

INGENIX[®]

Symmetry PEG

Assessing Surgical Specialists with Value-Based Measurement

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Introduction

The most recent addition to the Symmetry™ Suite of products for valid and practical health care measurement and analysis, Procedure Episode Groups™ (PEG™), closed a critical gap in the industry: evaluation of surgical providers. PEG 7.5 enables the quality and cost of care provided by surgical specialists to be measured as accurately as that provided by primary care practitioners and medical specialists. This analysis is essential for pay-for-performance, network tiering, and other initiatives that demand valid and robust approaches to measuring value in health care. Ingenix now presents an updated PEG methodology that addresses uncommon, but important, circumstances. For example, ICD-9 procedure codes provide clinical detail not accommodated by the CPT or HCPCS coding structure.

To accommodate the unique focus of surgical specialists, PEG creates a new unit of analysis, a **procedure episode**. The unit describes not only the anchor surgery, but also services directly related to its performance, including care prior to the procedure such as the workup or conservative care (e.g., prescribing physical therapy), and post-procedural activities such as repeated surgery and follow-up care. A PEG episode supports analysis of cost and utilization related to the performance of the surgery itself and to the entire sequence of care.

In building procedure episodes, PEG leverages the output of a related product, Episode Treatment Groups®. ETG® identifies and compiles all inpatient, outpatient, and ancillary services into mutually exclusive and exhaustive categories called episodes of care. These ETG episodes encompass the universe of services involved in the diagnosis, evaluation, and treatment of a clinical condition. ETG then applies powerful, accurate case mix adjustment by factoring in clinically relevant comorbidities and complications, producing clinically homogenous units of analysis. The duration of an ETG episode is carefully assessed to define complete episodes of care. Already accomplished in measuring the cost, utilization, and severity of health care conditions, ETG version 7.0 features significant improvements to its methodology. (For more information about the ETG process and new features, see the white papers *Measuring Health Care with ETG and Leveraging the Power of ETG 7.0*.)

ETG produces a detailed summary of how individual services group to unique episodes of care. This key data supports PEG

and other Symmetry Suite products including Episode Risk Groups® (ERG®), Pharmacy Risk Groups™ (PRG®), and EBM Connect®. PEG uses this service-level output to identify major therapeutic procedures, to gather associated services, and to build procedure-based episodes of care. By leveraging the same methodological platform as ETG and other Symmetry tools, PEG provides a consistent approach to measurement and contributes to a complete solution in health care measurement.

Procedure Episode Grouping

The PEG methodology uses information readily available from administrative medical and pharmacy services data to identify unique procedure episodes and the services related to those episodes. To provide accurate identification and thorough development of complete episodes, PEG uses a carefully designed sequence of decisions based on clinical guidelines and a complete understanding of the complexity of administrative services.

PEG episodes are developed using three key steps (see Figure 1):

- Identifying anchor records around which episodes will be built;
- Building the episodes by identifying and gathering services to, or *grouping to*, the anchor record; and
- Limiting service identification to an appropriate time frame.

Fully defined episodes rely on additional concepts, each with a thorough methodology, such as determining the responsible provider and when the episode is complete.

Identifying Anchors

PEG procedure episodes are built around major therapeutic procedures performed by a clinician. These services, called **PEG anchors**, are significant procedures which are intended as treatment for a condition. They are not diagnostic (e.g., colonoscopy) or minor (e.g., steroid injection). PEG anchors are identified using procedure codes on one or more services, all of which must occur on the same date.¹

Almost 200 **PEG anchor categories** are used to aggregate clinically related anchors into definable therapeutic events. Both the revenue code and procedure code fields on each input service are compared to a list of qualified procedure

¹ Specifically, PEG assesses CPT (Current Procedure Terminology), HCPCS (HCFA Common Procedure Coding System), and ICD-9 (International Statistical Classification of Diseases and Related Health Problems, 9th edition) procedure codes and National Uniform Billing Committee revenue codes. CPT is a registered trademark of the American Medical Association.

Figure 1. Building an Episode

Step 1:

Identify PEG anchor around which episodes will be built.



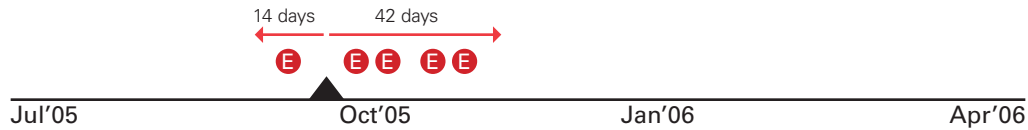
A PEG anchor is a significant procedure intended as treatment (not diagnosis) and performed by a clinician.

