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HealthPartners Technical Documentation

Total Resource Use
Bootstrap Reliability Analysis

Using Optum Symmetry Episode Risk Groups (ERG)

Purpose

Determine the bootstrap and 90% random sample reliability of the Resource Use Index (RUI) measure using the Optum Symmetry Episode Risk Groups (ERG).

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Overview of Analysis

Resource Use Index (RUI) is a measure of a provider's effectiveness of managing their primary care attributed population across the care continuum. The RUI measure was applied to HealthPartners primary care metro and regional providers as per the measure specifications and results were calculated for 2009, 2010, and 2011.

The reliability testing demonstrates the repeatability of producing the same results a high proportion of the time. To measure the reliability of the RUI measure a 90% random sample and a bootstrapping technique were employed. In these methods, reliability is measured as the mean of the variance between sampling iterations and the actual results.

In addition, the RUI measure was analyzed over time to demonstrate stability and sensitivity to provider changes or improvement initiatives.

These methods were chosen as they represent the measure intent, which is that the RUI measure represents providers' average resource use across their population. Since the measure is aggregated to the provider group level there is no need to quantify the variability at the member level into the evaluation.

In the 90% random sample method, the members that were attributed to a provider group were randomly sampled at the 90% membership level without replacement. This technique was employed to simulate variation within a provider group by leveraging their own population and case-mix. This method gives an indication as to the repeatability of the measure by comparing how closely the actual resource use measure is to the 90% sampled average and simulates any potential member selection bias.

In the bootstrapping method members that were attributed to a provider group were randomly selected with replacement. This method maximizes variation around a provider group's resource use as each randomly selected iteration (sample populations) does not truly represent the provider's case mix of patients. This method was performed in the same fashion as above to support and validate the results found in the 90% sample method.

Overall Conclusions

- The differences between provider Actual RUI results and both the 90% sample and bootstrap mean results are very small.
    - Ranging from -0.10% to 0.14% in the 90% sample in 2011.
    - Ranging from -0.34% to 0.48% in the bootstrap in 2011.
    - These results indicate that the RUIs for each provider group are repeatable and consistent.
- A provider's performance is relatively consistent across all three years with an average difference in RUI between 2010 and 2011 of 0.038.
    - These differences in provider performance over time occur because changes in use patterns, collaborating provider usage and resource use saving initiatives can account for the differences.
    - Since the measure is designed to capture and reflect changes in these areas, we expect to see some explainable variability within a provider group over time.

