White Paper

INGENIX®

Symmetry Episode Treatment Groups

Issues and Best Practices in Physician Episode Attribution

Overview and Background

Health care organizations increasingly need to measure value and understand the services rendered by networks and providers. Purchasers, consumers, and patients demand increased transparency into the cost, quality, and service delivered by physicians and hospitals. Measuring the health care delivered and providing incentives for high performance are seen as critical tools in demonstrating value and addressing differences in the cost and quality of care.

A number of organizations in the health care industry have adopted or explored different approaches to provider measurement, and then have used the findings for a wide range of applications. These applications have included information sharing with providers, transparency tools to assist purchasers and consumers, and "pay-for-performance" strategies that may impact provider reimbursement or patient access to select providers. In all these cases and others, the information available to support these initiatives is only as valid as the data and methods used in measurement.

For most organizations, the primary objective in assessing physician performance is to identify quality care at a reasonable cost, delivered with good service. "Cost of care" describes the relative resources used in delivering health care or managing a patient's clinical condition. "Quality" is an assessment of clinical outcomes or the processes used in patient care and their correspondence to evidence-based guidelines and others.[1] "Service" can relate to patient satisfaction and access to care. "Efficiency" is the cost of care for a given level of quality and service.

This paper examines a key methodological issue in measuring physician cost of care. In particular, the paper describes different options for attributing responsibility for "episodes of care" to individual providers. Episodes of care are a central concept in efforts to measure and compare physicians based on cost of care. An episode is the unique occurrence of a medical condition or disease for a patient and the health care services involved in diagnosing and managing his or her treatment. The importance of episodes in measurement is derived from the inherent nature of medical care and the U.S. health care delivery system. In particular, patients often present with a number of different acute and chronic conditions— many occurring during the same period of time. Patients also can have multiple care providers, each contributing to the same or different conditions. Episode tools assign services to appropriate conditions, supporting measurement of providers on those parts of care where they are most responsible.

Table 1.

Examples of Episode Treatment Groups	
ETG	**Description**
27	Type I diabetes, with comorbidity
29	Type II diabetes, with comorbidity
153-01	Malignant neoplasm of central nervous system, with surgery, with active management
153-02	Malignant neoplasm of central nervous system, with surgery, w/o active management
154-03	Malignant neoplasm of central nervous system, w/o surgery, with active management
154-04	Malignant neoplasm of central nervous system, w/o surgery, w/o active management
168	Migraine headache, common
169	Migraine headache, complicated
265	Ischemic heart disease, except CHF, w/o AMI
267	Congestive heart failure, with comorbidity
268	Congestive heart failure, w/o comorbidity
332	Allergic rhinitis
383	Acute bronchitis, w/o comorbidity, age less than 5
384	Acute bronchitis, w/o comorbidity, age 5 and older
720	Osteoporosis
744-01	Major trauma, other than fracture or dislocation, w/ surgery—foot and ankle

Symmetry's Episode Treatment Group (ETG) methodology is a widely used approach to create episodes of care.[2] ETG

[1] Symmetry's Evidence-Based Medicine (EBM) Connect product provides a comprehensive solution for assessing provider quality, including comparisons of delivered care and outcomes against evidence-based guidelines and national standards.

[2] Symmetry Episode Treatment Groups™. User's Guide, Release 6.0, 2006.

is a condition classification methodology that combines related services into a medically relevant and distinct unit describing a complete episode of care. The clinical richness of ETG and its reliance on information readily available from medical and pharmaceutical claims makes it a sound basis for provider measurement. Examples of ETGs are displayed in Table 1. Approximately 600 separate ETGs are defined—each categorized into one of 22 Major Practice Categories (MPCs) noted in Table 2. Appendix 1 provides an overview of the basic elements of the ETG approach.

There are a number of important challenges in using episodes to assess physician cost of care, such as determining which cost and utilization measures to consider in the assessment, how to adjust for differences in the case-mix across providers, and which groups of providers to use for peer comparisons. However, an integral step in any approach is the assignment of physician responsibility to different episodes of care, or episode "attribution."

This paper explores different approaches to physician episode attribution using standard ETG outputs and addresses the following questions:

- What are some of the more commonly used options for episode attribution?
- How are these options supported by ETG outputs?
- What are the trade-offs in selecting one approach over another? Do different options make sense given the specialty or delivery system being examined?

