Economic Burden of Managing Acute and Chronic Pain in the United States: National Estimates From 2022 Data

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BACKGROUND

- The United States (US) is currently experiencing a public health crisis due to the large number of Americans with acute and chronic pain conditions.[1] Pain is one of the most common reasons Americans seek medical care and is associated with significant economic burden and patient morbidity.[2,3]
- Opioids are commonly prescribed to manage painful conditions, which in some patients may lead to opioid misuse, abuse, and addiction, and also contribute greatly to the overall burden to patients and society.[4,5]
- Published estimates report nearly $300 Billion (B) of direct health care costs related to managing chronic pain.[6] These estimates do not include costs associated with managing acute pain and are out of date.
- This analysis provides a contemporary estimation of the economic burden of managing acute and chronic pain with prescription medications.

OBJECTIVE

- To examine healthcare resource utilization (HCRU) and the associated economic burden of managing acute and chronic painful conditions with prescription pain medications in the US.

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 describe patients in the US using prescription medications to manage acute and chronic pain.
- Annual all-cause healthcare utilization (inpatient admissions, outpatient encounters, outpatient pharmacy) and all-cause direct medical costs were descriptively summarized over the study period separately for the acute pain cohort and chronic pain cohort.
- All study measures were stratified by those with and without evidence of prescription opioid use.
- All-cause direct medical costs were described both with and without surgical costs.
- Total costs were extrapolated to national-level estimates using standardized statistical techniques based on age and sex.

Figure 1. Study Design

HCRU: healthcare resource utilization

Study Population

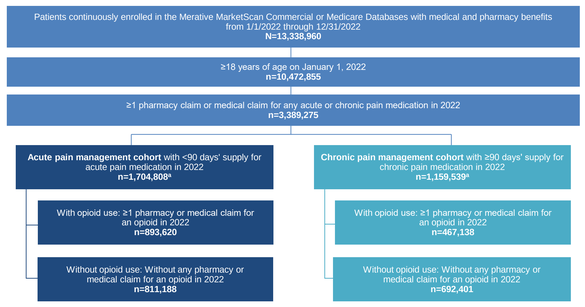
- Patients with continuous enrollment in the MarketScan Commercial or Medicare Databases with medical and pharmacy benefits from January 1, 2022, through December 31, 2022, who were age 18 years or older as of January 1, 2022, and had at least one pharmacy claim or medical claim for a pain medication in 2022 were included.
- 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).
- Aligned with the International Association for the Study of Pain (IASP) definition,[3] 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.

RESULTS

Study Population and Clinical Characteristics

- 1,704,808 acute pain patients and 1,159,539 chronic pain patients were identified **(Figure 2)**.
- The demographics and clinical characteristics of the population are shown in **Table 1** and **Figure 3**.

Figure 2. Patient Attrition



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

Treatment Utilization

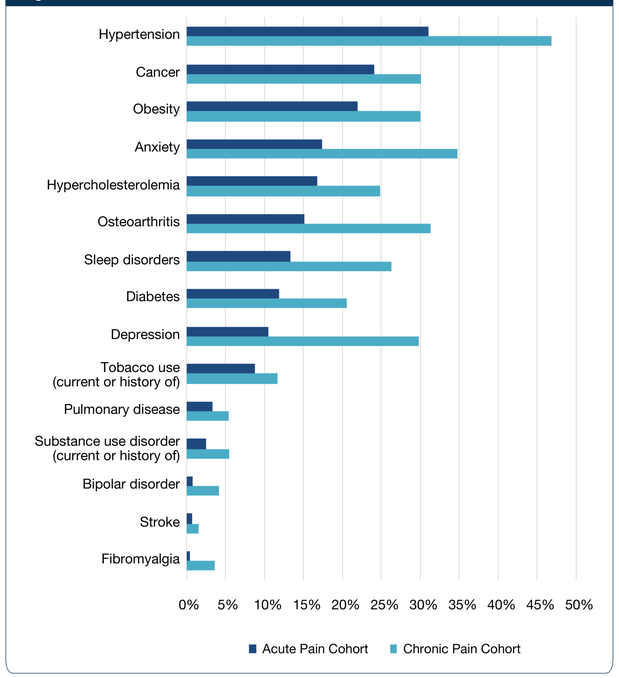
- The most frequently prescribed class of medication was NSAIDs (63% of acute pain and 53% of chronic pain patients) **(Table 1)**.
- Approximately half (52%) of acute pain patients and 40% of chronic pain patients received one or more prescriptions for opioids during the study period.

