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## Best Practices in Cold Supply Chain

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*Beyond affecting the bottom line, an improperly managed **cold chain** can lead to serious quality and safety concerns. By tailoring **supply chain best practices** for sensitive **cold chains**, shippers around the world can mitigate risk and better control the outcome.*

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By RAFAEL VELA | Best Practices Series

**Definition of *best practice***

a procedure that has been shown by research and experience to produce optimal results and that is established or proposed as a standard suitable for widespread adoption

Best practices are simply recommendations which provide a place to start as you build and enforce the procedures specific to your supply chain.

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## BEST PRACTICES IN COLD SUPPLY CHAIN

By Rafael Vela

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### Cold Chain Logistics

Cold chain logistics is the technology and logistics process that allows for the transport of temperature-sensitive goods and products along the supply chain.

Cold chain logistics management involves performing a sequence of activities to prepare, store, transport, distribute, and deliver the products along the cold supply chain. It is necessary to store and ship the products at a specific temperature otherwise it will render them unusable.

Most products labeled as “**perishable**” will likely need cold chain management (foods, medical supplies, pharmaceutical products, etc.).

A cold chain is a temperature-controlled supply chain. This typically involves keeping items cold from point-of-manufacture to point-of-use.

### Perishable Products

Perishable products are those likely to spoil, decay or become unsafe to consume or use if not kept between specific temperature ranges.

Some examples of perishable products are:

- Dairy products and eggs
- Flowers
- Fruit and vegetables
- Meat and poultry
- Medicines
- Seafood
- Some raw materials for pharma industry
- Vaccines

### Perishable Cargo

Perishable cargo is nothing more than perishable products loaded on a ship, airplane, or other mean of transportation that need to be kept under specific temperature, humidity and other environmental conditions to ensure its integrity during transportation.

## Main Components of a Cold Chain

The cold chain has 4 main components, each of which must work perfectly to ensure the safe transport and storage of cold chain products:

1. Temperature-controlled storage — specialized refrigerated facilities where cold chain cargo is stored until it is shipped out to a distribution center or its destination.
2. Temperature-controlled transport — using customized insulated cold containers that help transport goods via airways, waterways, roadways, or railways.
3. Trained and diligent personnel — that are familiar with the complexities of handling sensitive cold chain cargo.
4. Efficient operational and management procedures — to minimize risk during day to day operations as well as contain it in case of unexpected incidents.

## Best Practices in Cold Supply Chains

New regulations and an increasing demand of perishable products (medicines, food, etc.) have made cold supply chains a necessary but complex process.

So how does a logistics provider grow and thrive in this challenging environment? Let us examine some best practices across the cold supply chain:

### 1

#### Shipment Preparation

Understanding the chemical-biological characteristics of the products being shipped is fundamental to ensure product integrity while moving through the supply chain.

Make sure temperature, humidity, luminosity, etc. levels required to maintain the products in good condition are achievable by the equipment that will be used to move the goods.

Reefers need to be steam cleaned and precooled before the goods are loaded to avoid any chances of spoilage or contamination.

Make sure the packaging and wrapping used is adequate and will protect the goods as expected.

### 2

#### Ensuring the 'Cold' in the Cold Chain

Today, Cold chain technology offers temperature standards that can cater to a wide variety of products – from cryogenic (-135°C) to deep frozen, frozen, chilled, and various controlled room temperatures (CRTs). However, staying within the required range at each stage of the cold chain is vital.

The ambient temperature during the journey and at the destination, as well as weather predictions must always be taken into account. A reefer, with its own power supply can effectively handle these challenges.

It is also a versatile unit that can carry 20-25 tons of temperature sensitive cargo; hence it can be effectively used as an inter-modal transport system for global markets.

To prevent or control the ripening of fruits in-transit, atmospheric control is imperative. This can be achieved by wrapping the shipments in polyethylene bags, which will prevent gas from permeating.

Minimizing handling as well as unloading time is also the key to maintaining the integrity of the shipment.

## 3

### **Have adequate redundancies in place**

Create equipment, staff, and power supply redundancies to cover for unexpected events that may impede your capacity to maintain the necessary condition (temperature, humidity, etc.). Make sure you have an action plan and the back-up resources to rapidly cover for incidents like:

- Reefer problems
- Cooling system problems
- Truck problems
- Lack of electricity
- Smart-sensor damage
- Absenteeism
- etc.

Establish criteria to determine when these redundancies will be used and who is responsible for putting them in play.

## 4

### **Select the Right Packaging for your Product**

Packaging can be active or passive. Active packaging involves an energy source and thermostatic control (e.g., in the case of a reefer), plus monitoring mechanisms such as GPS and smart sensors.

Passive packaging involves conventional packages that use water/ ice/ dry ice to keep the product at required temperature. These shipments may be vulnerable to changes in ambient temperature, and to delays and disruptions in transportation.

However, the choice between the two modes must always consider the costs versus the benefits and risks. It must answer the question – how much risk can we take on?

Apart from the product value, risks also depend on regulatory compliance requirements, and possible loss of market share or brand value, should the product integrity be compromised.

## 5

### **Keep constant track of your storage capacity in all your locations.**

This helps to ensure that storage available is enough for products in transit, that everything will be stored adequately for whatever time is required and control of product movement and storage will not be lost.

## 6

### **Specialized Cold Chain Networks**

In the case of temperature sensitive pharmaceutical products, all equipment and facilities at the logistics end must be highly specialized to handle these products and serve as an extended arm of the manufacturer.

Consider the case of DHL which operates a Life Sciences and Healthcare division, which maintains certified stations near major airports operating on global GDP (Good Distribution Practices) standards to ensure that shipments are held, handled, and forwarded under controlled conditions.

