Financial and Clinical Success:

Data-Driven Insights for Informed Decision Making Through Activity-Based Costing

Introduction

Prior to March 2020, America's hospitals were facing extensive financial pressure due to shrinking revenues, rising costs, or both. In 2016, the Congressional Budget Office projected that between 40-60% of U.S. acute care hospitals would have negative margins by 2025[1]. Hospitals were already on shaky ground.

With the development of the COVID-19 public health emergency, in the timeframe of March to June 2020 alone, the American Hospital Association estimated a loss of $202.6 billion for America's hospitals and health systems, an average of $50.7 billion per month[2]. Between June 2020 and present day, the supply chain has decimated, inflation skyrocketed, and staffing expenses increase while resources decrease.

As a result, financial transformation is a key area of focus for healthcare executives[3][4]; transitioning from fee-for-service to value-based care and implementing those changes in accelerated Merger & Acquisition (M&A) strategies (both in the health system and physician practice markets).

One of the most critical components in supporting this transition is having clarity into the proper metrics to optimize care delivery and financial performance. Specifically, being able to understand the total cost of care and the associated resource with cost drivers for that care. An Activity-Based Costing (ABC) strategy will provide details on who, what, where and when within the organization could most benefit from these insights.

In comparison to historical charge-based costing methods, such as Ratio of Cost to Charge (RCC), ABC captures the details of the patient journey, giving a comprehensive view of resource

and cost drivers. By connecting clinical, operational and financial data points, ABC identifies clinical inefficiencies and provides an accurate total cost of care—across the care continuum.

On average, 65% of health systems that commit to deploying comprehensive data-driven Decision Support programs, such as Activity-Based Costing, benefit from higher net operating profit margins and substantially improved financial and clinical outcomes as compared to those that don't [5] .

Foundation

ABC was first introduced in 1971 by George J. Staubus of the Haas School of Business at the University of California, Berkeley. A formal definition was published in 1986 by Robert S. Kaplan and William J. Bruns of the Harvard Business School. Since its inception, there is growing consensus among costing professionals regarding the value related to the accuracy of information that the ABC method provides.

From the manufacturing perspective, where ABC was first developed and applied, it is defined as a costing method that identifies activities in an organization and assigns the cost of each activity to all products and services according to the actual consumption by each. This model assigns more indirect costs into direct costs when compared to conventional costing.

As defined for healthcare as an approach to determining the costs associated with providing patient care (case costing) or clinical service lines (groups of similar patients), ABC provides enhanced understanding of overhead costs with detailed insights to cost drivers, such as cost per minute in the Operating Room or nursing unit transfers. This is formulated by using a multitude of specific activity metrics, their assignment to services, and supplies utilized to provide patient care.

The level to which this value can be realized, and a risk managed, is predicated on knowledge, skills and experience applied to the design, implementation and support. It can provide benchmarking for the facility and service lines and improved performance management and balanced scorecards using detailed information.

Activity-Based Costing Method Provides Higher Accuracy to Deliver Improved Visibility and Results

As a globally recognized and highly accurate and effective approach, ABC provides patient-care costs at the individual record level. The patient-level costs are based on the care services and supplies received by a patient during patient care where costs are assigned to each service and product. The services and supplies include items such as nursing, drugs, lab, imaging, OR and therapeutic care, and both direct and indirect costs are distributed to the individual patient's records.

## Cost Precision, New Realities and Value-Based Care

Understanding the true costs of care (not retrospective payor costs and bulk payment) provides the accuracy and precision needed to manage costs while delivering the breadth and quality of care services. Some US hospitals have been contemplating shifting how they capture, analyze, and act on critical financial and clinical data insights for more than a decade, but lacked the organizational motivation or leadership support to change. Organizations that have consistently seen improvements in financial and clinical decision support are now faced with critical new realities that are driving them to reconsider the need to implement strategies that will ultimately determine their continued viability and ability to support the communities that they serve.

