Health Policy Research

A 24% Decline in the Utilization of Epidural Procedure Visits for Chronic Spinal Pain Management in the Medicare Population from 2019 to 2022: Updated Analysis of the Effect of Multiple Factors

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Background: The analysis of epidural procedure utilization has revealed several notable trends over recent years. Utilization increased significantly until 2004, then rose minimally until 2011, followed by gradual declines up to 2019 in the Medicare population. The COVID-19 pandemic led to a marked 19% decline in usage from 2019 to 2020. Additionally, recent studies of interventional pain management techniques showed a 28.9% reduction in use from 2019 to 2022, leading to an average annual decline of 10.9%.

Objective: The present investigation aims to provide an updated evaluation of epidural procedure usage for chronic pain management in the U.S. Medicare population.

Study Design: A retrospective cohort study examining utilization patterns and variables for epidural injections in the fee-for-service (FFS) Medicare population in the U.S. from 2000 to 2022.

Methods: Data was obtained from the Centers for Medicare & Medicaid Services (CMS) master database, specifically using the physician/supplier procedure summary for 2000–2022. Episodes or procedure visits were defined as one per region using primary codes only, while services included all procedure levels and any add-on codes.

Results: Between 2000 and 2010, epidural episodes rose by 6.7% annually but then declined by 3% each year from 2010 to 2019. The COVID-19 pandemic led to a 19.3% reduction in procedures from 2019 to 2020, followed by a partial recovery of 5.5% in 2021, then another 10.9% drop in 2022. During 2019–2022, lumbar interlaminar and caudal procedures decreased by 26.9%, while cervical/thoracic interlaminar procedures declined by 24.2%. By 2022, transforaminal procedures surpassed interlaminar procedures, reversing the trend from 2000.

Limitations: This analysis includes data only through 2022 and is limited to the FFS Medicare population; it does not account for Medicare Advantage Plan enrollees, who made up nearly half of Medicare participants by 2022. Additionally, the study is subject to limitations inherent in retrospective claims data analysis.

Conclusion: This two-decade analysis indicates significant shifts in epidural procedure utilization, with steady increases until 2010, followed by a general decline affected by COVID-19 and other contributing factors. An approximate 24% decline in epidural procedure visits for chronic spinal pain management was noted from 2019 to 2022.

Key words: Chronic spinal pain, interventional techniques, interlaminar epidural injections, caudal epidural injections, transforaminal epidural injections, utilization patterns, COVID-19 pandemic, economic decline, Affordable Care Act (ACA)

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The utilization of healthcare services worldwide—and particularly within the United States—has been a topic of extensive discussion, especially in the field of interventional pain management (1-25). Following the introduction of the Affordable Care Act (ACA), utilization rates for pain management procedures declined as patients faced high deductibles, coinsurances, and rising copays (6,7). Pain practices have also experienced increased operational costs related to the need to hire staff to explain complex insurance plans, address patient complaints, and manage heightened scrutiny and a rising number of audits (1,2,5,26-49). The COVID-19 pandemic accelerated these declines (1-5,50-55), introducing further disruptions as patients and healthcare staff faced quarantine measures. Fluctuating requirements for screening, testing, vaccinations, and treatment created additional obstacles and uncertainty around access to care. Lockdowns and temporary bans on elective procedures further compounded these challenges. Economic difficulties related to unemployment, inflation, workforce shifts, and supply chain issues have continued to worsen the situation (32-38,50-55). Many patients now present with worsened health conditions, having foregone routine screenings and essential care in recent years, either due to safety concerns or decreased access to primary and preventive services.

National healthcare expenditures are projected to grow ominously, with expected annual increases averaging 5.6%, surpassing nominal GDP growth by 43%. This trend reflects broad price inflation, an aging population, and increased demand for healthcare relative to income growth, potentially pushing healthcare's share of the economy to 19.7% of GDP by 2032 (56,57). Healthcare spending in the United States grew 4.1% in 2022, reaching $4.5 trillion—a faster growth rate than the 3.2% increase seen in 2021 but slower than the 10.6% spike in 2020 due to the pandemic. Expected spending for 2023 is $4.8 trillion, with a per capita expenditure of $14,423. This includes $6,838 per capita for private health insurance, $15,689 for Medicare, and $9,336 for Medicaid, with projections indicating increases to $10,576 for private insurance, $24,921 for Medicare, and $15,632 for Medicaid. Notably, less than 20% of Part B healthcare spending goes toward physician and clinical services, which increased by 2.7% to $884.9 billion in 2022—a slower rate than the general healthcare increase of 4.1% (58). Contributing factors included slower service utilization growth and lower physician price inflation. Specifically, epidural procedure utilization among FFS Medicare enrollees decreased by 19% per 100,000 beneficiaries from 2019 to 2020 due to COVID-19 disruptions (3).

Healthcare expenditure patterns have continued to follow prior trends, with the pandemic driving sustained increases in costs (56-58). Previously published U.S. data on public and private healthcare spending (59,60) showed the highest spending on back and neck pain, which rose by 53.5% from $87.6 billion in 2013 to $134.5 billion in 2016. These spending trends reflect ongoing changes in healthcare delivery, marked by increased regulations and oversight. While such adjustments have sometimes led to reduced utilization and improved criteria for procedures, they may also limit access to necessary treatments, including epidural procedures.

Past evaluations of epidural procedure utilization showed significant growth, with an annual increase of 6.7% per 100,000 FFS Medicare beneficiaries from 2000 to 2010, followed by a 3% annual decline from 2010 to 2019 (2). Declines varied across procedure types, with the largest reductions observed in lumbar interlaminar and caudal epidural injections, while lumbar transforaminal epidural injections experienced smaller decreases.

The literature presents mixed conclusions regarding the clinical and cost-effectiveness of epidural procedures. Despite extensive research, including systematic reviews, randomized controlled trials (RCTs), cost-effectiveness analyses, and guidelines (8-25), evidence remains moderate, and debates persist due to differing views on the procedures' effectiveness and indications.

This investigation, therefore, aims to conduct a retrospective cohort study on epidural injection utilization patterns from 2000 to 2022, providing updated insights on the U.S. FFS Medicare population and expanding on prior research (3).

Methods

This study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for observational studies (61). Data was obtained from non-identifiable, public-use files available through the Centers for Medicare & Medicaid Services (CMS) (62), ensuring confidentiality and non-attributability.

Study Design

The study was designed to evaluate utilization patterns and trends in the use of epidural procedures

for managing chronic spinal pain from 2000 to 2022. Continuous epidurals and neurolytic procedures were excluded.

Objectives

The primary objective was to analyze utilization patterns for epidural procedures within the FFS Medicare population from 2000 to 2022, including an updated assessment of trends.

Setting

Data was drawn from the CMS national database, focusing on the FFS Medicare population in the United States (62).

Participants

The study included all Medicare FFS recipients from 2000 to 2022, encompassing beneficiaries enrolled due to Social Security disability, Social Security insurance, or retirement.

Variables

Service and episode rates were calculated based on the Medicare beneficiary population for each year and are reported as procedures per 100,000 beneficiaries. Each episode was defined by one procedure per region, using only primary procedure codes. Services included all procedure levels with any applicable add-on codes.

Variables assessed included:

- Utilization patterns for epidural procedures from 2019 to 2020, reflecting COVID-19 pandemic impacts.
- Usage trends from 2000 to 2010 and 2010 to 2019.
- Characteristics of the Medicare population and its growth over time.

