sapio sciences

CASE STUDY

NGS Clinical Diagnostics: Achieving high-throughout performance with a configurable lab platform

The average clinical lab processes up to tens of thousands of samples each day. When coupled with massive volumes of data, fast turnaround times, stringent quality control requirements, and other complexities, clinical labs require extraordinary levels of efficiency and productivity.

Clinical labs require an end-to-end solution that enables them to configure quickly, maintain complete visibility over their entire process, collaborate across multiple sites, and get results faster.

This is especially true when it comes to next-generation sequencing (NGS), which brings its own unique demands for intricate sample management, continuous monitoring, instrument integration, and much more. In addition, NGS workflows involve a range of complex steps—from sample preparation, to library preparation, sequencing, and so on—and each of these steps requires proper reviews and approvals. Effectively tracking a multitude of NGS samples while rapidly generating results with high standards for quality and accuracy is all but impossible without a proper informatics platform.

Clinical labs require an end-to-end solution that enables them to configure quickly, maintain complete visibility over their entire process, collaborate across multiple sites, and get results faster. The answer? A comprehensive platform that not only provides built-in NGS templates, but enables rapid development in support of more specialized and nuanced NGS requirements. Read on to learn more about the unique challenges NGS presents to clinical labs, and discover how the right solution makes all the difference.

Real results
achieved by Sapio clinical clients

100s of Workflows
The Sapio platform has enabled us to record and track complex lab processes in minute detail. Sapio has truly been a force multiplier.

End-to-End Clinical
A true end-to-end platform from order ingest, receipt, review, authorization, instrument & sample tracking, library prep, sequencing, and reporting.

5 hours
Whole genome sequencing, which previously took weeks and even months, has been completed in as little as 5 hours.[1]

The challenges

NGS workflows bring a range of challenges to clinical labs. These include:

Sample volume and velocity

Clinical labs process anywhere from hundreds to tens of thousands of samples in a day, and clients expect fast turnaround times for results. Some of these samples are particularly urgent and must be prioritized accordingly. In addition, samples may have specific controls and qualifiers that must be accounted for. Entering these samples manually takes valuable time away from scientists and leaves significant room for inaccuracy. **Clinical labs, therefore, require an effective way to easily input and locate samples at each stage of the NGS workflow, view critical information at a glance, and account for any nuances or specific information in order to support a massive volume of samples with agility and efficiency.**

Complex instrumentation and materials management

NGS can involve a range of tools and instruments, from extraction tools, to library preparation instruments, sequencers, analysis solutions, and more. **All of these instruments may produce data in different formats, making it difficult to achieve rich analysis without first sorting through and organizing insights.**

In addition, every instrument used throughout the NGS workflow must be continuously monitored and validated to ensure proper performance, and juggling numerous maintenance and calibration timeframes adds to the complexity of instrument management. The same goes for materials and reagents, which require careful tracking over expiries and other lot-related issues to avoid impacting results. Without an integrated solution, clinical labs face longer workflows, disjointed data, and greater room for error.

Multi-faceted workflows

NGS workflows involve a multitude of steps, many of which depend on one another and necessitate review and approval from others before completion. If a step is overlooked, or a workflow is pushed forward without the proper pieces or approvals in place, it can lead to errors and other challenges down the line. This is especially relevant from a quality control perspective, as clinical labs have certain protocols in place to ensure ongoing quality and accuracy.

Furthermore, each NGS lab may handle these steps differently based on their sample volume, instrumentation, turnaround times, and other factors. Unfortunately, many solutions prevent clinical labs from tailoring solutions to their unique workflow requirements, instead leaving them to retrofit processes in a way that solutions can support. When solutions do allow flexibility, they leave labs to deal with tedious custom coding that can only be done by a team of computer scientists.

Results and reporting

Reporting is a critical component of a clinical lab's workflow—from developing reports to align with management to producing detailed results for patients. But report generation can take a significant amount of time without integrated data and automated reporting. **Even when reporting is automated, many platforms fail to provide the configurability necessary to account for the specific information the lab needs and format data in ways that can be easily shared.** Imagine if a clinical lab could set custom rules to generate meaningful reports with the click of a button.

