

Optimizing lab operations through digitized processes

with **cobas®** infinity lab solution

Case study of Burjeel Holdings GCC



Synopsis

Burjeel Holdings is a healthcare provider in the Gulf Cooperation Council (GCC), established in delivering specialized care for complex therapies.¹ Burjeel Holdings has 13 hospitals, taking care of over 4.3 million patient visits. coLAB Services operates and manages for the Burjeel Holdings laboratories more than 10 million tests a year. The high volume of patients and tests placed unique challenges for Burjeel Holdings, specifically, for their operational efficiency, testing capacity and quality. Before using cobas® infinity laboratory solution (cobas® infinity lab), Burjeel Holdings largely followed manual approaches and had lots of pain points. In the legacy process, the local staff needed to manually identify samples and enter data into the local Laboratory Information System (LIS) for transcription in addition to handling transcription errors. All the manual processes led to high FTE costs, were error prone, and resulted in longer turnaround time (TATs). Hospital leadership urgently wanted to identify a solution to transform their manual processes to digitization, starting with laboratory sample management. After thoroughly assessing laboratory applications across the industry, they chose cobas® infinity lab, because it offered advanced end-to-end sample management capabilities with a high degree of interoperability and data aggregation. cobas® infinity lab allowed information to flow seamlessly within the network, including the twelve clinical laboratories and four different health information systems.

cobas® infinity lab was implemented at Burjeel Hospital Abu Dhabi Lab in September 2021. Three months after implementation, evaluation teams assessed the performance of cobas® infinity lab with a combined qualitative and quantitative approach. After mapping out the workflows in the legacy approach (using the manual process) and the workflow after implementing cobas® infinity lab, they found that the new process was much more streamlined, and the number of key tasks were reduced by 69% (page 6).*

For the quantitative evaluation, the Burjeel evaluation team collected TATs for all tests extracted a month before and a month after implementing cobas® infinity lab. A comparison of the median TATs before and after implementation revealed that the median TATs across all 114 tests on average were reduced by 46%.

For some tests (e.g. Testosterone calculated Panel), the reduction was as much as 93%. The reductions in TATs were statistically significant (page 8).

“When consolidating, making changes in the health information system (HIS) was a mammoth exercise and included multiple stakeholders. We wanted to create a common workflow across all our labs to drive efficiency and improvement without necessarily changing the HIS and cobas® infinity lab enabled us in doing so. With cobas® infinity lab we were able to consolidate more tests in a centralized location. The time saved in pre-analytical processes helped us compensate for the transportation time, ultimately reducing the overall TAT.”

Mr. Mayur Sabhani | Group Director Burjeel Holdings

¹Individual lab results may vary, and testimonials are not claimed to represent typical results. All testimonials are real participants, and may not reflect the typical purchaser's experience, and are not intended to represent or guarantee that anyone will achieve the same or similar results.

As a result of these significant benefits from **cobas® infinity lab**, Burjeel Holdings has begun a full lab operations digital transformation with the support of the Roche portfolio. The **cobas® infinity lab** manager now provides multi-site integration to consolidate care across their 3 hospitals by streamlining process efficiency, reducing expenses and increasing diagnostic services.

Background

Founded in 2007, Burjeel Holdings (erstwhile VPS Healthcare) evolved into a quaternary care provider, with a growing presence in Oman and Gulf Cooperation Council. The facility provides world-class healthcare services and facilities to patients, visitors and residents. Burjeel Holdings has over 1200 doctors, 13 hospitals, 1600 beds, 69 operation theaters and takes care of over 4.3 million patient visits per year. Their laboratories are managed by a subsidiary, coLAB Services, which conducts through its 250 plus laboratory staff (clinical and administrative) around 10 million tests a year.

