Components of Trend

The trend in medical costs is one of the key metrics used when evaluating benefit plans. A significant change in the trend for medical costs can be due to several factors, and an understanding of these factors can provide insight on how to improve plan design. The Components of Trend analyses examine five high-level categories of medical and pharmacy claims that provide a starting point in assessing the medical cost trend. The five components are the number of members (membership), demographic mix of the population (demographics), high-cost claimant activity, price of services, and utilization of services. These components are very broad, high-level, and likely all-encompassing.

Two financial measures can be used to complete the Components of Trend analysis: allowed amount and paid amount. High-level, aggregate reports are available for each financial measure analysis, as well as the per-member, per-month (PMPM) measure analysis for each. These reports are available in the Components of Trend folder (see Figure 1).

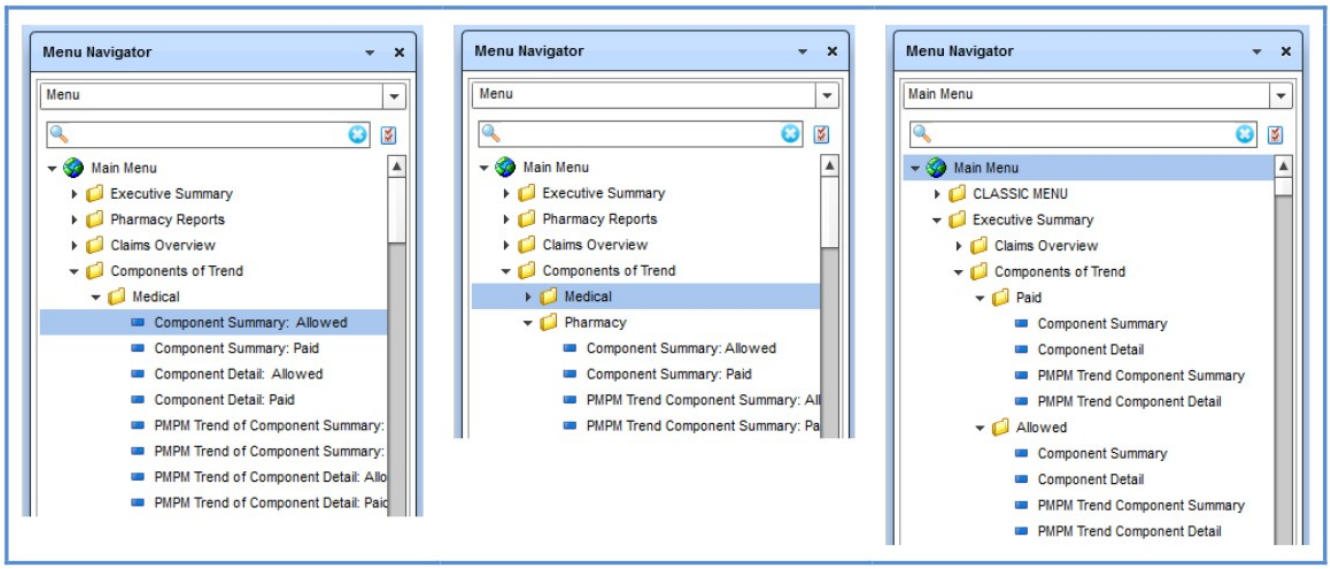

Figure 1. Components of Trend Menu Items

The analyses are also provided at the level of service category (in the “Detail” reports), so the analysis can be analyzed by inpatient facility, outpatient facility, and professional service lines. Depending on database configuration, pharmacy data may be included in the service category reports or split into separate reports.

Input Measures

The Components of Trend analyses require a few measures from the current and prior periods (see Table 1), including the financial measure (paid or allowed), member months, services, and the age-gender index. Additionally, the breakdown of the financial measure by the high-cost claimant categories is required.

Measure	Jan'15-Dec'15 "Current Period"	Jan'14-Dec'14 "Prior Period"
Allowed	$3,560,000	$3,000,000
Allowed: $30K-$50K HCC	$534,000	$400,000
Allowed: over $50K HCC	$890,000	$650,000
Paid	$3,239,573	$2,000,000
Paid: $30K-$50K HCC	$485,936	$300,000
Paid: over $50K HCC	$809,893	$500,000
Member Months	25,000	20,000
Services	1,806	1,858
Age/Gender Index	1.00590	0.99750

Table 1. Components of Trend Input Measures with Example Data

Analysis Steps

The analysis requires two years of data. The impact of any changes to plan design with this two-year period would not be directly measured in these reports. Once the data is collected, it is aggregated to two 12-month periods, and the components are calculated using a few key input measures.

