Abbott

LEVERAGE THE LAB FOR A HIGHER PERFORMING HEALTH SYSTEM

IT'S A CHALLENGING TIME FOR HEALTH SYSTEMS AND LABORATORIES.
Even before the pandemic, a sustained rise in chronic illnesses, increased consumer access to healthcare, and new testing methodologies were driving laboratories to be more agile in adjusting to new operational demands. Laboratories worldwide are struggling to meet staffing needs, while changes in reimbursement and shrinking budgets continue to drive health systems and laboratories to reduce costs. What this all adds up to is that health systems are being challenged to do more with less.

Through our work with laboratories and health systems around the world, Abbott has gained valuable insights about how to improve lab value – even in today's increasingly complex healthcare environment. Looking beyond the current healthcare challenges, growth opportunities exist.

Maximizing these opportunities begins with evolving the role of the laboratory beyond traditional performance measures such as throughput, turnaround time and variable cost per test. Forward-thinking health systems are taking a holistic view of the total value a laboratory can bring to the healthcare equation.

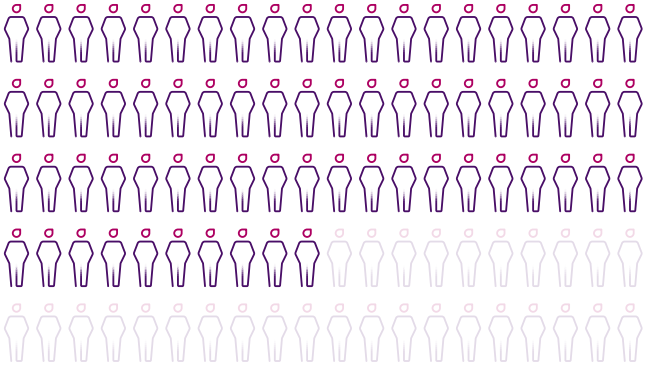
> "Forward-thinking health systems are taking a holistic view of the total value a laboratory can bring to the healthcare equation."

THE HEALTHCARE LANDSCAPE **IS EVOLVING**

- Greater information access
- Hospital consolidation
- Reimbursement cuts squeezing budgets
- Increasing patient volumes
- Staffing shortages
- New payor models

WHEN LEVERAGED CORRECTLY, THE CLINICAL LABORATORY CAN GREATLY ASSIST HEALTHCARE SYSTEMS IN ACHIEVING **OPERATIONAL EFFICIENCY** AND **INTEGRATED CLINICAL CARE EXCELLENCE.**

In fact, **70% of hospital executives** interviewed in a survey expressed their belief that the laboratory can have a significant impact on patient satisfaction.[1]



ABBOTT'S HOLISTIC APPROACH TO ACHIEVING MEASURABLY BETTER HEALTHCARE PERFORMANCE

OPERATIONAL EXCELLENCE & INTEGRATED CLINICAL CARE

Your roadmap to better health system performance starts here – with our whole picture perspective on maximizing health system performance.

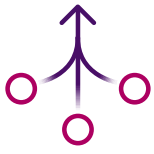
CORE COMPETENCIES

OPERATIONAL **EXCELLENCE**

The performance of your people, processes and technology to successfully deliver services.

- **Customer Centricity** – How well you know and serve your customers.
- **Quality Management** – Highest performance at lowest errors.
- **Performance Management** – Doing the right things and doing things right. Efficiency and effectiveness.
- **Network Optimization** – How efficiently you are leveraging the synergies and economies of scale across the system.

INTEGRATED **CLINICAL CARE**



The level of alignment and execution across your health system stakeholders to deliver improved clinical care outcomes.

- **Analytics Center** – How easy it is for you to access, share and utilize data for integrated care.
- **Execution of Integrated Care** – How effective you are at implementing an integrated approach.
- **Advice Center** – How effective you are at leveraging data and people to deliver actionable insights for decision making.
- **Population Health Management** – The level of integration across your stakeholders to provide preventative care and deliver improved population and financial outcomes.

FOUNDATIONAL **COMPETENCIES**

- **Sustainability**
  How well you use systems to ensure long-term sustainability and drive shareholder value.
- **Innovation**
  Your organization's appetite to implement change (leveraging people, processes and technology) to evolve and improve your performance.

ENHANCING LABORATORY PERFORMANCE AND VALUE

FOUR **KEY FOCUS** AREAS

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 contribute to positive patient outcomes at the lowest possible cost, but they must also deliver value above and beyond the laboratory's traditional scope of work. Through the exploration of four focus areas: **Patient Care Pathways, Early Disease Detection, Human Resources & Staffing and Cost Savings,** a strategic roadmap can be developed to achieve operational excellence and heighten the level of clinical care across your health system.

Patient Care Pathways

Early Disease Detection

Human Resources & Staffing

Cost Savings

FOCUS AREA 1

PATIENT CARE PATHWAYS

Reducing overcrowding in the Emergency Department through novel diagnostic testing strategies that connect patients to the appropriate care.