The next section describes different approaches to physician attribution, followed by examples illustrating each method. The final section of the paper provides a summary and discussion.

Table 2.

Major Practice Categories (MPCs)	
MPC	**Description**
1	Infectious Diseases
2	Endocrinology
3	Hematology
4	Psychiatry
5	Chemical Dependency
6	Neurology
7	Ophthalmology
8	Cardiology
9	Otolaryngology
10	Pulmonology
11	Gastroenterology
12	Hepatology
13	Nephrology
14	Urology
15	Obstetrics
16	Gynecology
17	Dermatology
18	Orthopedics and Rheumatology
19	Neonatology
20	Preventative and Administrative
21	Late Effects, Environmental Trauma and Poisoning
22	Isolated Signs and Symptoms

Physician Cost of Care and Episode Attribution

Physician cost of care measurement involves a number of important steps:

- Collecting, standardizing, and integrating complete and consistent information, including enrollment, medical, and pharmaceutical service data, and clinical records from lab results and other sources.
- Selecting the units of measurement, including episodes of care, populations, inpatient admissions, or specific procedures.
- Creating units of analysis—for example, applying the ETG grouping technology to define unique episodes of care for a patient.

- Selecting the individual physicians to be compared and creating "peer groups"—typically defined using attributes such as provider specialty and location.
- Identifying, for each peer group, the list of ETGs to be used in comparing providers.[3]
- Assigning physician responsibility to episodes of care (the episode attribution step).
- Identifying the metrics for use in comparing providers, such as costs (overall or by type of service) or the use of specific services in patient care.
- Risk adjusting for differences in patient morbidity or case mix across providers in a peer group.
- Creating physician cost of care results and identifying approaches for sharing these findings with providers and other stakeholders.

Attributing episodes of care to appropriate physicians is a challenging step in this process. Over some period of time, a patient can have multiple conditions and, in many cases, multiple providers caring for the same condition. For example, for an episode of hypertension, a patient can be managed by his or her primary care physician, an internist, and a cardiologist. For a patient with coronary artery disease, an internist, a cardiologist, and a surgeon can all play key roles in providing care. A methodology is required to identify these episodes for a patient and the providers responsible for the services performed within those episodes.

Some principles are involved in determining a valid approach to be used in assigning episodes:

- The approach must be valid conceptually. It must be defensible, understandable, and accepted by providers, health plans, and other users of the measurement results.
- The approach must be supported by readily available information, including the outputs from an episode grouping.
- The approach should be robust across physician measurement applications—working well for different sources of health plan data, for different patient populations, and over time.
- The approach should be flexible and consider the characteristics of the specialists being compared and the nature and severity of their patients and episodes.
- Both activity- and population-based approaches should be supported. An activity-based approach describes attribution where an episode is assigned to the providers responsible for the greatest amount of activity during the course of the episode. Activity can be measured using different concepts such as service costs, episode clusters, or patient visits.
- A population- or panel-based approach is sometimes used when measuring performance for primary care physicians (PCPs), in particular where providers perform a gatekeeper function for a population of members. In this case, responsibility for a member's qualified episodes may be attributed to the member's PCP—whether or not the PCP provided any of the services for that member during those episodes.
- "Sufficient" evidence of the provider's responsibility for the episode should exist. Thresholds should be considered that prevent providers from "winning" episodes where they have a small amount of involvement—relative to their physician peers or relative to all physicians involved in the episode.
- Attributing the same episode to multiple providers in different specialties should be considered, when appropriate.

The first point noted above, "The approach must be valid conceptually," deserves further discussion. Care during an episode can include two types of services: services where important clinical decisions are made regarding the course of care, and services that are a response to those decisions. Office visits, consultations, and other evaluation and management services are examples of the first type of services. As part of these services, decisions to perform tests, prescribe drugs, or order other ancillary services are made. The second type of service includes lab, imaging, other diagnostic tests, DME, drug therapies, and treatments. These services are typically responses to decisions made regarding the course of care. Some services, such as surgery, may describe a closely linked bundle of care and relate to both categories—where the surgeon has some role in the decision to perform the procedure and also performs the surgery itself.

[3] For example, when comparing primary care physicians, ETGs consistent with primary care might be selected. "Signs and symptoms" and other ETGs less well-defined from a clinical perspective may also be excluded.

