WhitePaper

Risk Management

Specimen Management and Logistics Issues to Evaluate for Continuous Quality Improvement

3 High-Risk Medical Courier Support Services

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Introduction

The new complexity of medical laboratory specimen sample management requires a highly sophisticated system of monitors, controls, and useful reports to meet lab and hospital accreditation requirements, prevent errors that can lead to costly quality failures, and reduce unnecessary healthcare costs.

The lab test ordered launches a complicated process that requires technical and healthcare expertise; proper specimen collection and transport; and effective logistics and communication. Additionally, effective specimen management requires adequate software or middleware to integrate financial and insurance information.

Within all this complexity are built-in mechanisms. These mechanisms ensure that physicians have the appropriate specimen collection supplies; the laboratory has appropriate reagents, kits, and other supplies; and the appropriate patient and physician information has been communicated.

Clinical and pathology laboratory specimen management functions may be plumbed together with different products from different vendors and little integration of primary logistical functions such as tracking samples, managing client inventory, managing internal inventory, and tracking customer and patient information.

This white paper, produced in partnership with Lab Logistics, will address value and quality issues related to medical laboratory specimen management and logistics. It will provide a framework for evaluating specimen processes, overview examples of cost savings and improved operations related to logistics and supply, and present examples of how hospital and health systems laboratories approached making changes.

Chapter 1:

Improving Sample Management and Logistics in the Clinical and Anatomic Pathology Laboratory

Sample management is included in the essential elements of a hospital or medical laboratory's quality management system (QMS). Part of process control, effective sample management means that laboratories must be proactive to ensure that the specimen samples it receives meet all the requirements needed to produce accurate test results.[1]

The collection of appropriate and optimum samples is the responsibility of the laboratory. As such, the new complexities of hospital outreach services, in-reach efforts to serve on- and off-campus physician offices, unique requirements of other referred specimens, and circumstances of handling critical and STAT specimen samples demand a **thorough analysis of the following areas:**

- Laboratory specimen handling and tracking,
- Medical security,
- Chain of custody, and
- Transit tracking.

An evaluation for quality and deficiencies in these areas will serve to improve the laboratory's end-to-end testing process, as well as improve overall patient and community safety and service. This is important because inaccuracies in testing can impact length of hospital stays, and hospital and laboratory costs. Inaccuracies also affect laboratory efficiency, leading to repeat testing which results in waste of personnel time, supplies, and reagents.

Proper management of samples improves confidence in laboratory testing and diagnostics.[2]

Chapter 2:

Evaluating Laboratory Specimen Management Processes Considering 3 High-Risk Support Areas

The unique workflows and processes in medical laboratories, whether independent, hospital, physician office, reference, or other, are expected to reduce risk of medical errors, and deficiencies at inspection. These workflows and process steps require continuous monitoring, performance tracking, and subsequent continuous quality improvement (CQI).

Teams from accredited laboratories and their consultants may perform gap analyses, mock or real root cause analyses, or value stream mapping to arrive at specific process steps where improvement is needed to reduce gaps.

When specimen handling errors occur, the result—specimen rejection—brings consequences. To reduce risk of specimen rejection and other issues, the following must be considered for weaknesses:

1 Handling and Tracking of Laboratory Specimen Samples

The most common handling errors include centrifugation, delivery delays, light exposure, and temperature issues.[3] Specimen rejection leads to a high rate of recollection of specimens and increased laboratory inventory and labor costs. Another major consequence of specimen rejection is a significant delay in availability of test results, a major issue around STAT tests.[4]

Improving sample integrity means that samples arrive at the laboratory in specific conditions: in varying types of test tubes,

sample containers, media, saline, and at varying (but very specific and required) temperatures, and at times that support sample quality and integrity. Strengthening these variables and more will improve the preanalytic phase of laboratory testing where most errors occur.

