



WHITE PAPER

AIR CARGO'S RESPONSE TO INITIAL GLOBAL COVID-19 VACCINES ROLL-OUT

JUNE 2021

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Introduction

It has been over a year since the Director-General of the World Health Organisation (WHO) Dr. Tedros Adhanom Ghebreyesus officially declared the COVID-19 outbreak as a pandemic on 11 March 2020. The world is still battling with the crisis, which has recently been aggravated by new COVID-19 variants, each more virulent than the previous. As of 3 June 2021, there have been over 173 million reported COVID-19 positive cases and more than 3.7 million deaths from the virus¹.

Throughout 2020, in saving lives and reigniting economies, we have already witnessed global pharma manufacturers speed up their vaccine development. The breakneck speed of COVID-19 vaccines development left logistics players a long list of unknowns and very limited time to prepare and set up the global COVID-19 vaccine supply chain and cold chain requirements. On 2 December 2020, Pfizer-BioNTech COVID-19 mRNA vaccine received emergency use authorization by the United Kingdom Medicines & Healthcare Products Regulatory Agency (MHRA), kickstarting the largest global vaccination campaign in history. As of 1 June 2021, there has been a total of 17 vaccine candidates² being approved by at least one country.

The challenge of COVID-19 vaccine global distribution, as we know, demands the air cargo industry deliver the humanitarian shipments in the highest form of speed, reliability, security and transparency. Driven by a strong commitment to prepare members and the air cargo industry for this mammoth logistical mission, Pharma.Aero and TIACA, with the support of other international organizations, teamed up in August 2020 through **Project Sunrays** to shine light on COVID-19 vaccine transport requirements and global airfreight readiness and to publish recommended practices in the handling, storage, and transport of COVID-19 vaccines once they are available.

Despite the unprecedented disruption that the pandemic has impacted global supply chains and air cargo capacity, the air cargo industry has shown incredible agility and resilience by pulling together as a community and doing their part in transporting the COVID-19 vaccines, test kits, medical supplies and personal protection equipment (PPE) globally. Over 9 billion COVID-19 vaccine doses have been secured by countries around the world and of that, more than 1.5 billion vaccination doses have been delivered and administered worldwide³.

As of 31 May 2021, 11.3 billion COVID-19 vaccine doses have been approved for production across 59 manufacturing sites concentrated in less than 10 countries³. As more production capacity for the vaccines are being set up, the expectation is to see larger volumes being transported by air globally for the rest of 2021.

Pharma.Aero recognizes that staying ahead of new developments, maintaining open communication and industry collaboration is the key to the preparedness of the industry. As a continuation of Project Sunrays, this project seeks to collate insights from the air cargo industry within Pharma.Aero membership on the measures undertaken, their hands-on experience and lessons learned from the initial handling and transportation of the COVID-19 vaccines based on four key requirements: speed, reliability, security, and transparency, and from our Pharma Shippers on how air cargo has responded to the humanitarian task thus far. By doing so, the project aims to provide additional insights to heighten industry readiness as more COVID-19 vaccines are being manufactured and shipped worldwide, as well as for any new emergencies that might be ahead of us.

This White Paper outlines air cargo's response to initial global vaccines roll-out with the following approach:

- **Collaboration:** Reinforce the imperative of open communication and strong collaboration across and beyond the air cargo supply chain, featuring exemplary global and local collaborations;
- **Action Plans:** Highlight behind-the-scenes and key measures undertaken by the air cargo industry; and
- **Feedback:** Gather Pharma shippers' initial review on air cargo's response

To the above end, two sets of questionnaires were rolled out to our pharma shippers and the rest of our members respectively in March 2021. In conjunction, one-on-one interviews were conducted with members across different nodes of the air cargo supply chain. 17 of our members and 5 pharma shippers contributed to this project (Annex A).

¹Source: [World Health Organisation \(WHO\)](#)

²Source: [World Health Organisation \(WHO\)](#)

³Source: [VACScene Second Issue](#)

Fostering Local and Global Collaboration

The key to success with the handling and transporting of temperature-sensitive particularly with ultra-cold conditions and time-critical vaccine shipments in the initial phase is founded on collaboration on a local and global level. Based on Project Sunrays' second global airfreight readiness survey conducted in November 2020, it was apparent that the group of respondents that were most prepared for COVID-19 vaccines distribution were those having the combination of dedicated team + collaboration with vaccine manufacturers + collaboration with their supply chain partners.

Ahead of the first batch of approved COVID-19 vaccine global distribution, several air cargo communities have already established joint task forces as a way to strengthen collaboration at local level such as the Brussels Airport's BRUcure Task Force, Edmonton International Airport's CEIV Cargo Community Ready Response Task Force, Hong Kong International Airport's Community Task Force for COVID-19 Vaccines Handling, Miami International Airport's MIAVAC Task Force, Singapore Changi Airport's Changi Ready Task Force, as well as the Abu Dhabi initiative – the Hope Consortium. Find out more about the air cargo community COVID-19 vaccine initiatives of Brussels Airport Company, Edmonton International Airport, Miami International Airport and Singapore Changi Airport in the published [white paper](#).