The legacy procedure for running this large volume of testing before **cobas® infinity lab** entailed staff manually completing a number of pre and post-analytical tasks, which were physically and mentally demanding, required high manpower cost and were error-prone. After sample collection, staff packed all the tubes individually together with the clinical order, then a courier transported the samples to the laboratory. Upon arrival at the laboratory, a technician checked each specimen one-by-one and documented them in a log sheet. Afterwards, a technician entered the information into the Electronic Medical Record (EMR) to register the sample and print a label for each specimen. After completing the sample arrival process, the samples were then processed using various instruments and methods. Once ready, the results were then be reviewed and validated by the laboratory professionals in the Laboratory Information System (LIS). The last step was to generate a report including all the test results, which were then sent back to the physicians.²

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“The digital transformation of laboratory process helped us unlock efficiencies in our network and better use our resources. Ultimately, it enabled us to in expand our service line. Another benefit for our clinical colleagues, is that we now deliver the test results digitally, facilitative easier consultations.”

John Sunil | CEO Burjeel Holdings

Because the laboratory process was manual, complex and time consuming, Burjeel Holdings wanted to improve process efficiency to deliver more specialized care for its patients. When the team conducted a thorough assessment of the operations to understand the change implications on each personnel, they quickly realized that an advanced laboratory process manager could be built on the existing EMR and LIS, in order to avoid a complete change of their IT solution.

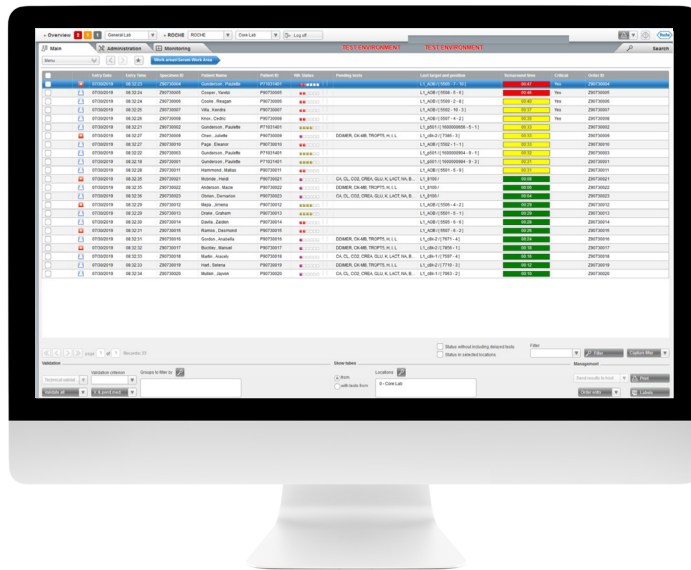


Figure 1:
One example of a validation screen in **cobas® infinity** laboratory solution. It is intuitive and easy to use.

Implementation of cobas® infinity lab solution

coLAB team at Burjeel holdings implemented **cobas® infinity lab** at Burjeel Medical City. **cobas® infinity lab** a laboratory process management solution that, integrated the existing IT infrastructure and connected different health information systems. It has been shown to be highly competent, enabling seamless integration between data producers and consumers, while at the same time being easy to use and understand (Figure 1). **cobas® infinity lab** streamlined information management as it provided laboratory personnel with relevant information at all times with an interface for alerts, required actions and system overview. Laboratory personnel could simply navigate the platform, with the support of task notifications. What has been unique with the **cobas® infinity** process manager is that it not only integrated sample processes from order to result, and from pre-analytics to archiving, it also has been completely browser based, allowing users to access and use the software from any desktop computer.

In addition to driving intelligent sample processing, **cobas® infinity lab** efficiently managed the samples with the advanced workflow engine integrating the process, from ordering to test result, with paperless reports. After sample processing, structured options for both manual and automatic archiving have been available for a defined period. It deliver orchestrated all the lab processes and enabled a personalized automation for enhanced operations in all different types of laboratories from low to high-volume output.

Automation of manual tasks and streamlined workflows

The implementation of **cobas® infinity lab** demonstrated increased laboratory efficiency within and across departments.³ With a simple scan, laboratory personnel sent data directly to electronic medical record systems. Leveraging the tight integration between **cobas® infinity lab** and **cobas® infinity POC** solution, diagnostic devices could easily be managed and connected to the, eliminating the need for manual documentation tasks such as order entry printing, logging, result management, quality control, etc.

