

An Evaluation of the Prevalence of Diagnosed Opioid Use Disorder and the Economic Burden of Opioid Use Disorder-Related Healthcare Costs in the United States

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BACKGROUND

- The total economic burden of the opioid crisis in the United States (US) is substantial, estimated as \$65.1 Billion (B) per year in healthcare costs and increases to \$188 B when the impact to society is incorporated.¹
- The impact associated specifically with prescription opioid misuse and abuse represents a subset of these total costs and is not well understood, as the majority of published literature and government reports describing the economic impact of opioid use disorder (OUD) do not differentiate between opioids that were prescribed or obtained illicitly.
- This study aims to evaluate the economic impact of OUD among patients managing painful conditions with prescription medication by assessing healthcare utilization and costs using claims data.

OBJECTIVES

- To provide national-level estimates of the one-year period prevalence of diagnosed OUD among acute and chronic pain patients managing pain with prescription medications in the US.
- To estimate the one-year period prevalence of diagnosed OUD at the national level for a subgroup of patients with chronic peripheral neuropathic pain (PNP), a particularly severe form of chronic pain for which treatment options are limited.
- To examine all-cause and OUD-related healthcare resource utilization (HCRU) and associated direct costs for patients managing acute and chronic painful conditions with prescription medications and diagnosed with OUD.

METHODS

Study Design

- This retrospective, cross-sectional, observational study used the Merative® MarketScan® Commercial Claims and Medicare Databases [1/1/2022-12/31/2022 ("Study period")] to identify patients in the US using prescription medications to manage acute pain, chronic pain, and the subgroup of chronic pain patients with PNP.
- Aligned with the International Association for the Study of Pain (IASP) definition, patients with ≥3 months of continuous or recurrent use of prescription pain medication within the study period were classified as chronic pain patients, while those with <3 months were classified as acute pain patients.²
- Prevalence of diagnosed OUD was evaluated separately for acute and chronic cohorts, as well as the subgroup with chronic PNP, as a one-year period prevalence defined as evidence of diagnosed OUD during the one-year study period captured as a medical claim with an International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) diagnosis for opioid abuse or opioid dependence.
- Among patients with diagnosed OUD, all-cause and OUD-related HCRU and associated direct costs (2022 USD) were calculated over the study period separately for acute and chronic cohorts, as well as the subgroup with chronic PNP.
- OUD-related HCRU was determined from the following claims: 1) inpatient admissions with a diagnosis of OUD in any position or 2) outpatient claims with diagnosis of OUD in any position. As such, outpatient pharmacy data, which does not include an OUD diagnosis code, is not included. OUD-related HCRU included claims with a diagnosis for opioid abuse and dependence (used for the identification of OUD) as well as those for opioid overdose and poisoning events.
- OUD prevalence and total costs were extrapolated to national-level estimates in 2022 using person-level weights based on US Census demographic distribution to project to the US national population using age and gender standardized estimates.

