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Symmetry™ Episode Treatment Groups®
Measuring Health Care with Meaningful Episodes of Care

Introduction

Identifying clinical episodes of illness and the services involved in their diagnosis, management, and treatment have become a key business need of any health care organization. Purchasers, consumers, and patients seek greater transparency into the cost, quality, and service of health care delivery. Episodes of care provide a valuable unit of analysis to support transparency, measure health care, provide incentives for high performance, and plan subrogation.

Episode Treatment Groups® (ETG®) were introduced to the market in the mid-1990's and rapidly became widely used for building episodes of care. Such measurements rely on accurate and valid definitions of a disease and the services related to a clinical condition. By combining related services into clinically homogenous units that describe complete episodes of care, ETG may be utilized to provide the basis of valid comparisons. Episodes are created by collecting all inpatient, outpatient, and ancillary services into mutually exclusive and exhaustive categories. The medical consistency within an ETG contributes to treatment decisions, as the groupings are meaningful to all care providers. At the patient level, ETG recognizes comorbidities, complications, and treatments that dramatically change the patient's clinical profile, health care utilization, and costs. ETG enables powerful, accurate case mix adjustment. ETG covers the breadth of clinical medicine; both acute and chronic conditions can be measured and compared.

A number of features of the ETG methodology have contributed to its status as a market leader, including the clinical validity of the ETG approach and its ability to create resource-homogeneous episodes of care that can be compared across patients, providers, and populations. Symmetry™ Suite products are now licensed by more than 300 health care organizations in the U.S., serving more than three-quarters of the insured population. When combined with other Symmetry products—Episode Risk Groups® (ERG®) and Pharmacy Risk Groups® (PRG®) assess patient and population risk, while EBM Connect® and the new Procedure Episode Groups™ (PEG™) measure quality of care—ETG supports a comprehensive suite of products, leveraging a single methodological platform to address a wide array of business needs.

ADVANCING ETG METHODOLOGY—SYMMETRY 7.0 ENHANCEMENTS

A trademark of Symmetry has been its ability to evolve and innovate to enhance product offerings and respond to customer needs. For ETG, each version introduced new clinical frameworks and enhancements to better support the configuration around episode grouping and the outputs. The newest release of the product, ETG 7.0, introduces the most significant developments to ETG methodology in more than a decade. The changes include:

- Expansion of categorization. New ETG concepts provide more clinical detail while maintaining historical continuity.

- Indication of specific relevant complications or comorbidities rather than the generic indications, "with complication" and "with comorbidity," and an output file listing all such complications and comorbidities.

- Indication of specific surgical or other relevant treatments within an episode, rather than the generic indication, "with surgery," and an output file listing all such treatments.

- Capability to parse chronic episodes lasting more than a year into complete year-long episodes with start or end points selected according to business needs.

- Accommodation of lapses in coverage for individual members.

- The groundbreaking addition of an episode-specific severity score that reflects a patient's comorbidities and condition complications, as well as age and gender and, based on the score and an ETG-specific model, an easily interpreted severity level.

These developments provide increased accuracy in severity adjustment, supporting more accurate modeling of how the characteristics of an episode of care impact the expected resource needs. The user has the advantage of added flexibility in how episode outputs can be used.

ETG 7.0 not only updates the familiar summary files, detailed service records for each episode, and the list of all comorbidities for each patient, but also adds new files. Lists of episode-specific comorbidities, complications, and

treatment indicators provide the user with the tools for a wide range of analyses.

In this paper, we present these developments with some specificity, showing how the ETG software supports:

• Valid measurement and comparison of providers based on cost of care

• Improved understanding of disease-specific risk to enhance care and case management

• Enhanced ability to track plan performance and trends around specific diseases and episodes.

ETG can be used for provider performance management, for case management by measuring demand, or for tracking financial performance and trends. A related white paper, *Using ETG 7.0*, provides readers with detailed examples of ETG in action.

