

Washington's Health Care Cost Growth Benchmark Program

**Age and sex risk adjustment, pooled
variance, and confidence interval of cost-
growth calculation for provider reporting**

August 2024

Version History

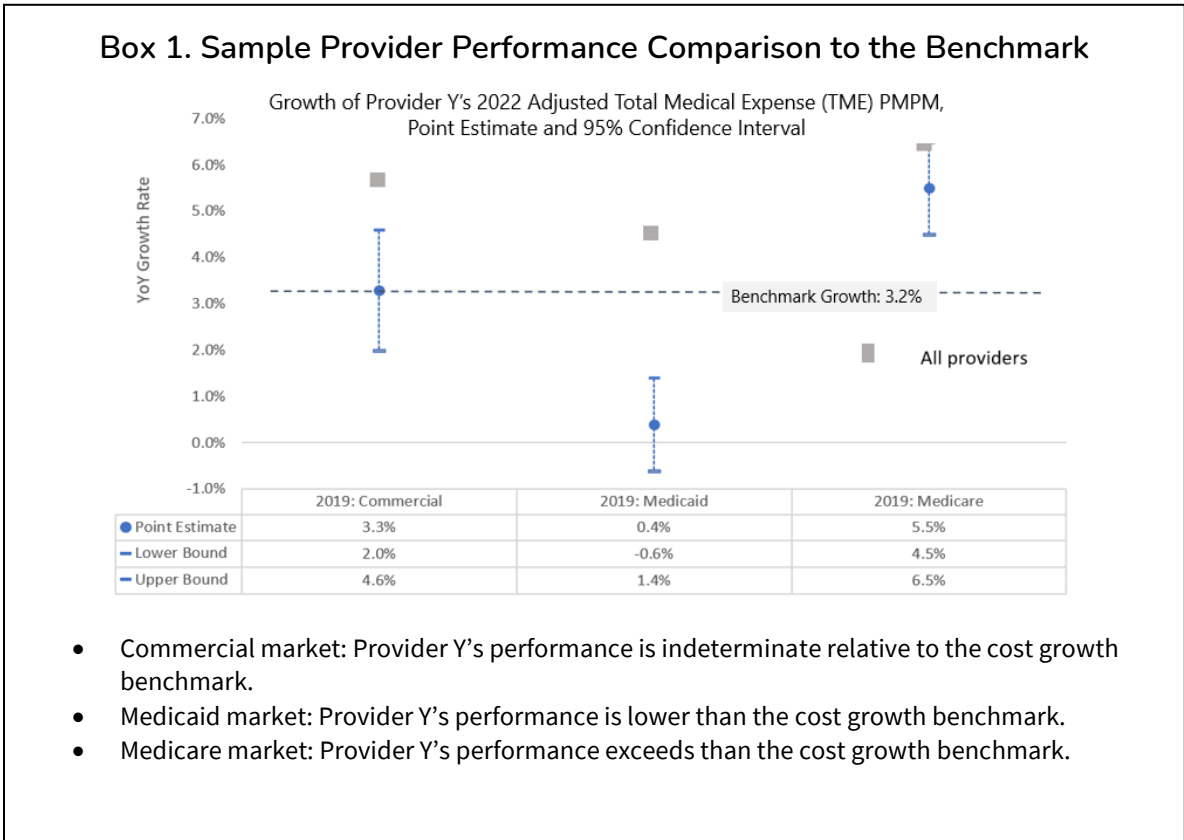
Version Number	Release Date	Description of Changes
1.0	June 06, 2024	Presented to Provider Reporting Webinar
1.1	June 12, 2024	Modified "risk-adjustment" term to "age-sex risk-adjustment"
1.2	Aug 01, 2024	Edited footnote 2 to note that Federal Employee Health Benefit Plans (FEP) insurance categories with split nature are excluded in provider reporting; added threshold for provider reporting for each market.

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Overview

To measure provider performance against the health care cost growth benchmark, we compare the year-on-year overall as well as market growth rate of each provider’s adjusted total medical expense (TME) per member per month (PMPM) relative to the set benchmark. The adjusted TME PMPM is the sum of age-sex risk-adjusted truncated claims PMPM and unadjusted non-claims PMPM.



