

# Risks and Opportunities in Medicare's Cardiac Bundled Payment Program

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## INTRODUCTION

In July 2016 CMS released a Notice of Proposed Rulemaking (NPRM) of its intent to implement a mandatory bundled payment program for specified cardiology and cardiac surgery services, along with several other programs. These Episode Payment Models (EPMs) will begin in July 2017 for almost all hospitals located in 98 selected metropolitan statistical areas (MSAs).

While many hospitals are already involved in the previous Medicare bundled payment programs, the cardiology episodes have significantly different characteristics from those of major joint replacement covered by the Comprehensive Care for Joint Replacement (CJR) program, and the popular medical episodes in the Bundled Payment for Care Improvement (BPCI) program. The risk characteristics, cost components and care management opportunities in cardiology episodes are quite different from those found in CJR and in many BPCI episodes.

This article provides some background information on the cardiology EPMs and the cost characteristics of these episodes along with an evaluation of the opportunities and risks of participation in this program.

## A BRIEF OVERVIEW OF BUNDLED PAYMENT EPISODES

The objective of bundled payment programs such as the EPM is to provide a payment model that creates an integrated approach to the care of a patient during and after hospitalization. The key components of that approach are described below.

### **Episode Structure**

A bundled payment episode such as those in the BPCI, CJR or EPM program begins with a hospital admission in a specific DRG and involves two timeframes – the “index admission” and the “post-discharge” period. The costs of the episode are defined using a specific methodology, and other characteristic such as targets, CMS discounts and quality metrics play key roles.

### **Episode definition**

In the Medicare bundled payment programs, episodes are defined by the diagnosis related group (DRG) of the hospitalization for the patient. This relatively simple definition facilitates identification of these patients in the hospital setting and at discharge. Clinically-related DRGs are grouped together (we refer to them as “episode families”); for example the three DRGs below comprise the “AMI” episode family:

- 280 - Acute myocardial infarction, discharged alive w MCC
- 281 - Acute myocardial infarction, discharged alive w CC
- 282 - Acute myocardial infarction, discharged alive w/o CC/MCC

The three episode families included in the cardiology EPM are acute myocardial infarction (AMI), certain patients in the percutaneous coronary interventions (PCI) DRGs, and coronary artery bypass grafts (CABG).

In the PCI EPM, CMS further defines this group as to whether the patient had an AMI primary or secondary diagnosis, including only those patients having those diagnoses.

### **Episode costs**

The focus of the Medicare bundled payment programs is on cost – that is, cost to the Medicare program. CMS is primarily concerned with the amounts that it pays to healthcare providers, and therefore whenever this article refers to “cost”, it means the amounts that Medicare (or the patient) paid to providers of services during the period of the episode.

These payments are made based on the then-current Medicare payment rates and methodologies for each type of provider. For example, hospitals are paid a fixed amount for each admission based on the DRG assigned to the patient. Physicians are paid on a fee schedule, while other providers are paid on various different bases. The actual costs to those providers of providing those services (salaries, supplies, etc.) are irrelevant to the Medicare payment, and thus to the episode cost as discussed in this article.

### **Index admission**

Each episode begins with an “index admission” to a participating hospital in one of the specified DRGs. Index admissions are paid at the DRG payment rate, and occasionally high-cost “outlier” cases receive additional payments. Since DRG payments are fixed, there are few opportunities to create cost savings during the index admission.

### **Post-discharge period**

The 90-day period after the hospital discharge is the period during which care management activities can create cost savings. There are two primary cost drivers in this period, each creating a different opportunity.

### **Post-acute institutional cost**

Post-acute institutional cost generally includes the costs of skilled nursing facilities (SNF) and inpatient rehabilitation. Where these services are significant components of post-acute cost, the management of these services is a primary issue in care management activities. In the CJR episodes involving major joint replacement surgery, SNF and inpatient rehabilitation services are a large part of this cost, meaning that significant opportunities exist in those areas. This opportunity is somewhat lower in the EPM episodes.

