CHAPTER 10

Mandated report: Relationship between clinician services and other Medicare services

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Chapter summary

Section 101(a)(3) of the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) directs the Commission to submit two reports to the Congress on the relationship between use of and expenditures for services provided by physicians and other health professionals (whom we refer to as "clinicians") and total service use and expenditures under Part A, Part B, and Part D of Medicare.

Submitted on June 15, 2017, our initial report had two parts:

- An evaluation of the relationship between beneficiaries' use of and Medicare program spending on clinician services and all services covered under Part A and Part B of Medicare.
- An evaluation of the relationship between beneficiaries' use of and Medicare program spending on clinician services and use of and spending on prescription drugs (as measured by gross drug spending) covered under Medicare Part D.

This final report updates the analyses conducted for the initial report using more recent years of data.

Because the legislation directs us to evaluate Medicare Part A, Part B, and Part D but not Part C (Medicare Advantage), we report on service use and

In this chapter

spending for the Medicare fee-for-service (FFS) population only. A finding of a positive correlation between clinician services and all other Part A, Part B, and Part D services would be consistent with the belief that the services are complements (which means that, when considering two services, greater use of one service correlates with greater use of the other service). Alternately, a negative correlation between clinician services and all other services covered under Part A, Part B, and Part D of Medicare would be consistent with the belief that the services are substitutes for each other.

We found that spending on clinician services as a share of Medicare spending on all Part A and Part B services decreased from 2013 through 2019, indicating that spending on clinician services grew at a slower rate than spending on all Part A and Part B services. However, we caution against finding a great deal of meaning in this result (which is based on raw, unadjusted expenditures): During this period, payment rates in the Medicare physician fee schedule were raised at a lower rate than the payment rates in most other Medicare payment systems.

We assert that, in determining whether a given service is a complement to or a substitute for clinician services, comparisons of service use are more meaningful than comparisons of spending. We base this assertion on the fact that unadjusted Medicare spending reflects various price and payment adjustments, which distort any direct relationship between the use of clinician and other services.

We estimated per capita service use in 2013 and 2018 for geographic areas based on metropolitan statistical areas (MSAs). We estimated service use for each geographic area by adjusting Medicare program spending for regional differences in Medicare prices and for beneficiary differences in demographics and health status.

Our analysis of service use found the following:

- In the aggregate, from 2013 to 2018, use of clinician services as a share of all Part A and Part B services slightly declined from 24.3 percent to 23.8 percent.
- For each of the geographic areas in our analysis, we estimated the percentage change from 2013 to 2018 in per capita use of clinician services and per capita use of nonclinician Part A and Part B services (total Part A and Part B services net of clinician services). We found a weak (almost neutral) relationship between percentage change in clinician services and percentage change in nonclinician Part A and Part B services.

- In 2018, among geographic units in our analysis, there was a weak negative correlation between per capita use of clinician services and per capita use of nonclinician Part A and Part B services. This finding implies that clinician services and other Part A and Part B services are only weak substitutes.

Our analysis also showed that from 2013 through 2018, Medicare spending on services covered under the physician fee schedule remained flat while spending on drugs covered under the Part D benefit grew by 26 percent. Nearly all of the growth in drug spending was due to higher prices rather than an increase in the number of prescriptions filled by beneficiaries, a change from the 2008 through 2013 period when spending growth mostly reflected a greater number of prescriptions filled.

For a subset of FFS beneficiaries who receive their drug coverage through the Part D program, we used a regression-based method to examine the relationship between the rate of growth and level of clinician service use and drug use (drug spending adjusted for demographics and health status) across the MSA-based geographic areas. For changes in service use from 2013 through 2018, clinician service use was positively correlated with the area's change in drug use. However, the regression model explained only 8 percent of the variation, suggesting a weak relationship between the growth rates in clinician service use and drug use. There was a modest positive correlation between the levels of clinician service and Part D drug use in 2018, consistent with our previous analysis.

In summary, our findings suggest that clinician services and other Part A and Part B services are weak substitutes. As for the relationship between use of clinician services and use of Part D drugs, it is not surprising to find a modest complementary relationship, given that most prescriptions are written by clinicians during office visits.

There are a few caveats in interpreting these findings. First, findings of correlation (or no correlation) of service use among different sectors do not prove or disprove causality. Second, our results are based on aggregate trends and do not represent any individual circumstances or specific geographic areas. An examination at a more disaggregated level may reveal different relationships from those observed at the aggregate level. ■

Mandate: Section 101(a)(3) of the Medicare Access and CHIP Reauthorization Act of 2015

(3) MEDPAC REPORTS.—

(A) INITIAL REPORT.—Not later than July 1, 2017, the Medicare Payment Advisory Commission shall submit to Congress a report on the relationship between—

(i) physician and other health professional utilization and expenditures (and the rate of increase of such utilization and expenditures) of items and services for which payment is made under section 1848 of the Social Security Act (42 U.S.C. 1395w–4); and

(ii) total utilization and expenditures (and the rate of increase of such utilization and expenditures) under parts A, B, and D of title XVIII of such Act. This report shall include a [method] to describe the relationship and the impact of changes in physician and other health professional practice and service ordering patterns on total utilization and expenditures under parts A, B, and D of such title.

(B) FINAL REPORT.—Not later than July 1, 2021, the Medicare Payment Advisory Commission shall submit to Congress a report on the relationship described in subparagraph (A), including the results determined from applying the [method] included in the report submitted under such subparagraph. ■

Background

Section 101(a)(3) of the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) directs the Commission to submit a report to the Congress on the relationship between beneficiary use of and Medicare spending on services provided by physicians and other health professionals and total service use and Medicare spending under Part A, Part B, and Part D of Medicare. MACRA directed the Commission to submit an initial report no later than July 1, 2017, and a final report no later than July 1, 2021 (see text box). The Commission met the requirement to submit the initial report, publishing it in the June 2017 report to the Congress (Medicare Payment Advisory Commission 2017).

This chapter is intended to satisfy the MACRA requirement for the final report. This analysis has two broad parts. The first part assesses the relationship between Medicare spending on and use of (1) clinician services and (2) nonclinician services covered by Medicare Part A and Part B. The second part assesses the relationship between Medicare spending on and use of (1) clinician services and (2) Part D drugs. Section 101(a)(3) of MACRA specifies that we evaluate Part A, Part B, and Part D of Medicare but not Part C (Medicare Advantage). Therefore, our analysis reports on service spending and use for the Medicare fee-for-service (FFS) population only. In the interest of brevity, throughout this report, we use the term *clinicians* to refer to physicians and other health professionals. Our analysis included the clinician services provided to all FFS beneficiaries in all settings. If a clinician was employed by a hospital or a health plan, that clinician's services were still included in our analysis.