Episode Treatment Grouping

A number of factors differentiate ETG in the market:

• Strong clinical content, matching a patient's diagnoses and procedures to appropriate episodes of care.

• Inclusion of all relevant services into episodes of care, including ancillary, pharmaceutical, inpatient, and outpatient.

• Use of both diagnostic and procedural information to more precisely assign individual services to episodes.

• Methodology for creating dynamic clean periods around discrete episodes.

• Recognition of the different complications, comorbidities, and treatment indicators that can influence an episode's costs and utilization.

• Severity assignment for an episode that factors comorbidities and complications, resulting in greatly enhanced classifications.

• Flexible treatment of chronic episodes of care, recognizing the ongoing nature of these conditions.

• Seamless integration with other Symmetry engines for consistent analysis.

• Transparency. Customers have access to the clinical rules and content behind ETG, supporting an understanding of grouped results.[1]

Each of these strengths continues to serve as the core of the ETG methodology. The resulting ETG provides medically meaningful, statistically stable units of analysis, representing a discrete underlying disease or condition.

SYMMETRY 7.0 ALLOWS GAPS IN COVERAGE

The ETG software first determines whether a member is eligible, based on enrollment during the time frame. ETG 7.0 allows gaps in coverage. Users determine how large a gap is acceptable. ETG then reviews each claim, building a complete treatment episode by identifying an *anchor record* and continuing to collect all clinically relevant information until an absence of treatment—or *clean period*—is detected. This process is outlined in the following sections and described in detail in product documentation.

BUILDING AN EPISODE

The key features of ETG are anchor records, *clusters*, and *non-anchor* (ancillary and pharmacy) records. Anchor records demonstrate that a clinician has evaluated a patient and determined the types of services required to further identify and treat his or her condition.

Prior to identifying claims records as anchor records, claims are assigned to one of five record types: management, surgery, facility, ancillary, and pharmacy. Certain revenue codes alone can be used to determine record type by, for example, identifying a facility's room and board records. In the absence of a procedure or revenue code, the type of service— room and board, medical/surgical, or ancillary—can be used with the provider type or facility to determine that a record is associated with an inpatient confinement (a facility service).

Anchor records are then identified by a combination of the provider type and procedure codes, based on one of the following:

• A claim submitted by a clinician for services related to the evaluation of a member's condition (management service)

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[1] Consistent with Symmetry's signature transparency, the ETG Clinical Knowledgebase that describes the relationship of diagnosis and procedure codes to Base ETG and of Base ETG to Major Practice Categories (MPC) is now available with a click.

• A claim submitted by a clinician for services for surgical or related procedures (surgical service)

• A claim submitted by a treatment facility for room and board services (facility service)

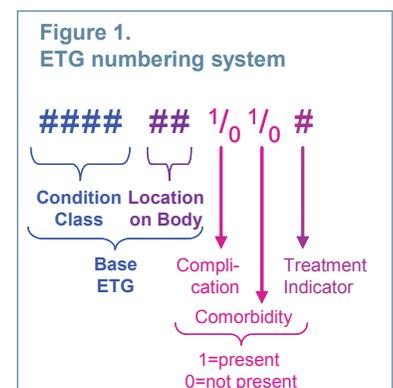• A claim submitted by a hospital for emergency room services (management service)

The anchor record starts an episode. The grouper evaluates every ancillary and pharmaceutical service (non-anchor records) against all episodes to determine the best fit and groups claims into clusters, each with one anchor record. When a non-anchor record such as lab test, X-ray, or pharmaceutical is eligible to join more than one cluster, ETG will join it with the cluster that has an anchor provider who is a clinician. If none is available, ETG joins the record to a cluster with a facility anchor provider. This logic provides a more meaningful tie-breaker rule: a physician's cluster trumps a facility's cluster. The result is clinically homogenous, statistically stable episodes. Each episode is assigned to a Base ETG, which classifies the medical condition. Base ETGs are new to ETG 7.0, incorporating both the specificity of sub ETG and the grouping capacity of super ETG used in prior versions. Examples of Base ETG include diabetes, hypertension, and chronic obstructive pulmonary disease.