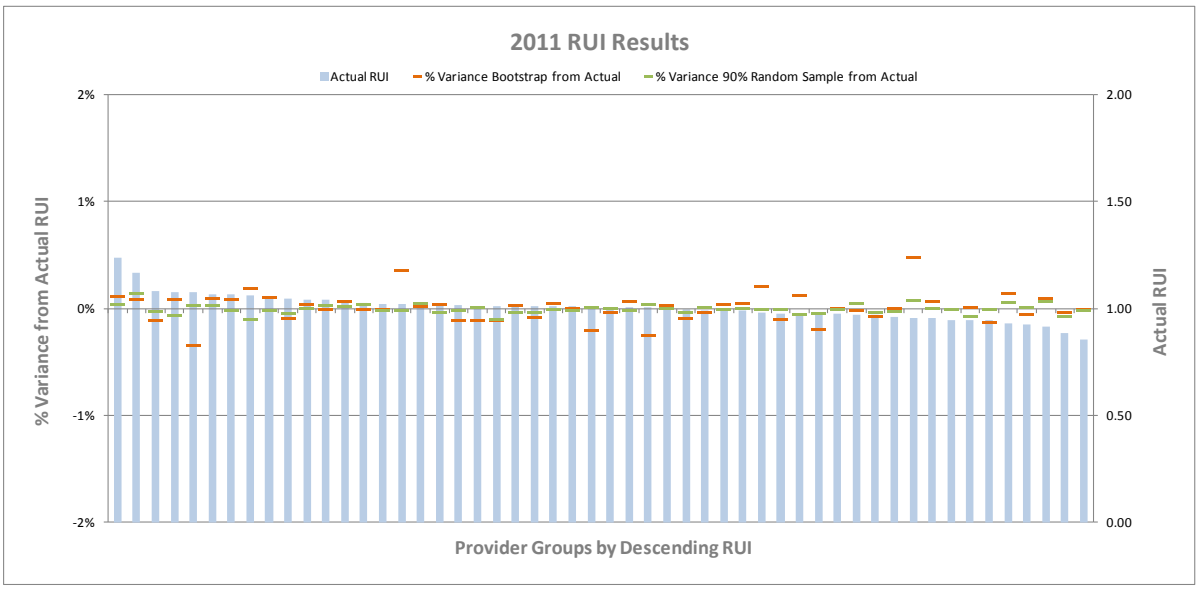
Methodology

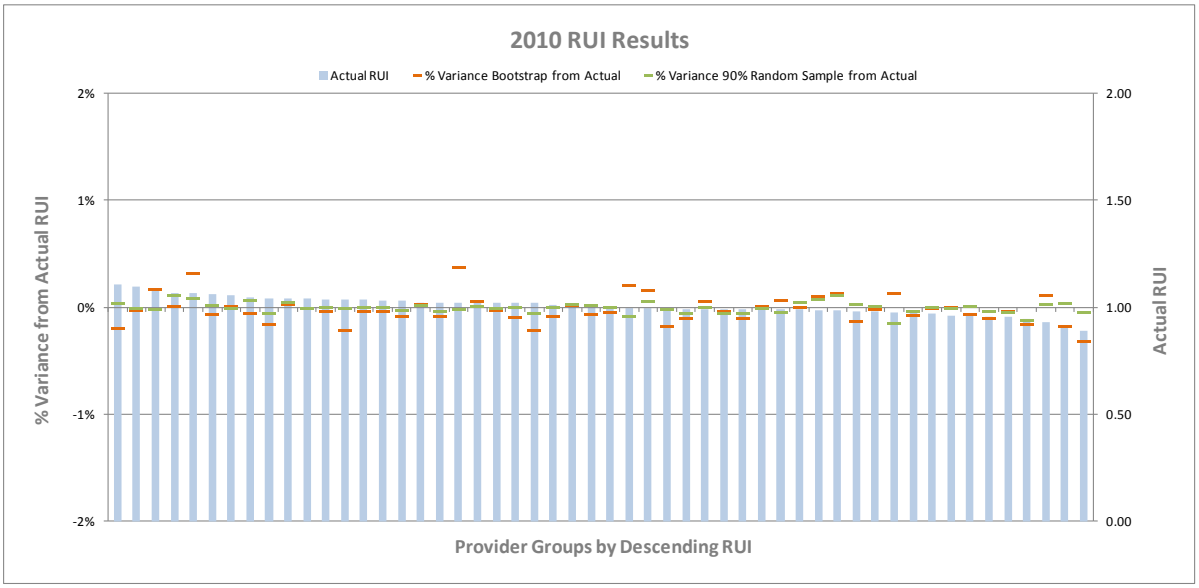
In the 90% sample method, 90% of attributed provider group members were randomly selected, without replacement. A 90% sample was used despite having the full health plan provider population, to simulate any potential member selection bias. The sampling process was performed using the SAS PROC SURVEYSELECT procedure with the Simple Random Sample (SRS) option. This method allows for each attributed member to be selected only one time until 90% of the total provider population has been reached. The 90% sampling process was repeated 500 times for each provider group and year analyzed. Attributed members' resource use was aggregated in each sample to produce 500 RUI results for each provider group for each year (see figure 1 in the definitions section for more information). Once the 500 samples were created for each provider group, the resource use of each sample for each provider group was compared to the metro average to produce a risk adjusted index. The Resource Use Index from each of the sampling iterations for each provider group/year was then compared to the actual RUI for each provider group/year and the mean variance was computed.