Evaluating spending on and use of clinician services relative to all Part A and Part B services

Spending and service use are different measures. In this study, spending represents monetary outlays by the Medicare program. Service use reflects volume of services (how many units) and the intensity of those services (for example, long office visits have higher service use than short office visits; MRI scans are a more intense use of service than simple X-rays). We derived service use by adjusting spending amounts for regional differences in the prices that Medicare sets for Part A and Part B services and for differences in demographics and health status among beneficiaries.

TABLE 10–1

Medicare spending on clinician services in FFS Medicare as a share of all Part A and Part B services fluctuated, 2009–2019

Year	Clinician services (billions of dollars)	Part A and Part B services (billions of dollars)	Clinician services as a share of Part A and Part B services
2009	$61.8	$328.5	18.8%
2010	65.4	338.2	19.3
2011	68.6	350.6	19.6
2012	69.9	357.8	19.5
2013	69.5	361.5	19.2
2014	70.6	367.3	19.2
2015	70.2	374.8	18.7
2016	70.0	384.7	18.2
2017	70.1	391.8	17.9
2018	70.8	403.0	17.6
2019	73.5	414.0	17.8

Note: FFS (fee-for-service). "Medicare spending" is the amount spent by the Medicare program excluding beneficiaries' cost sharing. The spending amounts are for services provided to FFS Medicare beneficiaries and exclude services provided to Medicare Advantage beneficiaries.

Source: Annual reports of the Boards of Trustees of the Medicare trust funds, 2019 and 2020.

Data and methods

Our analysis of the relationship between spending on and use of clinician services relative to all Part A and Part B services has two parts. In the first part, we evaluated the relationship between unadjusted Medicare spending on clinician services and unadjusted Medicare spending on all Part A and Part B services. For this part of the analysis, we used data from the Medicare Trustees' annual reports on the status of the Medicare trust funds (Boards of Trustees 2020, Boards of Trustees 2019). We extracted data on the annual expenditures that Medicare made from 2009 through 2019 on clinician services and all services covered under Part A and Part B of Medicare for beneficiaries in FFS Medicare. We made no adjustments to these data.

In the second part of our Part A and Part B analysis, we evaluated service use. We used beneficiary-level program spending in FFS Medicare from the Master Beneficiary Summary Files (MBSFs) from 2013 and 2018 and claims data from the Medicare Provider Analysis and Review (MedPAR) files from 2013 and 2018. We analyzed these data at the national level and for the geographic areas based on metropolitan statistical areas (MSAs). For beneficiaries residing in MSAs, we used geographic areas that consisted of counties that are in the same state and same MSA. For beneficiaries not residing in MSAs, we used each state's counties that were not in MSAs. For example, the MSA for St. Louis, Missouri, has 15 counties. Eight are in Illinois, and seven are in Missouri. The eight Illinois counties formed one of our geographic areas, and the seven Missouri counties formed another geographic area. The counties in Missouri that are not in an MSA formed a statewide, nonmetropolitan geographic area. In total, our study defined 484 geographic areas.

We estimated service use at the national and geographic-area levels in 2013 and 2018 by adjusting Medicare expenditures for geographic differences in wages, special payments to hospitals and clinicians, and differences in beneficiaries' demographics and health status. Medicare pays different prices in different locations to account for higher costs in one location compared with another. For example, wages for nurses are much higher in New York City than in Little Rock, Arkansas. Also, Medicare makes special payments to hospitals and clinicians, such as payments to hospitals for indirect medical education, that are not evenly distributed across geographic areas. We adjusted spending to remove the effects of these special payments. We also adjusted for differences in beneficiaries' demographics and health status so that service use reflected volume and intensity of services,

Adjusting Part A and Part B spending to measure Part A and Part B service use

We used the same method to estimate use of Part A and Part B services in both 2013 and 2018 for the geographic areas in our analysis. To obtain these estimates, we used data from the Master Beneficiary Summary Files (MBSFs) and, for hospital inpatient services (acute hospital, inpatient rehabilitation, long-term care hospital, and inpatient psychiatric facilities), the Medicare Provider Analysis and Review (MedPAR) file. We developed geographic areas based on metropolitan statistical areas (MSAs) of the core-based statistical area definitions. For each state, we grouped counties in the same MSA into one geographic area. For MSAs that cross state borders, we created geographic areas that included only the portion of the MSA in each state. For example, the Minneapolis–Saint Paul MSA consists of 14 counties in Minnesota and 2 counties in Wisconsin. We created one geographic area for the 14 Minnesota counties and a separate geographic area for the 2 Wisconsin counties. Finally, within each state, we grouped all the counties not in an MSA into a single statewide, non-MSA geographic area. Through this method, we defined 484 geographic areas.

We used the MBSF data to determine Medicare expenditures in seven health care sectors: hospital outpatient, skilled-nursing facility, home health, durable medical equipment, hospice, clinician, and other Part B services.[1] We included expenditures for clinical laboratory tests and physician-administered drugs in the sectors in which the laboratory tests and drugs were provided, which are predominantly the clinician and hospital outpatient sectors. Our computation of Medicare program spending did not include beneficiaries' payments for cost sharing because the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) directs the Commission to evaluate total utilization and expenditures under Parts A, B, and D of Medicare, which implies spending by the Medicare program, not beneficiaries' cost sharing. We tracked the data to each beneficiary's area of residence, not to where the services were provided.

For all services other than hospital inpatient care, we obtained beneficiary-level spending data from the MBSFs for both 2013 and 2018. We adjusted the spending data in the MBSFs for differences in regional prices, including geographic practice cost indexes (GPCIs) for clinicians and hospital wage indexes (HWIs) for all other providers. We also adjusted spending for additional payments to clinicians in health professional service areas and for clinicians who participate in the Medicare Shared Savings Program or the Comprehensive Primary Care Plus Program. Moreover, we adjusted for special outpatient and skilled nursing payments for critical access hospitals. We removed the effects that these special payments had on variation in spending by calculating the national per beneficiary amount of these special payments and adding it to each beneficiary's service use.

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not differences among beneficiaries themselves that can affect service use.