### **Readmissions**

Readmission costs include the hospital and physician costs for a patient who is readmitted to a hospital during the post-discharge period. The cost of the readmission depends on the DRG in which the patient is readmitted, plus the cost of the related physician services. Readmissions in a small number of DRGs are classified as “unrelated”, meaning that their cost is not included in the costs that are compared to the payment target. Costs of the physician services associated with the unrelated readmission, as well as post-discharge care after the readmission, are included in the episode cost, though.

### **Cost Targets**

The sum of the costs for all episodes is compared to targets set by CMS to determine the ultimate financial surplus or deficit during a “reconciliation” period, which in the EPM program is a year. Targets are initially established as a blend of the hospital’s historical average episode cost combined with the

episode costs of other hospitals in the same region. Initially targets are established at 2/3 hospital cost and 1/3 regional costs, but transition to a completely regional basis by the fourth year.

This phase-in of regional rates provides guidance as to the hospital's financial performance in this program in later years. Hospitals whose episode costs exceed the region's average episode cost are initially partially shielded from targets based on those regional costs; however their targets will eventually be lowered to the regional cost levels. Conversely, hospitals with low episode costs may initially have difficulty in creating savings due to their already-low costs, but may see their financial results improve as their targets are increased to the regional levels.

### **CMS discount**

When establishing the targets from the baseline or regional costs, CMS reduces those amounts by a "discount" percentage, which varies from 1.5% to 3%. This represents the true savings that CMS realizes from these programs (the "savings" resulting from reductions in Medicare costs are paid to the hospital). The effect of the discount, which is computed on the entire episode cost, is to require the hospital to achieve a cost reduction greater than the amount of the discount to achieve an overall financial surplus. The presence of the CMS discount means that creating cost savings is a necessary part of participation in this program to avoid financial losses. Participants must create savings that are at least equal to the CMS discount.

There's also a slightly insidious component to the CMS discount, which is that it's applied to all episode costs, including the index admission DRG payment for which there's no opportunity for cost reduction. And two of the three episode families in the cardiology bundles (PCI and CABG) have relatively high DRG payments, meaning that CMS will recover relatively high discounts from those episodes.

### **Quality measures**

A detailed discussion of quality metrics is beyond the scope of this article, but participants are required to report various quality metrics to CMS on a regular basis. The hospital's score on various quality measures also affects the amount of any surplus that the hospital can be paid. The CMS discount is also affected by the quality score, which can have a significant financial effect given the large proportion of the discount applicable to the index admission, as described below.

### **Claims Data**

A major facilitating factor in the Medicare bundled payment programs has been the provision of claims data by CMS for all of the services paid by Medicare during the episode. When processed through powerful bundled payment analytics software<sup>1</sup>, hospitals can drill into costs to identify efficient post-acute providers, review trends in readmissions, follow patients through all services throughout the episode and many others. CMS has promised to release claims data on a quarterly basis, which many participants believe is too infrequent; however the NPRA suggests that monthly data may be available in the future.

## **OPPORTUNITY AND RISK**

Opportunity and risk are the primary considerations in episode-based payment. Opportunity lies in controlling costs that are controllable. Risk lies in those costs that are not controllable – that occur

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<sup>1</sup> The graphics and other analyses in this article were produced by the [BPCI 360](#) bundled payment analytics toolset.  
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because of variations in patient conditions. Below we discuss assessment of risk and opportunity in the three episode families involved in this program.

## **Episode volume**

The number of episodes of each participant is an important factor in financial stability and creating critical mass for program success.

### **High volume creates financial stability**

The number of episodes is a primary determinant of the variation in episode costs and other bundled payment metrics. In general, hospitals having fewer than 20 episodes per quarter will have their quarterly average episode costs vary by more than +/-10% due to random variation in episode costs, which hospitals having more than 100 episodes in a quarter will have less than half of that amount of random variation.

