How To Reduce Product Loss

And Achieve a More Sustainable Pharma Supply Chain

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Many factors are motivating pharmaceutical brands to increasingly implement more sustainable practices throughout their supply chains. One contributor is widespread acknowledgment that companies across all industries, including healthcare, need to help reduce greenhouse gas (GHG) emissions. The healthcare segment, in particular, is responsible for 4.4% of global emissions; if not checked, those emissions will more than triple by 2050.

There's also stakeholder pressure to consider. Gartner reports that businesses are being pressured by customers (63%), investors (48%) and regulators (46%) to improve sustainability. Leaders also understand that more sustainable practices often have the added benefit of saving money.

Acknowledging that transportation generates 17% of total global GHG emissions and 28% of total U.S. emissions — more than any other economic segment — sustainability efforts in the pharma sector often focus on reducing emissions in transportation. Along with switching from air freight to surface freight wherever possible, many manufacturers are seeking other ways to improve. "The largest transportation sustainability effort now is in consolidating shipments by working with more logistics service providers and modes," said Chris Wallace, a pharmaceutical supply chain industry consultant.

Other key sustainability strategies include:

- **Optimizing for route, load and mode**
- **Using fossil fuel alternatives**
- **Shipping with less packaging or switching to biodegradable or returnable containers**
- **Encouraging or requiring sustainable practices with transportation partners**

The Missed Sustainability Opportunity

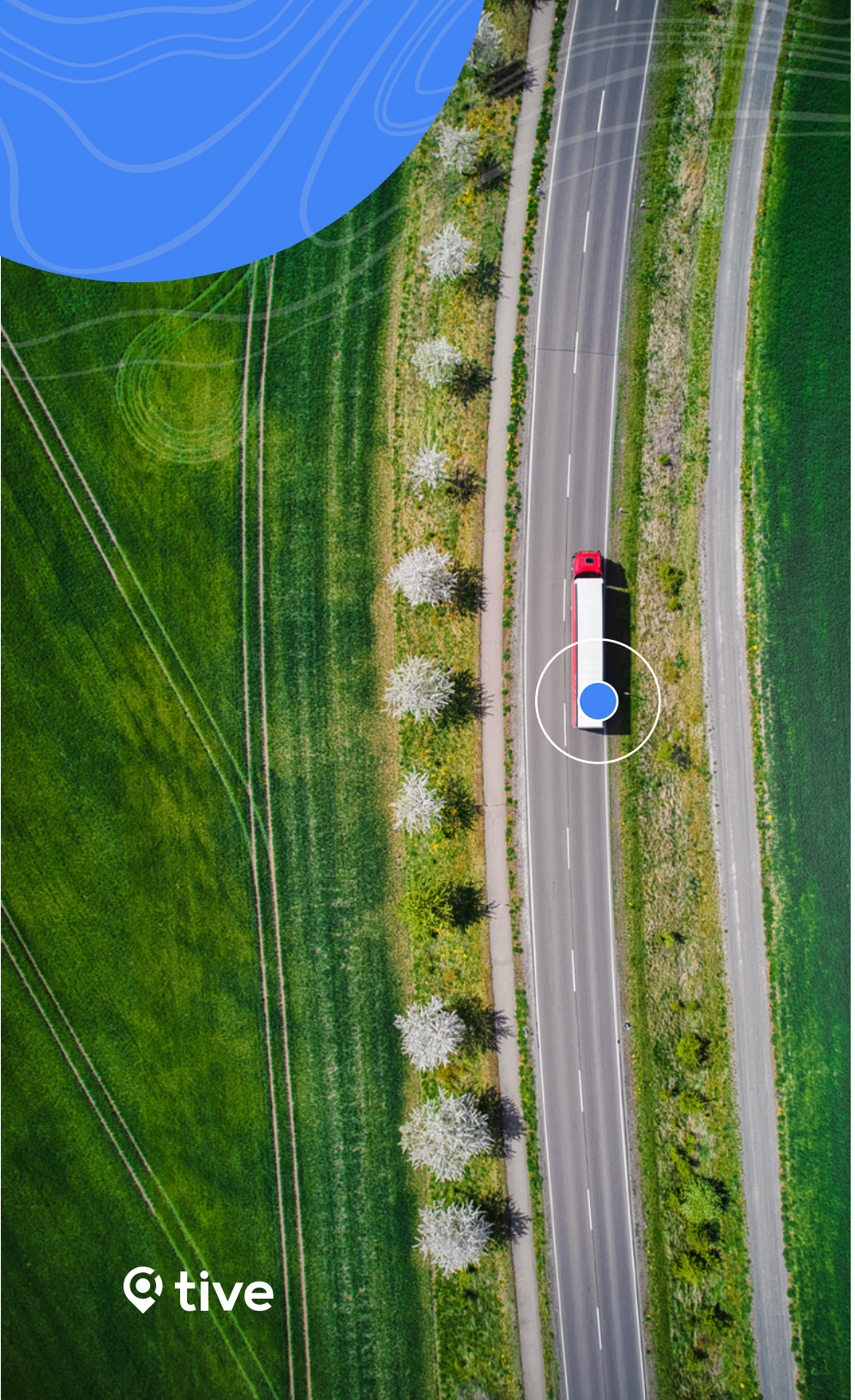
What isn't on that list, though, are strategies for reducing product loss during transportation. On the one hand, reducing waste has become important to many companies; failures in temperature-controlled pharmaceutical logistics are responsible for $35 billion in product and associated losses annually. However, there's another equally important reason to reduce waste: Replacing products because of loss or damage during shipment is counterproductive to sustainability goals. Often overlooked is the simple fact that manufacturing and transporting replacement products doubles the GHG emissions of the original shipment. In fact, it can increase them by multiples as replacement products often must be expedited by using air freight.