This dichotomy suggests two important concepts for assessing approaches to attribution. First, the measure of "activity" to be used in identifying a responsible provider should focus on those types of service where decisions regarding the course of care and management of the episode take place. Second, the decision on the approach to be used for attribution may differ by specialty. After the decision to undergo surgery has been made, it may make sense to use cost as the activity measure in the case of a group of providers such as surgeons, where the majority of their services may be of the second type. However, in the case of PCPs or medical specialists, non-acute E&M visits or the number of episodes may be a superior service activity.

The last point in the list, "Attributing the same episode to multiple providers in different specialties should be considered, when appropriate," also warrants further discussion. A number of those who use ETG to support physician measurement perform attribution separately for each specialty, or peer group, of interest.[4] In doing this, they select a single "winner," if possible, for each peer group in which the episode is relevant. In this way, providers in different peer groups can be assigned the same episode, provided that all attribution requirements are met. For the hypertension example used earlier, if the internist and cardiologist are in different peer groups, it is possible for both to be assigned the episode to support their comparisons.

In the remainder of this section, four different general options for physician episode attribution are discussed—three activity based and one population based. Each of these options can be supported using standard outputs from ETG. For each option, the description below assumes the following steps have been performed prior to attribution:

- ETG episode grouping—producing the detail and summary output files to be used in attribution and measurement.
- Identification of the comparison peer group and the individual physicians to be included.
- The selection of qualified episodes for the peer group. Qualified episodes include those episodes with an ETG that matches the predefined list to be used for that peer group.

Qualified episodes are further limited to complete, non-outlier episodes that fall within the time period defined for measurement.

For this discussion, it is assumed that the objective is to assign a single winner, if possible, for each peer group in which the episode is relevant, but allow providers in different peer groups to be assigned the same episode. To support this, the following logic would be applied separately, peer group by peer group. The activity-based options are described first.[5]

Approach 1—Physician Episode Attribution Using Professional Service Costs. This attribution approach identifies the responsible physician for an episode as that provider rendering the greatest amount of professional service costs during the episode.

Professional services are those performed by a clinician in managing and treating the patient during an episode of care, including visits and consultations, surgery, and therapies. Professional services exclude inpatient and outpatient services billed by a facility and also typically exclude ancillary services such as laboratory, imaging, DME, injectibles, medical and surgical supplies, transportation, pharmaceuticals, etc.[6]

Using professional service costs for attribution involves the following steps:

- For each qualified episode, add the costs of all professional services grouped to that episode, by physician.
- Identify those physicians with episode costs (if any) that are also included in the peer group being measured. Disregard any episodes without one or more physicians for that peer group.
- Identify the peer group physician with the greatest amount of total costs. If two or more peers are found to have the most costs, apply an appropriate "tiebreaker" to determine the winning physician (see discussion below).

[4] As noted above, peer groups define the group of physicians being compared. In defining a peer group for cost of care measurement, most organizations will include physicians from the same specialty or area of expertise. For organizations with a network covering a broad geographic area, some distinction by provider geography can also be used. Internal medicine, cardiology, or general surgery within a certain geographic area are examples of a peer group.

[5] Although these approaches are described for attribution at the individual physician level, they also could be applied using physician groups as the unit for attribution and measurement.

[6] Some ETG users have suggested extending the concept of the "professional services" to be used in this attribution approach. One option that has been proposed is the use of information on the "ordering" provider for a pharmacy prescription or diagnostic test. If available, the cost of ordered services for a provider could be added to the cost of those rendered and the sum used for attribution. A second option proposed by some is the assignment of total costs for an episode cluster to the cluster provider, and using those costs to support attribution—the argument being that cluster ownership may suggest that the physician played an important role in the decisions to perform both the anchor and ancillary services grouped to the cluster.

- For each physician, compute their professional costs as a percentage of costs for all clinicians for the episode and also as a percentage of all costs for all physicians in their peer group. These amounts can be used to compare against percentage thresholds to determine the degree to which a provider is "dominant" within an episode (see discussion below).

After application of the appropriate tiebreaker and threshold comparisons, the peer group physician with the greatest amount of professional costs is attributed that episode for that peer group.

