

LAB

R E P O R T E R

Science Innovations and Discoveries

NO. 3, 2020

 Productivity

Navigating Change: How Labs Are Adapting and Staying Productive

Also Featured:

How to Use Lists to **Streamline Repeated Orders**

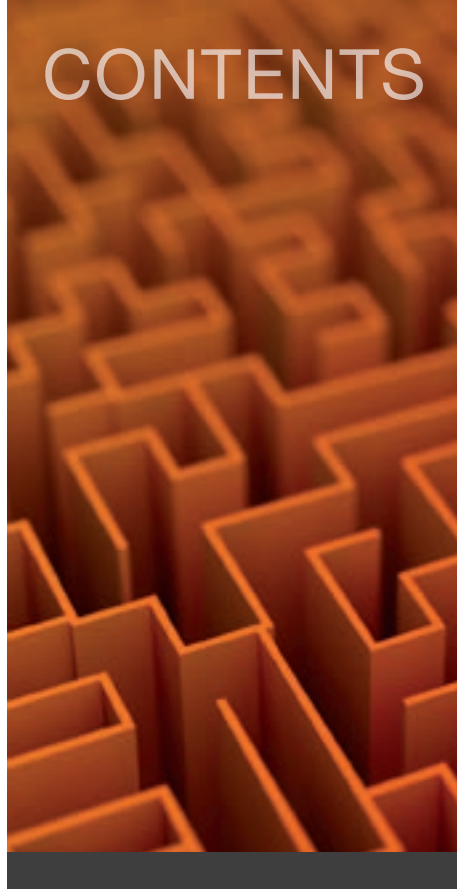
Finding **New Ways** to Go Digital

Omics for Faster Drug and Vaccine Development

Workplace Safety at the Forefront of 6S Lean System

Inspire Innovation with the Right **Lab Design**

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How to Use Lists to Streamline Repeated Orders

By Mike Howie

Keeping your lab stocked can be repetitive and time consuming. Maybe you need to reorder tubes, or chemicals, or filters. Maybe you need all that and more. With the My Lists feature on fishersci.com and fishersci.ca, repeating orders is quick and easy. It takes the guess work out of finding specific products and helps boost lab productivity.

Getting Started

Lists let you save preferred products for future reference and add them to your cart as needed. All you need to start creating lists is a Fisher Scientific web profile, which you can create for free on fishersci.com or fishersci.ca. Once signed in, you can create personal lists from multiple places on the website and view your lists by selecting the My Lists item in the Your Account dropdown menu.

Company lists are also available to certain users on fishersci.com and fishersci.ca. These lists are created and managed by one user in an organization and available to other users within the same organization. To get started with company lists, contact Fisher Scientific Customer Support:

- U.S.: FisherSupport@thermofisher.com
- Canada: help@thermofisher.com

Creating Lists

You can create new lists from the My Lists page, any place on the website that allows you to add products to your cart, and from inside your cart.

- To create a new list from the My Lists page, simply click the Create a List button
- To create a new list while browsing or in the cart, click the Add to List button and complete the Create a New List section of the popup

You can create as many lists as you need. If there's a list you use frequently, you can set it as a default to help you save time. Your default list will load immediately when you navigate to the My Lists page without the need to choose it from the menu.

Adding products to your lists is just as easy and can be done from search results, product pages, and your cart — just click the Add to List button and select your list. Once you've added products to a list, you can customize product descriptions by clicking the pencil icon within the list. You can also sort the list based on different criteria: catalog number, description, date added, and title.

Tip: To customize list order even further, add numbers to the beginning of product descriptions then sort by description.

Ordering from a List

Once you've created a list, you're ready to start ordering. Simply select the right list from the dropdown on the My Lists page. You can either add products to your cart individually or add multiple products to the cart at once.

- To add products individually, click the Add to Cart button next to the product

- To add multiple products at once, enter the needed quantities for each product and then click Add Item(s) to Cart — each product with a quantity will instantly be added to your cart

If a product is discontinued, you'll see a note with the product in your list.

You can save quantities to your list to streamline repeated orders that you need in the same quantities. Just add quantities to your products and select Retain List Quantities from the List Options menu.

And if you need more information about a product before ordering, click on the catalog number to visit the product page. When you're ready to go back to the list, just click your browser's back button to return to where you left off.

Sharing Lists

My Lists also makes collaboration even easier. Once you've made a list, you can easily email it to your colleagues. Similarly, you can upload lists your colleagues have created and shared with you.

To share a list, you'll first need to export it.

- Choose your list on the My Lists page
- Select Export List from the List Options menu
- Choose if you want to include descriptions
- Click Export to download a Comma Separated Value (CSV) file, which can be opened in a spreadsheet program like Microsoft Excel

You can then share the CSV file with your colleagues, who can import the list to their own Fisher Scientific account.

Importing lists is just as easy.

- From the My Lists page, select Import List from the List Options Menu
- Click Choose File
- Open the CSV file from your file browser

Lists are a simple but powerful tool that can help you save time in the lab and stay focused on what really matters: your work. They're easy to create and with just a few clicks they can help you order all the products you need.

Want to learn more about using the Fisher Scientific website?

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Five of the Most Useful Transformations in Modern Organic Synthesis

Since World War II, the monumental efforts of the pharmaceutical industry in pursuit of new biologically active molecules have been a major force in the evolution of synthetic organic chemistry. Incredible creativity has produced decades of chemical knowledge, with new discoveries from a toolbox of efficient reactions. This has enabled the synthesis of complex, multi-functional molecules.

During the past 25 years, several scientists have received the Nobel Prize for synthetic methodologies that have changed the way chemists approach molecular design. Palladium-catalyzed cross-couplings, asymmetric hydrogenation, epoxidation, and olefin metathesis have led to the development of completely new synthetic strategies. These have played a key role in the discovery and synthesis of L-Dopa,¹ Ledipasvir, Losartan,² Atorvastatin, and other new and important drugs.

Despite this, modern synthetic organic chemistry is often perceived as a more-established discipline with limited innovation. While its role remains the foundation of new drug discovery and development, R&D efforts have moved to other areas,^{3,4,5} mostly to the interface of biology and chemistry. From this perspective, chemical strategies have clearly evolved from the end of the 1900s to present day.

Brown and Boström⁶ analyzed medicinal chemistry literature in 1984 and 2014 and found that a limited number of reactions dominated the chemical landscape. With few exceptions, the

most common reactions of 1984 were still being used in 2014. carbon-carbon cross-coupling was the only new entrant, and an increase in amide bond formations and decrease in heterocyclic synthesis were the only other significant changes.

The five most common reactions, representing over half of the total number of references, are:

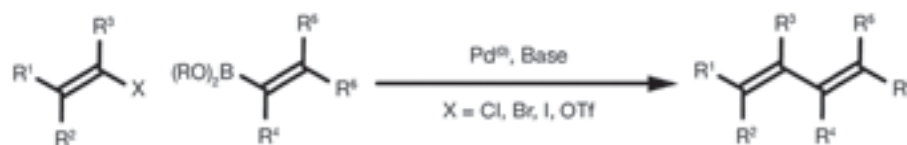
- Aromatic nucleophilic substitution (S_NAr)
- Alkylation of amines/nucleophilic substitution of alkyl halide
- Amine protection and deprotection
- Amide synthesis
- C-C cross-coupling

Aromatic nucleophilic substitution and the nucleophilic substitution of alkyl halides are “historical” chemical transformations. They are well-known, robust, and efficient. The first has been

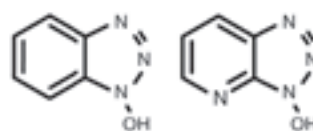
used since the early 1950s and is the method of choice for functionalizing aryl compounds. However, it is being replaced in favor of the more robust Pd-catalyzed Buchwald-Hartwig C-N coupling for synthesizing aromatic amines.

The second reaction, alkylation of amines, remains a primary tool for synthetic chemists despite its release of a halide side product, which is not environmentally friendly. It also requires relatively high temperatures.

Because amine functionality in bioactive molecules is very common, amine protection and deprotection reactions are widely utilized in synthetic chemistry. The method of choice is the mild and high-conversion carbamate formation, a reaction between the amine and the BOC (tert-butyloxycarbonyl) protecting group, chemically a di-tert-butyl dicarbonate (Boc₂O). The deprotection of the protected amine is a simple carbamate hydrolysis that takes place in acidic conditions.



Suzuki-Miyaura cross-coupling reaction



Triazole reagents for amide synthesis

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These first three reactions have remained unchanged. Their simplicity, broad substrate scope, and robustness make them extremely practical and offer flexibility for synthesizing multi-functional compounds.

The fourth reaction, amide synthesis, includes a long-time standard: the Schotten-Baumann reaction or acylation of amine by acyl chlorides. It proceeds rapidly and results in high conversion at room temperature, but suffers from the instability of the acyl chlorides, hazards related to their decomposition, and the release of a hydrochloric acid by-product.

Progress in the field of peptide synthesis presented an opportunity to address these shortcomings and inspired a significant update to this chemistry. The use of carbodiimides and, more recently, hydroxybenzotriazole, aminium/uronium, or phosphonium salts to generate highly activated ester intermediates has completely displaced the use of acyl chlorides and the Schotten-Baumann reaction.

The fifth and final reaction addresses a major organic synthesis challenge, the formation of C-C bonds. Carbon-carbon cross-coupling, the newer entrant in the ranks, represents one of the biggest revolutions in organic chemistry and has rapidly become ubiquitous in fine chemical synthesis. The discovery by Akira Suzuki, Ei-Ichi Negishi, and Richard Heck won the Nobel Prize for Chemistry in 2010.

Among the various types of cross-coupling, the Suzuki-Miyaura⁷ reaction — usually called “Suzuki coupling”

— arguably has the broadest utility and applicability. The Suzuki chemistry is based on the Pd(0) catalysed coupling of an aryl or vinyl halide with an aryl or vinyl boronic acid. This reaction was discovered at the end of the 1970s and has gained greater popularity since 2000, almost completely displacing the use of organozinc and organostannane compounds.

These top five reactions tell us a story of tradition and exemplify a constant and often subtle flow of innovation. Three of them have fundamentally remained the same, one evolved significantly in its application protocol, and one represents a completely new transformation.

New discoveries like C-C cross-coupling may provide leaps forward and profoundly change the chemical landscape. But innovation is more often driven by organic changes in applications and reaction conditions⁸ inspired and driven by research in related fields. The aromatic nucleophilic substitution and BOC protection/deprotection haven't changed, while amide synthesis has benefited from progress in peptide chemistry, where it offered a solution to an existing problem.