To make the comparison, the point estimate and the 95% confidence interval of the growth rate of adjusted TME PMPM will be calculated. Providers exceed the benchmark if the lower bound of the provider’s cost growth rate exceeds the benchmark. Performance is said to be indeterminate if the confidence interval contains the growth benchmark. Providers did not exceed the growth benchmark if the upper bound of the provider’s growth rate is lower than the benchmark (See Box 1 for sample analysis by market).

To be able to measure performance, the following needs to be done:

- 1) Calculate the age-sex risk-adjusted truncated claims PMPM which is needed to calculate (3). Section A provides the steps on how to do this.
- 2) Calculate the pooled standard deviation which is needed to calculate (3). Section B provides the steps on how to do this.
- 3) Calculate the point estimate and the 95% confidence interval of the growth rate of TME PMPM. Section C provides the steps on how to do this.

A [supplemental excel file](#) provides sample data and calculation for all three sections.

Provider reporting is done for providers that have at least 120,000 member months (approximately equivalent to 10,000 covered lives) based on data from data call. However, even if a provider met this threshold, provider reporting on market performance is limited to markets where a provider has at least 60,000 member months (approximately equivalent to 5,000 covered lives).

A. Steps in calculating the age-sex risk-adjusted truncated claims PMPM¹

Carriers submit truncated claims² and member months by age-sex band, provider, insurance category code and reporting year. The goal is to calculate each provider’s risk-adjusted truncated claims PMPM for each market and reporting year. The risk adjustment will account for demographic risk, specifically age and sex risks.

The steps in calculating provider *i*’s age-sex risk-adjusted truncated claims PMPM for each market and reporting year are:

1. For each provider in each market and reporting year:
 - a) Calculate $MM_{i,m,t}$ which is the total member months for provider *i* in market *m* and year *t*.³ (See [Appendix A](#) for Original Insurance Category Code, Modified Insurance Category Code and Market Code Crosswalk. Unlike the original insurance category code, the modified insurance category groups “Commercial: Full Claims” and “Commercial: Partial Claims” into one category.)
2. For each provider in each modified insurance category groups and reporting year:
 - a) Calculate $MM_{i,ic,t}$ which is the total member months for provider *i* in modified insurance category code *ic* in year *t*.
 - b) Calculate $TC_{i,ic,t}^{unadj}$ which is the total truncated claims spending for provider *i* in modified insurance category code *ic* in year *t*.⁴
 - c) Calculate the $TCP_{i,ic,t}^{unadj}$ which is the truncated claims spending PMPM for provider *i* in modified insurance category code *ic* in year *t*. The formula is:

$$TCP_{i,ic,t}^{unadj} = TC_{i,ic,t}^{unadj} / MM_{i,ic,t}$$

- d) Calculate $PDW_{i,ic,t}$ which is the population distribution weight of provider *i* in modified insurance category code *ic* and year *t* relative to provider *i*’s overall *m* market size at year *t*. The formula is:

$$PDW_{i,ic,t} = MM_{i,ic,t} / MM_{i,m,t}$$

¹ The age-sex risk-adjustment methodology is similar to what has been used by other states in their cost growth benchmark programs, including Rhode Island and Connecticut.

² Truncated claims spending refers to all payments spent on members after spending above the truncation threshold has been deducted on a per member basis. This is to ensure that a small number of expensive covered lives does not push an entity’s cost growth beyond the benchmark. For more details, see page A11-A16 of the [Technical manual](#).

³ To aggregate by market, the modified insurance categories are grouped by market. The crosswalk is in Appendix A. The report excludes spending from Federal Employee Health Benefit Plans (FEP) insurance categories with split plan feature in Washington State. The split nature of plans makes it challenging to avoid double counting member months by provider.

⁴ The superscript “*unadj*” indicates that the number is coming from the raw data and is not truncated and adjusted for demographic risk (i.e., age and sex risk).