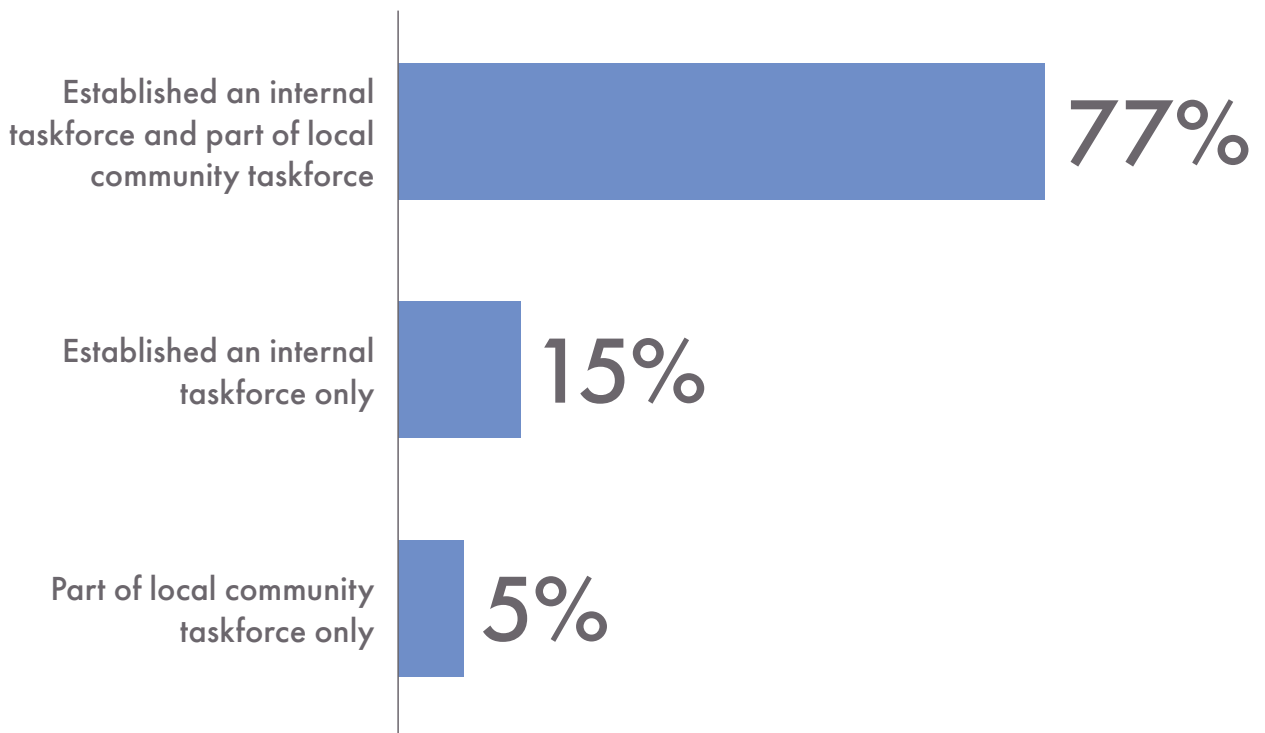
Based on the questionnaire Pharma.Aero conducted amongst our air cargo industry members in March 2021, majority of the respondents that have started handling COVID-19 vaccine shipments are part of an internal and local air cargo community task force.

Working collectively with vaccine manufacturers, logistic partners, authorities have shown to be effective in mitigating risks, identifying gaps, improving processes and building in interventions, particularly for high vaccine volume regions. With a community approach, the need of the customer from the start to the end destination can be taken care of.

“The local collaborative efforts have been enriching. Not only have new solutions been developed, but also members of the local community are appreciative of each other’s efforts and contributions”

Hong Kong International Airport (HKIA)

Majority of the member respondents, which have started handling Covid-19 vaccine shipments, are part of an internal and local air cargo community task force



Air Cargo's Response: Key Action Plans and Measures

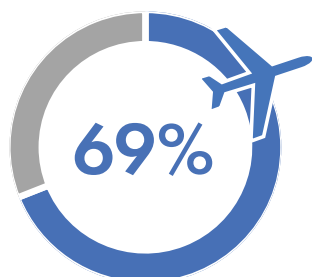
The COVID-19 vaccine global distribution demands the air cargo industry deliver these humanitarian shipments in the highest form of **speed, reliability, security and transparency**. Internationally-recognised standards and certifications such as the IATA Center of Excellence for Independent Validators in Pharmaceutical Logistics (CEIV Pharma), Good Distribution Practice (GDP) and Transported Asset Protection Association (TAPA) are proving to be fundamental standards and frameworks attested by most in the proper handling and transportation

of the COVID-19 vaccines and related medical products. Such industry certifications help standardise the pharma industry, providing a framework for proper and consistent handling of the delicate shipments.