RELEVANT DATA POINTS

- As the population of those 65 years and older continues to rise, expectations are that demand for ICU care will also increase.[2]
- According to a British Medical Association survey of physicians, **92% agree** that the NHS is "in a state of year-round crisis" when asked about core bed stock availability.[3]
- Multiple studies prior to the pandemic have demonstrated that total hospital length of stay (LOS) can be a full day longer for those boarded in the ED versus those placed in the inpatient unit.[4]
- As reported by several news outlets between 2019 and 2021, many hospitals reached or exceeded hospital bed capacity due to the COVID-19 pandemic. For example, in Brazil, ICU care wards treating patients reached levels **over 90% in 15 of 27 state capitals.**[5]

Why This Matters

Overcrowding in the ED causes problems for patients and staff, including:[6]

- **Increased** wait times, potentially leading to an increase in patient walkouts.
- **Increased** patient dissatisfaction, possibly leading to malpractice claims.
- **Increased** length of stay.
- **Increased** adverse events.
- **Increased** patient mortality.
- **Decreased** operational efficiency resulting in increased costs.

Patients who experienced greater than a 6 hour wait in the ED before transferring to the ICU had an overall **increased LOS (7 vs. 6 days), higher mortality rates (10.7% vs. 8.4%) and increased adverse events.**[5]

Historical studies have demonstrated that there was an association between some measures of overcrowding on **complication rates for patients presenting with acute coronary syndrome (ACS).**[7]

CASE STUDY OUTCOMES

There's increasing support for the idea that the laboratory can **help reduce overcrowding** in the hospital through the implementation of **novel patient pathways** and by **increasing laboratory efficiencies.**

NOVEL PATIENT PATHWAYS

Cardiovascular disease remains the leading cause of disease burden in the world. Non-traumatic chest pain is the second most frequent cause of emergency department visits in the United States, **yet only 5.5% were diagnosed as life threatening.**

Royal Wolverhampton National Health Service (NHS)

In 2018, the Royal Wolverhampton National Health Service (NHS) presented a case study that demonstrated their commitment to improving patient care by implementing an innovative integrated clinical care project to optimize pathways for patients with suspected Acute Coronary Syndrome (ACS). Specifically, low-risk patients were identified using clinical assessment and high-sensitive troponin values on arrival, enabling a discharge protocol that reduced the number of low-risk patients admitted unnecessarily while assuring patient safety. NHS deployed a **novel patient pathway** for those presenting with suspected ACS, which represented approximately 10% of ED visits. **The implementation of additional clinical assessment, coupled with high-sensitive troponin diagnostic testing, enabled the hospital to triage patients more efficiently.**

Success Factor: Sex-Specific Cut-Offs

The Biochemistry & Immunology Department at Kokilaben Dhirubhai Ambani Hospital & Medical Research Institute (KDAH) implemented new patient pathways for those with suspected acute myocardial infarction (AMI). Through their implementation, it was noted that using an upper reference limit (URL) of 26 ng/L may lead to under diagnosis for women.[12] Subsequently, the institution implemented sex-specific URLs, 16 ng/L for women and 34 ng/L for men.[12] The result of these changes identified an additional 14% of at risk women with potential AMI.[12]

The insights of this case study point to the importance of leveraging high-sensitive troponin assays that have sex-specific cut-offs. Per Table 1, the Abbott high-sensitive troponin assay for both Alinity i and ARCHITECT have unique URLs to support improved diagnosis of AMI.

Table 1

	Sex	99th percentile (ng/L)
hsTnI	Female	15.6
	Male	34.2
	Overall	26.2

"Implementation of our novel ACS pathway utilizing high sensitivity troponin has improved our confidence in safely discharging low-risk patients while admitting high-risk patients with minimal impact to the rate of cardiology consults. As a benefit of the improved sensitivity and specificity of hsTnI, I am more confident in the ability to risk stratify patients with ACS earlier in their pathway."
-Katherine Willmer, MD, The Royal Wolverhampton NHS Trust

CASE STUDY OUTCOMES

Royal Wolverhampton safely discharged over **25%** of low-risk patients without the need for serial measurements of cardiac troponin.[11]

9.6 hrs
reduced from 23 hours[11]
Total length of stay for patients from arrival to discharge

reduced by
37%[11]
Admissions from the ED to the hospital wards

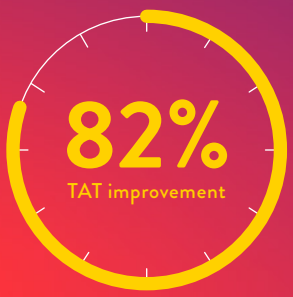
INCREASING LABORATORY EFFICIENCIES

In addition to the implementation of novel patient pathways, establishing key performance metrics can help improve patient care. One key metric to gauge laboratory performance is **test turnaround time (TAT).** While focus is often placed on the time to first result specification for assays, many variables can impact this metric in a routine laboratory setting, including:

- Sample Reception & Accessioning
- Pre-analytical Processing
- Sample Processing
- Result Verification Interpretation

By taking a personalized approach to understanding laboratory bottlenecks and opportunities for greater operational efficiency, Abbott Core Diagnostics experts can help optimize workflows to achieve best in class turnaround times. This capability is supported by a holistic portfolio that optimizes the process from the moment the test is ordered until the moment the result reaches the physician.