3. For each modified insurance category code and reporting year:
 - a) Calculate $MM_{ic,t}$ which is the total member months for modified insurance category code ic in year t .
 - b) Calculate $TC_{ic,t}^{unadj}$ which is the total truncated claims spending for modified insurance category code ic in year t .
 - c) Calculate $TCP_{ic,t}^{unadj}$ which is the truncated claims spending PMPM for modified insurance category code ic in year t . Specifically, the formula is:

$$TCP_{ic,t}^{unadj} = TC_{ic,t}^{unadj} / MM_{ic,t}$$

4. For each age-sex band in each modified insurance category code (ICC) and reporting year:
 - a) Calculate $MM_{ab,ic,t}$ which is the total member months for age-sex band ab in modified insurance category code ic and year t .
 - b) Calculate $TC_{ab,ic,t}^{unadj}$ which is the total truncated claims spending for age-sex band ab in modified insurance category code ic and year t .
 - c) Calculate $TCP_{ab,ic,t}^{unadj}$ which is the truncated claims spending PMPM for age-sex band ab in modified insurance category code ic and year t . The formula is:

$$TCP_{ab,ic,t}^{unadj} = TC_{ab,ic,t}^{unadj} / MM_{ab,ic,t}$$

- d) Calculate the $ASFW_{ab,ic,t}$ which is the age-sex factor weight for age-sex band ab in modified insurance category code ic and year t . The formula is:

$$ASFW_{ab,ic,t} = TCP_{ab,ic,t}^{unadj} / TCP_{ic,t}^{unadj}$$

5. For each age-sex band in each provider, modified insurance category code, and reporting year:
 - a) Calculate $MM_{ab,i,ic,t}$ which is the total member months for age-sex band ab in provider i , modified insurance category code ic , and year t .
 - b) Calculate $PDW_{ab,i,ic,t}$ which is the population distribution weight of age-sex band ab in provider i , modified insurance category code ic , and year t relative to provider i 's overall population size in insurance category ic . The formula is:

$$PDW_{ab,i,ic,t} = MM_{ab,i,ic,t} / MM_{i,ic,t}$$

- c) Calculate the $ASRC_{ab,i,ic,t}^{prev}$ which is the age-sex risk score based on $t-1$ or the previous year's age-sex factor weight for age-sex band ab in provider i , modified insurance category code ic , and year t using the following formula:

$$ASRC_{ab,i,ic,t}^{prev} = ASFW_{ab,ic,t-1} * PDW_{i,ab,ic,t}$$

The superscript "prev" indicates that the variable is based on the previous year's age-sex factor weight(s). If the subscript is t then the superscript "prev" should refer to $t-1$. If the subscript is $t-2$ then the superscript "prev" should refer to $t-3$.

- d) Calculate the $ASRC_{ab,i,ic,t}^{current}$ which is the age-sex risk score based on the current year's age-sex factor weight for age-sex band ab in provider i , modified insurance category code ic , and year t using the following formula:

$$ASRC_{ab,i,ic,t}^{current} = ASFW_{ab,ic,t} * PDW_{i,ab,ic,t}$$

The superscript “current” indicates that the variable is based on the current year's age/sex factor weight(s). “current” means the age-sex factor weights is based on the same year as the subscript. If the subscript is t then the superscript should refer to t . If the subscript is $t-1$ then the superscript should refer to $t-1$.

6. For each provider, modified insurance category code and reporting year:

- a) Using previous year's age/sex factor weights:

- i. Calculate the $RS_{i,ic,t}^{prev}$ which is the overall risk score for provider i in modified insurance category code ic and year t by summing all the age-sex risk score across all age-sex bands of provider i in modified insurance category code ic and year t . Specifically, the formula is:

$$RS_{i,ic,t}^{prev} = \sum_{ab} ASRC_{ab,i,ic,t}^{prev}$$

- ii. Calculate the $TCP_{i,ic,t}^{RA,prev}$ which is the age-sex risk-adjusted truncated claims spending PMPM for provider i in modified insurance category code ic in year t .

$$TCP_{i,ic,t}^{RA,prev} = TC_{i,ic,t}^{unadj} / RS_{i,ic,t}^{prev}$$

- iii. Calculate the $TCP_{i,ic,t}^{RA,W,prev}$ which is the population-weighted, age-sex risk-adjusted truncated claims spending. This is the product of $TCP_{i,ic,t}^{RA,previous}$ and $PDW_{i,ic,t}$. Specifically:

$$TCP_{i,ic,t}^{RA,W,prev} = TCP_{i,ic,t}^{RA,prev} * PDW_{i,ic,t}$$

- b) Using current year's age/sex factor weights:

- i. Calculate the $RS_{i,ic,t}^{current}$ which is the overall risk score for provider i in modified insurance category code ic and year t by summing all the age-sex risk score across all age-sex bands of provider i in modified insurance category code ic and year t . Specifically, the formula is:

$$RS_{i,ic,t}^{current} = \sum_{ab} ASRC_{ab,i,ic,t}^{current}$$

- ii. Calculate the $TCP_{i,ic,t}^{RA,current}$ which is the age-sex risk-adjusted truncated claims spending PMPM for provider i in modified insurance category code ic in year t .

$$TCP_{i,ic,t}^{RA,current} = TC_{i,ic,t}^{unadj} / RS_{i,ic,t}^{current}$$

- iii. Calculate the $TCP_{i,ic,t}^{RA,W,current}$ which is the population-weighted, age-sex risk-adjusted truncated claims spending. This is the product of $TCP_{i,ic,t}^{RA,current}$ and $PDW_{i,ic,t}$. Specifically:

$$TCP_{i,ic,t}^{RA,W,current} = TCP_{i,ic,t}^{RA,current} * PDW_{i,ic,t}$$

We will need the $TCP_{i,ic,t}^{RA,W,prev}$ to aggregate the $TCP_{i,ic,t}^{RA,prev}$ by market. We will also need the $TCP_{i,ic,t}^{RA,W,current}$ to aggregate the $TCP_{i,ic,t}^{RA,current}$ by market. Aggregation by market is necessary as provider performance comparison is by market and reporting year.

7. For each provider, market, and reporting year:

- a) Using previous year's age/sex factor weights, calculate $TCP_{i,m,t}^{RA,prev}$ which is the age-sex risk-adjusted truncated claims spending PMPM for provider i in market m and year t . This is the sum of all $TCP_{i,ic,t}^{RA,W,prev}$ across all modified insurance categories under market m for provider i in year t . The formula is:

$$TCP_{i,m,t}^{RA,prev} = \sum_{ic} TCP_{i,ic,t}^{RA,W,prev}$$

- b) Using current year's age/sex factor weights, calculate $TCP_{i,m,t}^{RA,current}$ which is the age-sex risk-adjusted truncated claims spending PMPM for provider i in market m and year t . This is the sum of all $TCP_{i,ic,t}^{RA,W,current}$ across all modified insurance categories under market m for provider i in year t . The formula is:

$$TCP_{i,m,t}^{RA,current} = \sum_{ic} TCP_{i,ic,t}^{RA,W,current}$$

$TCP_{i,m,t}^{RA,prev}$ and $TCP_{i,m,t}^{RA,current}$ will be used such that when calculating the confidence interval of the growth rate of the age-sex risk-adjusted TME PMPM of the current year, the age-sex factor weights used will be the same for the current year and the baseline (i.e., no change in age-sex factor weights across the two years) but the population weights may vary across the two years. For example when calculating the confidence interval of the growth rate of TME PMPM in 2022, the age-sex risk-adjusted truncated claims PMPM (a component of the TME PMPM) in the current year (2022) will be $TCP_{i,m,t}^{RA,prev} = TCP_{i,m,2022}^{RA,2021}$ and the age-sex risk-adjusted truncated claims PMPM in the baseline year (2021) will use $TCP_{i,m,2021}^{RA,2021}$. Note that the superscript is 2021 for both current and baseline years which indicates that the age-sex factor weights are based on 2021 weights.

B. Steps in calculating a provider’s pooled variance from various carriers

Carriers submit the standard deviation of per-member truncated claims spending by provider, carrier, market, and reporting year. Let $\sigma_{i,c,m,t}$ be the submitted standard deviation for provider i in carrier c and market m at year t .

The goal is to calculate for all providers in each market and reporting year the $V_{i,m,t}^{pool}$ which is the pooled variance for provider i in market m at year t . The pooled variance will be used to calculate the confidence interval of the growth rate of each provider’s adjusted TME PMPM in each market and reporting year.

