Lab & production services

The science and art of lab management - the value of the lab manager role

The average estimated research and development cost of bringing a new drug to market is more than USD $1.3B with a median cost of over USD $985M.[1]

To keep pace with continued demand for new drugs, the burden of cost, and increasing bottom line pressure, pharmaceutical companies look to improve efficiency and optimization so research teams can advance discovery quickly.

However, the responsibility for managing efficient, optimized labs often falls to the scientists themselves. In a typical lab set-up, lab management duties are often divided among several researchers, each tasked with managing specific tasks, from glass washing to waste bin disposal to inventory management.

For example, in one pharmaceutical company that Avantor works with, lab management duties were divided among several scientists, each spending an estimated 10% to 20% of their time on these vital — but non-core — scientific responsibilities. Even as they're working to make the next breakthrough discovery, they are also dealing with numerous challenges that take the focus away from their mission.

[1] https://jamanetwork.com/journals/jama/fullarticle/2762311

KEY LAB MANAGEMENT CHALLENGES

Timelines are more compressed than ever

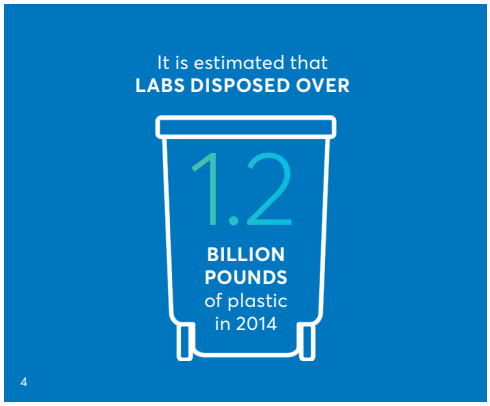
Drug developers recognize that improving lab operations and productivity can significantly help them earn the advantages of being first to market. One analysis showed that first movers boast a market share six percentage points higher ten years after launch.[2] Pharma and biotech companies able to improve speed and lower costs stand to reap significant benefits if the investment puts the drug into the market ahead of competitors.

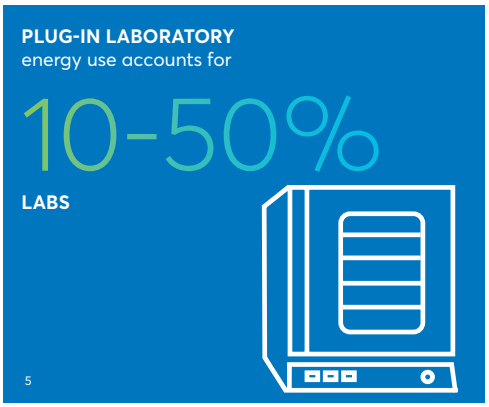
Accelerated timelines also mean that researchers must spend more of their time doing the highly skilled work that generates intellectual property, and evaluating new ideas. Sorting out how, and why, contaminated glassware ruined their assay, costing $70,000, takes time away from the high-value work.

Sustainability is moving beyond reduce, reuse and recycle[3,4,6]

One study estimated that in one year (2014) bioscientific research generated approximately 5.5 million tons of lab plastic disposable waste, which was equivalent to 83% of the plastic recycled worldwide in 2012.[6] Furthermore, labs consume approximately five to ten times more energy per square foot than office buildings.[7] As organizations and their leaders focus more on developing sustainability as a core value, from the lab bench to the boardroom, those with lab management responsibilities are being challenged to reduce waste and decrease the lab's impact on the environment.

Accomplishing these goals requires labs to go beyond recycling and programs, and to adopt aggressive, integrated programs grounded in data. Comprehensive and sustainable inventory management that ensures the **right product is in the right place at the right time** plays a key role in efforts to reduce costs as well as eliminate redundancies and inefficiencies, particularly when managing multiple labs and operating sites. Likewise, chemical and equipment management contribute as well. The drive to build more sustainable operations demands that labs increasingly leverage comprehensive inventory management, combined with digitization and predictive analytics. These initiatives can help perform the complex calculus that allows labs to manage the triple bottom line: spend management, social responsibility and sustainability.