In the case of multiple services being eligible for anchors status, transparent clinical hierarchies are applied to select most appropriate service.

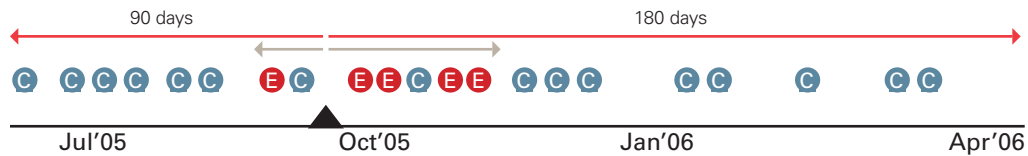
Step 2:

Identify services within PEG-specific, customizable time frames and group them to the anchor record.

- Within the PEG specific CloseTime Frame, identify claims with ETG numbers that are clinically related to the PEG anchor (represented by **E**)



- Within the PEG specific FurtherTime Frame, identify diagnostic and minor treatment procedures with strong clinical evidence for the relationship with the PEG anchor (represented by **C**)

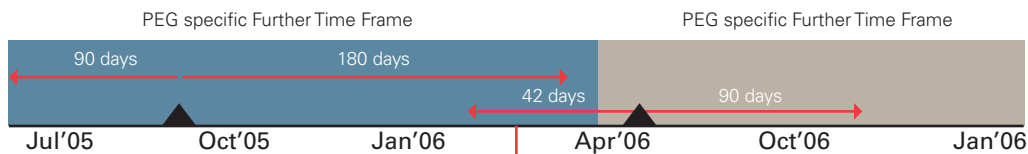


All services clinically related to the PEG anchor are grouped, including pre-procedural activities (e.g., workup, conservative care) and post-procedural activities (e.g., appropriate follow up, appropriate testing).

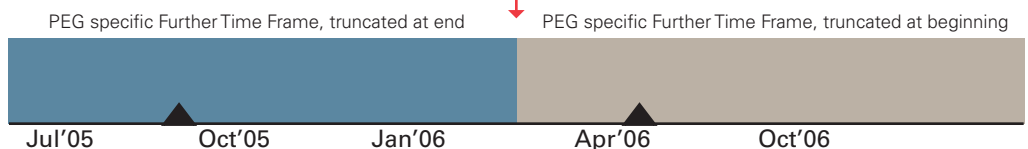
Step 3:

Limit the time frame within which services are collected as necessary.

- Identify any other PEG anchor procedures in the same PEG procedure category. Determine whether Further Time Frames overlap.



- Truncate both time frames at midpoint of overlap.



Each service and its associated costs are assigned to only one PEG.

codes to determine whether they meet the clinical requirements to be related to an anchor category. Figure 2 provides examples of PEG anchors and the anchor category they map to.

Not all services with pertinent procedure codes are eligible to be mapped to a PEG anchor. In some cases, the service is assigned to an ETG that indicates that the procedure is unrelated to the PEG anchor category. These are usually error ETGs such as *Inconsistent diagnosis/procedure matched record*.

A second example of a service not eligible to serve as a PEG anchor is a service for which the procedure code modifier on the service line indicates that the procedure was not eligible for clinical reasons, such as that it was anesthesiology rather than the primary surgery, although such a service could still be grouped to the procedure episode. Third, to become an anchor, the service must be performed by a physician with an appropriate clinical specialty, e.g., orthopedics for a hip replacement.

In rare cases, the CPT code is not specific enough to fully define an association with a PEG anchor category so ICD-9 procedure codes are enlisted to provide additional information. For example, ICD-9-CM code 36.07 (insertion of drug-eluting coronary artery stent(s)) is used to determine when PEG anchor

category 30708 (coronary artery catheterization w/ drug stent) is to be assigned. ICD-9 enables PEG to distinguish between more and less expensive procedures.

All anchors are assigned to a **PEG practice category (PPC)**, which identifies the particular body system addressed by the procedure—e.g., ophthalmology or nephrology/urology/gynecology.

It is possible for multiple services to meet the criteria to be a PEG anchor. However, only one anchor can be used to build a procedure episode. Therefore, within each PPC PEG implements a hierarchy that determines which anchor takes precedence.

Each potential anchor is given two precedence values, or ranks. The potential anchor with the lowest primary precedence value “wins.” In the case of a tie, the potential anchor with the lowest secondary precedence value “wins,” and becomes the foundation of a procedure episode. The service that does not become the anchor contributes data to the episode.

