

Beyond Average Spending: Distributional and Seasonal Commercial Insurance Trends, 2012-2021

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Americans place health care affordability among the top problems facing the country.¹ As election season approaches, the issue is likely to get increasing policy attention, particularly as estimates suggest roughly 1 in 4 middle-class Americans have medical debt.² In the decade since the Affordable Care Act was implemented, the cost-sharing structure of health plans has evolved. Enrollment in high-deductible health plans has grown steadily, from 20% of workers in 2013 to 29% of workers in 2023.³ In the same time frame, mean deductibles have grown substantially, from \$1135 in 2013 to \$1735 in 2023 for an employee with single coverage.³

Although trends in employer-sponsored health insurance premiums are widely reported,⁴ understanding trends in health care spending among commercially insured enrollees—and member out-of-pocket (OOP) spending, in particular—is critical to this issue. However, reporting on spending trends has generally focused on annual patient-level total spending averages, which, although relevant for premiums, obscure underlying distributional OOP trends with important implications, particularly for patients' perceptions of affordability and the feasibility of bill collection by providers.^{5,6}

Prior studies have focused on the disproportionate OOP costs and financial burden for patients with certain conditions or plan characteristics,^{7,8} as well as the increasing burden on the highest-paying individuals,^{9,10} but not an overall population of commercial insurance enrollees. This study of multipayer commercial claims data from 2012 through 2021 presents a novel approach to spending measurement by describing longitudinal, distributional, and seasonal trends in both plan and OOP spending. Additionally, we report spending trends before and during the COVID-19 pandemic, providing insights on how the pandemic altered the spending trajectory across the distribution.

METHODS

We examined the Health Care Cost Institute's 2012-2021 commercial insurance claims from Blue Health Intelligence, Aetna, and Humana. Enrollees younger than 65 years in commercial preferred provider

ABSTRACT

OBJECTIVES: The annual mean spending measures typically used to study longitudinal trends mask distributional and seasonal variation that is relevant to patients' perceptions of health care affordability and, in turn, provider collections. This study describes shifts in the distribution and seasonality of plan and patient out-of-pocket spending from 2012 through 2021.

STUDY DESIGN: Analysis of multipayer commercial claims data.

METHODS: Medical spending per enrollee was calculated by summing inpatient, outpatient, and professional services, which comprised plan payments and out-of-pocket payments (deductible, coinsurance, co-payment). To account for the long right tail of the spending distribution, enrollees were stratified by their decile of annual medical spending, and annual mean spending estimates were calculated overall and by decile. Mean spending estimates were also calculated by quarter-year.

RESULTS: Inflation-adjusted medical spending grew most quickly among the highest decile of spenders, without proportional growth in their out-of-pocket expenses. Out-of-pocket spending increased for the majority of enrollees in our sample prior to the COVID-19 pandemic, in real dollars and as a share of total medical spending. Out-of-pocket spending was increasingly concentrated in the early months of the calendar year, driven by deductible spending, and was lower in 2020 and 2021, plausibly due to policies limiting cost sharing for COVID-19-related services.

CONCLUSIONS: Insurance is working well to protect the highest spenders at the cost of reduced insurance generosity among spenders elsewhere in the distribution. The increasing cross-subsidization among enrollees through cost-sharing design—vs premiums—is a trend to watch among rising public concerns about underinsurance and medical debt.

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TAKEAWAY POINTS

This study of 2012-2021 commercial claims describes distributional and seasonal spending variation relevant to patients' perceptions of health care affordability.

- ▶ Inflation-adjusted annual medical spending is concentrated among the highest decile of spenders and their spending grew the fastest, without proportional growth in out-of-pocket expenses.
- ▶ Out-of-pocket spending increased for most other (ie, non-highest-spending) enrollees prior to the COVID-19 pandemic, in real dollars and as a share of medical spending.
- ▶ Out-of-pocket spending was increasingly concentrated early in the calendar year, driven by deductible spending.
- ▶ Insurance is working well to protect the highest spenders while reducing insurance generosity among spenders elsewhere in the distribution.

organization (PPO), point-of-service (POS), health maintenance organization, and exclusive provider organization plans as their primary coverage for a full calendar year were included, regardless of whether they utilized services (see the [eAppendix](#) [available at [ajmc.com](#)] for sample attrition).

We measured medical spending (allowed amounts) per enrollee by summing across all inpatient, outpatient, and professional services. Total spending comprises plan payments and OOP payments, which include cost-sharing spending through deductibles, co-payments, and coinsurance. We focused on medical spending and excluded prescription drug spending covered under the pharmacy benefit because the Health Care Cost Institute data set does not include pharmacy claims for roughly half of enrollees in the analytic sample (likely because the included plans do not administer the pharmacy benefit for those enrollees). We replicated our analyses for the subset of enrollees with prescription drug coverage, including both medical and pharmaceutical spending, as a sensitivity analysis. All monetary values were adjusted to 2021 US\$ using the Consumer Price Index for All Urban Consumers.

To illustrate longitudinal spending trends while accounting for the long right tail of the medical spending distribution, enrollees were stratified by their decile of total annual medical spending in each year (see the [eAppendix](#) for decile stratification details). Annual mean spending estimates were then calculated overall and for each decile. We also calculated mean spending measures by quarter-year to evaluate seasonal trends in spending over the decade.

We conducted a sensitivity analysis to assess whether longitudinal trends were biased by compositional changes in our sample over time. We used regression analysis to estimate mean annual total medical spending, plan spending, and member cost sharing, adjusting for enrollee age, sex, plan funding type, and plan product type (see the [eAppendix](#) for sensitivity analysis details).

RESULTS

Our sample included 329,446,097 enrollee-years spread across the 10-year study period. Most enrollees were in self-funded plans (70%) and had PPO (64%) or POS (26%) product types. The sample was

half (50%) female, with a mean of 7 clinician visits or ancillary services (such as laboratory tests) and 1 outpatient visit per enrollee-year as well as a mean of 5 inpatient stays per 100 enrollee-years. Across all years, the mean total medical spending was \$4315, including mean OOP spending of \$632.

We found that inflation-adjusted mean total annual OOP medical spending per person increased from \$578 in 2012 to a high of \$683 in 2019 before declining to \$587 in 2020 and somewhat rebounding to \$647 in 2021 ([Figure 1](#)). However, there was considerable variation, with these increases primarily driven by patients in

the upper half of the total medical spending distribution. Overall, mean annual total medical spending increased from \$4034 in 2012 to \$4774 in 2021 (18%), whereas among the top decile of spenders it increased from \$28,328 to \$34,506 (22%) over that time period ([Figure 2](#)). As a result, OOP spending as a percentage of total medical spending was lower (and relatively stable) for enrollees in the top decile of spending (14%-15% in all years in the study period) but increased for many enrollees across the distribution prior to the COVID-19 pandemic ([Figure 3](#)). Overall, OOP spending increased from 28% of total spending in 2012 to 31% of total spending in 2019 before falling to 27% and 25% in 2020 and 2021, respectively.

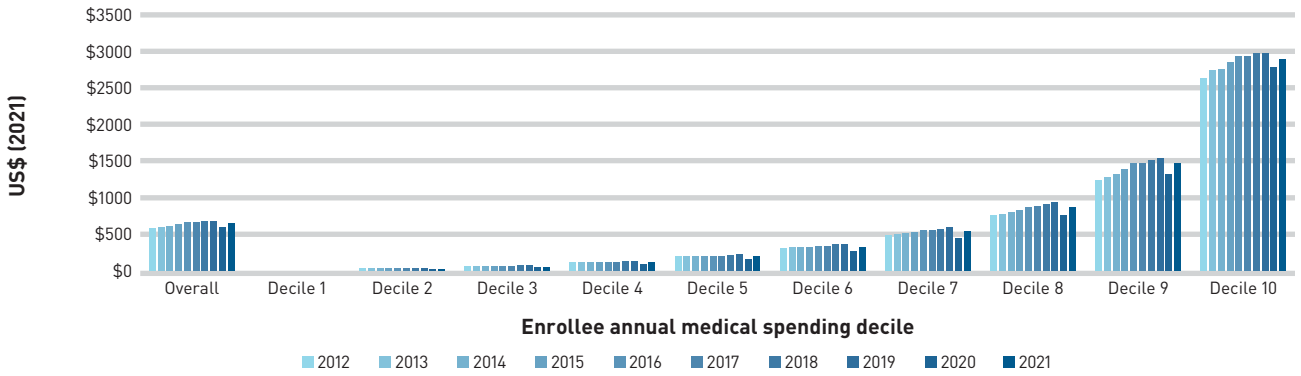
There were smaller reductions in total annual medical spending in 2020 and a faster rebound in 2021 compared with OOP spending. Overall, mean total spending declined from \$4603 in 2019 to \$4312 in 2020, increasing to \$4774 in 2021 ([Figure 4](#)). In contrast, overall mean OOP spending declined from \$683 in 2019 to \$587 in 2020 and increased to \$647 in 2021. As a result, the percentage of total spending paid OOP fell in 2020 and 2021, both overall and across all but the very lowest and highest ends of the distribution ([Figure 3](#)). These results were consistent with findings of adjusted analyses, as described in the [eAppendix](#). These results were also similar for the subset of enrollees with pharmaceutical coverage, and seasonal and distributional trends were consistent when pharmaceutical and medical spending were combined.