Robustness, flexibility, broad substrates, and reaction condition scope unify these reactions and explain their popularity.⁹ Nonetheless, the importance of other, more niche transformations cannot be understated. While not as frequently used as the “top five,” they still play key roles in a chemical space that would otherwise be inaccessible.¹⁰

The commercial availability of starting materials, building blocks, and reagents will continue to play a significant role in the development of the field. Thermo Fisher Scientific's Acros Organics and Alfa Aesar brands offer a comprehensive portfolio of fine chemicals, reagents, and chemical essentials. Find products in everyday sizes and bulk quantities to support synthetic organic chemists from the early stages of R&D to advanced process chemistry and production.

Visit fishersci.com/buildingblocks or fishersci.ca/buildingblocks to find the right products for your work.

1. W. S. Knowles, (2002). *Angew. Chem. Int. Ed.*, 41 (12): 1998–2007
2. R. D. Larsen et al. *J. Org. Chem.* 59, 6391 (1994)
3. P. Ball, Chemistry: Why synthesize? *Nature*, 528, 327–329 (2015)
4. G. M. Whitesides, *Angew. Chem. Int. Ed.*, 54, 3196–3209 (2015)
5. T. Laird, *Org. Process Res. Dev.*, 14, 749 (2010)
6. *J. Med. Chem.*, 2016, 59, 4443–4458
7. *Chem. Commun.* 1979, 20 (36): 3437–3440. *Chemical Reviews* 1979, 95 (7): 2457–2483. *J. Chem. Soc., Chem. Commun.*, 1979, 0 (1): 866–867
8. J.G. Donaire et al., *J. Am. Chem. Soc.*, 140, 355–361 (2018)
9. J.Boström, et al., *Nat Rev Drug Discov.* 17, 709–727 (2018)
10. K.R. Campos et al., *Science*, 363, 244 (2019)

Productivity



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Choosing the Right Sterile Water for Pharmaceutical, Biopharmaceutical, and Medical Device Manufacturing

Different grades of water quality are required for manufacturing therapeutics and medical devices.

Water is the most widely used substance, raw material, or starting material in the formulation, processing, and production of these products. It has unique chemical properties due to its polarity and hydrogen bonds, enabling it to dissolve, absorb, adsorb, or suspend many different compounds.

These compounds may include contaminants that represent hazards themselves or that may react with substances in the intended products to create a health hazard. Choosing the correct grade of water is also important for complying with GMP, ISO, and USP requirements.

Chemical purity, endotoxin content, and particulate content are important considerations when choosing the correct water. Basic guidance on appropriate applications for water can be found in USP <1231>. These attributes should be considered the “minimum” requirements, and more stringent controls may be

needed to ensure suitability for specific applications and products.

Because microbiological content control is a significant aspect of water quality, sterile water is considered the highest grade and requires the most validation and process controls. Sterile water is packaged and sterilized to help preserve microbial quality throughout its shelf life.

Intermountain Life Sciences offers a full portfolio of USP Sterile Water in quantities from 500 mL to 200 L. These products are manufactured under cGMP and ISO 13485 guidelines in an FDA-registered facility. They're suitable for upstream and downstream media and buffer preparation in your biopharmaceutical manufacturing applications.

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Sterile Water for Irrigation, USP Grade

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- Contains no antimicrobial or bacteriostatic agents or added buffers
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Sterile Purified Water, USP Grade

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Description	Grade	Quantity	Packaging	Cat. No.
Water for Injection, Sterile	USP/EP	4 x 4 L	Biotainer	Z0104
		20 L	Bioprocess Bag	WFI-EPZ-20L
		200 L	Bioprocess Bag	WFI-EPZ-2XL
Water for Injection, Sterile	USP	6 x 500 mL	PET Bottles	WFI-USP-5XM
		6 x 1 L	PET Bottles	WFI-USP-1X6
		10 L	Bioprocess Bag	WFI-USP-10L
		20 L	Bioprocess Bag	WFI-USP-20L
		100 L	Bioprocess Bag	WFI-USP-1XL
		200 L	Bioprocess Bag	WFI-USP-2XL
Water for Irrigation, Sterile	USP	6 x 500 mL	PET Bottles	WIR-USP-5XM
		6 x 1 L	PET Bottles	WIR-USP-1X6
		4 x 4 L	Biotainer	Z0304
		20 L	Bioprocess Bag	WIR-USP-20L
		200 L	Bioprocess Bag	WIR-USP-2XL
		6 x 1 L	PET Bottles	WPW-USP-1X6
Purified Water, Sterile	USP	20 L	Bioprocess Bag	WPW-USP-20L
		200 L	Bioprocess Bag	WPW-USP-2XL

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TCI DualSeal Bottles: Two Layers for Safety and Protection

Some chemicals, especially those used in organic synthesis, are sensitive to air and moisture and react — sometimes violently — when exposed to oxygen or water. In 2017, TCI introduced their patented DualSeal reagent bottles to provide an air-free environment for these highly reactive reagents, making it possible to handle them in a safe and effective manner.

The blue outer cap has an inner Teflon layer that helps maintain an air-tight seal, even when the inner septum has been pierced. The colorless inner cap septum has two layers of rubber and one of highly chemical-resistant PTFE (polytetrafluoroethylene). The septum is large enough for easy access and self-seals after being pierced to maintain conditions inside the container, even after repeated use. The DualSeal cap is attached or removed normally. For everyday use, remove just the outer cap, and remove (unscrew) the inner cap when you dispose of the bottle.

Steps for Safe Usage

- Clamp or otherwise secure the reagent bottle before opening
- Carefully unscrew the outer cap and place it near the bottle
- Insert a needle into an inert gas line (Ar, N₂) through the Teflon seal
- Retrieve the amount of reagent needed
- Purge the headspace with inert gas and remove the needle
- Replace the outer cap and screw tightly into place (do not place tape or other material between the caps — it can significantly reduce seal quality)
- Unclamp the bottle and return it to storage

To remove the inner cap for disposal:

- Clamp or otherwise secure the bottle and remove the outer cap
- Grasp the inner cap and remove it; use pliers as needed
- Avoid spillage; be aware that residual chemical may exist on the underside of the cap
- Dispose of caps and bottles cautiously after removing any remaining chemical

Content provided by:



TCI Reagents Packaged in DualSeal Containers

Reaction	Chemical	Cat. No.
Reductions	Lithium Aluminum Hydride (10% in Tetrahydrofuran)	L0170
	Lithium Borohydride (ca. 4 mol/L in Tetrahydrofuran)	L0186
	Triethoxy[5,5,6,6,7,7,7-heptafluoro-4,4-bis(trifluoromethyl)heptyl]silane 90+%	T3246
	Lithium Triethylborohydride (ca. 12% in Tetrahydrofuran)	L0190
	Sodium Bis(2-methoxyethoxy)aluminum Dihydride (70% in Toluene)	S0467
Bases	Triisopropylsilane 98.0+%	T1533
	Sodium Methoxide (ca. 5 mol/L in Methanol)	S0486
	Potassium tert-Butoxide (12% in Tetrahydrofuran)	P1619
	Sodium Bis(trimethylsilyl)amide (contains 2-Methyl-2-butene) (38% in Tetrahydrofuran)	H0894
Lithiation	Lithium Bis(trimethylsilyl)amide (ca. 26% in Tetrahydrofuran)	H0915
	Lithium Chloride (2.3% in Tetrahydrofuran)	L0222
Lewis Acids	Boron Trifluoride, Ethyl Ether Complex 98+%	B0527
	Titanium (IV) Chloride (14% in Dichloromethane)	T2052
	Zinc Chloride (ca. 7% in Tetrahydrofuran)	Z0019
Nucleophiles	Diethylzinc (ca. 17% in Hexane)	D3214
	Diethylzinc (ca. 15% in Toluene)	D3902
Solvent	1-Butoxy-2-propanol 96+%	B0864
Protection	N-Trimethylsilylimidazole 98+%	T0585
	Bromotrimethylsilane 95+%	B1087
Catalysis	Tetraisopropyl Orthotitanate	T0133

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Description	Quantity	Cat. No.
Trigger Spray Bottle	32 oz.	04-355-250
Plastic Jug	1 gal.	04-355-71

Tax-Paid Ethanol

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Packaging	Quantity	200 Proof (100%)	190 Proof (95%)	140 Proof (70%)
		Cat. No.	Cat. No.	Cat. No.
Glass Bottle	1 pt.	07-678-004***		
Glass Bottle	1 pt.	07-678-006		
Plastic Bottle	1 pt.	04-355-222***		
Plastic Bottle	1 pt.	04-355-450		
Plastic Bottle	1 gal.	04-355-451	04-355-454	07-678-001
Plastic Bottle	5 gal.	04-355-452*	04-355-455*	04-355-351
Poly Bottle	5 gal.	22-032-104**	22-032-106**	
Drum	55 gal.	04-355-456	04-355-457	
Metal Container	55 gal.	04-355-460	04-355-461	

*Spigot closure

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Finding New Ways to Go Digital

By Kylie Wolfe

With the constant introduction of new technologies, life in the lab continues to evolve. Scientists today have different ways of conducting their work than, say, scientists 50 years ago. Many are using technology to advance their research, contributing valuable information and insights to collaborative efforts, and improving science and society.

Technology in your lab can not only make collaboration more effective, but enhance your day-to-day processes. With the creation of laboratory information management systems, electronic lab notebooks, and other digital platforms, it's easier than ever to stay organized and share information.

Finding New Ways to Manage Data

Managing laboratory data can be complex, but it's imperative and requires consistent organization. Laboratory information management systems (LIMS) digitize hard-copy record keeping to streamline operations. They can help you track inventory, minimize errors, and improve the quality of your results.

With a LIMS, you can efficiently manage hundreds, if not thousands, of samples. These systems make it easy to store, track, and organize them to meet the needs of your lab. You can assign unique IDs to samples and maintain a profile of information for each patient, including demographics, medical history, and other insights.

Protecting your data is just as important as effectively managing it. LIMS also allow you to grant access privileges to certain users to protect your information and prevent unauthorized access.

Going Digital

Sharing and storing laboratory data hasn't always been simple. Traditional spreadsheets and paper notebooks are common, but cumbersome. Electronic laboratory notebooks (ELN) can help you exchange physical notes for digital ones.

Sorting through file cabinets to track down a protocol you worked with five years ago can use up valuable time. Not only is it hard to find what you're looking for, but once you've found

the right notebook, you may notice that you left out a key step or can't read your writing. Without the right level of detail, it's challenging to achieve reproducible results. And you can't exactly go back in time. With ELNs, you can access custom protocol templates, import images, and add annotations with a simple search.