We conducted a beneficiary-level regression analysis using data for 100 percent of Medicare FFS beneficiaries to estimate service use for each geographic area in 2018. We used data from 2013 in the same regression-based approach to estimate service use for each geographic area in 2013. Our data from 2018 included about 38.8 million beneficiaries, and our data from 2013 included about 37.7 million beneficiaries. The regression-based method we used for this analysis is summarized in the text box about adjusting Part A and Part B spending data.

Relationship between spending on clinician services and spending on all Part A and Part B services

Data from the Medicare Trustees' annual reports indicate that the share of Medicare spending on all Part A and Part B services in FFS Medicare that was attributable to clinician services fluctuated in a narrow range from 2009 through 2019 (Table 10-1). During this period, clinician services as a share of total spending on Part A and Part B services was at a maximum of 19.6 percent in 2011 and a minimum of 17.6 percent in 2018. This share of spending increased from 2009 to 2011, decreased from 2011 to

Adjusting Part A and Part B spending to measure Part A and Part B service use (cont.)

For a given beneficiary, we used the GPCIs and HWIs from where the beneficiary resides to adjust their spending. However, beneficiaries sometimes receive health care in geographic areas other than their area of residence. In some cases, the GPCIs and HWIs differ between where a beneficiary receives health care and where he or she resides. We did not address this issue of border crossing for services in the seven sectors included in the MBSFs. This approach could result in some overestimation of service use in rural areas if patients received their ambulatory care or post-acute care in higher priced urban areas. However, we believe this issue is small for these services, relative to inpatient services. For example, it is plausible that patients are less likely to travel long distances for clinician services than for inpatient care. In addition, the payment areas represented by GPCIs (112 payment areas) in the physician payment system tend to be larger than the payment areas in the inpatient payment system (about 450).

We used the MedPAR file to compute service use for hospital inpatient care. For each inpatient claim for an acute care hospital in the MedPAR file, we multiplied the relative weight for the claim's diagnosis related group by the national standardized rate to create an estimated payment for the claim that excludes the effects of adjustments for regional prices. We summed these results from the claims to the beneficiary level to create an estimate of adjusted acute inpatient service use for each beneficiary. Some hospitals received additional payments in the form of payments for graduate medical education, indirect medical education, treatment for disproportionate shares of low-income patients, and payments under participation in the Bundled Payments for Care Improvement policy. We removed the effects that these special payments had on variation in spending by calculating the national per beneficiary amount of these special payments and adding it to each beneficiary's adjusted acute inpatient service use. Finally, we adjusted the acute inpatient service use to include outlier payments and adjustments for transfer cases. For outlier adjustments, we removed the effects of regional differences in input prices.

We also used the MedPAR file to compute service use in inpatient rehabilitation facilities, inpatient psychiatric facilities, and long-term care hospitals. For these three settings, we determined the Medicare payment amount indicated on each claim, net of indirect medical education payments, disproportionate share hospital payments, payments for rural location, payments for low-income patients, and payments for facilities located in Alaska or Hawaii. We adjusted each net Medicare payment by the facility's HWI. We determined national average amounts for each of the special payments we removed to determine the net Medicare payment amount and added those national average amounts to each beneficiary's adjusted net Medicare payment.

We used claims data from the MedPAR file as the source for inpatient services because beneficiaries frequently obtained care in locations where the HWI used to adjust inpatient payments for geographic differences in wages was different from the HWI of their area of residence. Use of the claims data allowed us to adjust beneficiaries' inpatient spending using the HWIs where their services were provided. If we had used spending on inpatient services from the MBSFs, we would have had to adjust that spending for the

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2018, then increased again from 2018 to 2019. In short, there was not a consistent relationship over time between the change in spending on clinician services and the change in spending on all Part A and Part B services.

We also evaluated a measure that adds spending for clinical laboratory tests and physician-administered drugs—two sectors not covered by the Medicare physician fee schedule (PFS) but use of which clinicians largely control—to spending on clinician services. The spending on this measure as a share of spending on all Part A and Part B spending had less variation than did spending on clinician services—a maximum of 23.8 percent in 2014 and a minimum of 22.8 percent in 2009 (data not shown).

Adjusting Part A and Part B spending to measure Part A and Part B service use (cont.)

border crossing that potentially occurs more often with inpatient care than other service types. Adjusting for border crossing would have been more difficult than using our method based on the inpatient claims from the MedPAR file.

To estimate total price-adjusted spending for each beneficiary, we added the price-adjusted inpatient spending derived from the MedPAR claims to the price-adjusted spending for the seven health care sectors from the MBSFs. Because we used both 2013 and 2018 data in our analysis, we adjusted the price-adjusted 2018 spending amounts in each of the health care sectors for updates to the Medicare payment rates in each sector from 2013 to 2018.

We further adjusted the spending amounts for regional differences in demographics and health status using a regression-based method. We performed a separate set of regressions for the 2013 data and the 2018 data. In both years, we performed a regression for price-adjusted total spending and regressions for price-adjusted spending in each of the health care sectors. In each regression, the dependent variable was a beneficiary's monthly fee-for-service spending that had been adjusted for regional prices and additional payments. Explanatory variables included:

- demographic variables, such as age and sex;
- all conditions in CMS's hierarchical condition category (CMS–HCC) model (70 conditions in 2013 and 77 conditions in 2018), which CMS used to risk adjust Medicare Advantage payments in 2013 and 2018;
- other beneficiary-level factors in the CMS–HCC model, such as disability, dual eligibility for Medicare and Medicaid, and institutional status; and
- an indicator of the beneficiary's geographic area as defined for this study.

The regressions produced coefficients for the demographic variables, the CMS–HCCs, the other factors in the CMS–HCC model, and the 484 geographic areas.

