Episode Analytics: Essential Tools for New Healthcare Models
Contributing Executives

Daniel Barchi
Chief Information Officer
Yale-New Haven Health System

Francois de Brantes
Executive Director
HCI3

Graham Hughes, MD
Chief Medical Officer
SAS

Tricia Nguyen, MD, MBA
President
Texas Health Population Health, Education, & Innovation Center

Gregory Poulsen
Senior Vice President and Chief Strategy Officer
Intermountain Healthcare

David Redfearn, PhD
Advanced Analytics Senior Consultant
WellPoint, Inc.
Dear Colleagues

Your organization is likely already participating in one form of a value-based payment model or another and developing strategies to thrive in a value-based health care economy. Safe passage on this journey is perceived by most health plans and providers as essential for survival as the Triple Aim begins to bite – with financial incentives to improve care delivery and outcomes, while also controlling costs.

We are witnessing experimentation with a wide variety of payment models that range from escalating readmission penalties to bundled payment and full capitation of one form or another. Health care delivery organizations (HDOs) are increasingly accountable for the care of entire populations of patients across care boundaries. Most of these value-based payment approaches reward collaboration, which is driving the need for increasing levels of coordination between physicians, hospitals, accountable care organizations (ACOs), health plans and other key stakeholders.

It’s certainly not going to be easy, and many plans and providers are still asking how they will adapt. In my opinion, this is undeniably a data-driven exercise. There is no other way to realistically assess financial risk and reward for the populations you serve. You need better information to develop strategies for answering the most complex health care delivery questions.

The problem? The health care industry is struggling to make sense of disconnected data across the care continuum. The current focus on a historical perspective of performance needs to be augmented with a forward-looking view of risk. Health insurers and health care providers need to learn the lessons of more analytically mature industries and apply them to the unique and incredibly complex world of health care.

That’s exactly what we’re doing at SAS. We’re applying proven techniques in advanced analytics and using them to accelerate change in health care. For example, we have developed SAS® Episode Analytics – a solution that’s based upon the pioneering work of HCI3’s Prometheus software. It’s a significant advancement in the way that cross-continuum care delivery can be analyzed, especially considering that traditional grouping software packages were not designed to support rapidly evolving and localized definitions of care episodes. This solution gives you flexibility to modify existing clinical episode definitions or build your own, from scratch, to identify potentially avoidable care variation and target opportunities for both quality and cost improvement.

I encourage you to read more in this paper. It is a very useful resource that should help you with your planning. You’ll find a comparison of the leading types of episode analytics and read firsthand experiences from payers and providers who use it for payment bundling and other purposes. And you’ll even find recommendations on how to effectively target unwarranted care variation and manage contracts that involve financial risk.

I would like to thank iHT2 for all of its work in crafting this paper, and hope you find it helpful as you navigate this new era of care delivery and payment models.

Respectfully,

Graham Hughes, MD
Chief Medical Officer
SAS Center for Health Analytics and Insights
# Table of Contents

Executive Summary .................................................................5

Background ..............................................................................6-7

Episode Analytics .................................................................8-11
Prometheus' Approach .........................................................9
New Model .............................................................................10

Real World Experience .........................................................12-18
Payers ....................................................................................12
Providers ...............................................................................14
Strategic Goals .................................................................14
Data Sources and Measurement .........................................16

Analytic Challenges .............................................................19
Start With Claims-Based Analytics .......................................20

Conclusion ...............................................................................21
Action Points .........................................................................22
Notes ......................................................................................23
Executive Summary

The wide variations in healthcare cost and quality, a perennial issue for payers, have become important to providers as well with the advent of accountable care organizations (ACOs) and the increasing number of healthcare systems taking financial risk. These organizations need sophisticated software tools to analyze performance at the level of an episode of care that spans the care continuum, including episodes involving procedures, medical admissions, and chronic disease care. By using analytics to identify and measure these variations, organizations can work with clinicians to reduce potentially avoidable care variations that negatively impact care outcomes and lead to higher costs.

Previously, IT applications in this area include episode groupers that health plans have long used to profile the resource utilization of individual providers. A newer type of software can be used to more accurately define clinically meaningful episodes of care, measure variations in care, identify potentially avoidable complications, and track actual versus expected performance on a risk-adjusted basis. These new applications can also help provider organizations manage financial risk in payment bundling and other value-based reimbursement models.

