Are Medicare Local Coverage Determinations Both Life-saving and Cost-saving?

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Abstract

Medicare provides coverage for items and services for over 55 million beneficiaries. In the absence of a national coverage policy, an item or service may be covered at the discretion of an Medicare Administrative Contractor based on a local coverage determination (LCD). Most Medicare coverage decisions are made locally.

Issuance of LCDs by MACs may affect health care utilization and outcomes in several different ways. Previous authors have argued that application of coverage policy should be a potent tool for controlling expenditures, and if coverage policy is well-designed, it should promote the use of effective forms of medical care while avoiding ineffective, inappropriate care.

This study examines the impact of LCDs on medical procedure utilization using 2013-2023 state-level data on thousands of procedures (including procedures that were not subject to LCDs). It also examines their impact on mortality during 2014-2024, by state and disease. In both cases, we employ 2-way fixed-effects analyses of long-run changes in the dependent variable (utilization or mortality). The relative amount of LCD activity (e.g., across procedures and diseases) during 2014-2024 varied considerably across states.

The greater the number of procedures covered by LCDs issued for a disease in a state after 2014, the fewer the number of deaths from that disease in that state in 2024, controlling for the number of deaths from that disease in that state in 2014, state fixed effects, and disease fixed effects. The LCDs issued during 2015-2021 are estimated to have reduced the number of 2024 deaths by about 222 thousand (9%).

We estimate that issuance of at least one LCD covering a procedure in a state during 2015-2023 reduced the number of times that procedure was provided in that state in 2023 by about 7% controlling for the number of times that procedure was provided in that state in 2013, procedure fixed effects, and state fixed effects. The fraction of procedure-state pairs that were covered by at least one LCD issued during 2015-2023 was 15.3%, so we estimate that LCDs issued during 2015-2023 reduced the total number of procedures provided in 2023 by 1.1%.

The evidence is consistent with the hypothesis that LCDs promoted the use of effective forms of medical care while avoiding ineffective, inappropriate care.

1. Introduction

Medicare provides coverage for items and services for over 55 million beneficiaries. The Medicare statute states that items and services provided to beneficiaries must be "reasonable and necessary" to be covered for reimbursement to physicians, hospitals, and other providers. Although the Medicare program may determine in specific cases whether a particular item or service was reasonable and necessary, it also issues policies, called coverage determinations, to instruct carriers and other intermediaries regarding reimbursement to providers.

There are two types of coverage determinations: national and local. A National coverage determination (NCD) is a decision made by the Centers for Medicare and Medicaid Services (CMS) regarding whether a particular medical service, procedure, or technology will be covered under Medicare. This determination establishes a nationwide policy that applies to all Medicare beneficiaries and ensures uniform coverage across the US.

In the absence of a national coverage policy, an item or service may be covered at the discretion of a Medicare Administrative Contractor (MAC) based on a local coverage determination (LCD). LCDs may be developed in the absence of an NCD or as a supplement to an NCD if the LCD policy does not conflict with national policy. This determination establishes a policy that applies to all Medicare beneficiaries within the MAC jurisdiction and ensures uniform coverage within the jurisdiction.

According to CMS, "most Medicare coverage decisions are made locally by the MACs," and "the vast majority of coverage is provided on a local level and developed by clinicians at the contractors that pay Medicare claims" (Centers for Medicare & Medicaid Services (2026a, 2026b)). Similarly, Moneer et al (2024) noted that "local coverage determinations…represent the vast majority of Medicare's coverage decisions for new technologies." Garber (2008) also noted that "most Medicare coverage policy is local; in fiscal year 2005, for example, CMS only implemented 15 national coverage decisions (Norwalk (2007)), while literally thousands of coverage decisions were made locally." Garber also said that "this regional variation…offers an important empirical benefit to researchers. It provides an opportunity to learn what effects coverage policy has on utilization…"