INNOVATIVE ETG NUMBERING SYSTEM COMMUNICATES SEVERITY CONDITIONS

To achieve clinical homogeneity of the unit of analysis, the grouper reviews Base ETGs for the presence of three factors that could influence the amount of resources required to treat the episode: comorbidities, complications, or particular treatments, including major surgery or active management of neoplasms. Any one of these factors would generate a separate classification of the episode, characterized using a new nine-digit ETG numbering approach.

Figure 1 demonstrates how the nine-digit ETG clearly and immediately conveys the presence of any of these conditions. The first six digits define the Base ETG, including information about the part of the body affected. The seventh and eighth digits are set to 1 if the Base ETG has, respectively, complications or comorbidities and to 0 if these factors are not present. Notably, comorbidities and

**Figure 1.
ETG numbering system**

$$\#\#\#\# \quad \#\# \quad {}^{1}/_{0} \quad {}^{1}/_{0} \quad \#$$

Condition Class · Location on Body · Base ETG · Complication · Comorbidity · Treatment Indicator

1=present
0=not present

Table 1. Treatment indicators and their meaning		
Base ETG Description	**Treatment**	**Treatment Indicator**
Malignant neoplasm of large intestine	Without surgery, without active management	0
	With surgery, without active management	1
	Without surgery, with active management	2
	With surgery, with active management	3
Ischemic heart disease	Without surgery	0
	With angioplasty	1
	With coronary artery bypass graft (CABG)	3
	With valve surgery	4
	With valve surgery & CABG	5
Chest trauma, closed	Without surgery	0
	With surgery	1

complications are Base ETG-specific, as a medical condition will affect some types of episodes but not others.

The ninth digit reflects the absence or presence of any treatment indicators, which categorize services such as defining surgeries and active management procedures (chemotherapy and radiation therapy services). A value of 1 through 5 indicates specific groupings of similar procedures. The meaning of the code is specific to the Base ETG, as seen in Table 1, allowing some continuity with prior versions of ETG. Most Base ETGs use only a 0 or 1, indicating without or with surgery, respectively. A user would simply drop the final digit to perform analyses that don't differentiate between episodes with treatment and those without.

As with prior versions, each Base ETG is mapped to one Major Practice Category (MPC), which represents a body system or physician specialty.

Assigning claims to episodes involves many intermediate decision points. For example, if a drug is eligible for two different conditions, a ranking is used to assist in determining assignment to a Base ETG. Similarly, ETG is prepared for the unlikely event that a member has concurrently occurring episodes for multiple Base ETGs for which a procedure is eligible. A ranking system would assign the procedure to the most appropriate Base ETG. A third ranking system determines which Base ETG should receive a *Signs & Symptoms Anchor Record*, which, reflecting vague conditions like headache, is linked to a Base ETG after all other claims have been linked.

It is critical that each claim's dollars only be assigned to one episode so its associated costs are not double-counted. However, claims frequently have valid but unrelated diagnosis codes that should be considered. In these cases, ETG creates a *phantom cluster* and associates it with an existing or new episode, but does not attribute the costs to the episode. As additional claims are reviewed, they may be associated with this episode. If the episode based on a phantom anchor does not attract any other claims, it remains a phantom episode at zero cost. With the 7.0 enhancements, users now have the option of including phantom episodes in the summary file.

The grouping process loops back through the data and intelligently shifts results based on intermediate

determinations so that claims are assigned appropriately and accurately.

Some claims cannot be grouped to an episode. For example, screenings and immunizations incidental to other services could be indicative of preventive medicine or health promotion. They do not create an anchor record, but instead are assigned to a specific Base ETG and included in the output file. Similarly, prescriptions for ongoing conditions that were not associated with an office visit are assigned to a specific Base ETG.