The transitions in US healthcare payor and reimbursement models from Fee-for-Service to Value-Based-Care (VBC) or "fee-for-value," further supports this transition. The concept of bulk payment for care delivery based on patient outcomes associated with Value Based Care represents an important and significant philosophical shift in the US Healthcare market that began long before the COVID-19 pandemic. Hospitals have struggled to transform their business models to align to value-based practices, at least in part, because of the challenges associated with quantifying their cost analysis as a subset of the basic equation used to govern the payment and reimbursement models associated with value-based care delivery.

According to the October 2021 article "How the pandemic has accelerated the case for value-based care," [6] the article states "economic logic favors fee-for-value (FFV) vs. fee-for-service (FFS) models. VBC growth has been hampered by operational difficulties that made few FFV agreements profitable for provider organizations." "If there is an upside to the pandemic, it's the accelerated adoption of an environment in which value-based chronic disease agreements — the logical focus of FFV — can be managed effectively. Providers that continue to embrace innovation in patient care are likely to tap aggressively into this revenue stream."

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The Value-Based-Care equation established by the University of Utah, Health System defines "Value" as follows: Value (V) = Quality (Q) plus Service (S) divided by Cost (C). This model challenges the foundations of traditional financial and clinical healthcare decision making. As with any equation, the premise is that within a statement, the values of two mathematical expressions are equal. However, in the case of healthcare, "Value" is defined as the quality of care—made up of outcomes, safety and service—divided by the total cost of patient care over time. Value is still variable.
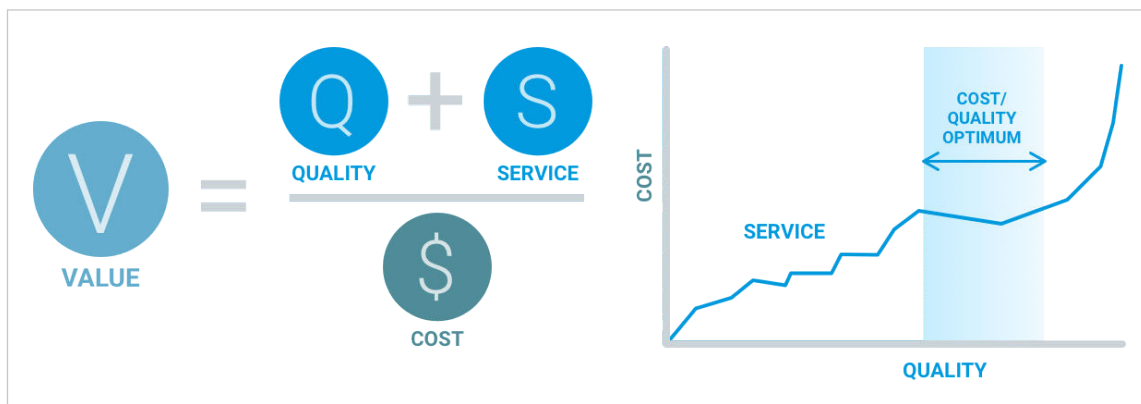
Having a decision support program that supports Activity-Based Costing, provides the ability to assess quality, service and real costs incurred on a continuous basis, represents that greatest opportunity for healthcare providers to capture the greatest rates of reimbursement, deliver the highest breadth and quality of care and achieve the best possible financial and clinical outcomes.

Differences Between Charge-Based Costing and Activity-Based Costing

With Charge-Based Costing, the patients' charge data is collected from the patient accounting source system, and the amount the patient is charged for the service, supply, or drug is used to allocate cost. Since there is only one source (patient accounting system), this is the simplest costing approach, however, there are major gaps with charge data that can cause costing inaccuracies.

Charge Data often does not contain 100% of the services and supplies consumed by the patient.

Nursing example:

- Nursing charges are typically based on bed census (where the patient was at midnight)

- For patients that spend part of their day in one nursing unit and are transferred, the first nursing unit is not reflected in the charge data

In Charge-Based Costing, the charge amount is not always reflective of the true cost of the service or supply.

Lab example:

- The hospital charges double for a Lipid Panel test compared to a CBC test, however the lab technician only spends an additional 2 minutes to do a Lipid Panel and there is negligible additional equipment and supplies required

- Charge-Based Costing would imply that a Lipid Panel costs twice that of a CBC, though the time and materials are equal

Activity-Based Costing (ABC) closes data quality gaps to provide the most accurate results by incorporating 100% of the patients' utilization data that is collected from various sources such as the admit/discharge/transfer (ADT) system, pharmacy system, OR system, lab systems, etc., and by allocating labor costs to the time spent delivering a service and the actual cost of a supply or drug is used to allocate materials costs.