Furthermore, lab personnel no longer had to ensure that samples were manually identified and entered into the system. With the significant reduction in clerical steps because of automation, lab personnel and could now work on more complex duties. Standalone automation delivered enhanced transcription error handling, safety and process quality with an intelligent and customizable sample distribution.

The end-to-end process manager enabled full traceability of samples regardless of it being processed manually or automatically; lab personnel could now easily determine where the sample was, where it has been and where it was going. Maximizing the availability of the software solution leveraging the proactive maintenance capabilities in addition to the advanced remote troubleshooting features bolstered business continuity.

“Samples are now ready for immediate processing and sent to Central lab, as we only have to sort the samples at the phlebotomy location.”

Phlebotomy Team



Figure 2: Example of patient samples sorted and packed in a specimen bag, prior to being sent to the laboratory.

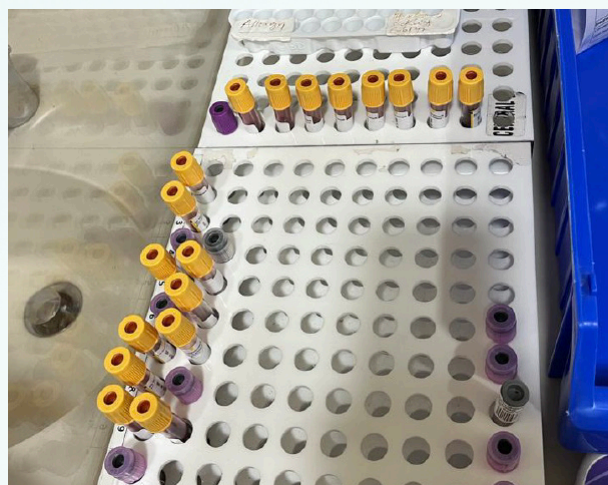


Figure 3: Example of samples sorted into automation racks at the time of sample drawing, before being sent to the lab.

After implementation of **cobas® infinity lab**, the automation of pre-analytic tasks resulted in faster sample reception registration procedures, including arrival registration and sample review. Pre-implementation sample arrival registration time was on average 31.6 seconds (SD = 21.5), ranging from 4 seconds to 52 seconds based on observations of 5 consecutive samples.

▶ **After the implementation of cobas® infinity lab arrival registration time was reduced to 9.0 seconds on average (45 seconds total for 5 consecutive samples), resulting in a 72% reduction.**