We used results from the regressions to estimate both per capita total service use and per capita service use in each health care category in each geographic area as follows:

- We created national average spending amounts by multiplying the mean value of each explanatory variable—except for the indicators for the geographic areas—by the value of its coefficient from the regression and summing these products. These calculations had the effect of removing the variation in service use resulting from characteristics such as demographics and health status.
- We added the coefficient for each geographic area from the regressions to the national average spending amounts. The result is our measure of service use for each geographic area.
- We used this process for total Part A and Part B services and for service use in each health care sector. ■

We caution against placing much emphasis on the results that are based on raw, unadjusted expenditures because Medicare uses different methods for annually updating the payment rates in different health care sectors. For example, payment rates in the PFS had small updates over the 2013 through 2019 period relative to the other sectors, such as hospital outpatient services. In particular, MACRA implemented very small updates to the PFS payment rates from 2015 through 2019. The relatively small updates that occurred in the PFS mitigated the share of total Medicare expenditures attributable to clinician services simply because prices rose more slowly for clinician services than for other services. For example, if payment rates in the PFS had been updated over the 2013 through 2019

TABLE 10–2

Use of Part A and Part B services had less regional variation than use of clinician services, 2018

Measure of variation	Part A and Part B service use	Clinician service use
Ratio of 90th to 10th percentile	1.22	1.55
Ratio of maximum to minimum	1.62	2.81

Note: "Part A and Part B service use" is per capita use in each geographic area of all services covered under Part A and Part B of Medicare. "Clinician service use" is per capita use of clinician services in fee-for-service Medicare in each geographic area. We defined geographic areas as the metropolitan statistical areas (MSAs) of the core-based statistical areas. If an MSA crosses state borders, we divided the MSA into multiple areas based on state borders. Areas that are not in MSAs were aggregated, per state, in one geographic area that consists of the given state's non-MSA counties.

Source: MedPAC analysis of the 2018 Master Beneficiary Summary File and the 2018 Medicare Provider Analysis and Review file.

period at the same rate as payment rates in the outpatient prospective payment system were, then clinician services as a share of all Part A and Part B services would have been more than 17.8 percent in 2019 (assuming no effect on the volume of clinician services provided).

Relationship between use of clinician services and use of nonclinician Part A and Part B services

We used several measures to evaluate the relationship between use of clinician services and use of nonclinician Part A and Part B services (total Part A and Part B services, excluding clinician services). These measures included the following:

- We determined the change from 2013 to 2018 in the share of all Part A and Part B service use attributable to clinician services.
- For each geographic area, we determined the per capita use of clinician services and per capita use of nonclinician Part A and Part B services in 2013 and 2018. We used these results to determine, for each geographic area, the percentage change from 2013 to 2018 in the use of clinician services and nonclinician Part A and Part B services.
- We determined the correlation between the percentage change from 2013 to 2018 in use of clinician services and the percentage change in use of nonclinician Part A and Part B services among our geographic areas. A positive correlation between the percentage change in use of clinician services and percentage change in use of nonclinician Part A and Part B services would suggest that higher use of clinician services was associated with higher use of nonclinician Part A and Part B services, meaning they were complements. A negative correlation would suggest higher use of clinician services was associated with lower use of nonclinician Part A and Part B services, meaning they were substitutes.
- For 2018, we estimated the correlation between use of clinician services and use of nonclinician Part A and Part B services among our geographic areas. A positive correlation would suggest that greater use of all nonclinician services was related to greater use of clinician services (complements). A negative correlation would suggest higher use of clinician services was associated with lower use of nonclinician Part A and Part B services (substitutes).

Variation in use of all Part A and Part B services across regions is less than the variation in use of clinician services

A comparison of service use from 2018 across our 484 geographic areas shows that use of all Part A and Part B services (including clinician services) varied less than use of clinician services (Table 10-2). For example, use of Part A and Part B services was 22 percent higher at the 90th percentile than at the 10th percentile, while use of clinician services was 55 percent higher at the 90th percentile than at the 10th percentile. At the extremes, use of Part A and Part B services was 62 percent higher in the highest use area than in the lowest use area, while use of clinician services was 181 percent higher in the highest use area than in the lowest use area.

TABLE 10–3

Clinician services as a share of all Part A and Part B services decreased slightly from 2013 to 2018

	Share of all Part A and Part B services	
Sector	**2013**	**2018**
Clinician	24.3%	23.8%
Acute inpatient	35.7	35.5
Outpatient facilities	13.3	16.2
Skilled nursing facilities	8.5	7.3
Hospice	4.7	4.7
Home health agencies	5.1	4.7
Durable medical equipment	2.0	1.9
Inpatient rehabilitation facilities	1.8	1.9
Long-term care hospitals	2.1	1.5
Other Part B	1.4	1.6
Inpatient psychiatric facilities	1.1	1.0

Note: We deflated our 2018 service use estimates to 2013 levels to remove the effects of payment updates that occurred over the 2013 through 2018 period. We included use of clinical laboratory tests and physician-administered drugs in the sectors in which they were used, which were predominantly the clinician and outpatient facilities sectors. "Outpatient facilities" consists primarily of hospital outpatient departments but also includes freestanding dialysis facilities, outpatient rehabilitation facilities, and rural health clinics. The percentages in the 2018 column do not sum to 100 due to rounding.

Source: MedPAC analysis of data from the 2013 and 2018 Master Beneficiary Summary Files and the 2013 and 2018 Medicare Provider Analysis and Review files.

Use of clinician services as a share of all Part A and Part B services, 2013 compared with 2018

We found that use of clinician services as a share of all Part A and Part B services decreased slightly from 24.3 percent in 2013 to 23.8 percent in 2018 (Table 10-3). For 2013 and 2018, we also divided total service use into 11 sectors. We found that the hospital outpatient sector had the largest service use increase from 2013 through 2018, the skilled nursing facility sector had the largest decrease, and the other nine sectors had either small increases or decreases. The small decrease in the clinician sector is likely a reflection of the acquisition of clinician practices by hospitals.

Correlation between percentage change in use of clinician services and percentage change in use of nonclinician Part A and Part B services