For example, services representing a coronary artery bypass graft (CABG) will outrank services representing pacemaker insertion, so the PEG anchor procedure would be CABG (see Table 1). The service line for CABG will be flagged as the PEG anchor procedure in the Summary Output File.

Figure 2.

Selected PEG Anchor Procedures and Associated Anchor Categories

PEG Anchor Procedure (selected list)	PEG Anchor Category
<ul style="list-style-type: none"> Coronary Artery Bypass, Vein only; Single coronary venous graft Coronary Artery Bypass, Vein only; Two coronary venous grafts Coronary Artery Bypass, Vein only; Six or more coronary venous grafts Coronary Artery Bypass, Using arterial graft(s); Single arterial graft Coronary Artery Bypass, Using arterial graft(s); Two arterial grafts Minimally Invasive Direct Coronary Artery Bypass Surgery involving mini-thoracotomy or mini-sternotomy surgery, Performed under direct vision, using arterial graft(s), Single coronary arterial graft 	Coronary Artery Bypass Graft
<ul style="list-style-type: none"> Endoscopy, Wrist, Surgical, With release of transverse carpal ligament Revise Median Nerve at Wrist 	Carpal Tunnel Release Arthroscopic
<ul style="list-style-type: none"> Explore/Biopsy Eye Socket, With bone flap, For exploration Explore/Drain Eye Socket, With drainage only Explore/Treat Eye Socket, With removal of lesion Explore/Treat Eye Socket, With removal of foreign body Orbitotomy Without Bone Flap (frontal or transconjunctival approach); With removal of bone for decompression Orbitotomy Without Bone Flap, Removal of lesion 	Orbitotomy

Building Procedure Episodes

Once the PEG anchor is determined, the grouping process can proceed. Services within a logical period of time are reviewed and, if determined to be clinically related, gathered to the anchor. The grouping process must balance the goal of identifying all clinically relevant services with the risk of gathering services—and their costs—that are not truly related to the surgery.

Services that occur near the date of the PEG anchor procedure record have a high likelihood of being clinically related to the anchor. However, focusing only on those services would potentially exclude related services occurring later due to complications or repeated procedures. (A list of procedures that may be related is provided with the product documentation.)

Selecting services that are further in time from the PEG anchor may produce a more complete financial picture. However, some less relevant services may be included, obfuscating the actual sequence of care as well as increasing the reported cost of the procedure.

PEG solves the dilemma by using two pre-defined time frames and specific rules for each. One time frame is narrow—close—around the date of the initiating service. The other—further—time frame has much longer pre- and

Table 1.

PEG Anchor Procedures in Cardiology PPC	
PEG Anchor Description	Precedence
Surgical valve repair	1
Coronary artery bypass graft (CABG)	2
Closed valve repair	3
Implantable device defibrillator	4
Invasive therapeutic (ablation) electrophysiology	5
Coronary artery catheterization w/drug stent	6
Coronary artery catheterization w/non-drug stent	7
Coronary artery catheterization (therapeutic)	8
Implantable device pacemaker	9
Coronary artery catheterization (diagnostic)	10

post-window periods. Each time frame assigns fewer days before the PEG anchor than after. The length of both time frames is specific to the PEG and can be customized by users.

Within each time frame, all services that fall within the member’s eligibility period are reviewed.

Figure 3.

Selected Target Procedures Associated with Selected PEG Anchor Categories

PEG Anchor Category	Target Category (selected list)	Target Procedures (selected list)
Coronary Artery Bypass Graft	<ul style="list-style-type: none"> Exercise stress test EKG Echocardiography Lab Tests to evaluate elevated cholesterol 	<ul style="list-style-type: none"> Transthoracic echocardiography for congenital cardiac anomalies; Complete. Transthoracic echocardiography for congenital cardiac anomalies, Follow-up or limited study. Echocardiography, Transthoracic, Real-time with image documentation (2D) with or without M-mode recording; Complete.
Carpal Tunnel Release Arthroscopic	<ul style="list-style-type: none"> MRI of any upper extremity joint Pain Management Physical Therapy 	<ul style="list-style-type: none"> Injection, anesthetic agent; Trigeminal nerve, any division or branch. Injection, anesthetic agent; Facial nerve. Injection, anesthetic agent; Greater occipital nerve.
Orbitotomy	<ul style="list-style-type: none"> Scanning computerized ophthalmic diagnostic imaging Visual field examination External ocular photography 	<ul style="list-style-type: none"> Visual field examination, Unilateral or bilateral, With interpretation and report; Limited examination. Visual field examination, Unilateral or bilateral, With interpretation and report; Extended examination.

