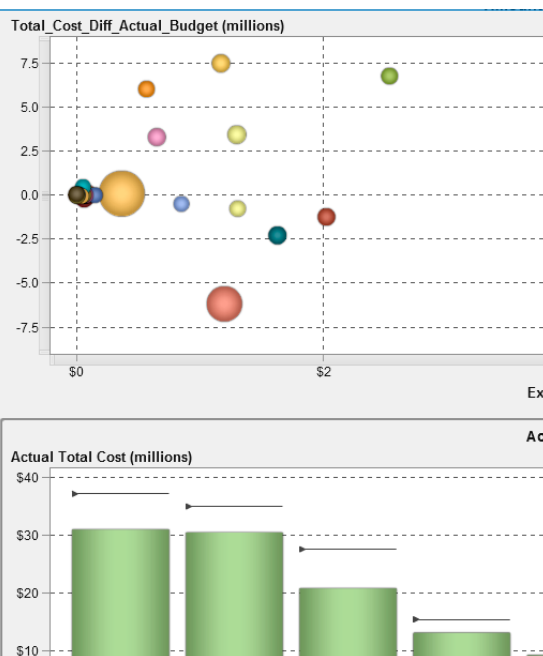# SAS® Episode Analytics

The future of value-based health care

As health care incentives more acutely center on value, providers and payers alike are struggling to define care delivery as it translates into value. Several factors – better patient outcomes, new reimbursement models, increased focus on risk management and accountability, and a more accurate understanding of costs – contribute to the complexity. But the complexity of patient care can be understood in context of episodes of care when you know what services are provided to individual patients – both on a granular level and in aggregate.

To analyze the total path of care in terms of cost and quality, and to know what to modify in the care continuum to reduce unwarranted admissions and readmissions, decrease length of stays, improve cost-effective prescribing, reduce variation in care and treat patients holistically, we offer SAS Episode Analytics. Going far beyond traditional claim grouping, this solution allows you to flexibly construct clinical episodes, identify variations and opportunities for improvement, and assess your financial risk in value-based reimbursement agreements. All while understanding your patients in more detail across multiple data sources.

Benefits

- **Flexibly define episodes of care**: Construct and analyze claims as episodes of care using clinical definitions of your choice, and automatically detect associations to obtain a holistic patient view.
- **Manage new payment models (e.g., bundled payments)**. Respond to new incentives to provide more efficient and better quality care by reducing care variation.
- **Identify potentially avoidable complications.** Differentiate between typical, complication and unrelated services to discover ways to reduce complications.
- **Create physician accountability for patient care**. Attribute individual episodes to multiple, accountable providers and measure adherence to protocols.
- **Understand accurate costs of episodes**. Quantify variation in utilization, cost, efficiency and quality, and calculate actual vs. severity and risk-adjusted costs.
- **Compare performance across providers on similar episode types**. Adapt your analysis to how your organization treats different episodes.

The Solution

Through analyzing health care claims data, SAS Episode Analytics allows health care organizations to construct and analyze claims as episodes of care. Clinical rules define which services in a given time period are related to an episode (for instance, a knee replacement) and what care is unrelated (such as a service performed for another episode occurring in the same time period). Services are categorized as "typical" in treatment of the episode or a complication (potentially avoidable complication, or PAC) arising from that episode, such as a readmission for infection.

Based on clinical definitions best suited for your organization, SAS Episode Analytics allows you to gain more accurate insights for effective decision making on quality and cost of care so that your organization can benefit from the emerging value-based care payment models.

Automatically Define Episodes of Care

The size of claims data sets makes it impractical to manually discover which patients have conditions to build episodes and then derive the complete episodes. There is far too much detail, making cross-referencing too complex to undertake without automation for any performance or scalability. The difficulty is in identifying the signals that indicate the presence of a condition, thus triggering an episode's creation.

SAS Episode Analytics identifies these signals and creates episodes based on the clinical definition of your choice. SAS Episode Analytics allows you to create clinical episode definitions. With an easy-to-use episode definition manager, individuals are empowered to manage episode rules and definitions.