Epidural procedures are performed by various physician specialties, including interventional pain management (-09), pain medicine (-72), anesthesiology (-05), physical medicine and rehabilitation (-25), neurology (-13), psychiatry (-26), and others. Medicare groupings also included a surgical group (orthopedic surgery -20, general surgery -17, neurosurgery -14), a radiological group (diagnostic radiology -30, interventional radiology -94), and other physicians.

The current procedural terminology (CPT) codes for epidural procedures from 2000 to 2020 included:

- Epidural procedures: CPT codes 62280, 62281, 62282, 62310, 62320 (new), 62321 (new), 62311, 62322 (new), 62323 (new), 64479, 64480, 64483, 64484.
- Additional interventional procedures were included as described in a recent publication (3).

Data was analyzed by place of service (facility-based, such as ambulatory surgery centers or hospital outpatient departments, versus non-facility, such as offices). Utilization was further compared across Medicare Administrative Contractors (MAC) jurisdictions. MACs are private health insurers with designated U.S. regions to process Medicare Part A, Part B, or durable medical equipment claims for FFS beneficiaries, as established by the Medicare Prescription Drug Improvement and Modernization Act (MMA) of 2003.

Data Sources

All data was extracted from the CMS physician/supplier procedure summary master data from 2000 to 2022 (62), encompassing FFS Medicare participants below and above 65 who received interventional techniques regardless of disability type.

Measures

The CMS 100% dataset included procedure codes (primary, add-on, and bilateral), specialty codes, place of service, total services, and information on allowed and denied services. Analysis focused on all allowed services (submitted services minus denied services and services with zero payments), excluding those with type of service codes equal to 8 or F. Rates were calculated per 100,000 Medicare beneficiaries per year.

Bias

Data for this analysis was acquired from CMS by the American Society of Interventional Pain Physicians (ASIPP). The study was supported by internal resources from the primary authors' practice, with no external funding or industry grants.

Study Size

This comprehensive study included all Medicare FFS patients undergoing interventional procedures for chronic spinal pain across all regions and settings in the U.S. from 2000 to 2022.

Data Compilation

Data compilation and analysis were conducted using Microsoft Access 2020 and Microsoft Excel 2020 (Microsoft Corporation, Redmond, WA).

Results

Patients

This analysis covers patients included in the FFS Medicare program from 2000 to 2022.

Descriptive Data of Population Characteristics

Population characteristics for Medicare beneficiaries and trends in epidural procedures from 2000 to 2022 are shown in Table 1, Figs. 1 and 2, and Appendix Table 1.

Utilization Characteristics

Utilization patterns of epidural injections in the FFS Medicare population from 2000 to 2022 are detailed in Table 2, Appendix Table 2, and Figs. 3 and 4. The data reveal distinct trends by procedure type and time period. From 2000 to 2010, the rate of episodes per 100,000 beneficiaries for lumbar interlaminar and caudal epidural injections grew by 2% annually, while lumbosacral transforaminal epidural injections increased sharply by 21.0% per year. However, from 2010 to 2019, lumbar interlaminar and caudal epidural injection rates declined by 4.9% annually, while lumbosacral transforaminal injection rates continued to grow modestly at 1.3% annually. The COVID-19 pandemic significantly impacted these trends: from 2019 to 2020, episodes of lumbar interlaminar and caudal epidural injections fell by 20.9%, and lumbosacral transforaminal injections decreased by 17.9%.

Further declines in epidural procedures were observed from 2019 to 2022. During this period, cervical/thoracic interlaminar episodes declined by 24.2% (averaging 8.8% per year), lumbar interlaminar and caudal episodes decreased by 26.9% (9.9% annually), cervical/thoracic transforaminal episodes dropped by 25.1% (9.2% annually), and lumbosacral transforaminal episodes fell by 21.4% (7.7% per year). Within 2021–2022 alone, notable annual declines occurred: cervical/thoracic interlaminar episodes decreased by 11.2%, lumbar interlaminar and caudal episodes by 11.6%, cervical/thoracic transforaminal episodes by 12.8%, and lumbar/sacral transforaminal episodes by 10.3%, as illustrated in Fig. 3.

Figure 4 demonstrates a shift in utilization patterns over time: interlaminar procedures, which accounted for 83% of all epidural procedures in 2000, declined to 44% by 2019 and further to 22% by 2022 as transforaminal procedures became more prevalent. Epidural procedures represented 57% of all interventional procedures in 2000, decreasing to 38% by 2019 and 2020, and then slightly increasing to 40% in 2021 and 2022, as shown in Fig. 5.

Discussion

The analysis of epidural procedure visits or episodes reveals a contrasting pattern over the years. From 2000 to 2010, there was an annual increase of 6.7% in epidural procedure episodes. This trend reversed from 2010 to 2019, where the episodes declined by 3% per year.

Table 1. *Characteristics of Medicare beneficiaries and epidural procedures excluding percutaneous adhesiolysis, continuous epidurals, and neurolytic epidurals.*

Year	U.S. Population (,000)	Medicare beneficiaries (,000)	Epidural Services* (all codes)	Rate	Epidural Services (Primary codes only)	Rate
2000-2022	18.1%	63.3%	107.1%	26.9%	80.8%	10.7%
GM	0.8%	2.3%	3.4%	1.1%	2.7%	0.5%
2000-2010	9.4%	18.4%	162.7%	121.9%	126.1%	91.0%
GM	0.9%	1.7%	10.1%	8.3%	8.5%	6.7%
2010-2019	6.3%	30.5%	-0.9%	-24.1%	-0.4%	-23.7%
GM	0.7%	3.0%	-0.1%	-3.0%	-0.05%	-3.0%
2019-2022	1.5%	5.7%	-20.4%	-24.7%	-19.7%	-24.1%
GM	0.5%	1.9%	-7.3%	-9.0%	-7.1%	-8.8%
2019-2020	0.8%	2.3%	-17.1%	-19.0%	-17.4%	-19.3%
2020-2021	0.3%	1.3%	6.5%	5.2%	6.9%	5.5%
2021-2022	0.4%	2.1%	-9.9%	-11.7%	-9.1%	-10.9%

Rate – Rate per 100,000 Medicare beneficiaries, GM - Geometric average change

* - Epidural Services = 62310, 62320, 62321 C/T or interlaminar epidural injections; 62311, 62322, 62323-L/S interlaminar epidural injections; 64479- C/T transforaminal epidural injections; 64480- C/T transforaminal epidural injections add-on; 64483-L/S transforaminal epidural injections; 64484-L/S transforaminal epidural injections add-on

