

Managing your laboratory with 20/20 vision

The Advanced Technology Laboratories (ATL) at Spectrum Health needed to capitalize on their opportunities and navigate their risks with certainty. By enhancing their ability to evaluate potential changes in their environment and accurately and reliably monitor their current performance, they effectively achieved 20/20 vision on various performance scenarios.

SPECTRUM HEALTH

Think Lab. Think LTS

Abbott



About the client

Spectrum Health

Spectrum Health is an integrated health system, with an award-winning health plan, teams of nationally recognized doctors and providers, and a network of hospitals and care facilities spanning 13 counties in West Michigan. Spectrum Health is fortunate to have the ATL in West Michigan. It is very rare to have three specialized laboratories (molecular, flow cytometry and cytogenetics) under one roof in a hospital setting. While it can take days to weeks for most hospitals to get results, the ATL can provide results in hours, which can be critical to patient care. That's why we provide diagnostic testing for health care providers across the country, as far away as California.

SPECTRUM HEALTH

Project Participants

LTS Health

Over the past two decades, LTS Health has been involved in improving laboratory performance in more than 35 countries around the world. LTS Health has established itself as an independent, leading provider of diagnostics performance solutions. We have accomplished this by providing a unique combination of laboratory performance consulting, technology and learning products.

Think Lab. Think LTS

Abbott Molecular

As a leader in molecular diagnostics and the analysis of DNA, RNA and proteins at the molecular level, Abbott Molecular has more than 1,000 employees dedicated to manufacturing and marketing more than 450 products worldwide in more than 130 countries. Abbott is committed to advancing molecular testing solutions that guide life's most profound decisions.

Abbott

Background

Laboratories face a major challenge: ensuring that a planned project achieves expected results.

For this reason, Abbott piloted Performance Assurance with Spectrum Health Advanced Technology Laboratories (ATL) in Grand Rapids Michigan. Abbott Performance Assurance is made possible by PinpointBPS®, which is a performance improvement platform developed by LTS Health. PinpointBPS® allows a laboratory to test the impact of any changes on performance, ensuring that the right decision is made at the outset and that a project accomplishes its full potential. It achieves this by documenting laboratory processes and activities in great detail and enables the simulation of complex changes to a laboratory with great accuracy.

The Spectrum Health ATL molecular diagnostics laboratory was selected as the main area of focus. This laboratory performs more than 35,000 tests a year for cancer studies and infectious disease testing, including molecular biomarkers for cancer treatment, human papilloma virus, hepatitis B, hepatitis C, CT/NG and more. In addition, Spectrum Health ATL molecular diagnostics laboratory provides genetic testing for Huntington's disease and cystic fibrosis.

The following summary showcases the successes, learnings and findings achieved through this initiative, which started late in 2015.



Kim Collison

Director of Laboratory Services
Advanced Technology Laboratories
Spectrum Health
Grand Rapids, Michigan

"The LTS team came into the lab with knowledge of lab processes unlike other improvement consultants we have seen in the past. They truly understood process, were extremely perceptive and very knowledgeable regarding data analytics."

"When I refer to a partner, it's a resource for education and expertise. Having a partnership with Abbott allows us to rely on their team. Spectrum Health alone can't do it all to meet the needs and requirements of our patients."

Benefits

SPECTRUM HEALTH

Key laboratory improvements

Timely result reporting was highlighted as a critical need, as it requires a significant number of resources, rules and other variables to operate in harmony. By navigating the complexities in workforce and process management for the molecular laboratory, a number of improvements were reported.



Accurate resource capacity planning

"The laboratory modeling capability of the service enabled us to accurately determine the latent capacity of our resources. With this information we could defer additional Full Time Equivalent (FTE) appointments, reducing potential costs. This data empowers us to engage with management on investment opportunities based on fact."

New technology with existing staff

"We needed to know our capacity to determine if we could bring on Human Leukocyte Antigen (HLA) testing using our existing staff. Utilizing the Performance Assurance Report and the PinpointBPS® modeling, we were able to determine that we could utilize existing staff to perform testing for the HLA laboratory start-up."