Pharmaceutical records are coded using a proprietary framework for drug coding that includes the National Drug Code system (NDC), a hierarchical drug coding system compatible with ETG methodology, and Major Practice Categories, as well as current medical and drug information literature. The framework is updated to reflect treatment evolution and new drug entities.

Drug claim records that cannot be legitimately grouped are assigned as Base ETG *orphan drug record*.

DYNAMIC CLEAN PERIODS

Episodes often occur in a discrete time frame. To build a complete episode, a unique time frame must be defined.

As ETG reviews the claims, it considers the length of time since a relevant claim was identified, called the *clean period*. To be clinically meaningful, the clean period is specific to each Base ETG. For example, the clean period for brain trauma is 90 days, while the clean period for migraine headache is 60 days. Most acute conditions have a clean period less than 180 days. The shortest is acute alcohol intoxication, with a clean period of only seven days.

Episodes also have Base ETG-specific *drug clean periods* within which pharmaceutical claims must fall to be associated with the episode.

Each episode is framed by a start date, defined by the earliest anchor record in the episode, and an end date. The end date is defined as the latest anchor record in the episode.[2] If both the start and end dates are known, the episode is *complete*.

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[2] Signs & Symptoms Anchor Records are one exception. These records are processed in reverse chronological order, allowing multiple pre-episodic claims to link together, re-setting the Start Date of an episode.

Episodes with an unknown start date, an unknown end date, or both, can be considered complete if they include a full year of data. The value of the variable Episode Type identifies the type of complete episode—e.g., clean start, unknown finish (full year of data)—enabling users to easily select the appropriate episodes. Episode Type also identifies the reason an episode is incomplete. It is essential to compare only complete episodes with complete episodes.

HANDLING CHRONIC CONDITIONS

To validly compare treatment of ongoing chronic conditions, ETG partitions episodes into year-long, separate episodes. ETG supports five different methods for users to define the year. With advanced development in 7.0, users who know or suspect their data are more complete at certain points, or who have long run-out periods, or whose members turn over frequently may now choose different options.

As medical conditions progress, the episode may shift. Once data are parsed into years, the patient may have a Base ETG of, for example, non-malignant neoplasm of prostate in one year and malignant neoplasm of prostate in the next. These situations can be easily identified using the Chronic ID field in the summary file and analyzed using the output file that shows all prior ETG assignments. (See Figure 2 for a demonstration of one patient's changing clinical profile over three years.)

ETG also offers an *unlimited episode length* option that allows episodes to be longer than one year for clients who are interested in analyzing chronic conditions such as diabetes or hyperlipidemia.

NEW SEVERITY MEASUREMENT METHOD

In ETG 7.0, Symmetry introduces a new method for adjusting the severity associated with episodes. This is important as the clinical severity of an episode is correlated with increased resource consumption and, in turn, higher costs.

ETG severity measurement involves two important concepts: episode severity score and episode severity level. To model severity, the complications and comorbidities important to each Base ETG were first noted. Multiple linear regression models were then run on a nationally representative sample of 66 million episodes to determine the impact of

these factors on the overall costs for an episode. Separate models were estimated for each Base ETG where severity adjustment was indicated. In addition to complications and comorbidities, the models accounted for patient demographics, selected interactions between complications, and selected interactions between comorbidities. For some conditions, separate severity models were calculated for elderly (ages 65 and older) and non-elderly populations to accurately reflect different disease progression and subsequent trends in costs.

Following the completion of a severity model for each relevant Base ETG, the results are used to generate a severity score for each episode. The severity score is derived from two components: (1) the observed complications, comorbidities, and patient demographics and the severity weights determined from the regression models; and (2) experience from the large sample of episodes used for development. The severity weight for each complication, comorbidity, or demographic factor in a model represents its expected incremental contribution to the cost for the episode. Summing the weights for all of the observed factors for an episode produces the severity score.

Table 2 shows three episodes of congestive heart failure from one patient, with each episode representing one year's experience.

