Executive paper

Adopting agility in clinical supply labeling

Why a purpose-built solution is critical for consistency, accuracy, and speed

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Executive summary

Clinical trial supplies teams are under increasing pressure. Pharmaceutical organizations are asking them to do more trials, with greater complexity, more quickly. This requires them to study new modalities in new markets using (relatively) new models of clinical trials. The approach is shining a light on operations right across the clinical trials supply chain, including labeling and packaging, as pharma sponsors look to increase R&D efficiencies and shorten the time to study start-up. With labeling frequently a bottleneck, many organizations are recognizing the urgent need to strengthen their labeling capabilities.

This paper explores why an agile clinical supply labeling solution has become business critical for pharmaceutical companies and their clinical services partners. It examines the global trends driving the need to improve labeling operations to shorten development timelines, increase efficiencies, and stimulate growth.

As organizations increasingly look to bring labeling in-house, many are discovering that a purpose-built labeling application is the only viable route to delivering GxP-compliant labeling with consistency, accuracy, and speed.

This paper outlines:

Part 1

Clinical supply labeling systems: Why purpose-built? Why now?

Part 2

What must a solution offer to deliver GxP-compliant labeling with consistency, accuracy, and speed?

Part 3

How do you implement a purpose-built labeling system to realize value quickly?

Part 1

Clinical supply labeling systems:
Why purpose-built? Why now?

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Part 1: Clinical supply labeling systems: Why purpose-built? Why now?

These are challenging times for the clinical trial supplies market as pharmaceutical organizations flex their R&D models in response to pervasive global trends. Rapid advances in therapeutic innovation – along with digital disruption, regulatory change, and a glut of imminent patent expiries – are redefining the landscape, forcing a rethink to their approach to clinical research.

The implications are reverberating across the clinical trials supply chain. With manufacturers, CROs, CSOs and CDMOs all looking to rewire operations to reduce development times and accelerate trial processes, labeling has been identified as a part of this supply chain transformation. They're discovering that a purpose-built clinical supply labeling solution is the only viable option. Here's why.

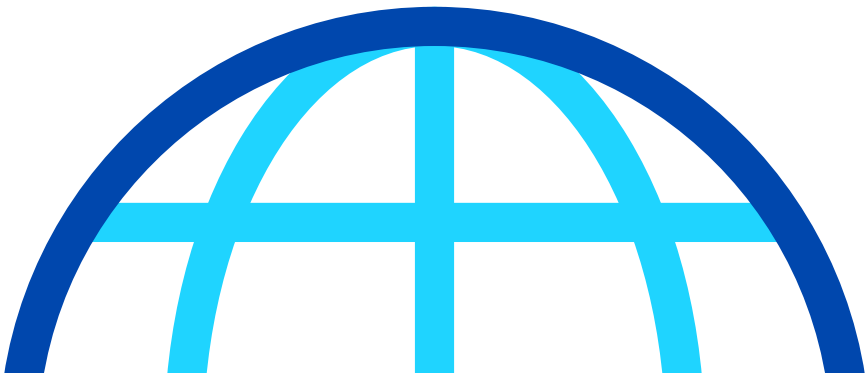
Global trends

The past few years have seen an unprecedented amount of change in the global clinical trials market. Much of it was triggered by the pandemic, which placed huge demands on the industry to fast-track vaccine development, trial, and manufacture, whilst at the same time requiring it to keep existing studies safely going despite the constraints of lockdown. The industry's response was remarkable, helped by a level of cross-sector collaboration that had never previously been seen.

The COVID vaccine experience reset sponsor expectations, providing conclusive evidence that trials could be conducted at speed without excessive cost or risk to patients. This has driven demand to apply those learnings to the wider market to accelerate clinical trial processes.

However, the pandemic hasn't been the only driver of change. At the macro level, pharma's business model is shifting as companies prepare for a future where customers pay for outcomes, not pills. The global trend towards value-based healthcare, designed to support spiraling demand, is forcing pharma to reimagine its R&D model to find new ways of accelerating high-value medicines to market whilst also reducing costs.

The need to optimize R&D productivity is urgent. McKinsey analysis suggests that by 2032 more than 55 blockbuster drugs – with expected sales exceeding $270 billion – will lose exclusivity in the US and Europe. 19 of those will drop off the patent cliff in the next 2-3 years. Companies' ability to replenish product portfolios with value-based therapies is therefore business critical. As a result, there's a huge push to bring more products to market – quickly – with organizations going all out to unearth breakthrough innovation.



