

# Total value of ownership: Is your laboratory demonstrating its true value?

## KEYWORDS

Total value of ownership, healthcare, total cost of ownership

## ABSTRACT

Today's clinical laboratory faces increased patient volumes, a rise in chronic illnesses and more educated patients demanding real-time information — all leading to rising costs. As a result, laboratories are often an easy target for budget cuts because decision makers are focused more on cost instead of total value. Solutions, such as headcount or reagent cost reductions and consolidation, often fail to have the desired impact on budgets. To remain viable, laboratories must deliver value above and beyond their ability to contribute to positive patient outcomes at the lowest possible cost.

Total value of ownership (TVO) is a methodology that widens the scope of value drivers beyond direct and indirect instrument costs to include other benefits, like time and space savings. The three laboratories showcased in this article used TVO to measure costs, audit processes and establish baseline metrics. Ultimately, they unlocked valuable opportunities to achieve greater operational productivity and excellence, leading to positive impacts on their institutions' performance.





## CHRISTUS HEALTH SANTA ROSA EMBARKS ON A TVO JOURNEY

Imagine you are a hospital core laboratory manager in San Antonio, Texas. You walk into your laboratory on an early June morning, stopping to greet your team on the way to your office, as you do most days. The laboratory is already full of activity when you arrive, as it is every morning, and the temperature is well on its way to a high of 38°C, a common occurrence for San Antonio in June. By all outward appearances, it looks like it will be just another day, but somehow you feel a change in the air.

CHRISTUS Health Santa Rosa (CSR), located in San Antonio, Texas, had been working through how to achieve better operational efficiency for several months. CSR's laboratory supported two hospitals that offered a broad range of cardiac, infectious disease, transplant and pediatric services. To provide for all of these services, the laboratory had been operating 14 diagnostic platforms from four vendors, creating an unnecessarily complex situation. The challenge was clear: make the changes necessary to continue to meet customer needs in a high-quality, efficient manner and, ultimately, grow.

The focus would be on improving turnaround time (TAT) to meet key performance indicators (KPIs), implementing a better quality process to positively impact clinical results, consolidating platforms and standardizing systems between its campuses to improve operational efficiency and effectiveness. Realizing CSR would not be able to do it on its own, the laboratory sought a partner to help achieve this transformation.

**Total value of ownership (TVO) is a methodology that widens the scope of value drivers beyond direct and indirect instrument costs (TCO) to include benefits like time and space savings.**

CSR turned to its laboratory diagnostics partner, Abbott, which had described the importance of both professional consulting services and an operational efficiency concept called total value of ownership (TVO). While somewhat common and well respected in other industries, the TVO methodology is not often used in a laboratory setting. However, CSR quickly realized that TVO provided an opportunity to evaluate the lab's daily operations and uncover hidden value in a way this laboratory had never done before.

## AN INDUSTRY IN TRANSITION

Before delving into the exceptional results CSR achieved through TVO, it is important to first understand the challenges that are impacting laboratories and healthcare organizations in this constantly evolving landscape.

Today, there is more pressure on laboratories than ever before. Delivering on-time, accurate results to physicians is no longer enough to remain viable. Laboratories must not only demonstrate their ability to contribute to positive patient outcomes at the lowest possible cost, but they must also deliver value above and beyond the traditional scope of their work.

At the same time, healthcare organizations face increased patient volumes, a rise in chronic illnesses and more educated patients demanding real-time information — all leading to rising costs. In response to the resulting financial pressures, decision makers in hospitals and healthcare institutions are continually looking for ways to cut their spending.

Laboratories are often an easy target for these budget cuts because decision makers are focused more on cost than total value.



### HOSPITAL DECISION MAKERS

- Not connected to day-to-day laboratory operations



### THEIR FOCUS

- High upfront instrument investments
- Per-test costs



### THEIR PERCEPTION

- Labs are cost centers
- Labs can easily be eliminated or outsourced

This narrow view of the laboratory's role has major implications, not just for the laboratory but also for the health of the institution overall. On average, laboratories directly impact up to 70% of value-based KPIs; yet they make up a tiny fraction — just 3% to 5% — of a hospital's budget.<sup>1</sup>

To counteract these challenges and combat increased pressures, laboratories often pursue piecemeal solutions, such as headcount or reagent cost reduction. However, these small-scale cost-cutting measures often fail to have the desired impact on healthcare organizations' budgets, and when they do, institutions often turn to consolidation as one way to decrease costs on a grander scale.