Issuance of LCDs by MACs may affect health care utilization and outcomes in several different ways. Garber (2008) wrote that "application of coverage policy should…be a potent

tool for controlling expenditures, and if coverage policy is well-designed, it should promote the use of effective forms of medical care while avoiding ineffective, inappropriate care." One MAC noted that two of the reasons for developing LCDs are to define the appropriate use of new technologies, and to address services with an abuse history or potential (WPS Government Services (2025)). The American Society of Clinical Oncology (2007) wrote that "the principal function of an LCD is to advise providers and practitioners when particular items and services will *not* be considered reasonable and necessary" (emphasis added).[1] The policies may also make clear when coverage is available. According to the Medicare Program Integrity Manual, LCDs can be issued when there is a validated widespread problem involving high dollar or high-volume services; an LCD is necessary to assure beneficiary access to care; or frequent denials are issued or anticipated as a result of post-payment claims review.

Foote et al (2008) argued that issuance of an LCD could have either a negative or a positive impact on utilization. They noted that, for a procedure that had already been covered, a decision to restrict coverage to a narrow set of medical indications would be expected to lead to a drop in utilization, but if coverage is ambiguous, issuance of a formal coverage determination might actually lead to increased utilization. To determine whether Medicare coverage policies affected utilization of services, they analyzed data on eight different procedures. They found that in only one case (transesophageal echocardiography) out of eight did utilization change (it was reduced by 13.6 percent) after the effective date of the local policies. They found no systematic pattern that policies affect utilization, and the type of coverage policy did not seem to play an important role in its impact.

This study will reexamine the impact of LCDs on medical procedure utilization using more recent (2013-2023) state-level data on thousands of procedures (including procedures that were not subject to LCDs). In addition to examining the impact of LCDs on medical procedure utilization, we will examine their impact on mortality during 2014-2024, by state and disease. In both cases, we will employ 2-way fixed-effects analyses of long-run changes in the dependent variable (utilization or mortality). We will analyze the effect of LCDs related to a procedure in a state during 2015-2023 on utilization of that procedure in 2023, controlling for utilization in

[1] This may be an exaggeration. In the Current and Retired Articles section of the Medicare Coverage Database (discussed below), the number of covered indications (497,838) is almost seven times as large as the number of noncovered indications (73,366).

2014, procedure fixed effects, and state fixed effects. We will also analyze the effect of LCDs related to a disease in a state during 2015-2024 on mortality from that disease in that state in 2024, controlling for mortality in 2014, disease fixed effects, and state fixed effects.

The 2-way fixed effects (or difference-in-differences) approach is feasible because the relative amount of LCD activity (e.g., across diseases) during 2014-2024 varied across states. That is illustrated by Figure 1, which shows the number of procedures (HCPCS codes) covered for 4 diseases in LCDs in Florida and Wisconsin.[2] For two of the diseases (prostate and ovarian cancer), the number of procedures covered in Wisconsin was much greater than the number covered in Florida. For the other two diseases (atherosclerosis and "other tuberculosis"), the number of procedures covered in Florida was much greater than the number covered in Wisconsin.

2. Data sources

LCD data. Data on LCDs during the period 2015-2024 were obtained from the Current and Retired Articles section of the Medicare Coverage Database (Centers for Medicare and Medicaid Services (2026c, 2026d)). Local Coverage Determinations began in the early 1990s. They were called Local Medical Review Policies, (LMRPs). In 2003, LMRPs were renamed Local Coverage Determinations (LCDs). Articles prior to 2015 are not included in the Current and Retired Articles section of the Medicare Coverage Database because, on October 1, 2015, the healthcare industry transitioned from ICD-9 to ICD-10 codes for diagnoses and inpatient procedures. Articles published before this date reference ICD-9 codes, which are no longer in use.

The database contains information about 2482 "articles." The number of articles, by year of publication, are shown in Appendix Figure 1. For unknown reasons, the number of articles published in 2015 and 2019 were much higher than the number published in other years. The following information is provided about each article:

- The date the article was published
- The contractor responsible for the article

[2] The numbers of procedures covered for all diseases in LCDs for the two states were similar.