Sample Selection

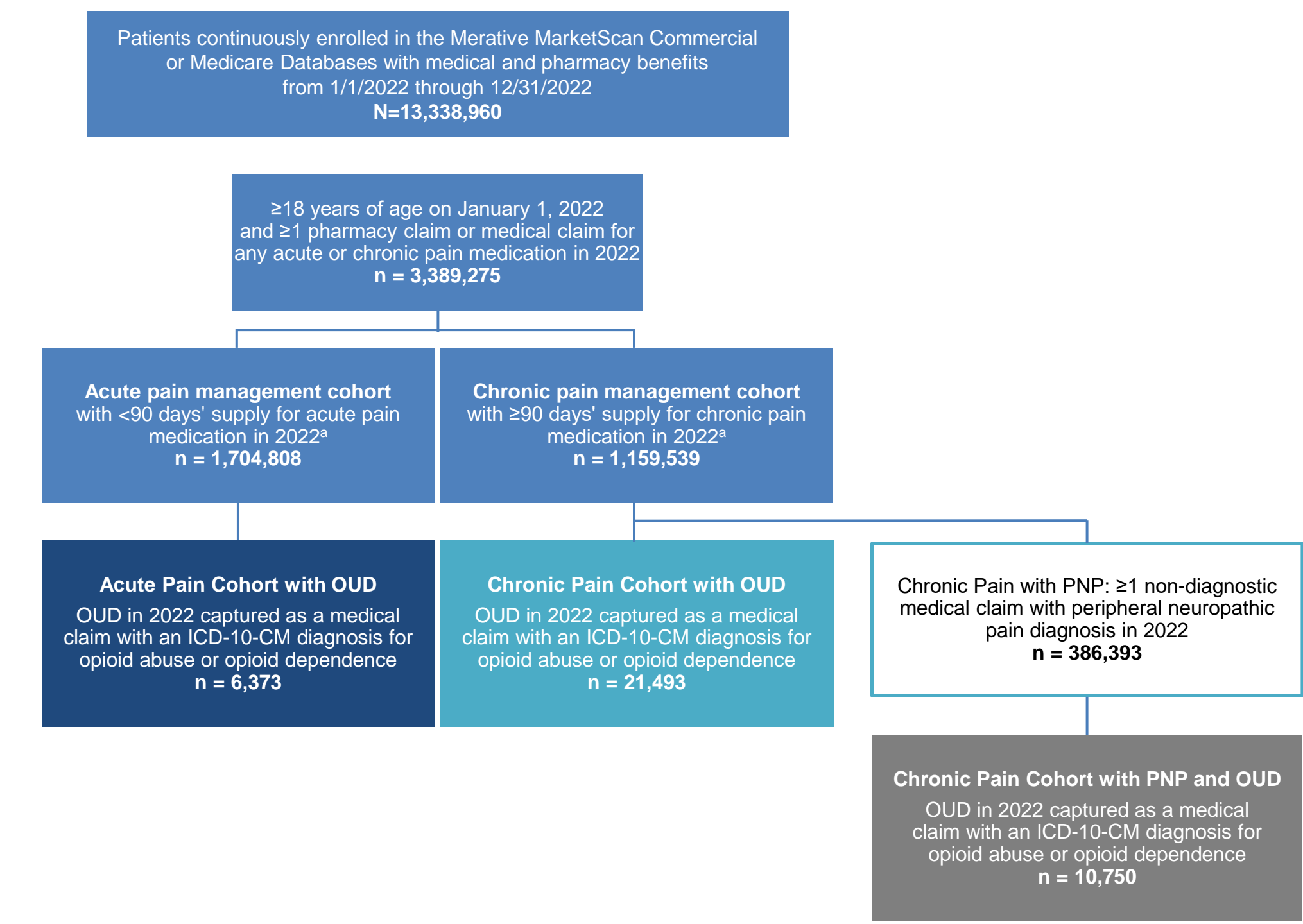
- The eligible population included adult patients (aged ≥18 years as of January 1, 2022) who had at least one pharmacy claim or medical claim for a pain medication of interest during the one-year study period, defined as January 1, 2022, through December 31, 2022 (inclusive).
- Patients were required to have a full year of continuous insurance coverage to ensure capture of all prescription medication use.
- Pain medications considered in the analysis included opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), anti-convulsants, local anesthetics, serotonin and norepinephrine reuptake inhibitor (SNRI) antidepressants, and non-opioid analgesics (including acetaminophen and aspirin).
- Within the chronic pain cohort, PNP patients were identified using ICD-10-CM diagnosis codes for the following peripheral neuropathy conditions:
 - Compression neuropathy, diabetic neuropathy, non-diabetic small fiber neuropathy, post-herpetic neuropathy, traumatic neuropathy, radiculopathy, trigeminal neuropathy, and other peripheral neuropathy.
- The OUD groups were defined as those with OUD captured as a medical claim with an ICD-10-CM diagnosis for opioid abuse or opioid dependence.

RESULTS

Study Population and Clinical Characteristics

- Using the methods outlined above, 6,373 patients with diagnosed OUD were identified in the acute pain cohort and 21,493 patients with diagnosed OUD were identified in the chronic pain cohort. Among the chronic pain patients with PNP conditions, 10,750 patients were diagnosed with OUD during the study period (**Figure 1**).
- The demographics and clinical characteristics for these cohorts are shown in **Table 1**.