Use an episode definition from our library, or create your own custom definitions within a repository-based environment that allows for shared episodes and a variety of episode definitions.

SAS looks for signals in data about clinical services that indicate that the patient has a medical condition. Then an episode is constructed based on the specific condition, and all services related to that episode are found so that the entirety of care can be analyzed across the episode. SAS Episode Analytics provides the ability to perform:

- Hierarchical association of clinically related episodes.
- Service assignment (typical or complication).
- Allocation of services based on rules determining highest relevance.
- Comparison of patient severity- and risk-adjusted expected costs with actuals.
- Analysis that uncovers a holistic view of a patient.

- Cost or reimbursement-related reports.
- Reporting capability to visualize episodes and their different characteristics.

Identify Potentially Avoidable Complications

PACs have an immensely negative effect on patients and costs. Understanding complications is a key factor in committing to and complying with a bundled payment contract. To reduce complications, provide higher quality care and meet benchmarks for reimbursement incentives, SAS helps you get to the root of complications so you can put your focus on those areas with more complications.

SAS Episode Analytics determines which services, procedures and medical events are relevant to a condition, and then allocates claim dollars to the most appropriate episodes as typical or complication. You can then see hierarchical relationships between episodes as typical or complication, giving you further insight into exactly where the complication is occurring to investigate further.

By analyzing claims data, you can answer questions such as: Which provider has the greatest number of complications? Is there a localization? And which complications could have been avoided – such as heart attack, sepsis or MRSA? Payers can identify the providers that are more likely to have a complication, and then negotiate a reduction target. Providers can use complication data to work to effect change, with goals of improving outcomes and preempting negative events.

- Characterize relationships as typical, typical with complication, complication or unassigned.
- Show analysis by specific condition, type of episode (procedural, etc.) or major diagnostic categories.
- Study complications at the provider level (facility or professional provider, provider group, provider ACO or health system).
- Drill down to patient and service levels to understand what happened regarding complications, to evaluate/understand outlier patients.
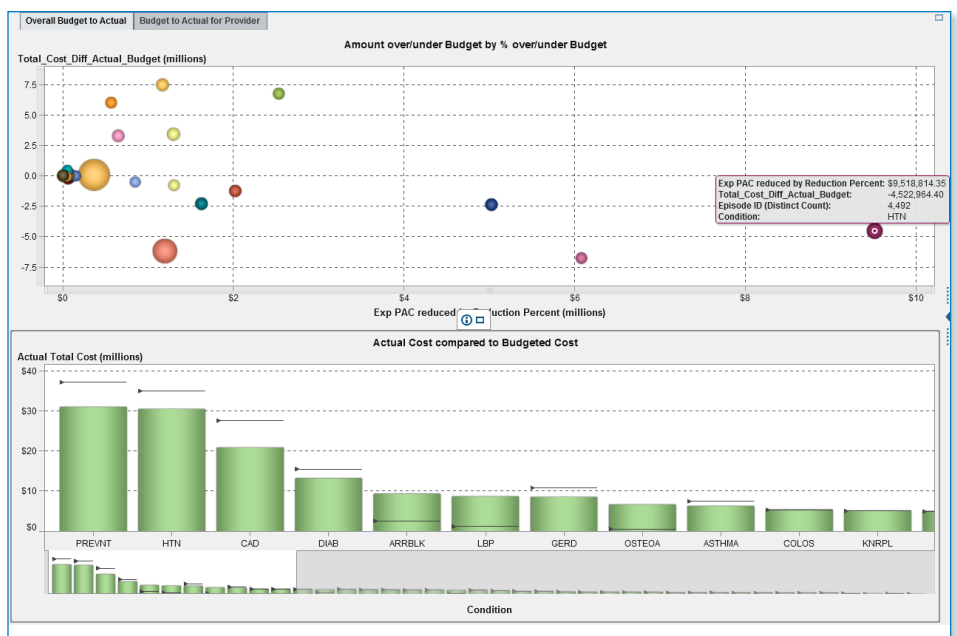