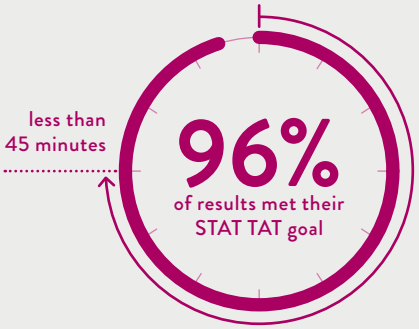
One example of improved test turnaround time comes from Lab Toledo, the leading laboratory in the Caribbean. With support from Abbott, the lab **realized significant workflow efficiencies through the automation of manual steps and result validation.**



As a result, Lab Toledo has achieved an 82% TAT improvement for chemistry and immunoassay testing.[13]

Another example of robust TAT improvement is from Saint Francis Hospital, the primary hub of a not-for-profit multi-hospital network with 95 clinics and urgent care centers across eastern Oklahoma.

Saint Francis evaluated turnaround time with Abbott's End to End Solution for 3 key STAT panels demonstrating that at least **96% of results met their STAT TAT goal of less than 45 minutes** from order to result.[14]



SAINT FRANCIS STAT TAT (TURNAROUND TIME)

Panel / Assay	Mean TAT (min)	Percent Complete in 45 minutes
Basal Metabolic Panel (Run on Alinity and ARCHITECT)	21	98%
Comprehensive Metabolic Panel (Run on Alinity and ARCHITECT)	24	97%
ARCHITECT STAT Troponin-I	28	96%

KEY TAKEAWAYS

1 The outcomes achieved at both Lab Toledo and Saint Francis enable physicians to treat patients with key diagnostic data with **greater expediency.**

2 A retrospective study found correlation between TAT and length of stay (LOS). A mere 1-minute reduction in TAT can **reduce LOS by 30 seconds.**[15] Based on these calculations, it can be estimated that as TAT improvements extend to between 5 and 15 minutes, it is possible to ultimately help free up beds to treat **upwards of 3% more patients.**[15]

3 By taking a personalized approach to understanding laboratory bottlenecks and opportunities for greater operational efficiency, Abbott can help **enhance workflows to support improved patient care.**

START HERE

Key Questions for Your Healthcare Partner

- How quickly and efficiently are we moving patients through the continuum of care?
- Where are we experiencing patient bottlenecks and what are we doing about these bottlenecks today?
- Are we using diagnostic insights to improve the way we triage patients?
- How are laboratory KPIs such as TAT impacting our patient care pathways?

FOCUS AREA 2
EARLY DISEASE DETECTION

Combining proven solutions with multi-disciplinary partnerships and programs to enable efficient identification of undiagnosed patients.

MARKET DATA/TRENDS

Across the globe, healthcare systems continue to struggle with financial sustainability:

Approximately 40% of people who are living with HCV **do not know they are infected,**[16] and 19% of HIV positive individuals are also **unaware of their status.**[17]

In the United States, 1.2 million people are living with HIV. Of these, **14% are unaware of their condition**[18] and therefore at a much higher risk of transmitting the disease to others.

Nearly 75% of people living with HIV who report a history of injection drug use are **co-infected with HCV.**[18]

Why This Matters

- Identifying individuals with unknown disease while successfully enabling treatment is essential for disease containment and prevention.

Per the FDA, treatments today for HCV have cure rates between

90%-100% **in just 12 weeks' time**[19]

Data published by the CDC shows that 59.8% of those receiving HIV medical care can achieve viral suppression for those

≥ 13 years[20]

- Lack of disease awareness and access to appropriate care can significantly impact timely treatment and ultimately lead to **disease spread, high morbidity and even mortality.**
- Early identification of disease conditions coupled with active education can **enhance patient disease awareness** while **identifying new individuals with undetected disease.**

CASE STUDY OUTCOMES

As demonstrated in a case study from the University of Alabama,

opt-out programs can support the identification of undiagnosed patients.[21]

Patients are surveyed in ED with the option not to be tested. For those that do not decline, an HCV and HIV test are performed.

Hepatitis C Virus (HCV) and Human Immunodeficiency Virus (HIV) are underdiagnosed and untreated chronic diseases in that population. Globally, **an estimated 71 million people have chronic HCV[22] and 38 million have HIV,[23] representing major public health burdens.** Lack of disease awareness and access to appropriate care can significantly impact timely treatment and ultimately lead to disease spread, high morbidity and even mortality.

An integrated clinical care team at the University of Alabama at Birmingham (UAB) Hospital sought to change this paradigm by enhancing identification and care for patients with undetected HCV and HIV. The team developed and implemented an **opt-out screening program** within the ED, coupled with **disease-specific care linkage services.**

CASE STUDY OUTCOMES

Active education and physician-level endorsement led to an increased uptake in population screening, resulting in the identification of **2,349 HCV RNA+ individuals and 195 individuals with newly diagnosed HIV infections.**[21]

Dedicated care coordinators facilitated enhanced patient engagement and ensured sustained linkage to care with routine consultation and subsequent confirmation as appropriate. In addition, **99 known HCV positive individuals previously identified by HCV antibody testing were re-engaged for care.**[21]

Implementation of the care coordination and improved access to HCV providers led to a **91%** reduction in the average days between testing and initial medical appointments enabling rapid treatment and reducing overall healthcare costs.[21]