Within the *Close Eligible Window Period*, PEG leverages the logic and algorithms of ETGs and only includes services grouped to ETG episodes that are clinically related to the anchor procedure. The services meet an appropriate threshold of clinical evidence.

Within the *Further Eligible Window Period*, services are identified with high specificity, requiring strong clinical evidence for the relationship with the PEG anchor. In order to assess clinical relevance consistently, each PEG anchor category has a list of clinically associated **target procedures**, aggregated into **target categories**, as demonstrated in Figure 3. An episode will accrue target procedures—both diagnostic and minor treatment services—that are mapped to the episode’s PEG anchor category.

This version of PEG incorporates new rules to identify high cost radiology services as target procedures.

In keeping with the Symmetry Suite’s tradition of transparency, four lookup tables that describe the PEG anchor categories are available to users.

Since the wider time frame includes the narrow time frame, services meeting the level of stronger clinical evidence within the close time frame are gathered as well² as seen in Figure 1, Step 2. Services that both have less strength in clinical evidence and are not temporally close to the PEG anchor are excluded from consideration.

Final Time Frame for Procedure Episodes

Any given service, and its associated costs, may only be assigned to one PEG, to avoid double-counting. Therefore, if a Further Eligible Window Period overlaps with the Further Eligible Window Period of another PEG anchor category associated with the same PPC, both overlapping window periods will be truncated. The services that had been in the overlap are assigned to one or the other episode.

As demonstrated in Figure 1, Step 3, the truncation is generally at the date in the middle of the overlapping periods. However, the overlap period cannot extend beyond either procedure episode’s PEG anchor procedure date of service. In the rare cases in which the truncation date is within the Close Eligible Window Period, the Close search window will also be adjusted.

Once all services associated with the PEG anchor category, from both window periods, are identified and gathered, they are grouped, creating the procedure episode. Each episode receives a unique episode number.

Responsible Provider

PEG assigns every procedure episode to one responsible provider, who will be identified based on a service line that produces the PEG anchor procedure. Provider responsibility is based on evidence that a provider is the primary surgeon. For example, a provider of a service that has been assigned a procedure code modifier of “assistance at surgery” would not become the responsible provider.

In some cases, more than one provider may be indicated as potentially responsible. For these episodes, PEG clinical rules are used to rank the providers based on which provider specialties are eligible to be considered for each anchor category. For example, for a CABG, cardiovascular surgeons and thoracic surgeons have the highest eligibility ranking, followed by vascular surgeons and pediatric cardiovascular/thoracic surgeons. The third tier includes 36 different types of providers who could legitimately perform the procedure.

Physicians who would not be expected to perform the surgery—dermatologists and oncologists, for example—are assigned a rank of 9. This rank shows that there may be some error in coding while retaining the procedure.

When multiple service lines with different providers on the same date of service are potentially eligible to be the responsible provider, the following logic is used to determine responsibility:

- The lowest-ranked (most appropriate) specialty provider wins the assignment; and
- When services from multiple providers with the same specialty ranking are eligible, the service(s) for the provider with the highest total cost will be assigned as responsible provider.

Episode Completeness

Procedure episodes have a combination of three flags to indicate whether they are *complete*. The *Begin Clean Flag* and *End Clean Flag* indicate whether any of these conditions are met at the start—or finish—of the episode:

- There is a competing episode overlapping the Close Time Frame;
- There is a competing episode overlapping the Further, but not the Close, Time Frame;
- The member’s eligibility start date is within the Close Time Frame;

² For Some users will want to review services that have an ETG and that would have been gathered to the anchor using the Close Time Frame process, but which were not gathered to the anchor by the Further Time Frame process. Such services are flagged as an “Unrelated ETG.”

Figure 4

Sample Output Data					
Procedure Episode Group			PPC	Episode	Laterality
72518-Lumbar Laminectomy			18-Orthopedics	Complete	(N/A)
Patient ID	Patient Name	Gender	Age	Provider	Clinical Specialty
5555-5555	Jerry Doe	Male	46	Dr. Francis Lee	Neurosurgery
Procedure	PEG Start	PEG End	Begin Clean	End Clean	Conflict Flag
09/30/2006	05/06/2006	09/13/2007	0	0	0
Change Type		Allowed	Date	Target Procedure	
Management		\$435	05/06/2006	CT with Contract Myelogram	
Surgery		\$3,511	06/01/2006	Functional Capacity Evaluation	
Facility		\$14,280	08/09/2006	Injection, Lumbar Back	
Pharmacy		\$0	09/09/2006	X-Ray, Plain Films	
Inpatient Ancillary		\$2,256	09/21/2006	MRI, Lumbar Back	
Outpatient Ancillary		\$0	12/04/2006	Physical Therapy	
Total		\$20,482	06/05/2007	Nerve Conduction Study	
Note: This example does not use actual data			09/13/2007	Physical Therapy	

- The member's eligibility start date is within the Further, but not the Close, Time Frame; or
- None of these conditions exist, so the episode has a Clean Start (or Clean Finish).