- The contractor's jurisdiction (state(s))
- The procedures (HCPCS codes[3]) contained in the article
- The ICD-10-CM diagnosis codes covered for each procedure

The database contains 5.98 million links between 3404 HCPCS codes and 7344 (narrowly-defined) diseases. 29% of the HCPCS codes were introduced before 1990; 41% were introduced before 2000; and 56% were introduced before 2010.[4]

Garber (2008) said that there are three types of coverage determinations: new technology (NT) policies and technology extension (TE) policies, both of which might be expected to increase utilization, by identifying initial or expanded uses for a procedure or other technology, and utilization management (UM) policies, which are explicitly targeted toward reducing the use of specified procedures and services. Unfortunately, our database does not enable us to determine the type of each LCD.

Mortality data. Data on the number of deaths after age 64 in 2014, by state and cause, were obtained from the Centers for Disease Control's (2026a) Multiple Cause of Death, 1999-2020 database. Data on the number of deaths after age 64 in 2024, by state and cause, were obtained from the Centers for Disease Control's (2026b) Multiple Cause of Death, 2018-2024 database. The cause of death classification we used was the 113-Category Underlying Cause of Death Classification (see Wisconsin Department of Health Services (2026)).[5]

We will analyze just one measure of mortality: the number of deaths, by state and cause. If we had unfettered access to the data, we would analyze additional indicators, e.g. mean age at death and the number of life-years lost before ages 75 and 85. However, constructing these indicators requires data on the number of deaths, by state, *age*, and cause. Although the mortality databases contain such data (even by single year of age), statistics representing fewer than ten deaths (1-9) are suppressed. Data on deaths by state, age, and cause would be suppressed far more often than data on deaths by state and cause.

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[3] The Healthcare Common Procedure Coding System (HCPCS) was established in 1978 by the Federal government to standardize the reporting of medical services, supplies, and equipment, essentially creating a unified system for medical billing across different healthcare providers and payers. While initially voluntary, the Health Insurance Portability and Accountability Act (HIPAA) of 1996 made the use of HCPCS codes mandatory for all healthcare transactions (see Applied Policy (2024)).

[4] Data on the vintage of HCPCS codes were obtained from Centers for Medicare and Medicaid Services (2026e).

[5] The 7344 (narrowly-defined) diseases appearing in the LCD database were aggregated to the 113-category Underlying Cause of Death Classification.

Utilization data. Data on utilization (the number of services provided to Original Medicare (fee-for-service) Part B (Medical Insurance) beneficiaries by physicians and other healthcare professionals), in 2014 and 2023[6], by HCPCS and state, were obtained from the Medicare Physician & Other Practitioners - by Geography and Service database (Centers for Medicare and Medicaid Services (2026d)). Most HCPCS procedures are used to treat many diseases. Although CMS publishes data on total utilization of each procedure in each state, it does not publish data on utilization of each procedure by disease.

3. Econometric models and descriptive statistics

To examine the impact of LCDs on mortality during 2014-2024, by disease (cause of death) and state, we will estimate the following model:[7]

$$\ln(n_deaths_{cs,2024}) = \beta_k \ln(n_hcpcs_{cs,2024-k}) + \gamma \ln(n_deaths_{cs,2014}) + \alpha_c + \pi_s + \varepsilon_{cs} \qquad (1)$$

where

$n_deaths_{cs,2024}$ = the number of deaths after age 64 due to underlying cause c in state s in 2024

$n_hcpcs_{cs,2024-k}$ = the number of procedures covered for underlying cause c in state s that were included in articles published between 2015 and (2024 – k), k = 0, 1, 2, …, 5

$n_deaths_{cs,2014}$ = the number of deaths after age 64 due to underlying cause c in state s in 2014

α_c = a fixed effect for underlying cause c

π_s = a fixed effect for state s

Eq. (1) allows the effect of the number of procedures covered by LCDs on the number of 2024 deaths to be subject to a lag of up to 5 years. The disturbances of eq. (1) will be clustered within states.