Figure 1. Overall Budget to Actual: See how risk-adjusted expected costs compare to actual costs.
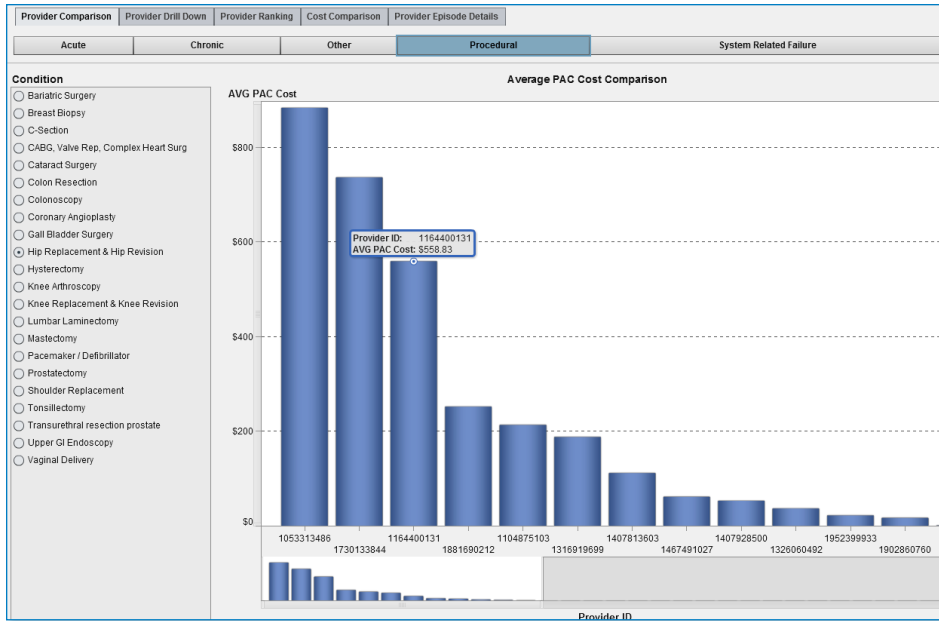
Figure 2. Provider Comparison: Set up condition attributes and view comparisons to determine whether conducting providers are meeting cost and quality measures for episodes.

Build Clinical Associations Between Episodes to Gain Holistic Patient Views

Every episode may not stand on its own accord; it may be interconnected with other conditions. Patients are likely to have more than one condition that's related to others. Having access to the information that reveals these relationships allows providers to deliver better treatment and prevent complications due to comorbidities or related conditions.

SAS lets you see the interplay between different conditions and the variation of care so you can understand how to change care delivered to certain types of patients. By identifying the potential clinical interactions of various episodes, you can see where there is a connection – and whether it is a typical or complication relationship – so you can understand the true clinical status of a patient. Once you know that these relationships exist (typical or complication), and are associated with negative outcomes for a specific type of episode, you can employ better approaches to avoid the risk or cost associated with a treatment.

- Show the associations between episodes in hierarchical relationships (which one causes the other – or which is child and which is parent).

- See all parent episodes at the highest level of the hierarchy. As you analyze different, or lower, child levels of the hierarchy, additional relationships may be revealed as the episode is further broken down into more granular levels.

- As you analyze each level of the hierarchy, you can survey the assigned reimbursement dollars.

Compare Patient Severity- and Risk-Adjusted Expected Costs With Actual Costs

An expected – or budgeted – cost must be fully understood to assess the baseline cost for treating a patient. Only then can you determine how to reduce that cost. By using SAS risk adjustment, statistical procedures and methodology, you can obtain the expected total cost of an episode of care and adjust it to account for heterogeneity and condition risk propensity in the patient populations being treated.

The SAS® Difference

- **Patient subset identification**. SAS provides a standard/agnostic engine that is flexible and metadata driven to enable you to identify subsets of patients using any type of additional data to allow you to uncover insights that can lead to better outcomes and cost optimization.

- **Capture key information: typical or complication**. Only SAS provides the added benefit to determine not only if claims are related, but whether they are typical or complications, which is invaluable information in knowing where to focus efforts on reducing PACs.

- **Patient severity adjustment modeling**. SAS performs patient severity adjustment modeling at the individual level, and then aggregates this information. SAS compares patient to patient, provider to provider, even on conditions – and all comparisons are within your own base.