Success Factor: Avoid Biotin Interference For Immunoassays

Biotin sales in the United States climbed to $547 million in 2020, a 15% increase over prior year.[24] This supports a continued trend in the prevalence of biotin as a vitamin supplement. Many assay manufactures use biotin-streptavidin methods which can be impacted by free-biotin and biotin metabolites. A recent Mayo study found that 7.4% of those admitted to the ED had biotin concentrations at or above 10 ng/ml, which is the lowest threshold for causing biotin interference for analyzers used in the study.[25] Per AACC guidelines, laboratories may use various methods to verify suspected interference, including dilution, removal of excess biotin via streptavidin-coated beads, biotin quantification via chromatography and have patients abstain prior to a redraw and subsequent retest. The ideal practice per the guideline is to process a specimen on an assay that does not use biotin in its format.[26]

UAB Success Factors:

- Utilization of highly sensitive HCV & HIV immunoassays enabled early antigen and antibody detection.
- Implementation of opt-out screening for HCV/HIV in the ED identified undiagnosed infections.
- Connected diagnosed individuals to appropriate care and helped reduce future transmission events.
- Care coordinators facilitated enhanced linkage to care, improving health by ensuring patients with identified disease receive care.

FOCUS AREA 2

EARLY DISEASE DETECTION

Mexico is disproportionately affected by liver disease, which among many causes includes HCV.[27] Public awareness of HCV is low. Together with the high cost of testing and low availability of treatments, HCV contributes to high disease-related morbidity and mortality.

Biomédica de Referencia and FundHepa deployed annual HCV awareness campaigns in association with World Hepatitis Day.[28] Print and online advertising alerted the public to free HCV screening. To maximize participation and enable hassle-free testing, screening was made available directly through the laboratory, as well as workplace collection centers.

Sample processing and analysis was performed at Biomédica de Referencia. In HCV antibody reactive samples, viral load was detected using real-time PCR.[28] All screened patients were alerted of their HCV status and provided associated educational materials, with viremic patients directly referred to appropriate medical care.[28]

CASE STUDY OUTCOMES

Over **70,000 individuals** in Mexico were made aware of the complications and risks of HCV.[28]

367 people with detectable anti-HCV antibodies (0.5%) were identified by the program. Among those, 221 were confirmed to have active HCV infections (0.3%).

Identification of individuals with active HCV infections enabled rapid treatment and helped reduce further transmission.[28]

Program success has led to **29 additional companies** and **6 clinical labs across Mexico** joining the initiative with a collective goal of improving public health in Mexico.[28]

Biomédica de Referencia/FundHepa Success Factors

- Strategic use of HCV antibody immunoassays, in combination with reflex testing by PCR for viral load, enabled rapid identification of HCV status.
- Population screening can identify unknown HCV infections in the general population, which includes individuals who otherwise would not have been screened.
- Media campaigns, such as those deployed in conjunction with World Hepatitis Day, can increase disease awareness and play a major role in encouraging people to get tested.
- Cross-disciplinary involvement and strategic partners (such as FundHepa) can amplify education initiatives, follow-up and treatment.

KEY TAKEAWAYS

1. Undiagnosed disease puts additional burden on the healthcare system and more importantly – **people's health.**

2. **Opt-out programs and awareness campaigns** have been leveraged to identify undiagnosed patients.

3. Through early disease identification and treatment, opt-out programs can help increase primary care appointments and reduce visits to emergency departments, resulting in **lower overall healthcare costs.**

4. To effectively facilitate public awareness and drive participation, **early disease detection initiatives** require cross-disciplinary coordination across the laboratory and beyond.

START HERE

Key Questions for Your Healthcare Partner

- How would a dedicated team assist in proactively identifying potential health issues amongst our patient population?
- What best practices should we consider for developing our own blueprint or methodology for developing an opt-out ED program?
- How do we maximize clinician and staff buy-in to ensure optimal results?
- How do we measure the success of our opt-out ED screening program?

FOCUS AREA 3
HUMAN RESOURCES & STAFFING

Automating manual steps to save lab time, reduce costs and increase staff satisfaction.

MARKET DATA/TRENDS

Health systems and labs from across the globe are **struggling to retain and attract medical technologists.**

Labs are seeing significant increases in retirement rates – the retirement rate increased from **9% in 2012** to **17.13% in 2018.**[29]

In the U.S., the expected increase in demand for medical laboratory technologists is **expected to be 7%.**[30]

In the U.K., **only 3%** of surveyed labs said they were sufficiently staffed to meet their needs.[31]

Why This Matters

To accommodate new and increased demand, health systems are paying overtime costs, hiring contractor staff and outsourcing testing work. As a result, labs are saddled with higher staffing costs as they struggle to meet a wide range of testing needs while keeping costs down.

Proven Solutions to Consider

Based on continued staff shortages, optimizing existing staff is one way to ensure that laboratories mitigate unnecessary increases in staffing costs and delays to patient results.

To support staff optimization, laboratories should consider investing in initiatives that support Performance Management and Comprehensive Workflows.