Table 1. Demographics and Clinical Characteristics

	Acute Pain Cohort N=1,704,808	Chronic Pain Cohort N=1,159,539
Age (years), mean (SD)	46.4 (15.9)	52.9 (14.7)
Sex, n (%)		
Male	727,164 (42.7)	392,800 (33.9)
Female	977,644 (57.3)	766,739 (66.1)
Evidence of major surgical procedure,[a] n (%)	423,286 (24.8)	218,771 (18.9)
Evidence of minor surgical procedure,[a] n (%)	1,552,833 (91.1)	1,123,156 (96.9)
Patients with treatment, n (%)		
NSAIDs	1,078,922 (63.3)	612,744 (52.8)
Opioid	893,620 (52.4)	467,138 (40.3)
Anti-convulsant	125,739 (7.4)	482,066 (41.6)
Local anesthesia	38,344 (2.2)	60,045 (5.2)
Non-opioid analgesics	34,236 (2.0)	48,401 (4.2)
Anti-depressant[b]	-	526,200 (45.4)

N: number of participants; n: number of participants in the specified category; NSAIDs: nonsteroidal anti-inflammatory drugs; SD: standard deviation
Demographics were summarized from the claim closest to January 1, 2022.
[a] Measured during the study period. Denominator is all patients. Patients can have both a major and minor procedure within the year. Minor procedures on the same claim with a major procedure will not contribute as these occur in support of a major procedure.
[b] Anti-depressants such as SNRI inhibitors were only used for identification of the chronic pain cohort, therefore no anti-depressant use was recorded in the acute pain cohort.
Categories not mutually exclusive. Patients may have more than one treatment during the year.

Figure 3. Clinical Comorbidities



Clinical characteristics were summarized over the study period.
Categories are not mutually exclusive. Patients may have more than one clinical comorbidity during the year.

Healthcare Resource Utilization

A large proportion of the acute and chronic pain cohorts utilize inpatient and outpatient services during the study period **(Table 2)**.

- The subgroup of acute pain patients with prescription opioid use had consistently higher healthcare utilization than those without opioid use in all inpatient and outpatient care settings included in the analysis, except office visits **(Table 2)**.
- The subgroup of patients managing chronic pain with prescription opioids use had a higher utilization of inpatient admissions, emergency room (ER) visits, and outpatient hospital services than chronic pain patients without opioid use **(Table 2)**.

Table 2. Healthcare Resource Utilization: Acute and Chronic Pain Cohorts

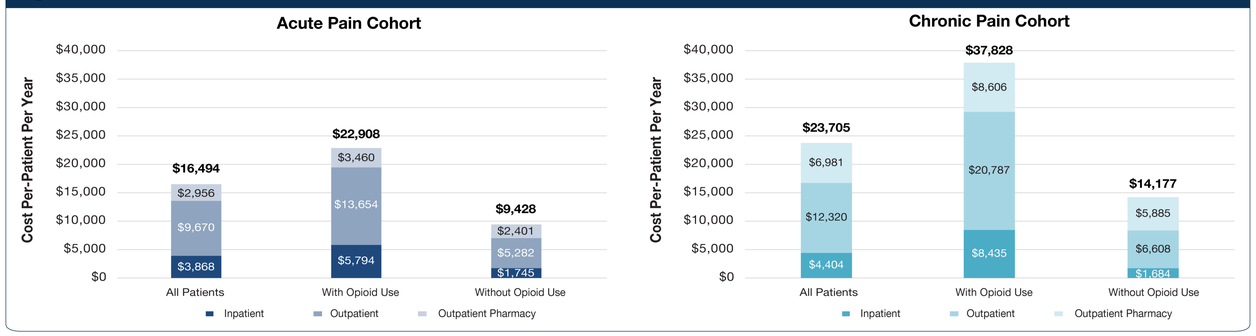
	Acute Pain Cohort				Chronic Pain Cohort			
	All Patients N=1,704,808	With Opioid Use N=893,620	Without Opioid Use N=811,188	Difference by Opioid Use (%)	All Patients N=1,159,539	With Opioid Use N=467,138	Without Opioid Use N=692,401	Difference by Opioid Use (%)
Patients with any event, n (%)								
Inpatient								
Inpatient admission	186,767 (11.0)	130,399 (14.6)	56,368 (6.9)	7.7	107,668 (9.3)	74,914 (16.0)	32,754 (4.7)	11.3
Inpatient admission requiring ICU visit[a]	44,317 (23.7)	34,748 (26.6)	9,569 (17.0)	9.6	41,672 (38.7)	28,797 (38.4)	12,875 (39.3)	-0.9
Outpatient								
ER visit	562,752 (33.0)	325,978 (36.5)	236,774 (29.2)	7.3	347,986 (30.0)	190,291 (40.7)	157,695 (22.8)	18.0
Hospital service	1,081,815 (63.5)	634,988 (71.1)	446,827 (55.1)	16.0	827,984 (71.4)	385,304 (82.5)	442,680 (63.9)	18.5
Outpatient office visit	1,586,808 (93.1)	831,914 (93.1)	754,894 (93.1)	0.0	1,139,002 (98.2)	459,758 (98.4)	679,244 (98.1)	0.3
Other outpatient services	1,586,356 (93.1)	835,444 (93.5)	750,912 (92.6)	0.9	1,133,466 (97.8)	459,634 (98.4)	673,832 (97.3)	1.1