We also observed seasonal fluctuations underlying total and OOP spending consistent with a typical health plan's calendar year reset on deductibles and OOP limits ([Figure 5](#)). OOP spending is highest in the first quarter and lowest in the fourth quarter across all study years. The first to fourth quarter OOP gap increased from \$56 in 2012 to a peak of \$83 in 2019 prior to the pandemic onset. Total spending and plan spending were greatest in the last quarter of each year.

DISCUSSION

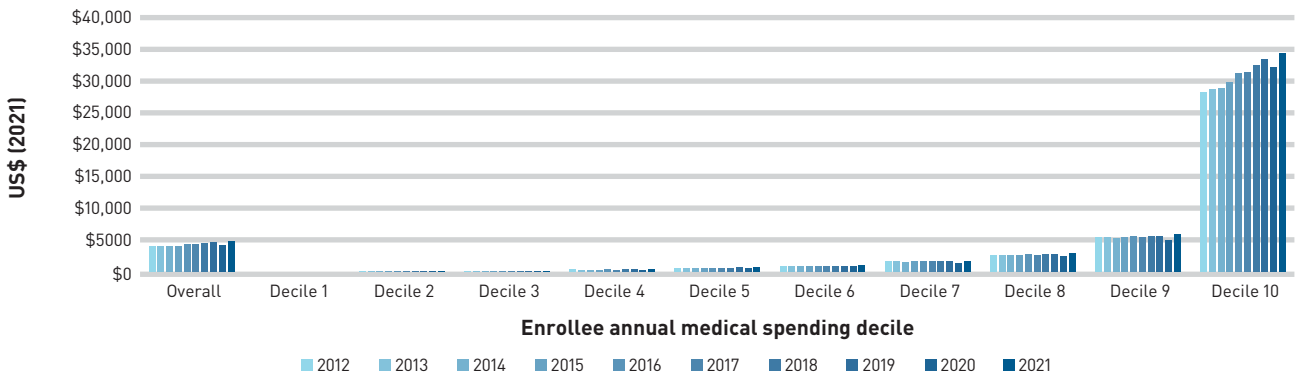
Our analysis of commercial claims offers several key insights related to trends in OOP spending. First, we found that OOP spending increased among enrollees across the upper half of the medical spending distribution. However, total medical spending increases

FIGURE 1. Mean Annual Member Out-of-Pocket Spending per Enrollee by Medical Spending Decile*



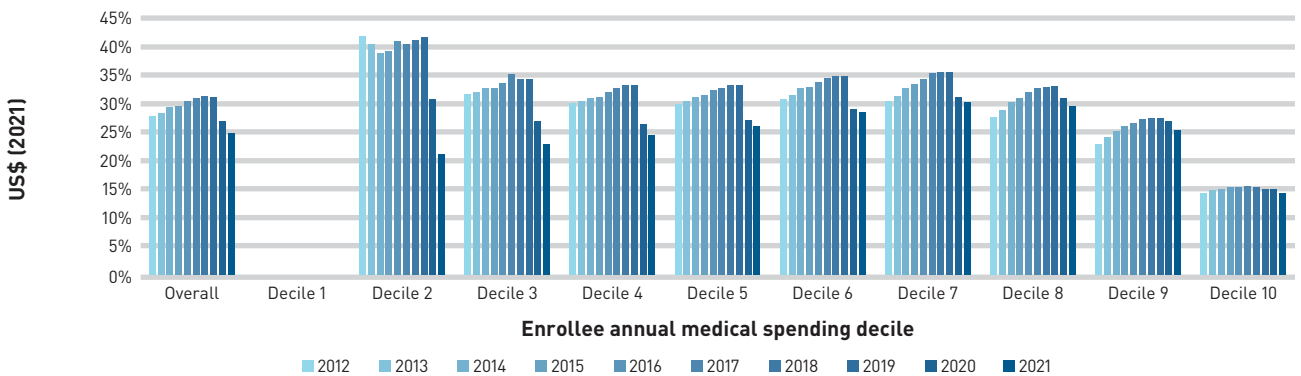
*Authors' analysis of Health Care Cost Institute commercial claims. Out-of-pocket spending is the sum of deductible, co-payment, and coinsurance spending. Dollars are adjusted to 2021 US\$ using the Consumer Price Index for All Urban Consumers.

FIGURE 2. Mean Annual Medical Spending per Enrollee by Medical Spending Decile*

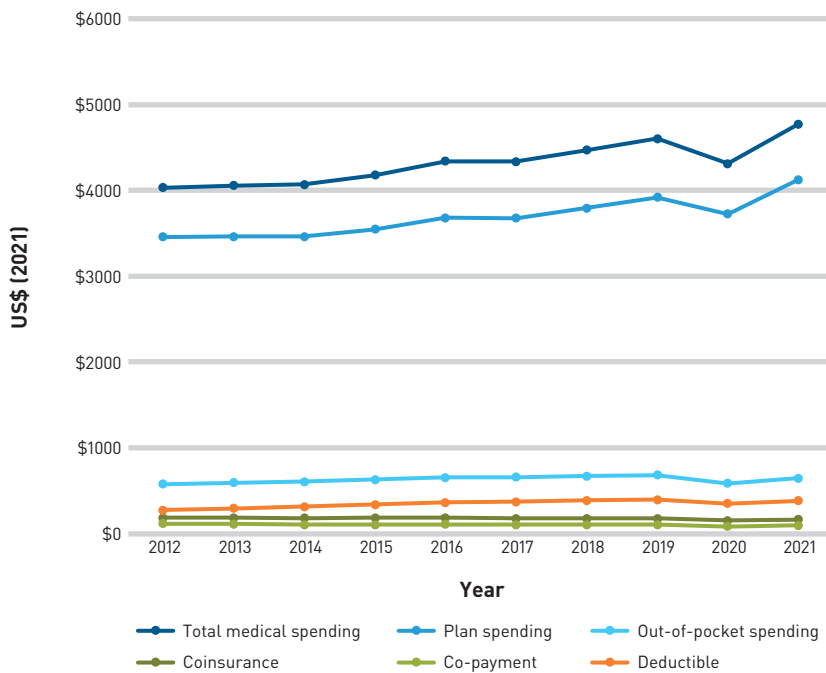


*Authors' analysis of Health Care Cost Institute commercial claims. Dollars are adjusted to 2021 US\$ using the Consumer Price Index for All Urban Consumers.

FIGURE 3. Mean Annual Percent of Medical Spending Comprising Out-of-Pocket Spending by Medical Spending Decile*



*Authors' analysis of Health Care Cost Institute commercial claims. Out-of-pocket spending is the sum of deductible, co-payment, and coinsurance spending.

FIGURE 4. Mean Annual Payment Composition per Enrollee^a

^aAuthors' analysis of Health Care Cost Institute commercial claims. Out-of-pocket spending is the sum of deductible, co-payment, and coinsurance spending. Total medical spending is the sum of out-of-pocket spending and plan spending. Dollars are adjusted to 2021 US\$ using the Consumer Price Index for All Urban Consumers.

were particularly concentrated among the top decile of spenders. As a result, prior to the COVID-19 pandemic, OOP spending as a share of total medical spending was increasing at all but the very highest and lowest ends of the spending distribution.

Our observation of lower spending during the pandemic is consistent with the results of a prior study on the medical spending of commercially insured individuals between 2018 and 2021, which found that spending decreased during the beginning of the COVID-19 pandemic in the US and recovered to prepandemic levels in 2021.¹¹ Our finding of lower OOP spending in 2020 may be partially explained by this overall reduction. However, we also found meaningful changes in the percentage paid OOP starting in 2020, when both total and OOP spending dropped considerably. Although medical spending bounced back to pre-COVID-19 levels in 2021, OOP spending did not. This may have been due to prohibitions on OOP spending for COVID-19–related testing and care during this time. Further research could explore the types of services that drove these OOP spending reductions, and additional years of data could shed light on the extent to which we should expect these trends to continue over time.