Performance Management

There are several areas within the laboratory which occupy lab technician time but do not necessarily create added value for the health system. These include tasks such as:

- Assessing inventory levels and processing orders
- Performing routine maintenance
- Retrieving and running calibration and quality control materials
- Loading reagents and other testing supplies
- Manually verifying test results

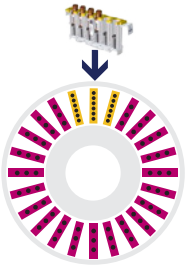
While these processes are often performed manually today, laboratories have the ability to streamline and automate them. This enables staff to dedicate more time to performing more technically demanding activities such as **performing esoteric tests, managing increasing volumes and providing physicians with greater support.**

For example, Navicent, a hospital system serving the central Georgia area in the United States, adopted the **Alinity ci-series** to enable its staff to automate historically laborious maintenance and calibration activities. Upon adoption, hands-on maintenance times have been reduced by 90% as previously manual tasks are automated by the system.[32] The ability to store frequently used calibration materials onboard and have them run automatically as needed has **freed up staff time by 58.5 hours per year,** representing an 80% reduction in time spent managing daily electrolyte calibrations.[32] Abbott's End to End Solution – including automation, informatics, and systems – **positioned Navicent's lab to manage 1.8MM (38% of laboratory volume) tests annually with just two techs during 3rd shift.**[32]

Alinity system allows for onboard storage of QC and calibration materials.

SAVED
58.5
HOURS PER YEAR

AN 80% IMPROVEMENT



BY AUTOMATING ELECTROLYTE CALIBRATIONS

"With the Abbott solution, we have been able to realize several operational efficiencies that have saved our staff precious time. By reducing tasks, we have been able to free staff up to better serve our nurses and physicians, by providing support around result interpretation and ordering processes. In addition, we have also been able to accommodate testing growth with our existing team."

-Christy Holbrook (MT), Chemistry Technical Leader, Navicent

FOCUS AREA 3

HUMAN RESOURCES & STAFFING

Comprehensive Workflows

Most laboratories perform a variety of testing disciplines, such as clinical chemistry, immunoassay, hematology, molecular, urinalysis, microbiology. Historically, many of these disciplines have been run in separate laboratory departments altogether, or at the very least have had distinct workflows. However, by leveraging solutions that cover a range of disciplines and support open 3rd party connectivity,

laboratories can choose analyzers that best fit their needs, streamline processes, and leverage their staff more efficiently.

Centro Hospitalar e Universitário de Coimbra (CHUC) is an academic hospital in Portugal that features 18 disciplines, including oncology, transplant, neurology, and pediatric medicine. Through implementation of Abbott's End to End Solution, CHUC was able to standardize instrumentation and workflows, as well as reduce manual steps and movement within the laboratory.

As a result, CHUC now manages a

25%

increased work volume with no increases in staff count

Implementation of an open automation solution enabled CHUC to increase samples processed on the automation track increased from

9%-100%

ADDITIONAL SUCCESSES FROM ACROSS THE GLOBE

By working with laboratories across the globe, Abbott has identified insights through data and detailed workflow analyses to support solutions and processes that increase operational efficiency.

Serbia – The Clinical Center of Serbia, the country's largest healthcare provider, automated inventory management through Abbott's AlinIQ IMS (Inventory Management System) **reducing hands on time by the equivalent of 4.5 full time employee weeks.**[34]

Russia – The Center for Molecular Diagnostics in Moscow was **able to increase the number of samples processed per day with existing staff by 4x.** This was enabled by automating verification of results using Abbott's AlinIQ AMS.[35]

Vietnam – Medic-Lab, based in Ho Chi Minh City, **was able to reduce time needed for routine manual tasks (bulk solution and reagent replenishment) by 645 hours annually** – or the equivalent of 16 FTE weeks – through the implementation of Abbott's next generation Alinity ci-series systems.[36]

KEY TAKEAWAYS

1. Optimization of existing staff is a first step in fighting staffing shortages, increases in staffing costs and delays to patient results.
2. Health systems should consider supporting staff optimization initiatives with Performance Management and Comprehensive Workflow solutions.
3. Automation of time-consuming manual tasks is essential to delivering better clinical care while addressing a host of operational inefficiencies.

START HERE

Key Questions for Your Healthcare Partner

- How am I addressing the staffing shortage in my laboratory today?
- What tasks are my staff currently performing that have been streamlined or further automated in other laboratories?
- How can automation and streamlined workflows help our laboratory attract and retain talent?

FOCUS AREA 4
COST SAVINGS

Finding new ways to help health systems and laboratories reduce expenditures while increasing operational efficiency and improving the quality of integrated care.

MARKET DATA/TRENDS

Across the globe healthcare systems continue to struggle with financial sustainability:

- In the UK, the underlying deficit for hospital trusts was **5 billion pounds in 2018.**[37]
- Many health systems are operating on razor thin margins that are declining. For example, in the Netherlands, top hospitals are achieving **operating margins of just 1.8%** — even after dramatic cost optimization initiatives.[38]
- In 2017, the Protecting Access to Medicare Act (PAMA) was passed in the U.S, aiming to drive reduced laboratory spending by **reducing testing reimbursement up to 15% YOY.** [39]

Why This Matters

Today's health systems face an aging population, increasing patient volumes and rise in chronic illnesses, all leading to growing costs. Dramatic change is needed to address budget and reimbursement challenges across the globe. The laboratory can support cost reductions by becoming more efficient. More importantly, the lab can be leveraged to reduce the overall cost of care by aiding in patient diagnosis and monitoring.

