



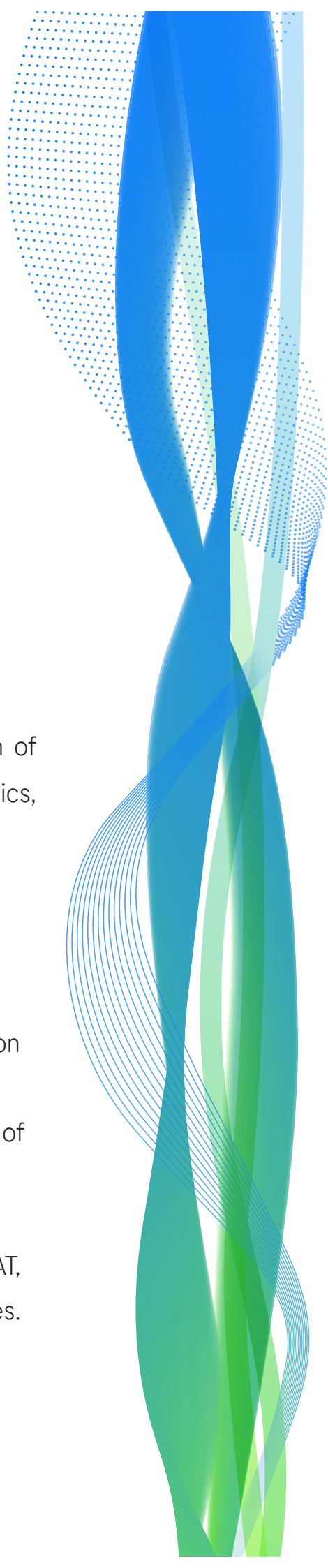
**navify**®

Lab Operations

## Improving Clinical Laboratory efficiency

This article highlights the implementation of **navify**® Lab Operations at Agilus Diagnostics, Mumbai. The laboratory aimed to improve turnaround times, staff utilization, productivity, and process simplification.

The implementation of sample result auto-verification (AV) is discussed, with a focus on the preparation, implementation, and analysis of the results. The positive impact of the middleware implementation on operational excellence is presented, including reduced review time, improved TAT, and increased autoverification percentages.



## Introduction

Agilus Diagnostics is an ISO 15189 & CAP accredited laboratory processing over 5,000 samples and more than 12,500 tests per day at its central processing center in Mumbai, India. As part of its efforts to continuously improve turnaround times (TAT), staff utilization, productivity, and process simplification, the laboratory recently implemented **navify**® Lab Operations in the core lab.

The solution aims to optimize and improve efficiency across the entire testing process. This whitepaper showcases the implementation of sample result auto-verification (AV) and its positive impact on laboratory operations. The laboratory segmented its implementation into four phases, each with its own goals and objectives.

## Preparation phase

The preparation phase involved defining the Statement of Work (SOW) and creating user-specific requirements for implementing **navify** Lab Operations.

The laboratory created masters for instruments, tests, internal quality control (IQC), and AV rules and conducted hardware server configuration. **navify** Lab Operations is a laboratory process management solution integrated with the existing IT infrastructure and connecting different health information systems. The solution has been shown to be highly competent, ensuring the smooth integration between data producers and consumers, while maintaining simplicity and user-friendliness.<sup>1</sup> With **navify** Lab Operations, information management becomes effortless.

The platform provides laboratory personnel with relevant and real-time information, offering an intuitive interface for alerts, required actions, and a comprehensive system overview. It can easily integrate the entire sample processing journey, from ordering to result reporting, and from pre-analytics to archiving. This browser-based software allows simplified access; utilizing the software is as easy as a few clicks, from any desktop computer. Furthermore, **navify** Lab Operations allows efficient sample management, orchestrating the entire process from test ordering to result reporting with paperless reports. It offers structured options for both manual and automatic archiving, ensuring secure data storage for a defined period.



# Implementation

## Phase 1



**Phase 1** involved configuring **cobas**® 8000 modular analyzers for 90+ assays and defining specific parameters in the test master, including ranges and tolerance levels. The laboratory also configured systems flags, analysis flags, patient history alerts, and dilution flags, and began the AV of test results. The phase concluded with a pilot test and a seven-day user acceptance testing protocol before releasing the technology in a live environment.