Our findings suggest that insurance is working well to protect enrollees at the highest end of the spending distribution from exorbitant OOP spending growth as their medical spending rises notably. Although we did not observe proportional levels of growth in their OOP obligations (relative to medical spending growth), we

nonetheless observed increases in the magnitude of inflation-adjusted OOP spending among these enrollees over time, in addition to high levels of OOP spending relative to other enrollees.

In some sense, this insurance protection at the high end of the spending distribution has come at the cost of reduced insurance generosity among spenders elsewhere in the distribution, who paid an increasing share OOP prior to the COVID-19 pandemic. These measurements demonstrate that the shift toward high-deductible insurance design has increased cross-subsidy within pools of commercial insurance enrollees through OOP spending. This has enabled premiums to remain lower than they otherwise would without shifts in cost-sharing design. These are expected observations, consistent with the intention of the plan design, yet still striking and informative in the context of rising public concern about underinsurance and medical debt among the insured.

Despite these COVID-19–related anomalies, our findings indicate that OOP spending rose for the majority of enrollees in our sample during the pre-COVID-19 era from 2012 to 2019, both in real dollars and as a share of total medical spending. OOP spending was also increasingly

concentrated in the early months of the calendar year, with a growing gap in OOP spending between the first and fourth quarters.

These OOP spending trends affect both patients and health care providers. Nearly one-third of US workers with employer-sponsored coverage are enrolled in a high-deductible health plan, and adults with larger deductibles have reported higher rates of cost-related access problems.^{12,13} Some enrollees in high-deductible health plans may utilize a tax-advantaged health savings account (HSA) meant to encourage enrollees to be cost conscious while planning for care. Although we do not have information about HSAs in our data, previous research has found that enrollees with more wealth and a higher level of education are more likely to have an HSA and contribute more to these accounts than enrollees with less income and lower levels of education.^{14,15} Prior studies have also found that providers are less likely to collect the full patient obligation on larger bills,¹⁶ which indicates that the seasonal spikes in patient OOP obligations we observe may worsen providers' collection rates.

The fact that high OOP spending obligations are often concentrated in a short time frame can pose additional financial difficulties for patients because only 37% of Americans could cover a \$400 emergency expense with cash on hand.^{17,18} Considering the expense of high deductibles—the mean annual deductible was \$1735 for workers with single coverage in an employer-sponsored plan in 2023—many patients are unable to fulfill their OOP obligations.³ Monthly or

quarterly, rather than annual, caps on OOP spending have been proposed as a potential mechanism for addressing this consumption smoothing challenge.¹⁹ For example, a 2022 cross-sectional study of national commercial health insurance claims data suggested that a monthly OOP cap of \$500 would affect 24.1% of the commercially insured.²⁰ The authors estimate that such a cap would cut mean annual in-network spending almost in half but would result in a 5.6% increase to premiums.²⁰ This trade-off highlights an important point: Reforms targeting OOP spending may help alleviate some financial pressures, but ultimately broader reforms that address the growing cost of health care are needed to improve affordability concerns writ large.

Limitations

Several limitations should be noted. First, these study findings may not be generalizable to commercial insurers beyond the analytic sample. In particular, the individual market was not represented in our sample. Additionally, our data use agreement restricts us from disaggregating enrollees by insurance carrier.

Second, our inclusion criteria requiring continuous coverage for a full calendar year excluded 31% of the initial sample of enrollees, representing 15% of unique claims and 17% of total medical spending. (Note that claims and spending are reported here as a percentage of annual claims and spending, but the excluded enrollees account for proportionally fewer months; that is, mean monthly spending within a given enrolled month is generally higher than mean monthly spending among full-year enrollees.) This differentially excluded people of different age groups such that individuals younger than 1 year, aged 25 to 34 years, and aged 55 to 64 years were disproportionately excluded from the analytic sample. We hypothesize that there is higher churning in these age groups due to dependents transitioning off parents' coverage at aged 26 years, higher frequency of life events (eg, marriage) for those aged 25 to 34 years, and health shocks and retirement of primary enrollees aged 55 to 64 years. Additionally, newborns and their associated costs during that first year of life were excluded because they have less than a full calendar year of enrollment. The annual and quarterly spending trends reported in this study are not generalizable to individuals who enter a plan or drop a plan partway through the year.

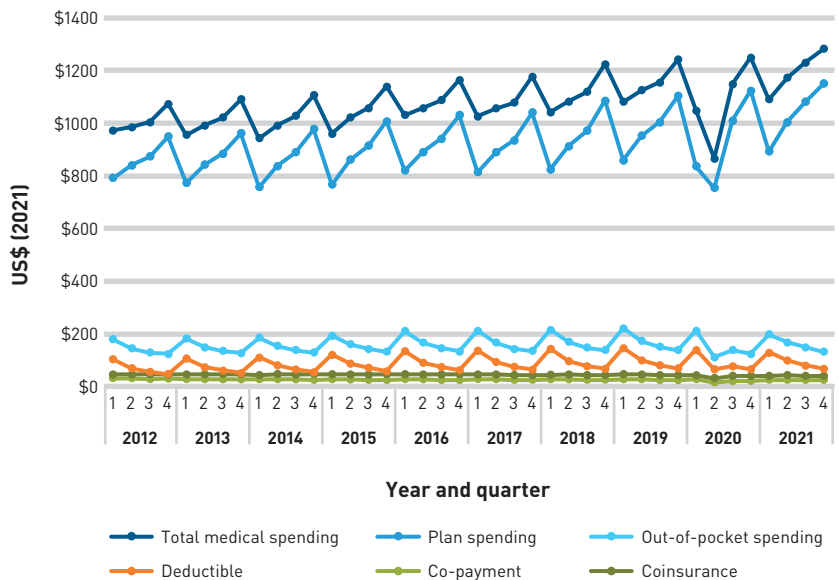
Third, our study did not measure spending at the household level because our data lack identifiers to group family members enrolled in the same plan. Although it is possible there is some smoothing of OOP and total spending at the household level, nonetheless we believe the general patterns of our findings on spending trends are

relevant regardless of whether subscribers are enrolled in individual or family coverage.

Fourth, our study did not evaluate spending on outpatient prescription drugs, which represents approximately one-fifth of total commercial spending overall.⁵ Our data did not include prescription drug claims for 47% of enrollees in our analytic sample, so we focused our primary analyses on medical spending. As a sensitivity analysis, we replicated our analysis using the subset of individuals with prescription drug coverage, including an analysis of their medical spending and their combined prescription and medical spending. Those analyses are shown in the eAppendix, and the findings are qualitatively similar.

Additionally, we did not observe whether individuals have access to flexible spending accounts or HSAs. Patients with these accounts to complement their high-deductible health plans may be less burdened by high OOP obligations than those without such accounts. We also did not directly observe the structure of cost sharing in plan design, such as OOP maximums and deductibles. Nonetheless, these findings provide important context for understanding household financial vulnerabilities and trends in medical collections practices and debt.

FIGURE 5. Mean Quarterly Payment Composition per Enrollee*



*Authors' analysis of Health Care Cost Institute commercial claims. Out-of-pocket spending is the sum of deductible, co-payment, and coinsurance spending. Total medical spending is the sum of out-of-pocket spending and plan spending. Dollars are adjusted to 2021 US\$ using the Consumer Price Index for All Urban Consumers.

CONCLUSIONS

Health care spending is highly concentrated, and total spending growth among the highest spenders has driven overall average

increases over the last decade. Insurance is working well to limit the financial burden of the highest spenders, whose portion paid OOP has been relatively flat despite their spending growth. However, subsidy increased across enrollees through cost-sharing design rather than further raising premiums. This is a trend to watch among rising public concerns about underinsurance, medical debt, and provider collections. ■

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Authorship Information: Concept and design (ELD, ET); acquisition of data (SG); analysis and interpretation of data (ELD, ET); drafting of the manuscript (ELD, SG, SR); critical revision of the manuscript for important intellectual content (SG, SR, ET); statistical analysis (ELD); obtaining funding (ET); administrative, technical, or logistic support (SR); and supervision (ET).

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1. Sample Attrition Table

	N Unique Patient-Years
Present in enrollment file	525,786,315
Aged <65 during entire year*	505,406,929
Commercial insurance is primary payer on all observed claims	499,364,910
No missing or unknown plan data**	494,012,994
Plan type is HMO, PPO, POS, or EPO***	489,975,893
Full calendar year of continuous enrollment in medical benefits	329,448,799
No negative values for any total cost variable in any quarter of the year	329,446,104
Non-missing value for state: <i>FINAL ELIGIBLE ENROLLEES</i>	329,446,097

*If a patient ages into another age band or there is over 65 flag during the calendar year, the higher age band/over65 flag is applied across the entire calendar year.