Approach 2—Physician Episode Attribution Using Episode Clusters. This attribution approach identifies the responsible physician for an episode as that provider in the peer group owning the greatest number of "clusters" within the episode.

As described in Appendix 1, other than the individual service, the cluster is the basic unit of an ETG episode. Episode clusters are created using anchor records. Anchor records represent services provided by a clinician engaging in the direct evaluation, management, or treatment of a patient (e.g., office visits, therapies, and surgical procedures). An anchor record indicates that a clinician has evaluated a patient's illness and has decided on the types of services required to further identify and treat the patient's condition. ETG links an anchor record with related services to form a cluster. Clinically homogenous clusters are then combined to create episodes of care.

The clinical nature of an episode cluster makes it a natural candidate as an activity measure for use in episode attribution. In particular, the anchor records that define a cluster represent those types of service where decisions regarding the course of care and management of an episode take place.[7]

Using episode clusters for attribution involves the following steps:

- For each qualified episode, add the number of clusters "owned" by each clinician. The detail output file from ETG can be used for this purpose. For each service that can be assigned to an episode, the detail file identifies a unique cluster number and a cluster provider ID (equal to the servicing provider ID for the cluster anchor record). Using this file, an episode's unique cluster providers and the number of clusters each provider owns can be identified.
- Identify those physicians with episode clusters (if any) that are also included in the peer group being measured. Disregard any episodes without one or more cluster providers from that peer group.
- Identify the peer group physician with the greatest number of episode clusters. If two or more providers are found to have the most clusters, apply an appropriate "tiebreaker" to determine the winning provider (see discussion below).
- For each peer group physician, compute the number of clusters, as a percentage of total clusters for all clinicians for the episode and also as a percentage of total clusters for all physicians in that peer group. These amounts can be used to compare against percentage thresholds to determine the degree to which a provider is "dominant" within an episode (see discussion below).

After application of the appropriate tiebreaker and threshold comparisons, the peer group physician with greatest number of clusters is attributed the episode for that peer group.

Approach 3—Physician Episode Attribution Using Non-Acute Evaluation and Management (E/M) Visits. This attribution approach identifies the responsible physician for an episode as that physician providing the greatest number of non-acute E/M visits within the episode.

Non-acute E/M services include office visits and consultations and other E/M services that occur outside of an acute setting where a provider manages patients and their care. For example, these services exclude acute inpatient visits and consultations, ER visits, and critical care visits. It includes office visits and consultations, home visits, SNF visits, psychiatric evaluations and therapy, and preventive services.

Because of the clinical nature of these services, they can be used as activity measures for episode attribution. In particular, these services represent encounters where decisions regarding the course of care and management of an episode take place. This subset of services will be narrower than that described by episode clusters.

[7] An additional benefit of episode clusters is that an anchor record for a cluster can reside in another episode of care, but the cluster and cluster provider can still be identified for the episode of interest.

Using non-acute E/M visits for attribution involves the following steps:

- For each qualified episode, add the number of non-acute E/M visits rendered by each clinician during the episode.
- Identify those physicians with these visits (if any) that are also included in the peer group being measured. Disregard any episodes without one or more visit providers from that peer group.
- Identify the peer group physician with the greatest number of visits. If two or more providers have the most visits, apply an appropriate "tiebreaker" to determine the winning provider (see discussion below).
- For each peer group physician, compute their number of visits, as a percentage of total visits for all clinicians for the episode and also as a percentage of total visits for peer group physicians. These amounts can then be used to compare against percentage thresholds to determine the degree to which a provider is "dominant" within an episode (see discussion below).

After application of appropriate tiebreaker and threshold comparisons, the peer group physician with the greatest number of visits is the responsible provider for that episode for that peer group.

Approach 4—Physician Episode Attribution Using a Primary Care, Population-based Approach. As noted above, a population- or panel-based approach is sometimes used when measuring performance for primary care physicians. In particular, this approach is often considered where the PCPs perform a gatekeeper function for a population of members. In this case, responsibility for a member's qualified episodes of care may be attributed to the member's PCP—whether or not the PCP provided any of the services for that member during those episodes.