### **Ability to measure clinical outcomes**

Higher volumes also create a greater level of stability in clinical metrics. For example, it's difficult to identify a 5% reduction rate in the readmission rate caused by effective care management when the quarterly average readmission rate is varying by 10% due to random variations in patient severity.

### **Savings create revenue to fund care management activities**

Creating effective care management programs is a costly undertaking, but savings from episode cost reductions can reduce the cost of these programs. With low episode volume, though, the resulting savings may be insufficient to defray the costs of these programs.

### **Critical mass is necessary to create interest among stakeholders**

Finally, success in bundled payment requires the involvement of many different stakeholder groups, including physicians, care managers, and finance and operations staff. But small episode volumes may not create enough activity to generate interest in physician groups, and lack of financial opportunity may similarly cause disinterest among the other parties.

## **Clinical Initiatives**

In bundled payment programs, two major strategies predominate – managing post-acute (PAC) institutional care (utilization of SNF and inpatient rehabilitation services) and managing readmissions. The applicability of each of those strategies depends on the predominance of those conditions in the episode. For example, readmissions are relatively rare in major joint replacement surgery, but many of those patients receive post-acute institutional care, so a PAC strategy is common in these episodes. By contrast, the cardiology episodes included in the EPM model have large numbers of readmissions, so a readmission management strategy is critical to their success.

### **Post-acute institutional utilization**

Managing post-acute institutional costs has been a successful strategy for many participants in the BPCI program. Since participants receive comprehensive claim-level data for all services provided within the episode, previously unavailable data on PAC services will be made available to the participant. In many cases information on the lengths of SNF stays or the services provided in inpatient rehabilitation facilities has been eye-opening to the physicians who treated those patients, and has resulted in the development of PAC care protocols that have provided more appropriate care to patients at lower cost. In addition, identification of PAC providers having lower lengths of stay and readmission rates has

resulted in the development of preferred PAC provider networks that provide higher-quality care at lower costs.

### **Readmissions**

Reducing unnecessary readmissions is a more complex task than addressing PAC provider utilization. In CJR episodes and many BPCI episodes readmissions aren't the primary cost driver, but in cardiology episodes addressing readmissions must be a significant component of the care management strategy. Fortunately the data provided by CMS contains information on each readmission occurring during the 90 day episode, even those readmission that don't occur at the index hospital. While this data is not sufficiently timely to use for contemporaneous care management, it is helpful to identify patterns of readmissions and develop strategies for their management, and to provide feedback on the effectiveness of those strategies.

### **Index Admit Percentage of Episode Cost**

An important factor in the opportunity for cost savings is the percentage of the episode cost that's attributable to the index admission. This is significant because the CMS discount is applied to the index admission cost, yet the hospital has no opportunity to reduce that cost. Therefore, the higher the percentage of index admission cost to the total episode cost, the greater the savings percentage from the remaining components of the episode must be to cover the discount. For example, if the index admission is 50% of the episode cost and the discount rate is 3%, the hospital must achieve a 6% reduction in the remaining post-discharge episode costs to cover the discount. But if the index admission is only 25% of the episode cost, the hospital need only reduce episode costs by 4% to cover the discount.

### **PAC Provider Percent of Episode Cost**

As discussed above, some episodes provide opportunities to reduce unnecessary PAC institutional costs. The degree to which these opportunities exist is measured by the percent of the episode cost that's attributable to PAC services. Obviously, a small amount of PAC cost in an episode reduces the opportunity, while a larger percentage increases it.

We have found these percentages to be highly variable across different hospitals. Some hospitals have high utilization rates of SNF and inpatient rehabilitation services, while others are more likely to discharge patients to home using home health services. Understanding each hospital's use of PAC services is key to developing actionable strategies, which is why having robust analytics tools are critical to success in these programs.