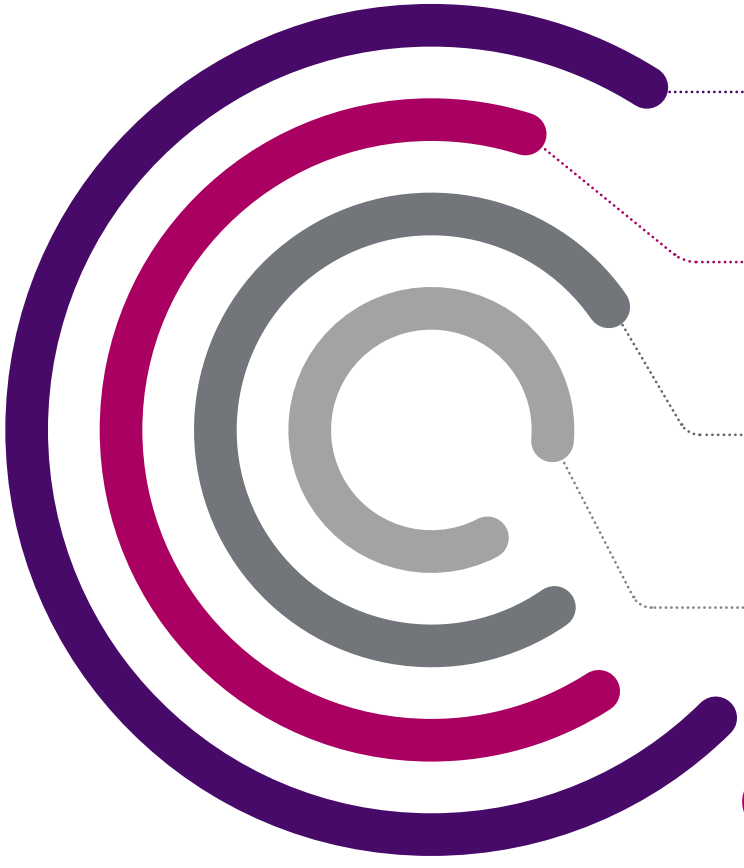
"The laboratory can support cost reductions by becoming more efficient. More importantly, the lab can be leveraged to reduce the overall cost of care by aiding in patient diagnosis and monitoring."

PROVEN SOLUTIONS TO CONSIDER

ABBOTT'S END TO END SOLUTIONS enables laboratories to reduce expenditures within their own four walls and to a great degree throughout the entire health system. Within the lab, savings have been realized through more efficient supply chain management, reduced consumption of consumables and decreased waste. The ripple effect of laboratory cost savings can significantly impact the overall cost of care, with contributions being realized in reductions in length of stay and improved patient management.

Laboratory Savings

As testing menus continue to grow, laboratories are being tasked with managing increasingly complex supply chains. **Saint Francis Hospital,** a 1,112-bed not-for-profit health system, implemented Abbott's AlinIQ IMS to support improved management of inventory through Radio Frequency Identification (RFID) and Electronic Data Interchange (EDI) technology. Automating inventory management led to a reduction in non-value add tasks, expired products and unnecessary shipping costs that **saved $169,000 annually.**



$68,300
per year savings from reduced inventory error rate[41]

$38,600
per year savings in cycle count costs[41]

$35,100
per year savings from drop in handling time[41]

$26,600
per year savings by reducing overnight shipping[41]

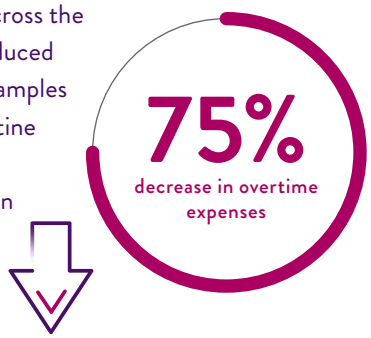
$169k
annually saved

In Beirut, Lebanon, Abbott's End to End solution helped **Clemenceau Medical Center (CMC)** achieve significant laboratory cost savings through increased operational efficiencies.

Improved assay quality and reduced aspiration volumes contributed to a

40% **decrease in Quality Control consumption.**[40]

Additionally, time saved across the laboratory (inclusive of reduced handling of reagents and samples and less time spent on routine maintenance) led to more efficient resource utilization **– reducing overtime expenses by 75%.**[42]



Health System Savings

The laboratory can play a key role in ensuring the prudent treatment of patients. **The Centers for Disease Control and Prevention (CDC)** estimates that 30% of all antibiotic prescriptions are unnecessary.[43] Health systems that employ an evidence-based procalcitonin protocol can guide the effective and appropriate use of antibiotics. For example, Swedish Hospital (formerly Swedish Covenant Hospital) in Chicago found that by implementing a standardized, evidence-based PCT criteria in concert with an antibiotic stewardship program led to a number of success factors:

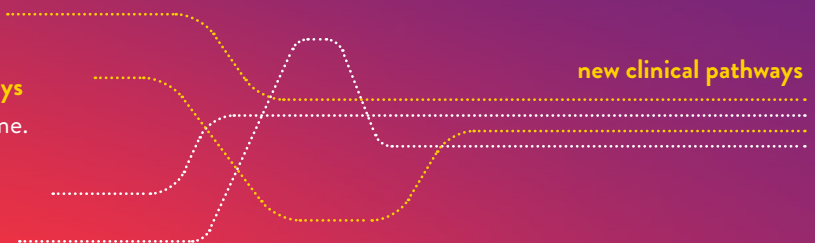
2.8% **increase** in the number of patients safely discharged

reduced total costs by **$2,759** **(US Dollars)**[44] per ICU patient with sepsis