As the patient's clinical profile becomes more complex, his severity scores and severity levels increase. He stays in the same age group (45–64) so each episode has the same demographic severity weight (0.2733). Each identified condition and comorbidity is listed, along with its weight. For example, in the first year (Episode 2423), the patient has comorbid diabetes (weight=0.1513), another hematologic disease (0.1217), and ischemic heart disease (0.0660).

When there are multiple comorbidities of a similar clinical nature within the same MPC, a clinical hierarchy indicates that only the more severe disease is assigned a severity weight. In year 2 (Episode 2424), the patient developed cardiomyopathy, which is more severe than ischemic heart disease and is thus assigned the severity weight for the last two episodes.

Table 2.
Severity Weights

ETG	ETG Description	Episode	Severity Score	Severity Level
386800010	Congestive heart failure, w/o complication, with comorbidity, w/o surgery	2423	00000.6123	2
386500010	Congestive heart failure, w/o complication, with comorbidity, w/o surgery	2424	00001.9423	3
386500011	Congestive heart failure, w/o complication, with comorbidity, with angioplasty	2425	00003.0827	4

Episode 2423

Demographics		Weight
Male 45		0.2733
Condition Status		
None		
Comorbidities		
80018	Diabetes	0.1513
80045	Other hematologic diseases	0.1217
80171	Ischemic heart disease	0.0660
Interactions		
None		
Multiple Counts		
None		
Total Score		**0.6123**

Episode 2424

Demographics		Weight
Male 46		0.2733
Condition Status		
None		
Comorbidities		
80018	Diabetes	0.1513
80045	Other hematologic diseases	0.1217
80171	Ischemic heart disease	0.0000
80173	Cardiomyopathy	0.7395
80375	Acute renal failure	0.0289
Interactions		
80173 & 80375		0.6276
Multiple Counts		
None		
Total Score		**1.9423**

Episode 2425

Demographics		Weight
Male 47		0.2733
Condition Status		
70086	Congestive heart failure, with diastolic heart failure	1.1404
Comorbidities		
80018	Diabetes	0.1513
80045	Other hematologic diseases	0.1217
80171	Ischemic heart disease	0.0000
80173	Cardiomyopathy	0.7395
80375	Acute renal failure	0.0289
80377	Chronic renal failure	0.0000
80381	Chronic renal inflammation	0.0000
80383	Nephrotic syndrome	0.0000
Interactions		
80173 & 80375		0.6276
Multiple Counts		
None		
Total Score		**3.0827**

Acute renal failure is more severe than chronic renal failure, chronic renal inflammation, and nephrotic syndrome, and thus is assigned a severity weight for the last episode. (Note that the weights assigned to each comorbidity and complication are shown here for demonstration purposes, but are not included in the output tables.)

The unweighted comorbidity is included in output tables for a complete view of the patient's medical condition.

Severity scores are normalized to each Base ETG. A severity score of 1.0 means that the episode has average expected resource costs, compared with other episodes of the same Base ETG. Severity scores are relative: a severity score of 0.5 means that the episode has half, while a severity score of 2.0 means the episode has double the expected resource costs.

In addition to a severity score, each episode is assigned to a severity level. The severity level is determined by the episode's severity score and also predetermined ranges for each level for a Base ETG. As an example, diabetes employs four severity levels. Episodes with a severity score of:

• less than 1.0 are assigned to Level 1;

• 1.01 through 1.4 are assigned to Level 2;

• 1.41 through 1.7 are assigned to Level 3; and

• 1.71 and above are assigned to Level 4.

When the relative severity is plotted against the cost, the resulting chart clearly indicates the pattern of costs increasing with episode complexity and severity. In most cases, there is a clear demarcation between severity levels.

Figure 2 shows how severity scores are fairly level for 60 percent of episodes of anxiety disorder or phobias. The severity scores then jump and again remain fairly level until they increase by about a third for the most severe 2 percent of episodes. The Base ETG anxiety disorder or phobia therefore has three severity levels under the enhanced version 7.0.