That hunt for innovation has seen the clinical research market explode. The number of registered studies has almost trebled in the last decade, with over 456,000 studies being conducted in 2023. The location of studies is growing too, with trials in emerging markets like Asia Pacific, Africa, and the Middle East outpacing those in established markets. Since the pandemic, trials in countries such as China (54%), Nigeria (36%) Pakistan (32%), Georgia and Cuba (both 30%) have experienced double-digit growth. That expansion into new geographies brings its own supply chain challenges; how do you ensure GxP compliance with country-specific regulations? And how do you manage those complexities at scale when you're operating trials in multiple countries, sometimes upwards of 50?

Pharma's R&D profile is changing too. Technologies in immunotherapy, mRNA, and cell and gene therapy are dominating development pipelines, while demand for personalized medicines is gathering pace. These modalities bring new challenges to clinical research, calling for more innovation and greater agility in the supply chain.

Regulations are also evolving. EU CTR 536/2014 came fully into force in January 2023 with the repeal of the Clinical Trials Directive, harmonizing procedures for the submission, assessment, and monitoring of clinical trials in the EU. The regulation has implications for the labeling of clinical trial supplies, with some products needing to include expiry dates on both primary and secondary packaging. That's challenging.

Innovation and its impact on labeling

The trends and challenges outlined above have been a catalyst for innovation, with organizations across the clinical trial supply chain – pharma sponsors, CSOs, CROs and CDMOs – collaborating to drive step-change in trial speed and adaptability. That collaboration has given new impetus to initiatives like decentralized, virtual, and adaptive trials. Originally embraced as a response to COVID, monoclonal companies are now looking to operationalize these initiatives as 'business as usual,' recognizing their value in the ongoing drive for productivity gains.

The full integration of these innovations across the global pipeline, along with the changing focus of product R&D, is having a significant impact on supply chains, including packaging and labeling. The most obvious include:

1. The growth of biologics

The biologics market is growing rapidly. Valued at $511 billion in 2023, it's forecast to top $1000 billion by 2030 as pharma companies throw their weight behind the development of targeted and personalized therapies. Biologics – in particular, monoclonal antibodies, immunotherapies, and gene therapies – are helping to improve outcomes and survival rates in cancer, as well making big advances in the treatment of hematological disorders and rare diseases. It's no surprise that biopharma companies, large and small, are investing heavily in this area. But this leads to huge implications across the services supply chain.

One of the biggest factors is the need to minimize product and comparator waste. Biologics are expensive – for example, in a phase III cancer trial, the cost of the comparator alone can be upwards of $60 million. In the old trial model, companies might overload sites with IMP (Investigational Medicinal Products) to avoid scenarios where they didn't have kits to supply for a trial. This could lead to waste levels as high as 50-75%. With expensive biologics, that approach is prohibitive. Companies need to move to a supply model that supports significant waste reduction. From a packaging and labeling perspective, that means shifting production to smaller batches or 'on demand'. It also requires an agile labeling solution that can support it.

Another big challenge is product expiration. Stability data for biologics is often uncertain, making it much more likely that expiration changes will occur during a trial. With expiration extensions required to be included on labels, this may mean there's a need for relabeling in the supply chain. That's difficult. To compound this, as referenced earlier, Annex VI of the EU CTR means that the latest expiration dates may need to be labeled physically on primary drug packs (dependent on the product).

Many organizations are looking at Just In Time (JIT)/on-demand models to fulfill these ever-changing requirements.

"These complexities are driving the need for companies to adopt a Just In Time model model of packaging and labeling. This helps ensure that as you pack – and as you ship – you're using the latest protocol data and the latest expiry data on the label. This minimizes the likelihood of needing to perform an expiry extension after the pack has been shipped."

