



Creating the Future of Laboratory Medicine: Building the Foundation for Operational Efficiency and Innovation

Innovations in analytics, artificial intelligence (AI), and machine learning are making an impact in the clinical laboratory space, and many labs are moving to assimilate these fast-evolving technologies into their workflows.¹ They present an important opportunity to integrate lab data with other health system data to enhance clinical decision making, and service efficiency, while improving patient outcomes and providing additional value.² Meanwhile, a sink-or-swim mindset is taking hold as clinical labs are under pressure to perform better and faster with fewer resources.

In the rapidly changing field of laboratory medicine, new methodologies for lab testing like leveraging increasing levels of automation, the adoption of more point-of-care testing, or totally new testing technologies (e.g. genomic testing) are adding to the burden of doing more with less. Globally, the drive to consolidation is changing the ways labs deliver their services, and with the need for investment as well as additional skilled laborers particularly in the field of genetic and genomic medicine, labs must prioritize efficiency.

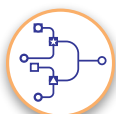
The Laboratory Business Model is Changing

The Centers for Medicare and Medicaid Services (CMS) is reducing reimbursement for laboratory tests up to 10% in 2018, 2019, and 2020, and then cutting an additional 15% between 2021 to 2023 under the Protecting Access to Medicare Act (PAMA). Smaller labs are also feeling a financial squeeze from contracts that index pricing to Medicare.³ For most labs, already operating on thin profit margins, these issues are an existential threat.

Worsening matters is that they come amid a shortage of skilled lab personnel. The Bureau of Labor Statistics in 2016 forecast an annual demand of 12,000 new clinical laboratory professionals. However, only 5,000 are entering the workforce each year.⁴

Faced with shrinking margins, labs are looking for ways to streamline and cut costs – while delivering results in a new reimbursement environment that places a premium on value.⁵ They must effectively optimize their limited time, staff, and other resources.

Improvements in process efficiency and technology are key to helping labs lower costs, increase throughput, and stay on solid financial footing in this environment. Against this backdrop, laboratories must find ways to:



- Modernize or consolidate aging technology platforms and IT systems within their organizations to lower costs and enable flexibility



- Eliminate manual processes and drive automation wherever possible to improve operational efficiency and use of skilled labor



- Leverage available data and analytics to promote better health outcomes, identify opportunities to optimize, and add new revenue streams internally and externally



- Enable information sharing and transparency across the health ecosystem, providing a longitudinal patient record and added value to payers and providers

Improving Efficiency Through Partnerships and Technology

Leveraging their unique capabilities and industry knowledge, laboratory software provider Rhodes Group saw opportunities to help labs become more efficient and optimize their limited resources, starting with streamlining the specimen collection and labeling process.

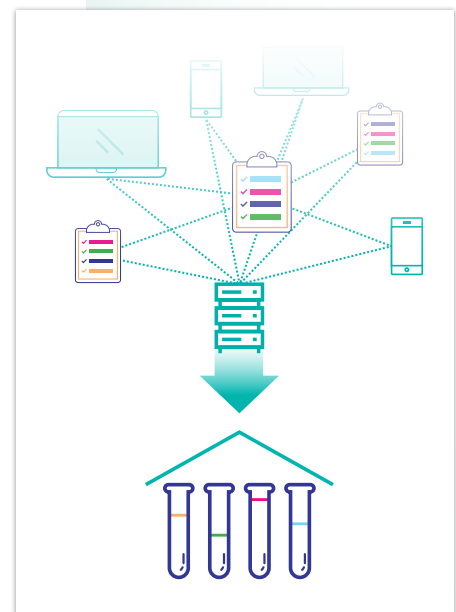
To build a solid foundation on which to grow their offering, Rhodes Group sought a technology partner that offered an agile application architecture with built-in healthcare interoperability and analytics for creating custom, high-value laboratory solutions.

Having these capabilities baked in would enable Rhodes to remove the complexity and cost of adding more point solutions to their technology stack. It also enabled them to build solutions for labs that could operate independently of any specific lab information system (LIS) or Electronic Medical Record (EMR) and integrate seamlessly into clinical workflows by handling HL7 messages. The result? Maximum flexibility and value for their laboratory customers.