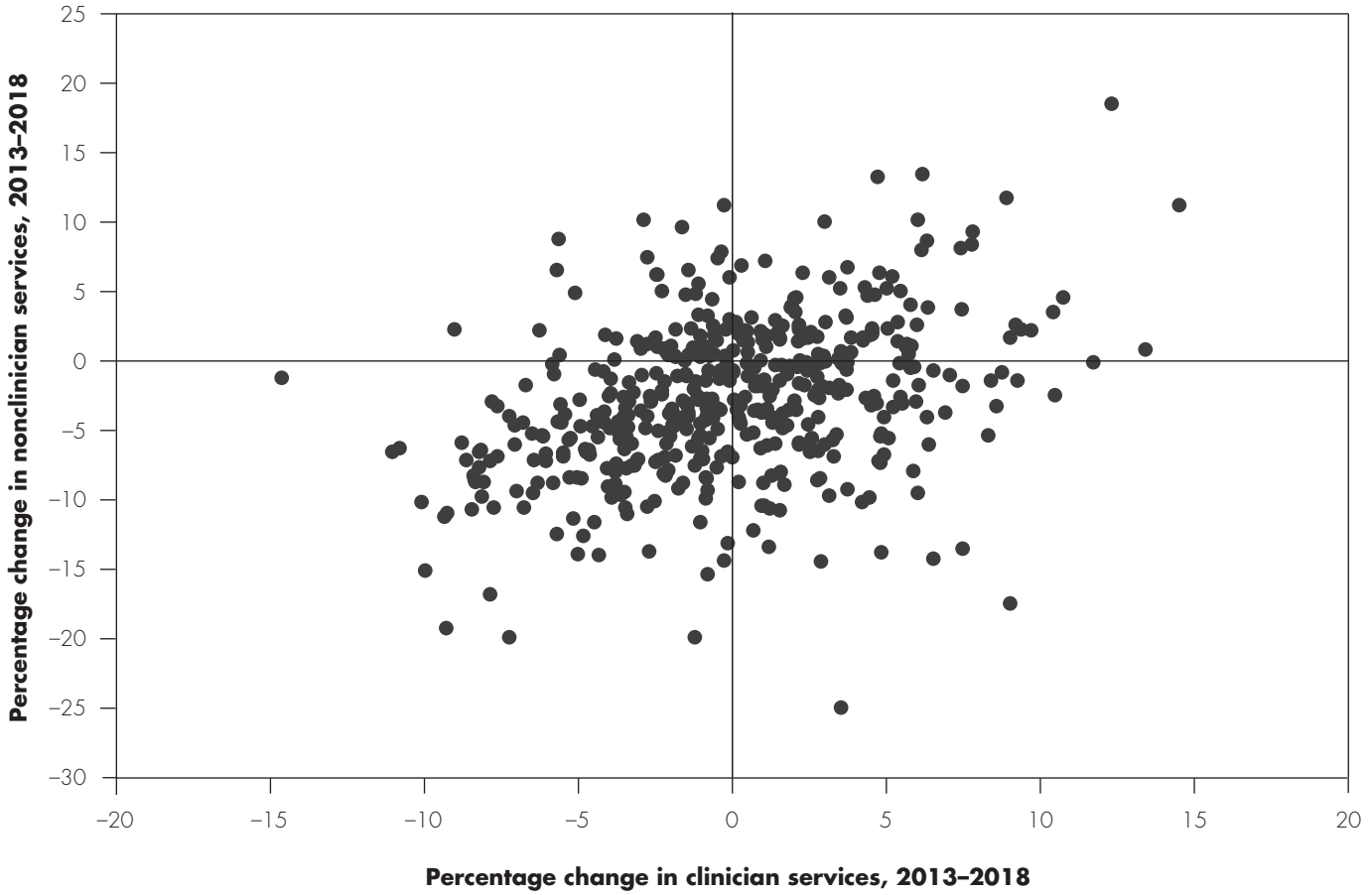
To determine whether any correlation existed in the use of clinician and nonclinician services covered under Part A and Part B, we performed a linear regression that had as the dependent variable the percentage change from 2013 to 2018 in per capita nonclinician Part A and Part B service use for each geographic area. This regression had one explanatory variable: the percentage change from 2013 to 2018 in per capita use of clinician services for each geographic area.

Results from this regression indicate that the percentage change in clinician services explains only 1 percent of the variation in the percentage change in nonclinician Part A and Part B services among geographic areas (R^2 = 0.01). Also, the coefficient on percentage change over time in clinician services was 0.001, which indicates that a 1 percentage point increase in clinician services resulted in a 0.001 percentage point increase in use of nonclinician Part A and Part B services over time.[2]

Figure 10-1 (p. 348) depicts the relationship between the percentage change in use of clinician services and the percentage change in nonclinician Part A and Part B services. This figure indicates there was a nearly neutral relationship between change in clinician services and change in nonclinician Part A and Part B services.

FIGURE 10–1

Weak relationship between percentage change in use of clinician services and change in use of nonclinician services, 2013–2018



Note: "Nonclinician services" includes all Medicare Part A and Part B services except for clinician services. We deflated our 2018 service use estimates to 2013 levels to remove the effects of payment updates that occurred over the 2013 through 2018 period. We defined the units of analysis as the metropolitan statistical areas (MSAs) of the core-based statistical areas. If an MSA crosses state borders, we divided the MSA into multiple areas based on state borders. In each state, we aggregated areas that are not in MSAs into one geographic area that consists of the given state's non-MSA counties.

Source: MedPAC analysis of data from the 2013 and 2018 Master Beneficiary Summary Files and the 2013 and 2018 Medicare Provider Analysis and Review files.

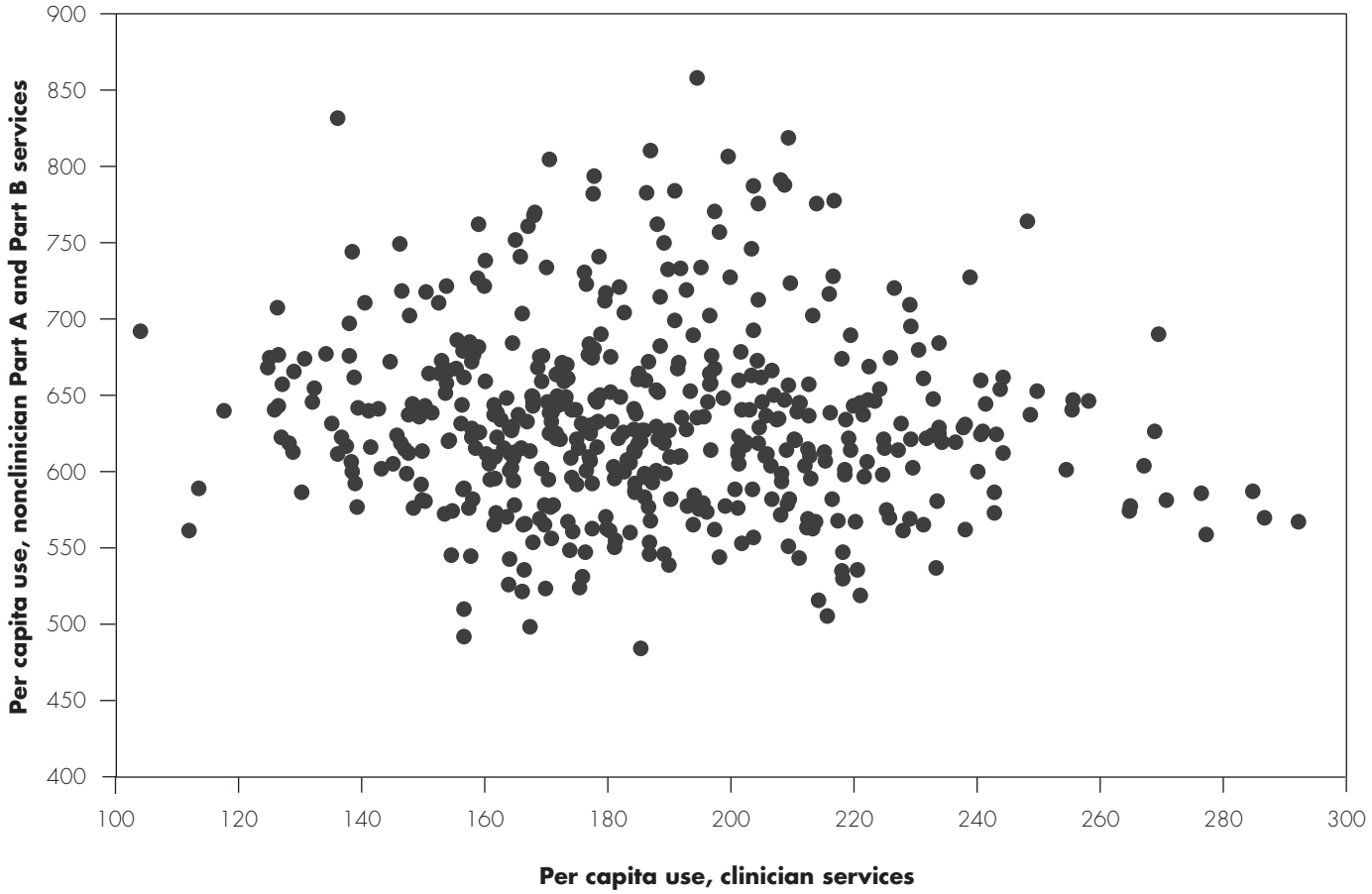
Correlation between use of clinician services and use of nonclinician Part A and Part B services in 2018

