

An inventory solution *built around real lab practice*

Overlooked, ignored, or simply a hassle, inventory management is rarely the central focus of any laboratory.

With 72% of labs managing their inventory manually, and 10% working without any inventory management system at all¹, the right solution can make for significant savings in time and costs, in addition to optimizing operational efficiency and effectiveness. Shifting from pen and paper-based inventory management to an automated capture system provides obvious and immediate benefits. The amount of time invested by lab technicians on ordering, inventory reconciliation, and searching for reagents and supplies is significantly reduced, as is the likelihood of human error. A solution that is built around specific needs and designed to provide tailored support can help alleviate bottlenecks and streamline all aspects of inventory management.

More importantly however, automated systems generate ever-growing bodies of data that can be parsed to provide powerful insights on inventory status, replacing cumbersome manual documentation processes. Based on the system's analytical capabilities, informed decisions can be made to anticipate the lab's needs. For example, by preempting understocking, an automated system can drastically reduce the risk of stockouts and the need for expensive rush orders. Similarly, overstocking and the expenses associated with storage and expiration of surplus product can be avoided.



Roche Inventory Solution 5.0 helps you to

- Eliminate time-consuming manual tracking
- Reduce the need for frequent and tedious manual stock counts
- Ensure users fulfil their service-level agreements and deliver on-time results
- Enable continuous monitoring of stock levels for lab managers
 - Provide a complete audit trail
 - Provide information on who used what product when
 - Offer broad-ranging oversight of key cost drivers
- Automate ordering processes, through integration with systems in the lab and across the organization
- Save costs in transportation and waste disposal

At Roche, we are committed to providing laboratory staff with simple, reliable, and effective solutions. The latest version of the Roche Inventory Solution, RIS 5.0, represents a radical upgrade of the existing solution (RIS 4.x), and was developed by taking on board customer feedback, to offer users a more flexible and user-friendly management solution for laboratory inventory, built around specific requirements. Featuring a completely new platform, a redesigned hand-held device, and a host of new workflows, RIS 5.0 provides laboratories with the tools they need to optimize supply chain processes. The solution understands and responds to real-world needs, readily integrates into existing environments and helps laboratories of all shapes and sizes deliver on their promises.

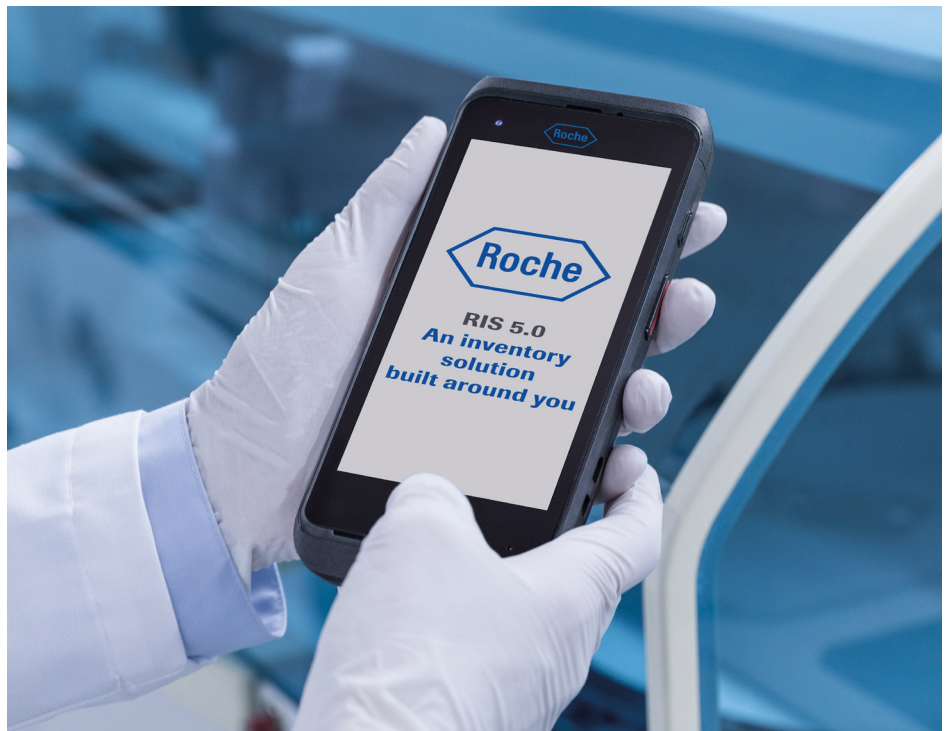
An overview

RIS 5.0 consists of two key components: the platform and the scanner.

