ThermoFisher SCIENTIFIC

EVALUATING & QUALIFYING TEMPERATURE MANAGED SHIPPERS

fisher clinical services

• API • BIOLOGICS • EARLY & LATE PHASE DEVELOPMENT • CLINICAL TRIAL SOLUTIONS • LOGISTICS SERVICES • COMMERCIAL MANUFACTURING

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INTRODUCTION & OVERVIEW

The maintenance of cold chain product integrity across the entire supply chain demands rigorous processes and cold chain expertise of the highest calibre—from packaging, handling, storage & distribution of temperature sensitive Investigational Medicinal Products (IMP), all the way to the investigator site. These eBooks outline industry trends and reviews how Fisher Clinical Services solutions are meeting the challenges of the cold chain distribution of clinical trial supplies all over the world.

COLD CHAIN INDUSTRY TRENDS provides an industry overview and a framework for discussion. The importance of a robust supply chain is addressed. It includes planning recommendations for biopharmaceutical companies preparing to scale up to global vaccine trials.

COLD CHAIN SHIPPING CONSIDERATIONS takes a deep dive into passive shipping options and how they work, with information on the advantages and disadvantages of various coolants.

EVALUATING & QUALIFYING TEMPERATURE MANAGED SHIPPERS **provides insight into how we qualify shipping options with a case study example of a 'return and reuse shipper pilot' which delivered very positive results.**

MANAGING TEMPERATURE EXCURSIONS provides top tips on the best course of action to take, and provides summary recommendations for Sponsors on how to handle cold chain or temperature sensitive IMP across the supply chain, up until delivery to the investigator site.

QUALIFICATION OF SHIPPING OPTIONS

Establishing best practices for the industry

With over 30 years in this industry and a sole focus on clinical trials, the Fisher Clinical Services team defines best practices to follow when shipping clinical trial supplies all over the world. We work closely with pharmaceutical and biotech Sponsors and regulatory bodies in order to define the best shipping options for a clinical trial protocol.

To that end, we set out to ensure that shipper qualification profiles encompassed 'real world' scenarios, based on the huge volume of shipments each profile would support.

In 2015, a project team was established to produce a set of "Global Profiles" representative of Europe/US and international shipping conditions. Ten (10) test profiles were developed (5 profiles for +2˚C to 8˚C and 5 profiles for +15˚C to +25˚C) from temperature and time information on worst-case routes for the company's Basel, Switzerland; Horsham, UK; Allentown, US; and Singapore locations.

The objective of the project team was to evaluate the performance capabilities of various shippers through rigorous objective testing encompassing a variety of shipping conditions across defined routes.

Ten test profiles were developed from temperature and time information on worst-case routes for the company's Basel, Switzerland; Horsham, UK; Allentown, US; and Singapore locations

Qualification Findings

Due to the ever-changing nature of a clinical supply chain and the many complex variables, the distribution environment cannot be validated to ensure zero temperature excursions[1]. Instead, passive shippers should be "qualified" with contingencies for events such as flight delays, unusual weather pattern and customs clearance issues.

The "Global Profiles" account for the vast majority of these eventualities to produce a robust set of profiles that account for > 95% of our domestic and international shipping conditions.

Where unique challenges occur, such as extreme high or low environmental temperatures (e.g in Russia's winter), custom profiles are developed. These ensure shipping systems meet the challenge to protect the IMP from the site of origination to final destination.

Passive shippers should be "qualified" with contingencies for events such as:

- **flight delays**
- **unusual weather pattern**
- **customs clearance issues**

1. Qualification Versus Validation and Good Cold Chain Management Practices', Rafik H. Bishara, PhD, Pharmaceutical Manufacturing and Packing Sourcer, Autumn 2005 issue, pages 102, 104, 106. © 2005 Samedan Ltd

EVALUATING SHIPPER OPTIONS

Ask these questions when evaluating shipper options:

1. Has the shipper been tested on its **ability to keep the inner temperature of the box stable**?

2. How long will the temperature **remain stable? This is known as "validity."** Will the shipper maintain its temperature to transport the drug from origin to destination without risking a temperature excursion?