[2] https://www.mckinsey.com/industries/pharmaceuticals-and-medical-products/our-insights/pharmas-first-to-market-advantage
[3] http://www3.weforum.org/docs/WEF_The_New_Plastics_Economy.pdf
[4] https://act.mygreenlab.org/about.html
[5] https://www.sciencemag.org/features/2016/04/adding-efficiency-general-lab-equipment#
[6] Urbina, M., Watts, A. & Reardon, E. Labs should cut plastic waste too. Nature 528, 479 (2015), https://www.nature.com/articles/528479c; See also for instance https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8209715/
[7] https://www.mygreenlab.org/blog-beaker/how-my-green-lab-is-cleaning-up-rd

Labs must manage the unexpected

The world at large plays a role in lab management as companies must deal with events that are often beyond their control. For example, COVID-19's impact on the industry was far-reaching, forcing those with lab management roles to deal with everything from sorting onsite schedules that minimized footfall in a facility, to ensuring social distancing measures. All while dealing with potential supply backlogs or shortages as they restarted projects that had been pushed to the back burner in the pandemic's immediate wake.

Likewise, Brexit has had a significant impact on laboratories in the United Kingdom, preventing labs from accessing critical resources. Team members charged with tasks like procurement had to move beyond simply acquiring resources and instead become vocal advocates for their scientific communities' needs.

Challenges to creating the lab of the future

From self-checkout kiosks to life cycle equipment management software, labs have already started to leverage advanced technology to optimize resources and increase productivity. But, as the demands of timeline acceleration, sustainability and external events increase, so does the demand to make the lab of the future a reality now – rather than later.

Personnel who handle lab management tasks are typically charged with supporting digitalization initiatives. From sourcing new chemical management software, to scheduling training for a new HPLC kit, or testing PPE-detection technology, non-dedicated lab managers may struggle to balance smooth, effective implementation with their scientific duties.

The lab of the future is also being challenged to do the same amount of - or more - work in less lab space, whether that means working in a shared lab facility or moving to a lab with a more compact footprint. Scientists who serve double duty as lab managers may find themselves doing less discovery. Instead, time is spent on the work of optimizing and downsizing, from identifying equipment redundancy, to re-evaluating workflows or optimizing storage.

Managing day-to-day lab operations

As labs are challenged by these meta trends, scientists doing double duty as part-time lab managers must also juggle day-to-day operational tasks, including:

Routine lab activities

To be effective and improve lab efficiency and productivity, scientists support a wide range of routine activities that must be carried out with the same scientific precision as the assays on the bench, including:

- **Health and safety procedures:** Those with part-time lab management responsibilities often play a key role in supporting the initiatives that keep personnel safe and maintain lab compliance. Communicating health and safety updates with teams and organizing safety audits, plus dealing with safety issues as they arise, requires personnel with the skills to ensure a safer and higher-quality working space.

- **Compliance and control processes:** Part of keeping labs in operation is ensuring change control and Good Manufacturing Practices (GMP) compliance for the individual scientific areas. For example, GMP research labs may rely on double-duty scientists to help maintain GMP compliance, ensuring processes are carried out robustly. They also need to make sure that all equipment is calibrated and checked in accordance with GMP-relevant legislation and that change controls are completed from both the perspectives of facilities management and GMP compliance.

- **Sustainability initiatives: As labs increase their sustainability efforts, they need the people power to facilitate those programs. In addition to actively encouraging teams to reuse and recycle, scientists may be asked to step away from research to initiate programs:** increasing freezer temperature from -80°C to -70°C, to save energy without impacting sample integrity, for example. Likewise, the use of Internet-of-Things technology, like wireless sensors or "smart" plugs, have a learning curve. New devices may require the scientist to learn how to use that data to continually optimize energy usage, as well as to quantify sustainability efforts to all stakeholders.