If both flags indicate clean margins, the Complete Flag indicates that the entire procedure episode is complete.

Resolving conflicts between procedure episodes

It is possible for services to have valid clinical relationships with more than one procedure episode. To avoid double-counting the cost associated with the service, PEG applies a series of rules to determine which procedure episode should retain the cost. The rules factor in:

- The service's relationship with the PEG anchor category for the episode;
- Whether the relationship is based on a Target Category or an ETG assignment; and
- The service date relative to any truncation date between procedure episodes.

Although the cost is not assigned to the other procedure episode(s), the procedure services could be used to evaluate the sequence of care. In order to retain the clinical data, the services, called *phantom procedures*, are output to a separate file.

Laterality

A very important measure of quality of care is whether or not a procedure has to be redone. Therefore, it is critical to distinguish between planned surgeries, such as a knee replacement after the other knee was replaced, and repeat surgeries on the same body part. Where laterality applies, PEG assigns a flag to the procedure episodes to indicate whether the anchor occurred on the left, right, or both sides, or whether the side cannot be determined.

Outputs

PEG offers a complete picture of the resources used for a major therapeutic procedure in three easy-to-use output files. The grouper creates a robust unit of analysis for creating financial knowledge for major therapeutic procedures. It carefully determines which provider to credit as responsible for the sequence of care, supporting valid performance measurement for surgical specialty providers.

The **Episode Summary Output File** includes aggregated data related to each procedure episode. That is, all costs from services associated with the episode are summarized.

In addition to providing total costs, as seen in Figure 4, the output includes summary amounts, both allowed and paid, for specific types of service:



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- Surgery: surgical or related services;
- Facility: room and board services;
- Management: services related to the evaluation of a member's condition;
- Pharmacy: prescription drug services; and
- Ancillary: services such as x-rays or laboratory tests that are incidental to direct evaluation, management, and treatment, summarized for both inpatient and outpatient services.

A procedure episode reflects the complete sequence of care, which can be compared to an ideal sequence of care developed through literature review and expert opinion. The sequence of care for each procedure episode can be further broken down into care provided prior to, during, and after the period described by the anchor procedure. In this way, PEG episodes provide a natural unit of analysis to serve as a foundation for measures of quality of care for surgeons.

For example, quality markers could be developed using the workup sequence of care for procedures such as:

- Knee MRI prior to knee meniscectomy;
- Conservative care (physical therapy or joint injections) prior to lumbar laminectomy; and
- Time between diagnosis and lumbar laminectomy (this time is short for surgeons who are overly aggressive)

Quality markers using the follow-up sequence of care could include:

- Physical therapy after orthopedic surgery;
- Monitoring pacemakers after placement;
- Postoperative infections;
- Removal of hardware; and
- PEG anchor procedures that are redone.

Two files provide the detail necessary to perform such analyses. The **Episode Detail Output File** appends fields created by PEG to the input fields, including user-selected pass-through input fields. The new fields include a unique procedure episode number, provide the anchor and target category, and present flags that identify anchor and target procedures with ETG assignments that do not relate to the PEG anchor category. The Episode Summary Output File is created from the Episode Detail Output File.

The **Phantom Detail Output File** is similar to the Episode Detail Output File with one exception. Its function is to provide information on the phantom procedures which supply important clinical detail about the procedure episodes without contributing costs. By definition, none of the services in this file served as an anchor procedure.

Summary

Building on a decade of experience with episodes and case mix adjustment, Symmetry's PEG enhances the spectrum of approaches available to assess care delivery and measure provider performance. PEG provides a clinically valid and robust methodology to identify significant therapeutic procedures and to capture and measure services related to its performance.

A two-stage process of gathering services to a procedure balances the need to ensure that the services are clinically relevant with the desire to identify services that are temporally distant from the index procedure. Once a procedure episode is built, PEG applies a series of tests to determine which provider is most appropriately deemed responsible.

Three output files conveniently convey the complexity of the procedures. In addition to supporting analyses of the final costs of procedures, the data also encourage analyses of the continuum of care, including assessments of repeated procedures. Symmetry is pleased to contribute this latest improvement to health care analytics that reflects and accommodates the complexity of actual medical decisions and procedures.

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