A Solid Technology Foundation

With these goals in mind, Rhodes Group CEO Steve Ayer turned to InterSystems, a longtime partner with a commitment to excellence in healthcare and vast experience in managing complex, mission-critical data. Globally, more than one billion health records are managed by solutions built on InterSystems technology and laboratories running on InterSystems process nearly half the specimens in the U.S. every day. Rhodes Group recognized the need for a technology platform that would enable it to:

- Ingest healthcare data in any format and from multiple sources including the LIS, EMR, claims systems, and other order management or clinical systems
- Aggregate, deduplicate, and normalize data from these sources to run analytics or leverage common AI/machine-learning toolsets to eventually build models for smarter processes
- Easily and cost effectively build multi-tenant applications that would scale to help increase the efficiency, speed, and accuracy of labs across the country
- Provide a robust platform as the foundation for Rhodes Group's solutions across their business/portfolio moving forward



“INTERSYSTEMS IRIS FOR HEALTH TAKES MOST OF THE COMPLEXITY OF DEALING WITH HEALTHCARE DATA AND INTEROPERABILITY OUT OF OUR HANDS. I THINK INTERSYSTEMS IS PROBABLY THE ONLY VENDOR THAT CAN MAKE THAT CLAIM.”

*Steve Ayer, CEO,
Rhodes Group*

For Ayer and Rhodes Group, driving efficiency for their laboratory customers is key. “In the mad dash to technology enabling lab 2.0, clinical laboratories often overlook the necessary underpinnings, aka lab 1.0” — or a solid foundation of operational efficiency that can free up resources and help them thrive and innovate.

For example, take a routine yet vital process like specimen collection and labeling. Typically, when specimens are picked up from the hospital, they have handwritten labels identifying the patient and physician, put on by the clinician. Upon receipt, the lab must decipher this information to determine the correct patient and analyzer it should be assigned to, peel that label off, and adhere a new, instrument-ready label. Such a manual process provides little visibility for providers, is labor-intensive for the lab, and is prone to transcription errors, which negatively impacts time, cost and patient safety.

Ayer and his team were able to help labs overcome this inefficiency by building a new application called eMyLabCollect on the InterSystems IRIS for Health™ data platform. It eliminates re-labeling and streamlines specimen collection operations for both the hospital and the laboratory.

The app can take in order information from virtually any system via HL7 message, and lets providers generate a barcoded, instrument-ready label for any sample collected at the point of care. This reduces labor on the lab receiving end and enables better tracking and transparency for the health system throughout the process. The app is particularly beneficial for mobile providers who are now able to support patients beyond the walls of the hospital, and support multiple institutions at one time with less risk of human error. When collecting samples at a nursing home, for example, from patients affiliated with different hospitals, care providers can instantly produce unique, instrument-ready labels that track back to each patient’s appropriate hospital and doctor.

A subsequent version of eMyLabConnect will leverage RFID (radio-frequency identification) labels, so mobile providers can ship an entire tray of samples to a lab that can be processed with even greater speed and even less labor on the front end.

eMyLabCollect enables a streamlined work flow for these mobile providers, bringing an additional source of revenue for labs to be able to support outpatient settings like long-term care facilities or home care environments. Hospitals and labs can now collect and process specimens from anywhere and enable mobile providers traveling to rural locations to care for patients that cannot easily travel on-site. The application even identifies the most efficient route for these providers to reach each of their assigned patients, providing driving directions via an integration with mapping tools.

The InterSystems IRIS for Health data platform offers the capabilities Rhodes Group needed to make eMyLabCollect feasible, such as integration and data management in one development platform that they would otherwise need multiple point solutions to replicate. Doing so would add complexity and cost to their development; but by leveraging IRIS for Health, they were able to lower their total cost of development and pass the savings along to their customers.

“Now our product has a much broader reach and a lower cost of ownership for customers,” says Ayer. Custom laboratory applications like this one offer cost-effective opportunities for labs to streamline their operations, improve scheduling, and efficiently allocate their resources like labor and equipment while adding new streams of revenue to their operations.

Healthcare Interoperability is Vital

Most technology vendors cannot provide healthcare data integration, analytics, and high-performance data management in one platform. The ability to take in HL7 messages from anywhere without the need for additional point solutions to translate them was important to Ayer in selecting the right development technology. InterSystems IRIS for Health offers built-in transformations between modern and legacy data formats, regardless of source, and baked-in support for every major healthcare interoperability standard and protocol worldwide.