Charge-Based Costing and ABC are costing methods. Both methods will provide the same bottom line at the department, or cost center level. The difference is at the individual patient, and, therefore, service line level. However, Charge-Based Costing will over-allocate costs to some patients and under-allocate costs to other patients.

Consider the following scenario:

A hospital has only 2 nursing units with total operating expenses of $1,000 in each unit and the hospital saw 3 patients:

- **Patient 1:** was admitted to nursing unit 1, stayed 1 night, and was discharged from unit 1 the next day

- **Patient 2:** was admitted to nursing unit 2, stayed 1 night, and was discharged from unit 2 the next day

- **Patient 3:** was admitted to nursing unit 1, transferred to unit 2, stayed there 1 night, and was discharged from unit 2 the next day

Charge Based Costing Results:

Patient #	Nursing Unit	Unit Charge	Unit Total Charge	% Patient's Charge	Allocated Cost
1	1	$1,500	$3,000	1,500/3,000 = 50%	50%*$1,000 = $500
2	2	$1,500	$1,500	1,500/1,500 = 100%	100%*$1,000 = $1,000
3	1	$1,500	$3,000	1,500/3,000 = 50%	50%*$1,000 = $500
ALL	ALL	N/A	N/A	N/A	$2,000

Activity-Based Costing Results:

Patient #	Nursing Unit	Unit Time	Unit Total Time	% Patient's Time	Allocated Cost
1	1	12 hours	28 hours	12/28 = 43%	43%*$1,000 = $430
2	2	8 hours	16 hours	8/16 = 50%	50%*$1,000 = $500
3	1	16 hours	28 hours	16/28 = 57%	57%*$1,000 = $570
3	2	8 hours	16 hours	8/16 = 50%	50%*$1,000 = $500
ALL	ALL	N/A	N/A	N/A	$2,000

Summary of Comparison:

Charge-Based Costing

Patient #	Total Nursing Cost
1	$500
2	$1000
3	$500
ALL	$2000

Activity-Based Costing

Patient #	Total Nursing Cost
1	$430
2	$500
3	$570 + $500 = $1,070
ALL	$2000

The variances between Charge-Based Costing and Activity-Based Costing (ABC) can be bi-directional and can greatly increase the risk of erroneous insights. This comparison highlights the cost variances at the patient level, which directly impacts service line cost and profitability metrics and emphasizes the value and confidence that ABC provides for both summary (high-level organizational) and detailed (granular-level operational) analyses.

Adoption Leads to Success

Most Electronic Health Record (EHR) systems contain the utilization and clinical information needed for Activity-Based Costing (ABC). This information, when combined with financial data from any healthcare financial system, provides the full picture data needed to calculate the cost detail including direct and indirect costs.

Invisible risks within the system include reconciliation that is not revealing hidden issues related to data validation, inappropriate activity and cost relationships. When ABC is first implemented,

these issues are low risk; however, over time as the organization adapts to market conditions, the process requires monitoring to ensure that the information provided is accurately correlated with the current state of operational activity.

A Proofpoint for Success

Activity-based costing has been used in Canada for over 30 years to provide comprehensive data to formulate Canadian healthcare funding. The data is used both nationally and provincially for healthcare funding formulae, evidence-based policy decisions and patient care management.

In the 1990's, hospitals in Ontario recognized that advancements in technology and the proliferation of digitalized information provided an opportunity for hospitals to gain access to clinical, financial, and utilization data. The integration of this data provided the opportunity for hospitals to process activity-based costing information at the patient level (case costing). In 2004, the Ontario Ministry of Health formalized a province-wide program to standardize and codify the process of capturing, categorizing, analyzing, and leveraging this data to manage costs, help define clinical pathways and best practices and, ultimately to ensure that healthcare providers across the province were in the best position to deliver cost effective and quality care to the communities and regions that they serve.