This approach requires two important steps:

- Identify a PCP for each member. This identification can often be obtained from the member's eligibility record, which can include a notation of his or her assigned PCP for a period of time. Alternatively, a PCP can be "imputed" for a member based on that primary care specialist providing the greatest number of primary care services or costs. When imputing a PCP, the list of eligible providers is typically limited to those physicians involved in primary care. Using either approach, a member is linked to a PCP for a defined period of time.
- For each qualified episode, identify the patient's assigned PCP during the episode period. Most users of this approach will select the member's assigned PCP at the beginning or end date of the episode (these dates are available as part of the standard ETG output).

Using this approach, the episode would be attributed to that peer group physician (if any) who is determined to be the patient's PCP during the defined time period.

Physician Episode Attribution—Other Issues. Some general issues around episode attribution remain. The first involves tiebreakers. When using activity-based attribution for some episodes, two or more providers may have the same amount of costs, clusters, or visits. In this case, a tiebreaker is often used to determine the responsible physician for the episode. Useful candidates for this purpose are the alternative activity measures described here. For example, if two physicians own the same number of clusters within an episode, the physician with the greatest amount of professional services costs could be selected. If a tie still remains, the physician with the greatest number of visits could be chosen, and so on.

A second issue involves setting thresholds to determine sufficient activity. As noted previously, most activity-based attribution approaches involve some screening of the winning provider to ensure that they owned sufficient activity relative to their peers and relative to all clinicians during the course of the episode. This is typically done using two threshold amounts—a provider's percentage of the total activity of peers and a provider's percentage of the total activity described by all clinicians for the episode. This percentage is then compared to a predefined threshold. For the physician with the greatest activity, if the percentages exceed both of these thresholds, he or she is determined to be responsible for the episode.

As an example, for an episode with ten clusters, Dr. Jones is responsible for two of the ten clusters and eight other physicians are responsible for one cluster each. Even though Dr. Jones has the most clusters, he still may not be assigned the episode because his involvement was very small.

Table 3. Attribution Example—Sample CAD Episode (assumes 30 percent threshold for peers and all clinicians)

Episode Results	Dr. Smith Family Medicine	Dr. Jones Family Medicine	Dr. Heart Cardiology	Dr. Martin Endocrinology
Peer Group	**Family Medicine 1**	**Family Medicine 1**	**Cardiology 1**	**Endocrinology 1**
# Clusters	3	1	5	1
Professional cost rendered	$400	$100	$400	$500
# of non-acute E/M visits	3	1	4	1
PCP at start of episode	Y	N	n/a	n/a
PCP at end of episode	N	Y	n/a	n/a
Clusters				
Total clusters, peer group	4	4	5	1
Total clusters, all clinicians	10	10	10	10
% peer cluster	75%	25%	100%	100%
% all clusters	30%	10%	50%	10%
Peer group winner	Dr. Smith	Dr. Smith	Dr. Heart	None
Costs				
Total costs, peer group	$500	$500	$400	$500
Total costs, all clinicians	$1400	$1400	$1400	$1400
% peer costs	80%	20%	100%	100%
% all costs	29%	6%	29%	36%
Peer group winner	None	None	None	Dr. Martin
Visits				
Total visits, peer group	4	4	4	1
Total visits, all clinicians	9	9	9	9
% peer visits	75%	25%	100%	100%
% all visits	33%	11%	45%	11%
Peer group winner	Dr. Smith	Dr. Smith	Dr. Heart	None
Population-based PCP				
PCP at start of episode	Dr. Smith	Dr. Smith	n/a	n/a
PCP at end of episode	Dr. Jones	Dr. Jones	n/a	n/a

Most users set these thresholds at 25 or 30 percent. For example, the winning provider must own 25 percent or more of all episode clusters owned by peers and 25 percent or more of all episode clusters owned by all clinicians.

As a final point, it is useful to summarize the issues around allowing an episode to be attributed to multiple providers. As noted previously, many ETG users who employ episode results to support physician measurement perform attribution separately for each specialty peer group of interest, including primary care. In doing this, they select a single winner, if possible, for each peer group in which the episode is relevant, but allow providers in different peer groups to be assigned the same episode, if attribution requirements are met.

In this way, it is theoretically possible to assign more than one physician to an episode if each peer group is considered separately. Users typically do not assign two physicians from the same peer group to the same episode.

To support multiple attribution across peer groups, users would repeat the attribution step selected from former example separately for each peer group. Physicians that meet both the dominant provider status for their peer group and exceed the threshold requirements could be responsible for the episode.