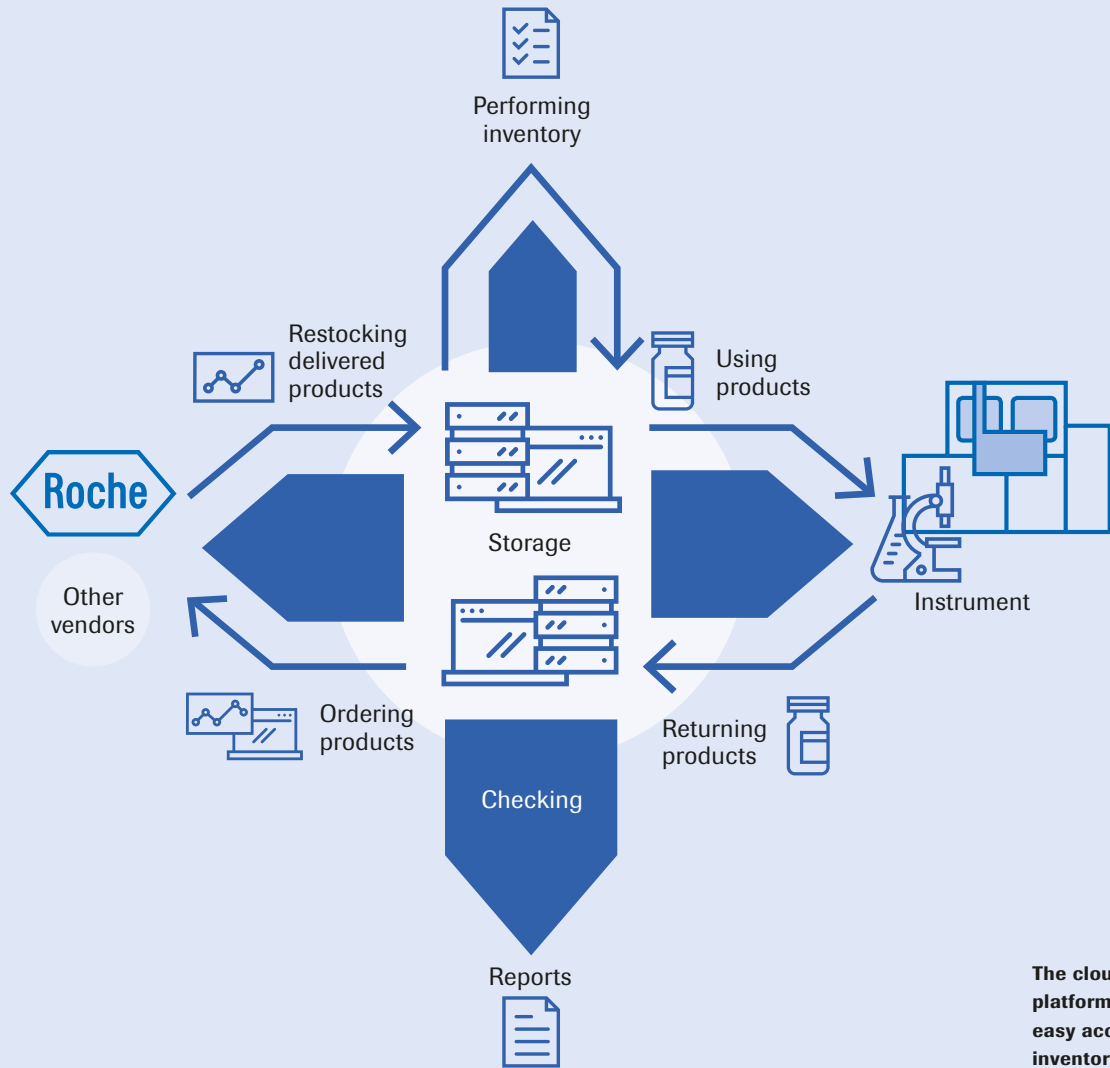
The simple, hand-held barcode scanner is the principal tool for laboratory technicians. Products are scanned with the hand-held device upon arrival, automatically added to the laboratory inventory, and assigned a modifiable, user-defined location.