The high value of pharmaceutical products means brands can achieve significant progress on multiple fronts by simultaneously reducing waste and their carbon footprint. Progressive brands looking to improve profitability by reducing product loss — while initiating more sustainable practices — are using innovative technology to monitor conditions during product shipment.

Solutions from companies such as Tive can track product conditions and location — in real time — throughout a shipment's journey. This technology delivers live alerts when temperature excursions or other deviations occur, enabling logistics teams to proactively mitigate potential delays and product damage.

"Just as technological developments are making it possible for pharmaceutical companies to create new and more powerful products, technology on the logistics side is also evolving rapidly — so rapidly, in fact, that shippers aren't always aware of innovations that can contribute to both cost savings and sustainability," said Alex Guillen, Tive's global SME, life science and pharma.

Here's why using technology to reduce waste is essential — and how it will contribute to sustainability goals while reducing overall costs.



THE PROBLEM

Pharmaceutical Product Waste During Transportation

While product profitability has made it possible for companies to absorb the expense of product loss in the past, that practice is coming under increased scrutiny as the marketplace evolves. Additionally, since many pharmaceutical products require cold chain shipping, there's significant potential for loss due to temperature variation or transportation delays.

Globally, 20% of temperature-sensitive products are damaged during shipment because of temperature problems, and 25% of vaccines are shipped incorrectly — such that they reach their destination damaged and unusable. Moreover, the number of available time- and temperature-sensitive pharmaceuticals (and thus, proportion of total shipments) is increasing, putting more shipments at risk for spoilage — and the resulting increased emissions.