Physician Attribution for Episodes of Care—Examples

The information in the following tables provides examples of different episodes and physician attribution.

Table 3 describes an episode of care for coronary artery disease (CAD) where four clinicians played some role in the diagnosis, management, and treatment of the patient. The physicians belonged to three different peer groups—Family Medicine 1, Cardiology 1, and Endocrinology 1. For each physician, the relevant information required to support each attribution method is presented, along with the provider attributed, if any, for his or her peer group. For this example, activity thresholds of 30 percent for peers and 30 percent for all clinicians are assumed.

As shown in Table 3, attribution results vary by method chosen for this example. Further, for some attribution methods, multiple providers in different peer groups can be assigned episode responsibility. Also note that, in some cases, a physician dominates the measured activity within his or her peer group but does not have sufficient activity to meet the all-clinician 30 percent threshold. In these instances, no winning provider is identified for the episode for the peer group.

Table 4 describes a second CAD episode where four clinicians contributed to patient care. For this episode, a percutaneous transluminal coronary angioplasty (PTCA) performed by Dr. Green is also observed. The physicians were part of three different peer groups—Family Medicine 1, Cardiology 1, and Cardiac Surgery 1. For each physician, the relevant attribution information is presented, along with the winning provider, if any, for his or her peer group. For this example, activity thresholds of 30 percent for peers and all clinicians are again assumed and a tiebreaker of highest costs is used for visits.

As shown in Table 4, attribution results vary by the method chosen for this example. No method produced multiple providers for the same attribution approach. One result of note is the attribution findings for Dr. Green, the cardiac surgeon. This physician contributed one cluster and zero non-acute E/M visits to the episode, but more than 80 percent of the costs. Using costs as an attribution approach allows Dr. Green to be assigned this episode for the cardiac surgery peer group, although no provider in any other peer group receives the episode. On the other hand, using clusters, Dr. Heart—who contributed 56 percent of peer clusters and 42 percent of all clinician clusters—wins the episode for Cardiology I. The number and share of clusters for this physician suggests that she played a significant role in the important decisions regarding the course of care for the episode.

The episode in Table 4 provides an example where the appropriate attribution approach may vary based on the type of physician being studied. Both medical cardiologists played a significant role in determining the episode's course of care and attribution to a cardiologist is warranted. This only happens using a cluster or visit attribution approach. On the other hand, Dr. Green played the central role in the most significant and expensive service occurring during the episode—the angioplasty—although he does not appear to have contributed in a significant way outside of that service. When assessing a peer group comprising cardiac surgeons, the inclusion and attribution to Dr. Green for this episode is the logical outcome. This only happens using the cost-based attribution approach. Using clusters or visits as the attribution method for cardiologists and costs as the attribution method for cardiac surgeons is a reasonable approach.

Finally, for the episode in Table 4, Dr. Jones and Dr. Heart contribute the same number of visits, requiring a tiebreaker to determine a winner. In this case, Dr. Heart wins the episode by having higher professional costs than Dr. Jones.

Table 4. Attribution Example—CAD Episode (assumes 30 percent threshold for peers and all clinicians)

Episode Results	Dr. Smith Family Medicine	Dr. Brown Cardiology	Dr. Heart Cardiology	Dr. Green Cardiac Surgery
Peer group	Family Medicine 1	Cardiology 1	Cardiology 1	Cardiac Surgery
# Clusters	2	4	5	1
Professional cost rendered	$200	$400	$600	$5,000
# of non-acute E/M visits	2	3	3	0
PCP at start of episode	Y	n/a	n/a	n/a
PCP at end of episode	Y	n/a	n/a	n/a
Clusters				
Total clusters, peer group	2	9	9	1
Total clusters, all clinicians	12	12	12	12
% peer cluster	100%	44%	56%	100%
% all clusters	17%	33%	42%	8%
Peer group winner	None	Dr. Heart	Dr. Heart	None
Costs				
Total costs, peer group	$200	$1,000	$1,000	$5,000
Total costs, all clinicians	$6,200	$6,200	$6,200	$6,200
% peer costs	100%	40%	60%	100%
% all costs	3%	6%	10%	81%
Peer group winner	None	None	None	Dr. Green
Visits				
Total visits, peer group	2	6	6	0
Total visits, all clinicians	8	8	8	8
% peer visits	100%	50%	50%	0%
% all visits	25%	37.5%	37.5%**	0%
Peer group winner	None	Dr. Heart	Dr. Heart	None
Population-based PCP				
PCP at start of episode	Dr. Smith	n/a	n/a	n/a
PCP at end of episode	Dr. Smith	n/a	n/a	n/a

Table 5 describes a hypertension (HTN) episode of care where only one clinician played a role in the diagnosis, management, and treatment of the patient. The physician was assigned to the Cardiology 1 peer group. The patient also had a PCP at the start and end of the episode and that provider was part of the Family Medicine 1 peer group.