The first step in analyzing health care variation is to select the right unit for analysis. Health care for the entire patient population is too broad a unit to yield useful insights; on the other hand, individual encounters, procedures, or diagnosis-related groups (DRGs) provide too narrow a focus because they exclude everything that happened before and after the encounter, procedure, or hospitalization.

A better unit of analysis than either of these extremes is an episode of care that crosses care settings and includes a pre/post period of time relevant to the specific condition or medical event, such as a hospital stay and post-acute care for 30 days after discharge, or the care of a patient’s chronic condition for a year. While the definition of an episode can vary widely, it should include enough services to allow the variations in treatment choices and intensity to be measured and analyzed. The ability to perform this kind of analysis is essential to any organization that seeks to make the transition from fee-for-service to value-based payment models. An approach utilizing episode analytics represents a major advance over the traditional claims groupers. The new analytics enable providers to identify variations and opportunities for improvement, increased flexibility in defining clinical episodes, and allows organizations to assess their financial risk in value-based reimbursement agreements.

This paper is divided into two parts. The first part provides some background and a comparison of the types of episode analytics. Part two explores the real-world experiences of payers and providers in using episode analytics for payment bundling and other purposes. Finally, we offer some recommendations on how to use episode analytics to reduce variations and manage contracts that involve financial risk.
Of the new payment models associated with healthcare reform, the one with the most affinity for episode analytics is payment bundling. While bundling can be applied to many different kinds of episodes, it is essentially payment for a bundle of services that is broader than a DRG but is far less inclusive than a capitation payment that covers all of a patient’s care for a specified time period. Because of the large variations in the costs of inpatient episodes, as well as of post-acute care, some experts believe that this kind of bundling across care settings offers a large opportunity for cost savings.1

DRGs, which Medicare introduced in 1982, apply only to inpatient care. In this “prospective payment” approach, hospitals are paid a flat rate for providing services related to a particular diagnosis during a hospitalization. DRGs reduced inpatient utilization by creating an incentive to keep down costs and discharge patients as early as possible.3-4 But, because they don’t include physician payments or post-acute care, they don’t motivate providers to prevent readmissions.

The Centers for Medicare and Medicaid Services (CMS) has completed two pilots of a more comprehensive kind of payment bundling and is now in the midst of a third program authorized by the Affordable Care Act. A major goal for CMS is to reduce readmissions by bundling payments for acute care and post-acute care.2

CMS first tested bundling from 1990 to 1996 in a program that combined Medicare Part A and Part B payments for coronary artery bypass grafting.5 The program reduced costs and improved patient health. Another Medicare demonstration from 2009-2012 bundled hospital and physician payments for selected cardiovascular and orthopedic procedures in five healthcare systems.6 Early results were positive.7-8

In the new CMS bundling pilot, which launched in July of 2013, a healthcare organization can receive a single payment for an episode of inpatient acute care, including physician and ancillary services, with or without post-acute care in skilled nursing or rehab facilities or at home.9 More than 400 hospitals signed up for the pilot, which includes bundled payments covering 48 different conditions.10

The private sector has also been exploring payment bundling. For example, Geisinger Health System’s ProvenCare program, which began in 2006, focuses on eight conditions, including a bundled payment for an episode of bypass surgery that includes readmissions.11 Minnesota’s Fairview Health Services in 2009 started to offer local employers 10 “baskets of care,” or care packages, that incorporated gain-sharing contracts with physicians and an outcomes-based compensation model.12 Today, a number of health plans offer bundled payment contracts to provider organizations across the country.
Background

Some insurers and healthcare organizations have piloted the Prometheus Payment model for bundled payments. A product of the Health Care Incentives Improvement Institute (HCI3), which also runs the Bridges to Excellence pay for performance program, Prometheus includes an episode costing approach built on two pillars: the basic cost of care, risk adjusted for each patient’s severity of illness, and the cost of potentially avoidable complications (PACs).

The price of each bundle of care includes half of the historical cost of PACs, incentivizing providers to prevent these complications. In addition, physicians are paid more if they improve the quality of care by sticking to evidence-based guidelines. The Prometheus model has been applied to a number of acute and post acute-care for medical conditions and surgical procedures, as well as ambulatory and acute care for chronic conditions.13

For payment bundling to succeed, a number of conditions must be in place. Those include:

- Common definitions for a variety of different bundles
- Sophisticated risk adjustment methods
- Reengineering of clinical processes
- The ability to price bundles based on historical costs and utilization
- Software that enables payers to identify and aggregate claims related to particular episodes
- Applications that providers can use to price episodes so that they can benefit financially from bundling.