Finding the right ELN for your colleagues can make data creation and retrieval more efficient, optimizing your time, effort, and funds. Sharing projects and protocols can also make it easier to collaborate with and support your fellow scientists.

Collaborating Inside the Lab and Out

According to labfolder.com, only 10 percent of researchers use ELNs. But with an ever-growing digital trend, this may be another opportunity for scientists to remain at the forefront of innovation.

And as laboratories faced unexpected closures at the beginning of this year, many had to rely on digital platforms. Though this was more challenging for laboratories where experiments require hands-on attention, it was necessary to find creative ways to stay productive.

It's easier than ever to stay organized and share information

Researchers kept in touch through video conferencing, online chats, screen sharing, and other collaborative programs. Lab meetings went virtual as many turned to technology to keep colleagues connected.

As a scientific community, there are many ways to continue sharing, innovating, and discovering. Maybe you'll find a new way to not only manage your lab's data, but to maintain a more digital presence in the future. ⚙️

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Use these tubes for tissue culture and clinical chemistry applications. Fisherbrand Disposable Tubes with Plain Ends are made of 51 expansion borosilicate glass to reduce changes in pH and contamination from substances that can leach from soda lime glass.

Dimensions	Capacity	Quantity	Cat. No.
10 x 75 mm	4 mL	1,000/Case	14-961-25
12 x 75 mm	6 mL	1,000/Case	14-961-26
13 x 100 mm	10 mL	1,000/Case	14-961-27
15 x 85 mm	13 mL	1,000/Case	14-961-28
16 x 100 mm	15 mL	1,000/Case	14-961-29
16 x 125 mm	19 mL	1,000/Case	14-961-30
18 x 150 mm	23 mL	1,000/Case	14-961-31
10 x 75 mm	28 mL	500/Case	14-961-32
20 x 150 mm	36 mL	500/Case	14-961-33
25 x 150 mm	55 mL	500/Case	14-961-34





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 Productivity

Setting the Stage for Sample Management Success

By Kate Meola, Regional Marketing Manager, Eppendorf North America

It's critical that laboratory samples are kept safe. They represent thousands of invested dollars and countless hours of hard work.

Much of a sample's life is spent stored at a constant temperature in an ultra-low-temperature freezer. Typically, DNA, RNA, proteins, mammalian cells, bacteria, and other cells are stored at -80° to -86° Celsius. Protecting your samples during long-term storage requires a vessel that is optimized for cold storage conditions and offers safe and reliable identification.

Many labs struggle with sample management and use inadequate vessels and procedures that are manual, inefficient, and prone to error. To optimize sample safety and establish a foundation for a successful sample management program, consider the following factors:

- Laboratory disposables — Depending on sample storage requirements, using the wrong vessel can result in contamination or devastating sample loss
- Sample labels — Samples may be lost or sacrificed if their labels are illegible due to peeling, fading, or poor handwriting
- Sample documentation — Inadequate record-keeping and tracking can have disastrous consequences

“In fact, according to a study published in the *Archives of Pathology and Laboratory Medicine* of identification errors in the lab, 55 percent are attributed to labeling errors.”¹

Robust sample management is no longer just for high-throughput labs, but for any lab looking to overcome costly and avoidable sample loss pitfalls.

Protect Your Lab's Most Important Assets

The Eppendorf SafeCode system was designed to handle samples with the utmost security and protection. With high-quality barcoded vessels and an easy-to-use code reader, the system includes both Eppendorf CryoStorage Vials and the Eppendorf RackScan barcode scanner.



High-Quality Vessels and Design

Eppendorf CryoStorage Vials are made from high-quality polypropylene and manufactured in a class VIII cleanroom. Available in Eppendorf Quality or sterile purity grades, these vials are free of detectable RNase, DNase, human DNA, and endotoxins (pyrogens). With a

temperature range of -196° to $+121^{\circ}$ Celsius, they're suitable for a wide variety of samples and storage conditions.

Features

- Pre-racked and precapped for convenient handling and clean conditions
- Rack capacity of either 48 or 96 vials, depending on volume class
- Locking latches on both sides of the rack lid for safe closing and easy opening
- Twist-lock bottoms prevent vial rotation for easy manual or automated screw cap opening and closing

Dependable Identification

To make sure your samples are never lost due to poor labeling, the SafeCode system provides pre-labeled and barcoded vessels for reliable and consistent identification. Eppendorf CryoStorage Vials offer three levels of coding:

- 2D DataMatrix ECC 200 codes use dots, squares, rectangles, and other geometric patterns
- Classic 1D Barcodes consist of a series of parallel lines that vary in width and spacing
- Easy-to-read numeric identifiers

DataMatrix ECC 200 error checking and correction enables code reading even when markings are 30 percent damaged.

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eppendorf

Digital Traceability

The Eppendorf DataPort provides complete documentation of individual CryoStorage Vials, from certificates and technical drawings to lot and order numbers. Convenient online access from the Eppendorf website simplifies requirements and is always available.

Scan barcodes individually with a hand scanner or scan the entire rack at once with the RackScan barcode reader. RackScan Analyzer software can transfer scanned sample data to external databases or to sample management software like eLABInventory.

Safety Simplified

Keeping samples safe and organized doesn't have to be difficult or time consuming. In fact, protecting samples from the start can save both time and money. The right vessels make all the difference in ensuring that samples are never lost or rendered unusable due to poor quality or improper labeling. Digitally capturing sample data lets you easily and efficiently manage samples, reduce the possibility of human error, and improve workflow.

These elements provide a proper foundation for successful sample management. You can then build on this foundation by adding other sample management essentials, such as optimized cold storage solutions and remote device monitoring.

1. Valenstein PN, Raab SS, Walsh MK. Identification Errors Involving Clinical Laboratories: A College of American Pathologists Q-Probes Study of Patient and Specimen Identification Errors at 120 Institutions. *Arch Pathol Lab Med.*, 2006; 130: 1106-1113



Omics for Faster Drug and Vaccine Development

By Iva Fedorka

The path of drug development — from initial discovery to final medication — is a lengthy and expensive process. Today, genomics, proteomics, and other new technologies are helping to make drug development faster and more efficient.

Currently, many research-based pharmaceutical companies, other pharmaceutical companies, biotech companies, and research institutions are engaged in producing drugs and vaccines effective against COVID-19. Developers are trying to work quickly, even though it is difficult to conduct clinical trials during a pandemic. Their efforts include the creation of new drugs and the repurposing of drugs already approved for other diseases. Vaccines must be proven safe and efficient, and strict limits apply to pre-approval testing before they can be administered to healthy people.

Background

In the United States, it may take more than 10 years and hundreds of millions of dollars to bring a single new drug to market. Detailed protocols and administrative requirements contribute to a high failure rate for most new drug candidates. As an example, of 5,000 compounds that undergo pre-clinical testing, only five may actually be tested in human clinical trials and only one ultimately approved for therapeutic use. [1]

In the U.S., the Food and Drug Administration (FDA) has the primary responsibility for overseeing drugs, biological products, and vaccines. Therapeutic product and vaccine developers must get approval from the FDA before they can investigate or market these substances.

Before testing in humans can start, significant pre-clinical data must be collected, and toxic doses determined to ensure human safety. Toxicology, pharmacology, metabolic, and pharmaceutical sciences comprise the core of pre-clinical development.

New drug development has multiple phases:

- New compound synthesis and extraction
- Biological screening and pharmacological testing
- Dosage formulation and stability testing
- Toxicology and safety testing (in vivo)
- Clinical evaluation (Phases I, II, and III)
- Manufacturing process and quality control
- Bioavailability studies
- Post-approval research

Genomics

The widespread availability of genomic sequencing has shifted vaccine and therapeutics development from microbiologically based to sequence-based methods. Genomics, transcriptomics, metabolomics, structural genomics, proteomics, and immunomics can help to identify targets, design new vaccines and drugs, and better predict the effects for patients. Human genomics also provides insights into the host biology that is important in infectious disease.

DNA microarray analyses have already become standard tools for studying transcription levels and patterns in cells, and advances in two-dimensional gel electrophoresis and mass spectrometry provide insights into the function of specific gene products. A full understanding of the proteome must consider the post-translational modifications of proteins that determine intracellular location, stability, activity, and function.

Exclusive reliance on mRNA levels to measure protein function can be misleading; information about protein levels and modifications, signaling pathways, and metabolite concentrations and distribution are also needed.

Proteomics

Functional genomics, a combination of proteomics and transcriptomics, offers a systematic way to identify biological pathways and processes in normal and abnormal physiological states. High-throughput, large-scale methodologies, and statistical and computational analyses can expand investigations beyond single genes and proteins to thousands of genes and gene products. With the biological functions of about 30 percent of the human genome still unknown, scientists are moving from genome mapping and sequencing toward functional genomic approaches to gain new insights into biological systems.

Functional genomics combined with combinatorial chemistry and information from emerging proteomics methods are helping to identify new drug targets. Some companies are virtually screening libraries of existing compounds for in silico predictions: unique combinations of biochemical assays, X-ray crystallography, informatics, and chemical and compound library screening can accelerate the drug discovery process.

Vaccines

Vaccines are a great public health success for eradicating diseases like smallpox and polio. But we still don't fully understand how genes and vaccine-induced proteins contribute to either innate and adaptive protective immune responses.

Proteomics can help identify potentially new antigens with greater speed and sensitivity; as a complement to transcriptomic approaches, systems vaccinology helps us understand the immune response following vaccination. Biotechnology and molecular immunology advances have provided new insights for vaccine manufacturers.

For example, serum antibody concentrations are one measure of whether a vaccine has elicited the intended immunogenic response. Range doses and several administration routes are typically evaluated to decide the final dose and dosing regimen. Initial assessment of post-vaccination immune responses occurs in Phase I and II trials; Phase III trials assess efficacy after preliminary results about vaccine safety and immunogenicity are available.

The quantitative biological data available from the human genome project, along with innovations in instrumentation, reagents, methodologies, bioinformatics, and software are transforming drug discovery and development. High-throughput genomic, proteomic, metabolomic, and other drug discovery methods will make for faster development, and safer, more effective, and better-targeted therapeutics. ⚙️

[1] Sandra Krajcovic, Peter J. Stambrook, and Kresimir Pavelic, Accelerating drug discovery, *EMBO Reports*, 2004 Sep; 5(9): 837-842.