Figure 1. Patient Attrition



N: number of participants; n: number of participants in the specified category
* N=524,928 were not able to be classified as acute or chronic due to how cohorts are defined based on pain medication use

Table 1. Demographics and Clinical Characteristics

	Acute Pain Cohort With OUD	Chronic Pain Cohort With OUD	Chronic Pain Cohort With PNP and OUD
	N = 6,373	N = 21,493	N = 10,750
Age (years), mean (SD)	46.2 (17.0)	52.7 (14.6)	56.0 (13.2)
Male, n (%)	3,792 (59.5)	9,843 (45.8)	4,686 (43.6)
Most common clinical conditions, ^a n (%)			
Substance use disorder ^b	5,605 (87.9)	18,255 (84.9)	8,891 (82.7)
Anxiety	2,625 (41.2)	10,094 (47.0)	4,958 (46.1)
Hypertension	2,445 (38.4)	11,444 (53.2)	6,691 (62.2)
Tobacco use ^b	2,188 (34.3)	6,569 (30.6)	3,215 (29.9)
Depression	2,070 (32.5)	8,954 (41.7)	4,387 (40.8)
Osteoarthritis	1,518 (23.8)	9,499 (44.2)	6,445 (60.0)
Sleep disorders	1,498 (23.5)	7,024 (32.7)	4,001 (37.2)
Obesity	1,378 (21.6)	6,392 (29.7)	3,789 (35.2)
Hypercholesterolemia	1,025 (16.1)	5,188 (24.1)	3,151 (29.3)
Cancer	1,010 (15.8)	4,898 (22.8)	2,873 (26.7)
Diabetes	832 (13.1)	4,595 (21.4)	3,154 (29.3)

N: number of participants; n: number of participants in the specified category; OUD: opioid use disorder; PNP: peripheral neuropathic pain; SD: standard deviation
Demographics were summarized from the claims closest to January 1, 2022, and clinical characteristics were summarized over the study period.
^a Categories are not mutually exclusive. Patients may have more than one clinical condition during the year. Conditions with >20% in any cohort are shown.
^b Current or history of substance abuse/tobacco use.

Estimated Period Prevalence of Diagnosed OUD

- Among patients with acute and chronic pain, the estimated national-level period prevalence of patients with diagnosed OUD was highest for chronic pain patients, particularly the chronic PNP subgroup (**Table 2**).

Table 2. Estimated National-Level Period Prevalence of Diagnosed OUD

Populations/Subpopulation	Period Prevalence of Diagnosed OUD	Extrapolated Number of Patients Diagnosed With OUD in 2022
Acute pain population	0.4%	176,831
Chronic pain population	2.0%	597,266
Chronic PNP population (subgroup)	3.0%	310,663