Project management

Whether the lab needs to set up an emergency cyanide response, clear chemical stores or conduct controlled substance audits, double-duty scientists often find themselves devoting valuable research and discovery time to managing projects.

For example, organizations may tap a scientist to help set up new labs or support relocation. Whether it's shutting down one space, managing the movement of consumables and glassware or facilitating OEM equipment reinstallation, this requires scientists to serve as a single point of contact (SPOC) — to both their scientific team members and service providers — to ensure transitions are as smooth as possible and new spaces are set up in the most efficient way.

Outdated lab management paradigms aren't well-suited to today's challenges

Another key lab management challenge is that the "traditional" model that spreads operational responsibilities across several scientists is no longer the most effective way to ensure researchers can help bring life-changing treatments to market faster. Organizations are starting to recognize that this traditional lab management model creates numerous challenges, including:

Lack of clear accountability: When multiple people share small portions of operational responsibility, it limits clarity around who's in charge — and who may need to take action.

Lack of transparency: Distribution of non-core responsibilities across several scientists may prevent them from having a holistic view of lab operations. This can lead to inefficiencies, from redundant equipment to consumables overspend.

Misaligned skillsets: Just as a doctor doesn't necessarily have the skill set to efficiently operate the business side of their medical practice, a scientist often doesn't have — or may not want to use — the skill set to run their lab like an efficient business operation. Even though that can reduce risk, costs and time and, ultimately, get treatments to market faster.

Time taken away from science: Every moment a scientist spends scheduling equipment maintenance or searching for a specialty product is valuable time not spent on the work required to develop innovative intellectual property or accelerate drug development and speed to market.

Given the critical role of managing day-to-day operations, labs should consider the value of a lab manager able to blend the science and art of lab management. An ideal solution would embed an experienced lab manager with a scientific background onsite, possibly responsible for multiple sites across an organization, who is dedicated to managing non-core tasks so scientists can focus on scientific research and development.

A LAB MANAGER: ADDING VALUE TO THE LAB EVERY DAY

Whether it's a seemingly simple shelving change that creates more inventory space or a significant workflow shift, expert lab managers combine the science and art of lab management to add value – every day – for the scientists and organizations they support.

Faster time to market: Scientists unable to access the resources they need when they need them are scientists unable to drive innovation and discovery. The right lab manager enables speed and efficiency every day, whether they are ordering consumables, scheduling calibrations or managing reagent availability. With an experienced professional who has the right processes and tools to coordinate day-to-day operational needs, the scientist is empowered to help get treatments to market more quickly.