Whether or not healthcare organizations are interested in bundling, any type of value-based reimbursement requires them to analyze their care processes and costs on the basis of episodes.
Episode Analytics

Episode groupers use software algorithms to group claims data into episodes of care. The two most widely used commercial groupers are Episode Treatment Grouper (ETG) from Symmetry, a division of Optum, and Medical Episode Grouper (MEG) from Truven. Neither approach was designed for payment bundling; for the most part, they’re used to measure provider efficiency.

These proprietary groupers use different assumptions and approaches to define and measure episodes, so it’s not surprising that they yield different results when applied to the same data. ETG considers procedure use, comorbidities and complications in assigning claims to particular episodes. MEG, in contrast, doesn’t factor in procedures or comorbidities; instead, it focuses on diagnoses, taking a disease staging approach to gauge the severity of illness in forming episodes. Its subcategories of major episode types, such as those under ischemic heart disease, are related to the increasing severity of disease, rather than to the presence or absence of comorbidities or whether procedures were performed.14

Besides being inconsistent, episode groupers have other issues. For example, during inpatient episodes, patients may see numerous physicians, some of whom treat their comorbidities. But those doctors’ claims might not be included in the episode with the patient’s principal diagnosis; instead, they’re grouped with different episodes.15

Current groupers, including ETG, MEG and others, use proprietary definitions that do not allow the customer to understand exactly why particular plan members or patients are included or excluded in the analysis; why certain episodes are being triggered or not; and how specific services are assigned to episodes. As a result, the groupers create an incomplete picture of the specific areas of care that require improvements.

Groupers are also typically unable to identify categories of potentially avoidable care and associated costs. And they don’t have the ability to link different episodes involving the same patient over time, such as “all cardiovascular care.”

Francois de Brantes, executive director of HCI3, explains why this type of capability is important. If an organization wants to create accountability for care, he says, it needs to go upstream from a particular episode, such as a joint replacement, and look at how the patient’s care was managed in previous episodes that may have been related. For example, did the management of their rheumatoid arthritis result in cartilage degeneration, resulting in the need for them to have a joint procedure?

“Rolling different conditions into procedure episodes allows you to create a different set of inferences,” he points out. “And at that point, you’re starting to create accountability for the patient’s management of their rheumatoid arthritis.”
Episode Analytics

Prometheus’ Approach

Be Accountability is not only about resource utilization; it’s also about quality of care. In fact, critics of bundling have charged that bundled payments—like capitation—will lead to stinting on care or avoiding sicker patients to maximize financial return.

HCI3’s Prometheus Payment, which is being piloted in several states, is designed to counter the incentive to provide lower-quality care. Its “evidence-informed case rates” (ECRs) for bundles of care—including chronic conditions, acute medical conditions, and procedures—incorporate quality scores that are factored into payments to individual providers. Risk adjustment for the severity of patient conditions is used to prevent cherry picking. The performance of each provider is measured against the evidence-based clinical guidelines that form the basis of each ECR. Depending on how well an individual physician does on these quality scores, he or she is entitled to a specific portion of an incentive pool.16

The incentive money, as mentioned earlier, comes from reducing potentially avoidable complications (PACs). HCI3’s software calculates the historic cost of PACs for a particular bundle and includes half of that cost in the ECR for that bundle. To the degree that the providers involved in the bundle can avoid those complications, they add to the incentive pool that’s available for them to share. The final distribution of incentive payments depends 70% on a provider’s own score and 30% on the scores of every other provider involved in the episode of care.

In the Prometheus model, unlike some other bundling approaches, payment is not prospective. Instead, individual providers submit claims to a health plan and are paid fee for service, using the ECRs, and those rates are adjusted on the back end. However, insurance company claims systems are not designed for this approach.

The participants in the early Prometheus pilots encountered some specific problems in using claims data for bundling purposes. Among these challenges were the inability of some claims processing systems to correctly identify patients or services in bundles, to decide which services to allocate to specific bundles, and to distinguish between paid claims and resubmitted claims. So HCI3 created new software to deal with these issues.