Healthcare C-suite executives have high expectations for the lab to contribute significantly to the changing healthcare landscape. A 2017 survey found that:

**40%** believe the lab is the most important function in delivering KPIs.<sup>2</sup>

**63%** of C-suite executives believe the lab impacts patient satisfaction.<sup>2</sup>

Given this new industry landscape and increased expectations, lab management must accurately assess the value of the laboratory and effectively communicate that value to its decision makers. As one might imagine, without the correct set of tools, moving this objective into practice can be yet another obstacle to overcome. This is where a TVO analysis is a crucial tool to help laboratories deliver results and be successful.

A laboratory must consider more than just the direct price of buying new instruments or completing diagnostic tests. Since a large percentage of a hospital's diagnostic decisions are based on laboratory results, a delay or misdiagnosis can have a meaningful impact on a healthcare organization's performance.

### LABORATORIES DIRECTLY IMPACT UP TO 70% OF VALUE-BASED KPIs.

### A LABORATORY'S ABILITY TO THRIVE IN THIS CHANGING INDUSTRY RELIES ON PROVING ITS POSITION AS A VALUE CENTER.

Consider the following statistics

U.S. annual patient **deaths** due to misdiagnosis

**40,000 to 80,000<sup>3</sup>**

U.S. annual cost of **diagnostic errors**

**\$750 billion<sup>3</sup>**

U.K. 2014/2015 National Health Service cost of **misdiagnosis claims**

**£185 million<sup>4</sup>**

As part of the healthcare patient pathway, the lab and data produced in the lab may affect these numbers. C-suite stakeholders globally expect clinical labs to increase their capabilities to improve patient management, with 71% seeing the most improvement from the clinical laboratory in reduced time to diagnosis and intervention.<sup>2</sup>

TVO can help ensure that a laboratory is achieving operational efficiency and using that efficiency to create greater value for the healthcare organization.

## UNDERSTANDING TVO

### TVO VS. TCO

To understand TVO fully, total cost of ownership (TCO) must first be understood.

**In a laboratory context, TCO is an estimate of all direct costs (instruments, reagents, calibrators and quality controls, etc.) and indirect costs (employee hours, waste management, energy consumption, etc.) associated with acquiring and operating an instrument throughout its lifetime.**

The next step in understanding a laboratory's true value is to transition to TVO. TVO builds on TCO and complements lean

six sigma processes to produce the best outcomes for the entire healthcare system over the lifetime of an instrument or solution, enabling laboratories to manage a changing industry.

Abbott has personalized existing TVO processes to be specific to the laboratory's singular challenges, based on a deep knowledge gained from partnering with laboratories across the world. The chart below underscores the transition from TCO, which is cost-focused, to TVO, which considers other key drivers of value (for example, saving time and space in the laboratory that may provide even greater value to the overall healthcare institution).

## TCO

An estimate of all direct and indirect costs associated with acquiring and operating an instrument throughout its lifetime.

### TCO ACCOUNTS FOR:

- Instrument and reagent upfront purchasing costs.
- Calibrators, quality controls and maintenance operating costs.
- Consumables, waste management and utilities costs.
- Instrument lifetime cost analysis.

## TVO

A methodology that widens the scope of value drivers beyond direct/indirect instrument costs (TCO) to include benefits of time/space savings, etc.

### TVO GAINS ADDITIONAL EFFICIENCIES THROUGH:

- Inventory management to better manage product expiration and cash flow.
- Floor space utilization translated into increased testing volumes.
- Cross-training to increase staff utility and job satisfaction.
- Time utilization of resources to minimize nonvalue-added tasks.
- Larger/broader workload that generates revenue.
- Real-time data analysis and insights to position the lab as a decision support center.
- KPI improvements.