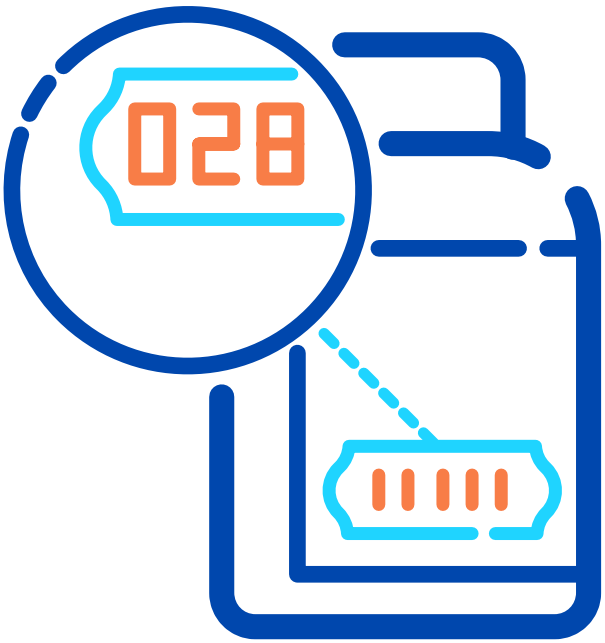
VP Product Management, Loftware

2. The surge in adaptive trials

Industry-wide efforts to reduce the time it takes to set up and start a clinical trial have led to increased adoption of adaptive trials. Adaptive trials bring flexibility to trial designs, allowing for modifications during a trial to streamline and optimize processes. They aren't new, but their uptake is growing, stimulated by a 2019 FDA guideline that made 'prospectively planned' modifications to the study design – such as adaptations to the patient population, treatment arm, patient allocation or endpoint selection – possible. The approach is an attempt to make drug development more efficient and lower the cost of developing new drugs. It can also help companies detect or prevent costly failures in the development process.

The FDA guideline sparked an uptick in adoption. In 2020 alone, almost 400 trials used adaptive designs. By comparison, in the previous decade, there were fewer than 300 in total. Evidence suggests the upward trend will continue as pharma sponsors strive for faster trial start-up.

The need for speed is having an impact on labeling, putting pressure on organizations to shorten the time for label and booklet design and production.



For years, the accepted norm was that the design and production process would take around three months. Today, however, organizations are looking to cut that dramatically. The rationale is understandable: slow turnaround times can delay studies and stall development, increasing the cost of a trial. Moreover, for CROs and CDMOs, a longer-than-expected wait for labels can delay billing and impact the bottom line.

However, adaptive trials present labeling challenges that can lead to delays if systems aren't fit for purpose. Flexible trial designs increase the likelihood that labels may need to adapt to protocol changes during a study. Doing it effectively requires an agile labeling solution.

"By modernizing our approach to the design of clinical trials, we can make drug development more efficient and less costly while also increasing the amount of information we can learn about a new product's safety and benefits. Using more modern approaches to clinical trials, we can lower the cost of developing new drugs and increase the amount of competition in the market. This can improve patient access."

Former FDA Commissioner Scott Gottlieb, M.D.

3. The growing appetite for decentralized trials

Arguably the biggest example of disruption to the traditional clinical trial model is the growing adoption of DCT (Decentralized Clinical Trials). Galvanized by COVID restrictions, the virtual model is steadily establishing itself as a new norm as sponsors look to maximize its obvious benefits.

DCT leverage innovations like digital technology, telemedicine, and remote monitoring to enable trial participation closer to (or in) patients' homes. The model offers patient convenience and a platform for greater connectivity between studies and subjects. It can also reduce the workload for trial investigators. Moreover, DCT can broaden access to potential subjects, bolstering trial populations and helping increase diversity and representation– a major industry objective.

Use of DCT more than doubled during the pandemic and has been growing ever since. So, what does this mean for packaging and labeling? Well, as more companies look to ship directly to patients, it's likely there will be a big shift to 'on demand' or JIT models of packaging, labeling, and shipping.

There are signs that the industry is already in transition, with a growing number of organizations adopting DTP (Direct To Patient) supply chain models. Success, however, will depend on establishing robust quality processes underpinned by a GxP-compliant labeling infrastructure that supports centralized production on demand or JIT. It requires a labeling solution that can pull data in real time and configure it into an approved format to be printed, validated, and applied.

The concept of meeting patients where they are when conducting clinical trials significantly predated the COVID-19 pandemic and aimed to improve patient convenience and experience. Typically, 70% of potential participants live more than two hours from trial sites, so decentralization broadens trial access to reach a larger number and potentially a more diverse pool of patients. The shift of clinical trial activities closer to patients has been enabled by a constellation of evolving technologies and services. We expect a significant increase in uptake because of experience gained during the COVID-19 pandemic.