OUD: opioid use disorder; PNP: peripheral neuropathic pain

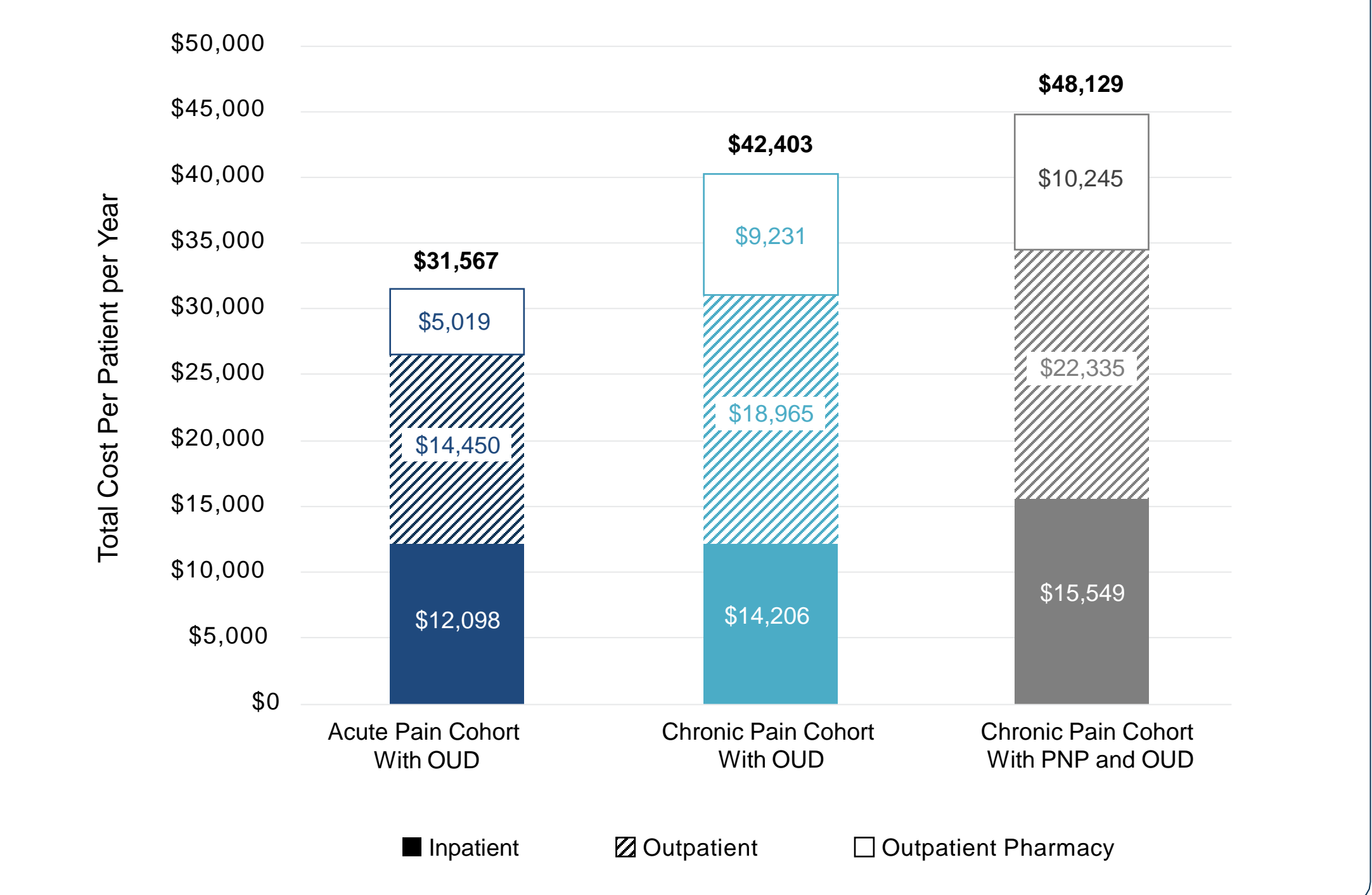
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Annual Total All-Cause and OUD-Related Per-Patient Costs