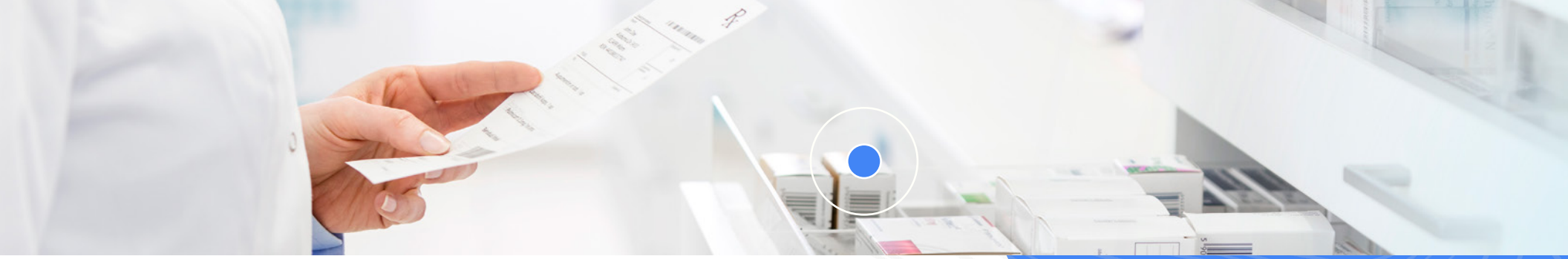
Stakeholders are taking notice. "There's been a dramatic level of increased awareness about [product waste] across the supply chain. It's not just the shipper who understands the value of the product but also logistics service providers, couriers and so on. And the results can be dramatic," said Wallace.

What's frequently overlooked is the domino effect that extends beyond the cost of the product itself when temperature variations, delays or other issues during transport spoil the product. Producing and transporting the damaged product that ultimately can't be used wastes human, material and energy resources. The duplicated effort required to replace and ship that merchandise also costs time and money — while increasing the total amount of GHG generated.

In addition, stringent protocols around reconciling and disposing of wasted pharmaceutical products require effort and resources. On top of that, most clinical trial pharmaceuticals are transported via air freight — the worst emissions offender. Deploying two air freight shipments for a single order harms both the bottom line and the environment.

Case Study: Optimize Courier

After a pharmaceutical company had to destroy $2.5 million of product that was shipped at the wrong temperature, it turned to Optimize Courier for help. Knowing that its new client had been using passive temperature logging technology, which reveals issues only after shipments arrive at their destination, Optimize switched to Tive's multisensor Solo 5G trackers, which have real-time monitoring capabilities. The change paid off; when a $500,000 shipment was mistakenly placed in a refrigerated cooler, a timely Tive alert enabled Optimize to save it by notifying the carrier, who pulled the product out so it shipped at the correct ambient temperature.



WHY IT MATTERS

Losing Product During Shipment Impacts People, Too

More than emissions are at stake with drugs that can't be used on arrival, especially those destined for clinical trials. Pharmaceuticals used in those situations frequently have an extremely narrow delivery window or margin of error. When they don't arrive within that window or the product is ruined en route, there's often an emotional toll because delayed treatment can cause both patient and provider stress and angst.

There are also consequences when damaged products can't be quickly or easily replaced, which is often the case. "If a drug infusion is out of temperature range when it arrives at a hospital for a patient's treatment, it can't be used. The patient will not only have no alternative drug available to them, but they are also unlikely to get that drug again for weeks or, potentially, months. That can have tragic consequences for that patient," Wallace said.

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> Pharmaceutical Supply Chain Industry Consultant

Additionally, some patients' treatment requires cells to be harvested and sent to a remote laboratory to be cultured over a period of weeks before being sent back to their healthcare providers. If that shipment were to be lost, the process would have to start all over again when the patient may not have the luxury of time. It could literally become a matter of life and death.

What's more, transporting — and then transporting again — 30 to 40 patients to a hospital for a clinical trial that's postponed because the product didn't arrive also generates extra emissions.

Outside of clinical trials, patients already struggling to fill prescriptions because of increased product shortages will suffer even more when an expected shipment is spoiled. And, of course, damaging, destroying and then replacing pharmaceuticals destined for clinical trials or pharmacies generates emissions.

Case Study: Mercury

Thanks to its partnership with Tive, express and cold-chain shipping provider Mercury was able to easily locate a medical implant that did not arrive at the hospital as scheduled for surgery the following day. The Tive platform showed the device's precise location at a nearby building, and staff retrieved it in time for the operation.