We performed another regression that focused on service use in 2018. In this regression, the dependent variable was our estimate of the per capita use of nonclinician Part A and Part B services in 2018 for each of our 484 geographic areas. The single explanatory variable was our estimate of per capita use of clinician services in 2018 for each geographic area.

Results from this regression suggested a slightly negative—but almost neutral—relationship between use of clinician services and use of nonclinician Part A and Part B services. Use of clinician services explains almost none of the variation in use of nonclinician Part A and Part B services ($R^2 = 0.007$). Also, the coefficient on per capita use of clinician services was –0.15 and had a relatively high *p*-value of 0.07, which indicates only moderate statistical significance. A scatter plot of the relationship between use of clinician services and use of nonclinician Part A and Part B services confirmed a very low level of correlation (Figure 10-2). These findings suggest that use of clinician services had a slightly negative effect on the use of nonclinician Part A and Part B services, perhaps

FIGURE 10–2

Weak relationship between use of clinician services and use of nonclinician Part A and Part B services, 2018



Note: "Nonclinician services" includes all Medicare Part A and Part B services except for clinician services. We defined the units of analysis as the metropolitan statistical areas (MSAs) of the core-based statistical areas. If an MSA crosses state borders, we divided the MSA into multiple areas based on state borders. Areas that are not in MSAs were aggregated, per state, in one geographic area that consists of the given state's non-MSA counties.

Source: MedPAC analysis of data from the 2018 Master Beneficiary Summary File and the 2018 Medicare Provider Analysis and Review file.

suggesting weak substitutes. (Note that this analysis shows association, not causality.)

Relationship between spending on and use of clinician services and Part D drugs

As requested in MACRA, we also examined the relationship between spending on and use of clinician services and prescription drugs covered under Medicare Part D.

The majority of Medicare beneficiaries receive their prescription drug coverage through the Part D program (Table 10-4, p. 350). Most other beneficiaries receive prescription drug coverage from other sources, such as their former employers, that is at least as generous as the Part D benefit, but we have no drug spending data for those beneficiaries.

Because the legislation directed us to evaluate Medicare Part A, Part B, and Part D, this analysis is limited to a subset of beneficiaries who were enrolled in Part D's stand-alone prescription drug plans (PDPs) and received their medical services under Part A and Part B of

TABLE 10–4

Part D enrollment and characteristics of beneficiaries enrolled in stand-alone PDPs, 2013 and 2018

	2013	2018
Medicare beneficiaries enrolled in Part D		
Number of beneficiaries, in millions	37.8	46.8
As a share of all Medicare beneficiaries	69%	74%
Part D enrollees in PDPs		
Number of beneficiaries, in millions	24.2	27.2
As a share of all Part D enrollees (remainder in MA–PDs)	64%	58%
As a share of FFS beneficiaries	61%	67%
Selected demographics of PDP enrollees		
Share:		
Female	58%	57%
Under age 65 (disabled)	22	18
Non-White	23	22
Receiving Part D's low-income subsidy	38	31
Residing in metropolitan areas	78	78

Note: PDP (prescription drug plan), MA–PD (Medicare Advantage–Prescription Drug [plan]), FFS (fee-for-service).

Source: MedPAC analysis of Medicare Part D denominator files from CMS.

Medicare. That is, we excluded beneficiaries enrolled in Medicare Advantage–Prescription Drug plans (MA–PDs) from our analysis. PDP enrollees accounted for about 64 percent (24.2 million) and 58 percent (27.2 million) of Part D enrollees in 2013 and 2018, respectively (Table 10-4).

The share of Medicare beneficiaries covered under Part D has grown over time, as has the share of enrollees in MA–PDs (Table 10-4). In 2018, 74 percent of beneficiaries received their drug coverage under Part D, up from 69 percent in 2013. At the same time, between 2013 and 2018, beneficiaries who were enrolled in Medicare Advantage plans (rather than traditional FFS) rose from 28 percent to 35 percent (data not shown). As a result, beneficiaries enrolled in PDPs accounted for 58 percent of all beneficiaries enrolled in Part D, down from 64 percent in 2013. Data included in the analysis of 2018 drug spending and use accounted for about 63 percent of total gross Part D spending compared with over 70 percent for 2013 (data not shown).

Changes in the pattern of Part D enrollment have resulted in PDP enrollees who have somewhat different demographic characteristics in 2018 compared with 2013. For example, in 2018, a smaller share of PDP enrollees were disabled beneficiaries under age 65 (18 percent, compared with 22 percent in 2013) and a smaller share received the low-income subsidy (31 percent, compared with 38 percent in 2013).