Test name	Test result	Primary unit	T	Ref. ranges	Critical range	Result alarms	Status	Test alarms	Last repeat	Instrument
Bicarbonate	7	mmol/L		22 - 29				0		L3_C8K-1 MU1-e602-1-2
BUN	24	mg/dl		8 - 25				0		L3_C8K-1 MU1-e602-1-2
Calcium	7.5	mg/dL		8.0 - 11.0				0		L3_C8K-1 MU1-e602-1-2
Hemolytic	3							0		L3_C8K-1 MU1-e602-1-2
Icteric	27							0		L3_C8K-1 MU1-e602-1-2
Lactate	4.20	mmol/l		0.50 - 2.20	> 4.00	▲▲		0		L3_C8K-1 MU1-e602-1-2
Lipemic	11							0		L3_C8K-1 MU1-e602-1-2
Procalcitonin	2.50	ng/mL		0.00 - 0.09	> 1.00	▲▲		0		L3_C8K-1 MU1-e602-1-2
GLUCOSE	138	mg/dL		65.00 - 99.00	< 30.00, > 500.0	▲		0		L3_C8K-1 MU1-e602-1-2
CREATININE	1	mg/dl		0.70 - 1.30	> 10.00			0		L3_C8K-1 MU1-e602-1-2
SODIUM	142	mg/dl		135.00 - 145.00	< 125.00, > 155.0			0		L3_C8K-1 MU1-e602-1-2
POTASSIUM	5.80	mg/dl		3.50 - 5.40	< 2.50, > 6.50	▲		0	5.70	L3_C8K-1 MU1-e602-1-2
CHLORIDE	101	mg/dl		97.00 - 107.00	< 90.00, > 120.0			0		L3_C8K-1 MU1-e602-1-2

Result	Orderer	T	Date and time	Dilution	Flag
2.50	ROCHE		01/28/2019 10:38:54	1	0

QC control	Result	Range	Date and time
PCCC1	0.51		01/28/2019 03:30:00
PCCC1	0.58		01/27/2019 03:30:00
PCCC1	0.49		01/26/2019 03:30:00

The lean validation solution takes laboratory efficiency to new heights by reducing manual work and increasing consistency and quality. By standardizing decision-making and enhancing compliance, **navify** Lab Operations consolidates all of the essential information onto a single screen, allowing you to focus on critical data. The configured automatic validation integrates key information, ultimately enabling the delivery of high-quality results.

# Consolidation

## Phase 2



In **Phase 2**, the team added new analyzers, yielding about 100 assays. The laboratory then set up IQC for the analyzers and created rules to hold sample results on IQC violations. Rules were established for automatic rerun, reflex, and dilution for all assays. The clinical correlation rules for Thyroid Assays for AV were also set up. Digital sample tracking was configured across the total testing process, alongside a seven-day user acceptance testing protocol before the actual AV went live.

# Expansion

## Phase 3



### Results and Impact of the Implementation

The implementation of **navify** Lab Operations had a significant impact on the laboratory's operations and productivity. The team reached 33% AV in Clinical Chemistry and 50% in Immunoassays (Fig 1).

The following results highlight the successful outcomes achieved:

#### 1. Improved Turnaround Time (TAT):

One of the primary goals of the implementation was to enhance TAT for laboratory results. After completing Phase 3, the laboratory achieved impressive results, with **93% of the results meeting the Lab TAT goals** (Fig. 2). As a result of reduced manual intervention and streamlined processes, the laboratory was able to **reduce TAT by 30 minutes for both clinical chemistry and immunoassay testing**. This improvement in TAT contributed to faster diagnosis and treatment decisions for patients, ultimately improving patient care.

#### 2. Enhanced Staff Utilization and Productivity:

By implementing auto-verification and configuring various flags and parameters, the laboratory achieved a significant reduction in manual review time. The number of staff members needed for the result review was reduced to only six, resulting in a **43% reduction in review time**, equivalent to a **saving of 30 staff-hours per day**. This optimized staff utilization allowed laboratory personnel to focus on more critical tasks, such as troubleshooting and quality control, while increasing overall productivity.

**Phase 3** involved configuring an additional 128 assessments. In addition to setting up IQC for the new tests and establishing rules to hold sample results on IQC violations, laboratory staff configured Patient Moving Averages as part of the AV framework. Clinical correlation rules for five new assays and extended range AV for Vitamin B12 and Vitamin D assays were set up. A seven-day user acceptance testing period was undertaken before the actual AV went live.