Statistics describing the data used to estimate eq. (1) are shown in Table 1. The dataset contains 3082 observations, covering 81 diseases[8] in 51 regions (50 states plus the District of

[6] The most recent data available are for 2023.

[7] Estimates of β_k from eq. (1) are identical to estimates of β_k from the following model of mortality *growth*: $\ln(n_deaths_{cs,2024}/n_deaths_{cs,2014}) = \beta_k \ln(n_hcpcs_{cs,2024-k}) + (\gamma - 1) \ln(n_deaths_{cs,2014}) + \alpha_c + \pi_s + \varepsilon_{cs}$.

[8] Some of the causes of death in the 113-cause list are aggregates of more detailed causes.

Columbia), accounting for 1.84 million deaths in 2014 and 2.23 million deaths in 2024. The covered deaths in 2024 are 95% of all 2.34 million deaths after age 64 in that year, which indicates that the suppression of statistics representing fewer than ten deaths does not pose a significant problem. The mean number of covered procedures that were included in articles published during 2015-2024 is 132.3—20% higher than the mean number of covered procedures that were included in articles published during 2015-2019 (109.9).

To examine the impact of LCDs on procedure utilization during 2013-2023, by procedure and state, we will estimate the following model:

$$\ln(n_services_{ps,2023}) = \beta_k \, lcd_{ps,2023-k} + \gamma \ln(n_services_{ps,2013}) + \delta_p + \pi_s + \varepsilon_{cs} \qquad (2)$$

where

$n_services_{ps,2023}$ = the number of times procedure p was provided in state s in 2023

$lcd_{ps,2023-k}$ = 1 if there was at least one LCD covering procedure p in state s between 2015 and (2023 – k), k = 0, 1, 2, …, 4

= 0 otherwise

$n_services_{ps,2013}$ = the number of times procedure p was provided in state s in 2013

δ_p = a fixed effect for procedure p

Statistics describing the data used to estimate eq. (2) are shown in Table 2. The dataset contains 149,969 observations, covering 5910 procedures in 51 regions, accounting for 2.32 billion services in 2013 and 2.20 billion services in 2023. The fraction of procedure-state pairs that were covered by at least one LCD issued during 2015-2023 was 15.3%, slightly higher than the fraction of procedure-state pairs that were covered by at least one LCD issued during 2015-2019: 14.7%.

4. Empirical results

Estimates of β_k from eq. (1) are shown in Table 3. Each estimate is from a separate model. Eq. (1) includes 51 state fixed effects and 80 disease fixed effects. The number of observations ranges between 3082 (when k=0 or k=1) and 2963 (when k=5). To assess the effect

of clustering of disturbances on the standard errors of the estimates[9], we estimated the models in 3 different ways: without clustering, clustering within states, and clustering within diseases.

As shown in Panel A of Table 3, the estimates of β_k range between -.023 (when k = 3) and -.016 (when k = 5).[10] As shown in Panel B, when disturbances are not clustered, all 6 estimates of β_k are highly significant (p-value $\leq$ .0076). As shown in Panel C, when disturbances are clustered within states, the standard errors increase by between 5% and 31%, but all 6 estimates of β_k remain significant (p-value $\leq$ .0343). As shown in Panel D, when disturbances are clustered within diseases, the standard errors are between 37% and 53% higher than the unclustered estimates. All 6 estimates of β_k remain at least marginally significant (p-value $\leq$ .0526), and the p-values of the estimates of β_2 and β_3 are less than or equal to .0386.