ER: emergency room; ICU: intensive care unit; N: number of participants; n: number of participants in the specified category
[a] Among patients with an inpatient admission

Costs Associated With Healthcare Resource Utilization

- Average total cost per-patient per-year was $16,494 among acute pain patients and $23,705 among chronic pain patients **(Figure 4)**.
- Among both acute and chronic pain patients, HCRU associated costs were greater for the subgroup with evidence of prescription opioids compared to without.
  - Among acute pain patients, there was a difference of $13,480 per patient per year between those with and without prescription opioid use.
  - Among chronic pain patients, there was a difference of $23,651 per patient per year between those with and without prescription opioid use.

Figure 4. Annual All-Cause Healthcare Resource Utilization Associated Per-Patient Costs: Acute and Chronic Pain Cohorts



Extrapolated Total Costs

- When projected to the national level, the estimated total annual economic burden of managing patients with acute and chronic pain in 2022 was $735 B and $725 B, respectively.
- Nearly 25% of the acute pain cohort and 19% of the chronic pain cohort had evidence of a major surgical procedure during the study period, and these surgical costs were reflected in the total all-cause costs.
  - Direct surgical costs represent approximately 50% and 39% of total all-cause costs for acute pain and chronic pain cohorts, respectively.
  - In order to better quantify costs associated with managing pain, the direct surgical costs were excluded.
  - Excluding direct surgical costs, the estimated annual economic burden of acute and chronic pain populations managed with prescription pain medications was $373 B and $447 B, respectively.

LIMITATIONS

- 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.
- Medication use to determine acute and chronic 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.
- Classification as acute or chronic is based on an algorithm adapted for data in administrative claims.
- Medical claims include evidence of a surgical procedure during the study period, but the reason for surgery was not included in the analysis making it unclear whether the surgery was related to the etiology of pain.
- 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.
- Based on the cross-sectional design of this study, the study results show evidence of medication use and medical encounters over the study period; it is not possible to evaluate temporal relationships between medication use, such as opioids, and medical encounters, such as inpatient admissions or emergency room visits.

CONCLUSIONS

- The total annual economic impact on the US healthcare system of managing acute and chronic painful conditions is substantial and remains high (almost $800 B combined) even when direct surgical costs are excluded.
- This analysis showed that both acute and chronic pain patients managing pain with opioids have a greater economic burden than those not using opioids for pain management.
- These results underscore the need for novel pain medications that can effectively manage pain while mitigating the high burden of HCRU and associated costs.

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AUTHOR DISCLOSURES

- **AS** received research funding from the Department of Defense and the Orthopaedic Research and Education Foundation
- **NP, MM,** and **HV** are employees of Merative
- **JMG, ZW, LS, MS,** and **AM** are employees of Vertex Pharmaceuticals and may own stock/stock options in the company

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