Antibiotic Stewardship Program Success Factors

- Procalcitonin is a proven biomarker for antibiotic stewardship in a variety of settings including the ED, ICU, and NICU (Neonatal ICU).[45,46,47]
- Strategies that employ evidence-based pathways using procalcitonin for antibiotic stewardship have shown to be both safe and cost-effective.[44,45,46]
- Interdisciplinary, cross-functional teams are essential in ensuring activation of evidence-based pathways for appropriate antibiotic therapy and the betterment of health in patients with infection and sepsis.[43]

As previously highlighted, Royal Wolverhampton National Health Service expedited patient care through the implementation of **new clinical pathways** for patients with suspected acute coronary syndrome. In addition to the metrics previously addressed, such as reduction in the length of stay (LOS), the hospital **reduced expenditures by £788,000.**[13]



KEY TAKEAWAYS

1. Laboratories have significant opportunity to automate manual activities and **reduce unnecessary waste** by adopting holistic solutions.
2. Health systems and laboratories can invest in initiatives that not only **reduce costs** but also **improve patient care.**
3. Having the right solution in place can help laboratories **decrease expenditures** through reduced staffing expenses (overtime), quality control costs, utilities, consumables and biohazardous waste.

START HERE

Key Questions for Your Healthcare Partner

- How do we identify the most impactful areas for cost reduction?
- Are we able to reduce costs while broadening our quality of care?
- How should we measure the success of these initiatives?

FORMULATING YOUR **TRANSFORMATION PLAN**

Pulling It All Together

A multi-faceted approach is needed to address increasingly complex healthcare pressures.

Taking measures that address both operational excellence and integrated clinical care to enable health systems is the key to achieving an effective multi-faceted approach.

All efforts must be strategically designed in order to position health systems to improve the level of integrated clinical care to patients at lower costs.

This Is Where It Begins

Transformative change can start with one great conversation. To initiate that conversation, here are three overarching questions to explore internally and with your lab diagnostic partner:

- How do I develop a three-year lab strategy that ties into corporate metrics, such as patient satisfaction and lower readmission rates?
- What is the best way to facilitate collaboration with physicians on test results and complex cases to help deliver clinical insights for better outcomes?
- How do I aggregate data from the lab to generate insights and proactively share those insights across functions?

About Core Diagnostics at Abbott

At Abbott, 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**

SOURCES

1. Abbott-sponsored study conducted by Ipsos Healthcare across 14 countries amongst hospital-based physicians, clinical laboratory directors, hospital leaders and patients. 2017. Detail available upon request.
2. Long EF, Mathews KS. The Boarding Patient: Effects of ICU and Hospital Occupancy Surges on Patient Flow. *Production & Operations Management*. 2018;27(12):2122-2143. doi:10.1111/poms.12808
3. Bed Occupancy in the NHS. British Medical Association. Accessed October 6, 2021. Bed occupancy in the NHS - Pressures - BMA
4. RJ Salway et al. Emergency Department (ED) Overcrowding: Evidence-Based Answers to Frequently Asked Questions. *Revista Médica Clínica Las Condes*. March-April 2017;28(2):213-219
5. Paraguassu, Lisandra, et al. Brazil hospitals pushed to limit as COVID-19 death toll soars. Reuters. 2021 March 11. https://www.reuters.com/article/us-health-coronavirus-brazil/brazil-hospitals-pushed-to-limit-as-covid-19-death-toll-soars-idUSKBN2B32F6 . Accessed October 15 2021.
6. Rasouli, H.R., et al. RH. Challenges, consequences, and lessons for way–outs to emergencies at hospitals: a systematic review study. *BMC Emergency Medicine*. Published online October 20, 2019.
7. Pines JM, et al. The association between emergency department crowding and adverse cardiovascular outcomes in patients with chest pain. *Acad Emerg Med*. 2009 Jul;16(7):617-25.
8. Roth MD MPH G., et al, Global Burden of Cardiovascular Diseases and Risk Factors, Update from the GBD 2019 Study. *Journal of the American College of Cardiology*. 2020;76(25):40.
9. Hsia RY, Hale Z, Tabas JA. A National Study of the Prevalence of Life-Threatening Diagnoses in Patients with Chest Pain. *JAMA Intern Med*. 2016;176(7):1029–1032. Doi:10.1001/jamainternmed.2016.2498.
10. Rubini Giménez M, et al. Rapid rule out of acute myocardial infarction using undetectable levels of high-sensitivity cardiac troponin. *Int J Cardiol*. 2013 Oct 9;168(4):3896-901.
11. Integrated Clinical Care Strategy Improves Emergency Patient Flow, The Royal Wolverhampton NHS Trust.
12. Increased Detection of Acute Myocardial Infarction in Women Using Sex-Specific Upper Reference Limits in Clinical Pathways for Patients Presenting with Suspected Acute Coronary Syndrome. Kokilaben Dhirubhai Ambani Hospital & Medical Research Institute, Mumbai, India
13. Case Study: Lab Toledo, Achieving Strategic Agility with the Abbott Total Solution.
14. Case Study: Saint Francis Hospital, Realizing Network Efficiency Through the Abbott Total Solution.
15. Kaushik N, et al. Reduction in laboratory turnaround time decreases emergency room length of stay. Open Access Emerg Med. 2018 Apr 20;10:37-45.
16. https://www.hhs.gov/hepatitis/learn-about-viral-hepatitis/hepatitis-c-basics/index.html. Accessed May 24, 2021.
17. UNAIDS. *Seizing the Moment, Tackling Entrenched Inequalities to End Epidemics; Global AIDS Update, 2020*; 2020.
18. https://www.hiv.gov/hiv-basics/overview/data-and-trends/statistics. Accessed May 24, 2021.
19. Hepatitis C Treatments Give Patients More Options. https://www.fda.gov/consumers/consumer-updates/hepatitis-c-treatments-give-patients-more-options. Accessed October 7, 2021.
20. Selected National HIV Prevention and Care Outcomes. National Center for HIV/AIDs, Viral Hepatitis, STD and TB Prevention. https://www.cdc.gov/hiv/pdf/library/slidesets/cdc-hiv-prevention-and-care-outcomes.pdf. Accessed October 7, 2021.
21. Enhanced Identification and Care for Patients with Undetected HCV and/or HIV via Opt-Out ED Screening with Active Education and Linkage to Care. University Alabama Birmingham Hospital Birmingham, Alabama.