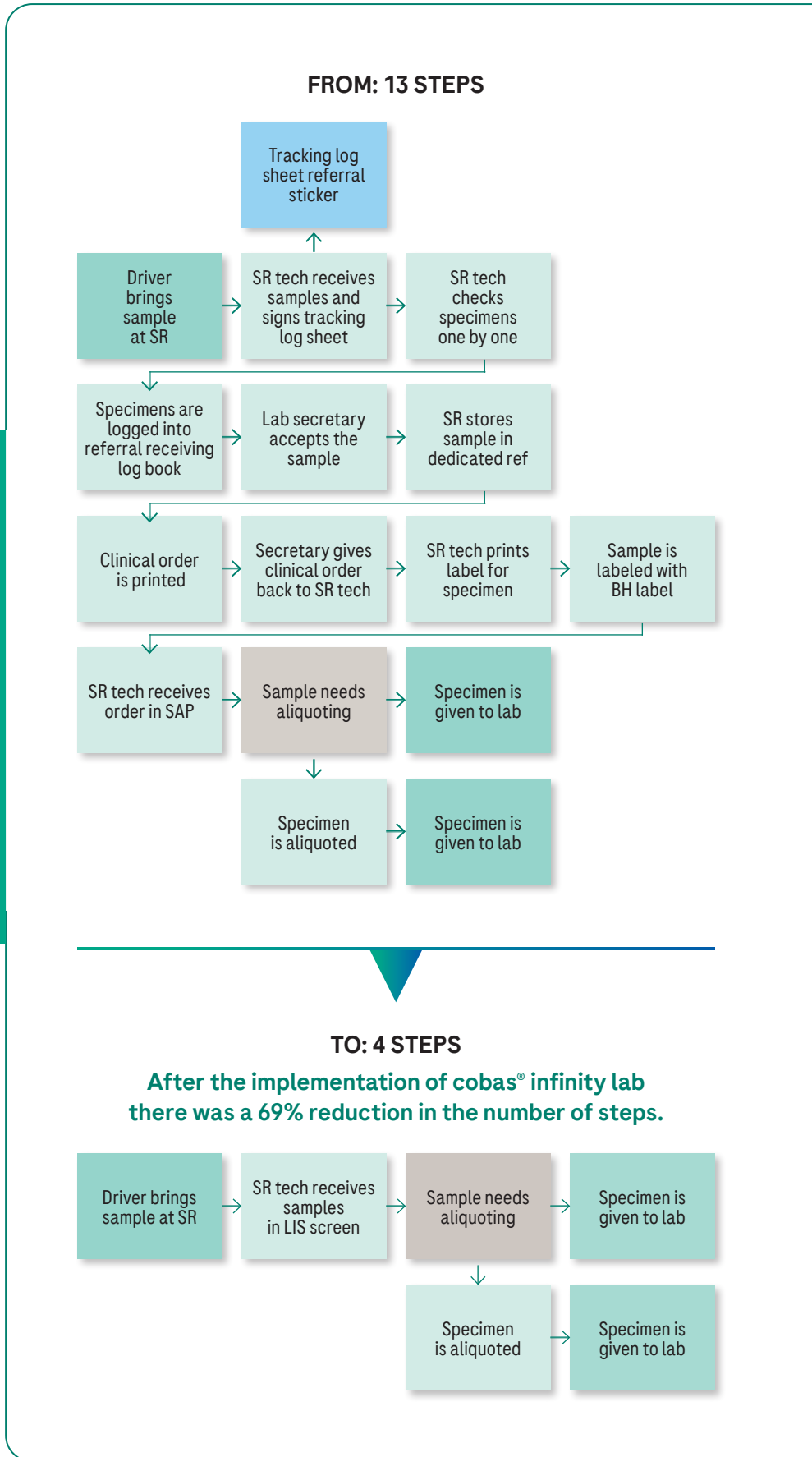
In addition, pre-implementation sample reviewing time in pre-implementation was on average 13.2 seconds (SD = 5.9). In post-implementation of **cobas® infinity lab**, all normal results were validated through **cobas® infinity lab**, at no time cost for the lab technicians. Only the abnormal results required lab technicians to validate, and it took on average 4 to 8 seconds to validate each abnormal result.

Legacy workflow at Burjeel Holdings

- 1**
Staff manually completed a paper order of the test that was individually packed with each bag of blood collection samples.
- 2**
Courier transported the samples from the collection site to the laboratory.
- 3**
Once the samples arrived at the laboratory, a lab technician checked each specimen individually and documented information in three different places: log sheet, referral book, and the billing sheet.
- 4**
A technician manually entered the content of each paper order into the Electronic Medical Record (EMR) to register the sample and print a label for each specimen.

STREAMLINED WORKFLOW

- 5**
After testing the sample, the results were manually validated for sample integrity, system errors, result range and delta check, etc.
- 6**
A lab technician manually ordered reruns or additional testing based on the validation outcomes.
- 7**
A report was generated and then emailed to the physicians.²



“We are now able to focus more on our clinical tasks, due to the time saved through the new auto validation process for test results.”

Senior Technologists | Core Lab

Value creation with lean validation

Manual validation of test results became a story of the past with **cobas® infinity lab**. Sample quality checks were managed conducted early on with the support of **cobas® infinity lab** for tube type identification, liquid and volume detection, spin status and sample quality checks. With lean validation, lab personnel analyzed the test results through an advanced set of rules and criteria, enabling them to focus on those test results that really needed attention.