McKinsey: Stepping up the decentralization of clinical trials.

Spotlight on labeling

As the size, scale, and scope of clinical trials proliferate on a global scale, labeling capabilities are becoming business critical. Companies have traditionally relied on generic solutions, home-grown offerings, and manual processes – or have outsourced labeling to service company partners who themselves operate their own legacy or manual systems. But as packaging and labeling requirements become ever more multifaceted in the wake of a shifting R&D environment, including the need for complex local language and country specific information, companies are looking at how to bring labeling capabilities into the digital era as part of the digital supply landscape.

CROs, CDMOs and CSOs are increasingly investing in labeling solutions, recognizing the opportunity to increase speed and agility, and give themselves greater control in label and booklet design and production. Many are finding that enhanced labeling capability gives them a competitive advantage, with the ability to offer additional value-added services that help win business, unlock new revenue schemes, and secure greater margin. The development of in-house capability also supports pharma sponsors' growing desire to reduce the number of suppliers in their supply chain.

"Label turnaround times have become a significant issue in the marketplace. CROs, CSOs and CDMOs are starting to think: 'let's take control of this, we can do it quicker if we bring it in-house.' Part of the impetus for that is the opportunity to create new revenue streams and attract new customers by offering labeling as a value-added service. It brings competitive advantage. It also sits well with sponsors' ongoing efforts to reduce the number of components in the supply chain. That's a key factor in speeding up trials: if you have fewer companies involved in the process, you're going to shorten timeframes. It's a win-win."

Director, Loftware

Part 2

What must a solution offer to deliver GxP-compliant labeling with consistency, accuracy, and speed?

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Part 2: What must a solution offer to deliver GxP-compliant labeling with consistency, accuracy, and speed?

Clinical supply labeling is very different from standard production labeling used in most other industries. It's much more complex. The environment is highly regulated; the design of labels and booklets, and the content they contain, must comply with stringent rules that vary by country and region. With trials being conducted across multiple locations, these complexities create content management needs that can't easily (or safely) be managed within an ERP (Enterprise Resource Planning) or manual system. The growing demand to speed up clinical trial processes only adds to the challenges and risks.

A purpose-built clinical trial labeling application is the only viable option. But what does a fit for purpose solution look like? At a mandatory level, clinical supply labeling solutions need to provide automated label and booklet design, translation and phrase management, regulatory rules, pack randomization, and flexible print capabilities.

Five key elements your labeling solution must have to be fit for purpose

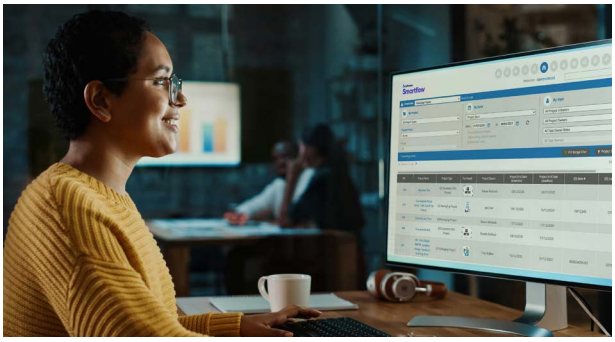
The fundamental job of any clinical supply labeling solution is to deliver GxP-compliant labeling with consistency and accuracy, at speed and scale. In the past, labeling processes have typically been managed in operational silos, separate from product production. However, the globalization of clinical trials, and the associated complexities of the supply chain, mean that the old approach is no longer fit for purpose. Siloed labeling operations leave companies vulnerable to mis-labeling, compliance breaches, and costly recalls.

Companies therefore need a labeling solution that provides complete visibility of master data assets and production processes across the organization. And they need an application that gives them the ability to control and optimize those data assets throughout the label lifecycle. This is particularly important in clinical supply labeling where content requirements vary and can evolve through a trial. Having a system that allows you to retrieve label content at the time of print, using the most up-to-date data in the right local language, is critical. With the right data structure and management processes in place, it becomes easier to ensure that the right data is available to the right person at the right time. The downstream benefits of that – precision, speed, productivity, and efficiency – are significant.