Overall, the estimates of eq. (1) indicate that, the greater the number of HCPCS codes covered by LCDs issued for a disease in a state after 2014, the fewer the number of deaths from that disease in that state in 2024, controlling for the number of deaths from that disease in that state in 2014, state fixed effects, and disease fixed effects. The sample mean value of $\ln(n_hcpcs_{cs,2021})$ is 4.20. The estimate of β_3 (-0.023) therefore implies that, on average, the log-change in the number of 2024 deaths due to the LCDs issued during 2015-2021 was about -9%: β_3 * mean($\ln(n_hcpcs_{cs,2021})$) = -0.023 * 4.20 = -0.095. As shown in Table 1, there were 2.23 million deaths after age 64 in 2024. If the number of 2024 deaths had not been reduced by 9%, the number of 2024 deaths would have been about 10% higher: 2.45 million. Therefore, the estimate implies that the LCDs issued during 2015-2021 reduced the number of 2024 deaths by about 222 thousand, *ceteris paribus*.

Estimates of β_k from eq. (2) are shown in Table 4. Once again, each estimate is from a separate model. Eq. (2) includes 5963 HCPCS fixed effects and 51 state fixed effects. The estimates shown in Table 4 are from models in which the disturbances are not clustered. The estimates of β_k range between -.072 (when k = 0) and -.069 (when k = 4) and are highly significant (p-value < .0001).

Due to the extremely large number of HCPCS fixed effects, clustering of the disturbances of this model is not feasible. Clustering would be likely to increase the standard errors, but the

[9] Clustering has no effect on the point estimates of β_k.

[10] To conserve space, Table 3 does not display estimates of the coefficient of $\ln(n_deaths_{cs,2014})$. Estimates of this coefficient were generally equal to about 0.62 and were highly significant (Z-value = 18.7).

coefficients would remain significant even if the standard errors were quadrupled. Clustering of the disturbances of the mortality model (eq. (1)) increased the standard errors much less than that, by no more than 53%.

The estimates of eq. (2) indicate that issuance of at least one LCD covering a procedure in a state during 2015-2023 reduced the number of times that procedure was provided in that state in 2023 by about 7% controlling for the number of times that procedure was provided in that state in 2013, procedure fixed effects, and state fixed effects. As noted above, the fraction of procedure-state pairs that were covered by at least one LCD issued during 2015-2023 was 15.3%. Therefore, we estimate that LCDs issued during 2015-2023 reduced the total number of procedures provided in 2023 by 1.1% (= 15.3% * 7%).

5. Summary

Medicare provides coverage for items and services for over 55 million beneficiaries. In the absence of a national coverage policy, an item or service may be covered at the discretion of the Medicare Administrative Contractor based on a local coverage determination (LCD). Most Medicare coverage decisions are made locally.

Issuance of LCDs by MACs may affect health care utilization and outcomes in several different ways. Previous authors have argued that application of coverage policy should be a potent tool for controlling expenditures, and if coverage policy is well-designed, it should promote the use of effective forms of medical care while avoiding ineffective, inappropriate care.

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The evidence is consistent with the hypothesis that LCDs promoted the use of effective forms of medical care while avoiding ineffective, inappropriate care.

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Figure 1
Number of HCPCS covered for 4 diseases in LCDs issued during 2015-2024:
Florida versus Wisconsin