The solution

As the world's first truly science-aware™ lab informatics solution, the Sapio Platform enables leading clinical labs to maximize efficiency and productivity across their NGS workflows.

High-throughput capabilities

Sapio's LIMS solution is built for NGS scientists to get up and running quickly. With out-of-the-box NGS templates built in from the start, clinical labs can begin to realize value immediately. The platform also provides built-in collaboration, and supports custom views by role, commenting on samples and plates, and visibility into previous updates.

In addition, the Sapio Platform is purpose-built to address NGS' intricate sample management requirements at scale. For example, scan samples with barcodes to input them directly into your LIMS, and set it to view sample status, the number of extractions needed, and more. To ensure ongoing accuracy, assign plate numbers directly within the LIMS and receive notifications when samples are ordered improperly. Later, when it comes time for results processing, view how many confirmations each sample is awaiting in a centralized dashboard. The solution delivers comprehensive visibility over sample lineage and aliquots, flags samples that require reprocessing, and enables users to search, sort, and filter samples to easily find what they need, so that clinical labs can carry samples from request to results with ease. For example, leave a comment on a specific plate, and make that information readily available to any user that views a sample within it across the entire workflow.

Configurable, scalable workflows

Sapio's no-code solution enables clinical labs to configure quickly and adapt rapidly as their needs evolve. Want to set up a custom view of your samples? Need to link samples from family members together for a greater view of genetic impact? Or maybe you'd like to add an additional review task that prevents users from moving on to the next step before the previous one has been approved, then notify relevant users that a step is ready for review. Sapio makes all of this and more possible, without the need for significant technical intervention. Lab requirements are constantly changing, and Sapio's NGS solution enables you to adapt at the speed of science, without disrupting existing workflows.

Seamless instrument and material management

With robust integration capabilities, the Sapio Platform empowers clinical labs to seamlessly connect their solutions for extraction, sequencing, library preparation, analysis, and more to create a comprehensive, single source of truth. The solution places information into a standardized, usable format so that labs can reduce time spent on manual data entry, and ensure accuracy and timeliness of their data. The platform also supports instrument information management—view all of the lab's critical instrument information in one place and understand timelines for calibration or preventative maintenance, and set email notifications for when a maintenance deadline is approaching.

The Sapio Platform also allows for robust material tracking, with visibility over lot numbers, expiries, and other key insights to avoid using compromised materials and preserve the integrity of results.

Streamlined reporting

The reporting capabilities within the Sapio platform enable labs to export custom reports at each stage of the workflow in a standardized, decision- or review-ready format. For example, a quality control user may require a full view of key sample statistics, confirmation status, and more. Filter out the samples you need and export data directly into Excel for at-a-glance insight. Enter advanced search criteria, then view results in a table that is ready for export.

Furthermore, the platform allows users to configure custom reports for management teams and patients. Provide lab leaders insight into turnaround times, instrument maintenance, sample orders, and more, narrowed down by specific sites or tests. Set custom patient reporting rules to pull in additional information based on positive or negative results and provide granular insight with the click of a button. Then, easily edit and approve reports to tailor results to a specific patient.

Set your clinical lab up for NGS success

Sapio serves some of the world's leading clinical labs in maximizing throughput, driving productivity, and making life easier for scientists. Some of our NGS solution's key features include:

- **Intuitive, web-based interface**
- **Science-aware™ searchability**
- **No-code rules engine**
- **Support for CLIA compliance**
- **End-to-end consumables management**
- **Integration with genomics instruments**
- **And more...**

NGS innovators choose Sapio:

Bio Theranostics · charles river · Discovery Life Sciences · labcorp · Foundation Medicine · GSK · Baylor College of Medicine · Regeneron

Ready to discover how Sapio can support your clinical diagnostic lab's high-throughput requirements?

Visit **sapiosciences.com/request-demo**

1. https://www.asbmb.org/asbmb-today/science/022722/record-breaking-rapid-dna-sequencing

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