis, across both inpatient and outpatient healthcare settings in the first 12 months following OUD diagnosis across the Commercial, Medicare, and Medicaid populations (**Table 3**).

Table 3. Healthcare Resource Utilization in the First 12-months After OUD Diagnosis ^a	Commercial		Medicare		Medicaid	
	With OUD Diagnosis N=6,021	Without OUD Diagnosis N=1,500,846	With OUD Diagnosis N=292	Without OUD Diagnosis N=138,618	With OUD Diagnosis N=15,812	Without OUD Diagnosis N=302,168
Patients with any, n (%)						
Inpatient						
Inpatient admission	1,963 (32.6)	72,846 (4.9)	105 (36.0)	22,558 (16.3)	4,536 (28.7)	33,514 (11.1)
LOS days, mean (SD) ^b	8.0 (7.5)	3.4 (4.3)	6.5 (6.1)	4.4 (4.3)	4.4 (4.9)	3.7 (4.7)
Inpatient admission requiring ICU visit ^b	301 (15.3)	17,172 (23.6)	52 (49.5)	8,774 (38.9)	1,127 (24.8)	7,411 (22.1)
ICU LOS days, mean (SD) ^c	5.8 (7.2)	5.1 (7.0)	6.9 (5.4)	5.5 (5.8)	6.2 (8.6)	5.4 (6.5)
Outpatient						
ER visit	2,579 (42.8)	303,706 (20.2)	139 (47.6)	38,471 (27.8)	10,666 (67.5)	159,450 (52.8)
Hospital service	4,204 (69.8)	740,811 (49.4)	238 (81.5)	99,816 (72.0)	10,060 (63.6)	181,304 (60.0)
Outpatient office visit	5,520 (91.7)	1,308,758 (87.2)	278 (95.2)	124,708 (90.0)	12,591 (79.6)	216,984 (71.8)
Other outpatient services	5,824 (96.7)	1,274,873 (84.9)	289 (99.0)	129,628 (93.5)	15,525 (98.2)	248,197 (82.1)

ER: emergency room; **ICU:** intensive care unit; **LOS:** length of stay; **N:** number of participants; **n:** number of participants in the specified category; **OUD:** opioid use disorder; **SD:** standard deviation.
^aPatients with ≥12 months continuous enrollment with medical and pharmacy benefits after the first OUD diagnosis date.
^bAmong patients with an inpatient admission.
^cAmong patients with an ICU visit.



LIMITATIONS

- This study evaluates patients newly initiating prescription opioids identified through the absence of pharmacy or medical claims for an opioid during the 12 months prior to the opioid treatment date; however, patients could have had a claim for an opioid outside the study period.
- This study captures OUD-diagnosed patients using specific ICD-10 codes from claims and would not include patients diagnosed through other measures or patients that may exhibit OUD symptoms but are not clinically diagnosed and is therefore likely an underestimation of the true incidence of OUD.
- Classification as acute pain was based on an algorithm adapted for data in administrative claims. Medication use to determine acute pain management was limited to a 12-month period. Any claims that occur before or after that period will not be utilized even if days' supply would have coverage during the period of interest.
- Further, the use of pain medications was identified largely by claims for filled prescriptions; patients' actual usage of medications and use of over-the-counter medications cannot be ascertained from healthcare claims.
- The MarketScan Multistate Medicaid dataset includes data only from 7-12 states, and the Medicare dataset only includes people with Medicare Advantage and Medicare Supplemental insurance plans; therefore, there may be limitations associated with generalizing results to the full Medicaid or Medicare populations.

DISCUSSION

- The 1-, 2-, and 3-year incidence of OUD among opioid-naïve patients who received prescription opioids for the management of acute pain represents a large number of patients across all payer types.
- The incidence of OUD was estimated to be approximately 10x greater among Medicaid beneficiaries compared to those with commercial insurance and nearly 20x greater compared to those with Medicare Advantage/Supplemental plans.
 - Medicaid beneficiaries have a higher prevalence of risk factors associated with OUD (history of mental health disorders and prior substance abuse) compared to those with Commercial or Medicare coverage, which may contribute to the elevated incidence of OUD in the Medicaid population observed in this study.^{10,11}
- Patients diagnosed with OUD have higher healthcare resource utilization and approximately 2-3 times higher total all-cause payer costs per patient than those not diagnosed with OUD in the 12-months after OUD diagnosis across all payer types.
 - Total all-cause costs reflect payer-specific costs, which vary given the amounts paid by each payer for adjudicated claims.

CONCLUSIONS

- The incidence and economic burden of OUD resulting from prescription opioids for acute pain management are substantial, irrespective of payer type.**
- Further investment in effective non-opioid treatment options for acute pain management may reduce the incidence of OUD and its associated burden on the healthcare system.**

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