With a purpose-built solution, the opportunity to streamline clinical supply labeling is there for the taking. An effective application will offer the following five key elements:

1. Automated label and booklet design, generation, and approvals

Modern solutions are transforming labeling processes through automation, allowing companies to simplify and streamline activities that have previously been manual, onerous, and risky.



With the right software, it's possible to automate a significant amount of label and booklet design, generation, and approval. Fully validated systems can automate many of the processes that underpin label design, content management, workflow, inspection, and version control. With each country having its own regulatory and language requirements, automation can help reduce the time it takes to design and print clinical labels and booklets from months to hours. Automation is therefore a must-have component of any purpose-built solution.

Things to consider

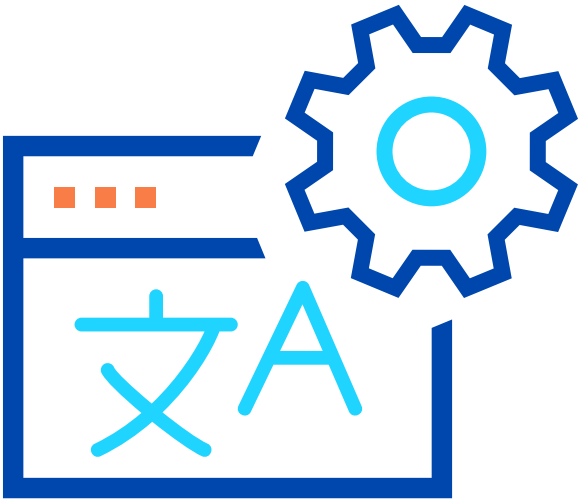
An effective purpose-built system will offer Master Label Text/Country Label Text (MLT/CLT) functionality to streamline the process of defining the content, design, and production of clinical supplies labels and booklets.

It will also integrate seamlessly within your digital supply chain to critical systems such as ERP, CSM (Clinical Supplies Management), and PLM (Product Lifecycle Management), enabling you to retrieve the most up-to-date label data at the point of printing.

The best applications will have a CMS that securely stores all content components – such as regulated phrases, symbols, numbers, fonts, and images – and subjects them to version control and design status control. The solution should manage each content entity's ownership, availability status, and links to other content entities. This ensures that any label can be reproduced at any time, with changes to labels tracked, versioned, approved, and audit logged.

2. Phrase and translation management

Functionality to support phrase and translation management is crucial. National regulators commonly require label text in the local language, which in some can mean multiple languages. Third party translation services can be expensive, especially if you're producing booklets for trials in 50+ markets. Those costs will spiral if your approach requires you to translate and approve the same phrases time and again for every study.



Things to consider

A good labeling solution will include phrase and translation management functionality as standard, optimizing costs and speeding up processes by enabling you to re-use pre-approved translations.

This should ideally include a GxP-compliant phrase library that provides a repository of approved translated master-level phrases that can be used without the need to reference third party translation houses or go through lengthy internal approval processes every time a phrase is used.

The smartest systems will be able to automate aspects of translation management, automatically determining the languages and phrases required based on country data. They will also be able to identify missing translation, triggering requests to ensure translations are completed without disrupting production schedules.

3. Regulatory rules engine

Country-specific regulations are at the root of much of the complexity in clinical supply labeling. Each country has its own set of regulatory requirements, typically impacting both label design and content. In addition to local language requirements, variation in regulations can cover everything from label format and font size, to warning statements, EudraCT numbers, symbols, and expiry dates. It's a significant content management challenge. A good labeling application will include tools that simplify and automate the task of ensuring label designs comply with local requirements.

Things to consider

To ensure labels meet the regulatory and language requirements for the destination country, your labeling application should be able to define these requirements as design and content 'rules', against which label designs and content can be automatically checked.

An effective solution will have a built-in regulatory rules engine that can be configured with the most up-to-date rules and prompt users of any country-specific requirements during the artwork design and approval processes.

4. Patient and kit label randomization

Since pharma sponsors don't always give their partners fully randomized data, clinical supply labeling solutions must have the functionality to generate this information. This allows CROs and CDMOs to randomize patient and kit label data on behalf of pharma sponsors.

Things to consider

An effective randomization model will enable a step-by-step definition of the structure, parameters, and data required to generate each randomization. Each state should be version controlled.