**Patients are excluded for plan-related data if:

1. The plan type is missing, NULL, or "unknown".
2. Funding type is missing or NULL.
3. There is more than one plan type or more than one type of funding for a given calendar year.

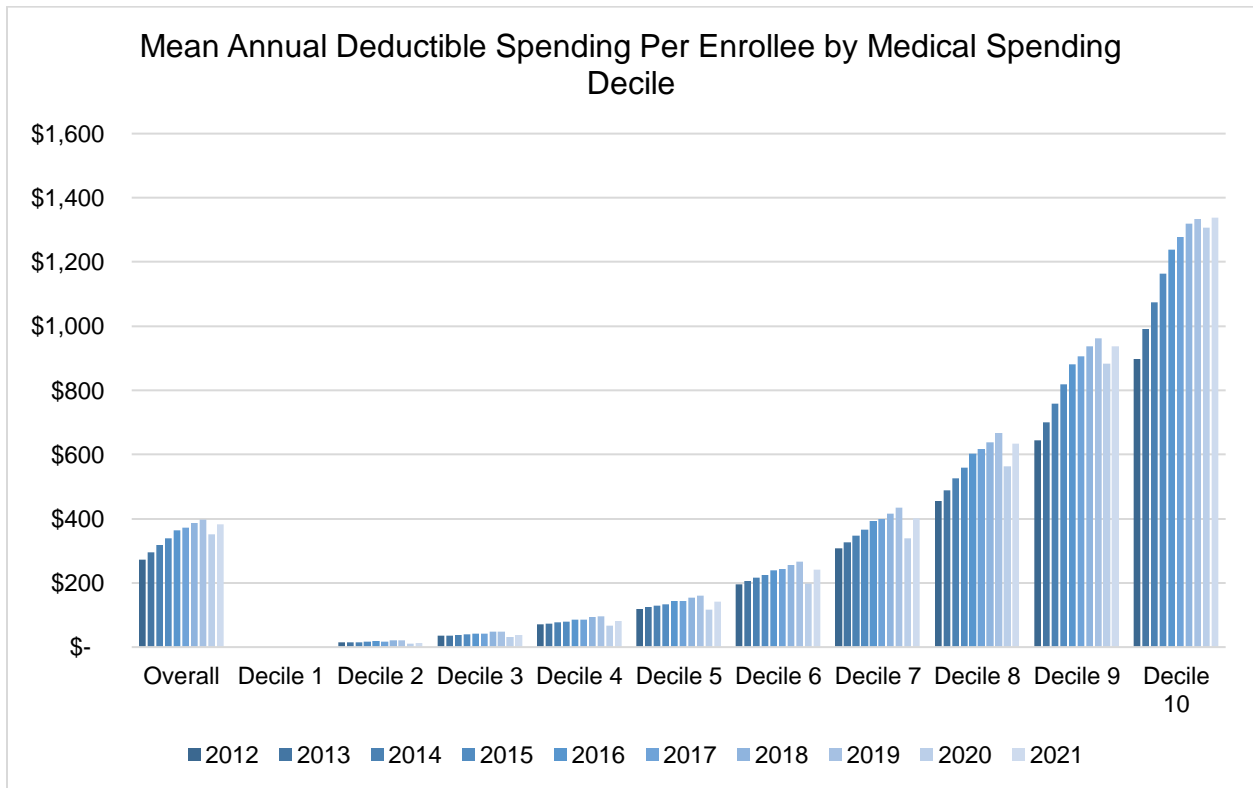
***Enrollees with indemnity plans are excluded from the sample.

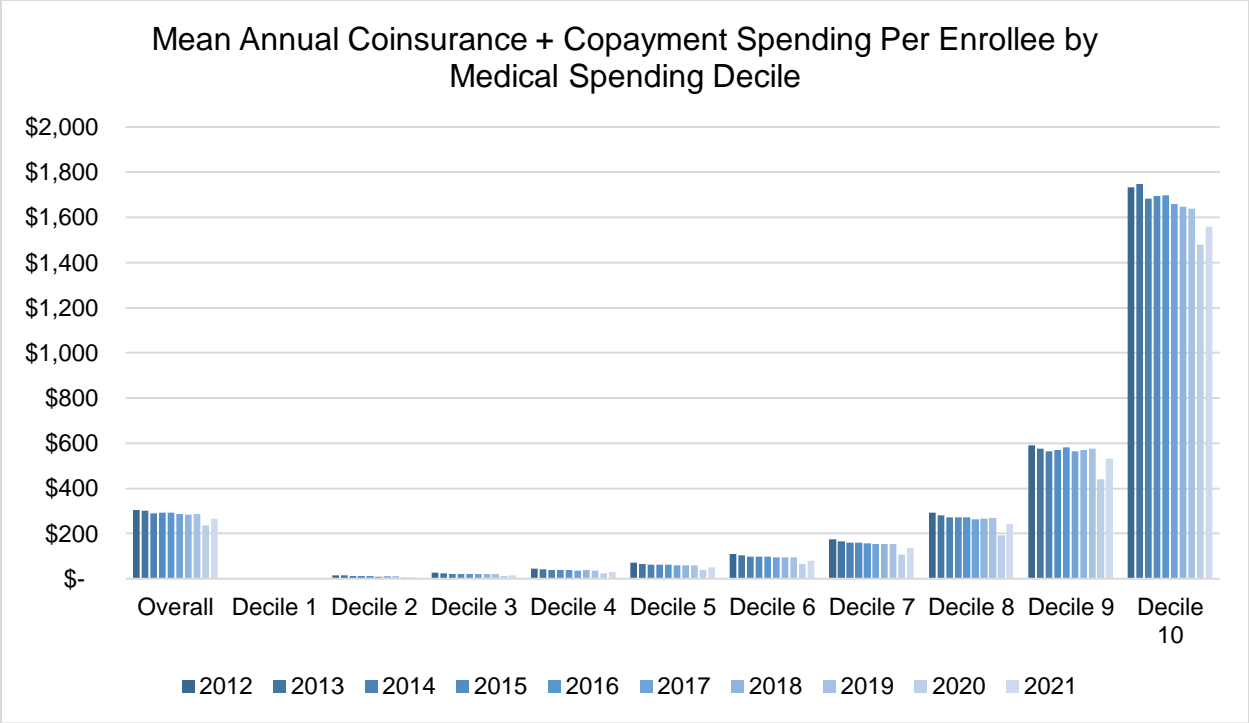
2. Medical Spending Decile Stratification

Enrollees with \$0 annual medical spending were assigned to the first (lowest) decile of the medical spending distribution. In each year, more than 10% of enrollees had \$0 spending and this yielded an inflated proportion of enrollees in the first decile and less than 10% of enrollees in the second decile. The third through tenth deciles each include 10% of the enrollee population.

3. Disaggregation of Deductible from Cost-Sharing Components

Figure 1 displays mean annual OOP spending per enrollee by medical spending decile, with deductible, coinsurance, and copayment aggregated. Here, we disaggregate between the deductible spending type and coinsurance and copayment spending type. These supplemental figures demonstrate that increases in OOP spending over the study period have been driven by the deductible component while coinsurance and copayment have remained fairly stagnant or declined within deciles.





4. Sensitivity Analysis Adjusting for Enrollee Characteristics

To assess whether longitudinal trends were biased by compositional changes in our sample over time, we performed regression analysis to estimate mean annual total medical spending and member cost-sharing adjusting for enrollee age, sex, plan funding type, plan product type, and state in years 2012-2021 by decile of medical spending. For each spending outcome, we estimated a model in the form:

$$Y_{i,t} = \beta_0 + \beta_t X_t + \delta_i + \epsilon_{i,t}$$

Where $Y_{i,t}$ is total annual spending in inflation-adjusted dollars for enrollee i in year $t=2012-2021$, and X_t is a Boolean indicator for the year. δ_i is a vector of enrollee characteristics: age band, sex, plan funding type, plan product type, and state. ϵ is the error term.

This model was fit separately for each decile of the distribution of total annual medical spending using Stata.¹

We assessed the distribution of spending outcomes, residuals of fitted regression, and other fit statistics to identify a model structure that fit well for each spending outcome following methods recommended in Deb, Norton, and Manning (2017) Chapter 4.² We first employed linear regression and observed that this fit well for the strata in the lower part of the spending distribution, but was less well fit in the upper strata of the distribution. This is largely explained by the distributions of the outcomes within strata – by applying spending thresholds to each strata, we artificially created within-strata distributions that more closely resemble a normal distribution at the lower decile strata, but retain a long right tail in the upper two decile strata.

