YOUR GUIDE TO EFFECTIVE INVENTORY MANAGEMENT
WHY FOCUS ON YOUR INVENTORY?

On average, labs manage up to 1 million samples\(^1\). The inventory store of samples can be one of the most valuable and expensive assets in any research and development (R&D) lab.

A report by The Tufts Center for the Study of Drug Development estimates the cost of getting just one new prescription medicine into market exceeds \$2.7 billion\(^2\). It’s a huge sum of money. With roughly \$10\) billion being spent on R&D each year by top investors in the space, 40\% of which is scientific, one can understand why R&D organizations are looking to cut their spending and streamline processes to get the most out of their investment.

Given the pressure, this has encouraged companies in the industry, from biopharma to food and beverage and petrochemicals, to take a more data-driven approach to research – reusing data generated from past projects to achieve better insight, solve other scientific problems and continue to innovate.

With so much at stake, your inventory is a good place to start. Standardized inventory management enables organizations to minimize risks, reduce expenses and embrace opportunities.
WHAT’S YOUR INVENTORY WORTH?

To fully understand the impact of poor inventory management, we must first ask, ‘what is the value of inventory? Stanford University recently estimated their samples to be worth over $8 million per lab, or a total value of $2.8 billion across all their labs.\(^3\)

THE IMPORTANCE OF GOOD INVENTORY CONTROL

Being aware of your reagents and materials and their status can improve safety. Here’s how: with good inventory management, if an item is expired, it’ll be flagged to the user, who should dispose of it correctly. Throwing out expired reagents means there is no risk to personnel, and there is less chance of using it in another experiment, triggering costly rework.

Understanding the source of errors is vital to enforce GxP compliance. Was the balance out of calibration? How many experiments was it used in? With an integrated inventory system, you can quickly identify the root of the issue.

With poor inventory control, you’ll only be able to manage stock that you can see, with little added benefit to optimizing the process. It’s what you can’t see that makes a difference – reagents that are bought but never used, and those not reflected in the inventory system, so they are forgotten.
Inventory management is more than defining storage locations, and monitoring expiry dates; a key part of managing your inventory is labelling your samples and material accurately to recall the right information when they’re being consumed.

When labelling is done manually, it’s easy and common for personnel to misread words, invert the numbers, put a decimal point in the wrong place and skip lines in the text while transcribing. These mistakes can continue to cascade down the line.

These mistakes can continue to cascade down the line. Imagine a situation where the wrong concentration of a sample is provided, it gets diluted incorrectly, and you can get unexpected results in analysis. Introducing simple technology such as barcode scanning and label printing technology (Bartender™ or Zebra™) eliminates the risk of accidental mistakes through manual entry, helping to increase accuracy and productivity.

And it’s much faster, too. Research has demonstrated that scientists using a barcode scanner in the lab are ten times more productive.
IMPROVE TRACEABILITY AND REPRODUCIBILITY

Being able to successfully reproduce an experiment validates it. So, when the BBC reports more than 70% of scientists can’t replicate their colleagues’ work, that’s worrying. How can we be sure that the study is reliable? Scientific integrity and reproducibility depend on accuracy and traceability in reporting.

While electronic data capture drastically reduces the number of transcription errors and boosts accuracy, a barcode scanner on its own isn’t enough. There’s still the issue of tracking the genealogy of your samples from origin to end product, which can be challenging when there are gaps in the data and information is siloed. What you need is a holistic data management system with ELN functionality and an inventory management platform built-in.

Such a platform can grab all the information needed and collate it in a single location for reporting that is easy, quick, accurate, regulatory compliant and, above all, accessible. With consistency in labelling, quantity measures and reporting standards, each sample can be traced back to its origin to form an audit trail. Creating genealogical linkages and automatically generating usage logs enables scientists to go back and understand what materials were used to create a sample, or when a sample was split or pooled.
Having your items in stock silos at multiple locations has its limitations; losing track of the inventory levels can lead to storing more than required. While it is common for scientists to hoard inventory at convenient locations around the lab, this informal inventory is not controlled, increasing the average amount of inventory held in the official store by 264%⁵. Considering the average cost of a single container of reagent is about $12.50, expenses can add up.

Consequently, labs are paying to store items that are not (and will never) be used. Once they expire, disposal also adds to the costs.

Materials are often duplicated, and hoarded inventory creates false data on the use of materials, making it look like materials usage is more volatile than it really is. In 2015, Merck & Co. investigated their labs and recovered more than $1.7 million in assets and $190,000 in glassware, cutting costs on consumables by about 25%, and liberating 6000 square feet of lab space (valued at $4 million) – in just 5% of their labs⁶.
SMART STORAGE SOLUTIONS
REAP REWARDS

It’s not just a matter of ‘do we have it in stock, and where is it stored?’ but also ‘how is it stored?’. Materials should be stored in conditions that offer the least resistance – but are still in line with SOPs and good laboratory practice (GLP).

Let’s take ultra-low temperature freezers as an example. Cold storage is essential for biological samples, but even here, there’s wiggle room to cut costs.

First, there’s the space. To efficiently arrange clearly labelled samples, those with shorter expiry dates should be at the front, within easy reach, while those with longer expiry dates should be behind them. This allows researchers to access the samples and materials they need quickly.