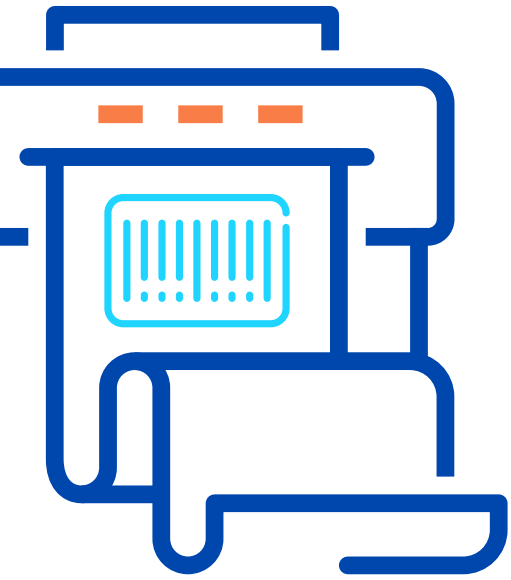
5. Flexible production print capabilities

As agile trial protocols become the norm, there's a growing demand for more varied production models. Conventional batch production processes increasingly need to be complemented with more flexible production print models like JIT or on demand. These models are similar but nuanced. In a clinical setting, on demand is where requests for clinical packs come in via an IRT system in response to confirmed patient attendance at study sites, where JIT packaging, labeling and production is carried out in line with a predefined plan. Labeling solutions must be optimized to offer this flexibility.

Things to consider

An effective system will support the diverse range of production print models used today – but it will also be able to adapt quickly to meet new production print demands.

The application should include standard pre-configured print processes for use in the most common production print environments. But it should also be easy to implement and configure new print processes to specific production line requirements, without requiring supplier involvement or revalidation.



Part 3

How do you implement a purpose-built labeling system to realize value quickly?

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Part 3: How do you implement a purpose-built labeling system to realize value quickly?

Organizations recognize the benefits of having an enterprise-wide labeling solution but have often struggled to standardize their operations around a single, global application. Sub-optimal implementation programs can be expensive and disruptive, typically leading to poor adoption and significantly minimizing operational value. However, advances in technology are making implementation simpler, faster, and much more cost-effective, helping companies realize value quickly.

Leveraging the cloud

The last few years have seen a change in the way CROs, CSOs and CDMOs implement software applications. In the past, companies pushed for on-premise solutions, believing the approach would give them greater control. In recent years, however, there's been a shift towards the use of Software-as-a-Service (SaaS), with companies increasingly turning to software applications that are deployed in the Cloud.

This approach offers major advantages, not least around implementation. Leveraging the Cloud means that companies don't need to source hardware or operating systems, and they don't need to perform the implementation qualifications to ensure the application is correctly installed. Responsibility for implementation passes to the software provider, who deploys it in their own managed environment and knows how to get it up and running quickly. This simplifies implementation, minimizing risk and improving adoption. With the software provider also responsible for ongoing management of the application, including upgrades, organizations can realize value much quicker.

By leveraging the Cloud, clinical trials service companies can reduce the level of internal technical resources required to implement and maintain their labeling system, freeing them to concentrate on their labeling strategy and operations, rather than technology.

The benefits of the Cloud go beyond implementation and operational efficiencies. Cloud-based systems unlock data, allowing greater visibility, and greater collaboration, both across the organization and across the end-to-end label lifecycle. Moreover, SaaS simplifies organizations' ability to scale labeling, both in terms of capacity and global reach. This is a huge benefit in a marketplace where pharma sponsors are running multiple studies in multiple geographies and need to reduce time to start-up.

The shift from custom-built to purpose-built

Another growing trend is the industry's shift in preference from custom-built applications to purpose-built solutions. Historically, organizations have favored the custom-built approach to labeling solutions. However, this has often been an onerous process, with companies spending a long time defining detailed user requirements for highly configured solutions, then going through protracted tender processes to identify the best partner to build them. Many found that these customized applications satisfied their initial requirements but proved expensive to adapt as business needs evolved.

Today, organizations are increasingly pursuing off-the-shelf, purpose-built solutions that have been designed to incorporate – and flex to – industry best practice. The development of these solutions is being helped by a growing culture of collaboration across the sector, where industry leaders are actively partnering with software vendors to inform GxP-compliant innovation.

The adoption of proven, off-the-shelf software shortens implementation and accelerates time to value.