The barcode scanner is also used to scan products upon removal from storage or transfer to a different location. RIS 5.0 helps laboratories manage their entire inventory processes from end to end. Furthermore, it provides support for manual delivery and lots quarantine workflows. Once incoming products have been scanned, the system can provide powerful, actionable insights on inventory status. Configurable alerts ensure

that technicians select products according to expiry date, optimizing usage and avoiding waste. Reminders can also be set to support scheduled recounts of valuable or hazardous stock. RIS 5.0 can alert users about upcoming shortages based on user-defined minimum and maximum stock levels, and can propose or, if desired, automatically trigger restock orders as required (with options to create different replenishment schedules for different types of products). This allows labs to optimize use of valuable space, minimize the need for costly rush orders, eliminate many of the errors associated with pen-and-paper-based inventory management, and avoid stockouts and surplus inventory.



The hand-held scanner has been redesigned – and comes with extensive new functions



The cloud-based platform provides easy access to inventory information

The cloud-based, browser-ready platform – accessible via desktop or tablet – allows lab managers to monitor the status of their entire inventory in real time, providing full transparency on a key cost driver, and offers a host of distinct perspectives depending on user needs. Inventory can be visually grouped based on a range of parameters (e.g., supplier, expiration date, order status, location), with the option to create tailored movement or consumption reports and perform subsequent, more in-depth analyses.

Lab managers have complete control over system use and access, with the ability to create, modify, or delete users, ensuring all personnel have the appropriate level of system access. By supplying detailed information on all movements of products within the system (who moved what, where and when), the system reduces the need for time-consuming manual tracking and provides global

oversight on inventory usage and availability, as well as the means to fulfil reporting needs and comply with regulatory requirements.

Crucially for large laboratories with decentralized stocking, the RIS allows standardization and streamlining of processes across multiple sites.

For the IT team, the cloud-based platform offers two immediate benefits: security and support. Not only is RIS 5.0 secure by design, the outsourced platform means that vulnerabilities and risks are monitored and managed as part of the service, to the highest standards of regulatory compliance. The service also include 24/7 support, to complement the expertise and effort in the in-house team.

An inventory solution *built around you*



RIS 5.0 offers powerful and cost-effective laboratory inventory management that prioritizes ease of use, and is driven by industry-standard barcode technology. It thereby avoids some of the obstacles to automated inventory solutions posed by RFID technology and delivers a solution that is built around individual needs.

The use of a barcode-based system over, for example, newer radio-frequency identification (RFID), is a deliberate choice based on careful consideration of the many advantages offered by this technology. Its versatility means it can be adapted to meet the needs of laboratories of all sizes and degrees of automation. Furthermore, barcode scanning supports third-party products, eliminating the need for time-consuming relabeling. In addition, the technology integrates easily with existing software infrastructure and requires minimal hardware costs. Barcode technology makes RIS 5.0 flexible and responsive to specific laboratory needs.

Its alternative RFID has huge potential for the future. Currently, however, many healthcare facilities are not yet in a position to fully adopt, embrace and benefit from this

technology. Moreover, for all the advantages it promises, RFID has a number of downsides that are all too often swept under the carpet by proponents of the system.

Standardization across vendors

Foremost while developing RIS 5.0 was the goal to produce a reliable, practical and useable system. Barcode-based systems are well-established and have proven their effectiveness. Importantly, they benefit from a level of standardization unrivalled by newer technologies.

To date, the adoption and widespread use of RFID has been hindered by the lack of standards, with multiple electronic and labelling protocols currently coexisting. Different vendors may use different protocols which means time-consuming relabeling and retagging of inventory items may be necessary.

This increases both hardware expenditure and effort as facilities need to invest in specialist tag-printing equipment, before manually relabeling stock.

Integrating third-party products

In the lab inventory management context, this issue is particularly evident where orders from multiple vendors are concerned. Not all manufacturers use RFID tags at all, while others may use any of a variety of formats. While RFID is generally proposed as a solution for labs with large inventories, the larger the lab, the more manual relabeling required. Thus, despite the promise of complete automation, RFID-based systems continue to suffer from several drawbacks that necessitate manual intervention. Barcodes, on the other hand, are present on all lab consumables – including low-cost basics – making it significantly easier to integrate items from multiple suppliers into one inventory management tool.