When samples are well-organized, they are easier to find, and more freezer space is available, so more samples can be stored in the same location. IDBS’ E-WorkBook Inventory, supports the concept of boxes and nested boxes – scientists can define a freezer box with 24 positions a specific location. For example, you can allocate a sample to A1, and within that position, put in a smaller freezer box for 48 sample vials.

**In addition, E-WorkBook Inventory enables scientists to:**
- Upload inventory details in bulk
- Visualize the locations of their items using a ‘stadium view’
- Quickly identify occupied and empty spaces in a box.
Without a management system detailing the location of inventory items, researchers can waste time every day simply searching for items required in their experiment. This lost time costs the lab money, as the more time scientists are looking for samples, reagents, materials or equipment, the less time they are at the bench conducting science.

And once these items are found, who's to say they're in good condition for their intended purpose? In 2005, the US National Cancer Institute began a lung cancer study, for which they spent $12 million collecting biological samples. But after a few months of collection, it was found that 99% of the samples had not been preserved suitably to maintain consistent quality levels and so were not fit for use. The study was cancelled, costing the organization millions.10

If they had been aware of the quality issues of their samples through an integrated management system, things could have had ended differently.

With E-WorkBook Inventory, scientists can see their inventory at an experiment and project level, and can even filter search results by manufacturer, status and GMP items, among other criteria.
IMPLEMENTING A NEW STRATEGY

There has been a paradigm shift in R&D, where the worth of samples, materials and equipment are treated as valuable assets. This approach demands a comprehensive item management strategy; streamlining data capture and optimizing search tools.

Any item management platform needs to follow samples throughout their entire journey – from collection, to use, and disposal. It must identify, store, track, and associate materials and each sample with experimental results. Also, equipment need to have a log and traceability of updates, such as calibration dates extending.

Enter IDBS’ E-WorkBook Inventory module, an inventory management software platform built to address a lab’s inventory concerns across the entire R&D space. In combination with its family of E-WorkBook modules, its key benefits hit all the major pain points.

**E-WorkBook Inventory:**

- Reduces operating costs and minimizes risk
- Streamlines scientists’ daily workflow by being directly integrated into their experimental workflows and so inventory can be accessed without leaving E-WorkBook or associated modules like Advance
- Maximizes opportunities and optimizes the value of samples for use in the future
- Facilitates GxP reporting and compliance.
WHAT CAN E-WORKBOOK INVENTORY OFFER YOU?

Our E-WorkBook Inventory module forms part of an integrated platform, addressing the most common challenges labs experience every day:

ITEM MANAGEMENT – each sample, material and piece of equipment is tracked by quantity and location. With Inventory, you can see if a bottle is unopened, as well as the approximate value of the material within. You can allocate them a defined freezer box location, from which you can see all meta-data associated with those samples. Equipment, locations and statuses are recorded and tracked, and any updates made to inventory items are logged in the item history, leaving a clear audit trail.

SEARCHING AND FINDING ITEMS – searching with E-WorkBook Inventory enables you to find items within your Inventory or Advance spreadsheets with speed and ease – creating genealogical linkages between the items to boost traceability. By filtering your search results by date range, default field, quantity or status, the platform provides a snapshot of all the relevant information you need, when you need it, so that you can make informed decisions accordingly. Drill down into box locations to see sample information at each location and see the available spaces within.

COMPLIANCE REPORTING WITH ACCURACY – E-WorkBook Inventory captures all corresponding meta-data automatically and collates it in a single place, making reporting a breeze. Each item used in the experiment is tracked from collection to usage, and through to disposal, maximizing traceability through hierarchal relationships. The integrated system provides a full, contextualized picture of all the item details at the time of use and flags any equipment that has not been calibrated, or samples and reagents that have expired.

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E-WORKBOOK INVENTORY IN ACTION

Say you need to create a buffer for your experiment. You’ve already identified the reagents you need: acetic acid and sodium acetate. But are they in stock? By running a quick search query for acetic acid, you can filter the results based on supplier or brand. This functionality enables organizations to add a layer of location permissions – to reserve stock, or to segregate materials for GMP.

Once the buffer has been created, it’ll be given an expiry date and a defined storage location. In fact, Inventory enables you to see where it is in the storage room, as well as its position in its box.

With just a few clicks, you can update the status of the buffer, amend its quantity from, say, ‘Unopened’ to ‘100 ml’, and check if the balance and pH meter are within calibration.

But it goes further than that. This holistic approach to inventory management means all relevant information associated with this specific bottle of your buffer is visible, including the experiments it was used in. Need to view the history of the item? No problem – a usage log records any updates performed, who made them and when, providing full audit history.

E-WorkBook Inventory is seamlessly integrated with E-WorkBook, so while you are performing your experiments and creating new samples, you can dynamically reference, access and write information to and from Inventory. All actions are recorded and logged at the time of usage. So, if there’s an issue, there’s a clear audit trail to follow up on, making GxP compliance and validation easier.
To find out more about how our Inventory module can help you improve your inventory management to save you both time and resources, please get in touch with our experts today.

REFERENCES