Below are the basic steps behind the calculations that occur in these reports.

1. Aggregate two years of data, dividing the data into 12-month segments
2. Calculate the change in the selected financial measure between the two periods
3. Calculate each component of the financial measure
4. Calculate the covariance factor to estimate the overlap among components
5. Adjust the components using the covariance factor
6. Assess the analysis and take further action

In general, each component calculates a difference between the current and prior period values of a measure (e.g., member months). Then, using another measure from the prior period (e.g., Prior Paid PMPM), multiples out the difference to obtain annual dollar amounts. The intent is to examine only one change at a time, assuming the second measure did not change in order to assess the impact of the original measure (e.g., "What was the impact of the change in member months, as if the Paid PMPM amount did not change?").

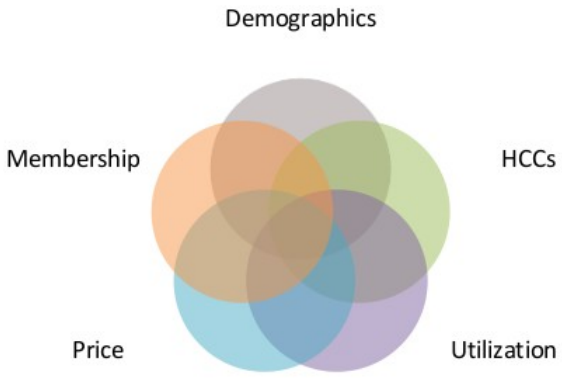

Figure 2. Overlap Among Components

Since each component is calculated independently, the total of all components will exceed the observed amount of change in medical cost. The components inherently overlap (see Figure 2). For example, a change in price will likely impact the high-cost claimant component, even if high-cost claimant activity remains the same.

In order to understand the impact of each component on the total change without this overlap, a covariance factor is calculated and used to adjust each component. The covariance factor used in the analysis does not take into account whether the overlap between any two components is larger or smaller than any other. It simply calculates the amount of overlap altogether, assuming each component overlaps by the same percentage.

What follows is a description of each component and the formula used to calculate it. The formulas assume that the financial measure of Paid or Paid PMPM is used, but it can be substituted for Allowed or Allowed PMPM. Any differences when using a PMPM measure are noted, so do not substitute Paid with Paid PMPM or Allowed PMPM, or vice versa.

Calculations

Change in the Financial Measure

The selected financial measure is compared across two reporting periods. For Paid or Allowed, it is a simple difference. For Paid PMPM or Allowed PMPM, a percent change is calculated.

Change in Paid = Paid − Prior Paid
% Change in Paid PMPM = (Paid PMPM / Prior Paid PMPM) – 1

Measure	Current Period	Prior Period	Change
Paid	$3,239,573	$2,000,000	$1,239,573
Paid PMPM	$129.58	$100.00	29.58%

Table 2. Change in Financial Measure Calculation with Example Data

Membership Component

The impact of change in membership is estimated by taking the difference in membership between years and multiplying it by the Paid PMPM or Allowed PMPM from the prior year. This measure estimates the impact of change in membership on the overall trend, if the Paid or Allowed amount for each member had remained the same.

Member Months Component of Paid = (Member Months − Prior Member Months) * Prior Paid PMPM

Measure	Current Period	Prior Period
Member Months	25,000	20,000
Paid PMPM	$129.58	$100.00
Component	$500,000	

Table 3. Membership Component Calculation with Example Data

Demographic Component

The impact of a change in the age/gender distribution is estimated by taking the difference in the age/gender index between years and multiplying it by Paid or Allowed from the prior period. This measure estimates the impact of change in demographics on the overall trend, if the Paid or Allowed amount had remained the same.

Demographic Component of Paid = (Age Gender Index − Prior Age/Gender Index) * Prior Paid

Measure	Current Period	Prior Period
Age/Gender Index	1.0059	0.9975
Paid	$3,239,573	$2,000,000
Component	$16,800	

Table 4. Demographic Component Calculation with Example Data

High-Cost Claimants Component

The high-cost claimant (HCC) measures are split into the two high-cost claimant groups ($30-$50k and over $50k). In order to assess the total impact of high-cost claimants, these two separate measures must be aggregated, and then converted into overall PMPM.

The impact of a change in high-cost claimant activity is estimated by taking the difference in Paid PMPM for high-cost claimants between years and multiplying it by the member months from the prior period. This measure estimates the impact of change in high-cost claimant activity on the overall trend, if the membership had remained the same.