SAFETY



Workplace Safety at the Forefront of 6S Lean System

By Kevin Ritchart

No matter the industry, a primary goal of any organization is often to maximize efficiency and reduce waste. While there are plenty of business models that will help you achieve those goals, some fail to properly address the issue of workplace safety.

6S Lean is a management system designed to promote and foster high levels of productivity and safety throughout the workplace. With its origins in the Japanese 5S system, 6S Lean takes the concept even further by establishing a sustainable culture of safe workplace practices.

While they have primarily been used in manufacturing, the 5S and 6S systems also have shown to be effective in healthcare facilities and office environments to increase efficiency and reduce waste.

A Closer Look at 6S Lean

The 6S Lean management system is made up of six steps. Employees are expected to learn and perform the tasks in each of the steps to ensure they're maintaining a safe, efficient work environment.

Sort: This step is also known as red tagging, a process where items not vital for work are removed from the area.

Set in order: A logical next move after sort, setting in order involves the organization of tools and materials. They're grouped by function and labeled, then placed in convenient areas so workers can easily access them when needed.

Shine: Mastering this step includes routine cleaning of the workspace to maintain an organized, clutter-free appearance and employing ongoing measures to keep areas clean.

Safety: This additional step from the traditional 5S system focuses on the identification of workplace hazards and putting in place preventive controls to keep workers safe during their shifts.

Standardize: The establishment of new workplace norms includes providing visual reminders, setting clear expectations of workers' responsibilities, and conducting regular site checks and inspections.

Sustain: This is the most challenging step in the process, where standardized procedures must be applied continuously until following them becomes a habit.

Lean: This refers to the goal of maintaining a zero-waste environment.

Emphasis on Safety

Safety should be a top priority in any workplace. A safe working environment has a positive effect on both quality and productivity.

Creating a healthy, stress-free workplace using the principles of 6S Lean will allow employees to feel safe and secure while performing their daily tasks. And maintaining a clean, organized workplace makes it easy to identify and address potential hazards.

Employees must be aware of the potential hazards in their workplace and be able to evaluate them using standardized methods of risk assessment. These prerequisite methods will help employees perform the necessary safety procedures to reduce or eliminate hazards.

PPE for You and Me

Workers should don the appropriate personal protective equipment (PPE) at all times to limit their exposure to hazards that are either difficult to control or cannot be eliminated. PPE may include hard hats, goggles, facemasks, gloves, slip-resistant footwear, and more.

Guidance on required PPE and proper donning and doffing procedures should be made available through ongoing training efforts, and regular checks should be done to ensure PPE requirements are followed.

Implementing the 6S Lean methodology won't guarantee that workers will be safe 100 percent of the time. But adhering to these principles can help create and maintain a focused workforce and a clean, safe environment. ⚙️

 Productivity

A Groundbreaking Solution for Diverting Lab and Cleanroom PPE from Your Waste Stream

By Jennifer Shaffer, Kimberly-Clark Professional Global Scientific Business

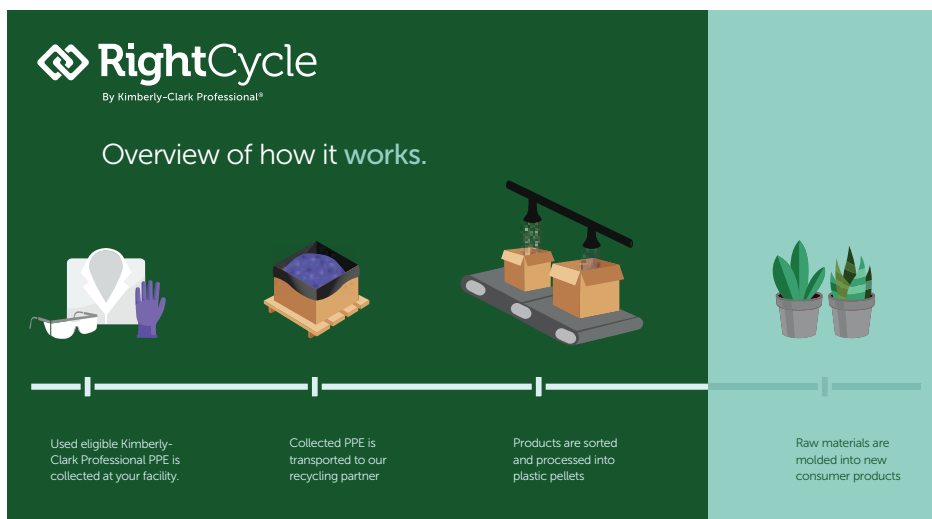
In recent years, labs and cleanrooms have gotten pretty good at recycling primary commodities such as cardboard, paper, plastic, and aluminum.

But what about other commonly used products, like single-use apparel, safety glasses, and nitrile gloves? How can these non-traditional items be diverted from the waste stream and given new life?

Kimberly-Clark Professional has a solution: The RightCycle Program.

This groundbreaking service enables customers to collect previously hard-to-recycle items, such as nitrile gloves, safety glasses, and single-use apparel items, and have them turned into new plastic products and consumer goods. The used PPE is shipped to domestic recycling facilities where they're sorted and processed into plastic pellets and then molded into flowerpots, patio furniture, plastic shelving, and other products.

The graphic below shows how the process works from start to finish.



At a time when consumers expect businesses and institutions to do the right thing when it comes to sustainability, The RightCycle Program provides an innovative waste management solution for items that would otherwise end up in a landfill.

Nearly a Decade of Waste Diversion

Since 2011, The RightCycle Program has helped labs, cleanrooms, universities, manufacturing facilities, zoos, aquariums, and a range of businesses divert more than 1,000 tons of PPE waste from landfills.

Almost one-third of that volume occurred just last year, when customers recycled 312 tons of used PPE. That included 197 Fisher Scientific customers who diverted 133 tons, or 43 percent of the total waste. There also are 40 Thermo Fisher Scientific sites enrolled in the program,

stretching from Massachusetts to California. In 2019, those sites diverted 18 tons of used PPE in support of the company's Zero Waste program.

“Because the environment is one of four customer touch points we have as a safety team, having the ability to offer an all-encompassing solution that diverts used PPE from landfill is critical. Our partnership with Kimberly-Clark is integral to accomplishing this,” said Tony Spearing, Sr. Director of Commercial Operations for Safety and Production at Thermo Fisher Scientific.

Where Gloves Fit In

The average cleanroom worker goes through 3.5 pairs of gloves per day. That amounts to 2,024 gloves per worker, per year — or 22 pounds of gloves per worker, per year. If a worker is double-gloving, the amount is even higher: 44 pounds of gloves per worker, per year. It's no wonder that gloves make up a large portion of the PPE diverted through The RightCycle Program.

For example:

- An audit conducted by the University of Washington found that 22 percent of its research waste consisted of nitrile gloves¹
- A waste assessment by the University of California Santa Cruz found that nitrile gloves made up a majority of laboratory waste destined for the landfill²

Both universities now participate in The RightCycle Program. Others include the School of Chemistry at the University

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of Edinburgh in Scotland and Purdue University in Indiana. The University of Edinburgh uses approximately 200,000 nitrile gloves per year and recycles about 85 percent of them via the program.³

Purdue University estimates that it uses about 360,000 disposable gloves each year, equivalent to 3.5 tons of landfill waste. The university has reached 89 percent compliance for glove recycling in its labs, even higher than the rate for paper and cardboard recycling. Since it joined the program in 2014, it has diverted over 10 tons of gloves from landfills.

“Once you address cans, bottles, paper and cardboard recycling, you get into smaller niche streams,” said Michael Gulich, director of campus master planning and sustainability at Purdue. “We have some addressed very well, such as electronics waste and landscape debris. Previously, gloves didn’t have a solution.”

Universities aren’t the only organizations that have adopted this innovative recycling solution. Cabot Microelectronics is among the many businesses recycling nitrile gloves through The RightCycle Program. Since 2013, it has diverted more than 14,000 pounds of gloves.

Single-Use Apparel Adds Up

Apparel also makes up a significant amount of lab and cleanroom waste. Estimates show that the average cleanroom worker generates 640 pounds of used PPE waste per year. In a single



facility with 100 workers, that can add up to over 29 tons of used apparel items per year being sent to landfills.

Seeing a Bigger Picture

Proper eye protection is critical to minimizing risk of eye injuries. According to the Canadian National Institute for the Blind, over 700 Canadian workers per day sustain eye injuries on the job, resulting in lost time and temporary or permanent vision loss. They also estimate that 90 percent of these injuries are preventable with the use of proper safety equipment, including eyewear.⁴

In response to customer demand, Kimberly-Clark Professional expanded The RightCycle Program in 2018 to include a recycling option for safety glasses from labs, cleanrooms, and industrial facilities, providing a head-to-toe recycling solution for the most common PPE categories.

Are You Eligible?

The RightCycle Program is open to all companies that use Kimberly-Clark Professional apparel items, safety glasses, or nitrile gloves in non-hazardous applications. Since its inception in 2011, it has enabled labs, cleanrooms, and other businesses to:

- Reach their sustainability goals
- Support zero-waste-to-landfill initiatives
- Reduce waste disposal costs
- Protect the planet for future generations

Visit fishersci.com/RightCycle or fishersci.ca/RightCycle to learn more.

Sources

¹ <https://csf.uw.edu/application/lab-glove-recycling>

² <https://sustainability.ucsc.edu/engage/green-certified/green-labs/green-labs-action-plan.pdf>

³ <https://www.ed.ac.uk/sustainability/what-we-do/circular-economy/case-studies/glove-recycling>

⁴ Eyesafe, 2015, Administered by the Alberta Association of Optometrists.

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SafeWear Apparel

This complete line of protective apparel, including lab coats, jackets and isolation gowns, is made from top-quality materials and designed to provide reliable barrier protection without sacrificing comfort or style.

Crisis strategy from the protection experts



Plan

- Develop a process for handling emergencies.
- Educate staff about tasks they will be responsible for in case of a crisis such as a pandemic.



Prepare

- Ensure adequate supplies to protect your staff for at least several days.



Protect

- The best defense is a good offense.
- Ensure you are cleaning, sterilizing and disinfecting using a high-quality disinfectant.



Educate

- Train your staff on how to use and handle essential tools.
- Healthcare workers should know how to properly don, doff and use PPE to limit exposure.

Keep Your People Safe with Our Proven Experience

Navigate U.S. and Canadian safety standards, maintain facility and lab compliance, and find the right safety products to protect your people and investments with help from our safety specialists.



Gretchen Lloyd
San Diego, California

“For the last 14 years, I’ve been ensuring customers have high-quality, comfortable safety products — creating a better, safer workplace for everyone. I am proud to be working with a great team and an industry leader dedicated to providing quality safety products and a great customer experience!”