Figure 2.
Disease episodes vary in severity:
anxiety disorder or phobias
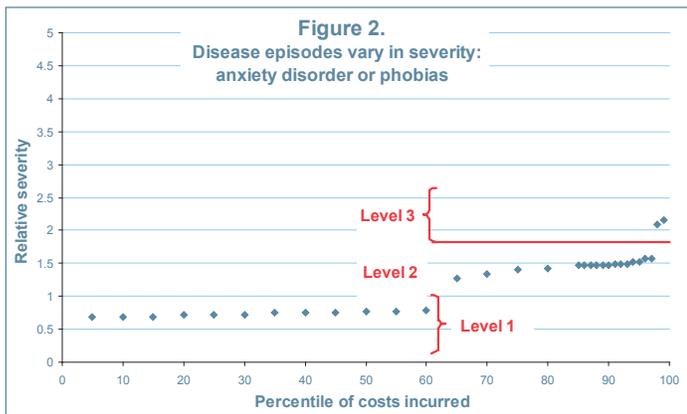
Now when data are run through ETG 7.0, episodes of anxiety disorder or phobia will be assigned a severity level of 1 if they are in the lowest risk category, 2 if they are in the middle risk category, and 3 if they are in the highest risk category.

Figure 3.
Disease episodes vary in severity:
lymphoma
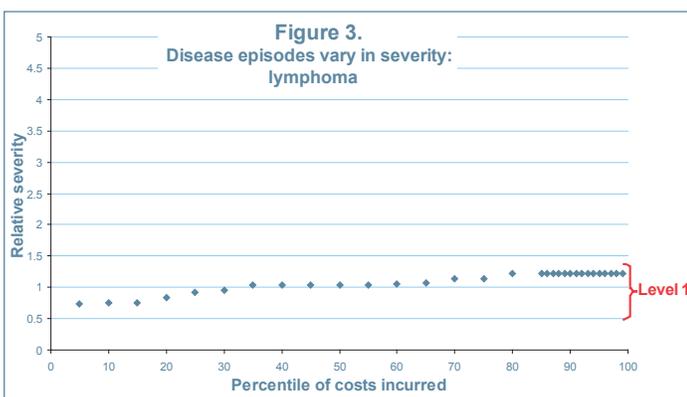
In contrast, there is very little variation in severity of episodes of lymphoma, as seen in Figure 3. All episodes of lymphoma will be assigned a severity level of 1. No further severity assessment was indicated for episodes in this ETG beyond the base condition.

Each Base ETG was assigned as many as four severity levels, determined by the Base ETG's unique pattern of increased severity. Therefore, the severity levels are closely correlated with actual data, which would not be the case if episodes were divided according to an arbitrary measure such as quartiles.

Clinical accuracy can be inferred from the statistical homogeneity of the cost within a severity grouping. The white paper *Using ETG 7.0* demonstrates how ETG 7.0 severity levels precisely distinguish between risk groups.

OUTLIERS
Each combination of Base ETG, severity level, and treatment indicator is assigned *trim points* that frame the normal range of costs for the combination. Episode costs outside the range are flagged as *outliers*. (Since complications and comorbidities are factored into the severity, as described in the previous section, they are not considered again in calculating outliers.) Outliers can be the result of inappropriate treatment; rare, extremely complicated cases; or simple coding error.

Trim points can be customized to create customer-specific outlier ranges.

Using complete non-outlier episodes, users can calculate a risk-adjusted value for cost or utilization measures that the provider's immediate peers would be expected to generate if treating the same set of episodes within a Base ETG, with the same case mix as measured by episode severity. Using this measure, a provider's utilization decisions and costs can be validly compared with his or her peers. (For a thorough description of the statistical approach to developing Provider Performance Measures and a case study, see the white paper *Using ETG 7.0*.)