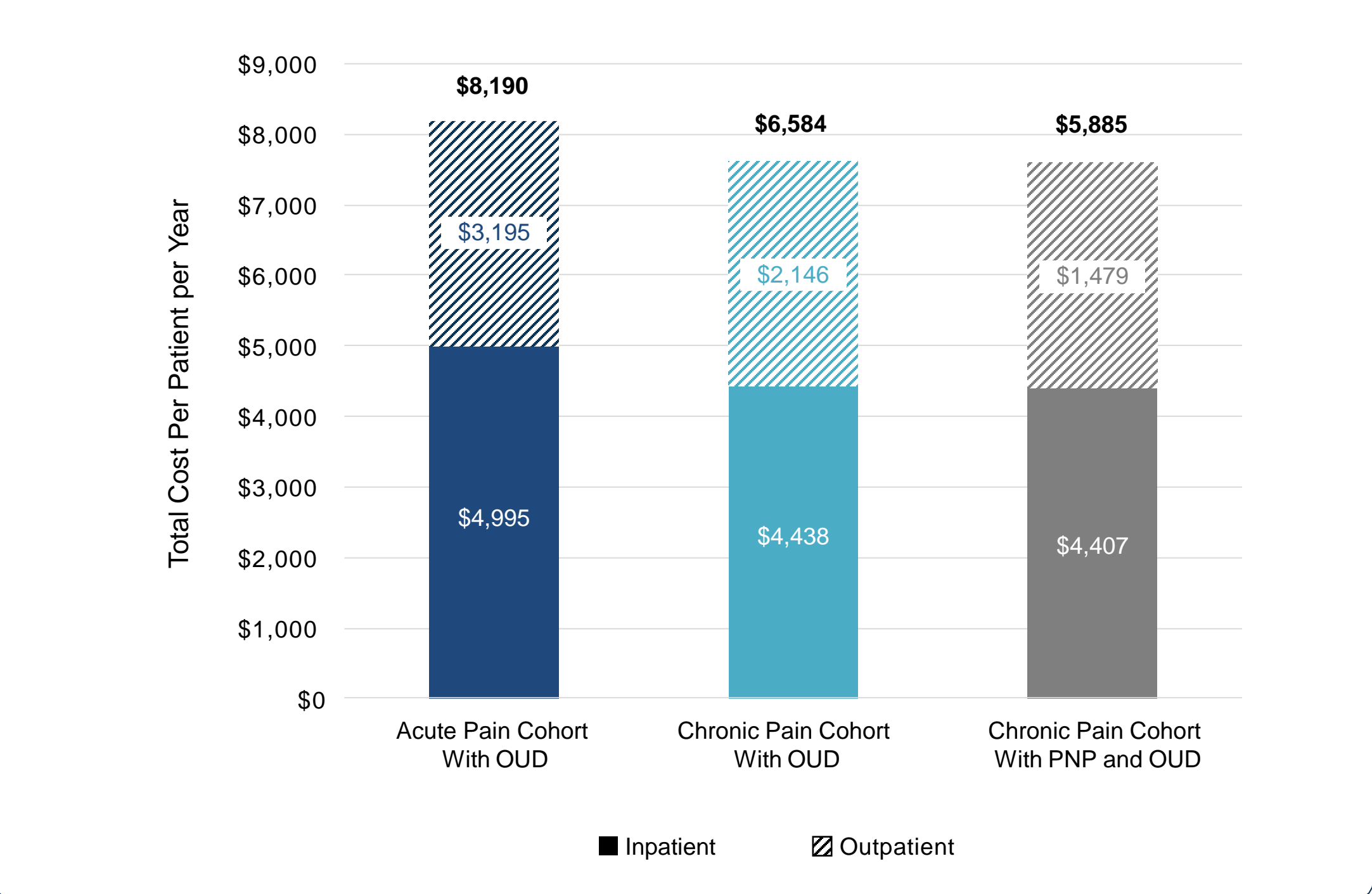
- Average annual all-cause (total inpatient + outpatient + outpatient pharmacy) per-patient costs were \$31,567 and \$42,403 for the acute and chronic pain cohorts with OUD, respectively. The highest per-patient costs were reported for chronic PNP patients with OUD (\$48,129) (**Figure 2**).
- Average annual OUD-related costs (total inpatient + outpatient) per-patient were \$8,190 and \$6,584 for acute and chronic pain cohorts, respectively, and \$5,885 for chronic PNP patients diagnosed with OUD (**Figure 3**).

Figure 2. Annual All-Cause Healthcare Resource Utilization Associated Per-Patient Costs



OUD: opioid use disorder; PNP: peripheral neuropathic pain

Figure 3. Annual OUD-Related Healthcare Resource Utilization Associated Per-Patient Costs



OUD: opioid use disorder; PNP: peripheral neuropathic pain
OUD-related healthcare resource utilization is determined from the following medical claims: 1) inpatient admissions or outpatient claims with a diagnosis code of OUD in any position. As such, outpatient pharmacy data, which does not include an OUD diagnosis code, is not included.

LIMITATIONS

- This analysis only captures the economic impact of OUD-diagnosed population 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 economic impact of OUD.
- 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.
- This is a cross-sectional study, and as such, patients were not followed over time, incidence of OUD cannot be calculated, and causality cannot be inferred.
- MarketScan databases are convenience samples comprised of people with employer sponsored health insurance (ESI) and represent about 50% of the full US population; therefore, there may be limitations associated with projecting to the full US population.

CONCLUSIONS

- Each year, there are a substantial number of people in the US managing acute and chronic pain with prescription medications with clinically diagnosed OUD (0.4% to 3%, depending on the pain subgroup).
- This study highlights the substantial economic impact of managing pain with OUD-diagnosed population, specifically among patients managing pain with current prescription therapies.
- Indirect economic impact of work productivity and disability are not measured in this analysis but would be an important future research area to fully evaluate the impact on the healthcare system and society.