### **Percent of Patients Discharged to Home without Institutional PAC Care**

An important metric in evaluating savings opportunity is the percent of patients who are discharged directly to home without institutional SNF or rehabilitation services (although they may receive home health services). Since many bundled payment care management strategies focus on identifying the appropriate post-acute setting for each patient (which may not include institutional care), a downward trend in this metric is frequently a goal. Early in the participation period a high percentage of institutionalized patients may indicate an initial opportunity for cost reduction.

## Readmission Rate

Readmissions represent the other significant cost reduction opportunity for bundled payment participants. Unlike post-acute institutional care, though, readmissions are not planned and their management is more difficult than managing institutional care. Nonetheless, episodes that have large numbers of readmissions create an opportunity for these strategies. In addition, understanding the DRGs in which the patients are readmitted may indicate opportunities for improvement.

## Catastrophic episode frequency

The frequency of catastrophic episodes also factors into the opportunity/risk issue. While high-cost cases in the EPM program carry a lower financial penalty than those in the BPCI program<sup>2</sup>, an occasional high-cost case can create a significant financial loss, especially for low-volume episodes in which that loss can't be averaged over many other episodes.

## OVERVIEW OF EPISODE FAMILIES INCLUDED IN EPM

The EPM model includes three major DRG-based episode categories that are discussed below.

### Visualization of episode components

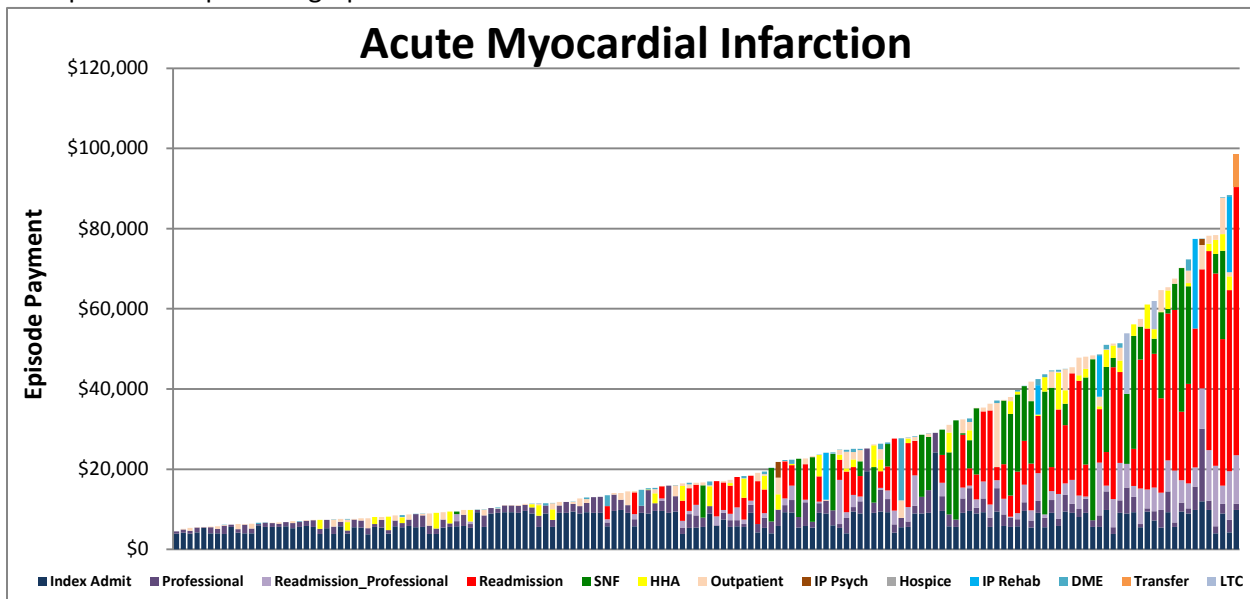
Understanding of the cost components of an episode is facilitated by an “episode composition graph” such as those below. Each column on the graph shows an individual episode with the “stacks” on the column showing the contribution to total episode cost of the payments to each provider type. The shape of the graph can indicate the risk and opportunity profile – a graph with a steep upward tail at the high-cost end may indicate the presence of rare but extremely high-cost episodes that increase risk. The predominance of different colors on the graphs (green and blue for SNF and inpatient rehabilitation; red for readmissions) can indicate the type of care management strategy most appropriate for that particular episode type.

