



SUPPLY CHAIN INSIGHTS

INCREASING SUSTAINABILITY IN THE CLINICAL TRIALS COLD CHAIN

Like all industries, pharma is aiming to become increasingly sustainable in all its activities. In clinical trials logistics the challenge is to find measures that increase sustainability without compromising performance.

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Sustainability is now hard-wired into the DNA of clinical trials businesses. Not only is the Environmental, Social and Governance (ESG) agenda becoming increasingly crucial to a company's reputation and success, but there's also an ethical imperative to conserve the earth's resources.

Within clinical trials logistics there are specific sustainability matters that need to be addressed. "The smaller deliveries involved in Clinical Trials Logistics mean we have to adopt a different approach to sustainability," explains Richard Tencer, Global Head of Clinical Operations, DHL Supply Chain. "Things are further challenging because products need to be kept within tightly controlled temperature ranges, normally either below -20°C, between +2°C and +8°C or between +15°C and +25°C."

It's neither practical nor sustainable for clinical trial deliveries to use large active temperature-controlled vehicles or single-use passive shippers.

Your packaging choice: reusable or disposable?

Traditionally clinical trials logistics uses small, expanded polystyrene (EPS) containers for deliveries. These are made from a thermoplastic foam containing 98% air, which provides low heat conductivity. When these are used in conjunction with frozen water-based gel packs, they can keep the temperature of the transported product low and stable for between 48 and 72 hours.

This solution performs relatively well, but once the contents have been removed, the container cannot be reused and has to be disposed of. Not only does this cause a large amount of waste –and disposal administration – but it also creates additional emissions manufacturing replacement containers.

Advances in packaging materials mean there is now an improved cold-chain delivery method to reduce

the environmental footprint of clinical logistics operations. It uses vacuum-insulated panels and Phase Change Material (PCM) based coolants, a combination that offers several advantages:

1. The vacuum-insulated panels can be reused for an average of five years if properly maintained while blocking temperature exchange more efficiently than EPS.
2. The PCM cooling elements can be reconditioned for unlimited use. Moreover, it can store and release large amounts of energy, which means it maintains a temperature within a specific range more effectively than gel packs.
3. The combination of vacuum insulation and PCMs can keep temperatures closely controlled for a minimum of 100 hrs – even, in the right conditions, for over a week.
4. Unlike active refrigerated containers this is a passive solution, so it doesn't require an energy source and creates no emissions while in use.

A holistic approach to sustainability

While this advanced packaging is undoubtedly a step forward in terms of sustainability, the need to return and maintain the parts might be a burden. That is why the right solution will consider the packaging materials and the process required to ensure sustainability and reliability.

"Many of our pharmaceutical customers enjoy the benefits of our "packaging as a service" solution. It makes life much easier for them because we manage the entire process. Customers can adopt a hands-off approach as we buy and maintain all the boxes, whether they are using the service locally, regionally or globally," says Richard Tencer.

“A dedicated team is responsible for tracking all orders shipped with reusable packaging, assuring they are delivered and collected in a timely manner. As the boxes return to our depots, they are inspected, cleaned and prepared to be used again. Data analytics, performance management and reporting are also part of the services provided by DHL”, he adds.