According to a Health Affairs study of early Prometheus pilots, this tool:

- Analyzes each insurance claim submitted for reimbursement by a participating provider
- Determines whether the service covered by the claim is part of a bundle
- If it is, adds the payment amount to a running total budget for the case rate.17

At the end of the episode of care, the total amount is reconciled against the ECR to determine how much providers can receive as a bonus after factoring in their quality scores.

HCI3’s Prometheus Payment, which is being piloted in several states, is designed to counter the incentive to provide lower-quality care. Its “evidence-informed case rates” (ECRs) for bundles of care—including chronic conditions, acute medical conditions, and procedures—incorporate quality scores that are factored into payments to individual providers.
Episode Analytics

While this might seem straightforward on the surface, it actually requires the automation of a number of complex rules that go far beyond the logic built into health plans’ fee-for-service payment systems. These include rules for tracking patients through a longitudinal care process, attributing patients to managing providers, risk-adjusting individual patient budgets, and accounting for patients when they jump from one episode of care into another. The latest kind of episode analytics software can provide all of these capabilities to health plans.

On the provider side, bundling requires healthcare organizations to do much more than estimate costs for an episode of care. They must also figure out why their costs and utilization of resources are higher than that of other organizations for the same episode, and they need to analyze the reasons for the variations in care patterns among their providers. Again, the new solution can help providers achieve these goals.

New Model

The latest iteration of Prometheus’ analytic tools—which are available commercially from SAS Institute as SAS® Episode Analytics—allows provider organizations to:

- Identify clinical meaningful episodes of care in their populations
- Understand the relationships between multiple and potentially overlapping clinical episodes for a particular patient
- Track actual performance against expected performance based on evidence-informed best practice, after risk adjustment to factor in patient severity
- Identify the magnitude of potentially avoidable care variation, complications and associated costs
- Participate in and manage to the incentives of bundled payments, shared savings and other new payment models.

These tools enable organizations to analyze care delivered across the care continuum, from physician offices and hospitals to rehabilitation and other post-acute care settings. By analyzing the cost and outcomes of that care, the software can help both payers and provider organizations assess the potential risk and reward attached to value-based payments. In addition, providers can use the claims-based analytics to identify opportunities for reducing variations in care and potentially avoidable complications. But de Brantes emphasizes that providers must delve into their clinical data to understand the root causes of these variations.
Episode Analytics

The solution also gives organizations a holistic view of a patient’s care by aggregating the analysis of multiple patient episodes over a defined study period. Clinically validated definitions of the relationships between episodes—whether procedural, acute medical or chronic—permit users to generate insights into the care delivered to the patient during that period.

By rolling up that data to the population level, organizations can also use these tools to analyze practice variations across their organizations. While the episode analysis doesn’t cover the full cost of care delivery, 20 percent of episodes account for about 80 percent of costs in a typical organization. So by combining those costs, a healthcare system or physician group can get a fairly accurate idea of what it will cost to provide care under a global capitation contract.

Finally, the analytics incorporate risk adjustment methods that allow organizations to measure variations and make comparisons among individual providers. This capability is essential to ensuring that individual providers get paid fairly, based on their performance on quality and utilization metrics.
Real World Experience

A number of health plans, providers, and quality improvement organizations are using HCI3’s software to analyze their data in pilots across the country. Some have graduated to using new software based on Prometheus Payment as the basis for commercial contracts. In the previously cited study of Prometheus pilots, interviewees at all sites said they’d found benefits in using the methodology as a measurement tool. The experience made them more aware of their measurement needs and “stimulated new care coordination and improvement activities.” Perhaps most important, it opened new areas of dialog between providers and payers.18

What follows is an exploration of how payers and providers are approaching payment bundling and episode analytics. In addition, the interviewed executives explain how they’re trying to reduce variations in care.

Payers

With the proper analytic tools, it should not be too difficult for payers to price specific bundles of care, de Brantes says. For example, he notes, CMS’ Bundled Payments for Care Improvement Initiative is “pricing out tons of bundles for people all over the country;” hundreds of healthcare organizations have contracted with CMS for some of its 48 bundles. Horizon Blue Cross Blue Shield of New Jersey is also pricing bundles routinely, he adds.

“The plans that say it’s difficult to do this are thinking about the broader set of operational challenges that they have to enact internally in order to fully implement bundled payments,” including the cost of upgrading their systems, he argues.