As shown in Table 5, since Dr. Heart was the only physician involved in the episode, Dr. Heart is the responsible provider for all activity-based attribution approaches. Further, if a population PCP approach is also used for attribution, Dr. Smith—the patient's PCP—is the responsible provider, even though he did not contribute any services to that particular episode of care.

Summary and Conclusions

Health care organizations place increasing emphasis on measuring the cost and quality of the care delivered by physicians. An important and challenging step in this measurement process is how to decide which patients and

Table 5. Attribution Example—HTN Episode (assumes 30 percent threshold for peers and all clinicians)

Episode Results	Dr. Smith Family Medicine	Dr. Heart Cardiology
Peer Group	**Family Medicine 1**	**Cardiology 1**
# Clusters	0	3
Professional cost rendered	0	$900
# of non-acute E/M visits	0	2
PCP at start of episode	Y	n/a
PCP at end of episode	Y	n/a
Clusters		
Total clusters, peer group	0	3
Total clusters, all clinicians	3	3
% peer cluster	0%	100%
% all clusters	0%	100%
Peer group winner	None	Dr. Heart
Costs		
Total costs, peer group	0	$900
Total costs, all clinicians	$900	$900
% peer costs	0%	100%
% all costs	0%	100%
Peer group winner	None	Dr. Heart
Visits		
Total visits, peer group	0	2
Total visits, all clinicians	2	2
% peer visits	0%	100%
% all visits	0%	100%
Peer group winner	None	Dr. Heart
Population-based PCP		
PCP at start of episode	Dr. Smith	n/a
PCP at end of episode	Dr. Smith	n/a

episodes a physician should be held responsible for. Patients often present multiple conditions, and for each condition, multiple providers can contribute to the course of care. Providing valid and robust methods for physician attribution is a fundamental requirement for creating meaningful and actionable measures of performance.

This paper describes different approaches for attributing episodes to physicians to support cost of care measurement. These approaches include both activity- and population-based methodologies and use standard outputs from the ETG episode grouping technology. The attribution methods described here also have had some practical application by those using ETG episodes and can be considered "best practices" in assessing physician cost of care.

There are a number of common principles that should be adhered to in selecting any attribution approach. The discussion and examples presented in this paper can be used to inform guidelines around these principles:

- The attribution approach must be valid conceptually and understandable to physicians and other users of the measurement results. The rules behind attribution should be transparent and, for those episodes where multiple providers contribute care, physicians should have general confidence in the selection of the provider who is most responsible.
- Thresholds should be used to ensure that only those providers playing a significant role in directing the episode's course of care will be assigned responsibility. Setting a reasonable threshold of physician activity (20-40 percent) will cause only a few episodes to go without attribution, but will prevent the majority of arguments from physicians over attribution.
- Attribution should be performed within a peer group. This will result in a few episodes attributed to two different physicians from different peer groups (specialties). Because the physicians are from different peer groups, they will never be compared to each other. However, the episode can contribute to measurement for both providers relative to their peers.

Assuming these principles have been met, questions linger. If multiple attribution approaches have been recommended, which approach is most valid? Which makes the most sense for my application?

The answer to these questions depends on the measurement task at hand. The selection of an attribution approach many times relates to the objectives of the measurement and, in particular, the physician specialties being measured. Users should be flexible and consider the characteristics of the specialists being compared and the nature of the services they provide. The best method allows the attribution approach to vary by specialty.