High-Cost Claimant Component of Paid =
(Paid PMPM: HCC − Prior Paid PMPM: HCC) * Prior Member Months
Where:
Paid PMPM: HCC = Total Paid: HCC / Member Months
Total Paid: HCC = Paid: $30K-$50K HCC + Paid: over $50K HCC

Measure	Current Period	Prior Period
Paid: $30-$50K HCC	$485,936	$300,000
Paid: over $50K HCC	$809,893	$500,000
Paid: HCC	$1,295,829	$800,000
Member Months	25,000	20,000
Paid PMPM: HCC	$51.83316	$40.00000
Component	$236,663	

Table 5. High-Cost Claimant Component Calculation with Example Data

Price Component

The impact of a change in price is estimated by taking the difference in the Paid per Service or Allowed per Service between years and multiplying it by the number of services from the prior period. This measure estimates the impact of change in price on the overall trend, if the services volume had remained the same.

Price Component of Paid = (Paid per Service − Prior Paid per Service) * Prior Services

Measure	Current Period	Prior Period
Paid	$3,239,573	$2,000,000
Services	1,806	1,858
Paid/Service	$1,793.783499	$1,076.426226
Component	$1,332,850 †	

Table 6. Price Component Calculation with Example Data
† The component value displayed here is rounded.

Utilization Component

The impact of a change in utilization is estimated by calculating the change in Services per 1000 between years. The percent change in utilization is then multiplied by the prior services. This figure represents the impact a change in services per 1000 members would have on total services. Next, this figure is multiplied by Prior Paid per Service. This measure estimates the impact of change in utilization on the overall trend, if the Paid per Service or Allowed per Service had remained the same.

Utilization Component = (% Change in Services per 1000 * Prior Services) * Prior Paid per Service
Where:

% Change in Services per 1000 = (Services per 1000 / Prior Services per 1000) – 1

Measure	Current Period	Prior Period	Change
Services	1,806	1,858	
Services/1000	866.88	1114.80	-22.23897%
Paid/Service	$1,793.783499	$1,076.426226	
Component	-$444,779 †		

Table 7. Utilization Component Calculation with Example Data
† The component value displayed here is rounded.

Covariance Factor

The covariance factor is calculated by taking the change in Paid between years and dividing it by the sum of the five components. The Paid PMPM or Allowed PMPM differs by excluding the Membership component, and additionally multiplying by the percent change in Paid PMPM. In effect, this adjusts the covariance factor to reflect percent change instead of the difference, since Paid PMPM is examined as a percent change.

Covariance Factor for Paid = Change in Paid / (sum of each component)
Covariance Factor for Paid PMPM =

Change in Paid / (sum of each component except Membership) * % Change in Paid PMPM

Measure	Value
Change in Paid	$1,239,573
% Change in Paid PMPM	29.58%
Membership Component	$500,000
Demographics Component	$16,800
HCC Component	$236,663
Price Component	$1,332,850
Utilization Component	-$444,779
Total	$1,641,534
Total PMPM	$1,141,534
Covariance Factor	0.7551309776 †
Covariance Factor PMPM	0.3212361288 †

Table 8. Covariance Factor Calculation with Example Data
† The rounded components displayed here result in slight differences from the true value of the covariance factor.

Adjusted Component

Each component is adjusted to remove the overlap among the measures by multiplying the component by the covariance factor.

Adjusted Component = Member Months Component of Paid * Covariance Factor

Component Name	Component Value	Adjusted Component	Adj. Comp. (PMPM)
Membership	$500,000	$377,565	
Demographics	$16,800	$12,686	$5,397
HCCs	$236,663	$178,712	$76,025
Price	$1,332,850	$1,006,476	$428,159
Utilization	-$444,779	-$335,867	-$142,879
Total	$1,641,534	$1,239,573	$366,702

Table 9. Adjusted Component Calculation with Example Data

Component Contribution

Finally, the adjusted component is converted into a percent of the total change. For PMPM measures, the final measure is a portion of the total percent change.

Component Contribution to Paid = Adjusted Component / Change in Paid

Component Name	Adjusted Component	Adjusted Percent	Adj. Comp. (PMPM)	Adjusted % (PMPM)
Membership	$377,565	30.46%		
Demographics	$12,686	1.02%	$5,397	0.44%
HCCs	$178,712	14.42%	$76,025	6.13%
Price	$1,006,476	81.20%	$428,159	34.54%
Utilization	-$335,867	-27.10%	-$142,879	-11.53%
Total	$1,239,573	100.00%	$366,702	29.58%

Table 10. Component Contribution Calculation with Example Data

Final Results

Below are the final results of the Components of Trend analysis for Paid and Paid PMPM. These measures are the final adjusted components as a percent of the total (Paid) or as a portion of the percent change (Paid PMPM). The adjusted measures total up to either 100% (Paid) or the percent change (Paid PMPM).