David Redfearn, advanced analytics senior consultant for WellPoint, which includes 14 Blues plans across the country, takes a different view. Redfearn, who spoke for himself and not for WellPoint, has spent much of his career doing provider efficiency profiling.

In Redfearn’s view, the biggest challenge in building case rates is not the episode analytics model that a payer selects, but the practical decisions that must be made in defining episodes and what’s included in them. Of course, those decisions require the right kind of analytics. Currently, the latest episode analytics software available enable organizations to accurately identify episodes of care in their patient populations and understand the relationships between the multiple and potentially overlapping clinical episodes for a single patient.

Redfearn cites a bundle for cardiac bypass or hip replacement surgery: “How long a follow-up period do you want: 30 days, 60 days, 90 days? Do you want to include readmissions? How long do you want to go to the date of readmission? Do you want to include readmission for the primary diagnosis of the initial hospitalization, or all-causes readmission To address these challenges, health care organizations will need to use software that will allow the flexibility in defining episode criteria.
Real World Experience

Payers and providers also have to agree on whether to include “train wrecks” in a bundling contract, he notes. These are cases in which, for example, a patient is readmitted and has a number of complications. Naturally, providers would prefer to exclude those cases from the bundle definition.

“If the insurer is willing to pay more to cover those kinds of things, it will get agreement from the provider,” he says. “But the insurance carriers are not going to do that. Our goal is to keep prices down, and the provider’s goal is to make a profit. We’re both trying to make a profit. So you end up with a discussion that’s not data-based most of the time.”

De Brantes agrees that providers and payers approach bundled payments from different viewpoints. Whereas a provider organization might base its price estimate on historical data, a health plan will factor in savings from the anticipated reduction in variations. “They won’t create a bundle that perpetuates that variation,” he says. “Their goal is to squeeze it out.”

For provider organizations to prosper under bundling arrangements, they must use their analytics and their relationships with physicians to start reducing the waste, de Brantes and Redfearn agree. For instance, de Brantes notes, “If the surgeon selects the implant, what are we supposed to do? Under a bundled payment arrangement, the organization has a gain-sharing ability and can start to work more closely with the surgeons on rationalizing the sourcing of implants.”

Similarly, Redfearn notes that WellPoint has begun a pilot to reduce variations in care with its subsidiary CareMore, a California Medicare Advantage plan. By analyzing care patterns, “CareMore is showing physicians how their care differs from that of their colleagues and is letting them drill down to find the reasons for those variations. WellPoint has seen some behavior change as a result of these collegial discussions, Redfearn says. To make this process much easier, new episode analytic software packages incorporate care pattern analysis in their core functionality.
Real World Experience

Providers

Healthcare organizations are using various approaches to prepare for bundling and other value-based reimbursement models. Among their needs are solid, reliable methods to:

- Define clinical episodes
- Separate out services that belong to episodes
- Attribute patients to accountable providers
- Measure variations in care
- Measure adherence to clinical protocols
- Calculate the costs of care delivery

Across the U.S. healthcare system organizations are working with a wide variety of data and approaching bundling and value-based reimbursement models differently. Interestingly, of the organizations that we interviewed, each were using different kinds of data, and started in different places, yet are all making progress toward reducing costs. All are using some type of analytic approach which is included in, or related to the episode analytic software: care variation analysis, analysis of the financial risk of bundling, or merely by understanding and managing underlying costs better by applying analytics. Here are the insights we derived from interviewing executives of three large healthcare systems: Yale New Haven Health System, Texas Health Resources, and Intermountain Health Care.

Strategic Goals

Yale New Haven Health System (YNH) in New Haven, Conn., is a three-hospital system built around Yale Medical Center. Including its physician group and the Yale School of Medicine, YNH encompasses about 10,000 doctors. While it doesn’t yet have an accountable care organization, the healthcare system is preparing to take bundled payments in the first quarter of 2014. With help from an outside consulting firm, YNH plans to use the clinical and business intelligence (B&CI) it has developed over the past 10 years to analyze its cost data so it can negotiate bundling contracts.