Covering all the bases

"As Next-Generation Sequencing (NGS) testing increased, we were struggling with how to schedule staff so all the areas of the laboratory were adequately covered. Reviewing latent capacity and Turnaround Time (TAT) targets we developed a new staffing model based on pods rather than individual tests."

Process-driven TAT reduction

"We had spent the last year working on a multi-departmental performance improvement project to reduce our overall TAT for HPV testing. The Laboratory Information System (LIS) data and process modeling identify the delays in specimen handling prior to specimen arrival in our laboratory."

Planning for the future

"This process modeling provides us with data-driven foresight to quantify the future impact of decisions. We can see latent capacity of both people and instrumentation that helps us clarify expectations versus reality. We could easily determine if the increase in volume of a test would negatively impact the TAT of other tests on that instrument and how it would affect staffing."

- Kim Collison

Director of Laboratory Services
Advanced Technology Laboratories
Spectrum Health
Grand Rapids, Michigan

The Intervention

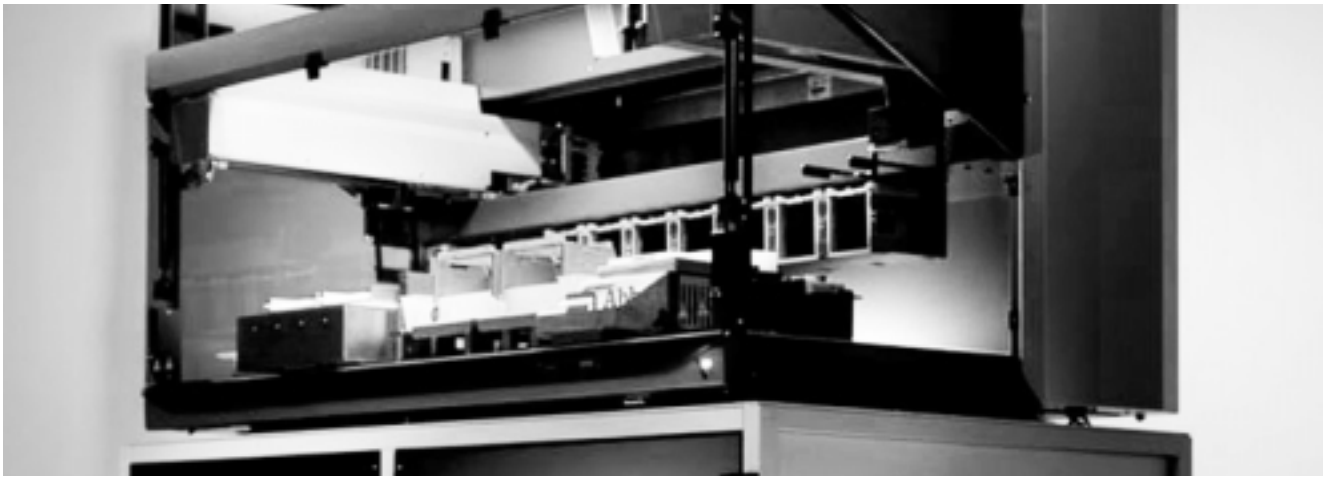
How it was done

Through Abbott's Performance Assurance offering, Abbott Molecular worked with LTS Health to identify and develop six critical performance scenarios. These scenarios accurately depict how changes to the laboratory would affect performance. Abbott involved LTS Health to conduct the analysis and ultimately provide Spectrum Health with a detailed Performance Assurance report.

To provide an accurate view on the different performance scenarios for Spectrum Health, LIS data analysis and laboratory process modeling were executed through the implementation of PinpointBPS®, a laboratory performance management platform developed by LTS Health.

The initiative journey involved the following actions by the LTS consulting team:

1. Identified the different scenarios or issues in the laboratory that needed resolution. Clearly defined each scenario in terms of context, KPIs (key performance indicators) and laboratory variables.
2. Documented laboratory processes in detail in a standardized format and acquired representative LIS data.
3. Structured and cleansed the LIS data and established current-state performance metrics.
4. Created a validated, virtual model of the laboratory and investigated the impact of each defined performance scenario.
5. Documented the outcomes and scenario KPIs in the Performance Assurance Report.
6. Advised to continuously monitor actual performance data and test new scenarios by modeling them in PinpointBPS®.