Adoption of industry-common label data structures

The increased collaboration across the sector is driving an eagerness to adopt industry-common label data structures and label reports, with a view to simplifying how label data is passed between pharma sponsors and their supply chain partners. The adoption of common data structures will further streamline implementation, helping organizations realize faster time to value.

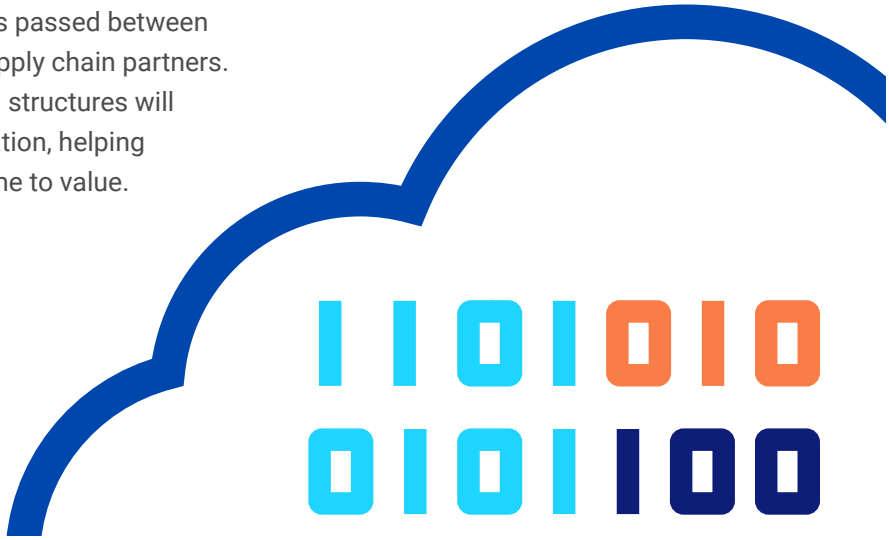
Automated testing eases in-life upgrades

Historically, many clinical services organizations have been reluctant to adopt new software upgrades because of the potential high cost of documenting, testing, and validating system changes. However, the most advanced labeling applications are leveraging automated testing technology to help their customers realize the value of new features whilst minimizing cost and disruption. Automated testing technologies can greatly reduce the manual effort required to test and validate system changes, in the process bolstering the quality and compliance of the software application.

The most progressive vendors include their own fully documented automated testing output for their customers to leverage. This approach aligns with FDA recommendations that pharma organizations should take advantage of vendors' functional specifications and test results to simplify and shorten the efforts required to prove validation.

Purpose-built applications that are validation-ready help optimize implementation, providing documentation, guidance, and support to accelerate the validation process.

It's just another example of how companies can leverage technologies to de-risk implementation, streamline operations, and reduce time to trial.



10 benefits of a purpose-built clinical supply labeling solution

A purpose-built system streamlines labeling processes, increasing efficiency, and accelerating

Simplify complexities and shorten timelines to deliver compliant labeling

Drive continuous improvement

Provide enterprise-wide visibility of data assets and production processes

Centralize control for traceability

Enable regulatory compliance, mitigating the costly risk of regulatory breach

Support global requirements

Use automation to simplify label/booklet design and approval, reducing manual effort