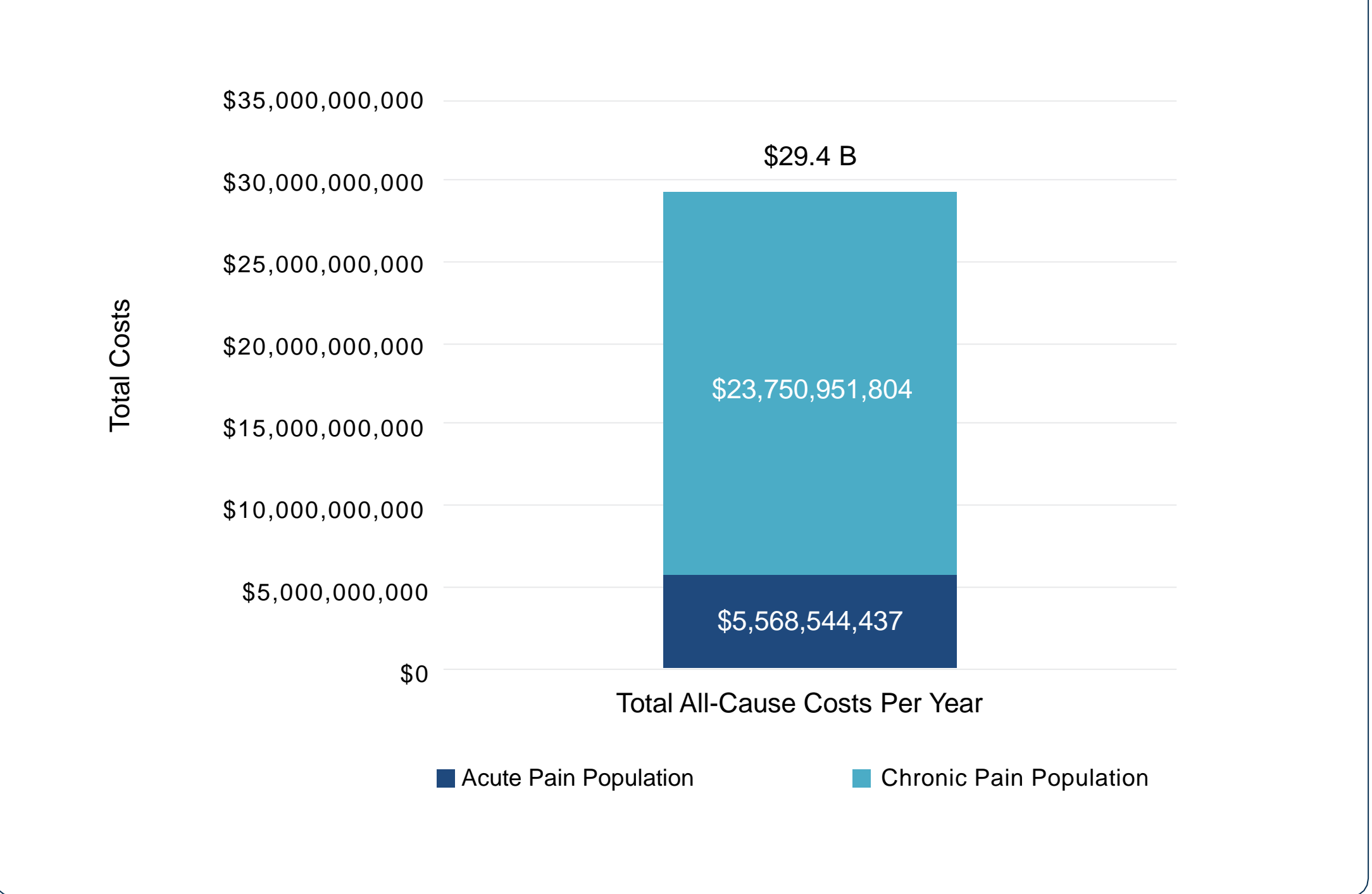
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National-Level Economic Burden of OUD Within the Diagnosed Population