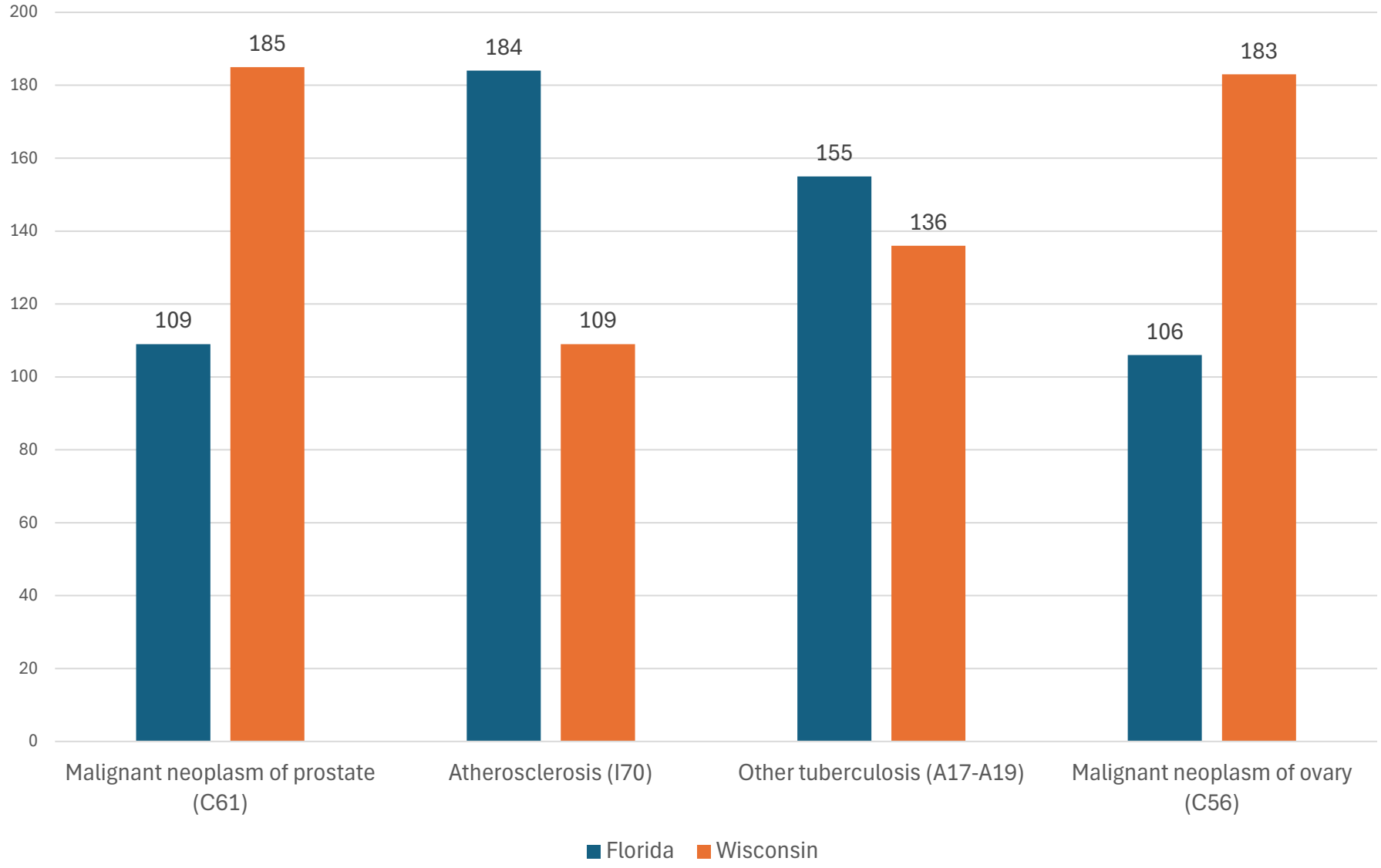


Table 1

Descriptive statistics: mortality analysis

Variable	N	N > 0	Sum	Mean	Minimum	Maximum
$n_deaths_{cs,2014}$	3082	3082	1,842,093	597.7	10	18,403
$n_deaths_{cs,2024}$	3082	3082	2,225,318	722.0	10	25,852
$n_hcpcs_{cs,2024}$	3082	3082	407,651	132.3	1	1,302
$n_hcpcs_{cs,2023}$	3082	3082	405,059	131.4	1	1,259
$n_hcpcs_{cs,2022}$	3082	3075	394,130	127.9	0	1,203
$n_hcpcs_{cs,2021}$	3082	3018	368,773	119.7	0	1,160
$n_hcpcs_{cs,2020}$	3082	2970	355,673	115.4	0	1,136
$n_hcpcs_{cs,2019}$	3082	2963	338,802	109.9	0	1,095