¹ StataCorp. 2023. *Stata Statistical Software: Release 18*. College Station, TX: StataCorp LLC.
² Deb, Partha, Edward Norton, and Willard Manning (2017), *Health Econometrics Using Stata*, College Station, TX: Stata Press

To better accommodate the skewed distributions in the upper decile strata, we then fit a generalized linear model with a log-link and a Gamma family distribution, following methods recommended in Deb, Norton, and Manning (2017) Chapter 5.³ Adjusted annual means of the spending outcomes were calculated at the means for other covariates using the Stata “margins” command.

The results of these adjusted analyses were similar to the unadjusted results (shown below), generally within pennies and rounding to the same nearest dollar in the lower decile strata and within a few dollars in the upper two strata. We report the unadjusted results as our primary findings due to accessibility of methods and interpretation.

Note that no results are shown for the first decile because that decile only includes enrollees with \$0 spending.

³ Deb, Partha, Edward Norton, and Willard Manning (2017), *Health Econometrics Using Stata*, College Station, TX: Stata Press

Mean Annual Member Out-of-Pocket Spending Per Enrollee by Medical Spending Decile

Unadjusted Means (Primary Analysis Presented in Figure 1)

	Decile								
Year	2	3	4	5	6	7	8	9	10
2012	\$31	\$61	\$116	\$190	\$306	\$482	\$747	\$1,236	\$2,630
2013	\$30	\$60	\$116	\$191	\$309	\$492	\$768	\$1,276	\$2,739
2014	\$28	\$60	\$116	\$193	\$315	\$507	\$797	\$1,322	\$2,757
2015	\$29	\$61	\$118	\$196	\$323	\$524	\$830	\$1,387	\$2,858
2016	\$31	\$64	\$124	\$205	\$337	\$551	\$876	\$1,461	\$2,936
2017	\$27	\$62	\$122	\$203	\$337	\$552	\$883	\$1,471	\$2,938
2018	\$33	\$68	\$130	\$214	\$350	\$569	\$903	\$1,506	\$2,966
2019	\$33	\$69	\$134	\$220	\$361	\$588	\$935	\$1,539	\$2,975
2020	\$18	\$45	\$91	\$156	\$262	\$447	\$755	\$1,322	\$2,785
2021	\$19	\$54	\$111	\$191	\$323	\$538	\$877	\$1,469	\$2,896

Adjusted Means Using Linear Model

	Decile								
Year	2	3	4	5	6	7	8	9	10
2012	\$31	\$61	\$117	\$191	\$308	\$484	\$748	\$1,240	\$2,657
2013	\$30	\$61	\$117	\$192	\$310	\$494	\$770	\$1,279	\$2,757
2014	\$28	\$61	\$117	\$193	\$316	\$508	\$798	\$1,323	\$2,766
2015	\$29	\$61	\$117	\$196	\$323	\$523	\$828	\$1,380	\$2,849
2016	\$31	\$64	\$123	\$205	\$337	\$551	\$875	\$1,456	\$2,924
2017	\$26	\$62	\$121	\$202	\$336	\$551	\$880	\$1,466	\$2,925
2018	\$33	\$68	\$130	\$213	\$349	\$568	\$903	\$1,508	\$2,962
2019	\$33	\$69	\$134	\$220	\$361	\$588	\$936	\$1,541	\$2,965
2020	\$18	\$45	\$91	\$155	\$260	\$444	\$753	\$1,323	\$2,780
2021	\$19	\$54	\$111	\$191	\$323	\$540	\$880	\$1,475	\$2,901

Adjusted Means Using Generalized Linear Model, Log-Link and A Gamma Family Distribution

	Decile								
Year	2	3	4	5	6	7	8	9	10
2012	\$31	\$60	\$115	\$188	\$303	\$476	\$734	\$1,210	\$2,567
2013	\$29	\$59	\$114	\$188	\$305	\$485	\$754	\$1,247	\$2,663
2014	\$28	\$59	\$114	\$189	\$310	\$499	\$782	\$1,291	\$2,675
2015	\$28	\$59	\$115	\$191	\$316	\$514	\$811	\$1,346	\$2,760
2016	\$30	\$62	\$120	\$200	\$330	\$540	\$856	\$1,419	\$2,836
2017	\$26	\$60	\$118	\$197	\$329	\$541	\$862	\$1,429	\$2,841
2018	\$32	\$65	\$126	\$208	\$342	\$557	\$884	\$1,468	\$2,873
2019	\$32	\$66	\$130	\$214	\$353	\$576	\$916	\$1,502	\$2,879
2020	\$18	\$43	\$88	\$150	\$254	\$435	\$738	\$1,294	\$2,713
2021	\$19	\$52	\$107	\$183	\$314	\$527	\$862	\$1,445	\$2,839

Mean Annual Medical Spending Per Enrollee by Medical Spending Decile

Unadjusted Means (Primary Analysis Presented in Figure 2)

	Decile								
Year	2	3	4	5	6	7	8	9	10
2012	\$72	\$194	\$385	\$634	\$995	\$1,592	\$2,721	\$5,468	\$28,328
2013	\$70	\$192	\$381	\$627	\$982	\$1,570	\$2,687	\$5,411	\$28,710
2014	\$68	\$188	\$375	\$616	\$965	\$1,545	\$2,649	\$5,346	\$28,983
2015	\$69	\$190	\$378	\$622	\$976	\$1,567	\$2,691	\$5,445	\$29,899
2016	\$71	\$194	\$386	\$635	\$997	\$1,601	\$2,758	\$5,604	\$31,182
2017	\$60	\$181	\$372	\$618	\$973	\$1,568	\$2,704	\$5,505	\$31,416
2018	\$74	\$201	\$393	\$641	\$1,000	\$1,603	\$2,751	\$5,607	\$32,452
2019	\$74	\$203	\$403	\$661	\$1,035	\$1,659	\$2,837	\$5,751	\$33,452
2020	\$54	\$170	\$346	\$575	\$898	\$1,428	\$2,439	\$5,008	\$32,238
2021	\$88	\$235	\$452	\$731	\$1,127	\$1,771	\$2,967	\$5,903	\$34,506

Adjusted Means Using Linear Model

	Decile								
Year	2	3	4	5	6	7	8	9	10
2012	\$72	\$194	\$385	\$634	\$995	\$1,592	\$2,721	\$5,467	\$28,560
2013	\$70	\$192	\$381	\$627	\$982	\$1,570	\$2,687	\$5,411	\$28,889
2014	\$68	\$188	\$375	\$616	\$965	\$1,545	\$2,649	\$5,345	\$29,119
2015	\$69	\$190	\$378	\$622	\$976	\$1,567	\$2,691	\$5,444	\$29,972
2016	\$71	\$194	\$386	\$635	\$997	\$1,602	\$2,758	\$5,603	\$31,176
2017	\$60	\$181	\$372	\$618	\$973	\$1,568	\$2,704	\$5,504	\$31,367
2018	\$74	\$201	\$393	\$641	\$1,000	\$1,602	\$2,751	\$5,608	\$32,401
2019	\$74	\$203	\$403	\$661	\$1,035	\$1,658	\$2,837	\$5,752	\$33,240
2020	\$54	\$170	\$346	\$575	\$898	\$1,427	\$2,439	\$5,010	\$32,103
2021	\$88	\$235	\$452	\$731	\$1,127	\$1,770	\$2,968	\$5,905	\$34,352

Adjusted Means Using Generalized Linear Model, Log-Link and A Gamma Family Distribution

	Decile								
Year	2	3	4	5	6	7	8	9	10
2012	\$72	\$194	\$385	\$634	\$995	\$1,592	\$2,721	\$5,467	\$28,108
2013	\$70	\$192	\$381	\$627	\$982	\$1,570	\$2,687	\$5,411	\$28,445
2014	\$67	\$188	\$375	\$616	\$965	\$1,545	\$2,649	\$5,345	\$28,676
2015	\$69	\$190	\$378	\$622	\$976	\$1,567	\$2,691	\$5,444	\$29,534
2016	\$71	\$194	\$386	\$635	\$997	\$1,602	\$2,758	\$5,603	\$30,736
2017	\$60	\$181	\$372	\$618	\$973	\$1,568	\$2,704	\$5,503	\$30,922
2018	\$74	\$201	\$393	\$641	\$1,000	\$1,602	\$2,751	\$5,607	\$31,899
2019	\$74	\$203	\$403	\$661	\$1,035	\$1,658	\$2,837	\$5,752	\$32,732
2020	\$54	\$170	\$346	\$575	\$898	\$1,427	\$2,439	\$5,009	\$31,579
2021	\$88	\$235	\$452	\$731	\$1,127	\$1,770	\$2,967	\$5,905	\$33,810