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<sup>2</sup> In the BPCI program participants are charged with 20% of the excess episode cost over the outlier limit. In the CJR and EPM programs there is no such cost sharing; all of the costs that exceed the outlier limit are removed from the episode cost.

## Acute Myocardial Infarction

AMI episodes have several characteristics that create opportunities and several that create risk. From the episode composition graph below several factors are evident.



First, the index admission is a small percentage (about 20%)<sup>3</sup> of the overall average episode cost. This is caused by two factors; first, the DRG payment to the hospital for these DRGs is relatively low compared to the DRG payments for PCI and CABG DRGs. Also, there is significant post-acute care for many of the patients in these episodes, as noted by the preponderance of red (readmission) and green (SNF) costs. The negative characteristics of AMI episodes are also apparent, noting the relatively low cost of many of the episodes compared to the significantly increasing cost of the higher-cost episodes. The “coefficient of variation”<sup>4</sup> (CV) of these episodes is quite high – between .8 and .9 – indicating a large difference in cost between the least costly (about \$5,000) and most costly (about \$100,000) episodes. This increases the risk in these episodes, which would require a significant episode volume to mitigate an “unlucky” period in which many high-cost cases occurred. But many hospitals don’t have a significant volume of AMI patients – many may only have several dozen patients per year. Participation in AMI episodes alone, therefore, could expose participants to significant risks due to random variations in episode costs that are compared to fixed targets. Fortunately the EPM model combines these episodes with PCI and CABG episodes that can mitigate some of these risks, as described below.

From the amount of red in the graph it’s evident that readmissions are a significant cost driver in AMI readmissions. Indeed, about 70% of AMI patients in this data are readmitted, and the readmission hospital and physician costs comprise about 28% of episode costs. Therefore, readmission reduction will be a major strategy for cost reduction in AMI episodes. Post-acute institutional opportunities also exist because those costs represent about 18% of average episode costs.

<sup>3</sup> The statistics presented in this paper were obtained from a variety of sources and are intended to be generally representative of those that a participant would encounter. They are not intended to be representative of any particular provider or population.

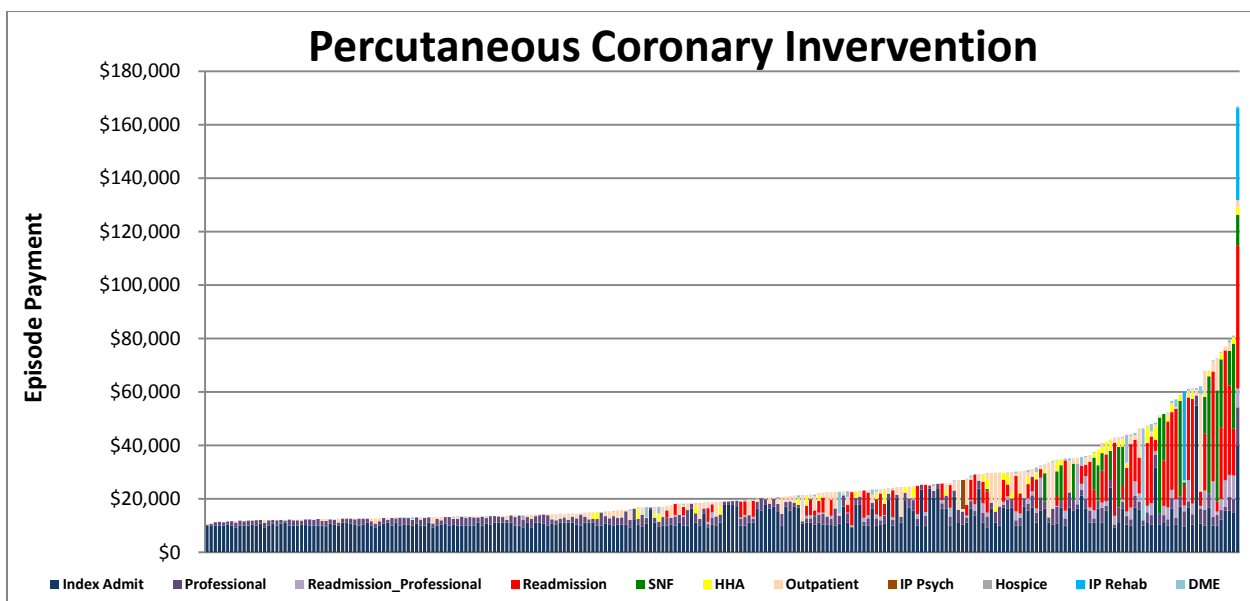
<sup>4</sup> The coefficient of variation is the standard deviation of the episode costs divided by the mean episode cost of the population.