3. **How easy** is it for the shipper to be prepared and packed by dispatch personnel? Complex packing instructions can cause incorrect preparation of the box which increases the risk of temperature excursions.

4. Do you want to select **a shipper that can be reused** in order to reduce carbon footprint and possibly reduce cost?

5. If clinical sites struggle with the **disposal of waste**, have you selected a shipper with fewer elements that may help alleviate this problem?

RETURN & RE-USE PROGRAMS BENEFIT MANY PARTIES

In recent years the industry has seen a shift away from traditional Expanded Polystyrene (EPS) water-based shipping solutions to smaller, reusable, shippers with Vacuum Insulation Panels (VIP) and Phase Change Materials (PCM).

Sponsors are demanding more robust systems and also have an increased awareness of the cost of disposal. In some EU countries such as Germany—the largest clinical trial supply and logistics market in Western Europe—responsible disposal of these systems can cost twice as much as disposal of water-based shippers. Single-use systems also create difficulties at the clinical site with 'waste build-up' and present major challenges for smaller sites with limited storage space.

Who Benefits in the Supply Chain?

CLINICAL SITE

- Reduced waste build-up
- Less storage space required to store waste until destruction
- Easier manual handling due to smaller shippers for the same payload space

SPONSOR

- Less excursion risk due to increase in shipper performance
- No waste disposal costs
- Shorter leadtimes
- Lower outbound freight costs due to smaller shippers for same payload space
- Significant cost reduction when compared to purchase cost of the equivalent shipper

CLINICAL SUPPLIES LOGISTICS PROVIDER

- Level load week for dispatch as higher performance allows shipping over weekends
- Less excursion risk and associated burden of investigations
- Supporting a green initiative

COURIER

- Defined process to manage reverse logistics of the shipper boxes
- New revenue stream from returning empty shippers

PATIENT

- Higher success of on-time, in-full delivery to the clinical site and patient due to a lower excursion risk

CASE STUDY & PILOT PROGRAM

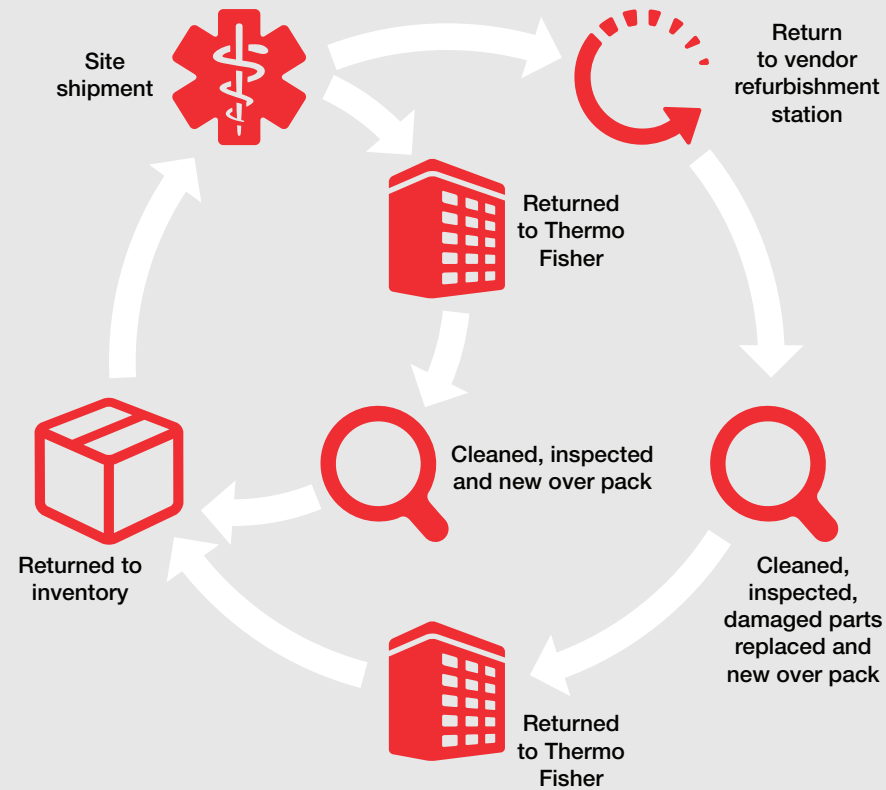
A leading multinational pharmaceutical company with a high volume of cold chain shipments approached us for guidance on a shipper return and reuse program. An inconsistent model had been in place with single-use shippers deployed in some regions, and return and reuse shippers in others.