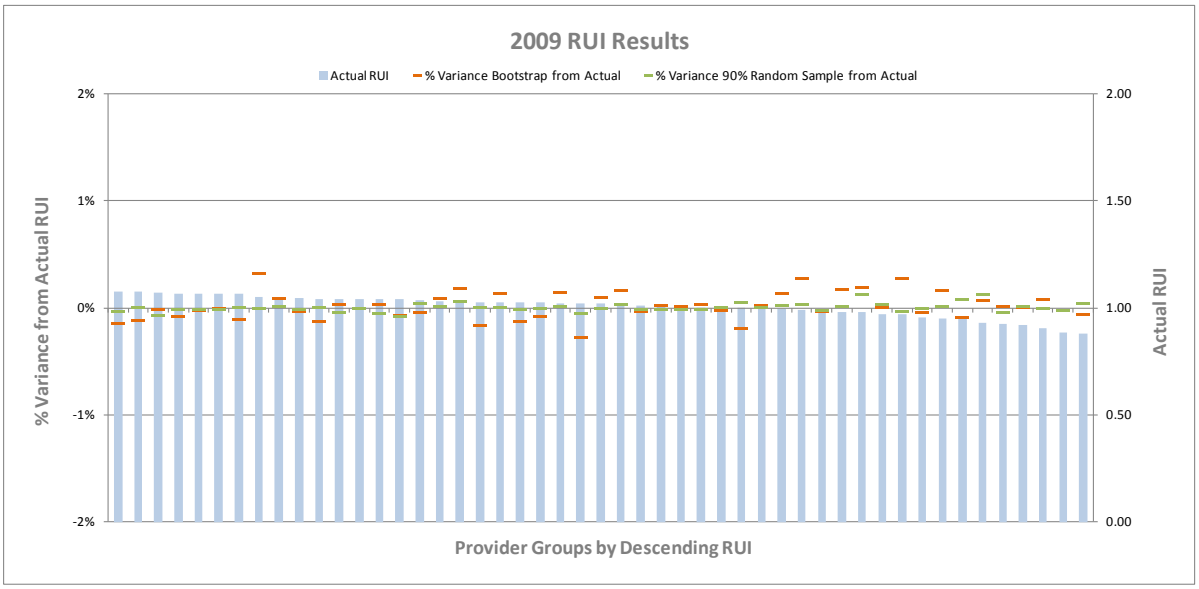
To perform the bootstrap, the SAS PROC SURVEYSELECT procedure with the Unrestricted Random Sample option for full replacement utilized to create a series of random samples for each provider group being measured. Full replacement means that one observation is drawn at random, recorded, and then placed back into the data pool so that it can be drawn again if randomly selected. The numbers of records sampled are drawn such that the samples created are the same size as the original number of attributed members for the provider group. In this way, it is theoretically possible (although virtually improbable) to produce a sample of size n that could consist of the same record drawn n times in a row. This was done to artificially maximize the variance within the defined populations. This sample process was performed 500 times for each year and provider group being analyzed, to produce 500 sets of risk adjusted Resource Use results for each provider for each year (see figure 2 in the definitions section for more information). The Resource Use Index from each of the sampling iterations for each provider group/year was then compared to the actual RUI for each provider group/year and the mean variance was computed.

Bootstrap and 90% Random Sample

The mean Resource Use result from the bootstrap and 90% samples compared to the actual Resource Use result for each provider group and year is displayed in the tables and graphs on the following pages.