The DRG payments for AMI (about \$7,000 +/- local wage index variations) are lower than those for PCI and CABG and comprise only about 30% of the cost of the average episode. Therefore, there is significant opportunity to create cost savings, both from reductions in readmissions and management of post-acute institutional care.

The main issue in bundling episodes for AMI patients is the relatively low volume in many hospitals. Many of our clients had only 20-30 AMI episodes per year. However, opportunities for savings will increase when these episodes are combined with PCI episodes as described below.

## Percutaneous Coronary Interventions

Percutaneous coronary interventions (PCI) episodes have a similar episode composition to AMI episodes, but with slightly more institutional post-acute care and greater high-cost episode risk. In fact an [earlier](#) Singletrack Analytics article suggested that PCI episodes may never be appropriate for bundling in the BPCI program because of the occasional but ever-present risk of a “train-wreck” case. However, the outlier limits implemented in the EPM program, which are different from those in BPCI, provide reasonable protection from these cases.



As can be seen from the graph, fewer PCI episodes offer opportunities for cost savings because almost half of the episodes involve no post-acute care. Because of this, the CMS discount becomes a significant factor because the discount is applied to all episodes. In addition, the DRG payments for PCI (about \$12,000 +/- local wage index variations) are higher than those for AMI, so about 40% of the average episode cost occurs in areas where no savings is possible.