Texas Health Resources (THR), which operates 25 hospitals that have approximately 5,500 physicians on staff, withdrew from CMS’ Pioneer ACO program at the end of 2012. However, THR has kept its ACO structure and is deploying it in some commercial risk contracts, says Tricia Nguyen, MD, executive vice president of THR and president of its Population Health, Education & Innovation Center. The organization is also considering bundled payments for episodes of acute care, she notes, although it hasn’t entered any agreements yet.
Intermountain Healthcare is also very concerned about care variations. In fact, an internal study of national Medicare claims data showed that, across all DRGs, there’s a 2.4 times difference, on average, between the top quartile and the bottom quartile of providers in their utilization of resources, after adjusting for patient’s ages.

“Any payment mechanism that doesn’t embrace fixing that problem is going to ultimately fall short,” says Greg Poulsen, senior vice president and chief strategy officer of Intermountain.

The big Utah provider organization and health plan has already made considerable progress in operational efficiency, cutting the annual growth in its cost trend to the increase in the Consumer Price Index, Poulsen says. “In the last two years, we’ve reduced utilization by about $200 million.”

Because of that progress, Poulson doesn’t believe Intermountain can derive financial benefits from the Medicare shared savings program. The organization hasn’t formed an ACO, he adds, because that structure does not sufficiently promote patient engagement. Instead, Intermountain’s strategic goal is to share financial risk with payers while getting patients more involved in medical decision making.

Under this arrangement, which he calls shared accountability, “we all do well when effective decisions are made and are penalized when ineffective decisions are made,” he says. Ineffective decisions, he adds, pertain to undertreatment or overtreatment.
Real World Experience

Data Sources and Measurement

Yale New Haven

Yale-New Haven, which has had three different EHRs in the past 10 years, recently moved to a new system. It's now in the process of migrating its internally developed clinical and business intelligence applications to that EHR, says Daniel Barchi, YNH's senior vice president and CIO.

"We focused primarily on safety in the beginning," he says. "But over time, we used our EHR to improve our overall operational efficiency by doing time studies on what people are doing."

YNH has been interested in activity-based costing for some time. "We've done a lot in this area already, independent of our EHR, but are now starting to use the EHR as leverage to understand the cost of care delivery and modeling different patients for the cost of the care," Barchi says.

In addition, YNH can look at the amount of resources expended on a per patient basis. Much of that analysis focuses on OR costs, supply costs, and nursing staff operations, he notes.

YNH has not used episode analytic software up to this point, he says. The organization utilizes cost estimates for its patient population to project the "potential upside" for each of the bundles that it's considering in bundled payment contracts. It accomplishes this by aggregating the cost data on a per-patient basis and rolling it up to a population level, he notes.

Initially, YNH is applying this method to a few conditions such as sickle cell anemia, looking at the cost of care for an individual patient and how that changes over time as the process becomes more efficient. "So we know what the general cost of care is and what we're able to sign up for in a bundled payment," he says.

For many of its patients, YNH can aggregate the requisite cost data across the continuum of ambulatory care, acute care and post-acute care, Barchi says. That's not too difficult because much of the patient population sees only providers within the YNH community. However, he adds, "When somebody is out of our network, we have less insight into what the costs are." To supplement its internal data, he says, YNH also uses commercial and Medicare claims data.
Real World Experience

Texas Health Resources

THR is using its B&CI applications for population health management, Nguyen says. It has contracted with an outside consultant to supply methods of analyzing costs across care settings. That consultant, working with THR management, has generated “an opportunity matrix to look at where the spend is and where the opportunities to generate savings come from.”

Right now, she says, the organization has difficulty measuring variations in care. “We don’t have a robust tool that enables us to do that. We do ad hoc reporting and analysis, and that’s a problem we’re going to have to solve.”

THR does have an enterprise data warehouse, and clinical data is transmitted to that repository in near real time, Nguyen says. But the clinical data is not yet integrated across settings of care. The only way to track patient care across the continuum, she says, is by using claims data. THR has medical and pharmacy claims from some commercial payers, but no longer has access to Medicare data, she notes.

Intermountain Healthcare

Intermountain is the most advanced of the three systems in its ability to measure care variations at an episode level. One reason is that Intermountain’s EHR includes integrated data on all care settings within the system. In addition, about 25% of Intermountain patients belong to its health plan, so it has claims data on the care those patients receive outside of its clinics and hospitals. Moreover, Poulsen notes, Intermountain can tie EHR data to claims to analyze episodes.