Overcoming the barriers

Since barcode reading relies on line-of-sight scanning, staff receive instant feedback on the accuracy and success of a scan. Though RFID inherently demonstrates a greater degree of automation, it is also more susceptible to error with much higher miss rates. Typical obstacles to accurate reading include environmental factors, such as temperature and humidity, ambient radio noise and object geometries and occlusions. All of these can impact and interfere with correct object detection and identification. In addition, there are large variations in tag receptivity and detectability even within the same product batch, which can lead to inconsistencies.²

Tag orientation, one tag obscuring another or electromagnetic interference can severely impact the accuracy of RFID reading. “Unfortunately, RFID tags are not necessarily the most cost-effective and workable solution in today’s global supply chains. Constraints include: higher costs; interference caused by certain materials; upgrading equipment may be necessary; RFID may be incompatible in other countries, DCs or warehouses.”³

Lower infrastructure overhead

Another major drawback of RFID-based systems is the associated infrastructure and high cost. Products are checked in and out by RFID antennae installed at lab entry and exit points. While the system theoretically allows

non-line-of-sight tracking of products within the laboratory, this is only possible in locations in which corresponding RFID antennae have been installed.

Apart from installation and maintenance costs, an RFID solution may involve increased running costs if products from other vendors need to be tagged, as described above. The price per tag ranges from 15 cents to \$1 or more, depending on various factors.

Additionally – and unlike the barcode system where the user can be identified when they activate the scanner – RFID provides no information on the identity of the individual handling the product. This complicates auditing of inventory management. There are also issues with reliability, where object detection probabilities as low as 66% have been reported.⁴

Furthermore, though this technology is newer, it is less versatile and a high number of hardware components mean costly maintenance. If lab configurations change, the RFID infrastructure must be altered accordingly, whereas barcode technology keeps working without needing any change of reconfiguration. “The integration of RFID into existing practices requires considerable investment from organizations; reengineering the business and aligning the systems takes time.”⁵

Thus, preparing the existing infrastructure for RFID is costly and time-consuming. RIS 5.0 is fast and simple to adopt and can be easily integrated into existing infrastructure and processes.

Staff training and acceptance

Everyone is familiar with the existence and the principles behind barcodes. RFID on the other hand, is a modern technology that is yet to be widely established. As such, it not only encounters greater resistance and acceptance barriers but it also requires a much higher commitment to staff training. RIS 5.0, on the other hand, is based around intuitive, familiar processes that help to keep training costs down while increasing the likelihood of good acceptance rates.

RFID-based systems promise potential for the future.

But their adoption and use are currently limited by

- Standardization issues requiring manual workarounds
- Prohibitive infrastructure costs
- Auditing issues
- Obstacles such as tag orientation, environmental conditions or electromagnetic interference

By contrast, RIS 5.0 uses barcodes for

- Minimal infrastructure costs
- Seamless integrated into existing workflows
- Minimal staff training
- Compatibility with items from multiple vendors

A host of benefits



Offline activity is stored, and synchronized to central storage when a connection is re-established.

Meeting the needs of ERP-based ordering processes

RIS 5.0 is designed for maximum compatibility with existing supply chain management systems, and can be integrated with an institution's ERP system or customized interfaces.

Orders can therefore be sent and approved in a way that matches the client's standard administrative procedures. This allows for routing of purchase orders via the customer's own ERP system, which is necessary in order to obtain order approval in many institutions.

RIS 5.0 comes with a range of features and benefits specifically developed in response to customer feedback. The result is a more intuitive, user-friendly, and powerful inventory management system for labs of all sizes and disciplines.

- Simpler, more streamlined use allows the lab manager to delegate more tasks to technicians.
- Smoother integration of the system with the client's own systems and processes.
- New workflows allow for the management of internal replenishment and quarantine processes.
- Users can tailor the system and its output to their needs, thanks to new options for customization

Supporting offline use

The rugged, intuitive hand-held scanner has been redesigned for greater ease of use on the laboratory floor. Its offline mode ensures optimal functionality in laboratories with absent, limited, or unstable WiFi coverage, and allows lab technicians to perform their workflows wherever necessary. The mobile device buffers all data necessary for workflows on the device, and then synchronizes this with the server whenever a connection to the internet is re-established (such as once the device is returned to its cradle).