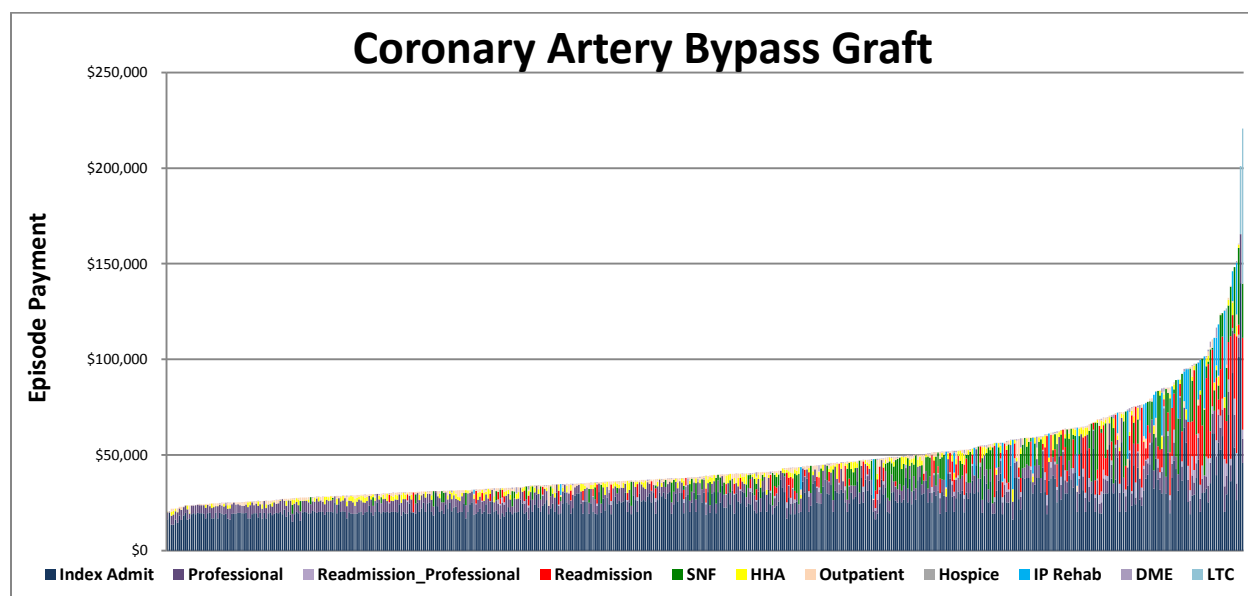
The primary cost reduction opportunity in PCI is in readmissions; however their cost only accounts for about 20% of the episode cost. Post-acute institutional costs are much lower (about 6% of episode cost), which will present challenges in creating cost reductions in these episodes. Taken all together, the high percentage of index admission cost, the correspondingly low opportunities in post-acute and readmission cost, and the potential for extremely high-cost episodes make PCI a difficult episode in which to achieve financial success.



## Coronary Artery Bypass Graft

Coronary artery bypass graft (CABG) episodes have some of the same characteristics of AMI and PCI episodes, but with more post-acute institutional care and a much higher index admission payment (about \$25,000 +/- local wage index adjustments). The index admission accounts for about 60% of the episode cost, with physician costs during the index admission accounting for about another 13% of the cost. This places almost 75% of the episode cost out of reach of any care management processes, meaning that readmission and post-acute institutional costs need to decrease almost 12% to cover a 3% CMS discount. In the BPCI program some participants have managed to reduce post-acute costs sufficiently to cover this discount (mostly by reducing use of inpatient rehabilitation services) but many others have failed to achieve financial success in these programs.

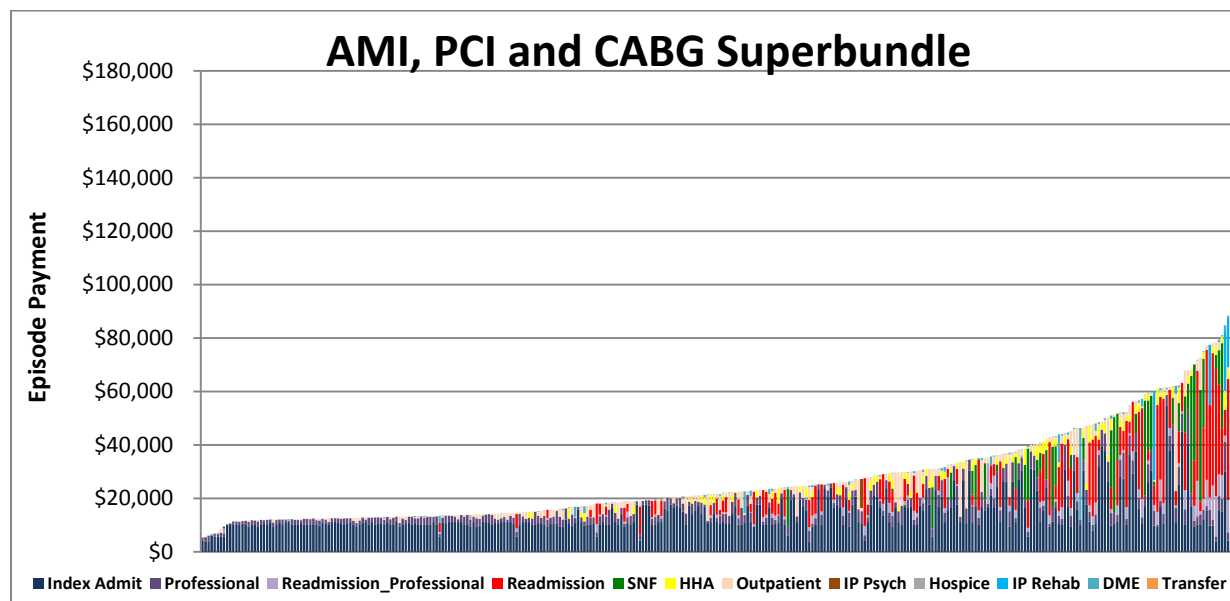
In addition, admissions for CABGs have decreased in recent years because of the substitution of other services, so many hospitals may have low volumes of these episodes. Fortunately the variation in cost of CABG episodes is relatively low (coefficient of variation of about .5, as compared to AMI with a CV of .8), so lower volumes in CABG don't increase the episode cost variations as much as they do in AMI.