As the healthcare system evolves, healthcare providers are finding themselves under increasing levels of financial risk for effective patient management, while at the same time being held more accountable for demonstrating their ability to provide and document appropriate cost-effective high-quality care. To accomplish this objective, providers have taken dramatic steps in collaborating through informatic information applications to allocate patient specific case costing data to identify opportunities to optimize services and improve patient outcomes.

Leveraging the Affinity Decision Support system from Harris Computer, activity-based costing has delivered the comprehensive data that has changed the way that hospitals and health systems are funded in Ontario, Canada.

Ontario Case-Costing (OCC) Facilities Generate $17 Billion in Detailed Cost Data

Currently, there are 66 healthcare facilities within the Canadian healthcare system using ADS for submitting their patient data. The facilities leverage Activity-Based Costing (ABC) methods and annually submit approximately $17 billion in cost data.

ABC data is notably used by the Ontario Ministry of Health. The national healthcare research organization, the Canadian Institute for Health information, uses ABC to create funding formulae and models used for healthcare funding across Canada. In addition, this data is widely used by researchers for many types of substantive healthcare analysis; another use is the creation of Canadian case mix groups, such as DRGs.

In addition to providing patient data, the facilities use ADS information to manage their healthcare organizations and help to improve patient care. Facilities such as the University Health Network have incorporated the use of ADS information throughout the organization from financial management and patient care improvement initiatives to healthcare research.

University Health Network

University Health Network (UHN) is a public research and teaching hospital network in Toronto, Ontario, Canada. It is the largest health research organization in North America and ranks first in Canada for total research funding.

Four hospitals make up UHN: Toronto General Hospital, Toronto Western Hospital, Princess Margaret Cancer Centre, and Toronto Rehabilitation Institute.

The following cases exemplify the use of ADS data for cost and care improvements at the Ottawa General Hospital and the Niagara Health System, specifically demonstrating how UHN is a leader in Canada for these improvements.

UHN uses ADS for evidence-based decision making throughout the organization.
The use of ADS information is extensive and includes:

Funding Proposals
- Actual cost to deliver certain type of cases or new procedures
- Current funding and full expense analysis
- Patient case mix funding

Physician Impact Analysis
- Cost estimate to hire new physicians or adopt new technique for procedure

Other Users of Data
- Nursing workload vs. proxy cost impact
- Price setting for billing
- Planning – e. g., investment to open new beds
- Business solution (e.g. TAMS – Transient Ischemic Attack and Minor Stroke)

Benchmarking
- Peer comparisons
- Compare practice
- Efficiency metrics
- Methodology constraints

Data Quality
- Reconciliation e. g. Internal reconciliation process with coding
- Internal DQ projects (why downstream data matters) e.g., conversion cases

Quality-Based Procedures (QBPs)
- Funding impact analysis
- Clinical pathway development
- Best practice (cost and utilization)

Utilization Management
- Labs pharmacy operational efficiencies (supply costs vary by surgeon, standardize supply picklist)
- Medical imaging, LOS and ALC

Budget Allocation
- Internal chargeback
- Budget allocation to units who support volume funded cases
- Holding accountabilities

Research
- New techniques
- Innovation
- Trending analysis

Case 1: The Ottawa General Hospital (TOH)

As one of the largest teaching hospitals in Canada, The Ottawa General Hospital (TOH) uses decision support information for financial management and clinical improvements, ensuring that the leadership is informed while prioritizing the patient experience.

At TOH, cross-functional teams analyze clinical pathways to align cost with clinical best practices. These teams include decision support, financial and clinical representatives, and physicians. The teams begin analysis with high-cost, high-volume cases, which include neonatal jaundice, pneumonia, endoscopy, hips and knees, hip fractures, and cataracts. ADS data is the foundation for decision making.

Hip Fracture Review

Analysis revealed several potential clinical practice improvements within lab, pharmacy, OR and imaging.

Goal: Analyze clinical pathways to align cost with clinical best practices.

Result: Clinical practice improvements within lab, pharmacy, and imaging with cost reductions and reduced length of stay.