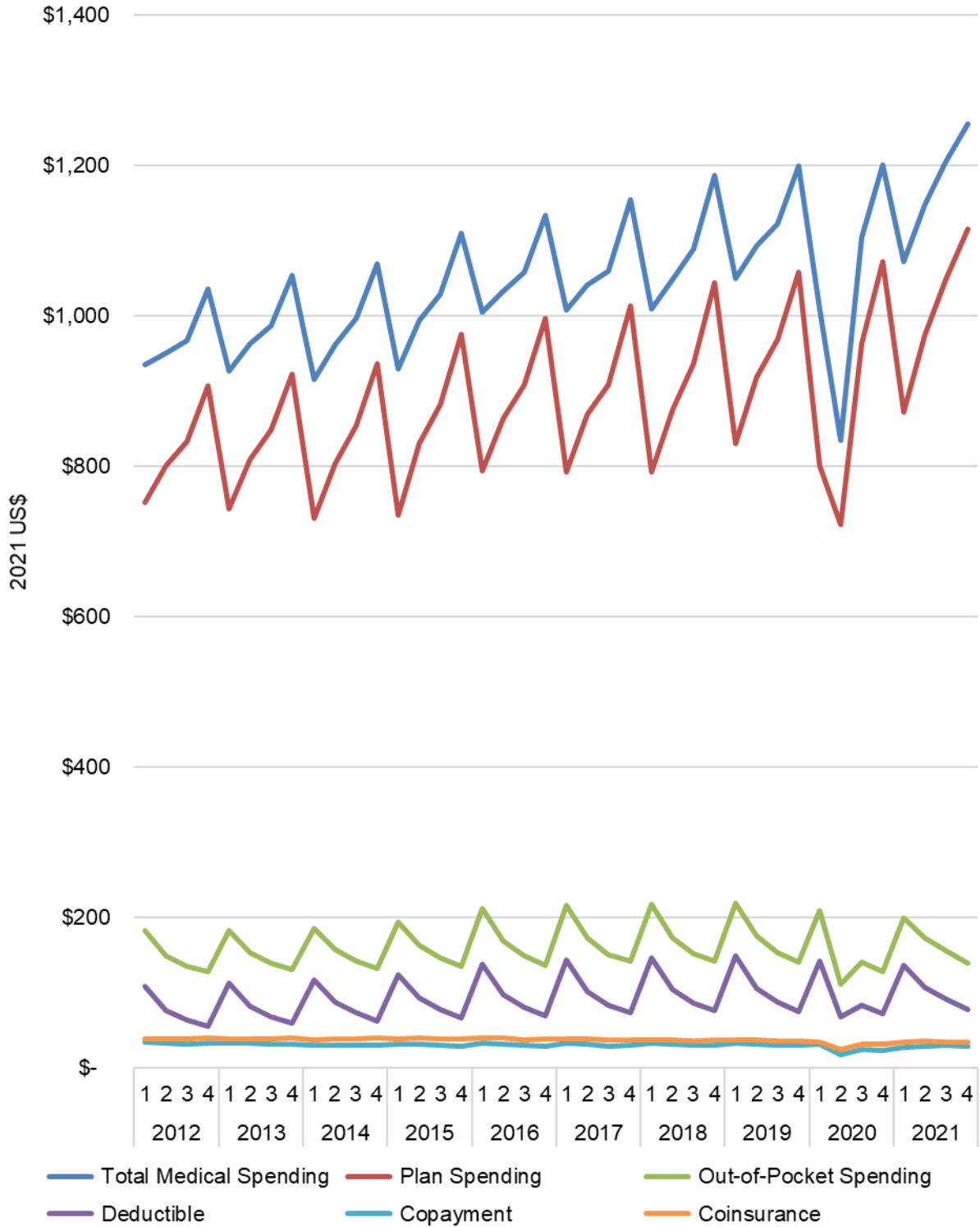
5. Replicated Analyses on Subset with Prescription Drug Coverage

A limitation of this study is the focus on medical spending – inpatient, outpatient, and professional – with the exclusion of outpatient prescription drug spending. We made this decision because no prescription drug coverage data is provided for 47% of the HCCI enrollee sample. We conducted several sensitivity analyses on the subset of enrollees with prescription drug coverage. Notably, prescription drug claims combine coinsurance and copayment forms of out-of-pocket payment.

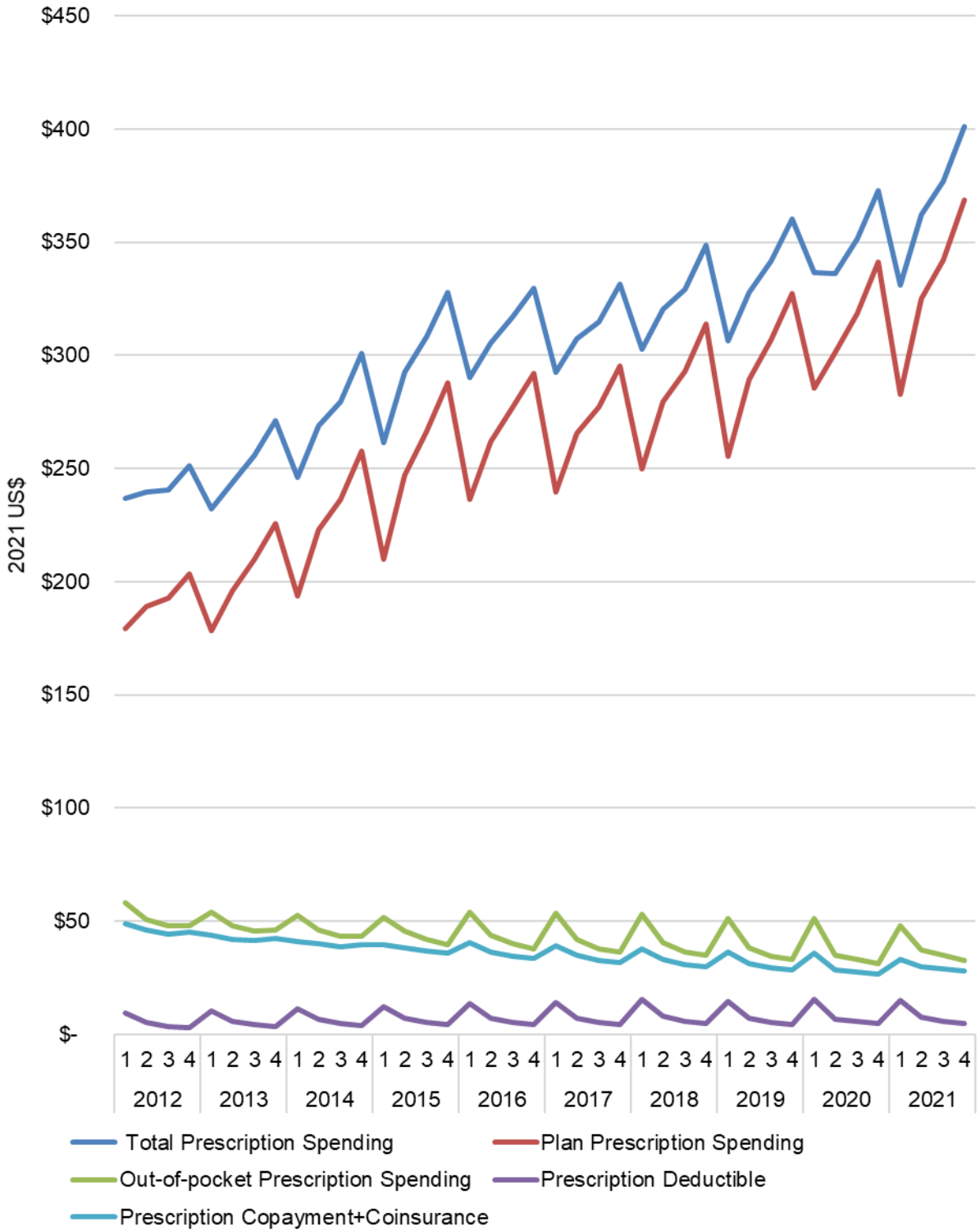
First, we replicated our seasonal trends analysis for the subset of enrollees with prescription drug coverage for their medical spending alone, their prescription drug coverage alone, and their combined medical and prescription drug coverage. These trends are shown in the three figures below, which are analogous to Figure 5 in the primary set of figures. We observe that seasonal trends in total medical spending, prescription drug spending, and the combined medical and prescription drug spending are remarkably similar to the results presented in our primary Figure 5. One observed difference is that cost-sharing for prescriptions is predominantly in the form of copayment and coinsurance rather than deductible, whereas deductible spending is the leading form of cost-sharing for medical spending.