Alan DiBenedetto
North Kingstown, Rhode Island

“I recommend and sell products that protect people and their environments, as well as safeguard the process of manufacturing pharmaceuticals. Safety plays an important role in the preservation of health and our daily mission supports that. The best part of my job? It’s the relationships I’ve built with my clients and colleagues over the last 38 years.”



Charlie Fink
Gambier, Ohio

“Working in safety for the last 27 years, I’ve learned that the single largest contributing factor to an institution’s bottom line is the safety, health, and welfare of its employees and their families — in other words, “safety first.” What I enjoy most about my job is working with our customers, suppliers, and colleagues to provide a total safety solution.”

Visit fishersci.com/safety-specialist-contact or fishersci.ca/safety-specialist-contact to contact a Fisher Scientific safety specialist today.

Protecting What Matters Most



Navigating Change: How Labs Are Adapting and Staying Productive

By Christina Phillis

It has often been said that preparation is the key to success. Because change is just a fact of life, we all must be ready for that fateful day when our world might get turned upside down. But change doesn't always happen as we've imagined it. Think of the COVID-19 pandemic, for example. No one could have completely prepared for that.

How can you adapt quickly when a situation doesn't go according to plan? What do you do when something happens that you never expected? We invited some lab and facility personnel to share their experiences and methods for maintaining productivity amid sweeping and unforeseen change.

Evaluate the Hazards and Risks

There are inherent risks present in every lab, from physical obstacles that can cause trips and falls to chemical hazards, which vary by chemical class. Evaluation of these hazards should start as soon as a lab opens, according to Michael J. Russell, Environment, Health & Safety director at the University of Kansas. Russell and his team help over 900 labs incorporate safety procedures into their everyday operations.

"From day one, we work with labs to understand what they're trying to accomplish, so we can help them run through a hazards risk assessment. From there, we work with them to develop operating procedures to integrate safety into everything they do," said Russell.

If disaster strikes, potential hazards are a known quantity and can be addressed based on the situation. Russell and his team reevaluated hazards when labs started to shut down due to COVID-19 restrictions. He said, "You have to look at what's in process. How are chemicals being stored? Are bio activities and chemical activities being taken down properly? What about equipment? Some pieces can't just be unplugged. They need to go into hibernation mode so things can keep running while people are away."

If your lab is located in an area prone to natural disasters, it's important to be vigilant about these risks. According to Logan Mlakar, Fisher Scientific portfolio manager and former lab manager, a move from Pittsburgh, Pennsylvania, to a lab in Charleston, South Carolina, meant learning about the potential risks that accompany tropical storms. Buildings in the south may be designed to withstand hurricane winds, but associated flooding can also cause serious damage. Pay attention to hazardous chemicals and equipment that might need extra attention during storms.

During evacuations, there can be security issues for unoccupied labs. Scheduled and unscheduled deliveries need to be received to avoid damage or loss of materials. Personal items and equipment left unattended are susceptible to theft or vandalism.

Cyber security can also be a real threat, especially when labs are vulnerable. According to the recent *Fortune* article "Hackers 'without conscience' demand ransom from dozens of hospitals and labs working on coronavirus" by Ryan Gallagher, ransomware attacks have increased in the U.S. and Europe during the global pandemic.

In addition to following all IT protocols at your institution, look for any weaknesses in your system. "If you're using a probe to monitor the temperature of a freezer or other piece of equipment, you should make sure that system gets fully integrated within your university's IT network," said Mlakar.

Communicate Effectively

When Leanne Sayles, a research specialist and lab manager for the Sweet-Cordero Laboratory at the University of California, San Francisco (UCSF), and her team were told they had to close their lab in a single afternoon because of the pandemic, they needed to decide what parts of their research had to stop completely and which activities could continue in some capacity.

Sayles said communication is key in a situation like this: "It's really important to keep communication open. Communication has changed a lot in terms of how we used to communicate on a daily basis in the lab. But the other part of it is not spamming people with too many emails. I really try to be intentional with the information that I'm giving them."

She also recommends keeping in mind that communication is a two-way street and said, "People need to feel comfortable enough to tell me when they feel there's an issue."

In a situation like the COVID-19 pandemic, where stay-at-home orders prevent people from accessing the lab, Sayles expressed the importance of having a small subset of people who can visit the lab and be the "eyes and ears" of the physical space to report back to the rest of the team.

Finding the best channel and cadence for communication with various cross-functional teams and colleagues can be difficult. Luckily, different platforms can serve a range of purposes. Samantha Savage Stevens, a lab manager at CEDAR, Oregon Health & Science University (OHSU) Knight Cancer Institute, School of Medicine, said her team uses a combination of Zoom, Slack, and Confluence.

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Navigating Change: How Labs Are Adapting and Staying Productive

“We have an internal web page that we use to post updates. We use Slack to quickly communicate with our larger group. And we have a weekly Zoom lab meeting where we highlight different research groups,” said Savage Stevens.

Be Flexible

Adaptability is important in the best of times and can be a lifeline as you manage a crisis. Think creatively and consider options you wouldn't normally utilize.

When faced with shutting down your lab, find out what you can and can't do. “You don't want to lose months of progress,” said Sayles. For example, she worked with UCSF to understand their restrictions and was able to harvest tumors and freeze them for later study. To make up for lost time, her team is considering outsourcing mouse genotyping, plasmid preps, gene editing, and other molecular biology procedures.

As Savage Stevens' OHSU team ramps up, they will need human specimens and data. They're currently working on establishing a pipeline for sharing these essential resources with other institutions. She's also helping other teams within the organization by ordering necessary supplies for COVID-19 research.

Returning to work with social distancing guidelines and capacity restrictions presents its own set of challenges, so staff members need to remain flexible. Savage Stevens' team will use Outlook to schedule work in two shifts. All of their tissue culture and equipment rooms will be scheduled using a web-based platform called Lab Agenda. If a COVID-19 outbreak occurs, they'll know which staff members were potentially exposed.

“Overall it's good to be as flexible as possible. We need to find a way to navigate this new normal,” said Savage Stevens.

Utilize Downtime

If you can't enter a lab or your research is put on hold, use this additional time to think through process improvements. Find educational opportunities; free online courses are offered through Coursera and edX. Process experimental data. Submit papers or grants. Design new experiments.

Sayles said she utilized her time taking a course on basic computer programming to help her perform data analysis for an upcoming drug screen at UCSF.

You may not need to venture beyond your own team to share knowledge and insights. Savage Stevens said they looked to in-house subject matter experts at OHSU to provide educational opportunities to the larger team.

“Overall it's good to be as flexible as possible. We need to find a way to navigate this new normal,” said Savage Stevens.

They also used the time to explore subjects they might not have otherwise — for example, bringing in an outside speaker to learn more about healthcare disparities. “It's opening our eyes to how we can collaborate with people,” said Savage Stevens.

Support Your Team

Employees will need different levels of support as you manage change. “Don't assume everyone has the required technology or that their equipment is fully functional,” said Jason Dong, an executive projects analyst at the Cardiovascular Research Institute, UCSF. He had to replace his hard drive before he could effectively work from home, and one of his colleagues did not have a laptop or at-home wireless service before the stay-at-home order.

Consider your team's morale. Some people may not have family nearby or may be new to the area. Create opportunities for bonding virtually. “We have a recurring Zoom lunch every day and a Zoom happy hour every Friday to reach out and see how everybody is doing,” said Sayles.

Sayles recommends making it clear to your team that you will get through this. She said, “Be aware that there needs to be flexibility.” A patient, understanding team-first mentality can help you manage even the toughest of challenges — together. ⚙️



Inspire Innovation with the Right Lab Design

By Gina Wynn

The way we conduct scientific research has evolved and so has the idea of a productive lab environment. Now that scientists are taking a more multidisciplinary approach to research, design experts are developing spaces that complement the scientific team structure. Cutting-edge building designs take collaboration, flexibility, and wellness into account in order to foster a culture that inspires innovation.

The Multidisciplinary Movement

Researchers looking to make advancements in their areas of study are realizing that there are benefits to bringing together biologists, chemists, computer scientists, economists, engineers, medical professionals, physicists, and other experts from various disciplines to contribute their knowledge and opinions.

Coined “convergence research” by Massachusetts Institute of Technology (MIT) scientists, the concept has the support of the National Science Foundation (NSF) and is considered a revolution in the life sciences by many academics. In 2016, the NSF identified “growing convergence research” as one of 10 Big Ideas for Future NSF Investments.

Cultivating Collaboration

To facilitate this paradigm shift in research practices, designers are rethinking traditional lab workspaces to cultivate environments conducive to collaboration. It’s becoming the norm to house groups from different specialty areas in the same building where they have shared access to common gathering spaces. Cafes and snack areas with comfortable seating encourage informal conversations and spark creativity among people of different backgrounds.

A University of Michigan study shows that this practice can produce positive results. “Researchers who occupy the same building are 33 percent more likely to form new collaborations than researchers who occupy different buildings, and scientists who occupy the same floor are 57 percent more likely to form new collaborations than investigators who occupy different buildings,” according to Toni Loiacano in her article “A Revolution in the Creation of Scientific Workplaces” for *Scientific American*.

Design firms have already been optimizing their floor plans to take advantage of these benefits. CannonDesign developed the concept for CJ Blossom Park in South Korea to help the CJ Corporation, according to CannonDesign’s website, “create industry-defining product strategies and increase its global competitiveness” by consolidating its pharmaceutical, biotechnology, and food products businesses into one 1.2 million square foot building.

It also made accommodations to locate multidisciplinary groups within the Rice University New Emerging Science & Technology Center in Houston, Texas, the Johns Hopkins University Applied Physics Laboratory (Building 201) in Laurel, Maryland, and many other well-known research centers.

Fostering Flexibility

In the age of convergence research, flexibility in lab design is important for preparing for future needs and process improvements. Teams who come together from different locations rely on workspaces that can be quickly and easily optimized to allow them to work efficiently.

Modern designs give researchers control of the lab furniture, casework, and fixtures. This may include universal, adjustable bench systems with or without wheels that can be rearranged and reconfigured to maximize productivity. Lighting can also be engineered to move with the furniture. And plumbing, electricity, gases, and other utilities, can be

accessed through overhead service booms. Lab layouts must also provide options to accommodate team members with accessibility demands.

People from different disciplines may also need to perform multiple types of work in the same spaces without having to leave the floor or building. There should be a variety of wet and dry workspaces to serve everyone’s needs, including write-up areas and open and private meeting spaces. You may also set up identical rooms that offer the same equipment so it can be used interchangeably for standardized procedures.