Cost Reduction

- Lab test reduction from daily blood work to one CBC on day two. Cost reduction of 90%.
- Drug costs lowered by using an oral anticoagulant versus an injection. Cost reduction of 3.6% in pharmacy labor.
- Imaging costs reduced 25% by using a one-view X-ray versus two-view X-ray.
- Overall Length of Stay (LOS) reduction of 1-2 days per case with an approximate nursing cost reduction of 20%.

The average hip fracture case was reduced in total by 11%, approximately $700,000 based on a volume of 410 cases.

Improved Care: Patients were discharged sooner, blood tests were reduced, and oral drugs were administered instead of injectables, resulting in better patient experience during their hospital stay.

Case 2: Niagara Health System

Niagara Health System (NHS) is one of the largest community hospitals in Ontario and is an advanced user of ADS information for healthcare management.

NHS was an early adopter in the Provincial Order Set Project in 2016 using digital order sets and provincial standards. A clinical order set is a pre-defined template that provides support in making clinical decisions for a specific condition or medical procedure. The expected outcome was better inventory control and utilization. However, ADS data revealed higher costs after the first few months using the Provincial Order Set.

Goal: Decision support and clinicians analyzed ADS data to understand increased costs and identify cost-reduction opportunities. The Order Set Project was suspected as the cause of increased costs.

Change Initiative

- Duplication of testing was evident on the day of admission in acute inpatient from emergency department. The same tests had been conducted in the emergency department.
- FY 17/18 - $32K in potential duplicate lab test costs, not including the cost of supplies, were identified
- Focused on the general internal medicine and CHF order sets (high volumes)

Result:

- Changed the pre-selected tests to unchecked boxes on the order sets in both acute inpatient and emergency department
- Overall reduction in lab duplication of 14.0%
- The site with the highest reduction (24.6%) went from 40.5% to 15.9% duplication
- The site with the lowest reduction (5.3%) went from 34.1% to 28.8% duplication

Improved Care: The health system was able to reduce duplicate tests for patients, saving costs, while providing better patient care by eliminating unnecessary or invasive tests.

Imaging Duplication in Stroke

In FY17/18, 65% of patients (post-thrombolytic) with stroke receiving tPA had the "carotid doppler" option checked on admission, even though they already had a CT angiogram as part of the code stroke protocol.

Change Initiative

- The option to order CT angiogram and carotid doppler was removed from the post-thrombolytic order set
- The option to order CT angiogram on the non-thrombolytic order set was also removed

Result: The Niagara Falls site of the Niagara Health System, a stroke excellence centre, experienced a significant reduction in imaging duplication from 21.3% of patients at Q3 YTD and a further reduction to 8.0% in Q4. In non-thrombolytic cases, the proportion of patients receiving carotid doppler showed only a decrease of 5%.

About Harris Affinity

Harris Affinity Decision Support (ADS is recognized as the industry expert in Activity-Based Costing with implementations in over 90 U.S. and Canadian healthcare systems. ADS combines financial, operational, clinical, and patient activity information to help healthcare administrators understand patient costs and reimbursement across product lines, populations, contracts, and practitioner groups. As a result, administrators have the tools to create paths of improvement for financial and clinical performance, while monitoring progress, resulting in improved financial and clinical outcomes.

ADS Costing, Contracting, and Budgeting components empower healthcare providers to confidently make evidence-informed, data-driven financial and clinical decisions based on precise and accurate cost data. The ADS solution allows users to:

- Combine multiple financial and allocation models that fit the customized needs of the organization

- Support various financial structures across the entire health system

- Utilize, blend, and compare multiple allocation methodologies simultaneously

- Create unlimited what-if models

1 https://www.cbo.gov/publication/51919

2 https://www.aha.org/
   guidesreports/2020-05-05-hospitals-and-health-systems-face-unprecedented-financial-pressures-due

3 https://www.bdo.com/insights/industries/healthcare/2021-healthcare-cfo-outlook-survey

4 https://assets.kpmg/content/dam/kpmg/xx/pdf/2021/07/healthcare-ceo-outlook-report.pdf

5 based on self-reported and government collected CMS data compiled by Definitive Healthcare

6 https://assets.ey.com/content/dam/ey-sites/ey-com/en_us/topics/health/ey-how-the-pandemic-has-accelerated-
   the-case-for-value-based-care.pdf?download