Technical results verification could be conducted for sample images, instrument flags, reference ranges, previous test results and more. In addition, **cobas® infinity lab** supported clinical result verification based on rules and criteria, to identify those abnormal test results that required extra attention and automatically released those that met the criteria.

These rules also allowed reruns and further testing to be automatically arranged. Manual work was further reduced by the capability to reformat test results and add comments. Altogether, **cobas® infinity lab** has been highly valued for its advanced automation with lean validation feature.³ “**cobas® infinity lab** is the one-stop-shop for pathologists,” says Mayur, as it dramatically reduces manual work on all fronts.

Moreover, **cobas® infinity lab** has enabled a complete overview of their quality control processes and how their instruments performed across devices and location.

“A one-stop-shop for laboratories, cobas® infinity has earned a stellar reputation for its cutting-edge capabilities of algorithm-based result verification while improving patient safety and several key performance indicators. It enabled laboratory staff to redirect focus on key activities through the substantial reduction of manual work.”

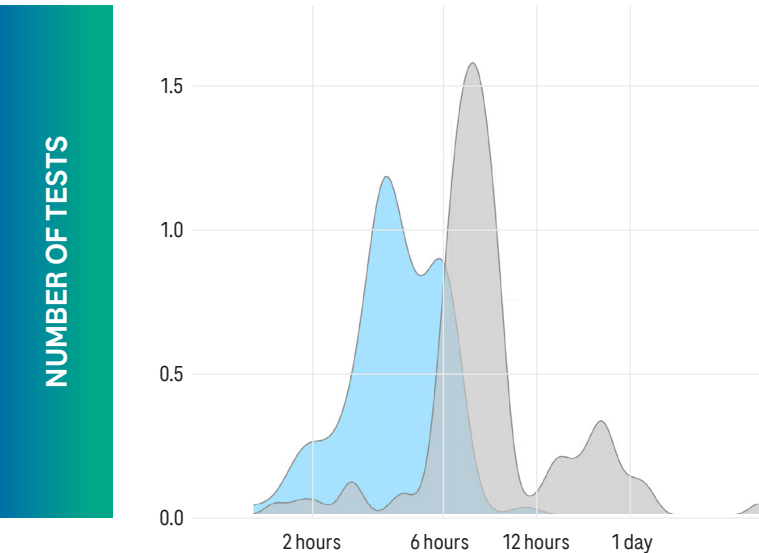
Chief Clinical Pathologist

Reduced turnaround time

The Burjeel evaluation team collected sample turnaround time (TAT) data to evaluate the impact of **cobas® infinity lab**. Turnaround time (TAT), defined operationally as the difference between verification time and extraction time, was available for each test. 183,177 runs data were collected before the introduction of **cobas® infinity lab** and 575,231 after, and therefore, in total 758,408 runs were collected from a total of 114 unique test types.

The distributions of all TATs for all test types before and after the implementation of **cobas® infinity lab** are illustrated (Figure 4). Overall median turnaround time before **cobas® infinity lab** implementation was 7.0 hours (Median Absolute Deviation = 5.2 hours), and after implementation, it was 4.0 hours (Median Absolute Deviation = 2.9 hours).