Specimen transport must be managed carefully. Personnel who package or transport specimens should be regularly trained on personnel responsibilities and proper procedures, both for safety and for good maintenance of samples.[5]

2 Confirming Medical Security, Chain of Custody, and Transit Tracking

While medical laboratory directors and technologists must stay apprised of the consequences and costs associated with rejected samples, they must also monitor medicolegal issues resulting from lost specimens,[6] as well as new calls for more rigorous biosafety procedures.[7]

The COVID-19 pandemic created a wave of increased volume and risk in security, custody, and transit tracking of specimens at a heightened biosafety level (BSL), while at the same time reduced the volume of more routine samples. Lab Logistics data from three hotspots, California, Louisiana, and New York City, showed a 26% increase in requests for specimen delivery, personal protective equipment, and additional supply chain movement.

THE COVID-19 PANDEMIC IMMEDIATELY CAUSED A 26% INCREASE IN REQUESTS FOR SPECIMEN DELIVERY, PPE, AND ADDITIONAL SUPPLY CHAIN MOVEMENT.

Additionally, during the pandemic, as in ordinary times, a major risk area involving the practice of allowing relabeling of improperly labeled specimens introduces a significant likelihood of specimen mislabeling and potential harm to the patient, according to an article in the *Archives of Pathology and Laboratory Medicine*.[8]

Because of the numerous handoffs, complex steps, regulations, and compliance associated with transporting specimen samples, custody accountability and sample security are essential to an effective specimen management and logistics system. Assessing each handoff and detecting weaknesses will assist the laboratory team in overall process improvement.

Samples need to be effectively and securely tracked in a HIPAA-compliant fashion. Medical courier and logistics providers that have the ability to leverage mobile barcode readers to scan the sample upon pickup, and then upon delivery to the laboratory, serve to ensure patient specimens are tracked throughout the chain of custody. Some medical-specific courier firms also offer an integration of this data into the Laboratory Information System (LIS) utilized by their client.

Where annual expenditures were $2.6 million, approximately $600,000 per year was saved after the medical courier service conversion.

(Source: Lab Logistics)

Advanced systems employ Global Positioning System (GPS) technology for tracking each specimen from customer to laboratory. GPS technology also allows the laboratory to analyze the routes, and sample pickup and drop-off times to maximize efficiency and cost effectiveness.

By utilizing a logistics system that includes a dedicated courier, medical laboratories can manage all aspects of specimen transport, including handling and tracking of specimens; medical security, chain of custody, and tracking; and, in addition, supply inventory and delivery. Successfully executed, all of these functions can generate financial improvements and even leverage when negotiating contracts.

3 Coordinating Test Kits, Supplies, Reagents, Lab Equipment, and Instruments

A sufficient supply of laboratory test kits, supplies, and reagents relies on a sophisticated system of forecasting optimal delivery by supply type; cost controls and expected cost variances; customer service; and other factors that are relevant and unique to the hospital, health system, reference or physician office lab.

Monitoring inventory with a focus on overhead risk reduction is vital to a smooth-running clinical diagnostic laboratory. **Primary issues to consider include:**

- Client-specific inventory,
- Temperature data logging,
- Optimal minimum and maximum inventory,
- Replenishment logistics, and expiration of products.

Physician office laboratories, for example, face a number of challenges when dealing with clinical diagnostic laboratory supplies and kits, whether they are point-of-care kits used in the doctor's office or those used in off-site clinical laboratories. First, physician office laboratories are known to need low unit-of-measure (LUM) quantities—they don't have the room or the need for a large volume of supplies. Customizing delivery of laboratory supplies and test kits that are appropriate for practice and setting, while accounting for reasonable and adequate volume, creates delivery efficiencies, reduces waste, and ultimately controls costs.

Additionally, logistics solutions that leverage advanced radio-frequency identification (RFID)[9] tracking offer more efficient inventory control. With the RFID method, test kits that include passive RFID tags provide real-time, trackable data for senders, recipients, and the various kits and media in transit. They also provide automated alerts for kit replenishment.

Another benefit of RFID is pre-accessioning, or allowing the receiving area at the laboratory to sort prioritized specimens without needing to open the package.

Finally, another component of inventory management is order management—how and from whom the laboratory orders supplies.

An inventory management system that tracks orders allows for:

- Easily ordering supplies and managing client catalogs,
- Specific order process per client,
- Ability to access detailed order history, and
- Set quantity limits on orders and flag orders that require special approvals.