## IMPROVED OPERATIONAL EFFICIENCIES





## RETHINKING VALUE

TVO impacts the laboratory, as well as the institution, in four main ways:



### 1. MORE TIME FOR VALUE-ADDED TASKS

**What if a senior laboratory technician freed up 15 work hours?**

This technician could host training sessions to teach others more streamlined processes. This would increase the laboratory's efficiency and ultimately improve the service it provides to clinicians.



### 3. MORE ACTIONABLE INTELLIGENCE

**What if the instruments in that laboratory were optimized to collect real-time data that could be translated into actionable intelligence?**

The laboratory staff could use its available resources to generate and apply insights. By identifying patterns and trends in the data, the laboratory could inform decision making across departments and potentially help the organization meet its KPIs and targets.



### 2. MORE SPACE

**What if that same laboratory freed up 15 square meters of space?**

Recognizing a regional rise in chronic diseases, technicians might take on additional specialized testing that was previously outsourced, thereby establishing the lab as the local go-to testing center and increasing revenue for their organization.



### 4. MORE OPERATIONAL EFFICIENCY AND EFFECTIVENESS

**Replete with efficient technicians, optimized workflows and data-driven insights, what else might be possible?**

A single laboratory can prompt an entire healthcare organization to increase its efficiency, improve processes and make smarter decisions. These process changes can, in turn, improve patient health outcomes, increase satisfaction rates for both care providers and consumers, and indicate key areas of expansion or improvement.

These examples demonstrate that analyzing the laboratory from a different perspective can unlock a wealth of possibilities. But how does TVO come to life in a functioning laboratory that must manage daily responsibilities and address constant challenges? Returning to the TVO analysis at CSR is a good place to start to understand how TVO can be a useful method to uncover untapped value.

ANALYSIS LEADS TO SIGNIFICANT GROWTH FOR CSR

The TVO-based workflow analysis CSR and Abbott conducted focused on achieving predetermined goals to evaluate TAT, consolidate platforms and standardize instruments across campuses. The team began the analysis by reviewing costs, including upfront instrument costs, as well as indirect costs, such as consumables, waste management and utilities.

Understanding best practices for managing space was also an important concern. With an ambulatory surgical center and three free-standing emergency departments, CSR needed a solution that could adapt to different specialties and space constraints.

As part of the analysis, the team reviewed sigma performance. A higher sigma level means a better quality process, which can lead to better clinical results — a crucial metric of success for the CSR team to prove its the value to the larger institution.

The TVO analysis and improvements far exceeded CSR’s expectations with the following outcomes:

Platforms	↓ from 14 to 6
Vendors	↓ from 4 to 2
Test results	Standardized across platforms
TAT (immunoassay tests)	↓ 22% decrease
TAT (clinical chemistry tests)	↓ 17% decrease
Water consumption	↓ 50% decrease
Operating costs	↓ \$2.3 million over 7 years
Sigma performance metrics	↑ to match those of prestigious healthcare institutions

= ELEVATION OF THE QUALITY OF PATIENT CARE ACROSS MULTIPLE CAMPUSES

CSR IMMUNOASSAY TAT SUMMARY

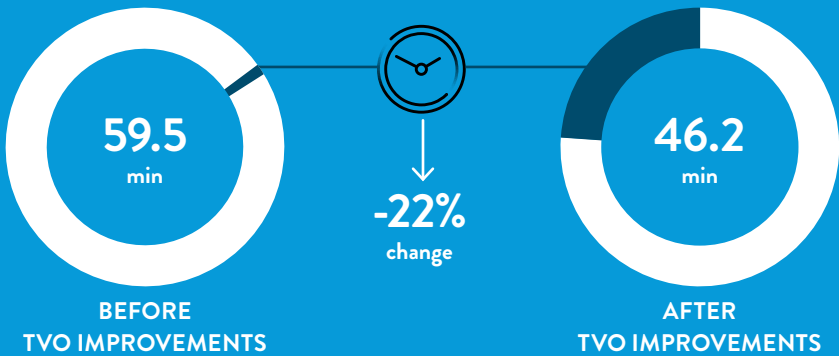


Figure 1: CHRISTUS Santa Rosa TAT improvement

These outcomes allowed CSR to change its trajectory in a rapidly consolidating industry. CSR has now grown to include four full-service hospitals, comprising a surgical center and three free-standing emergency centers.