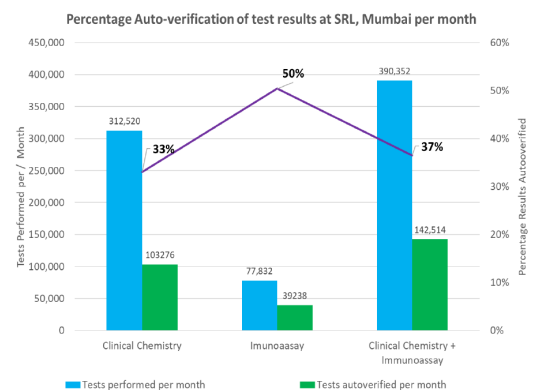


Fig 1: Impact of the solution on results auto-verification rate

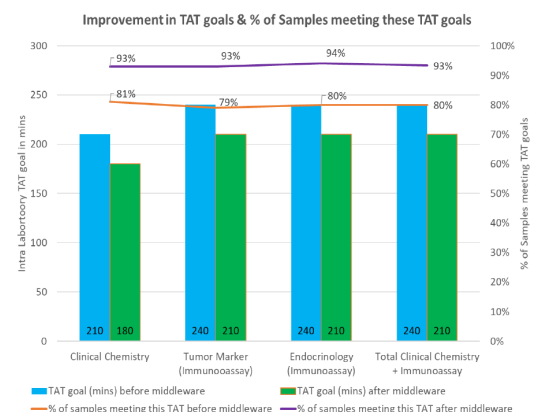


Fig 2: Impact of the solution on turn around time reduction

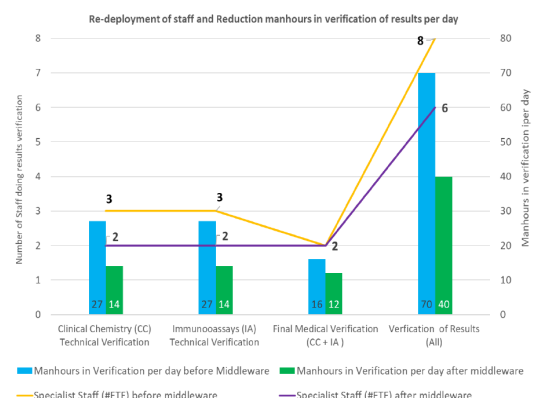


Fig 3: Comparison of manhours in results verification before and after the implementation

### 3. Process simplification and digital transformation

The implementation of middleware brought about substantial process simplification and digital transformation within the laboratory. By eliminating 248 paper sheets and logs per month, the laboratory moved towards a digitized workflow, reducing administrative tasks associated with record-keeping and improving data integrity.

The introduction of digital sample tracking across the total testing process further enhanced efficiency and reduced the risk of errors or sample misplacements. Collectively, these advancements in process simplification resulted in more streamlined and error-resistant laboratory operations.

The above results showcase the positive impact of the middleware implementation. Not only did the laboratory achieve substantial improvements in TAT, staff utilization, and productivity, but it also experienced process simplification, enhanced digital capabilities, and a reduction in non-value-added steps. These outcomes collectively contribute to improved operational excellence, patient care, and overall laboratory efficiency.

### Conclusion

With clear planning and an agreed scope of work in place, Agilus Diagnostics' step-by-step approach to AV adoption prioritized high-workload assays and made the implementation effective and efficient for laboratory staff.

In conclusion, the laboratory has succeeded in improving the turnaround time for their lab results while increasing productivity, also eliminating the nonvalue-added steps in the post-analytical sample workflow.



#### Notes:

navify® Lab Operations is the rebranded product of cobas® infinity laboratory solution.

Please note that the product navify® Lab Operations is currently commercialized as cobas® infinity central lab which is the official product name. For the purpose of this document, navify® Lab Operations will be used when referring cobas® infinity central lab product. It is planned that cobas® infinity central lab will be rebranded as navify® Lab Operations.

This white paper is based on the customer's poster that was presented and published by AACC in 2022.

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### References

- 1.- Sanghavi D, Pimpalgaonkar K, Bhatia S, Anand K, Implementing auto-verification algorithms in a core clinical chemistry section of a private reference lab in India, AACC 2022
- 2.- <https://meeting.myadlm.org/abstracts/annual-meeting-abstract-archive> [last accessed January 2024]

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