SOURCES

22. https://www.who.int/news-room/fact-sheets/detail/hepatitis-c. Accessed July 18, 2020.

23. https://www.who.int/news-room/fact-sheets/detail/hiv-aids. Accessed July 18, 2020.

24. Nielsen data on file at Abbott.

25. Katzman BM et al, *Clinical BioChemistry*, 2018;60:11-16.

26. https://www.aacc.org/science-and-research/aacc-academy-guidance/biotin-interference-in-laboratory-tests.

27. Méndez-Sánchez, N, et al. Current trends of liver cirrhosis in Mexico: Similitudes and differences with other world regions. *World J Clin Cases*. 2018 Dec 6;6(15):922-930. doi: 10.12998/wjcc.v6.i15.922.

28. Improving Population Health Through Screening for Hepatitis C to Enable Treatment for Undetected Viral Infections, Biomédica de Referencia, México City, Mexico.

29. Edna Garcia E al. The American Society for Clinical Pathology's 2016-2017 Vacancy Survey of Medical Laboratories in the United States. *American Journal of Clinical Pathology*. 2018;149(5):387–400.

30. https://www.bls.gov/ooh/healthcare/clinical-laboratory-technologists-and-technicians.htm#tab-6tch.

31. *Meeting Pathology Demand; Histopathology Workforce Census*.; 2018. https://www.rcpath.org/uploads/assets/952a934d-2ec3-48c9-a8e6e00fcdca700f/Meeting-Pathology-Demand-Histopathology-Workforce-Census-2018.pdf.

32. Case Study: Navicent Health, Achieving Sustainable Growth Through Continuous Improvement.

33. Case Study: Centro Hospitalar e Universitário de Coimbra (CHUC), Optimizing Operational Efficiencies Through Implementation of Total Abbott Solution.

34. Case Study: Clinical Center of Serbia, Improving Turnaround Time and Stakeholder Satisfaction.

35. Case Study: Center for Molecular Diagnostics, Central Research Institute of Epidemiology.

36. Case Study: Medic-Lab, Achieving Sustainable Growth as a Result of the Abbott Total Solution.

37. Full Fact Team. Spending on the NHS in England. Full Fact. Published July 9, 2019. Accessed June 3, 2021. https://fullfact.org/health/spending-english-nhs/.

38. Allen S. 2020 *Global Healthcare Outlook*. 2019. https://www2.deloitte.com/content/dam/Deloitte/za/Documents/life-sciences-health-care/za-2020-global-health-care-outlook.pdf. Based on Deloitte analysis of hospital annual reports.

39. https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/ClinicalLabFeeSched/PAMA-Regulations. Accessed May 24, 2021.

40. Saint Francis Health System About Us. https://www.saintfrancis.com/about-us/. Accessed October 11, 2021.

41. Data on file at Abbott.

42. Case Study: Clemenceau Medical Center (CMC), Achieving Operational Excellence Through Improved Resource Utilization.

43. https://www.cdc.gov/media/releases/2016/p0503-unnecessary-prescriptions.html.

44. Personalized Antibiotic Therapy for Reduced Inappropriate Exposure to Antibiotic, Swedish Covenant Hospital, Chicago, IL

45. Balk RA, et al. Effect of Procalcitonin Testing on Healthcare Utilization and Costs in Critically Ill Patients in the United States. *CHEST*. 2017;151(1):23-33.

46. Stocker M, et al. Procalcitonin-guided decision making for duration of antibiotic therapy in neonates with suspected early-onset sepsis: a multicentre, randomised controlled trial (NeoPIns). *Lancet*. 2017;390:871-881

47. Zhou H, et al. The risk stratification and prognostic prediction value of procalcitonin and clinical severity scores on patients with community-acquired pneumonia in emergency department: Prediction value of procalcitonin and severity scores for CAP. *Am J Emerg Med*. 2018 Mar 21. pii: S0735-6757(18)30242-0. doi: 10.1016/j.ajem.2018.03.050.

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