In focusing its the attention on operational excellence, CSR was able to reallocate staff time to value-added tasks, increase the ability of its team to focus on actionable intelligence and improve on overall efficiency — all while providing measurable savings to the broader organization. Learn more about CSR at the [core laboratory website](#).

“This effort demonstrates that substantive supplier collaboration can result in better outcomes that drive evidence-based decision making. Abbott is at the forefront of customer-supplier collaboration with CHRISTUS.”

**Sean Poellnitz**  
Director, Contracting and Resource Utilization, Supply Chain Management, for CHRISTUS Health in Irving, Texas

## TVO AT WORK: MORE REAL-WORLD EXAMPLES

CSR is not the only case study of its kind. TVO also had an impact on two other very different laboratories based in Russia and Korea. The expert team at Abbott partnered with both laboratories in personalized ways to help them realize the benefits of a TVO analysis.

### CITILAB: LOWER COST DOES NOT ALWAYS EQUAL GREATER VALUE

#### PRE-TVO ANALYSIS

The operators of Citilab, the second-largest medical diagnostics laboratory in Moscow, understood the growing pressures of their industry firsthand.

As production-related costs were rising, laboratory staff was being pressured to identify other areas of cost savings, increase efficiencies and prove value, all while management was unable to define its role in the situation.

Administrative staff made purchasing decisions based solely on the upfront costs of solutions and instruments, rather than considering the costs of using the instruments over several years. Without input from anyone in the lab close to the action, the staff made purchasing decisions based on only direct technology-related costs.

**“We were aware of the magnitude of this undertaking; yet we had to execute it.”**

#### Citilab Operators

#### RESULTS OF TVO ANALYSIS

Using more than 3.5 million data points, Citilab determined the initial cost of Abbott’s immunoassay instruments and reagents was 17% more expensive than Roche’s. However, after calculating the indirect costs, such as utilities and waste, and completing a more in-depth analysis, Abbott’s solution was 33% less expensive than Roche’s and provided greater value to the organization. By focusing on increasing overall operational efficiency, this laboratory was able to make substantial financial impact, thus adding significant value to the organization.

#### SOLUTION

To deliver measurably better healthcare performance to the institutions it supported, Citilab turned to TVO to reveal and correct workflow and instrument inefficiencies that were preventing the laboratory from growing or innovating.

Citilab implemented a TVO analysis by comparing the performance of instruments and assays between Abbott and Roche, which was replacing Abbott as Citilab’s in vitro diagnostics provider. The goal was to fully identify and attribute the value of each solution.

Citilab began by selecting its top 20 immunoassays (82% of its immunoassay volume) and its top 20 clinical chemistry assays (78% of its clinical chemistry volume) to compare the TVO of Abbott to the TVO of Roche. The real-life, real-time analysis utilized fully trained laboratory staff to run all tests using Roche instruments and reagents for one month and then all tests using Abbott instruments and reagents for the next month. Then, Citilab validated its theoretical model and repeated the data analysis over the year to show large-scale impacts and determine the value of both solutions.