THE SOLUTION

Real-Time Shipment Monitoring

Continued use of legacy shipment monitoring practices during transportation is one of the most significant obstacles to reducing waste and resulting emissions. Most current temperature monitoring still involves passive data loggers and after-the-fact data collection. To reveal what happened along the way, these data loggers must be collected and connected manually to a computer after transport is completed.

In this scenario, the damage is done before it's even been discovered.

With the understanding that detecting shipment problems after the fact is too late, many leading brands are getting ahead of the situation by using more sophisticated monitoring systems.

> **"The advent of real-time temperature monitoring is one of the biggest and most important changes we've seen."**
>
> **CHRIS WALLACE**
> Pharmaceutical Supply Chain Industry Consultant

Tive Solo 5G trackers leverage advances in technology and telecom infrastructure — along with access to wireless networks and access points — to monitor the precise location and condition of shipments throughout the journey. As a result, problems such as delays or temperature excursions can be detected while there is still time to act to save the shipment.

With the push of a button, Tive's family of hyper-accurate, multisensor trackers record location, temperature, humidity, shock and light exposure data — with one device. Using GPS, 5G cellular and WiFi triangulation, Solo 5G trackers transmit this information to the Tive cloud-based platform, which enables users to generate custom deviation alerts and conduct detailed data analysis that can be used to improve operations and customer satisfaction.

Case Study: Biocair

When a shipment for Biocair — a specialist courier for pharmaceutical, biotechnology and life sciences products — wasn't on its scheduled flight, the airline told the courier that the shipment was lost. Using Tive's real-time technology, Biocair was able to find, retrieve and ship the product before it was too late.

Unprecedented Times Mean Unprecedented Progress

Efficiencies offered by solutions such as Tive's aren't limited to monitoring products during transit. Unprecedented technological advances and logistics service provider collaborations fostered by the global pandemic add new layers that benefit everyone. Necessity and a new-found understanding of how collaboration — rather than competition — will benefit all stakeholders has led logistics service providers, packaging manufacturers and temperature-monitoring companies to partner for the good of all, including the environment.

Partnerships include the Open Visibility Network, which promotes open accessibility of data among participating supply chain management platforms via application programming interfaces (APIs) and webhooks. For example, data sharing among Tive, third- and fourth-party logistics providers and shipper transportation management systems makes it possible to re-route pharmaceutical shipments in real time when challenges — such as weather or other deviations — arise that threaten product integrity.

Data analytics from these partnerships can also be used to analyze packaging performance. As a result, both shippers and packaging manufacturers can identify opportunities for improvement in an effort to reduce their carbon footprints.

"We see this cooperation as a game changer in the logistics industry. We're all talking more openly about issues and challenges at conferences and elsewhere because we understand that collaboration is the smartest way to become more sustainable while improving efficiency," said Guillen.

Fortunately, for organizations looking to reduce product waste while improving sustainability, many of today's decision makers are digital natives who are not only accustomed to using technology to improve processes — but expected to do so. Those same leaders are concerned about global warming, too. In fact, 71% of millennials believe addressing climate change should be a top priority, compared to 57% of baby boomers. They're at the forefront of change and looking for this type of innovation to make it happen.

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>
> **ALEX GUILLEN**
> Tive's Global SME, Life Science and Pharma

Reduce Your Carbon Footprint with Real-Time Visibility

Your organization can begin making a difference now by using real-time visibility to reduce its carbon footprint — while protecting products and patients, reducing costs and improving customer satisfaction. Today is the time to invest in innovative technology that will make a significant difference for multiple stakeholders tomorrow. Don't wait to start.

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ABOUT TIVE

Tive is the global leader in real-time supply chain visibility solutions. More than 500 global shippers, logistics service providers, and retailers use Tive to monitor shipment location and condition in real time, gain actionable insights, and ensure end-customer satisfaction. Tive's cloud platform, patented sensor technology, and 24/7 Live Monitoring services reduce excursions and delays, minimize rejected loads, and decrease theft, damage, and spoilage. Customers count on Tive to ensure that shipments are delivered on time and in full — because every shipment matters.

For more information, visit www.tive.com.