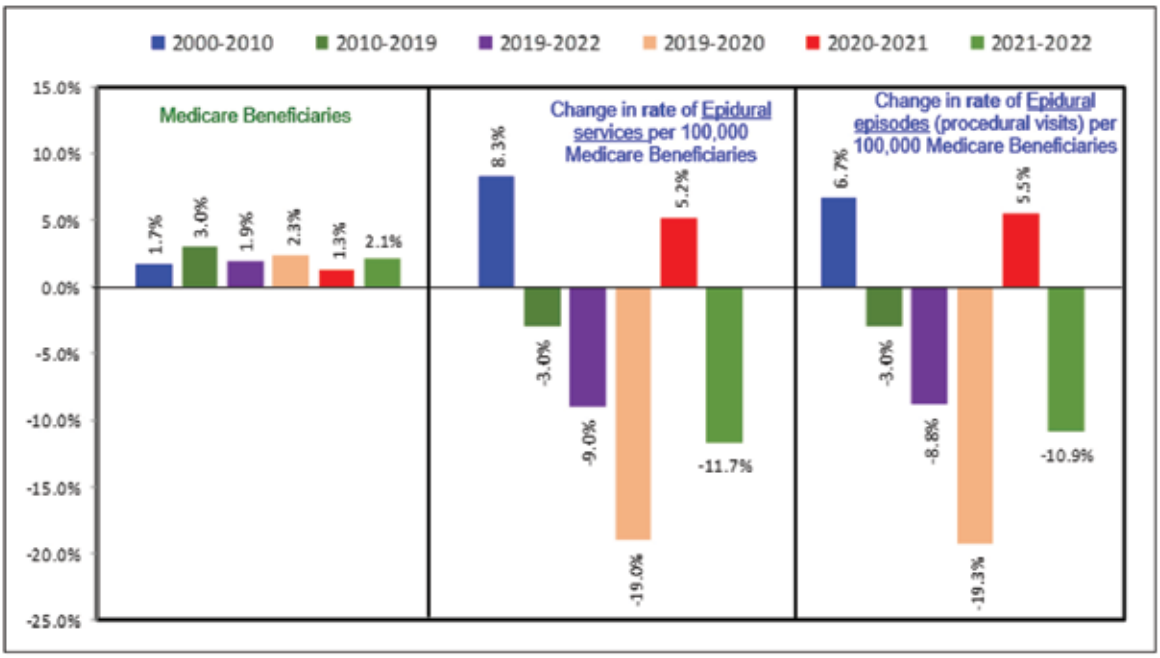


Fig. 1. *Comparative analysis of annual rates Medicare participation and utilization of services and episodes (procedure visits) of epidural procedures.*

Fig. 2. *Utilization patterns of epidural procedures from 2000 to 2022.*

Table 2. *Growth of epidural injections in the fee-for-service Medicare population from 2000-2022.*

HCPCS	Cervical/ Thoracic Interlaminar Epidurals (CPT 62310, 62320, 62321)		Lumbar Interlaminar and Caudal Epidurals (CPT 62311, 62322, 62323)		Cervical/Thoracic Transforaminal Epidurals (CPT 64479,64480)				Lumbar/Sacral Transforaminal Epidurals (CPT 64483, 64484)			
	Services	Rate	Services	Rate	CPT 64479 Services	Rate	Total (64479, 64480) Services	Rate	CPT 64483 Services	Rate	Total (64483, 64484) Services	Rate
2000-2022	134.4%	43.6%	-7.8%	-43.5%	118.5%	33.8%	79.1%	9.7%	671.5%	372.6%	675.7%	375.1%
GM	3.9%	1.7%	-0.4%	-2.6%	3.6%	1.3%	2.7%	0.4%	9.7%	7.3%	9.8%	7.3%
2000-2010	143.9%	106.1%	43.7%	21.4%	197.3%	151.2%	205.4%	158.0%	698.9%	574.9%	767.3%	632.6%
GM	9.3%	7.5%	3.7%	2.0%	11.5%	9.6%	11.8%	9.9%	23.1%	21.0%	24.1%	22.0%
2010-2019	19.9%	-8.1%	-17.0%	-36.4%	-7.2%	-28.9%	-22.7%	-40.7%	16.2%	-11.0%	10.3%	-15.4%
Change	2.0%	-0.9%	-2.0%	-4.9%	-0.8%	-3.7%	-2.8%	-5.6%	1.7%	-1.3%	1.1%	-1.8%
2019-2022	-19.8%	-24.2%	-22.7%	-26.9%	-20.8%	-25.1%	-24.1%	-28.3%	-16.9%	-21.4%	-18.9%	-23.3%
GM	-7.1%	-8.8%	-8.2%	-9.9%	-7.5%	-9.2%	-8.8%	-10.5%	-6.0%	-7.7%	-6.8%	-8.5%
2019-2020	-17.1%	-18.9%	-19.1%	-20.9%	-16.6%	-18.5%	-16.5%	-18.3%	-16.0%	-17.9%	-15.9%	-17.8%
2020-2021	6.6%	5.2%	5.9%	4.6%	6.8%	5.4%	5.7%	4.3%	7.9%	6.5%	6.9%	5.6%
2021-2022	-9.3%	-11.2%	-9.8%	-11.6%	-11.0%	-12.8%	-14.1%	-15.8%	-8.3%	-10.1%	-9.8%	-11.7%

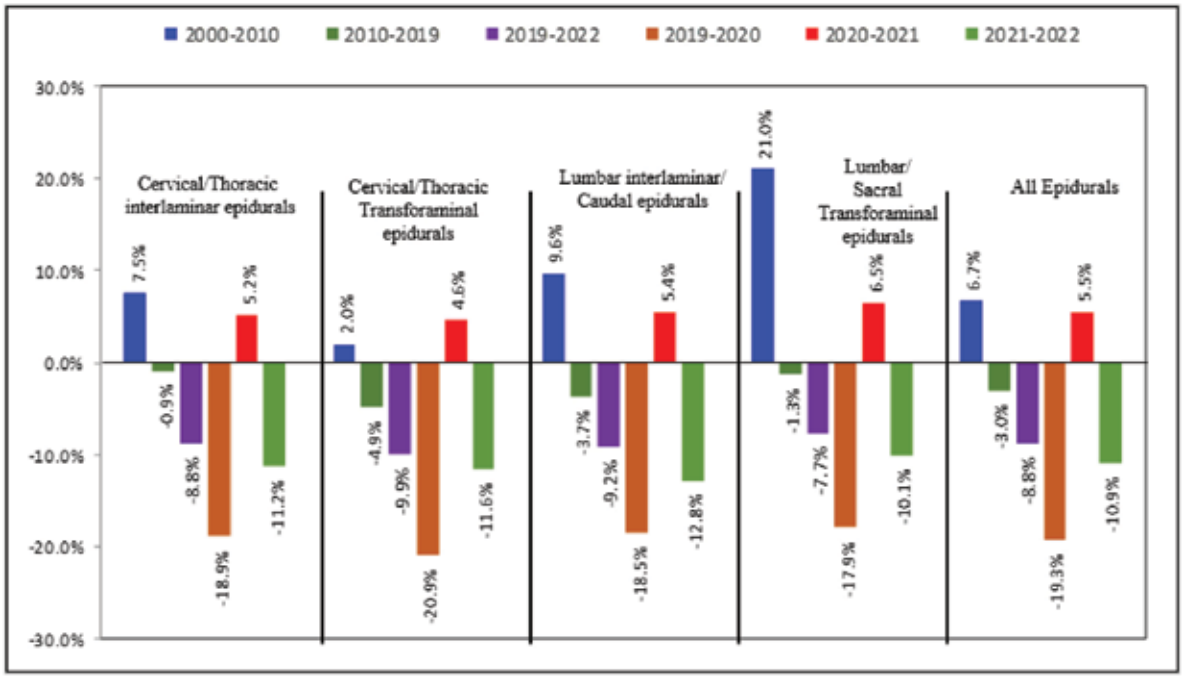


Fig. 3. *Frequency of utilization of episodes of epidural injections (annual change in the rate) by episodes in Medicare recipients.*