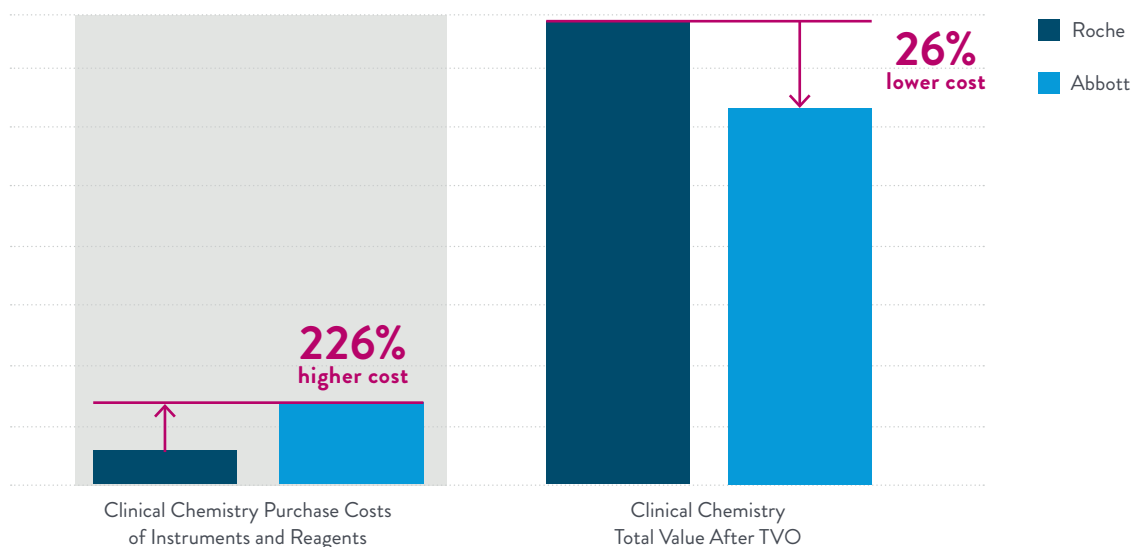


Figure 2: Citilab comparison of initial costs vs. total value after TVO

Similarly, the initial cost of Abbott’s clinical chemistry instruments and reagents was 2.25 times higher than Roche’s, but after calculating the indirect costs and completing a full TVO analysis, Abbott’s solution was 26% less expensive than Roche’s, again providing greater value.

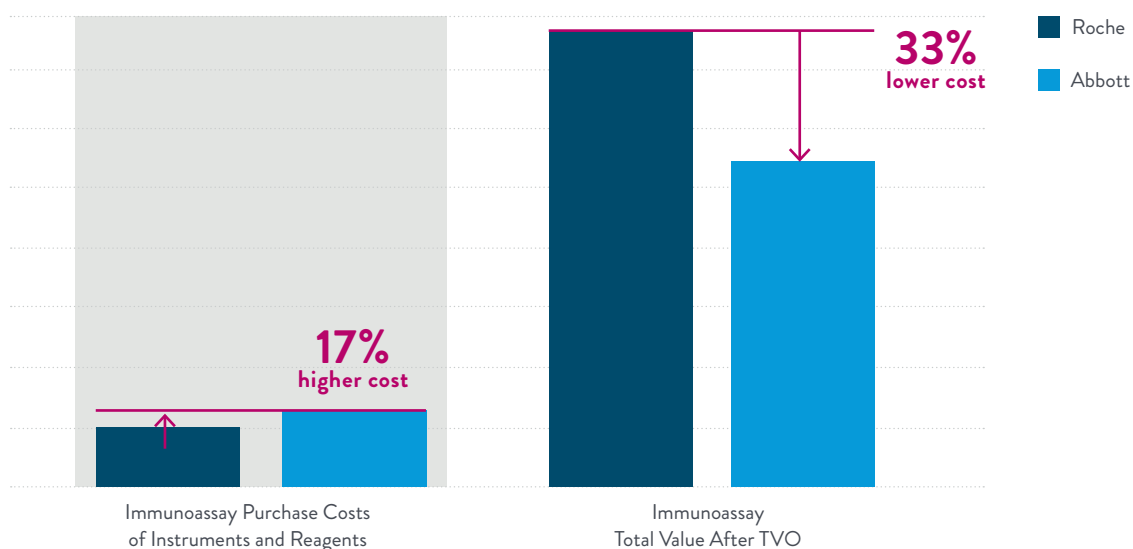


Figure 3: Citilab comparison of initial costs vs. total value after TVO

In other words, identifying the additional indirect costs and maximizing operational efficiencies completely changed the laboratory’s decision-making processes.