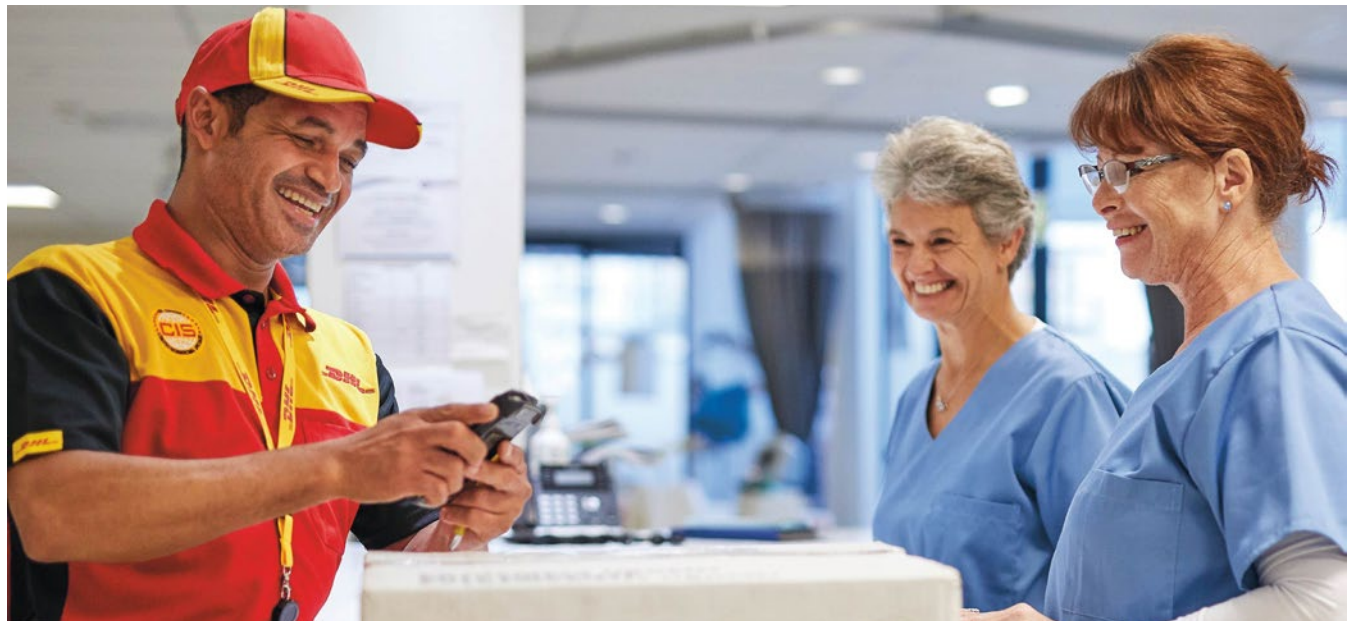
The right packaging solution will ensure product integrity, even when obstacles arise. For instance, if there’s a hold-up at customs, the right shippers can “hibernate” in cold storage or maintain temperature long enough to return to the point of departure. The contents can still be used, reducing costs through spoilage and repeat sends while also reducing waste. And through efficient reverse logistics processes, the boxes can easily be picked up and returned to the depot for maintenance, reducing complexity for the consignee, who would only have to add the return label over the box and wait for the collection the next day.

Value-added services that enhance the patient experience can also be approached with sustainability in mind. “We offer white glove transportation where the products are shipped using sustainable thermal packaging and delivered on a predefined date and time. The box is handed over to the consignee while the driver waits for the contents to be removed, then immediately takes the packaging back away,” explains Richard Tencer. “This works particularly well with decentralized clinical trials, where items are delivered to a patient’s address rather than a central depot. There’s no waiting around for packaging to be picked up and no boxes to clutter up the home.”

Maximum performance. Minimum waste and emissions.

When it comes to performance, both clinical and sustainable, the reusable packaging system wins hands down.

As already stated, the vacuum insulated boxes and PCM coolants maintain the contents at a stable temperature for at least 100 hours - compared to a maximum of 72 hours for traditional boxes. This means fewer clinical products get wasted and more patients get the treatment they’ve signed



up for. In terms of convenience, the reverse logistics model reduces hassle and clutter for hospitals and patients. And thanks to integrated systems and robust fleet management processes, return rates up to 99% are achievable.

Richard Tencer has been looking at the figures: “Our own calculations for one leading pharmaceutical customer showed not only a large improvement in their environmental footprint,” he says, “but also cost reductions by using our reusable packaging solution.”

Another study¹ compared end-to-end environmental impacts between single-use and reusable containers. The study was conducted over a two-year clinical trial of 30,000 individual package shipments where 12 liters of payload were kept at a controlled 2-8°C temperature range for around 96 hours. Whereas the average single-use approach would emit 1,122 tonnes of CO₂ equivalent, the reusable solution emitted just 241 tonnes. That’s a 78% difference in harmful emissions, not to mention 95% less post-consumer waste. A convincing argument for reusability, if ever there was one.

Alongside the packaging system, sustainability in clinical trial operations is further increased through other sustainable logistics solutions, including greener warehousing and cleaner transport initiatives.

“Our sustainable logistics solutions empower many of our life sciences and healthcare customers to achieve greater progress towards their ESG targets,” sums up Richard Tencer. “Through our reusable packaging, our customers benefit from a simple, cost-effective solution that works extremely well in reducing CO₂ emissions - and most importantly, is welcomed by both clinicians and patients alike.”

FOR FURTHER INFORMATION

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¹An environmental impact comparison of packaging methods in the cold-chain industry - Peli BioThermal