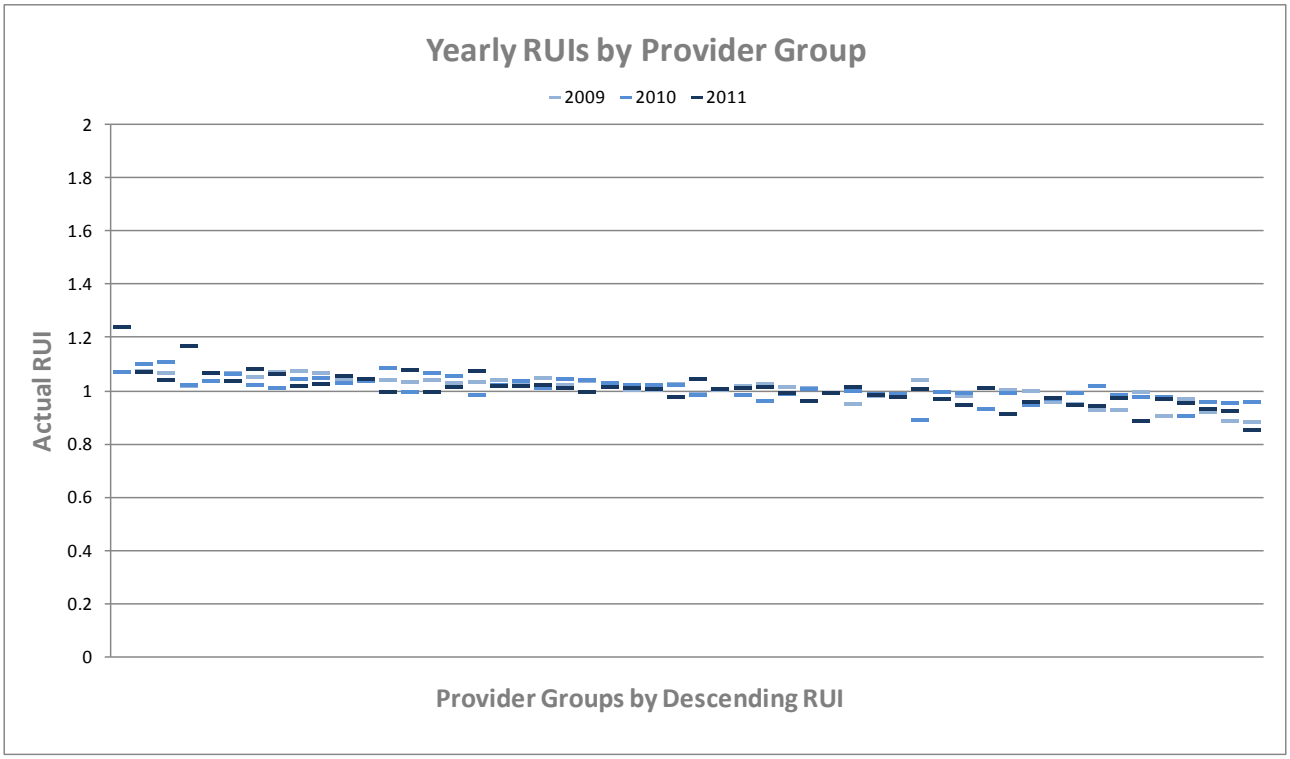


Bootstrap and 90% Random Sample Results

- The differences between provider Actual RUI results and both the 90% sample and bootstrap mean results are very small ranging from -0.10% to 0.14% in the 90% sample to -0.34% to 0.48% in the bootstrap in 2011.
- The results indicate that the RUIs for each provider group are repeatable and consistent.

RUI Consistency Over Time

The Resource Use results are displayed from 2009 through 2011 for the HealthPartners Primary Care Metro and Regional Network. The measure differentiates between providers however they remain relatively consistent over time. The factor that drives variation between years within a provider is resource use management.



RUI Consistency Over Time Results

A provider's relative performance is relatively consistent across all three years with an average difference of 0.038.

- These differences in provider performance over time occur because changes in use patterns, collaborating provider usage and resource use saving initiatives can account for the differences.
- Since the measure is designed to capture and reflect changes in these areas, we expect to see some explainable variability within a provider group over time.

Definitions and Examples

Figure 1: 90% Sampling – Simple Random Sample Without Replacement

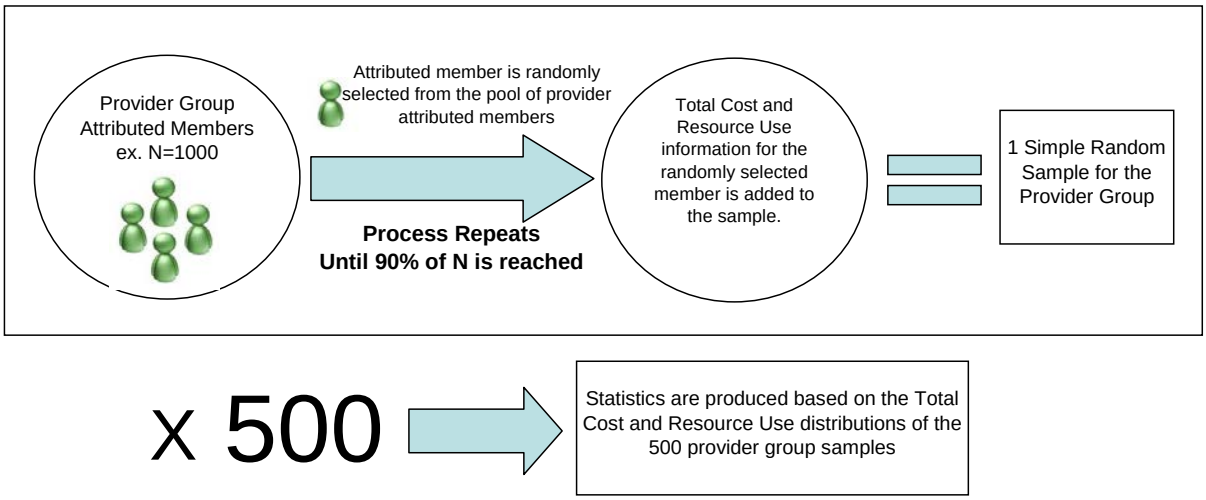


Figure 2: Bootstrap Sampling – Unrestricted Random Sampling With Full Replacement