Once Citilab could demonstrate the practical use and application of the TVO methodology, it revised its approach to purchasing new instruments. Citilab also showcased how much value this new decision-making process could hold for the organization at large, from the finance and human resource departments to the medical staff. View the webinar at the [core laboratory website](#) to learn more about Citilab and a secondary laboratory under the management of Gontard & Cie, which was able to increase its EBIDTA (earnings before interest, tax, depreciation and amortization) by 5% in an 8-month period of time, showing ingenuity to the broader organization and adding significant financial value.



## KOREA CLINICAL LABORATORY: RISK IDENTIFICATION YIELDS QUALITY IMPROVEMENTS

Embracing a TVO mindset can result in operational efficiencies for laboratories, as it did with Citilab and CSR, but it also can uncover risks to a system, as it did for Korea Clinical Laboratory (KCL).



### PRE-TVO ANALYSIS

KCL, a research-oriented medical foundation and laboratory located in South Korea, had promoted innovation and highquality instruments as its differentiators, but it realized this was not enough to stay ahead of its intensifying small- and medium-sized contract research competitors.

### SOLUTION

During a three-day workshop hosted by Abbott, KCL filtered its daily workflow and operations through a TVO lens to determine where it could create more efficiencies. Since KCL laboratory managers had not accounted for the total operation costs of their instruments, the workshop focused on analyzing the costs incurred from basic system checks, workflow improvements, appropriate workforce management and more.

### RESULTS OF TVO ANALYSIS

KCL realized that an ineffective laboratory poses risks to the rest of the healthcare system, such as the costs of remobilizing staff to collect extra fluid samples to rerun a test. Not only does this impact patient care, it also affects an organization's financial performance and EBITDA, a company's earnings before interest, tax, depreciation and amortization. When KCL improved the quality of its medical test services, it offered more benefits to patients, revealed the optimum number of workers for its laboratories and determined a vision that would help management focus on the institution's goals. Learn more about KCL at the [core laboratory website](#).

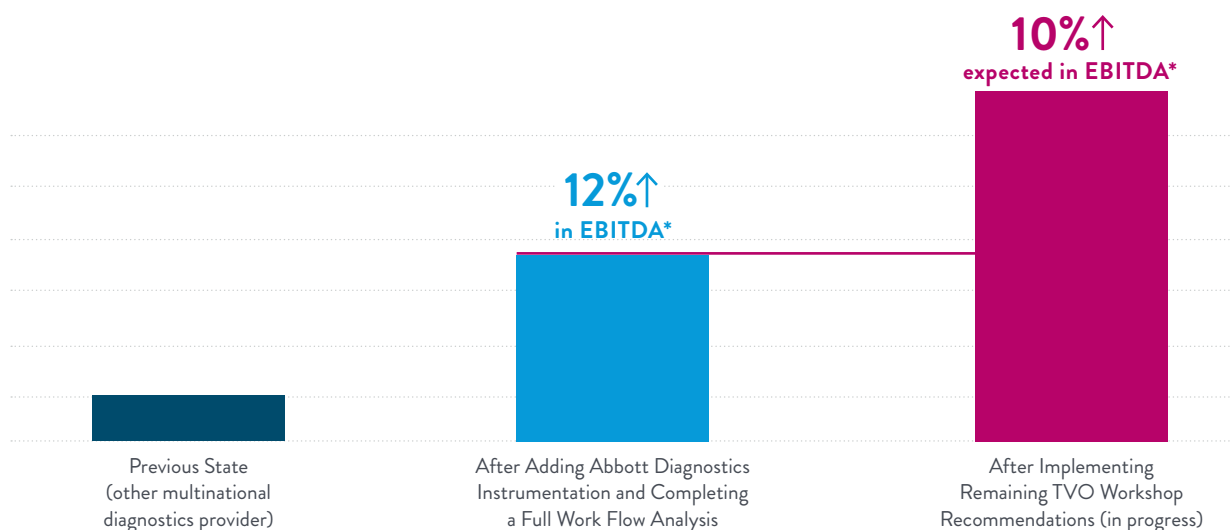


Figure 4: KCL change in EBITDA\* after applying TVO methodology

\*Earnings before interest, taxes, depreciation and amortization

## TVO: A CHANGE IN MINDSET

Each of these healthcare institutions — CSR, Citilab and KCL — addressed the challenges they faced in an innovative way. By utilizing a TVO methodology, they began to measure costs, audit processes and establish baseline metrics, which allowed them to identify opportunities in operational efficiency and utilize their findings to think differently about their laboratories' future.