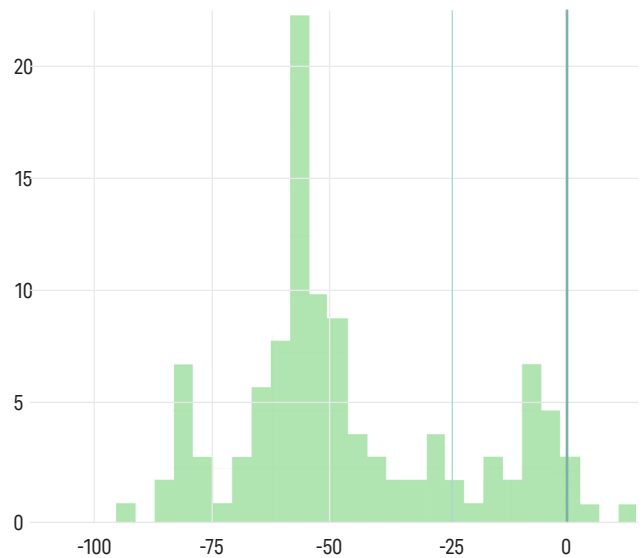
For each test, the percentage reduction in median turnaround time was calculated for before and after the introduction of **cobas® infinity lab**, defined as $100 * (T^b - T^a) / T^b$, where T^b , T^a are the median turnaround times before and after **cobas® infinity lab**, respectively. The distribution of the percentage reduction in median turnaround time, (Figure 5) demonstrates vast majority of tests benefited from a substantial reduction in median turnaround time. On average there was 46% of reduction in TATs. The difference between TATs before and after was significant.



Turn Around Time

Figure 4: The distributions of all TATs for all test types before and after the implementation.

Infinity ■ After ■ Before



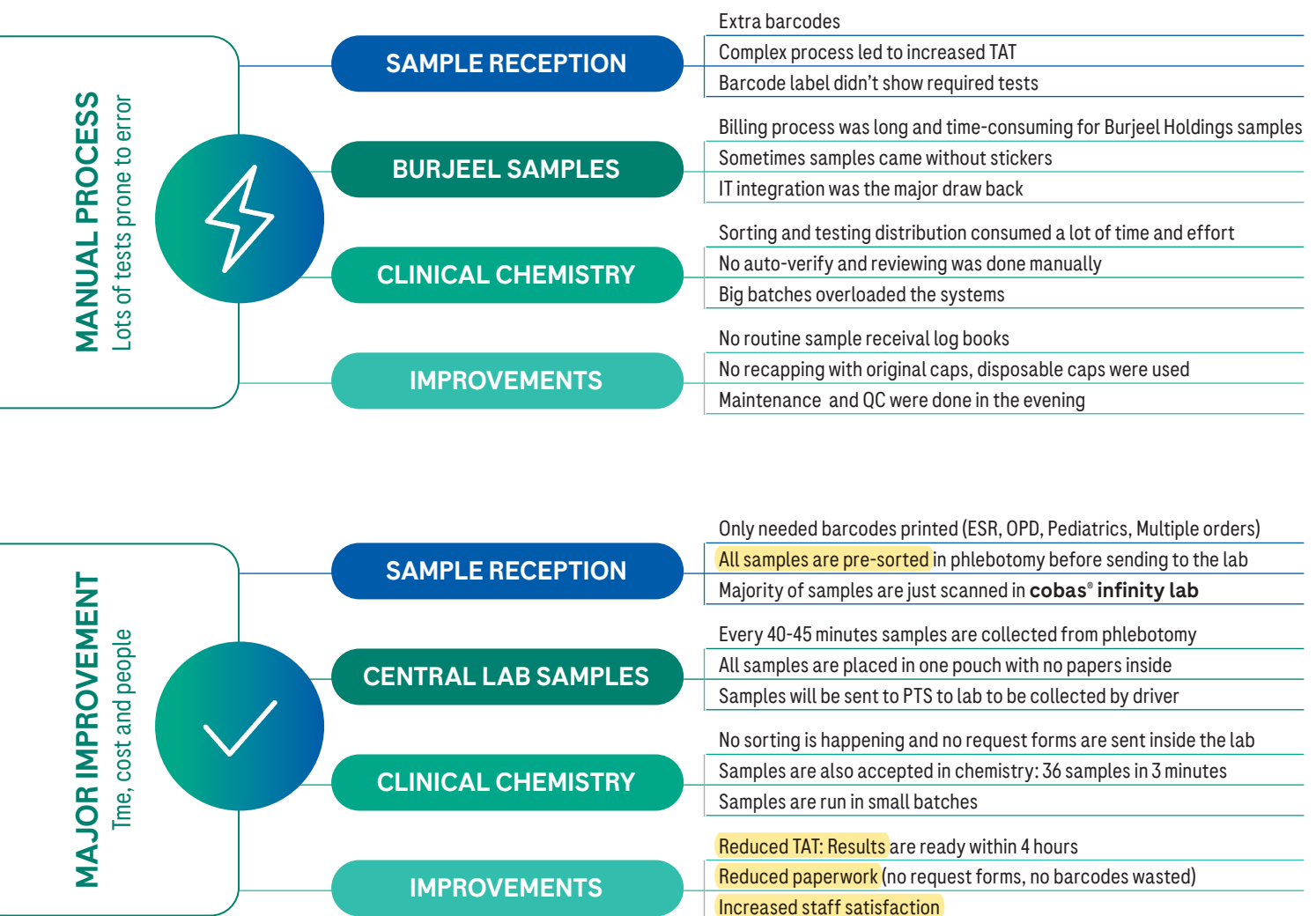
Percentage of TAT Reduction (before vs after)