Data and methods

The method we used to estimate drug use in each geographic area parallels the method used to estimate medical service use from the MBSF. We obtained estimates of prescription drug use from Part D prescription drug event (PDE) data.[3] For our analysis, we used gross drug spending from the PDE data that reflect ingredient costs—that is, payments to pharmacies for covered Part D drugs, excluding dispensing fees, sales tax, and any postsale rebates and discounts from manufacturers and pharmacies. (This measure of Part D drug spending and use differs from the measure of spending and service

TABLE 10–5

Growth in unadjusted per capita spending for clinician services and Part D drugs diverged after 2013

				Percent change	
	2008	2013	2018	2008–2013	2013–2018
Physician fee schedule payment per FFS enrollee	$1,836	$2,061	$2,078	12%	1%
Gross Part D spending per PDP enrollee	2,805	3,096	3,899	10	26

Note: FFS (fee-for-service), PDP (prescription drug plan). "Gross Part D spending" includes payments for ingredient costs, dispensing fees, and sales taxes, before accounting for postsale rebates and discounts.

Source: MedPAC analysis based on Table IV.B2 of the annual report of the Boards of Trustees of the Medicare trust funds for 2016, Table IV.B2 of the annual report of the Boards of Trustees of the Medicare trust funds for 2020, and Part D prescription drug event data and denominator files from CMS.

use covered under Part A and Part B in that it includes beneficiary cost-sharing liabilities.) Because there are no special payment adjustments (such as indirect medical education) as there are in Part A and Part B of Medicare, we calculated drug use as gross drug spending adjusted for beneficiary demographics and health status; after adjustment, the measure of drug use reflects volume (number of prescriptions) and intensity (such as choice of a brand-name vs. generic medication).[4]

We used a regression-based method to estimate service use by adjusting for differences in demographics (e.g., age, sex, institutional status, low-income subsidy status) and health status as measured by the prescription drug hierarchical condition categories (RxHCCs) (see text box for the description of the regression-based method used to obtain estimated use of Part A and Part B services, pp. 343–345).[5] Estimated service use reflects average monthly drug use for each beneficiary (i.e., total annual drug use divided by the number of months enrolled in a Part D plan).

To measure the change in drug use from 2013 to 2018, we adjusted 2018 drug spending to account for the average increase in drug prices observed between 2013 and 2018. The volume-weighted price index constructed by Acumen LLC showed that, between 2013 and 2018, overall prices of Part D–covered prescription drugs filled by PDP enrollees grew from 1.01 to 1.17. To adjust 2018 drug spending to account for the increase in drug prices between 2013 and 2018, we reduced the 2018 drug spending by 14 percent (adjustment factor of 0.86 calculated by dividing 1.01 by 1.17).[6] This adjustment is greater than the 3.3 percent reduction applied to 2013 drug spending in the previous report, which examined drug spending and use in 2008 and 2013, reflecting the more rapid growth in prices at the pharmacy after 2013 (Medicare Payment Advisory Commission 2017).

Findings on the relationship between clinician services and Part D drugs

We compared spending for clinician services and Part D drugs for the subset of FFS beneficiaries who receive their drug coverage through the Part D program. We first examined the relationship between unadjusted spending in these two sectors. Second, to examine the relationship between clinician service use and Part D prescription drug use, we compared spending adjusted for differences in demographics and health status across the MSA-based geographic areas.

Growth in unadjusted per capita spending for clinician services and Part D drugs diverged after 2013

From 2008 through 2013, unadjusted per capita spending on services covered under the physician fee schedule (clinician services) and spending for drugs covered under Part D grew at similar rates (cumulative growth of 12 percent and 10 percent, respectively) (Table 10-5). However, the growth trends diverged dramatically after 2013. Between 2013 and 2018, annual gross Part D spending per PDP enrollee

TABLE 10–6 **Prescription drug use had less variation across regions than clinician service use, 2018**

Measure of variation	Prescription drug use	Clinician service use
Ratio of 90th to 10th percentile	1.25	1.55
Ratio of maximum to minimum	1.83	2.75

Note: "Prescription drug use" is per capita drug use among enrollees in stand-alone prescription drug plans in each geographic area. "Clinician service use" is per capita use of clinician services among fee-for-service (FFS) beneficiaries in each geographic area. We define geographic areas as the metropolitan statistical areas (MSAs) of the core-based statistical areas. If an MSA crosses state borders, we divided the MSA into multiple areas based on state borders. For areas not in MSAs, the geographic area is a state's counties not in MSAs. The measures of variation reported for clinician service use differ slightly from those reported in Table 10-2 (p. 346) because the measures are based on clinician service use by a subset of FFS beneficiaries who were enrolled in Part D (about 67 percent of all FFS beneficiaries).

Source: MedPAC analysis of the 2018 Master Beneficiary Summary File and 2018 prescription drug event data from CMS.

increased by 26 percent, from $3,096 to $3,899. During the same period, Medicare's total annual spending per FFS enrollee for clinician services increased by 1 percent, from $2,061 to $2,078.

Because the two sectors use different payment methods, these comparisons in growth rates may not necessarily correspond with growth in service use. For example, various adjustments applied to payments for clinician services could distort the relationship that might exist between the use of clinician services and the use of drugs under Part D. Further, measuring changes in drug use is complicated by the fact that price growth (reflecting both higher prices of existing products and high launch prices of new drugs) has increasingly driven growth in Part D spending (Medicare Payment Advisory Commission 2020). Nearly all of the growth in Part D spending between 2013 and 2018 was due to higher prices rather than increases in the number of prescriptions filled by beneficiaries, a change from the 2008 through 2013 period when spending growth mostly reflected an increase in the number of prescriptions filled.[7] The increase in prices after 2013 was driven primarily by drugs and biologics launched after 2013.[8]

Change in prescription drug use is positively correlated with change in clinician service use

To examine the relationship in our geographic areas between growth in the use of clinician services and growth in the use of drugs, we compared the level of service use in 2013 with the level of service use in 2018 to determine each area's growth rate from 2013 to 2018. During this period, per capita drug use grew cumulatively by about 9.4 percent compared with a slight decline (–0.3 percent) in per capita clinician service use. However, growth in per capita use varied widely across regions. For example, growth in per capita drug use during this period ranged from –22 percent in the Kansas portion of the St. Joseph, Missouri–Kansas geographic area, to 40 percent in the El Centro, California, geographic area.