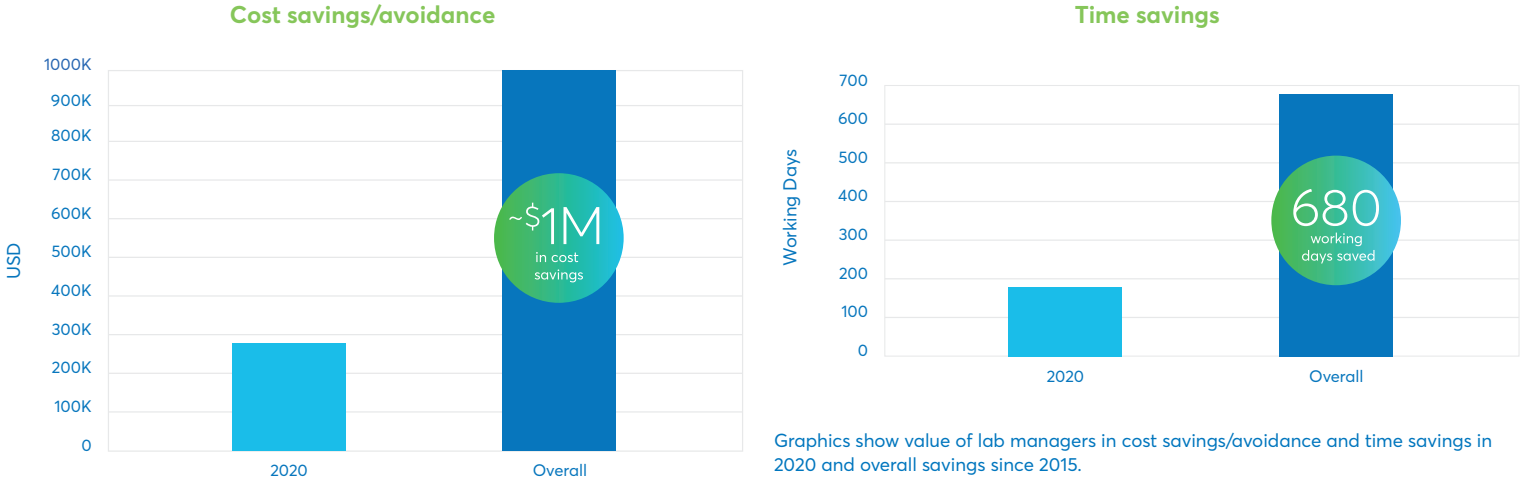
Lower cost of discovery: Lab managers proactively look for ways to save money or reduce the costs of waste. Whether they are optimizing workflows or managing equipment and consumables, they help prevent costly downtime and speed up the discovery process. With an in-depth knowledge of the science and workflows as well as relationships built with people in the space — from lab techs to supplier reps — they can help build connections that, for instance, lead to the rediscovery of forgotten equipment or consumables. These can then be put back into reuse, saving money.

Dedicated lab managers save time and money.

Lower chance of rework and delays: Lab managers support quality in a lab space by utilizing their skills to deliver faster, more cost-efficient research and development that's less likely to encounter delays. By taking ownership of non-core operational tasks, the lab manager ensures equipment and consumables are available, giving time back to the scientists so they can concentrate fully on scientific work and improve delivery of scientific data.

In addition, the lab manager can influence quality by facilitating control and compliance. That might entail ensuring work in the lab space is GxP or ISO compliant and that relevant supporting paper or electronic documentation is available. Lab managers can also serve on safety or compliance audit teams and can help ensure findings are recorded appropriately and proper subsequent actions are taken to create a safer, higher quality lab space.

Increased sustainability: Lab managers work closely with facilities management and scientists to implement green initiatives and best practices wherever possible. They support teams in reducing energy, water, waste and space footprints without compromising



Graphics show value of lab managers in cost savings/avoidance and time savings in 2020 and overall savings since 2015.

research, from supporting power-down programs to implementing recycling for plastic bottles and non-contaminated lab plastics.

Beyond that, a lab manager can help change mindsets to build a culture of sustainability. For example, they can initiate partnerships with a group like My Green Lab, a nonprofit dedicated to improving sustainability through awareness, action and optimization. https://www.mygreenlab.org/

Potential for better retention and recruitment: Scientists as a group are passionate people who enter that line of work because they want to make a difference in the world. Researchers whose focus is divided because they're taking on lab management duties may feel like their core skills aren't being fully utilized. A lab manager, who is often also a trained scientist, applies that same passion to lab operations, serving as a constant resource in the lab space. This quality has the potential to help retain team members pushing through this new era of discovery, in which needs constantly evolve and breakthroughs happen quickly. Organizations that invest in a lab manager may also be more appealing to top talent than a lab that assigns operational duties to scientists.

Provide a convenient Single Point of Contact (SPOC): It's not unusual for special jobs to arise that need to be addressed quickly. On any given day, a lab manager might report concerns to facility management, manage equipment repairs, support the relocation or removal of lab, or submit and manage change controls. Often, they also work on various ad hoc issues involving communication with lab users.