Figure 5: Demonstration of the distribution of the percentage reduction in median turnaround time.

Improved operational efficiency and potential impacts on financials

Burjeel Holdings observed financial improvements as a result of shortened turnaround time, greater throughput, increased testing volume, staff productivity, and improved patient satisfaction. For example, certain immunoassays that only ran once a day before were now running multiple times in a day. With connected automation, **cobas® infinity lab** connected different instruments to maximize the predictability of time to test results. Physicians who have been impressed by same-day turn-around of test results, increased uptake and utilization of laboratory services.

In parallel, the cost of running immunoassays was observed to have a reduced nearly 20%.³ The analysis was done through regular quarterly and semi-annual laboratory processes as well as performance assessments performed by Roche Healthcare Consultants at the site. The time spent by the lab personnel doing the tasks at the sample reception area, accessioning area, analysis and post-analysis area (including results validation and release) were all measured. Additionally, a set of samples was timed and the average time to complete the steps per sample for each full time employee was measured. The laboratory process and performance assessments also included complete workflow analysis and process maps to identify non-value adding tasks and wastage in movement and time.



Facilitating digital transformation

The cobas® infinity lab implementation has been a flagship success; a “proof of concept for digitalization,” as stated by the Director. Hospital personnel have been excited for more digitalization changes.

Building on this momentum, implementation plans for cobas® infinity lab quickly rolled out for all the patients needed to Burjeel Holdings hospitals. With cobas® infinity lab, Burjeel Holdings brought improved experience for patients. Before the implementation of cobas® infinity lab, patients had no visibility into their patient journey. Patients needed to wait for test results from their healthcare providers (HCPs). In contrast, cobas® infinity lab enabled the delivery of test results to patients digitally. This enabled patients to better plan and schedule their consultation with HCPs, instead of waiting for days or even longer.

cobas® infinity lab has been designed to evolve with the needs of customers and the healthcare industry. Roche has been committed to build on its existing software portfolio, and invest in a new digital backbone that will aggregate data across lab disciplines and across locations. With new tools and services, Roche will continue to improve the quality and efficiency of laboratory diagnostics.

“The partnership with Roche, enabled the digital team at Burjeel Holdings to design and implement an integrated workflow, including reporting and regulatory compliance, all within a short time span. We now have bidirectional capability integration between cobas® infinity lab and our HIS systems that enable a seamless flow of information. It includes sophisticated reporting capabilities for delivering reports to patients on digital channels such as Mobile App, SMS, WhatsApp, all in line with the regulatory requirements of realtime event registration.”

Pradeep Shilige | CIO Burjeel Holdings

References

¹<https://burjeelholdings.com/about-us/>

²Based on the laboratory workflow analysis and mapping activity provided by Burjeel Holdings

³Based on interview with Burjeel Holdings

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Legal Approval	Emily Wilson (emily.wilson@roche-diagnostics.com) on behalf of Debra Robinson Legal 11-Apr-2023 13:44:10 GMT+0000
Regulatory Approval	Kazuo Semitsu Regulatory 11-Apr-2023 23:08:04 GMT+0000

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