And consider providing flexible options for future expansion and growth without interrupting workflow, including planned open spaces within and outside the building and in utility shafts. Leaving space for air-side valves and filters will also let contractors perform maintenance without needing to enter controlled environments.

Prioritizing Wellness

Worker wellness must also be taken into account in order to motivate multidisciplinary teams to expediently produce high-quality results — especially in today’s competitive scientific landscape. The ability to recruit new talent and avoid turnover is one measure of an institution’s success.

According to researchers Umut Toker and Denis Gray, authors of the *Science Direct* article “Innovation spaces: Workspace planning and innovation in U.S. university research centers,” an organization’s human costs are 85 to 90 percent of its budget over a 10-year period while operating and maintenance costs are around eight percent.

Needless to say, keeping researchers comfortable, satisfied, and safe in their work environment is critical. Here are some other important elements to consider:

- Provide chairs that are comfortable and ergonomically correct
- Construct the lab using LEED v4 certified materials to protect against harmful chemicals
- Select equipment that reduces repetitive strain injuries
- Control sound levels by storing loud equipment in special rooms and limiting noisy work to soundproof areas
- Choose ceiling and floor materials that help manage acoustics

In addition, provide windows for natural lighting and access to pleasant views. Studies have shown that exposure to daylight helps maintain circadian rhythms and sleep quality, which affects researcher productivity. Even in labs where light exposure may harm sensitive samples, windows can be placed away from susceptible environments.

At the Novartis-Penn Center for Advanced Cellular Therapies (CACT) in Philadelphia, polarized film was added to its windows that can be activated with the flick of a switch. CACT’s recent work-environment enhancements are highlighted in the *Scientific American* article “How Strategic Lab Design Can Accelerate Our Fight against Cancer” by Bruce Levine, Kurt Buchholz, and Steven Copenhagen.

Innovation by Design

By strategically designing your lab to promote collaboration, flexibility, and wellness in this age of convergence research, you’ll be creating an environment in which researchers will be able to thrive. By investing in design, you’ll be investing in your team, and setting the stage for next-level scientific discovery. ⚙️

 Productivity

Optimize Your Productivity with Automated Glassware Washers

If you've spent any time in a laboratory, you've probably hand-washed reusable labware. Glassware, plasticware, and utensils are the most ubiquitous reusable items in any lab. Whether used to hold samples and buffers or measure liquids, reusable labware is part of almost every lab activity.

Labware washing may be rudimentary, but what seems to be a simple task can become a real burden over time, especially if lab space is shared or your experiments require a lot of washable items.

Laboratory glassware washers can solve these problems for laboratories with significant labware use. When choosing a lab washer, consider the challenges you currently face, like:

- Do delays in lab washing impede your ability to carry out important experiments and lab tasks?
- Are you using a lot of water to wash labware?
- Are you seeing differences in precision and accuracy in your lab experiments?
- Are you discarding labware that could actually be reused?

If you answered "yes" to any of these questions, you may benefit from adding a Labconco glassware washer to your lab.

Resource Optimization

Labconco FlaskScrubber and SteamScrubber glassware washers use an advanced interface to provide precise washing cycles. Automating the labware washing process helps keep labware readily available for the next experiment and frees employees for more critical tasks.

Environmental Consciousness

Energy efficiency and lower water consumption help reduce the carbon footprint of a laboratory. The adjustable programming features of Labconco glassware washers offer effective cleaning with shorter cycle times. Users can select a standard program or customize the process to limit water and energy use and reduce carbon emissions even further.

Labconco glassware washers use a maximum of 12.9 liters per fill, which can reduce your overall water consumption by as much as 67 percent.

Better Results

Because experimental performance is directly tied to the materials used for the protocol, the cleanliness of reusable labware will have a direct impact on your results. Cleaning efficacy is achieved through:

- Water temperature and spray pressure
- Detergent concentration and contact time
- Rinse water quality

Viscous and oily substances or other materials that have dried onto labware can be difficult to remove at lower water temperatures. When washing labware by hand, the water temperature is limited by the heating source — facility water systems that adhere to regulations may have a maximum temperature of 120°F (49°C). Labconco washers quickly heat the water to 199°F (93°C) to help remove contaminants.

The use of more aggressive detergents and the time required for manual glassware washing can lead to skin irritation or damage. The mechanical washing action of Labconco units ensures cleaning with detergent concentrations that remove even challenging contaminants. They also employ an acid-neutralizing rinse to remove residual basic detergents.

Some labware surfaces may be missed when rinsing by hand. Labconco glassware washers come with an optional pure water connection. To provide purified water for the final rinse, facilities can easily plumb those services directly to the washer. Labconco washers also

Content provided by:

LABCONCO

direct all drain water through a dedicated and contamination-eliminating drain pump.

Installing a glassware washer in your laboratory can help reduce workload, support the environment, and improve the reliability of your test results. Evaluate and discuss your needs with your facilities personnel, then contact your Fisher Scientific sales representative to move your lab forward.

Labconco Glassware Washers

FlaskScrubber glassware washers are designed to wash and dry general-purpose and narrow-necked labware. The lower spindle rack holds up to 36

volumetric flasks or similar labware. Water, detergent, and forced warm air travel through the spindles to reach all surfaces of your labware.

Choose an optional upper standard or spindle rack to increase capacity. Or replace the lower spindle rack with a standard rack that can be used with specialized pipette, BOD bottle, petri dish, culture tube, and small utensil inserts.

SteamScrubber glassware washers have stainless-steel top and bottom racks that accommodate basket inserts, beakers, and other wide-mouthed labware. SteamScrubber washers can also be used with the same upper and lower spindle racks as FlaskScrubber washers.

Shop FlaskScrubber:

U.S.: fishersci.com/flaskscrubber

CA: fishersci.ca/flaskscrubber

Shop SteamScrubber:

U.S.: fishersci.com/steamscrubber

CA: fishersci.ca/steamscrubber



SteamScrubber



FlaskScrubber



Productivity

Productivity as a Goal in Lab Design and Layout

Laboratory productivity is a function of both an environment that matches the lab's purpose and one that suits the individuals who will use the space.

Your project may be building a new lab or renovating an older one. Because the useful life of a lab ranges from 10 to 30 years, you'll want your lab to be a productive and comfortable space for as long as possible. To start, select a team to develop a clear understanding of the project goals. The team should include lab management, personnel, facilities management, a representative from health and safety, and a lab design professional.

Lab productivity also relies on three important elements: design considerations, ergonomics, and adaptability.

Design Considerations

When reviewing your lab needs and requirements, consider:

- The general purpose of each lab, support, or workspace, including:
 - Number of people
 - Bench space per person or operation
 - Number of fume hoods or biological safety cabinets
- The rough amount of laboratory space needed
- The location of the lab(s)
- All lab equipment, including a listing of purpose, location, dimensions, and service requirements
- The current layout and workflow and any modifications needed
- Flexible, open space for possible future needs
- Specific use and storage for:
 - Radioactive or biological materials
 - Hazardous materials and processes
 - ADA compliance
 - Rolling equipment access
- Ancillary space needs:
 - Sample receipt or work in progress areas
 - Glass washing and preparation areas
 - Equipment support space
 - Offices and desk space
- Lab storage needs:
 - General supplies
 - Glassware
 - Chemicals
 - Samples and specimens
- Future and potential revised use for any spaces

Ergonomics

Ergonomics is the science of matching the task, workspace, and tools to the user to reduce musculoskeletal stress. Laboratorians are at risk for developing health issues from the repetitive nature of pipetting, use of small handheld tools, opening and closing vial caps, prolonged awkward postures, and other various laboratory tasks.



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Whether you're working in a laboratory for one semester or throughout your career, you can protect yourself and other personnel from the ergonomic hazards common in laboratory settings. Well-designed and flexible furniture systems and Fisherbrand ergonomic seating can help provide a comfortable, healthy, and productive lab environment.

- Position work surfaces and cabinets at comfortable heights and locations
- Place materials and equipment in easy-to-reach locations on the benchtop
- Keep areas underneath biosafety cabinets free of drawers, supplies, refrigerators, and other items to provide adequate leg room
- Use ergonomically designed chairs that provide back support, adjustable seat angles, and adjustable heights between 28 and 33 inches
- Use seating with adjustable footrests
- Use anti-fatigue matting for areas where personnel stand for extended periods of time

Adaptability

Changes in lab environments are inevitable, and the ability to accommodate changes must be planned. Productivity can be compromised if the lab can't adapt to new needs, programs, or equipment.

Adaptable laboratory furniture systems can help maintain or increase lab productivity as changes occur. These include modular furniture assemblies with support structures, cabinets, worksurfaces, and other accessories. They allow for adjustability of shelving, cabinetry, worksurfaces, and utilities.

One of the most popular lab furnishing systems is the Class 7 free-standing workstation, defined by the Scientific Equipment Furniture Association (SEFA) as:

“...table-based systems utilizing floor-mounted tables as the key component. The workstation can be worksurface height or incorporate above-counter structure[s]. The workstations can incorporate either adjustable-height or fixed-height worksurfaces. Base cabinets can be mobile, floor mounted, or suspended. Upper cabinets,

worksurfaces, shelving, service utility distribution, and ancillary items can be suspended from the frame structure. Free-standing workstations with above-counter structures can be pre-plumbed and pre-wired and used in conjunction with ceiling-mounted service distribution systems. Typically, free-standing workstations incorporate adjustment slots for vertical height adjustability of worksurfaces, shelving, and ancillary items. Free-standing workstations are not anchored to the building, allowing for simple relocation.”

Adaptable laboratory furniture systems can provide the structure and function that you need today while accommodating future changes and updates to your laboratories. Contact your Fisher Scientific sales representative to learn more about Fisherbrand lab furnishings.



 Productivity

Speed, Safety, and Uniformity: The Benefits of Bead Mill Homogenizers

In this fast-paced scientific world, results are critical. But analyzing samples can be slowed by the bottleneck of sample preparation.

Some traditional methods suggest manual grinding with a mortar and pestle or long enzymatic digests for plant, soil, and other difficult samples. But bead mill homogenizers can help you produce quality samples and speed up the sample preparation process.

What Is a Bead Mill Homogenizer?

Bead mill homogenizers can be used to reduce the size of solid particles and universally disperse them in a sample. The beads and sample are added to a tube and then vigorously and rapidly shaken to break up the sample. The homogenization occurs as beads collide with the sample (reducing particle size on a macro scale) and the inner surface of the tube (reducing particle size on a micro scale.) To a lesser extent, shear forces caused by the rapidly moving beads also help with homogenization.