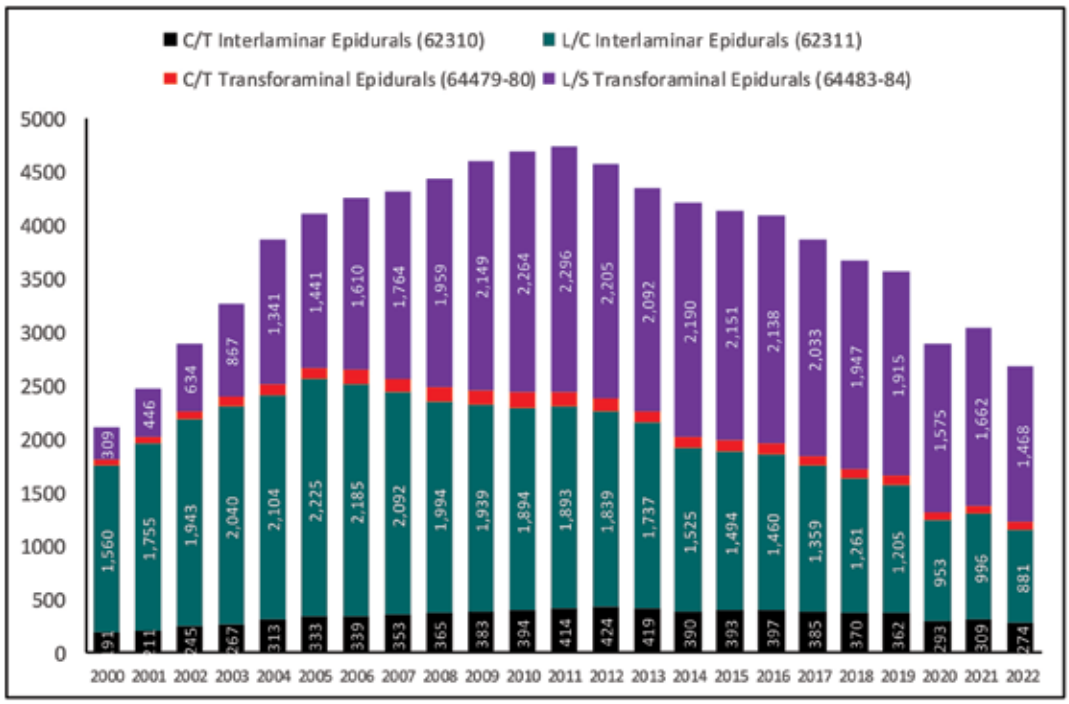
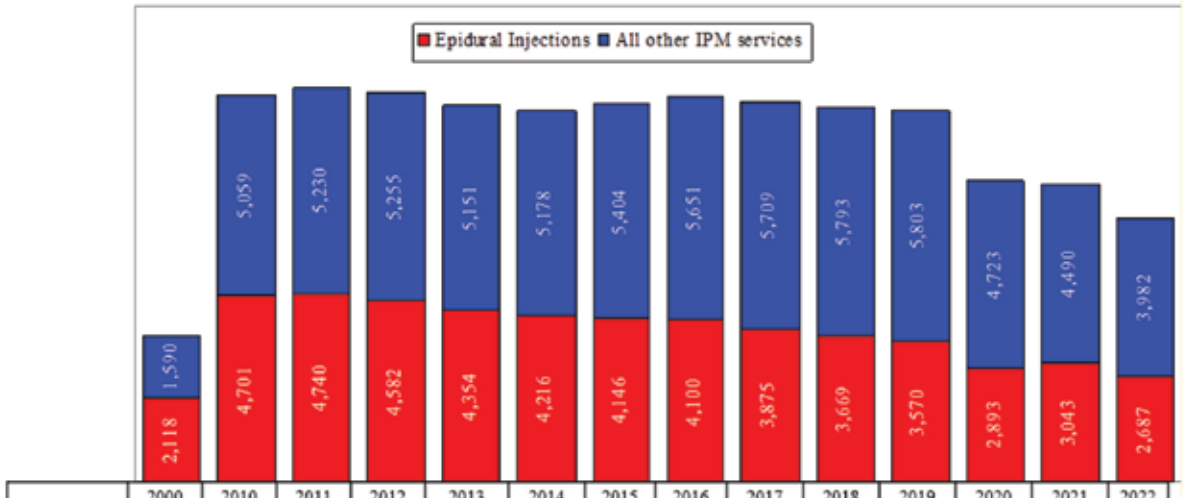


Fig. 4. *Frequency of utilization of epidural injections by procedures from 2000 to 2020, in Medicare recipients.*



	2000	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
All Epidurals	2,118	4,701	4,740	4,582	4,354	4,216	4,146	4,100	3,875	3,669	3,570	2,893	3,043	2,687
Percentage	57%	48%	48%	47%	46%	45%	43%	42%	40%	39%	38%	38%	40%	40%
All Other	1,590	5,059	5,230	5,255	5,151	5,178	5,404	5,651	5,709	5,793	5,803	4,723	4,490	3,982
IPM Services	3,708	9,760	9,970	9,837	9,505	9,394	9,550	9,751	9,584	9,462	9,373	7616	7,533	6,669

Fig. 5. *Utilization rates of epidural injections and all other IPM procedures from 2000 to 2020, in Medicare recipients.*

Notably, due to the COVID-19 pandemic, there was a sharp 19.3% decrease in epidural procedure episodes from 2019 to 2020. This was followed by a partial recovery, with a 5.5% increase in 2021, but the rate declined again by 10.9% in 2022. Overall, there was a cumulative decline of 24.1% in epidural procedure episodes per 100,000 Medicare beneficiaries from 2019 to 2022.

The data indicate that the Medicare population grew at an average annual rate of 3% from 2010 to 2019, compared to an annual U.S. population increase of 0.7% in that same period. However, from 2019 to 2022, the U.S. population grew at an annual rate of 0.5%, while the Medicare population increased by 1.9% annually, a slower rate than the previous decade's 3%.

Among procedure types, lumbosacral transforaminal epidural injections experienced the smallest reduction, with a 6% annual decline, while lumbosacral interlaminar and caudal injections saw the steepest decrease at 9% annually. By 2022, transforaminal injections had largely replaced interlaminar injections, reversing the distribution seen in 2000, when interlaminar procedures were predominant. This shift reflects evolving clinical practices and possibly changing guidelines within the Medicare population, as epidural procedures have diminished as a proportion of all interventional treatments.

This study provides an updated assessment of epidural procedure utilization in the Medicare FFS population from 2000 to 2022, with a focus on trends over three intervals: 2000–2010, 2010–2019, and 2019–2022. This comprehensive analysis includes all epidural procedures except percutaneous adhesiolysis. The declines observed may be attributable to multiple factors mentioned in the introduction, such as the lingering economic effects of the pandemic, broader economic challenges, and the introduction of the ACA and related medical policies that took effect around 2021 in utilization patterns may also stem from updated eligibility criteria that restrict the frequency of epidural injections, reducing the maximum number of injections from five times in the first year to a standard limit of four, with few exceptions, as per revised local coverage determinations (LCDs) and medical policies (43-50).