Table 2

Descriptive statistics: utilization analysis

Variable	N	Sum	Mean	Minimum	Maximum
$n_services_{cs,2013}$	149,969	2,317,723,564	15,455	11	17,899,288
$n_services_{ps,2023}$	149,969	2,196,563,940	14,647	11	16,584,563
$lcd_{ps,2023}$	149,969	22,966	0.153	0	1
$lcd_{ps,2022}$	149,969	22,771	0.152	0	1
$lcd_{ps,2021}$	149,969	22,670	0.151	0	1
$lcd_{ps,2020}$	149,969	22,097	0.147	0	1
$lcd_{ps,2019}$	149,969	22,012	0.147	0	1

Table 3

Estimates of β_k from eq. (1):

$$\ln(n_deaths_{cs,2024}) = \beta_k \ln(n_hcpcs_{cs,2024-k}) + \gamma \ln(n_deaths_{cs,2014}) + \alpha_c + \pi_s + \varepsilon_{cs}$$

A. All models				B. Unclustered				C. Cluster by state				D. Cluster by disease		
lag (k)	Number of obs.	Estimate		Std. Err.	Z	Pr > |Z|		Std. Err.	Z	Pr > |Z|		Std. Err.	Z	Pr > |Z|
0	3082	-0.021		**0.008**	**-2.67**	**0.007**		**0.010**	**-2.13**	**0.033**		0.011	-1.96	0.050
1	3082	-0.021		**0.008**	**-2.66**	**0.008**		**0.010**	**-2.12**	**0.034**		0.011	-1.95	0.052
2	3075	-0.022		**0.008**	**-2.86**	**0.004**		**0.010**	**-2.20**	**0.028**		**0.011**	**-2.07**	**0.039**
3	3018	-0.023		**0.007**	**-3.05**	**0.002**		**0.010**	**-2.34**	**0.019**		**0.011**	**-2.15**	**0.031**
4	2970	-0.020		**0.007**	**-2.99**	**0.003**		**0.008**	**-2.52**	**0.012**		0.010	-1.96	0.050
5	2963	-0.016		**0.006**	**-2.72**	**0.007**		**0.006**	**-2.59**	**0.01**		0.008	-1.94	0.053

$n_deaths_{cs,2024}$ = the number of deaths after age 64 due to underlying cause c in state s in 2024
$n_hcpcs_{cs,2024-k}$ = the number of procedures covered for underlying cause c in state s that were included in articles published between 2015 and (2024 – k), k = 0, 1, 2, …, 5
$n_deaths_{cs,2014}$ = the number of deaths after age 64 due to underlying cause c in state s in 2014
α_c = a fixed effect for underlying cause c
π_s = a fixed effect for state s

Each estimate is from a separate model.
Estimates in bold are statistically significant (p-value < .05).

Table 4

Estimates of β_k from eq. (2):

$$\ln(n_services_{ps,2023}) = \beta_k \, lcd_{ps,2023-k} + \gamma \ln(n_services_{ps,2013}) + \delta_p + \pi_s + \varepsilon_{cs}$$

lag (k)	Estimate	Standard Error	t Value	Pr > |t|
0	**-0.072**	**0.008**	**-8.78**	**<.0001**
1	**-0.072**	**0.008**	**-8.68**	**<.0001**
2	**-0.071**	**0.008**	**-8.61**	**<.0001**
3	**-0.069**	**0.008**	**-8.44**	**<.0001**
4	**-0.069**	**0.008**	**-8.48**	**<.0001**

$n_services_{ps,2023}$ = the number of times procedure p was provided in state s in 2023

$lcd_{ps,2023-k}$ = 1 if there was at least one LCD covering procedure p in state s between 2015 and (2023 – k), k = 0, 1, 2, …, 4

= 0 otherwise

$n_services_{ps,2013}$ = the number of times procedure p was provided in state s in 2013