- **Risk adjustment**. For each episode condition, SAS employs a three-stage regression framework to obtain model-adjusted expected episode costs of care while adjusting for a patient's demographic characteristics – including risk and episode-specific subtype factors that may influence episode of care expenses.

- **Cross-episodic services**. Only SAS splits services across relevant episodes to create such an accurate picture. Other systems assign services to only one episode, thus creating inaccuracies and misrepresentations when trying to understand the services associated with an episode.

To learn more about SAS Episode Analytics, download white papers, view screenshots and see other related material, please visit sas.com/episodeanalytics.

SAS lets you examine how the risk-adjusted expected cost compares to your actual cost. And this is not just on your total, but also for expected typical and expected complications. SAS lets you analyze your data by provider, by condition and by patient to understand which providers are performing with least risk or cost associated with episodes of care/treatment.

You can determine where higher than expected costs are occurring so you can make adjustments to reduce variation. You can also study trends of complication effects over typical episodes so that, for example, you can spend more money on typical care, but have fewer complications. Having the data at your fingertips allows you to inform and motivate providers to change behavior.

- Estimate the cost of care for a patient while also considering the risk profile and normalizing against the population at large. This makes it possible to determine where you're going over budget and why.
- Compare provider performance on an equal footing. SAS compares episode costs and resources by provider, while adjusting for differences in patient population composition.
- Create reports to show what should have happened, versus what actually did.

Accurately Calculate True Costs of Episodes

By gaining an accurate understanding of both the services and cost of an episode, you can ensure services are counted toward the right episodes.

SAS calculates the correct cost of an episode by looking at all codes on each claim to determine their level of relevance to any specific episode, and then assigns them to the relevant episode. If they are related to more than one episode, SAS splits that service across relevant episodes.

- Assign outpatient facility and professional claims to episodes at the individual services level.
- Accurately measure the quality of care by attributing all relevant services provided, and include all of those services to maximize the opportunity for incentive payments.
- Split any service across episodes (when appropriate) to assign it to multiple relevant episodes.
- Avoid under- or over-representing costs of episodes due to "lost" services that aren't split and counted toward the appropriate episodes.

Attribute Providers to Episodes to Measure Cost and Quality

Based on the specifics of a patient's episode, it is helpful to have different methods of assigning an owning or conducting provider. For example, your organization may want to assign some episodes to a facility and others to a professional provider.

With SAS, you can attribute a conducting provider(s) to a specific episode. By doing this, you can understand whether the conducting provider is meeting cost and quality measures for that episode. SAS allows for multiple attribution options, by class and for specific conditions, giving you additional control over the attribution method you want to use.

You can choose an attribution method based on the types of conditions in your data. Configure different default methods for class of condition, and then set rules for how any specific condition would be treated. For example, you may use a Minimum Number of Visits threshold to determine conducting provider as a default for chronic conditions, yet use a Percentage of Total Reimbursement threshold for a

more complex condition such as congestive heart failure. Then you can attribute based on the more complex services (like heart surgery), instead of routine maintenance and health checks that are related to managing congestive heart failure.

- Utilize multiple attribution methods and have control over the attribution method used.
- Select a default by class.
- Set rules at the condition level about what attribution type should be used, in addition to setting thresholds where appropriate, such as Minimum Number of Visits, or single versus multiple providers.

Add Data Sources to Enhance Patient Subset Analysis

When managing your population's health, it is important to understand at a detailed level the different characteristics of various patient groups, based on various data sources. For example, it is important to understand not only the cost of treatment of a diabetes episode, but other factors within that patient subset, such as blood pressure levels or weight.

With SAS, you can create cohorts of patients by identifying individuals with certain attributes. These attributes can come from multiple data sources. For instance, you may want to bring in clinical information from your electronic medical record system, or patient-generated data from mobile apps or wearable devices.

SAS Episode Analytics can ingest any type of data, and through a user-friendly interface, to build patient subsets using these added data elements. This allows you to understand at a deeper level the attributes of patient groups to create more efficient and effective paths of care.