Limitations

As with other retrospective analyses, this study has limitations. It does not distinguish between individual procedures within each category and excludes Medicare Advantage enrollees, who represent nearly half of the Medicare population. Additionally, it does not differentiate specific approaches within each treatment modality, such as distinguishing between facet joint nerve blocks and radiofrequency neurotomy, or between interlaminar and transforaminal epidural injections. These limitations may affect the granularity of the findings and suggest potential avenues for further investigation.

Conclusion

This analysis of FFS Medicare data from 2000 to 2022 highlights major changes in the utilization patterns, patient demographics, and procedural trends for epidural injections. From 2000 to 2010, the data shows a strong upward trend in epidural procedure episodes. However, this growth shifted to a downward trend between 2010 and 2019. The COVID-19 pandemic further intensified this decline in 2019–2020, followed by a partial recovery in 2021 and another significant decrease in 2022. Overall, from 2019 to 2022, all categories of epidural procedures experienced notable declines, with interlaminar injections showing the steepest reduction. These findings reflect the evolving landscape of epidural interventions, shaped by policy changes, economic factors, and pandemic-related disruptions, underscoring the need for ongoing evaluation of procedural utilization in chronic pain management.

Conflict of Interest

Dr. Abd-Elsayed receives consulting fees from Medtronic and Curonix. Dr. Soin received support in the past from Neuros Medical and Avanos Medical, received consulting fees from Avanos Medical, owns several patents and is a co-inventor with Avanos Medical, and has stock options with Neuros Medical. Dr. Hirsch receives grants or contracts from Neiman Health Policy Institute, is a consultant for Medtronic, Relievant, and Sanofi, and is the Chair CSMB of neurovascular studies for Balt: Rapid Medical.

All other authors certify that he or she, or a member of his or her immediate family, have no commercial association (i.e., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted article.

Author Contributions

The study was designed by LM, VP, and JH.

Statistical analysis was performed by VP.

All authors contributed to the preparation of this study, reviewed, and approved the content with final version.

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References

1. Manchikanti L, Pampati V, Sanapati MR, et al. Exponential decline of 28.9% in utilization of interventional pain management techniques among Medicare beneficiaries from 2019 to 2022: Updated analysis on the ongoing effects of COVID-19, economic decline, the Affordable Care Act (ACA), and medical policies. *Pain Physician* 2024; in press.
2. Manchikanti L, Pampati V, Sanapati MR, et al. COVID-19 pandemic reduced utilization of interventional techniques 18.7% in managing chronic pain in the Medicare population in 2020: Analysis of utilization data from 2000 to 2020. *Pain Physician* 2022; 25:223-238.
3. Manchikanti L, Pampati V, Knezevic NN, et al. The influence of COVID-19 on utilization of epidural procedures in managing chronic spinal pain in the Medicare population. *Spine (Phila Pa 1976)* 2023; 48:950-961.
4. Manchikanti L, Kaye AD, Latchaw RE, et al. Impact of COVID-19 pandemic on utilization patterns of facet joint interventions in managing spinal pain in Medicare population. *Pain Ther* 2023; 12:505-527.
5. Manchikanti L, Pampati V, Soin A, Sanapati MR, Kaye AD, Hirsch JA. Declining utilization and inflation-adjusted expenditures for epidural procedures in chronic spinal pain in the Medicare population. *Pain Physician* 2021; 24:1-15.
6. Manchikanti L, Soin A, Mann DP, Bakshi S, Pampati V, Hirsch JA. Reversal of growth of utilization of interventional techniques in managing chronic pain in Medicare population post Affordable Care Act. *Pain Physician* 2017; 20:551-567.
7. Manchikanti L, Sanapati MR, Pampati V, Boswell MV, Kaye AD, Hirsch JA. Update on reversal and decline of growth of utilization of interventional techniques in managing chronic pain in the Medicare population from 2000 to 2018. *Pain Physician* 2019; 22:521-536.
8. Oliveira CB, Maher CG, Ferreira ML, et al. Epidural corticosteroid injections for lumbosacral radicular pain. *Cochrane Database Syst Rev* 2020; 4:CD013577.
9. Manchikanti L, Knezevic E, Knezevic NN, et al. Epidural injections for lumbar radiculopathy or sciatica: A comparative systematic review and meta-analysis of Cochrane review. *Pain Physician* 2021; 24:E539-E354.
10. Manchikanti L, Knezevic E, Knezevic NN, et al. A Comparative systematic review and meta-analysis of 3 routes of administration of epidural injections in lumbar disc herniation. *Pain Physician* 2021; 24:425-440.
11. Manchikanti L, Knezevic E, Latchaw RE, et al. Comparative systematic review and meta-analysis of Cochrane review of epidural injections for lumbar radiculopathy or sciatica. *Pain Physician* 2022; 25:E889-E916.
12. Chou R, Hashimoto R, Friedly J, et al. Epidural corticosteroid injections for radiculopathy and spinal stenosis: A systematic review and meta-analysis. *Ann Intern Med* 2015; 163:373-381.
13. Manchikanti L, Knezevic NN, Boswell MV, Kaye AD, Hirsch JA. Epidural injections for lumbar radiculopathy and spinal stenosis: A comparative systematic review and meta-analysis. *Pain Physician* 2016; 19:E365-E410.
14. Knezevic N, Manchikanti L, Urits I, et al. Lack of superiority of epidural injections with lidocaine with steroids compared to without steroids in spinal pain: A systematic review and meta-analysis. *Pain Physician* 2020; 23:S239-S270.
15. Manchikanti L, Knezevic NN, Sanapati J, Kaye AD, Sanapati MR, Hirsch JA. Is epidural injection of sodium chloride solution a true placebo or an active control agent? A systematic review and meta-analysis. *Pain Physician* 2021; 24:41-59.
16. Manchikanti L, Knezevic NN, Parr A, Kaye AD, Sanapati M, Hirsch JA. Does epidural bupivacaine with or without steroids provide long-term relief? A systematic review and meta-analysis. *Curr Pain Headache Rep* 2020; 24:26.
17. Kwak SG, Choo YJ, Kwak S, Chang MC. Effectiveness of transforaminal, interlaminar, and caudal epidural injections in lumbosacral disc herniation: A systematic review and network meta-analysis. *Pain Physician* 2023; 26:113-123.
18. Lee JH, Lee YJ, Park HS, Lee JH. Clinical effectiveness of posterior annular targeted ablative decompression as an alleviative intervention for lumbosacral discogenic pain: Systematic review and meta-analysis. *Pain Physician* 2023; 26:E437-E447.
19. Riegger M, Le H, van Kuijk SMJ, et al. Intradiscal glucocorticoid injection in discogenic back pain and influence on Modic changes: A systematic review and meta-analysis of RCTs. *Pain Physician* 2023; 26:E449-E465.
20. Manchikanti L, Sanapati MR, Pampati V, Hirsch JA. Compliance and documentation for evaluation and management services in interventional pain management practice. *Pain Physician* 2023; 26:503-525.
21. Manchikanti L, Pasupuleti R, Pampati V, Sanapati MR, Hirsch JA. Assessment of radiation exposure with mandatory two fluoroscopic views for epidural procedures. *Pain Physician* 2023; 26:557-567.
22. Lee JH, Lee Y, Park HS, Lee JH. Comparison of clinical efficacy of transforaminal and interlaminar epidural steroid injection in radicular pain due to cervical diseases: A systematic review and meta-analysis. *Pain Physician* 2022; 25:E1351-E1366.
23. Manchikanti L, Pampati V, Parr III A, et al. Cervical interlaminar epidural injections in the treatment of cervical disc herniation, post surgery syndrome, or discogenic pain: Cost utility analysis from randomized trials. *Pain Physician* 2019; 22:421-431.
24. Manchikanti L, Falco FJE, Pampati V, Cash KA, Benyamin RM, Hirsch JA. Cost utility analysis of caudal epidural injections in the treatment of lumbar disc herniation, axial or discogenic low back pain, central spinal stenosis, and post lumbar surgery syndrome. *Pain Physician* 2013; 16:E129-S143.
25. Manchikanti L, Pampati V, Sanapati SP, Sanapati MR, Kaye AD, Hirsch JA. Evaluation of cost-utility of thoracic interlaminar epidural injections. *Curr Pain Headache Rep* 2020; 24:5.
26. Manchikanti L, Helm S 2nd, Benyamin RM, Hirsch JA. A critical analysis of Obamacare: Affordable care or insurance for many and coverage for few? *Pain Physician* 2017; 20:111-138.
27. Bauchner H, Fontanarosa PB. The future of US health care policy. *JAMA* 2016; 315:1339-1340.
28. Neiman PU, Tsai TC, Bergmark RW, Ibrahim A, Nathan H, Scott JW. The Affordable Care Act at 10 years: Evaluating the evidence and navigating an uncertain future. *J Surg Res* 2021; 263:102-109.
29. Department of Justice. Office of Public Affairs. Principal Deputy Assistant Attorney General Nicole M. Argentieri. Combating Health Care Fraud: 2024 National Enforcement Action. July 1, 2024. Accessed 10/23/2024. www.justice.