Because of that, Ayer and his team avoided the pain and cost of deploying multiple point solutions and have enjoyed the peace of mind that comes with having all the necessary components in one platform, lowering their cost of development significantly.

Ayer was further impressed by InterSystems recognition as a 2019 Gartner Peer Insights Customers’ Choice for Operational Database Management Systems, receiving the highest score of any company in the Magic Quadrant. Ayer is confident in the ability of the underlying InterSystems IRIS for Health technology to deliver high availability, disaster recovery, and scalability for all his next-generation laboratory solutions.

“AS WE ADD MORE TENANTS TO THE APPLICATION’S MULTI-TENANT CLOUD ENVIRONMENT AND THEIR SIZE GROWS, WE’LL TAKE ADVANTAGE OF THE DATABASE SHARDING CAPABILITY TO HANDLE THAT.”

*Steve Ayer, CEO,
Rhodes Group*

Flexibility and Scalability Imperative for Innovation

Rhodes Group is thinking ahead as their solution gains traction, with InterSystems playing a key role in their future. The organization is building out its multi-tenant, cloud-based application and gearing up for rapid adoption from health systems across the country that want to leverage eMyLabCollect.

“As we add more tenants to the application’s multi-tenant cloud environment and their size grows, we’ll take advantage of the database sharding capability to handle that. So, InterSystems IRIS for Health will allow us to grow without having to re-architect the application,” he said. It also provides the flexibility to easily deploy on public or private clouds.

And in addition to eMyLabCollect, Rhodes Group is working on a portal for entering orders and viewing results to expand product offerings, as well as a case management tool with various modules for diagnostic optimization. This tool allows the user to set established protocols for specific conditions and enables a set of reminders to payers or providers that can be tailored and triggered by certain circumstances. For example, payers being automatically alerted about recommended tests that should be performed for a specific patient cohort, or if they missed any recommended tests to identify gaps in care.

A Foundation for the Future

In the increasingly automated lab space, efficiency means survival. Labs need innovative ways to increase their speed and output, replace outdated systems and processes, lower their costs, and create new revenue streams that will enable them to thrive.

Leveraging the right combination of partners and technology can help this goal become a reality. InterSystems technology helps labs and software solution providers aggregate and normalize their data as a foundation for analytics or machine learning models, so they can view and improve their own processes and can provide more value to the health system through high-quality, actionable insights. InterSystems technology also allows organizations like Rhodes Group to build custom applications that cost effectively solve laboratory problems and open the door for new revenue streams.

Rhodes Group will continue to leverage their partnership with InterSystems to build, scale, and offer more innovative solutions for their clients. “Eventually our entire platform for laboratories, providers, and payers will be on InterSystems,” said Ayer.

About InterSystems

InterSystems is the information engine that powers some of the world's most important applications. In healthcare, finance, government, and other sectors where lives and livelihoods are at stake, InterSystems has been a strategic technology provider since 1978. InterSystems is a privately held company headquartered in Cambridge, Massachusetts (USA), with offices worldwide, and its software products are used daily by millions of people in more than 80 countries. For more information, please visit **InterSystems.com**.