It cannot be understated that every laboratory is different and has different reagent and supply requirements, as well as storage space needs. Reviewing inventory management optimization strategies should take place routinely.

4 Approaching a Medical Courier Service Conversion

LAB LOGISTICS INITIATIVE 1 Constitution Diagnostics Network

Constitution Diagnostics Network is a joint venture between Western Connecticut Health Network and Sonic Healthcare. It was formed in early 2017, with the goal to improve laboratory services for individuals, the hospital system, and healthcare providers throughout Connecticut.

THE HOSPITAL SYSTEM SOUGHT

To manage its own dispatching, no missed pickups, better access to the couriers and courier service, consistent and efficient routes, analysis, ability to access client information, and a customized courier presentation (identification, uniforms).

WHAT HELPED

Weekly reporting that assessed details of each pickup made return on investment more visual.

"We were able to modify the routes to be both more flexible and more efficient. We found that some drivers were doing daily pickups, and we weren't getting any specimens. Our internal systems didn't have any of that information," explained former General Manager of Constitution Diagnostics Network Mike Napolitano. "We identified that some clients were on vacation, they had stopped using the laboratory altogether, or weren't doing that type of laboratory work anymore. It really opened our eyes."

LAB LOGISTICS INITIATIVE 2

Ochsner Health System is a not-for-profit healthcare system based in southeast Louisiana. Ochsner Health System is the largest healthcare system in Louisiana. Its flagship hospital is Ochsner Medical Center, located in Jefferson Parish, La., close to the New Orleans city limits.

About two years ago, the system converted to a new courier system.

Ochsner Health System

THE HEALTH SYSTEM SOUGHT

Courier service for laboratory specimens and materials, as well as pharmacy and other types of medical courier needs. Noted: One of Ochsner's hospitals is a trauma center about six hours from its main campus and is outside the typical courier route network.

WHAT HELPED

1. Centralized dispatch, barcode, and other tracking systems generated efficiencies and significant cost-savings.
2. Pharmacy delivery services and delivery of the completed paperwork for the home infusion program.

For Ochsner Health System laboratory services, a typical route to its Baton Rouge hospital is 90 miles away. "Originally this was a big loop," explained Lloyd Gravois, Jr., Assistant Vice President of Logistics–Supply Chain for Ochsner Health System. "With the change, we avoided 'hot shots,' which are special request, one-time delivery pickups," Gravois said, adding that Ochsner uses barcodes on the coolers the drivers use, which allows the coolers to be tracked wherever they are.

For the health system's home infusion services, Gravois said the program requires that drivers drop off equipment, drugs, and an instructional video to patients' homes. "Upon arrival, the drivers instruct the patients or caregivers to watch the video and make sure the required paperwork is signed. They also deliver the completed paperwork back to the pharmacy," Gravois said. "These are a specialized group of drivers, and they take a class to qualify for this home infusion delivery program."

LAB LOGISTICS INITIATIVE 3

A large midwestern hospital system acquired a failing system with 11 hospitals.

THE HOSPITAL SYSTEM SOUGHT

To dramatically reduce spend, improve services, and create a scalable system.

WHAT HELPED

Courier system analysis and a 60-day transition plan. Duties of internal FTEs and the external vendor were absorbed on an accelerated timeline.

A third example explains initiatives that followed the acquisition of a system of 11 hospitals by a large midwestern hospital system. In this case, courier needs were handled through a combination of full-time employees, with vehicles, and an outsourced vendor.

Risks noted included inaccuracies and delays. Among the many needs at the time, an immediate transition (rather than 60 days) became urgent.

Results included a 25% reduction in STAT runs, $2.1 million in immediate cost savings, and an increase in both on-time delivery and correct recipient delivery to 100%. The hospital system also saved over $2 million in annual printing costs, with no additional transportation costs. The hospital estimated gains at approximately $2 million per year, as well as $1.5 million per year for its central pharmaceutical delivery service.

Chapter 3:

Minimizing Disruptions Through Specialized Specimen Management, Supply, Logistics Communication and Reporting

In a 2018 article in *The Journal of the International Federation of Clinical Chemistry and Laboratory Medicine*, Damien Gruson wrote, "The consolidation of laboratories, the evolution to an integrated care network as well as an environment of consumerization are disrupting laboratory services and operations.