Results from our regression analysis suggest that, for the 2013 through 2018 period, change in drug use was positively correlated with change in an area's clinician service use (coefficient on the change in clinician service use of 0.36 ($p < 0.0001$)). This finding differs from that of our previous analysis that examined the period between 2008 through 2013. In that analysis, we found a negative correlation (–0.27, $p < 0.0001$) between the growth rate in an area's drug use and clinician service use.[9] However, in both cases, the growth rate of clinician service use explained only 6 percent to 8 percent of the variation in the growth rate in drug use across the 484 geographic areas, suggesting very little relationship between the growth rates for these two sectors. (The adjusted R^2 for the regression analysis for the 2008 through 2013 period was 0.0568, and the adjusted R^2 for the 2013 through 2018 period was 0.0820.)

Prescription drug use varied less than clinician service use across regions

Similar to our analysis comparing clinician and nonclinician service use, we used a regression-based method to adjust spending data to remove the effects of

demographics and, in the case of clinician services, of regional differences in prices and special payments to providers.

A comparison of service use across our 484 geographic areas shows that use of prescription drugs (drug spending adjusted for variations in demographics and health status) varied less than use of clinician services in 2018 (Table 10-6). For example, drug use in high-use areas (areas at the 90th percentile) was 25 percent higher than in low-use areas (areas at the 10th percentile). In comparison, clinician service use in high-use areas was 55 percent higher than in low-use areas. At the extremes, drug use in the area with highest use was about 1.83 times that in the area with lowest use, compared with 2.75 times for areas with the maximum and minimum clinician service use. These findings are consistent with our previous analysis of 2008 and 2013 data for the initial report (Medicare Payment Advisory Commission 2017).

Clinician service use is positively correlated with prescription drug use

A cross-sectional analysis of clinician service use and drug use data for 2018 suggests that they may be weak complements rather than substitutes for one another. This finding is consistent with our previous findings based on the analysis of 2013 data (Medicare Payment Advisory Commission 2017). Results from a regression analysis indicate that use of clinician services explains about 22 percent of the variation in drug use ($R^2 = 0.2249$). The estimated coefficient is positive (0.35) and is similar in magnitude to the results of our previous analysis of 2013 data (estimated coefficient of 0.3, $R^2 = 0.2397$). (It is important to note that we are measuring association, not causality.)

Implications of our findings

The variability in Medicare spending on clinician services as a share of Medicare spending on all Part A and Part B services from 2009 through 2019 indicates there was not a consistent relationship over time between the change in spending on clinician services and the change in spending on all Part A and Part B services. For the 2013 to 2018 period, there was a weak (nearly neutral) correlation between use of clinician services and use of nonclinician Part A and Part B services. This finding suggests that clinician and nonclinician Part A and Part B services are either weak substitutes or are uncorrelated. As for the relationship between clinician services and prescription drug use, the positive relationship we found for changes in service use from 2013 through 2018 is different from our previous analysis covering the 2008 to 2013 period. However, in both cases, the variation in service use explained only 6 percent to 8 percent of the variation in drug use (i.e., R^2 values of 0.06 and 0.08, respectively), suggesting that there may be very little relationship between changes in the service use in these two sectors. The modest positive correlation between the levels of clinician service use and drug use, however, is consistent with our prior findings. This correlation is not surprising given that most prescriptions are written by clinicians during office visits.

Two caveats should be considered in interpreting these findings. First, correlation in service use among different sectors does not prove causality. Second, our results are based on aggregate trends and do not represent individual circumstances or geographic areas. ■

Endnotes

1 Other Part B services include services provided in the ambulatory surgical center, dialysis, and anesthesia sectors.

2 In the Commission's initial report, published in June 2017, we presented results of a regression that had designated change in use of *all* Part A and Part B services (including clinician services) as the dependent variable and change in use of clinician services as the explanatory variable. The results of that regression showed a weak positive relationship between change in use of clinician services and change in use of all Part A and Part B services. We do not believe this comparison is the best representation of the relationship between use of clinician services and overall use of Part A and Part B services because of endogeneity. That is, greater use of clinician services can drive greater use of all Part A and Part B services because clinician services are a large share of total Part A and Part B services. Nevertheless, we performed the same regression using the percentage change in service use from 2013 to 2018 among our 484 geographic areas. We found largely the same result as that we reported in the Commission's June 2017 report, a weak positive relationship.

3 PDE data include all payments to pharmacies for drugs covered under Part D, including payments by plans, beneficiaries, manufacturers (for brand-name drugs and biologics subject to the coverage-gap discount), and Medicare through the low-income cost-sharing subsidy that provides cost-sharing assistance for beneficiaries with low income and assets.

4 While prices for a given drug may vary across pharmacies, in general, drug prices do not vary systematically across the U.S. For example, for years between 2008 and 2013, variation in drug prices across states ranged from 1 percentage point to 2 percentage points below the national average to 1 percentage point to 3 percentage points above the national average. Our analysis did not adjust for regional difference in average prices because it would have had no material effect on the estimates of drug use across geographic areas based on MSAs.

5 The RxHCC model is used to risk adjust Medicare's capitated payments to Part D plans to reflect the underlying health status of each plan's enrollees. The model is based on gross plan liability before accounting for postsale rebates and discounts. Similar to the CMS–HCC model, the RxHCC model includes demographic variables, such as age, sex, and institutional status, and a set of condition categories (76 RxHCCs in 2018).

6 The Commission's Part D price index does not account for postsale rebates and discounts paid by pharmaceutical manufacturers and pharmacies and is measured at the median of the distribution. The index reflects actual prescription drug use by beneficiaries enrolled in PDPs (i.e., measured using prices that take generic substitution into account). Adjustment factors are calculated based on the price index measured in July of respective years.

7 In both 2013 and 2018, beneficiaries enrolled in PDPs filled, on average, a total of 52 standardized 30-day prescriptions per year.

8 Most of the growth in per capita Part D spending after 2013 was attributable to new high-priced drugs and biologics, typically placed on a specialty tier, that were launched after 2013. CMS allows plan sponsors to place high-priced drugs and biologics whose cost exceeds a specified threshold on a specialty tier with higher coinsurance. In 2018, that threshold was $670 per month.

9 In our previous analysis of the relationship between the physician and other health professional services and other Medicare services, we used all carrier-paid services as a proxy for clinician services (Medicare Payment Advisory Commission 2017). For this analysis, we used a subset of carrier-paid services to examine services provided by physicians and other health professionals.

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