Measure Name	Results
Change in Paid	$1,239,573
Adj Member Month Component Contribution to Paid	30.46%
Adj Demographic Component Contribution to Paid	1.02%
Adj High Cost Claimant Component Contribution to Paid	14.42%
Adj Price Component Contribution to Paid	81.20%
Adj Utilization Component Contribution to Paid	-27.10%

Table 11. Final Results with Example Data

Measure Name	Results
% Change in Paid PMPM	29.58%
Demographic PMPM Percentage Points: Paid	0.44%
High-Cost Claimant PMPM Percentage Points: Paid	6.13%
Price PMPM Percentage Points: Paid	34.54%
Utilization PMPM Percentage Points: Paid	-11.53%

Table 12. Final Results for PMPM with Example Data

Interpretation

In the example given, the paid amount changed by about $1.2 million. Membership contributed 30%, demographics 1%, high-cost claimant activity 14%, price 81%, and utilization −27%. The following is a list of statements interpreting the results from one point of view.

- Price changed a great deal, and is the primary driver for most of the change from the prior period. Since price is usually set by contract (or lack thereof) between payer and provider, an inspection of the reasoning behind this change is warranted.
    - Perhaps too many services had been set at a low price, requiring an increase to adequately cover costs.
    - Alternatively, perhaps a contract lapsed, and higher payments were required as a result, and the contract needs to be renewed.
- Membership and Utilization:
    - Membership increased, resulting in a sizable contribution to the total change in paid.
    - Utilization decreased, contributing a moderate negative amount to the trend.

    - In this scenario, many new members were added (membership), but members did not use more services per member or per thousand members (utilization). This may be the result of new or existing members using higher-cost services, and many members avoiding visits entirely.

- Some of the increase is related to high-cost claimants. The amount here (14%) does not suggest anything unusual. Regardless, an inspection of high-cost claimant activity may discover unnecessary or inefficient services that could be better managed.

- While membership changed, the demographic mix did not change much. This conveys that the mix of age and gender among the population is about the same as before. If this had changed significantly, perhaps there was an increase in the number of older members, who may require more services. There is nothing significant regarding demographics in this scenario.

- The Paid PMPM analysis is not significantly different. It is simply more apparent that Price is the primary source of change in this scenario.

Further analysis is required to validate the above interpretations.

Next Steps

Upon completing assessment of the analysis, analysts often ask, “What should be done next?” Here are a few tips on how to proceed.

- Identify components that are the greatest contributors to the trend, and examine any detailed information about those components. Here are some examples:

    - Within the organization, identify the reasoning behind changing the price.

    - Assess changes in plans or groups that may drive membership changes.

    - Examine age and/or gender bands to identify changes in demographic groups.

    - Inspect the types of services provided to new members or members of particular age/gender groups.

    - Examine the various types of services, looking for services that increased or decreased drastically. (See Component Detail reports for service category analysis.)

    - Investigate the types of procedures provided to high-cost claimants.

- Examine the Component Detail analysis, which is split by service category.

    - Identify which service categories are the greatest contributors to the trend.

    - Examine procedures, high-cost claimants, and other factors within the service category.

    - Consult with a clinical professional with expertise in the area to provide avenues of investigation.

- Identify special interactions between components and follow up with interventions to alter these components.
    - In the example scenario, membership increased but utilization decreased. This implies that new members may not be using any services. Investigate whether this is the true.
    - Reaching out to new members regarding preventative care may be beneficial, as it would alter the impact of membership and utilization. It's possible bringing new members in for preventative care may decrease one or both of these components, since preventative care visits are usually less costly than other types of visits.
    - Clinical expertise on these subjects are key to appropriate, effective interventions.
- Extreme changes in the Components of Trend analysis may be a result of incomplete data. Here are some common examples of incomplete data:
    - Management Services data, a service category, usually includes capitated (paid per member per month) services that often do not include a Paid or Allowed amount on individual services. As a result, the analysis treats these services as if they were free. The resulting analysis is incorrect and uninterpretable. The best option is to remove the Management Services service category from the analysis.
    - New or removed data sources. For example, if the organization begins providing inpatient claims where there were none before, there will be drastic changes in the Components of Trend analysis. As above, the best option is to filter out the new data until two full years are available.
    - Large increases or decreases in groups, plans, or any other dimension where members can be counted. Similar to new or removed data sources, large changes in any category of members may change the analysis drastically. It may be best to filter out any dimensions where such changes occurred (e.g., filter out a particular plan that was retired five months ago).