Improve operational agility

Improve response times, speeding up processes and reducing costs

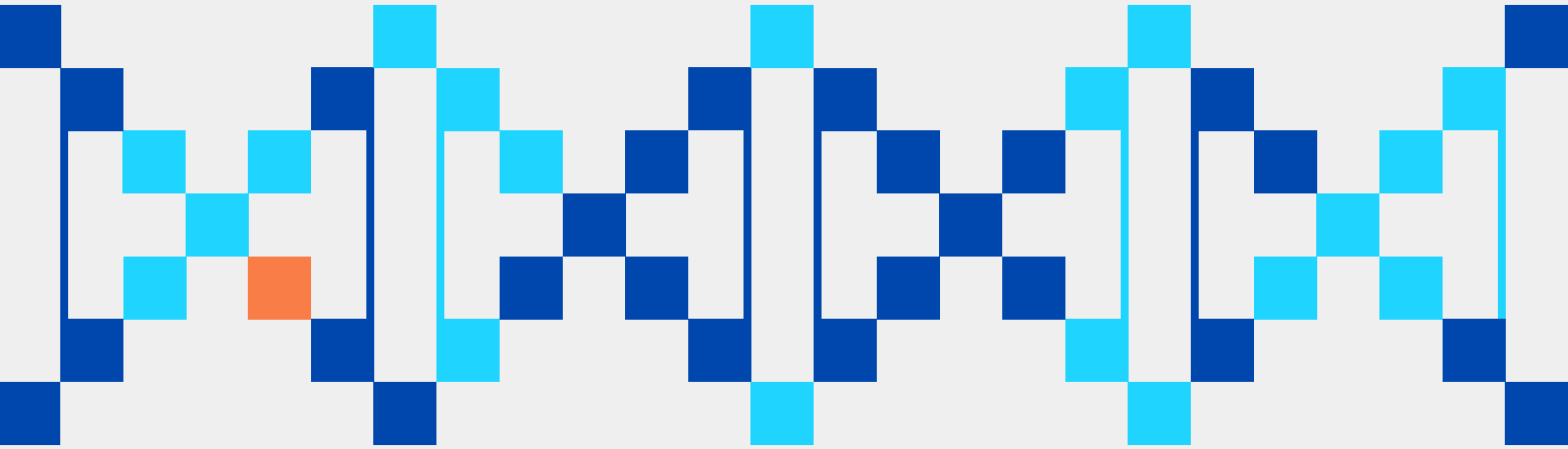
Provide competitive advantage and opportunity for new revenue streams

Adopting agility is critical

Business leaders are recognizing that their ability to be agile and deliver compliant clinical supply labeling with consistency, accuracy, and speed on an international scale is critical.

Both market and technology drivers are changing the traditional model that many organizations have always followed using disparate labeling solutions at each site that are no longer fit for purpose. Increasingly, this siloed approach has become a headache for many, with obvious pitfalls when it comes to managing the complexities of this highly regulated market.

In a business environment where 'purpose' is considered a leading driver of growth, a purpose-built clinical supply labeling solution that seamlessly slots into the digital supply chain allows pharma organizations to have complete control of every detail of the label lifecycle.

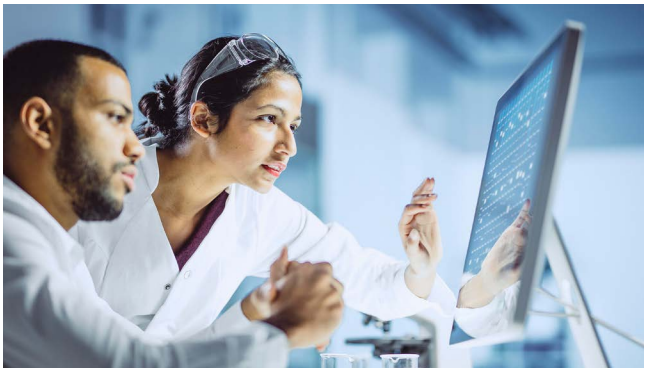


Loftware Prisym 360 - it's built into our software's DNA

Loftware's Prisym 360 software is an innovative label and content management solution that incorporates industry best practice and is designed to meet the complex regulatory requirements essential for clinical supply labeling.

Prisym 360 is a validation ready cloud-based label printing platform that is simple, standardized, and scalable. Its unique features include automated booklet design, phrase and translation management, and approval workflows, and flexible on-demand/Just-in-Time (JIT) print models.

Designed, tested, and delivered with a full validation documentation pack, Prisym 360 provides certainty that labels and booklets are produced accurately, efficiently, and compliantly to support today's complex, adaptive clinical studies.



About Loftware

Loftware is the world's largest cloud-based Enterprise Labeling and Artwork Management provider, offering an end-to-end labeling solution platform for companies of all sizes. Maintaining a global presence with offices in the US, UK, Germany, Slovenia, China, and Singapore, Loftware boasts over 35 years of expertise in solving labeling challenges. We help companies improve accuracy, traceability, and compliance while improving the quality, speed, and efficiency of their labeling. As the leading global provider of Enterprise Labeling and Artwork Management, along with Clinical Trials Labeling and Content Management, Loftware enables supply chain agility, supports evolving regulations, and optimizes business operations for a wide range of industries. These include automotive, chemicals, consumer products, electronics, food & beverage, manufacturing, medical device, pharmaceuticals, retail, and apparel.

For more information on Loftware's clinical trial offerings, please go to:

https://www.loftware.com/clinicalsupply

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