The Sponsor wanted to:

- **Minimize impact on the environment**—make changes to impact its global sustainability target & reduce the environmental impact and carbon footprint of its supply chains
- **Increase customer satisfaction**—improve the process for its investigator sites and reduce the waste that they needed to dispose
- **Ensure product integrity**—reduce temperature excursions from shipment delays
- **Promote patient safety**—embrace new technologies & methods to help ensure its IMPs are delivered to patients in the best possible way

A pilot program for reusable shippers was set up for US domestic and EU shipments.

Everyone is a winner in this scenario—the Sponsor, the Logistics Provider, the Investigator Site and ultimately the Patient



To ensure success of the pilot, it was a priority to ensure that:

1. All stakeholders were engaged early in the process
2. The benefits were clearly outlined to all parties involved
3. The process was simple to enable the sites to return the shippers
4. Communication & training for all those involved was done well
5. Site feedback was gathered to refine the process

CASE STUDY RESULTS

A robust process was put in place and the pilot exceeded expectations, resulting in:

- Recovery rate of 97% returns for US domestic & European shipments (above the 90% target)
- Reduced temperature excursion
- Positive impact on the environment
- Defined reverse logistics process making it easy for site personnel
- Positive feedback from the site

YEAR 1

300,000 POUNDS OF WASTE DIVERTED FROM LANDFILL

YEAR 2

TARGETED REDUCTION OF 1.2 MILLION POUNDS OF WASTE DIVERTED FROM LANDFILL

"I like it—the whole process works well"

"I think it's a great system. They make it very easy to return"

"I love the reuse process! I hate all the waste when we don't recycle"