Bead mill homogenization is a very effective method for processing multiple samples at once. Homogenizers use disposable bead and tube combinations, which reduces the risk of cross contamination. Because the process

occurs within a closed tube, fewer aerosols are created and user exposure is limited. This can be especially important when samples contain toxic, infectious, or otherwise hazardous substances.

The use of various types and sizes of beads makes this method suitable for many applications. Bead mills effectively extract small molecules like nucleic acids and proteins, dissociate tissue, and recover live cells. The tubes can also be used without adding liquid, making them useful for dry and solid samples.

Bead type and size are important factors when choosing bead tubes to process your samples. Larger beads can break down large or dense structures, while small beads are better for cellular components. Bead shape and density also matter. Denser beads are needed for tougher and harder materials. Irregularly shaped beads can help break down tough or fibrous materials, and their edges can help deliver the force of the moving beads to a smaller surface area.



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Fisherbrand Bead Mill Homogenizers

Fisherbrand Bead Mill Homogenizers have a unique carriage motion for efficient bead movement and high impact forces. Increased power reduces processing time and maximizes sample preparation efficiency. Fisherbrand Bead Mill Tubes are available with a range of bead beating materials to help produce a true homogenate, regardless of sample type. Bead mill homogenization can increase your nucleic acid, protein, and small molecule yields to improve the results of your downstream assays.

- Simultaneously homogenize up to 24 x 0.5 mL or 2.0 mL tubes
- Convenient front-loading tube holder for accessibility and ease of use
- Non-stop processing — no cool-down needed between runs
- Smaller footprint
- Run time range: 1 to 99 sec.
- Performance range: 0.8 m/s to 6 m/s (in increments of 1.5 m/s)
- Number of cycles: 1 to 9

Bead mill homogenizers can help you process more samples in less time, have a range that works well for soft tissue samples, and provide rapid sample preparation that can reduce the potential for sample degradation.



 Productivity

How Proper Lab Furniture Can Help Improve Lab Productivity

Every variable in a laboratory can affect overall lab productivity, including the way one sits. Lab techs and researchers spend much of their time sitting in pharma, biotech, university, or medical settings and can benefit from seating developed specifically for their needs.

Labs, hospitals, and offices that take wellness seriously can provide ergonomic furniture to help employees be more comfortable, increase productivity, and even decrease absences.

Durability

Chairs from office supply stores aren't necessarily designed or suitable for harsh or challenging lab conditions. Often, these chairs have fabric upholstery, which is not permitted in many lab settings. Time and resources can be wasted when chairs must be replaced or repaired because they don't suit the workspace. And most office stores have a limited one-year warranty for chairs. Fisherbrand chairs and seating, on the other hand, have a 15-year warranty.

Cleanability

Lab chairs created with materials like antifungal and antibacterial vinyl and self-skinning polyurethane can be easily maintained with readily available cleaning agents. Fisherbrand chairs and stools are made with vinyl that has a closed-pore system that makes them inherently antibacterial. Employees can more easily comply with

decontamination procedures — which have become even more important in the wake of the COVID-19 pandemic — when their seating is easy to clean.

Back Support

Consider comfort, back support, and ergonomics when choosing lab seating. Seat height, back support height, and the angle of the back rest can affect posture. Poor posture can lead to injury and pain. One's back forms an S-shape of three natural curves. When these curves are properly aligned, the ears, shoulders, and hips align in the same plane.¹ Fisherbrand chairs offer built-in lumbar support and backs that are fully adjustable for different height and angles.

Ergonomics

Lab seating should be designed for everyday working conditions. Some design features, like waterfall seats that are sloped and contoured, help relieve pressure against the thighs and lower legs. Waterfall seats used in conjunction with foot rings can dramatically improve blood circulation to the lower limbs. Additionally, adding seat tilt can allow for better blood flow during extended seating periods.

Arm Position

The height, angle, and depth of a chair's arms reduce strain during repetitive-motion office activities like typing or using a mouse. They can also help

increase stability when pipetting, plating cell cultures, and performing other lab manipulations. Laboratory personnel are at higher risk for cumulative trauma injuries caused by repetitive tasks: pipetting, using small hand-held tools, or opening and closing vial caps.²

Seat Angle and Height

OSHA recommends tilting your seat forward or using a seat wedge when working in a forward posture and making sure not to extend your chin forward as well. OSHA also states that workers should adjust the position of their work, work surface, or chair so that they are seated in an upright and supported position.



Prolonged awkward sitting postures at a microscope, fume hood, biological



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safety cabinet, or elsewhere can also cause injuries. The correct angle of a seat can help reduce lumbar pressure when leaning forward, as when using a microscope. Adjustable lab seating makes it easier to gain the proper support. Fisherbrand chairs have easily adjustable controls, allowing users to adjust settings to best suit their requirements.

Accessories

When sitting at higher work surfaces (32 or more inches), chairs with foot rings can help you achieve proper form. If your feet dangle while sitting, OSHA recommends lowering the chair, adjusting the foot ring, or using a footrest.

Lab safety can also be improved by choosing the appropriate accessories for a chair. If slips, trips, or falls are a concern, self-braking casters help stabilize the chair so that it doesn't move when you sit on it or stand up.

The right lab tools and equipment are necessary for productivity and safety, including the chairs and stools that furnish your lab. Because researchers spend many hours working in sitting positions, extra attention should be given to selecting ergonomic solutions that are built to last. Not only will your work life improve, but the quality and efficiency of the lab will also benefit.

Sources

¹ <https://www.osha.gov/Publications/laboratory/OSHAfactsheet-laboratory-safety-ergonomics.pdf>

² <https://uhs.berkeley.edu/facstaff/ergonomics/laboratory>



Oil Free, Low Maintenance

Fisher Scientific MaximaDry Pumps

No more downtime to add or change pump oil. Enjoy quiet, reliable operation without the mess of oil or the operating costs and environmental problems associated with water aspirators.

- **Corrosion-resistant materials** — The thick, solid PTFE resin heads will not peel or corrode when exposed to most aggressive solvents and the sturdy FFPM valve system handles occasional liquids without degrading performance
- **Quick and easy setup** — Be up and running in minutes; everything connects together without tools or fittings, just add 3/8 in. I.D. tubing
- **Compact, stylish design** — For convenient access, your MaximaDry Oil-Free Pump fits easily where you need it — on your bench or inside your fume hood



13-880 Series

Head Configuration	Capacity	Vacuum	Pressure	Motor	Dimensions (L x W x H)	Cat. No.
Single Stage	20 L/min.	75 torr	15 psig	1/6 hp	13 x 6.5 x 8.5 in.	13-880-14
Single Stage	40 L/min.	65 torr	15 psig	1/6 hp	13 x 6.5 x 8.5 in.	13-880-16
Two Stage	20 L/min.	6 torr	15 psig	1/6 hp	15 x 6.5 x 8.5 in.	13-880-18
Two Stage	35 L/min.	6 torr	15 psig	1/8 hp	16 x 7 x 9 in.	13-880-20
Two Stage	35 L/min.	1.5 torr	15 psig	1/8 hp	16 x 7 x 9 in.	13-880-22

Ultrasonic Cleaner for Cleaning, Mixing & Degassing



The Most Full-Featured Ultrasonic Cleaners

Fisherbrand Ultrasonic Cleaners are state of the art and made in Germany. They're fully featured to allow you the maximum versatility for all of your lab needs.

Fisherbrand 11200 Series Advanced Ultrasonic Cleaners are more powerful than conventional cleaners. They include a wide range of adjustable parameters for lab applications, including cleaning, mixing, and degassing.

Strongest, fastest, and most durable

- Maximum versatility: choose frequency, power level, time, temperature, and ultrasonic mode
- Modes: normal, pulse, sweep, and de-gas
- Six tank sizes: 0.7 to 7.4 gallons

Model	Capacity	Cat. No
FB-11201	2.75 L (0.7 gal.)	FB11201
FB-11203	5.75 L (1.5 gal.)	FB11203
FB-11206	6.9 L (1.8 gal.)	FB11205
FB-11207	12.75 L (3.3 gal.)	FB11207
FB-11209	18 L (4.75 gal.)	FB11209
FB-11211	29 L (7.4 gal.)	FB11211

⚙️ Productivity

Faster, More Efficient Cleaning

The Versatile Bransonic CPXH Ultrasonic Bath

The Bransonic CPXH offers enhanced precision and fast, efficient, industry-leading technology. With fully programmable controls, heated cleaning, and ultrasonic power tracking to adjust for light or heavy loads, the CPXH is our most advanced ultrasonic cleaning bath for removing soils and contaminants such as reagents, chemicals, oils, blood, protein, and more from glassware, instruments, and components. Beyond cleaning, the Bransonic CPXH is also effective for cell separation, cell lysing, mixing, emulsifying, and sample preparation. Additionally it can be used to remove support material from 3D-printed parts.

The Bransonic CPXH features:

- Heated cleaning up to 69°C/156.2°F
- Constant activity/power tracking
- High temperature visual alarm/auto shut off
- Full programmability
- High/low power control
- Degassing/conditioning solutions
- Sleep mode



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⚙️ Productivity

Isola VUE Filtered Chemical Workstation

Isola Series filtered workstations provide chemical and particulate containment. Advanced monitoring and control are key components of each Isola filtered workstation.



Standard Features:

- EverSafe III Touch Control with electronic monitoring of face velocity, filter saturation, temperature and humidity with audible and visible alarms
- Polycarbonate construction for 360-degree visibility—excellent for demonstrations
- Solid-state gas detection with three sensitivity set points

ISOLA VUE FILTERED WORKSTATION

Model	Width	Mfr. No.	Cat. No.
Isola Vue	36 in.	MY-ISL36	15-338-900
Isola Vue	48 in.	MY-ISL48	15-338-901
Isola Vue	72 in.	MY-ISL72	15-338-902

Isola filters sold separately - application dependent

Is Your Lab in the Cloud?

A Digital Solution for Increasing Demand

Time and accuracy can help or hurt labs, depending on how they're handled. Today's labs are juggling more tasks than ever before, and it's a constant struggle to keep up while still maintaining accuracy.

So how can labs keep up? A technician's time is incredibly valuable, so if lab technicians perform simple, repetitive tasks in high volume, their workflow should be evaluated. Is there a better way to get the work done? The answer is yes — with automation. When labs add automation, they can develop faster and more economical ways to complete critical and repetitive tasks.

When striving for accuracy, one option is to replace hand-written labels with pre-printed identification. This helps ensure precision and save time, which helps maintain reliability.