The steps in calculating provider i ’s pooled variance for each market and reporting year are:

1. For each provider in each market and reporting year:
 - a) Calculate $MM_{i,c,m,t}$ which is the total member months for provider i in carrier c and market m at year t .
2. For each provider in each carrier, market, and reporting year:
 - a) Calculate $TC_{i,c,m,t}^{unadj}$ which is the total truncated claims for provider i in carrier c and market m at year t .
 - b) Calculate $TCP_{i,c,m,t}^{unadj}$ which is the total unadjusted truncated claims PMPM for provider i in carrier c and market m at year t . The formula is:

$$TCP_{i,c,m,t}^{unadj} = TC_{i,c,m,t}^{unadj} / MM_{i,c,m,t}$$
 - c) Get the $\sigma_{i,c,m,t}$ which is the standard deviation of provider i in market m , carrier c , at year t . This information is submitted by carriers.
3. Calculate the $V_{i,m,t}^{pool}$ which is the pooled variance for provider i in market m at year t . The formula is:

$$V_{i,m,t}^{pool} = \left(\frac{\sum_{c_1}^J MM_{i,c_1,m,t} \sigma_{i,c_1,m,t}^2}{MM_{i,m,t}} \right) + \frac{MM_{i,c_1,m,t} MM_{i,c_2,m,t} (TCP_{i,c_1,m,t}^{unadj} - TCP_{i,c_2,m,t}^{unadj})^2}{MM_{i,m,t}^2} + \text{other terms}$$

where $j=1 \dots J$, with J as the total number of carriers that contract business with provider i and each term in ‘other terms’ contain the difference of truncated claims PMPM of provider i in each of the other unique two-carrier combinations, each weighted by $\frac{MM_{i,c_j,m,t} MM_{i,c_k,m,t}}{MM_{i,m,t}^2}$ where $j \neq k$.

The following examples may help clarify the ‘other terms’ in the formula.

Example 1: Provider i contracts business with two carriers (i.e. carriers c_1 and c_2). The specific formula would be:

$$V_{i,m,t}^{pool} = \left(\frac{MM_{i,c_1,m,t} \sigma_{i,c_1,m,t}^2}{MM_{i,m,t}} + \frac{MM_{i,c_2,m,t} \sigma_{i,c_2,m,t}^2}{MM_{i,m,t}} \right) + \frac{MM_{i,c_1,m,t} MM_{i,c_2,m,t} (TCP_{i,c_1,m,t}^{unadj} - TCP_{i,c_2,m,t}^{unadj})^2}{MM_{i,m,t}^2}$$

Example 2: Provider i contracts business with three carriers (i.e. carriers c_1 , c_2 , and c_3). The specific formula would be:

$$\begin{aligned}
V_{i,m,t}^{pool} = & \left(\frac{MM_{i,c_1,m,t} \sigma_{i,c_1,m,t}^2}{MM_{i,m,t}} + \frac{MM_{i,c_2,m,t} \sigma_{i,c_2,m,t}^2}{MM_{i,m,t}} + \frac{MM_{i,c_3,m,t} \sigma_{i,c_3,m,t}^2}{MM_{i,m,t}} \right) \\
& + \frac{MM_{i,c_1,m,t} MM_{i,c_2,m,t} \left(TCP_{i,c_1,m,t}^{unadj} - TCP_{i,c_2,m,t}^{unadj} \right)^2}{MM_{i,m,t}^2} \\
& + \frac{MM_{i,c_1,m,t} MM_{i,c_3,m,t} \left(TCP_{i,c_1,m,t}^{unadj} - TCP_{i,c_3,m,t}^{unadj} \right)^2}{MM_{i,m,t}^2} \\
& + \frac{MM_{i,c_2,m,t} MM_{i,c_3,m,t} \left(TCP_{i,c_2,m,t}^{unadj} - TCP_{i,c_3,m,t}^{unadj} \right)^2}{MM_{i,m,t}^2}
\end{aligned}$$

C. Steps in calculating the confidence interval of the growth rate of adjusted TME PMPM

The steps in calculating provider i 's adjusted TME PMPM year-on-year growth rate (point estimate and confidence interval) in each market and reporting year are:

1. For each provider in each market, and year:
 - a) Calculate $TCP_{i,m,t}^{RA,prev}$ which is the age-sex risk-adjusted truncated claims spending PMPM (based on $t-1$'s age-sex factor weights) for provider i in market m and year t . (See Section A of this document)
 - b) Calculate $TCP_{i,m,t-1}^{RA,current}$ which is the age-sex risk-adjusted truncated claims spending PMPM (based on year $t-1$'s age-sex factor weights) for provider i in market m and year $t-1$. (See Section A of this document)
 - c) Calculate $MM_{i,m,t}$ which is the total member months for provider i in market m and year t .
 - d) Calculate $NC_{i,m,t}^{unadj}$ which is the total non-claims for provider i in market m at year t .
 - e) Calculate $NCP_{i,m,t}^{unadj}$ which is the total non-claims claims PMPM for provider i in market m at year t . The formula is:

$$NCP_{i,m,t}^{unadj} = NC_{i,m,t}^{unadj} / MM_{i,m,t}$$

- f) Calculate $TMEP_{i,m,t}^{adj}$ which is the adjusted TME PMPM for provider i in market m and year t . This is based on age-sex factor weights that are based on $t-1$ data. The formula is:

$$TMEP_{i,m,t}^{adj} = TCP_{i,m,t}^{RA,prev} + NCP_{i,m,t}^{unadj}$$

- g) Calculate $TMEP_{i,m,t-1}^{adj}$ which is the adjusted TME PMPM for provider i in market m and year $t-1$. This is based on age-sex factor weights that are based on $t-1$ data. The formula is:

$$TMEP_{i,m,t-1}^{adj} = TCP_{i,m,t-1}^{RA,current} + NCP_{i,m,t-1}^{unadj}$$

- h) Calculate $V_{i,m,t}^{pool}$ which is the pooled variance of the unadjusted truncated claims PMPM for provider i in market m and year t . (see Section B).
- i) Calculate $Gr_TMEP_{i,m,t}^{adj,CI}$ which is the 95% confidence interval of the year-on-year growth rate of the adjusted TME PMPM for provider i in market m and year t . The formula⁵ is:

⁵ This assumes that the standard deviations across carriers in each market and reporting year are different for each of the provider. For theoretical explanation on statistical testing of growth rates, please see [Oregon State's statistical testing documentation and its references](#).

$$\text{Gr_TMEP}_{i,m,t}^{\text{adj,CI}} = \left(\frac{\left(\text{TMEP}_{i,m,t-1}^{\text{adj}} \text{TMEP}_{i,m,t}^{\text{adj}} \pm \sqrt{\text{TMEP}_{i,m,t-1}^{\text{adj}^2} \text{TMEP}_{i,m,t}^{\text{adj}^2} - \left(\text{TMEP}_{i,m,t-1}^{\text{adj}} - 1.64^2 \frac{V_{i,m,t-1}^{\text{pool}}}{\text{MM}_{i,m,t-1}} \right) \left(\text{TMEP}_{i,m,t}^{\text{adj}} - 1.64^2 \frac{V_{i,m,t}^{\text{pool}}}{\text{MM}_{i,m,t}} \right)}{\left(\text{TMEP}_{i,m,t-1}^{\text{adj}} - 1.64^2 \frac{V_{i,m,t-1}^{\text{pool}}}{\text{MM}_{i,m,t-1}} \right)} \right) - 1 \right) * 100$$

- j) Calculate $\text{Gr_TMEP}_{i,m,t}^{\text{adj,pt}}$ which is the point estimate of year-on-year growth rate of TMEP for provider i in market m and year t . The formula is:

$$\text{Gr_TMEP}_{i,m,t}^{\text{adj,pt}} = \left(\left(\frac{\text{TMEP}_{i,m,t}^{\text{adj}}}{\text{TMEP}_{i,m,t-1}^{\text{adj}}} \right) - 1 \right) * 100$$

Appendix A. Original Insurance Category Code, Modified Insurance Category Code, and Market Code crosswalk

Original Insurance Category Code	Original Insurance Category Description	Modified Insurance Category Code	Modified Insurance Category Description	Market Code	Market
1	Medicare Expenses for Non-Dual Eligible Members	1	Medicare Expenses for Non-Dual Eligible Members	1	Medicare
2	Medicaid Expenses for Non-Dual Eligible Members	2	Medicaid Expenses for Non-Dual Eligible Members	2	Medicaid
3	Commercial: Full Claims	3	Commercial	3	Commercial
4	Commercial: Partial Claims	3	Commercial	3	Commercial
5	Medicare Expenses for Medicare/Medicaid Dual Eligible	5	Medicare Expenses for Medicare/Medicaid Dual Eligible	1	Medicare
6	Medicaid Expenses for Medicare/Medicaid Dual Eligible	6	Medicaid Expenses for Medicare/Medicaid Dual Eligible	2	Medicaid
7	Federal Employee Health Benefits: Full Claims*	3	Commercial	3	Commercial
8	Federal Employee Health Benefits: Partial Claims*	3	Commercial	3	Commercial

Note: * With split plan feature