CONFINEMENTS
ETG builds individual confinements based on all claims associated with an inpatient stay, determined by the admit date and discharge date. The software then reviews all other claims, such as specialty inpatient consults, that occur within that time frame and assigns them to the confinement. As a default, each facility record would trigger a discrete confinement. Users can select the *Link Facility Records*

option to include facility records within the days allowed between confinements, with the same provider ID, and with the same *bed type value*, to join the confinement. The only exception is facility records that would extend the confinement beyond a year, unless the *unlimited episode length* option is activated.

Outputs

ETG produces a variety of output files. Users can confine their analyses to the main summary file or link the files to analyze the data for a wide range of purposes.

The primary output file is the summary file, used to analyze data by defining episodes of care as the medically meaningful unit of analysis. The precise configuration of the summary file is determined by whether various options were selected. For example, the *summarize complete episodes only* option excludes episodes that have unknown start or end dates. These episodes may not have accrued all the relevant costs, so they could be misleading for comparative purposes.

The new ETG numbering system clearly demonstrates whether or not the episode has a clinically relevant condition (including complications), comorbidity, or treatment. And, in the 7.0 version, each of these has its own output file that includes the specific data comprising a condition, comorbidity, or treatment. This information is critical to analyzing provider performance as it provides the specific factors that may have affected the management of the patient's condition. Additionally, the information may be useful for the physicians who are managing those cases.

ETG also produces a *patient comorbidity file* of all comorbidities for each member. This file can be used as an input for future runs, to make sure a patient's underlying health status is factored into disease severity.

The *episode ETG file* presents all the episodes that shifted Base ETG during the grouping process. Analyses will demonstrate the disease progression and utilization pattern of the underlying condition.

The *annual file* includes the Base ETG *orphan record* and orphan episodes. Therefore, it allows for analysis of members' complete ETG costs, including those that do not, for example, fall within the clean period of a specific episode.

The *phantom file* presents the phantom clusters and phantom episodes, based on claims which were relevant to two or more episodes, but whose costs could only be grouped to one episode to avoid double-counting costs. These data can be linked to summary file episodes that contain only ancillary or pharmacy records to assess care and utilization for the entire episode.

Confinements can include episodes from many ETG. Therefore, the *confinement file* enables users to analyze all costs associated with the inpatient stay, whether or not the confinement is related to an episode.

Finally, users may want to determine whether a claim service record was included in an episode, a confinement, or both. An ETGINFO set of fields provides a link between the claims data and all output files. This function also allows the user to investigate the grouping results in detail.

All output files are described in detail in product documentation, along with business applications.

Summary

ETG 7.0 represents a significant development that will take analyzing and comparing health care utilization to a new level while retaining the signature integration with other Symmetry engines for consistent analysis. In addition to the major new features outlined here, many other developments are detailed in product documentation.

The new ETG numbering system streamlines analysis of episodes and directly presents factors that contribute to case mix. These factors are easily linked to the summative data. Similar, concurrent conditions are now grouped into one episode.

The newly designed severity scores provide unprecedented ability to distinguish between episodes, based on

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the patient's underlying condition, episode-specific comorbidities, and demographics. The severity levels reflect the clinical reality of each Base ETG—some have little variation while others demonstrate a wide range of utilization requirements.

Similarly, each ETG has a newly calibrated "normal" range of costs, outside of which episodes are deemed outliers.

ETG 7.0 retains Symmetry Suite's commitment to flexibility. Users have many options to select or override particular features according to their business or analytic needs. Users can now define the analysis year, as five options accommodate different types of data strength or weakness.

ETG, already an industry leader for measuring disease severity, now provides an even more robust basis for analysis and decision making.

About the Company

More than 1,200 payers now look to Ingenix for solutions to their complex business challenges. By integrating a diverse suite of products and services, Ingenix helps its clients increase revenue, manage medical costs, and simplify complex administrative and financial processes with powerful data, software, consulting, and outsourcing solutions. Consistent capital investment, stability of resources, and continual innovation have made Ingenix one of the largest and fastest-growing U.S. health care information companies.