gov/opa/blog/combating-health-care-fraud-2024-national-enforcement-action

30. Perez V, Ramos Pastrana JA. Finding fraud: Enforcement, detection, and recoveries after the ACA. *Int J Health Econ Manag* 2023; 23:393-409.
31. Department of Justice. Office of Public Affairs. Press Release. National Health Care Fraud Enforcement Action Results in 193 Defendants Charged and Over $2.75 Billion in False Claims. June 27, 2024. Accessed 10/23/2024. www.justice.gov/opa/pr/national-health-care-fraud-enforcement-action-results-193-defendants-charged-and-over-275-0
32. Strazewski L. American Medical Association. 8 threats facing physician private practices. February 21, 2022. Accessed 10/23/2024. www.ama-assn.org/practice-management/private-practices/8-threats-facing-physician-private-practices#:~:text=8%20threats%20facing%20physician%20private%20practices%201%20Rising,isolated%20...%208%20Bumpy%20transition%20to%20practice%20
33. American Medical Association. AMA examines decade of change in physician practice ownership and organization. July 12, 2023. Accessed 10/23/2024. www.ama-assn.org/press-center/press-releases/ama-examines-decade-change-physician-practice-ownership-and#:~:text=Based%20on%20data%20collected%20between%202012%20and%202022,practices%20are%2-0sold%20to%20hospitals%20or%20health%20systems.
34. Henry TA. American Medical Association. Is private practice collapsing? Congress can help stem the tide. August 23, 2023. Accessed 10/23/2024. www.ama-assn.org/practice-management/private-practices/private-practice-collapsing-congress-can-help-stem-tide#:~:text=%E2%80%9CThe%20fabric%20of%20our%20health%20care%20system%2C%20woven,Private%20Practice%3A%20Examining%20the%20Challenges%20Facing%20Independent%20Medicine.%E2%80%9D
35. Rakshit S, Wager E, Cox C, Hughes-Cromwick P, Amin K. How does medical inflation compare to inflation in the rest of the economy? KFF, May 17, 2024. Accessed 10/23/2024. www.kff.org/health-costs/issue-brief/how-does-medical-inflation-compare-to-inflation-in-the-rest-of-the-economy/#:~:text=Inflation%20in%20medical%20care%20prices%20and%20overall%20health,grew%20much%20more%20rapidly%20than%20in%20the%20past.
36. Physicians Advocacy Institute. PAI-Avalere Report on Physician Employment Trends and Practice Acquisitions in 2019-21: Key Research Findings. Accessed 10/14/2024. www.physiciansadvocacyinstitute.org/Portals/0/assets/docs/PAI-Research/Key%20Findings%20-%20Physician%20Employment%20Trends%20Study%202019-21%20Key%20Findings.pdf?ver=mDlkytCMEj2KIs___eFTdw%3d%3d
37. Medical Group Management Association. Provider Compensation and Productivity Data Report. May 2024. Accessed 10/14/2024. www.mgma.com/getkaiasset/252744ee-c63b-4a96-9211-8a5d6b908b39/MGMA-2024-Provider-Compensation-Data-Report.pdf?_gl=1*1gzsra5*_ga*MjAyODQ0MDc4MC4xNzE2OTA3NTAy*_ga_DT1SR7HF62*MTcxNjkwNzUwMS4xLjEuMTcxNjkwNzUzNy4yNC4wLjA
38. American Medical Association. 3 top reasons why doctors are selling their practices to hospitals. August 23, 2023. Accessed 10/14/2024. www.ama-assn.org/practice-management/private-practices/3-top-reasons-why-doctors-are-selling-their-practices#:~:text=In%20fact%2C%20almost%2080%25%20of,a%20hospital%20or%20health%20system.
39. Bono MJ, Wermuth HR, Hipskind JE. Medical Malpractice. [Updated 2022 Oct 31]. In: *StatPearls [Internet]*. Treasure Island (FL): StatPearls Publishing; 2024 Jan-
40. Rathmell JP, Michna E, Fitzgibbon DR, Stephens LS, Posner KL, Domino KB. Injury and liability associated with cervical procedures for chronic pain. *Anesthesiology* 2011; 114:918-926.
41. Abrecht CR, Saba R, Greenberg P, Rathmell JP, Urman RD. A contemporary medicolegal analysis of outpatient interventional pain procedures: 2009-2016. *Anesth Analg* 2019; 129:255-262.
42. Tironi FA, Pollanen MS. Iatrogenic needle penetrating injury of cervical spinal cord: A case of fatal therapeutic complication. *Forensic Sci Med Pathol* 2024 Oct 9. Epub ahead of print.
43. CGS Administrators, LLC. *Local Coverage Determination (LCD). Epidural Steroid Injections for Pain Management (L39015).* Revision Effective Date: 11/09/2023.
44. United Healthcare Commercial and Individual Exchange Medical Policy. Epidural steroid injections for spinal pain. Policy Number: 2024T0616I. Effective Date: July 1, 2024. Accessed 10/3/2024. www.uhcprovider.com/content/dam/provider/docs/public/policies/comm-medical-drug/epidural-steroid-injections-spinal-pain.pdf
45. United Healthcare Commercial and Individual Exchange Medical Policy. Facet joint and medial branch block injections for spinal pain. Policy Number: 2024T0004RR. Effective Date: May 1, 2024. Accessed 10/3/2024. www.uhcprovider.com/content/dam/provider/docs/public/policies/comm-medical-drug/facet-joint-injections-spinal-pain.pdf
46. AIM Specialty Health. Appropriate Use Criteria: Interventional Pain Management (MSK01-0423.1). Version Creation Date: 12/01/2022, Effective Date: 04/09/2023. Accessed 10/3/2024. https://files.providernews.anthem.com/1994/AIM-Interventional-Pain-Management.pdf#:~:text=Reporting%20of%20symptom%20severity:%20Severity%20of%20pain%20and
47. Aetna. Clinical Policy Bulletin: Back Pain – Invasive Procedures. Number: 0016. Effective 07/31/1995, Last reviewed 08/06/2024. Accessed 10/3/2024. https://es.aetna.com/cpb/medical/data/1_99/0016.html#:~:text=Policy%20Scope%20of%20Policy.%20This%20Clinical%20Policy%20Bulletin
48. eviCORE Clinical Guidelines. Cigna Medical Coverage Policies – Musculoskeletal Epidural Steroid Injections. CMM-200: Epidural steroid injections (ESI). Effective May 31, 2023. Accessed 10/18/2024. www.evicore.com/sites/default/files/clinical-guidelines/2023-08/Cigna_CMM-200_Epidural_Steroid_Injections_V102023_eff05312023_pub02162023.pdf
49. Milliman Care Guidelines (MCG) Industry-Leading Evidence-Based Care Guidelines. Accessed November 5, 2024. www.mcg.com/care-guidelines/care-guidelines/
50. Carelon Insights. Carelon Medical Benefits Management: Specialty care (Formerly AIM Specialty Health). Accessed 11/8/2024. www.carelon.com/capabilities/medical-benefits-management
51. Hill-Oliva M, Ampen-Darko KK,