To understand variations in care, the Utah healthcare system first compares its numbers of procedures to those of other healthcare organizations in relation to its population. “Are we doing more lumbar surgeries than other healthcare systems do?” he says. “Are we doing more hip replacements, gall bladder removals etc.?” The same analysis is conducted for outpatient procedures such as upper GI endoscopies.
Real World Experience

Intermountain also looks at more detailed clinical data that it has gotten from comparable systems such as the Mayo Clinic, the Cleveland Clinic, and Denver Health. The goal is to benchmark its utilization of resources, using metrics such as length of stay, time in the OR, complication rates, and readmission rates.

Next, the analysis moves to the individual patient level. Using DRGs as the initial classification system, Intermountain’s analysts consider a patient’s treatment from diagnosis to resolution of the problem as a single episode, where that’s possible, says Poulsen. This is where the system’s integration of data across the continuum is really important.

By comparing how providers performed in these episodes and whether they followed treatment protocols, Intermountain can start to see the variations in care among different providers and how it is related to outcomes. Poulsen cites research that Intermountain did on the induction of labor sooner than 39 weeks, following a recommendation against it by the American College of Obstetricians and Gynecologists (ACOG). Intermountain found that when babies were delivered in the 38th week, they were twice as likely to end up in the neonatal ICU; babies delivered in the 37th week were five times as likely to go to the ICU.

Intermountain uses internally developed algorithms for population analytics, but it also uses commercial software tools where they make sense. For example, it employs an outside solution to compare the costs of treating patients to what the expected costs should be, and it uses insurance company-derived risk adjustors to predict which patients are likely to be high utilizers in the next year.
Analytic Challenges

Of the three organizations, only Intermountain has good data on outcomes and providers’ adherence to protocols. YNH’s new EHR, Barchi says, allows the organization to see whether a physician is using a standard order set for a particular procedure. “But other than that, it’s hard to know whether somebody is following a protocol or not.” Texas Health Resources uses the hospital measures for CMS’ value-purchasing program and its own ambulatory care quality measures as a “proxy” for guideline adherence, says Nguyen.

Provider attribution can also be challenging in non-procedural and chronic care episodes. Prometheus has developed a fairly reliable method of doing this, says Francois de Brantes, but it’s not foolproof. First, the organization looks at the “preponderance of E&M codes.” If 15 or 20 of a patient’s office visits are to a single doctor, that’s the accountable physician. But a complex patient may have numerous providers, making attribution more difficult. In those cases, de Brantes says, you have to show the physician a list of patients that have been attributed to him or her.

Risk adjustment, which is required to measure care variations and to make sure that bundles are fairly priced, is also problematic, says Barchi, because the current risk adjustment methods don’t factor in patient compliance. “Whether a patient follows a treatment regimen or not, the health system is still financially at risk,” he points out.

Patient compliance is just one of many variables that are not included in the analyses used to select a bundle and calculate its financial impact, Nguyen says. Take an episode that involves surgery, for example. Besides cost and utilization data on a particular surgeon, one needs information on the physician’s skill set and his or her preference of items like orthopedic implants and surgical equipment. Patients’ health status, their readiness for surgery, and their understanding of their role before, during and after the procedure are also critical. In addition, there are variables related to each patient’s social status and behavioral health.

“You need to figure out how to normalize for all of that so you can have enough information to price a bundle so you don’t go out of business,” Nguyen states.
Analytic Challenges

Start With Claims-Based Analytics

Graham Hughes, MD, chief medical officer for the SAS Center for Health Analytics and Insights, agrees that it would be valuable to have EHR and other clinically rich data to supplement claims data as inputs to episode analytics. But he advises, “Don’t let the perfect be the enemy of the good.”

For identifying variation in the treatment of a particular condition, like congestive heart failure, claims data “is a good place to start because it’s broad, longitudinal, and includes diagnostic and service data,” he says. Claims-based analytics can give providers a “broad brush to uncover the major areas of potential waste and inefficiency so they can begin to attack the root causes of unnecessary care variation,” he points out.

Francois de Brantes notes that providers can use historical claims data to calculate the prices of bundles and to reduce variations that affect the financial outcome of bundled payments. The causes of avoidable complications, he says, are usually system-specific or provider-specific. “Look at the results of the analyses and see who is associated with these complications and the type of complications, and you start seeing a pattern. It’s usually not random. If a provider has 15%-30% of their costs related to complications, there’s nothing random about that.”