Processing non-RIS orders on the scanner

One of the key features of RIS 5.0 is its ability to manage orders that were not created in the system itself. This could be orders for Roche products submitted by phone, for example. But it could also be products that are not even manufactured by Roche but by third-party vendors. This openness to inventory from other vendors is, of course, complemented by using established barcode standards, thus avoiding additional tagging workarounds (as described in "Standardization across vendors".)

Orders not initiated via the RIS (that is, sent to Roche by phone, fax, or email) will nonetheless trigger an advance shipping notice (ASN) to the RIS. This can be used to incorporate the order into the RIS, so they can

be tracked in the same way as RIS-generated orders, and recognized when scanned upon arrival. In the case of non-Roche products, relevant product information (vendor, product name and number, lot number, Global Trade Identification Number (GTIN), etc) provided by the supplier in Excel format can be uploaded to the system, and the system configured to recognize this format for import of subsequent orders, precluding the need for manual entry of relevant order information.

Reassigning inventory flexibly for multi-site labs

RIS 5.0 can be extended to support the internal transfer of products between multiple organizational units within a lab, or geographically separated organizational units within an organization. This function is particularly valuable in large institutions, such as hospitals where multiple labs are replenished from a central warehouse.

A new workflow has been developed to allow internal transfer of products using the hand-held device and the establishment of user-defined internal replenishment processes, to which technicians are alerted via the hand-held device.



Telephone orders – and orders not placed with Roche – can now be accommodated on demand, using the scanner.

Controlling the correct use of inventory

Another new feature of RIS 5.0 is the quarantine function. This is crucial in laboratories in which samples from new lots must be validated on the lab's instruments before the entire lot can be released for use. RIS 5.0 allows for new lots to be automatically locked into quarantine and released only after successful validation.

In some cases, inventory may require extra oversight. This can include hazardous chemicals or stock that is particularly valuable. Here, RIS 5.0 reminds the user who is responsible about scheduled recounts when they login. The reminder includes the location or bin – to keep the process as streamlined as possible.

Customization options

While RIS 5.0 comes with a standard view for each role (affiliate user, lab manager, lab technician, etc.), users will also be able to tailor the system according to their needs, with options to personalize their dashboards with the relevant widgets, customize system output by adding or removing columns from reports, and prefiltering certain views.



Inventory can be quarantined until it has been validated.

Summary

Laboratories are critical components of the healthcare continuum, the end goal of which is to continually improve patient safety and care. RIS 5.0 is a simple yet powerful solution that addresses key barriers to laboratory supply chain management, and demonstrates that safe and economically sound patient care need not be mutually exclusive. Since barcodes are already present on the vast majority of items stored and used in the lab and RIS 5.0 leverages barcode technology and hand-held readers, the system requires minimal

investment in terms of IT infrastructure. Instead, it offers a simple solution that can be implemented with ease.

Moreover, RIS 5.0 avoids many of the common pitfalls of RFID, such as the need to attach multiple tags, incorrect tag orientation, electromagnetic interference and having to install multiple readers, to name just a few. The system is designed for reliable, cost-effective operation and delivers the tools laboratories need to optimize efficiencies regardless of their size and budget.

Furthermore, it is the ideal choice to support facilities as they change and grow; for many, providing a starting point for automated inventory management, while leaving scope to adapt as future needs evolve.

As such, RIS 5.0 is a versatile, flexible answer to today's inventory management challenges, built around the specific needs of its users both today and tomorrow.

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¹ Data on file, SmartLab 2016.

² L. Bolotnyy and G. Robins, 'Multi-Tag RFID Systems', International Journal of Internet Protocol Technology (JIPT), special issue on "RFID: Technologies, Applications, and Trends", eds. M. Sheng, S. Zeadally, Z. Maamar, and M. Cameron, 2007

³ Pros and Cons: The Use of RFID for Inventory Management, <https://veridian.info/inventory-management/>

⁴ L. Bolotnyy and G. Robins, 'Multi-Tag RFID Systems', International Journal of Internet Protocol Technology (JIPT), special issue on "RFID: Technologies, Applications, and Trends", eds. M. Sheng, S. Zeadally, Z. Maamar, and M. Cameron, 2007

⁵ Michael, K & McCathie, L, The pros and cons of RFID in supply chain management, Proceedings of the International Conference on Mobile Business, 11-13 July 2005, 623-629