But how can ballooning demands be performed accurately when labs are stuck in overdrive? The answer: technology. Specifically, integrated technology.



A Cloud-Based Solution

Cloud-based technology goes well beyond the storage of information and can be used in real time to:

- Transform lab workflows
- Generate greater accuracy
- Process and track samples

This may involve combining printers, scanners, materials, and software into a single system that manages lab processes and output.

To harness the cloud's power in your lab, start by automating sample data. With a printer and software system like the BradyPrinter M611 Mobile Label Printer, Express Labels Mobile App, and Brady Workstation Lab Identification software, this can be easily accomplished.

With an app on a mobile device or tablet, you can access files via the cloud or email and scan data from pre-existing barcode labels using the device camera. This allows you to edit data, change layouts, create new labels, and print sample labels over Bluetooth or Wi-Fi.

The M611 has other lab-friendly features:

- 2.8 in. color touchscreen display
- Automatic label formatting with smart-cell technology
- Rugged rubber bumpers
- 300 dpi printhead
- Rechargeable Li-Ion internal battery and AC power adapter
- Die-cut, continuous, custom, and bulk label options (up to 2 in.)
- Auto-cutter
- Compact design
- Optional magnet attachment for metal surfaces



Brady's Laboratory Identification Software Suite can help labs more fully integrate workflow processes, data, printers, materials, and scanners. Even when working on separate tasks, technicians can share vital information, track samples, and analyze data.

Brady also offers high-quality label materials for many applications, like labels that resist smearing and fading and stay affixed in liquid nitrogen, freezers, autoclaves, and hot water baths — even when exposed to chemicals and solvents.

Embrace Your Digital Future

It's easy to get stuck on a single lab task instead of focusing on the whole process. But labs need to reevaluate their use of technology to provide faster and more accurate data.

Cloud-based technology in labs is important for sharing, importing, tracking, and printing critical sample data. An integrated system like the BradyPrinter M611 Label Printer, app, and software suite can help you manage time and accuracy — all in the cloud.

Content provided by:



UNLEASH *the Power.*

Enrich your lab with the enhanced performance, reliability and powerful stirring of the Hei-TORQUE. These laboratory stirrers are equipped with the latest drive technology and leading safety standards. The Hei-TORQUE Series provides a suitable stirring tool for every application.

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SARTORIUS

Sartorius Entris II Balances

Whatever you're weighing, the new Sartorius Entris II is the right choice. Offering value at an affordable price, it's the only balance in its class that features isoCAL, LED touch technology, and 12 built-in applications.

Backed by almost 150 years of German engineering expertise, the Entris II line of balances includes 40 models to meet your specific weighing needs.

Functionality

- Fastest stabilization time in its class
- Overload protection
- Quick connection to printers, a second display, or a PC

Technology

- Reliable monolithic weigh cell technology (invented by Sartorius)
- isoCAL internal calibration and adjustment with notifications
- LED and touch technology hybrid screen



Weigh the Right Way with Excellence Weighing Solutions

Weighing is often the first step in many analytical procedures, and any error in your weight measurement can therefore negatively impact your entire analysis.

Proper weighing means following procedures and guidelines for the correct selection, installation, and operation of your balance to minimize the uncertainty in your results.

Potential Weighing Challenges

Problem, Air Drafts:

Drafts can cause drifting and affect accuracy. Common sources of air drafts in the lab include safety cabinets and fume hoods, doors and windows opening and closing, biohazard cabinets, and AC units.



Solution: Smart weighing pans from METTLER TOLEDO allow you to weigh without a draft shield, and are available for XPR/XSR precision and analytical balances.

Problem, User Skill:

Users have different techniques and skill levels in sample handling and balance operation and knowledge of following and interpreting weighing SOPs.



Solution: METTLER TOLEDO not only provides the proper tools for the job, we also offer extensive training and support from industry experts. LabX for standardization of workflows, traceability, and data management/integrity is also key to user success.

Problem, Vibrations:

The smaller the readability, the more susceptible a balance is to external vibration. Common sources of vibration in the lab include other equipment and instrumentation, foot traffic, etc.



Solution: Choosing a location with minimal vibration is key and, ideally, the bench should not be fastened to the wall. Instead, use a dedicated weighing table like a marble table/slab or balance table from METTLER TOLEDO.

Problem, Electrostatic Charges:

The main hidden source of weighing error, electrostatic charges are generated by friction when drying a glass beaker, using disposable gloves and plastic, and filling a tare vessel.



Solution: XPR analytical balances can detect and eliminate electrostatic charges on a sample and container. StaticDetect identifies charges, which are eliminated by the integrated ionizing module. Legacy model and external options are also available.

Content provided by:

METTLER TOLEDO



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316 protects 24/7/365



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- Mobile and stationary
- In stock and available for shipment

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Newly Redesigned

BRAND Transferpette S Pipettes

The newly redesigned BRAND Transferpette S pipettes have updated features for easier, more efficient pipetting. Transferpette S pipettes are lightweight and fully autoclavable. Choose between adjustable and fixed-volume single-channel pipettes from 0.1 μL to 10 mL and multichannel pipettes from 0.5 μL to 300 μL .

- Redesigned grip for one-handed operation for hands of all sizes
- Slimmer shaft for narrow vessels with easy-to-clean housing
- Tip cones accommodate most brands of quality pipette tips



Single-channel pipettes

Volume Range	Mfr. No.	Cat. No.
0.1 to 1 μL	705868	14-381-033
0.1 to 2.5 μL	705869	14-381-042
0.5 to 10 μL	705870	14-381-041
2 to 20 μL	705872	14-381-040
5 to 50 μL	705873	14-381-039
10 to 100 μL	705874	14-381-038
20 to 200 μL	705878	14-381-037
100 to 1000 μL	705880	14-381-036
0.5 to 5 mL	705882	14-381-035
1 to 10 mL	705884	14-381-034

Fixed-volume and multichannel models and sets are also available on fishersci.com and fishersci.ca.

Safer and More Convenient

BRAND Dispensette S Bottletop Dispensers

Redesigned BRAND Dispensette S Bottletop Dispensers bring even more safety and convenience for dispensing laboratory reagents.

Choose S models for most applications, S Organic for difficult solvents and concentrated acids, S Trace Analysis for high-purity reagents, and Trace Analysis Pt-Ir for hydrofluoric acid.*

- Improved safety valve system
- Eliminated seals for greater reliability
- Lower operation forces
- Easier volume selection
- Faster priming

















Dispensers include adapters for common bottle sizes. Other adapters and accessories sold separately.



Valve Type	Analog		Digital	
	Standard	Recirculating	Standard	Recirculating
Volume Range	Cat. No.	Cat. No.	Cat. No.	Cat. No.
0.1 to 1 mL	13-689-019	13-689-012	13-689-006	13-689-000
0.2 to 2 mL	13-689-020	13-689-013	13-689-007	13-689-001
0.5 to 5 mL	13-689-021	13-689-014	13-689-008	13-689-002
1 to 10 mL	13-689-022	13-689-015	13-689-009	13-689-003
2.5 to 25 mL	13-689-023	13-689-016	13-689-010	13-689-004
5 to 50 mL	13-689-024	13-689-017	13-689-011	13-689-005
10 to 100 mL	13-689-025	13-689-018	N/A	N/A

*Dispensette S Organic for high organic solvents, Dispensette S Trace Analysis for HF and high-purity reagents, and select fixed-volume models are also available on fishersci.com or fishersci.ca.

GILSON PIPETTE SELECTION GUIDE

	DESCRIPTION	THROUGHPUT	COMFORT	MODEL / VOLUME	BENEFITS
SINGLE CHANNEL, AIR DISPLACEMENT	PIPETMAN M PIPETMAN M Connected 	L – M – H Medium to High		8 single-channel models Volume Range: 0.5 - 10 mL	<ul style="list-style-type: none"> • Easy to use • On-target performance • PIPETMAN M Connected makes manual processes verifiable
	PIPETMAN L 	L – M – H Low to Medium		8 single-channel models Volume Range: 0.2 - 10 mL Fixed Volume: 1 - 5000 µL	<ul style="list-style-type: none"> • All-day pipetting comfort • Secure pipetting • Fully autoclavable
	PIPETMAN G 	L – M – H Low to Medium		8 single-channel models Volume Range: 0.2 - 10 mL	<ul style="list-style-type: none"> • Pipetting comfort • Reliable results • Built to last and convenient
	PIPETMAN Classic 	L – M – H Low		8 single-channel models Volume Range: 0.2 - 10 mL	<ul style="list-style-type: none"> • Built to last • Extremely easy to maintain
MULTICHANNEL	PIPETMAN M PIPETMAN M Connected 	L – M – H Medium to High		12 multichannel models Volume Range: 0.5 - 1200 µL	<ul style="list-style-type: none"> • Easy to use • On-target performance • PIPETMAN M Connected makes manual processes verifiable
	PIPETMAN L 	L – M – H Medium to High		8 multichannel models Volume Range: 0.5 - 300 µL	<ul style="list-style-type: none"> • All-day pipetting comfort • Secure pipetting • Fully autoclavable
	PIPETMAN G 	L – M – H Medium to High		8 multichannel models Volume Range: 1 - 300 µL	<ul style="list-style-type: none"> • Pipetting comfort • Reliable results • Built to last and convenient
SPECIALTY	MICROMAN E 	L – M – H Low		6 single-channel models Volume Range: 1 - 1000 µL	<ul style="list-style-type: none"> • Reliable results even with non-aqueous liquids • Overall protection • Designed with comfort in mind

Visit fishersci.com or fishersci.ca to learn more.



11-386-000

Inside Dimensions (W x D x H)	Outside Dimensions* (W x D x H)	Cat. No.
28 x 23 x 29 in.	43 x 24 x 31 in.	11-386-000
35 x 29 x 30 in.	49 x 30 x 31 in.	11-386-001
48 x 29 x 32 in.	63 x 31 x 35 in.	11-386-002
60 x 29 x 32 in.	76 x 32 x 35 in.	11-386-003

*Outside width includes a 12 in. transfer chamber

Compact Glove Box

With transfer chamber AND flat side access door.

Completely sealed glove box for basic isolation and/or containment.

All units feature a high visibility of the interior, cleanliness, safety, complete containment, portability and a draft-free atmosphere. The installed purging valves are ideal for lowering oxygen and humidity levels.

Features include:

- Transfer chamber with purging valves and vacuum gauge
- Flat side access door for easily introducing larger equipment
- Four key cock valves for purging
- Hospital-grade outlet strip



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