## SUPERBUNDLES MITIGATE RISK AND ENHANCE OPPORTUNITY

In the EPM program CMS decided to implement a “superbundle”, combining CABG, AMI and certain PCI episodes into a single bundle. We’re previously [written](#) about the advantages of superbundles which, if carefully designed, can mitigate some of the disadvantages of episodes defined by a similar family of DRGs, and can create strategic and clinical synergies whose successes can surpass those of participation in individual episode types. This can occur through increasing volume and mixing high-variation with low-variation episode types. Combining episodes having high index admission costs (CABG and PCI) with those having lower index admission costs (AMI) can mitigate the lack of opportunity caused by those high DRG payments and create additional opportunity. High-cost cases will continue to occur, but their effect will be mitigated by a larger volume of lower-cost cases. Finally, clinical strategies for post-acute institutional care and readmission management are similar across all three episode groups, so those strategies can be leveraged across a larger group of patients.

Below is an episode composition graph of a combined superbundle of AMI, PCI and CABG. The index admission DRG payments are about 50% of the total average episode cost, which is somewhat higher than is found in the major joint replacement episodes of the CJR and BPCI programs (the index admission percentage in those programs is about 40%), so participants in this program will have less opportunity to achieve savings than in CJR, all other factors being equal.



Opportunities for cost management in post-acute institutional care exist, and several BPCI participants have achieved success in reducing use of inpatient rehabilitation in CABG and cardiac valve replacement episodes. Clearly, the major opportunity lies in readmission management, with readmissions accounting for about 15% of the average episode cost and being a clear driver of high-cost cases.

A summary of the major metrics for each episode family and the combined superbundle is below.

	Index Admit %	PAC Institutional %	Readmission %
AMI	29%	18%	28%
PCI	51%	6%	19%
CABG	60%	9%	24%
AMI + PCI + CABG	51%	9%	16%

## EPILOGUE

Since the EPM initiative is mandatory, hospitals won't have the option available in BPCI to elect not to participate. The episode types that CMS has selected for EPM haven't been particularly popular in BPCI, and participants in similar episodes like CHF and CABG have had varying amounts of success and failure. In addition, these episodes have less opportunity than those in BPCI or CJR because of the higher index admission costs, larger readmission component and correspondingly lower PAC costs. But the large group of participants in this program may create some new best practices that previous participants have failed to master, and may create some successes in this difficult group of episodes. Hopefully the information presented above will be helpful in creating strategies for success.



## **ABOUT SINGLETRACK ANALYTICS**

Singletrack Analytics is a healthcare financial and data consulting firm specializing in analytics for healthcare payment systems. Our analytical toolsets provide participants in advanced healthcare payment programs such as bundled payments and ACOs with the insights into their claims data to identify trends, risks and opportunities. We understand the healthcare financial environment and the tools and techniques required to achieve success.

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