Shekane P, et al. The use of telemedicine in outpatient pain management: A scoping review. *Pain Physician* 2023; 26:535-548.

52. Godbout-Parent M, Spilak T, Pagé MG, et al. The calm after the storm: A state-of-the-art review about recommendations put forward during the COVID-19 pandemic to improve chronic pain management. *J Clin Med* 2023; 12:7233.
53. Berg S. American Medical Association. The 12 factors that drive up physician burnout. May 28, 2020. Accessed 10/23/2024. www.ama-assn.org/practice-management/physician-health/12-factors-drive-physician-burnout
54. Alkhamees AA, Aljohani MS, Kalani S, et al. Physician's burnout during the COVID-19 pandemic: A systematic review and meta-analysis. *Int J Environ Res Public Health* 2023; 20:4598.
55. Mithani M, Benhamroun-Zbili J, Bloomfield A, et al. Cross-sectional study evaluating clinical & psychological impact of limited access to healthcare in chronic pain patients during the COVID-19 pandemic. *Pain Physician* 2022; 25:427-439.
56. Fiore JA, Madison AJ, Poisal JA, et al. National health expenditure projections, 2023-32: Payer trends diverge as pandemic-related policies fade. *Health Aff (Millwood)* 2024; 43:910-921.
57. Hartman M, Martin AB, Whittle L, Catlin A; National Health Expenditure Accounts Team. National health care spending in 2022: Growth similar to prepandemic rates. *Health Aff (Millwood)* 2024; 43:6-17.
58. Centers for Medicare and Medicaid Services. Office of the Actuary. National health expenditures 2022 highlights. December 13, 2023. Accessed 9/30/2024. www.cms.gov/newsroom/fact-sheets/national-health-expenditures-2022-highlights#:~:text=Spending%20for%20other%20health,%20residential,%20and%20personal%20care
59. Dieleman JL, Baral R, Birger M, et al. US spending on personal health care and public health, 1996-2013. *JAMA* 2016; 316:2627-2646.
60. Dieleman JL, Cao J, Chapin A, et al. US health care spending by payer and health condition, 1996-2016. *JAMA* 2020; 323:863-884.
61. Vandenbroucke JP, von Elm E, Altman DG, et al; STROBE Initiative. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): Explanation and elaboration. *Epidemiology* 2007; 18:805-835.
62. Centers for Medicare and Medicaid Services. Accessed 10/3/2024.

Appendix Table 1. *Characteristics of Medicare beneficiaries and epidural procedures excluding percutaneous adhesiolysis, continuous epidurals, and neurolytic epidurals.*

Year	U.S. Population		Medicare Beneficiaries		Epidural Services*					
	In thousands	Percentage of >= 65 years old	In thousands	Percentage of >= 65 years old	Services (all codes)	Rate	PCPY	Services (Primary codes only)	Rate	PCPY
Y2000	282,172	12.40%	39,632	86.50%	839,474	2,118		792,563	2,000	
Y2001	285,040	12.40%	40,045	86.10%	989,034	2,470	16.6%	927,364	2,316	15.8%
Y2002	288,369	12.30%	40,503	85.70%	1,172,248	2,894	17.2%	1,082,298	2,672	15.4%
Y2003	290,211	12.40%	41,126	85.20%	1,342,829	3,265	12.8%	1,213,014	2,950	10.4%
Y2004	292,892	12.40%	41,729	84.70%	1,611,887	3,863	18.3%	1,397,749	3,350	13.6%
Y2005	295,561	12.40%	42,496	84.20%	1,747,771	4,113	6.5%	1,510,354	3,554	6.1%
Y2006	299,395	12.40%	43,339	83.80%	1,844,182	4,255	3.5%	1,575,656	3,636	2.3%
Y2007	301,290	12.60%	44,263	83.50%	1,915,227	4,327	1.7%	1,618,656	3,657	0.6%
Y2008	304,056	12.80%	45,412	83.40%	2,017,132	4,442	2.7%	1,675,681	3,690	0.9%
Y2009	307,006	12.90%	45,801	83.35%	2,112,511	4,612	3.8%	1,733,339	3,785	2.6%
Y2010	308,746	13.00%	46,914	83.11%	2,205,307	4,701	1.9%	1,792,291	3,820	0.9%
Y2011	311,583	13.28%	48,300	82.82%	2,289,213	4,740	0.8%	1,864,066	3,859	1.0%
Y2012	313,874	13.75%	50,300	83.30%	2,304,993	4,582	-3.3%	1,892,951	3,763	-2.5%
Y2013	316,129	14.14%	51,900	83.04%	2,259,887	4,354	-5.0%	1,854,380	3,573	-5.1%
Y2014	318,892	14.48%	53,500	83.36%	2,255,668	4,216	-3.2%	1,826,336	3,414	-4.5%
y2015	320,897	14.88%	54,900	83.79%	2,276,267	4,146	-1.7%	1,845,604	3,362	-1.5%
Y2016	323,127	15.24%	56,500	84.07%	2,316,285	4,100	-1.1%	1,882,269	3,331	-0.9%
Y2017	326,625	15.63%	58,000	84.83%	2,247,240	3,875	-5.5%	1,835,796	3,165	-5.0%
Y2018	327,167	16.00%	59,600	85.23%	2,186,893	3,669	-5.3%	1,788,915	3,002	-5.2%
Y2019	328,293	16.47%	61,200	85.95%	2,184,917	3,570	-2.7%	1,784,870	2,916	-2.8%
Y2020	331,002	16.90%	62,600	86.42%	1,810,884	2,893	-19.0%	1,473,789	2,354	-19.3%
Y2021	332,049	16.83%	63,400	86.91%	1,928,978	3,043	5.2%	1,575,384	2,485	5.5%
Y2022	333,272	17.24%	64,700	87.64%	1,738,530	2,687	-11.7%	1,432,658	2,214	-10.9%
2000-2022	18.1%		63.3%		107.1%	26.9%		80.8%	10.7%	
GM	0.8%		2.3%		3.4%	1.1%		2.7%	0.5%	
2000-2010	9.4%		18.4%		162.7%	121.9%		126.1%	91.0%	
GM	0.9%		1.7%		10.1%	8.3%		8.5%	6.7%	
2010-2019	6.3%		30.5%		-0.9%	-24.1%		-0.4%	-23.7%	
GM	0.7%		3.0%		-0.1%	-3.0%		-0.05%	-3.0%	
2019-2022	1.5%		5.7%		-20.4%	-24.7%		-19.7%	-24.1%	
GM	0.5%		1.9%		-7.3%	-9.0%		-7.1%	-8.8%	
2019-2020	0.8%		2.3%		-17.1%	-19.0%		-17.4%	-19.3%	
2020-2021	0.3%		1.3%		6.5%	5.2%		6.9%	5.5%	
2021-2022	0.4%		2.1%		-9.9%	-11.7%		-9.1%	-10.9%	