δ_p = a fixed effect for procedure p

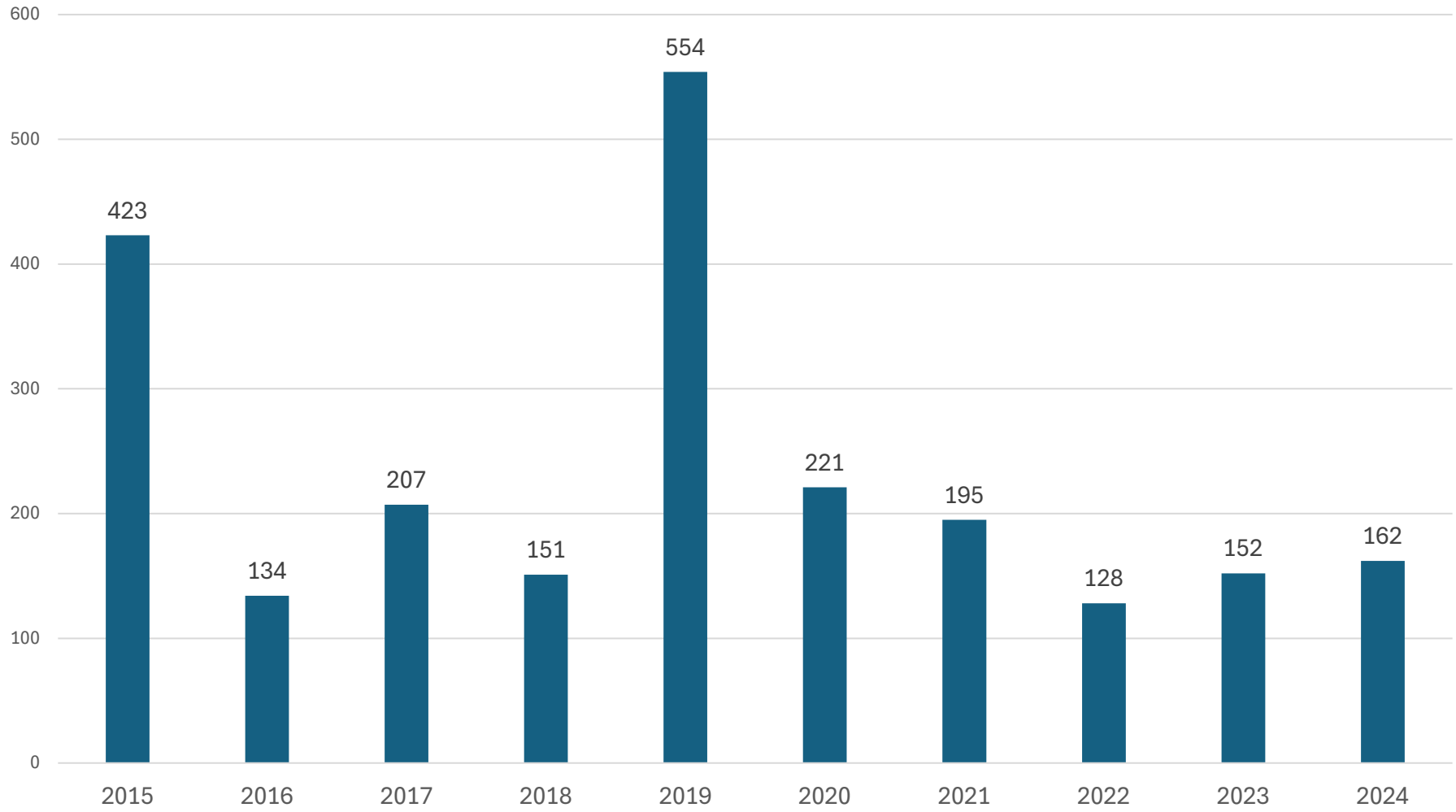
π_s = a fixed effect for state s

Each estimate is from a separate model. N = 149,969.

Due to the large number (5963) of procedure fixed effects, disturbances of eq. (2) are not clustered.

Estimates in bold are statistically significant (p-value < .05).

Appendix Figure 1
Number of Articles in the Current and Retired Articles section of the Medicare Coverage Database, by year of publication



155 articles had missing publication dates