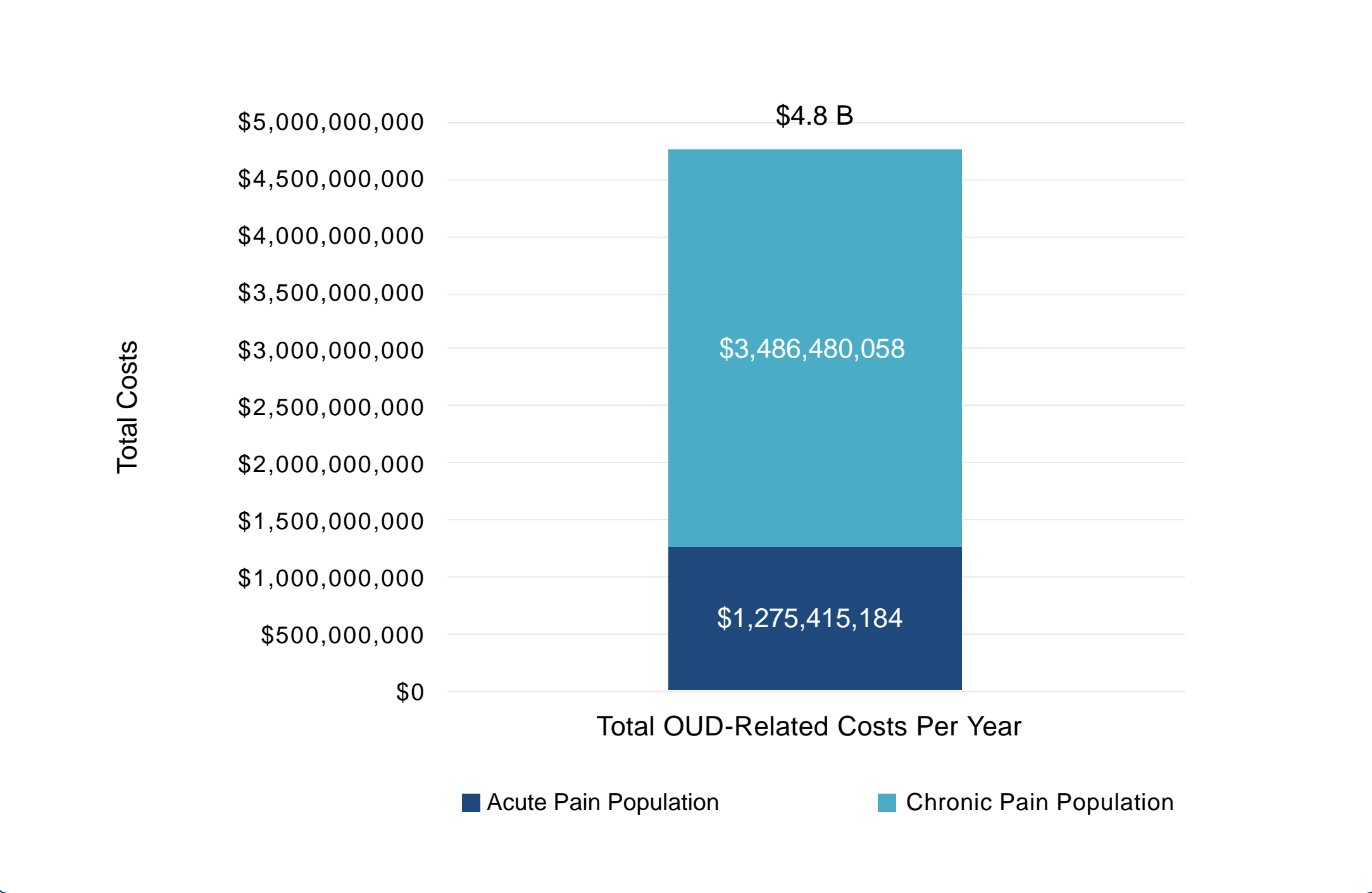
- When projected to the national-level, the estimated annual US economic burden of all-cause costs in the OUD-diagnosed population in 2022 were \$29.4 B (**Figure 4**). The estimated OUD-related costs among this population were \$4.8 B (**Figure 5**); these OUD-related costs for the population with an OUD diagnosis represent inpatient and outpatient services with an OUD-diagnosis code. OUD-related costs may reflect those with previous OUD diagnoses or newly diagnosed patients. Patients with previous OUD diagnoses may have greater annual costs than those who are newly diagnosed.

Figure 4. National-Level Extrapolated Annual US Economic Burden of All-Cause Costs Among Patients With OUD



B: billion; OUD: opioid use disorder

Figure 5. National-Level Extrapolated Annual US Economic Burden of OUD-Related Costs Excluding Pharmacy Costs Among Patients With OUD



B: billion; OUD: opioid use disorder
OUD-related healthcare resource utilization is determined from the following medical claims: 1) inpatient admissions or outpatient claims with a diagnosis code of OUD in any position. As such, outpatient pharmacy cost data, which does not include an OUD diagnosis code, is not included.