Second, we replicated the analyses presented in the main Figures 1, 2, and 3 combining medical and prescription drug spending. These analyses stratify enrollees by decile of medical and prescription drug spending in each year and graph the mean annual medical and prescription drug spending, mean annual out-of-pocket spending, and the mean annual share of total spending attributable to out-of-pocket spending for each strata. We observe trends similar to the primary analysis in this sensitivity analysis. The results are shown in the figures below.

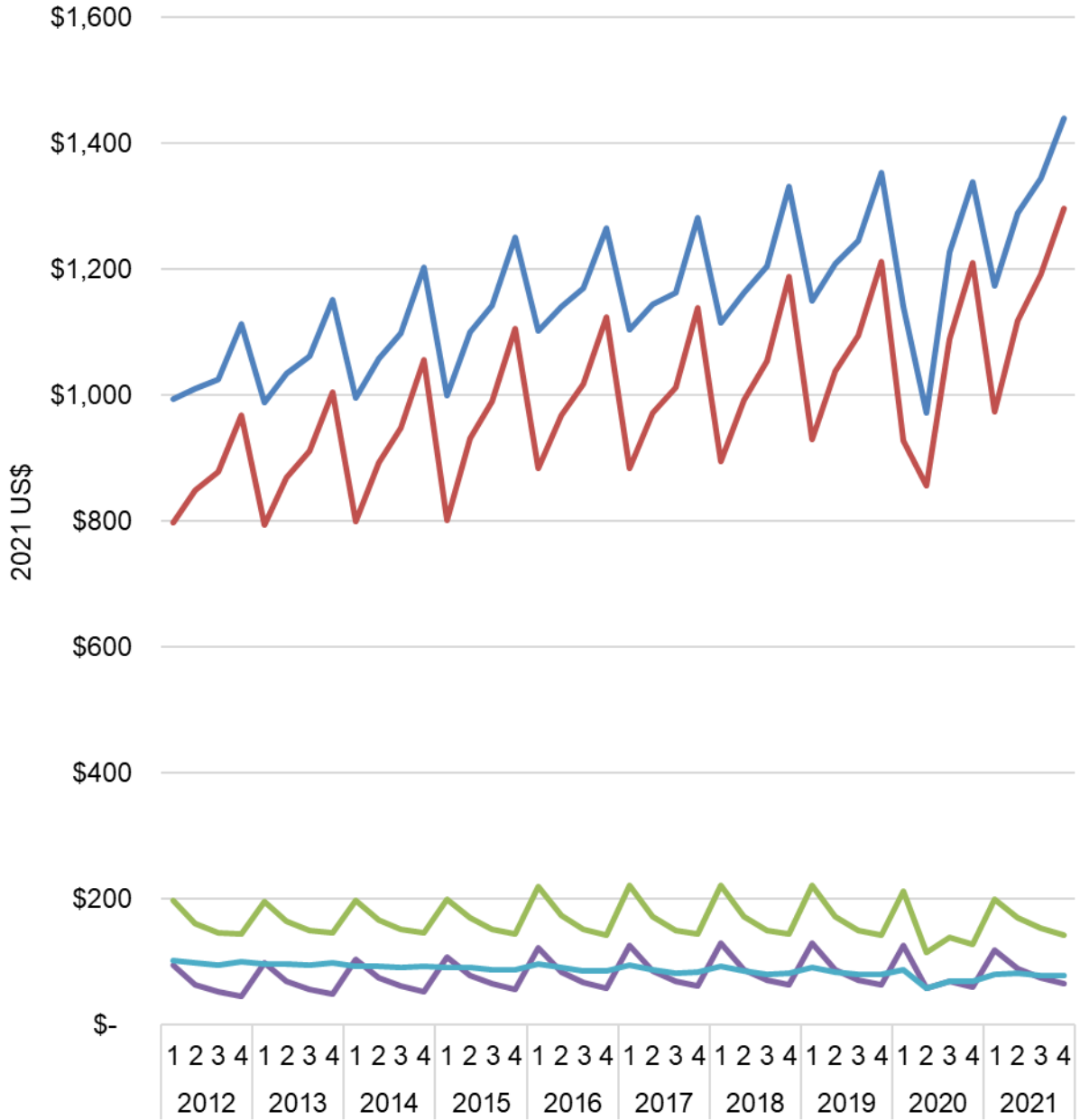
Population Having 12 Months Pharmacy Benefit Administration:
 Mean Total Medical Spending by Year and Quarter



Population Having 12 Months Pharmacy Benefit Administration:
Mean Pharmacy Spending by Year and Quarter

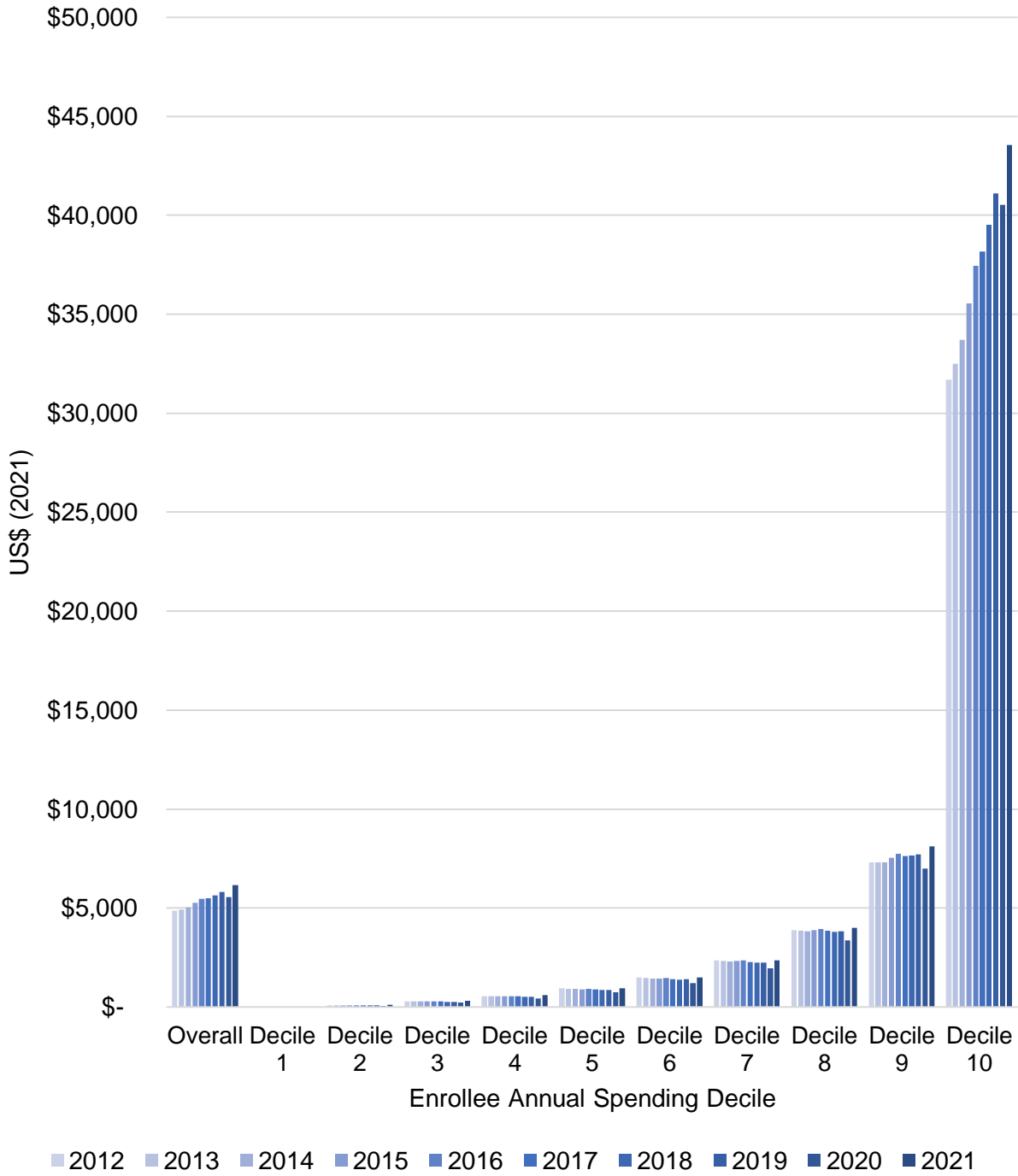


Population Having 12 Months Pharmacy Benefit Administration:
 Mean Total Medical and Pharmacy Spending by Year and Quarter