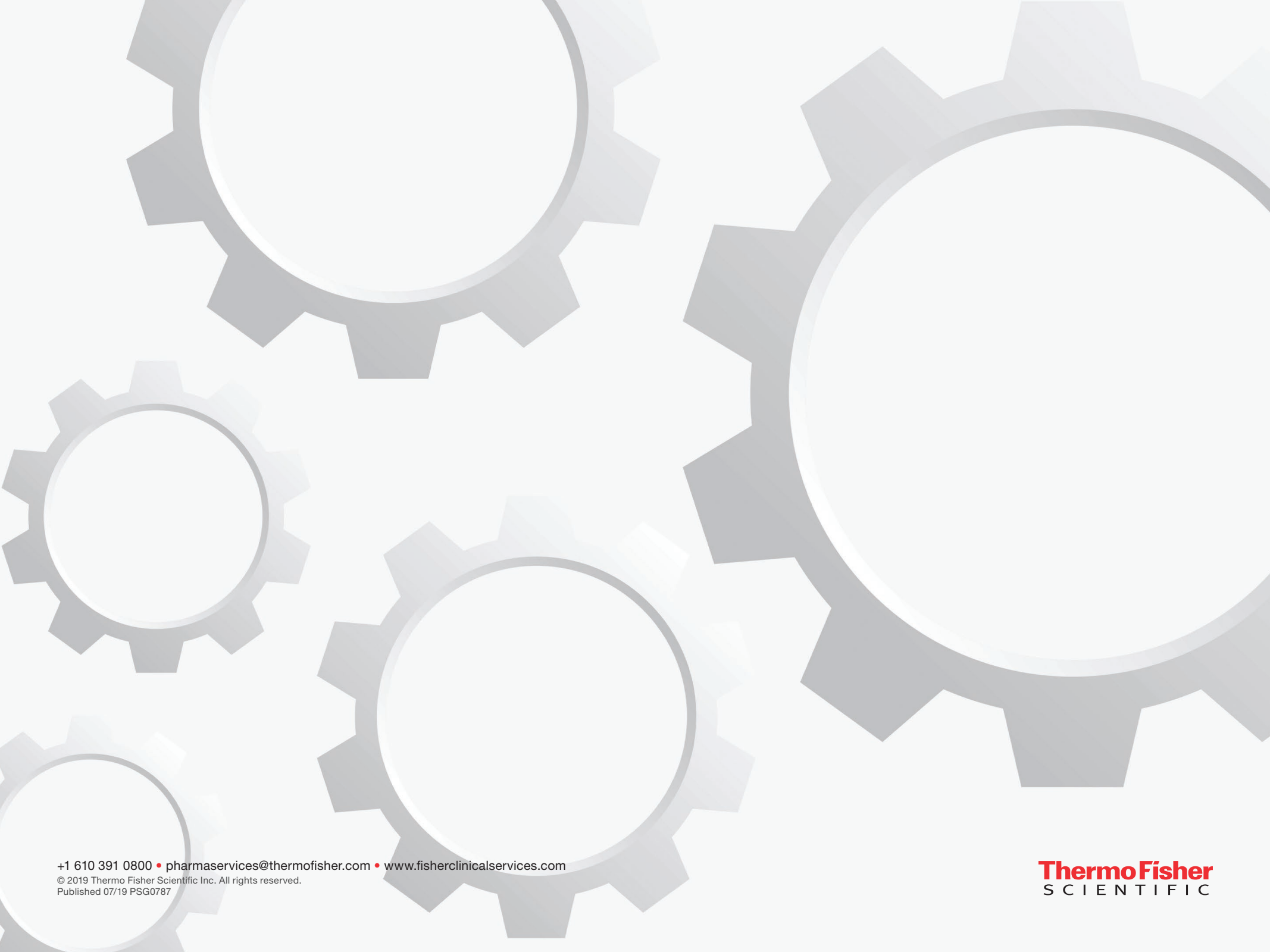
GLOBAL CLINICAL SUPPLY DISTRIBUTION FACILITIES

ABOUT US

With unwavering commitment to service, science and process engineering, Thermo Fisher Scientific is powered by people with an exceptional commitment to quality, deeply instilled ethics of personal responsibility and unrivaled expertise.

Thermo Fisher Scientific is the world leader in serving science, with revenues of more than $24 billion and approximately 70,000 employees globally. Our mission is to enable our customers to make the world healthier, cleaner and safer. We help our customers accelerate life sciences research, solve complex analytical challenges, improve patient diagnostics, deliver medicines to market and increase laboratory productivity. Through our premier brands—Thermo Scientific, Applied Biosystems, Invitrogen, Fisher Scientific and Unity Lab Services—we offer an unmatched combination of innovative technologies, purchasing convenience and comprehensive services.

Fisher Clinical Services, by Thermo Fisher Scientific, are a comprehensive suite of market leading global clinical supply chain services. With a network of cGMP facilities strategically located across the globe to support the conduct of clinical trials, we offer worldwide support for all aspects of clinical supply management including comparator, co-medication and ancillary supply sourcing, packaging, labeling, storage and distribution through to returns and destruction. With more than 30 years of experience exclusively focused on clinical trials, we can offer guidance and full logistics support across all types of clinical programs and projects.



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