The facts and figures

Investigating the scenarios

After cleansing and validating the process model, a simulation of the ATL molecular laboratory operation was created using the process map as logic, resource data (workforce and equipment) as capacity and actual LIS arrival data as workload.

The following scenarios were part of this pilot, and the outcomes are documented below:

HLA Laboratory

The ATL was performing a feasibility study to establish HLA typing capability within the current molecular laboratory. The existing NGS laboratory volumes had been increasing steadily over the last year with additional protocols being added continuously. The question was asked: Can existing NGS staff cover the HLA typing volume?

Outcome: Using resource data, workforce utilization analytics, the HLA process design and expected service performance, the answer was that existing NGS staff should be capable of handling the ramp-up period for HLA typing. Additional staff would only be required if operational volumes increased. The original assumption was that a dedicated HLA laboratory would be required.

Hepatitis clinic

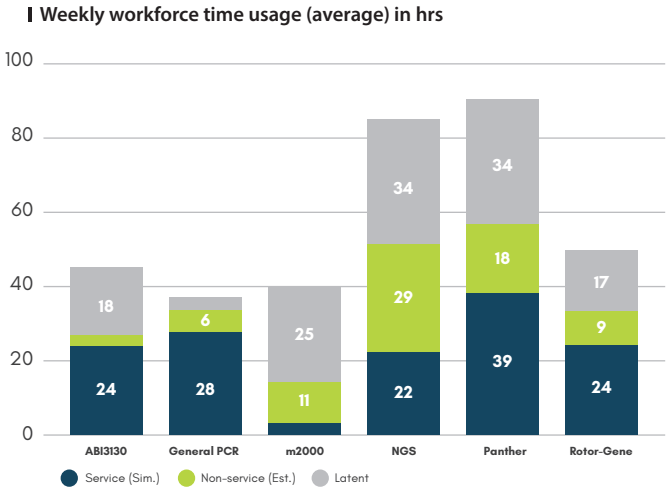
The volume of hepatitis requests is expected to increase in the future if the hospital ramps up clinic operations. The question was asked: At what increased volume will laboratory performance be affected negatively?

Outcome: A sensitivity analysis was performed with hepatitis volumes increased in increments of 25 percent with existing resources and processes applied. Due to the high throughput capacity of the Abbott *m*2000 systems, it was established that even a 100% increase in volume would not have a negative impact on service delivery, and staff utilization would remain at acceptable levels. Armed with this information the ATL is actively seeking opportunities in the market to push hepatitis and other associated volumes to the laboratory.

Impact of interfaced resulting

No automated result interfacing between analyzers and LIS is applied in the ATL molecular laboratory. The question was asked: Will there be an impact on resourcing and TAT performance given automated result interfacing?

Outcome: The motivation for interfacing should not be hands-on savings, which showed to be minimal as the laboratory does not apply complicated rules or algorithms to technical results. It was recommended that the highest volume instruments be interfaced to improve quality through the reduction of transcription errors.



HPV arrival logic

It is suspected that processes within cytology and central receiving are delaying the forwarding of samples to molecular, which has a negative impact on TAT performance. The question was asked: Can the handling time of HPV specimens be reduced, thereby improving TAT metrics?

Outcome: An analysis of pre-analytical processes outside the molecular laboratory jurisdiction revealed that the overall process (TAT performance) is not affected by the PAP processing in cytology or HPV processing in central receiving. The uncertainty of where an HPV sample was received was causing the variability, as the same timestamp could be generated at two locations. The solution was to implement an additional receiving location and associated timestamp in the LIS to enable accurate tracking of HPV arrivals throughout the process.

Staff allocation

The rotation of staff between molecular work areas, inclusive of NGS, is impacting clinical performance in certain areas, and supervisors are routinely performing work in the laboratory instead of managerial responsibilities. The question was asked: What is the proper staff schedule to execute the work and not negatively impact performance?

Outcome: The erratic nature of hands-on staff intervention in most molecular diagnostics processes created an opportunity for smoothing of general workforce utilization. The solution was to combine the management of complementary work areas into pods. With this change, peak area utilization was reduced by 12 percent, improving throughput reliability, skills development opportunities and general workforce morale. Specific scenarios were tested, reducing staff numbers to simulate absenteeism and test staff reallocations. Scenarios with limited service delivery impact and acceptable staff workload were selected. With this knowledge, a detailed reallocation plan was set up based on every workforce eventuality.