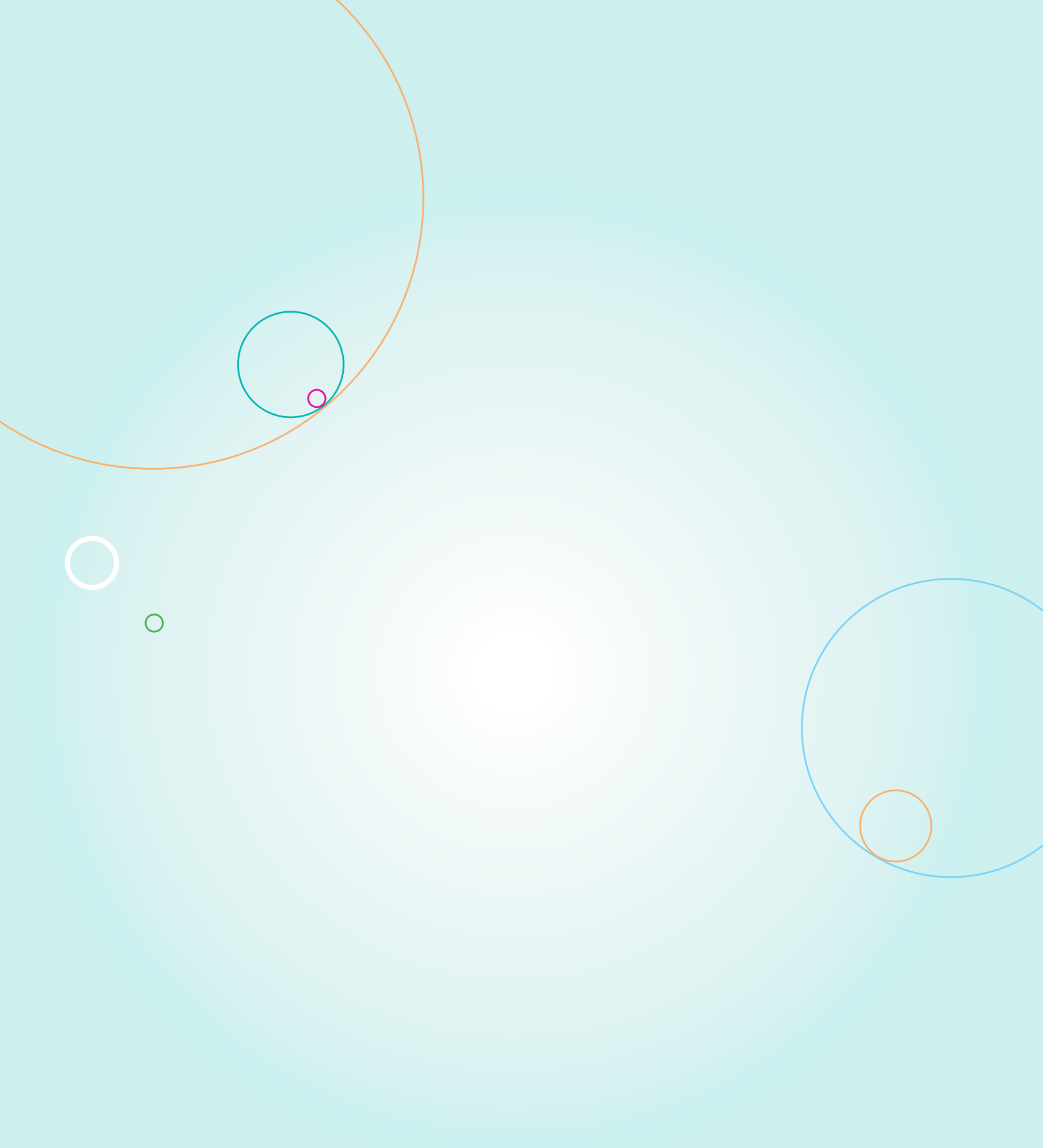
¹ Durant T. Machine learning and laboratory medicine: Now and the road ahead. Clinical Laboratory News. March 1, 2019. (<https://www.aacc.org/publications/cln/articles/2019/march/machine-learning-and-laboratory-medicine-now-and-the-road-ahead>)

² Shirts B, Jackson B, Baird G, et al. Clinical laboratory analytics: Challenges and promise for an emerging discipline. J Pathol Inform. 2015; 6:9. doi: 10.4103/2153-3539 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4355825/>)

³ Lim, David. Clinical lab lobbying spikes as PAMA cuts kick into effect. MedTechDive. Feb. 1, 2019. (<https://www.medtechdive.com/news/clinical-lab-lobbying-spikes-as-pama-cuts-kick-into-effect/547278/>)

⁴ Richards, Kathryn. Using automation to help address the laboratory workforce shortage. Medical Laboratory Observer. July 24, 2018. (<https://www.mlo-online.com/information-technology/automation/article/13017028/using-automation-to-help-address-the-laboratory-workforce-shortage>)

⁵ Nichols J, Stine V, Forsman R, et al. What the Protecting Access to Medicare Act Means for Clinical Laboratories. Clin Chem. 2019; 65: 6. doi: 10.1373/clinchem.2019.303255. (<http://clinchem.aaccnls.org/content/early/2019/03/27/clinchem.2019.303255.abstract>)



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