A designated SPOC in a lab can offer huge efficiency gains. For example, scientists no longer need to stop their work to search for the OEM warranty for malfunctioning equipment, call service and schedule maintenance. Instead, they stay at the bench doing the intellectual work of discovery while the lab manager handles the situation and follows through as needed, minimizing downtime and any related impact on the work.

Leverage the art of lab management: Managing a lab is a science itself, but there's so much more to the role than understanding how to leverage tools and processes to drive efficiency and optimization. An effective lab manager is also skilled at working with the individual people they support.

As a partner in science, the lab manager is an ideal collaborator able to engage all their stakeholders, from research scientists and suppliers to R&D or QC managers and facilities managers. Lab managers can also serve as an advocate, helping scientific teams see value in — and embrace — changes like updated workflows or new inventory vending machines.

Lab managers are also well positioned to connect people and ideas within their lab ecosystem. Because they have a 360-degree view of the teams and their work, lab managers can make connections that otherwise might not happen. Facilitating watercooler-type moments, like a conversation that shares innovative best practices, have tremendous potential to move discovery and science forward.

THE SOLUTION: OUTSOURCING THE LAB MANAGER ROLE

There is a science to lab management — and to providing a specialized professional with the skills, background and resources to optimize lab operations and help researchers move their science forward. Avantor's Lab Manager Concept, launched in 2014, is a successful example of this service.

Each Avantor lab manager has a scientific background that aligns with a lab's unique needs. By using a fit-for-purpose approach, we ensure a best-in-class understanding of a lab's operational needs and the expectations of the scientists and support teams. In addition, Avantor lab managers are GxP trained and compliant in a given area. Depending on a lab's needs, a lab manager may focus on one lab space or manage several within an organization.

Many of our lab managers are trained in Lean methodologies or project management. Adept at working with a lab's internal teams and external supplier partners, our onsite lab managers provide support to all types of lab operations projects, including those with an innovation element. Consider the increasing role of digitalization as a tool to advance efficiency. An outsourced lab manager from Avantor can lead a project to integrate tablet computers into the workflow used by scientists to book service or support.

In this service-on-demand type of experience, a scientist could, within a few clicks, order a media reagent made onsite, request equipment removal or ask for support using equipment. The lab manager, who is often a "super user" of a given tool or technology, would support that technology rollout and, once the technology is in use, continue to optimize it.

Furthermore, Avantor has developed a lab manager network, allowing our lab managers in participating labs to exchange ideas, share best practices or innovations and ensure the best level of service for their individual operations, while maintaining client confidentiality. And, as part of the full Avantor team, an Avantor lab manager can connect with any of our subject matter experts around the globe to support improvements in logistics, equipment, procurement, business processes (such as Lean Six Sigma) and other critical lab functions.

Advancing the future of lab management

Even with the latest digital research tools and other advanced systems available for today's researchers, many research organizations still find themselves hampered by the cost, time and effort it takes to efficiently manage life sciences lab operations and move new treatments from discovery to delivery faster.

As science has evolved, so has the potential value that a professional lab manager like those offered through Avantor's Lab Manager services can provide. As new needs and challenges arise, Avantor lab managers can apply the science — and art — of lab management to support better efficiency and optimization so scientists can bring life-changing new treatments to market faster.

About Avantor Services

Avantor Services is an industry leader in laboratory facility and technical, scientific services, with over 1,500 highly skilled associates deployed across the U.S., EU and Asia. We provide turnkey solutions in lab supplies, equipment life cycle, bio sample, chemical and solvent management that help labs run more efficiently, effectively and sustainably. Our technology development teams build industry-leading systems that leverage the latest technological innovations, including IoT and AI, to reduce operating costs and drive discovery.

Please visit our website at avantorsciences.com/lab-production-services to learn more about lab management services and read success stories.

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