Automation in sample preparation

The question was asked: Will the application of an automated liquid handler to perform sample preparation for certain assays have a positive impact on staff utilization?

Outcome: The technical feasibility of implementing a multipurpose liquid handler to handle sample preparation for certain assays was discussed at length within ATL prior to the intervention. By modelling the implementation of the proposed system, ATL was in a position to definitively decide not to go ahead with the implementation of the system. The implementation would only become financially feasible and yield positive workforce utilization benefits if all infectious disease samples were prepared on the system.



From project to partnership

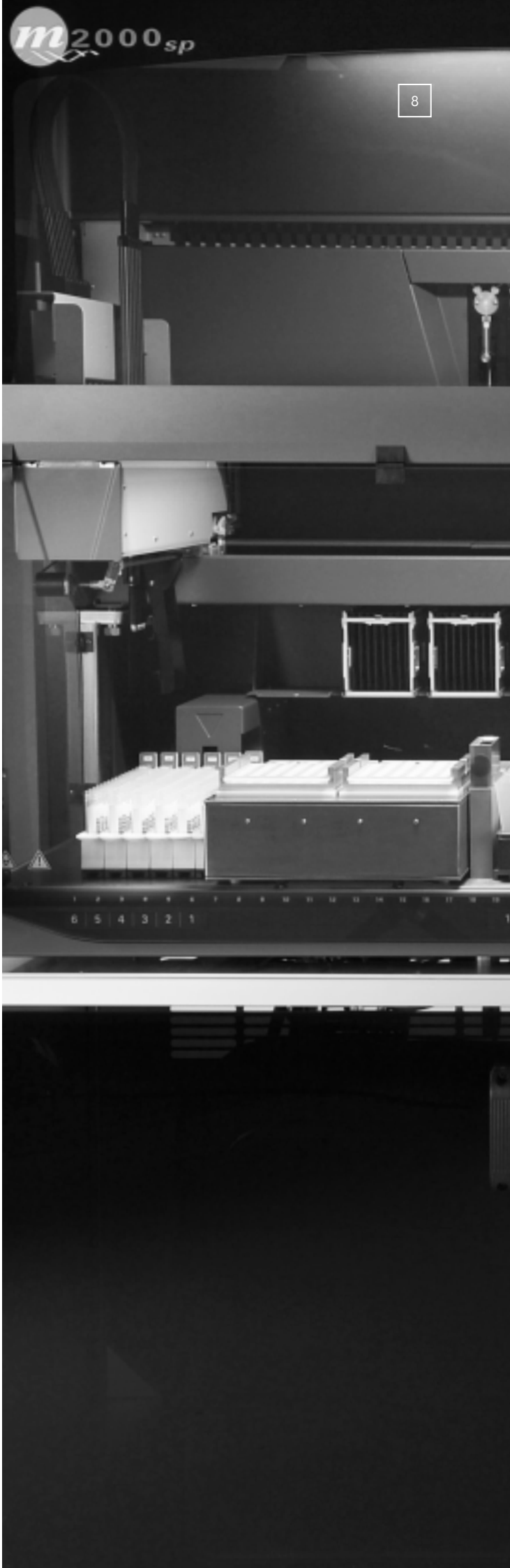
Taking the journey together

The in-depth investigations, documentation, collaborative discussions and fact-based decision-making truly transformed the mindset of the Spectrum Health ATL stakeholders. The laboratory is now in a position to approach problem-solving and improvement initiatives from a position of certainty.

Since the completion of the project, Abbott, LTS Health and Spectrum Health ATL teams continue to engage on a weekly basis to review recent performance metrics and discuss opportunities for improvement or alleviation of pain points.

Many conventional third-party improvement projects result in a printed report on someone's desk with the ideas of a consultant imposed on the laboratory stakeholders. This project was different in its collaborative approach and the practical recommendations that stemmed from it.

The collaborative Performance Assurance approach applied at ATL created an environment of clarity and empowerment where all stakeholders were able to participate, collaborate and innovate toward reducing risk in decision-making, and improving laboratory operations and service delivery.





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