Given these considerations, recommendations follow for different types of specialties:

- For medical specialties (e.g., cardiology, endocrinology, pulmonary medicine, gastroenterology, and neurology), an activity-based approach using counts of episode clusters or non-acute E/M visits makes sense. These metrics describe unique patient "touches" by a physician during an episode—services where important decisions are often made regarding the episode's course of care. Although physicians in medical specialties also will provide some procedural care, the majority of their relevant service activity can best be recognized and weighted using clusters and visits as the metrics for attribution.
- For surgical specialties (e.g., general surgery, orthopedic surgery, neurosurgery, invasive cardiology, and cardiac surgery), an activity-based approach using professional service costs is the best fit. Relative to a surgeon's peers, costs describe accurately the resources provided by the surgeon during the course of an episode. These specialists often provide consultation and other E/M services, in particular around the decision to perform surgery. However, service costs, including the cost of the surgery itself, most appropriately weigh the impact of these providers on the episode.
- For PCPs, either an activity or population-based approach can be used. Where member panel or gatekeeper arrangements are in place, a population-based approach is a reasonable option. When using an activity-based approach, counts of episode clusters or non-acute E/M visits are the best fit—for the same reasons these approaches are good choices for other medical specialties.

Future Research—The discussion provided in this paper focuses on the important conceptual issues in physician episode attribution and describes some best practices. A number of important questions remain that can support a better understanding of this area.

One important set of questions focuses on the sensitivity of the results of cost of care measurement to choice of attribution method. In particular:

- Does the selection of an episode attribution approach make any difference?
- How often is the same provider attributed to the same episode using different methods?
- What is the ultimate impact on the assessment of a provider's relative cost of care?
- How many episodes can be attributed to one or more physicians and how many are left "unmeasured"?
- How do these results vary by the clinical ETG family, provider specialty, or the health plan or geographic area being studied?

These and other questions will be the focus of a follow-up to this white paper.

Appendix 1—The ETG Approach

Symmetry's ETG is a basic condition classification methodology that combines related services into a medically relevant unit describing a complete episode of care. An ETG episode of care is the unique occurrence of a medical condition or disease and the health care services involved in diagnosing and managing their treatment.

The key features of ETG are clusters, anchor records, and ancillary records. Other than the individual service, the cluster is the basic unit of an episode. For example, consider a patient with a condition requiring a series of diagnostic tests. The patient's initial encounter is an office visit with a physician who diagnoses the illness and subsequently orders laboratory and other tests to confirm the diagnosis. ETG links these related services to form a cluster. Clinically homogeneous clusters are then combined to create episodes of care.

Episode clusters are created using anchor records. Anchor records represent services provided by a clinician engaging in the direct evaluation, management, or treatment of a patient. Office visits, inpatient stays, therapies, and surgical procedures are examples. An anchor record indicates that a clinician has evaluated a patient's illness and has decided on the types of services required to further identify and treat the patient's condition.

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Ancillary records are services that are incidental to the direct evaluation, management, and treatment of a patient—for example, x-rays, pharmaceuticals, and lab tests. Each ancillary record links to only one anchor record, based on the type of provider, the nature of the service performed, and the diagnoses assigned.

After anchor and ancillary services are assigned to clusters, clusters are grouped into episodes based on a series of rules; the diagnoses and procedures found on medical claims; and the drug treatments included on pharmacy claims. To do this, ETG categorizes diagnoses as primary, incidental, complicating, or comorbid. In general, each diagnosis is primary to only one ETG. A primary diagnosis can begin an episode or be mapped directly into an existing one. Incidental diagnoses describe conditions present during the treatment of another disorder and are incidental to that disorder. Throat pain for a patient being treated for an episode of bronchitis is an example of an incidental diagnosis. In this instance, the services related to the throat pain would be included in the bronchitis episode and not begin a new episode. Complications indicate a sicker patient that may require more extensive treatment for a related condition. Comorbidities represent ongoing chronic conditions that impact treatment requirements for another episode. The presence of complications and comorbidities can impact the final ETG assigned to an episode of care.

An episode is termed complete based on the absence of treatment for a condition for a specified period of time. This dynamic period of time is called the clean period and varies across ETGs. For example, the clean period for an episode of acute bronchitis is 30 days. This timing and the diagnostic and other categorizations described previously determine the final grouping of services into an episode and the assignment of the episode to an ETG. The ETG technology is distributed in the form of "grouper" software. This software accepts health care claims and returns an ETG value, along with other information. The subsequent "grouped" data can then be used as input into other applications such as measuring physician cost of care.