Even warehouses that hold these shipments for an extended period are GDP certified, and provide value added services such as repacking, country specific labeling, end-to-end tracking, and compliance documentation.

## 7

### **Maintain Standard Operating Procedures (SOPs) Globally**

Transporting high value goods globally through the cold chain requires well thought out policies and procedures.

The foundation for this is an assessment of in-transit / storage requirements and risk factors across the supply chain.

This could include what to do if there is a flight delay or if a container gets ruptured and product starts leaking etc. SOPs must be prepared in collaboration with the customer to ensure they are adequate to the customer's products. SOPs must be standardized, staff needs to be trained to understand SOPs and when and how to apply them, and there must be a revision plan in place to review all SOPs regularly to ensure they are always adequate to customer's requirements and contribute to maintain compliance.

## 8

### **Be Smart When Managing Costs**

While transporting pharmaceuticals, rather than managing costs on a purchase price basis, it is smarter to always consider the total cost of ownership (TCO).

This incorporates direct as well indirect costs such as risk of penalties, patient safety, loss of business/ market share/ brand value, investor sentiment etc. The hidden costs are the real risks facing the business, should the cold chain fail.

Hence, 3PLs need to realize that when they economize on one aspect of the cold chain without considering TCO, they put their client's business at risk.

## 9

### **Invest in Technology**

In the US, nearly a third of all food produced ends up being wasted. Out of this, about 12% occurs during the distribution process. To avoid spoilage, it is critical to ensure that food stuff is maintained at a specified temperature during transportation.

The only way to ensure this is to monitor temperature in real time. The use of smart sensors and IoT contributes significantly to measure repeatedly, in real time, and with extreme precision elements like temperature, humidity, luminosity, refer settings, geo location, battery level, door open/shut, risk of damage from shock etc.

It can send out updates and alert notifications in real time, so that the impact of breakdowns, power outages, open doors etc. is corrected before it starts to impact the product integrity.

## 10

### **Build Skilled Teams**

Physical assets and technology alone cannot be considered a cold chain. People with right skills set to use and manage the technology is what makes a cold chain run adequately. Be it food products or pharmaceuticals, logistics partners need to build teams that have knowledge and experience on the respective categories – product needs, handling of shipments and maintaining proper standard operating procedures (SOPs) to eliminate guess work and inadequate control and corrective measures.

Creating niche teams and training them is and always must be a top priority.

## 11

### **Maintain Continuous Compliance**

Regulatory entities are taking a more aggressive and proactive approach to ensure food safety and prevent food contamination.

To meet this challenge cold chain operators must be compliance experts and monitor and log temperature and humidity for every shipment as it moves through the supply chain and must also be able to keep records and provide documentation as required by the competent control organisms.

This provides proof of product integrity to regulatory authorities and builds customer confidence as these records can be investigated to get to the source of any problem that may arise.

## 12

### **Leverage Artificial Intelligence**

The power of Big Data can be leveraged to better manage the cold chain. By working with data generated across thousands of shipments, it is possible to identify risk trends and devise ways to mitigate those risks.

Also, by looking at packaging performance across products, markets, temperature ranges, routes, transport modes etc. it could be possible to evaluate how a given packaging is likely to perform under a given set of parameters. This would help manufacturers shorten the qualification process for packaging.

## 13

### **Achieve end-to-end collaboration**

Collaboration with all key stakeholders is critical for long-term success in the cold chain. Establishing processes and setting expectations is of utmost importance so, too, is sharing data between stakeholders. Transparency of shipment information, such as through a shared cloud platform, through which stakeholders have access only to relevant data, can help reduce inefficiencies and save product loads before waste occurs.

Long-term temperature-controlled success depends on the right level of collaboration, expertise, and technology to help mitigate risk and ensure positive outcomes for all stakeholders across the cold chain, including a safe, high-quality product delivered to the end consumer.

## 14

### **Establish mutual expectations early on**

All key stakeholders should be involved up front to define roles, expectations, and requirements to reduce risk. All details of the shipment process, including the technology used, processes for reviews, returns, and rejections, temperature boundaries, and contingency plans should be discussed and agreed to. Any obligations required under the sanitary transport rule should also be clearly defined. These mutual understandings will help to avoid confusion and delay when timing is critical, and clear expectations help to prevent any breaks in the cold chain that can become areas of dispute later on.

## 15

### **Find the right freight forwarder**

Temperature-sensitive assets traveling by air, ocean, rail, or road present their own unique sets of needs, and balancing them will help optimize the right results. For example, high-value goods may

benefit from a faster, albeit more expensive, shipping option. A truck shipping food might return cartons or another good on the way back to help reduce shipping costs. By considering these needs, the right shippers might help mitigate these costs by securing the right capacity through innovative and strategic planning.

That is why it's vital to choose a dedicated carrier that meets all your criteria and provides the following:

- On-time service
- Reliable transportation equipment
- Compliant protocols
- Knowledgeable drivers and dispatchers

Over time your selected carrier can become lax and decrease their level of service, which risks your product and consumer safety so make sure you have an evaluation program in place. While you can assess your carrier yourself, you can also entrust a third-party logistics (3PL) firm with the task. If you are unfamiliar with carrier selection, 3PL firms are a sound investment. They will compare carriers in your area, as well as their capabilities, plus negotiate their rates for you, which ensures your company receives a competitive price from a trusted shipper.

## Conclusion

Best practices create an environment that reduces the chances of employee error, product diversion, and equipment failures that can render cold chain products unsafe for use and unfit for sale.

When transporting fresh produce, frozen foods, flowers, medicines and vaccines, and other temperature sensitive products, speed to market is critical. An efficient and effective cold chain is achieved when all key stakeholders, including producers, growers, manufacturers, shippers, carriers, vendors, and providers understand the importance of these practices.

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