Each laboratory calculated the total impact of potential operational efficiencies, such as saving time and space in the laboratory, by extrapolating and quantifying the benefits realized across its healthcare institutions. After identifying the areas of significant impact, the laboratories could proceed with value-driving initiatives and establish performance metrics to monitor and report at regular business intervals. When the management teams of these three laboratories started thinking differently, they streamlined processes to attain greater operational excellence, leading to positive impacts on their institutions' operational performance.

Incorporating the idea of TVO into daily work can be a significant change for most healthcare organizations and laboratories, as it requires rethinking value beyond simple costs. But TVO isn't just a methodology; it's a mindset change that is the catalyst for remaining relevant in a quickly changing industry.

One member of the KCL team described this mindset shift: "Healthcare deals with people's lives, and healthcare is also a sector of industry. This means healthcare requires not only humanitarian devotion to saving lives but also wisdom and techniques for optimizing cost and efficiency in healthcare."

**Today's laboratories must embrace a TVO approach to achieve continuous improvement, as evidenced by CSR, Citilab and KCL.**

## THE TVO PROCESS

The impacts of TVO on each laboratory will vary, but the steps laboratory teams can take to unlock the possibilities within their laboratories are the same.

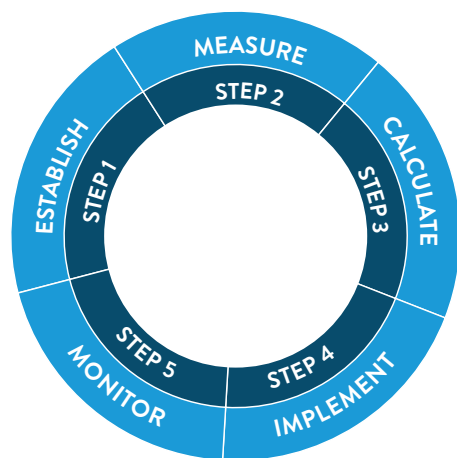


Figure 5: TVO process

Through the power of TVO, laboratory management can tell a story to hospital decision makers that changes the lab's identity from a cost center to a value center.

### 1. ESTABLISH

Establish customer goals and baseline metrics to be documented (improve total quality transformation, minimize human intervention, reduce waste generation, etc.).

### 2. MEASURE

Measure direct and indirect instrument-related costs and audit laboratory process (instruments, reagents, consumables, quality control, labor, required maintenance, utilities, footprint, etc.).

### 3. CALCULATE

Calculate and validate the impact of potential operational efficiency benefits.

### 4. IMPLEMENT

Design and implement operational productivity changes.

### 5. MONITOR

Monitor performance and update baseline metrics for continuous process improvement.

## REALIZE YOUR LABORATORY'S TRUE VALUE

If your laboratory is facing cost pressures and sitting on under-recognized value, consider using TVO to evaluate your laboratory. Look for the “Let’s discuss your lab” button on the [core laboratory website](#) to get in touch with a resourceful advocate from Abbott about reframing the value discussion within your organization. Uncover ways to drive improvements in cost structures, operational efficiency and patient satisfaction and to allow your organization to achieve measurably better healthcare performance.

Core Diagnostics’ resourceful advocates have extensive experience in TVO principles and can support your laboratory in its journey to recognize value.

## ABOUT CORE DIAGNOSTICS AT ABBOTT

At Core Diagnostics, we’re committed to helping you connect the performance of your laboratory to the performance of your healthcare institution. We align people, processes and technology to create personalized solutions tailored to your unique challenges. Our resourceful advocates can help you achieve measurably better healthcare performance through harmonized systems and intelligent insights.

Connect with us at [corelaboratory.abbott](#) and on [LinkedIn](#) at Abbott | Diagnostics

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