Rate – Rate per 100,000 Medicare beneficiaries, GM - Geometric average change

Epidural Services = 62310, 62320, 62321 C/T or interlaminar epidural injections; 62311, 62322, 62323-L/S interlaminar epidural injections; 64479-C/T transforaminal epidural injections; 64480- C/T transforaminal epidural injections add-on; 64483-L/S transforaminal epidural injections; 64484-L/S transforaminal epidural injections add-on

Appendix Table 2. *Utilizations of epidural injections in the fee-for-service Medicare population from 2000-2022.*

HCPCS	Cervical/ Thoracic Interlaminar Epidurals (CPT 62310, 62320, 62321)		Lumbar Interlaminar and Caudal Epidurals (CPT 62311, 62322, 62323)		Cervical/Thoracic Transforaminal Epidurals (CPT 64479,64480)				Lumbar/Sacral Transforaminal Epidurals (CPT 64483, 64484)			
	Services	Rate	Services	Rate	CPT 64479 Services	CPT 64480 Services	Total Services	Rate	CPT 64483 Services	CPT 64484 Services	Total Services	Rate
2000	75,741	191	618,362	1,560	13,454	9,434	22,888	58	85,006	37,477	122,483	309
2001	84,385	211	702,713	1,755	14,732	8,537	23,269	58	125,534	53,133	178,667	446
2002	99,117	245	786,919	1,943	18,583	10,835	29,418	73	177,679	79,115	256,794	634
2003	109,783	267	838,858	2,040	21,882	15,769	37,651	92	242,491	114,046	356,537	867
2004	130,649	313	878,174	2,104	25,182	18,094	43,276	104	363,744	196,044	559,788	1,341
2005	141,652	333	945,350	2,225	27,844	20,525	48,369	114	395,508	216,892	612,400	1,441
2006	146,748	339	946,961	2,185	29,822	23,073	52,895	122	452,125	245,453	697,578	1,610
2007	156,415	353	926,029	2,092	29,938	22,266	52,204	118	506,274	274,305	780,579	1,764
2008	165,636	365	905,419	1,994	32,286	24,003	56,289	124	572,340	317,448	889,788	1,959
2009	175,503	383	888,166	1,939	37,012	27,487	64,499	141	632,658	351,685	984,343	2,149
2010	184,750	394	888,421	1,894	40,003	29,888	69,891	149	679,117	383,128	1,062,245	2,264
2011	200,134	414	914,324	1,893	38,970	26,628	65,598	136	710,638	398,519	1,109,157	2,296
2012	213,390	424	925,179	1,839	35,945	21,293	57,238	114	718,437	390,749	1,109,186	2,205
2013	217,393	419	901,468	1,737	34,699	20,409	55,108	106	700,820	385,098	1,085,918	2,092
2014	208,741	390	815,858	1,525	37,944	21,587	59,531	111	763,793	407,745	1,171,538	2,190
2015	215,897	393	820,227	1,494	37,855	21,115	58,970	107	771,625	409,548	1,181,173	2,151
2016	224,118	397	824,822	1,460	38,741	20,467	59,208	105	794,588	413,549	1,208,137	2,138
2017	223,060	385	788,456	1,359	37,648	18,915	56,563	98	786,632	392,529	1,179,161	2,033
2018	220,470	370	751,846	1,261	37,184	17,251	54,435	91	779,415	380,727	1,160,142	1,947
2019	221,462	362	737,394	1,205	37,129	16,919	54,048	88	788,885	383,128	1,172,013	1,915
2020	183,699	293	596,369	953	30,948	14,201	45,149	72	662,773	322,894	985,667	1,575
Y2021	195,792	309	631,676	996	33,041	14,667	47,708	75	714,875	338,927	1,053,802	1,662
Y2022	177,504	274	569,962	881	29,398	11,599	40,997	63	655,794	294,273	950,667	1,468
Change from												
2000-2022	134.4%	43.6%	-7.8%	-43.5%	118.5%	22.9%	79.1%	9.7%	671.5%	685.2%	675.7%	375.1%
GM	3.9%	1.7%	-0.4%	-2.6%	3.6%	0.9%	2.7%	0.4%	9.7%	9.8%	9.8%	7.3%
2000-2010	143.9%	106.1%	43.7%	21.4%	197.3%	216.8%	205.4%	158.0%	698.9%	922.3%	767.3%	632.6%
GM	9.3%	7.5%	3.7%	2.0%	11.5%	12.2%	11.8%	9.9%	23.1%	26.2%	24.1%	22.0%
2010-2019	19.9%	-8.1%	-17.0%	-36.4%	-7.2%	-43.4%	-22.7%	-40.7%	16.2%	0.0%	10.3%	-15.4%
Change	2.0%	-0.9%	-2.0%	-4.9%	-0.8%	-6.1%	-2.8%	-5.6%	1.7%	0.0%	1.1%	-1.8%
2019-2022	-19.8%	-24.2%	-22.7%	-26.9%	-20.8%	-31.4%	-24.1%	-28.3%	-16.9%	-23.2%	-18.9%	-23.3%
GM	-7.1%	-8.8%	-8.2%	-9.9%	-7.5%	-11.8%	-8.8%	-10.5%	-6.0%	-8.4%	-6.8%	-8.5%

Appendix Table 2 cont. *Utilizations of epidural injections in the fee-for-service Medicare population from 2000-2022.*

HCPCS	Cervical/ Thoracic Interlaminar Epidurals (CPT 62310, 62320, 62321)		Lumbar Interlaminar and Caudal Epidurals (CPT 62311, 62322, 62323)		Cervical/Thoracic Transforaminal Epidurals (CPT 64479,64480)				Lumbar/Sacral Transforaminal Epidurals (CPT 64483, 64484)			
	Services	Rate	Services	Rate	CPT 64479 Services	CPT 64480 Services	Total Services	Rate	CPT 64483 Services	CPT 64484 Services	Total Services	Rate
2019-2020	-17.1%	-18.9%	-19.1%	-20.9%	-16.6%	-16.1%	-16.5%	-18.3%	-16.0%	-15.7%	-15.9%	-17.8%
2020-2021	6.6%	5.2%	5.9%	4.6%	6.8%	3.3%	5.7%	4.3%	7.9%	5.0%	6.9%	5.6%
2021-2022	-9.3%	-11.2%	-9.8%	-11.6%	-11.0%	-20.9%	-14.1%	-15.8%	-8.3%	-13.2%	-9.8%	-11.7%