"The switch to SMART (Speed Metrics Automation Remote Technologies) digital laboratories-based health ecosystems depends on several prerequisites for success," Gruson continued. "Intelligent processes, integration of big data and real-time data management, automation, blockchain, Internet of Things and enhancement of user experiences are key elements of the SMART digital laboratory. Safety, security and cost-effectiveness are pillars for the credibility and transferability of such SMART digital laboratory environments."[10]

Leveraging overall logistics technologies in the clinical diagnostic laboratory offers ways to reduce risk and avoid disruptions in laboratory services, including:

- Specimen receipts can be scanned and entered automatically;
- Detailed data that include time, patient information, tracking number, and kit details can be collected and monitored;
- Shipments delivered versus specimens received can be tracked and reconciled; and,
- RFID tag tracking can improve specimen receipt efficiency.

Customer service has become an increasingly important aspect of healthcare, and the clinical diagnostic laboratory must be prepared.

Furthermore, "Being able to resolve issues efficiently and correctly requires that information be readily accessible and at the representatives' fingertips. This is probably the most difficult to attain because it requires the efforts of the Information Technology departments and the testing sections, but once the information is in place it can be updated and it contributes tremendously to the overall efficiency of the services provided by the laboratory," as Victoria Anderson noted in *Lab Medicine*.[11]

A system that handles client information and is fully integrated into all the other important aspects of the laboratory supply chain—specimen collection, transport, monitoring, kit, supply and inventory management—is another tool to assist laboratory managers and staff in providing better customer service, while also improving efficiencies within the enterprise.

In addition, linking the data related to the types and volumes of tests, delivery times, kit and reagent supplies to client information, provides a greater ability to proactively manage client relationships.

An integrated client management system offers several advantages, including:

- Ability to manage client data and key logistical information;
- Automated email notifications for supply and shipment alerts;
- Client-level access for ordering and reporting;
- Detailed order and specimen delivery reports;
- Proactive and effective management of client relationships;
- Maximized value for every sales opportunity;
- Improved sales productivity;
- Assignment, management, and tracking all client-related tasks; and,
- The ability to set up any external and internal key metrics for graphing and tracking.

Conclusion

Outsourcing logistics and courier services in some situations allows healthcare providers to stay focused on their core strengths. These are the strengths that maintain high quality patient care, assure accreditation standards, and prevent errors that can lead to quality failures.

The supply chain and logistics needs of hospitals, health systems, and clinical diagnostic laboratories are highly complex.

Competitive laboratories maximize efficiency, increase profitability, and decrease costs over the long run when they leverage not only effective medical courier services but those that utilize digital technologies.

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About the Author

Mark Terry is a freelance writer and editor specializing in the life sciences—biopharma, clinical diagnostics, genetics, and medical practice management. He has written literally thousands of articles, white papers, market research reports, and more than 20 books. He earned a Bachelor of Science degree in microbiology and public health and worked in clinical diagnostics for 18 years prior to turning to writing. He lives in Michigan.

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Susan Uihlein brings 30-plus years of experience in healthcare management, including logistics operations and business development. Her consultative approach is always focused on being a valued asset to laboratories, hospitals, and their customers. As such, she believes that extending a compassionate patient focus to the critical links that comprise specimen handling and transportation is essential to high quality medical care.

About Lab Logistics

Lab Logistics provides the transportation of medical specimens, supplies, pharmacy, and any other needs of each department of a hospital, healthcare system, or laboratory. We witnessed the immense amount of stress, pressure, and demand faced during the COVID-19 Pandemic.

Lab Logistics provides dedicated medical courier services exclusively for the hospital and laboratory industry. We return significant transportation savings to our clients using dedicated routes, advanced barcode technology, and years of industry experience.

Our staff is highly experienced in the economics and execution of all methods of medical specimen transportation and logistics, treating each specimen as if it was our own.

Lab Logistics provides its customers with performance tracking reports, service-level and financial dashboards, and online "real-time" tools to help organizations manage transportation spend.

To learn more about Lab Logistics, contact Susan Uihlein at **suihlein@LabLogistics.com.**

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