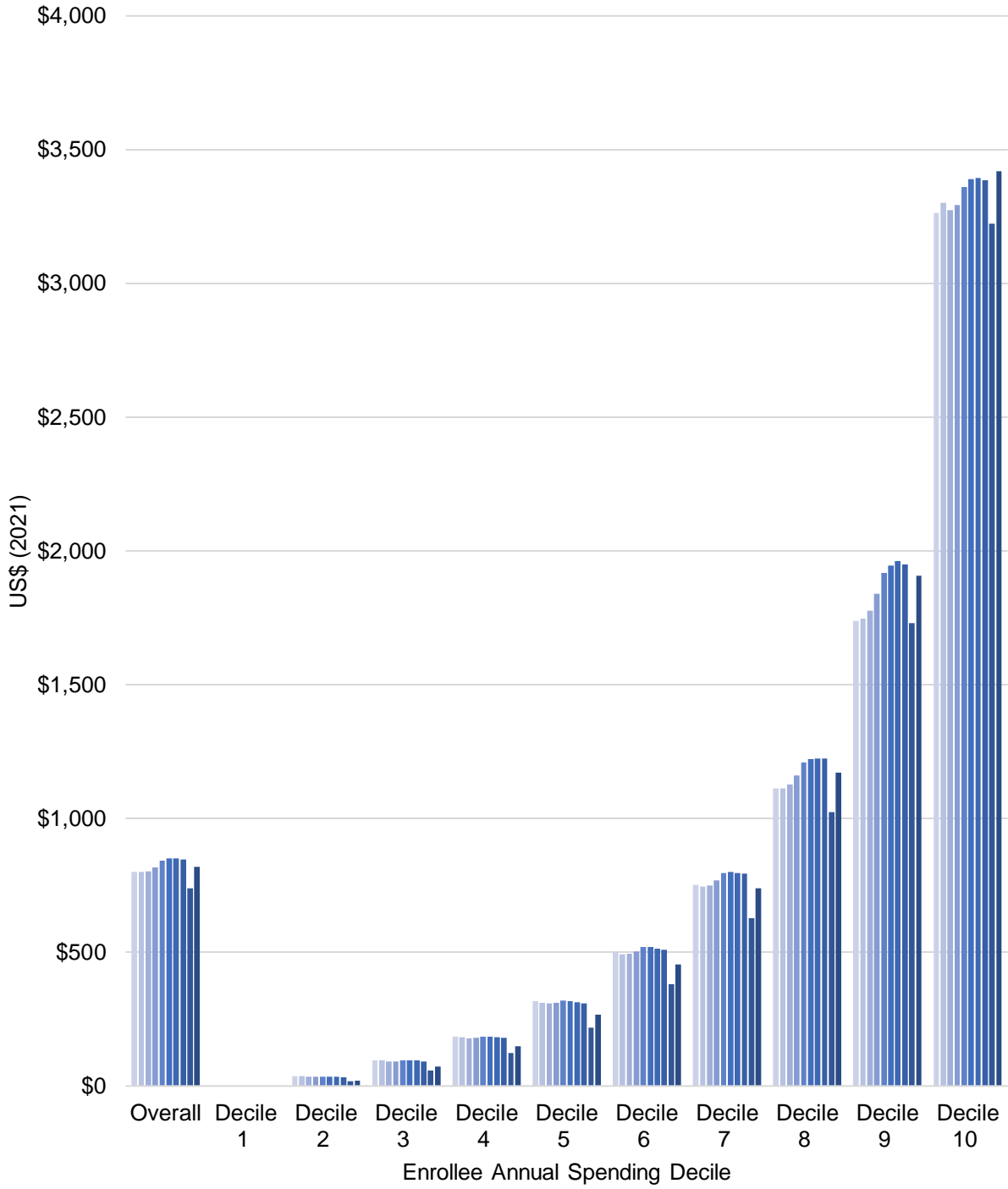


- Total Medical & Prescription Spending
- Plan Medical & Prescription Spending
- Out-of-pocket Medical & Prescription Spending
- Medical & Prescription Deductible
- Medical & Prescription Coinsurance & Copayment

Mean Annual Medical & Prescription Spending Per Enrollee by Medical & Prescription Spending Decile

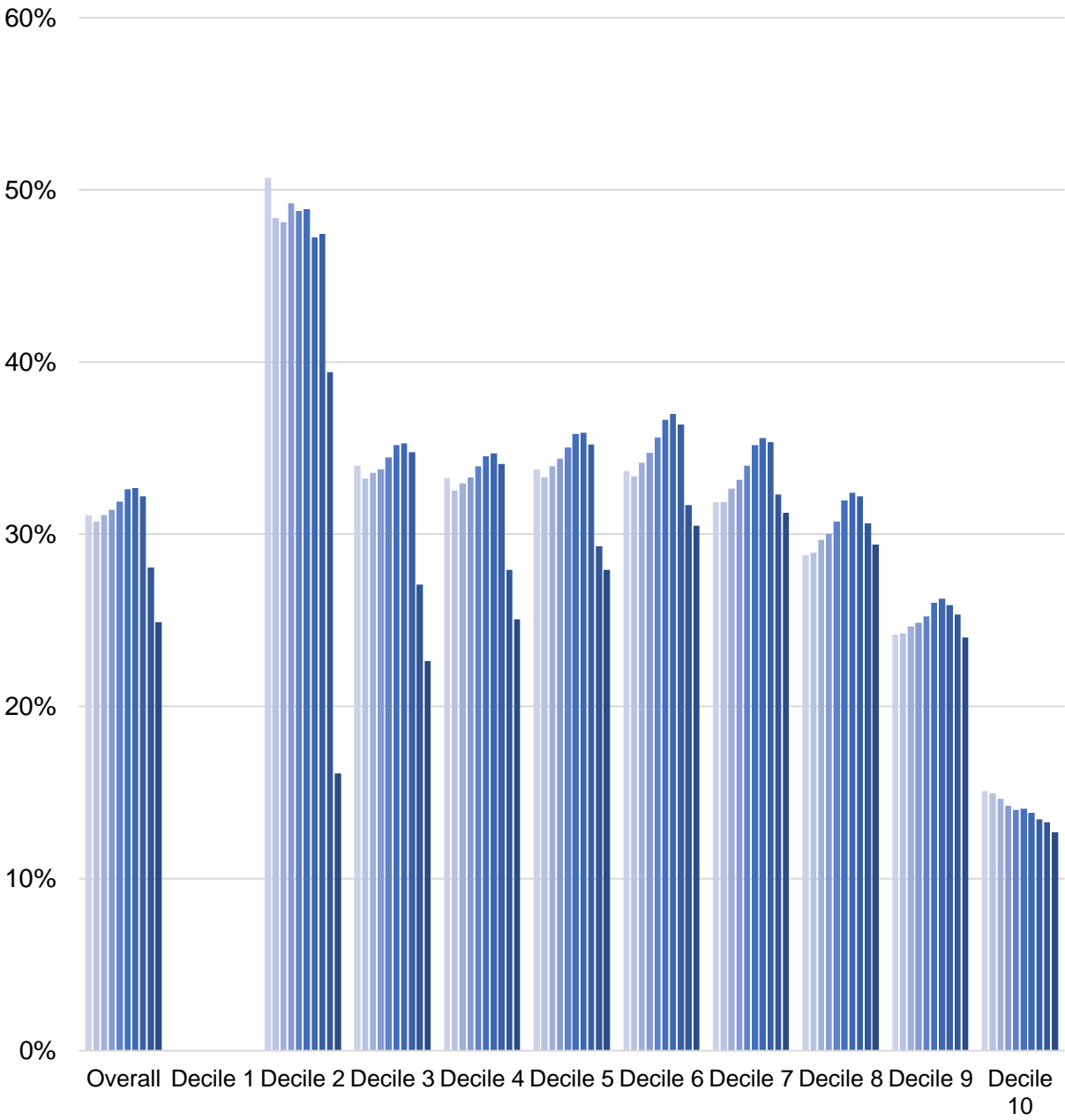


Mean Annual Member Out-of-Pocket Spending for Medical & Prescription Services Per Enrollee by Medical & Prescription Spending Decile



■ 2012 ■ 2013 ■ 2014 ■ 2015 ■ 2016 ■ 2017 ■ 2018 ■ 2019 ■ 2020 ■ 2021

Mean Annual Percent of Medical & Prescription Spending Comprising Out-of-Pocket Spending by Medical & Prescription Spending Decile



■ 2012
 ■ 2013
 ■ 2014
 ■ 2015
 ■ 2016
 ■ 2017
 ■ 2018
 ■ 2019
 ■ 2020
 ■ 2021