But the claims data can only inform providers about the nature of the complications and which patients incurred them, he cautions. Then they have to drill down into their clinical data to find the root causes so they can prevent similar situations.
Both health insurers and healthcare organizations need some type of episode analytics to prepare for payment bundling and other value-based reimbursement models. These analytic tools can help identify care variations, including potentially avoidable complications that drive up the cost of an episode of care. Provider organizations can use these applications to define clinically meaningful episodes and to understand the hierarchical relationships among episodes. And healthcare systems can use episode analytics to price bundles in negotiations with payers.

Current episode analytics are based on claims data, which is useful for assessing financial risk and detecting large-scale variations. For root cause analysis, episode analytics software can help identify where to begin examining your clinical data from EHRs, which is necessary to make the insights from episode analytics actionable. In addition, other kinds of information may be needed to make fully informed judgments about bundle pricing and risk adjustment.

Nevertheless, the latest episode analytic approach represents a major advance over the traditional claims groupers, which were not designed for bundling. The new analytics provide flexibility in defining clinical episodes, enable providers to identify variations and opportunities for improvement, and allow organizations to assess their financial risk in value-based reimbursement agreements.
Action Points

• **Analyze variations in episodes of care.** Isolated procedures, hospitalizations or encounters are too narrow to understand how care patterns differ across an organization and how they affect overall costs.

• **Start with claims data.** In most healthcare organizations, only claims supplied by health plans provide a broad enough view of patient care for episode analytics, which are designed for claims. While clinical data is required to understand the causes of variations, claims can help organizations see where the waste and efficiency are.

• **Go beyond traditional episode groupers.** Although these tools can be used to construct case rates related to procedures, they’re not designed for bundled payments that extend across care settings for a period of time. Specialized software gives organizations more flexibility in defining episodes, the ability to analyze multiple episodes involving the same patient, and visibility into the true costs of medical decisions.

• **Attribute patients to the correct managing physician.** To gain insights into variations in care, organizations must know which of a patient’s doctors was calling the shots in an episode. This is especially important with complex patients who have several comorbidities.

• **Measure adherence to evidence-based practice guidelines.** To succeed in a bundling contract, organizations must persuade their physicians to follow clinical protocols and reduce potentially avoidable complications. To do this, they need to know the extent to which individual providers are following these guidelines.

• **Use the data to collaborate with payers.** Health plans are not the enemy. They want to reduce variations in care and health costs, and so should providers if they want to thrive under bundling contracts. Neither side can win unless they agree on a reasonable target for the amount of waste that providers can be expected to eliminate.
Notes


5. “Medicare’s Bundled Payment Pilot.”


13. Ibid.


18. Ibid.
About The Institute for Health Technology Transformation

The Institute for Health Technology Transformation (IHT²) is the leading organization committed to bringing together private and public sector leaders fostering the growth and effective use of technology across the healthcare industry. Through collaborative efforts the Institute provides programs that drive innovation, educate, and provide a critical understanding of how technology applications, solutions and devices can improve the quality, safety and efficiency of healthcare.

The Institute engages multiple stakeholders:
- Hospitals and other healthcare providers
- Clinical groups
- Academic and research institutions
- Healthcare information technology firms
- Healthcare technology investors
- Health plans
- Consumer and patient groups
- Private sector stakeholders
- Public sector stakeholders

Mission and Vision

The mission of the Institute for Health Technology Transformation: to drive improvement and the effective use of technology throughout the continuum of care through education and collaboration among multiple stakeholders. Technology in-and-of itself will not solve the deep challenges facing our healthcare system nor will it alone ensure more accessible and higher quality care. Realizing the benefits of technology across the healthcare continuum is a complex, under utilized and often misunderstood process. Stakeholder collaboration underscores the Institute’s focus working to ensure technology has a transformative effect at all levels of the healthcare sector.

What We Do

The Institute for Health Technology Transformation (IHT²) provides programs that drive innovation, educate, and provide a critical understanding of how technology applications, solutions and devices can improve the quality, safety and efficiency of healthcare. We do this though a number of vehicles including: educational workshops, access to industry thought leaders, peer reviewed research, high level conferences, webinars, focus groups, topic specific committees, and other unique initiatives allowing individuals and organizations access to resources that will enable them to leverage the full value of healthcare technology.