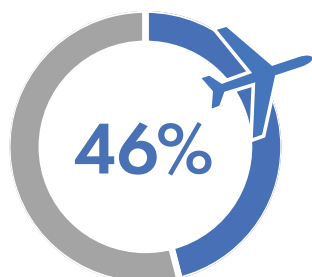
At the same time, organisations that have invested in cold chain infrastructure and capabilities over the years are benefiting from their investments and expect continued returns in the upcoming years.



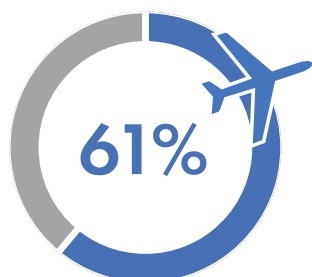
All member respondents have **implemented at least one initiative** to improve on their handling and transportation of COVID-19 vaccine shipments



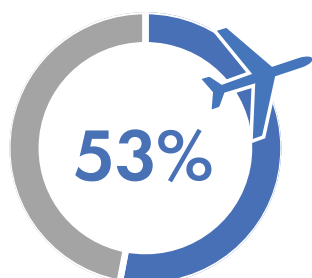
69% of member respondents which have handled actual COVID-19 shipments have **conducted operational simulations and drills prior**



46% of member respondents which have handled actual COVID-19 shipments have **made new and/or refinements to existing standard operating procedures (SOPs)**



61% of member respondents which have handled actual COVID-19 shipments have **introduced or are introducing initiatives to improve shipment visibility**



53% of member respondents which have handled actual COVID-19 shipments have **made new investments to their cold chain infrastructure and capabilities** in anticipation of COVID-19 vaccine shipments

Key Action Plans and Measures by Air Cargo Stakeholders

1. Speed

1.1 Parking Bays Prioritisation

Some airports have prioritised freighter flights conveying COVID-19 vaccine shipments to be assigned parking bays close to cargo terminal to shorten apron travelling time. Hong Kong International Airport (HKIA) is one of such examples.

1.2 Expedited Customs Clearance

Some air cargo communities have in place special procedures for expedited customs clearance. HKIA and São Paulo Guarulhos International Airport (GRU Airport), for instance, have worked closely with the local customs department to establish a customs green lane. With the necessary data submitted in advance before the shipment arrives, each COVID-19 vaccine shipment clearance was able to be processed in a very short period.

Abu Dhabi Airport, in connection with Hope Consortium stakeholders, have shortened the unloading to delivery time by directly moving COVID-19 vaccine shipments from the aircraft to awaiting pre-cooled reefer trucks waiting in the airside. Local customs and health authorities provide clearance in advance and conduct physical inspections at the consignees' facilities. This special process saved about 3 hours at the airport.

2. Reliability

2.1 Cold Chain Capacity Mapping

Ahead of the first COVID-19 vaccine shipment, most air cargo communities have taken steps to map out their airport cool chain capacity and capabilities, as part of risk mitigation to ensure adequate cool chain and human resources in order to effectively handle the shipments.

For instance, AirBridgeCargo Airlines conducted temperature mapping of their freighters to identify cargo compartments suitable for vaccines carriage. Etihad Cargo has been preparing and sharing full station capabilities through advanced technology platform such as Validaide in order to facilitate lane risk assessment.

2.2 Operational Drills and Simulations

Preparing for the unexpected necessitates scenario planning, test drills and contingency plans in ensuring that vaccine shipments are correctly handled and maintained within the temperature threshold. Contingency plans should map to every stage of the air freight journey. Amongst airline members that have handled COVID-19 shipments, Cathay Pacific, Singapore Airlines and Turkish Cargo had organized operational simulations and drills ahead of the actual shipments. Some have even collaborated with vaccine manufacturers and their logistics partners to conduct test shipments.



Cathay Pacific, for example, carried out a few test shipments with a sample box of vaccines to measure the actual sublimation rate, ensure transportation temperatures are well-maintained within threshold, as well as to simulate the quick release to get the vaccines delivered promptly when arriving at destinations. Together with HKIA, the airline timed when the shipment was unloaded from the aircraft, when it got into the terminal and when the shipment was released. Bolloré conducted joint trials with airlines and active and passive container suppliers. Italy-based cargo handler ALHA Group ran ground simulations based on different scenarios.

It was underscored by various members the importance of having thorough contingency plans in event of power outages or storage unit malfunctions at the cargo terminals with emergency power back-up, alternative cold room storage solutions etc. Together with their logistics partners, they have made sure the following have been put in place: additional electrical plugs for the handling of active containers; adherence to Dangerous Goods guidelines; trained personnel; and availability of dry ice within 24 hours for the handling passive containers with dry ice.

2.3 COVID-19 Vaccines Internal Task Forces and Dedicated Teams

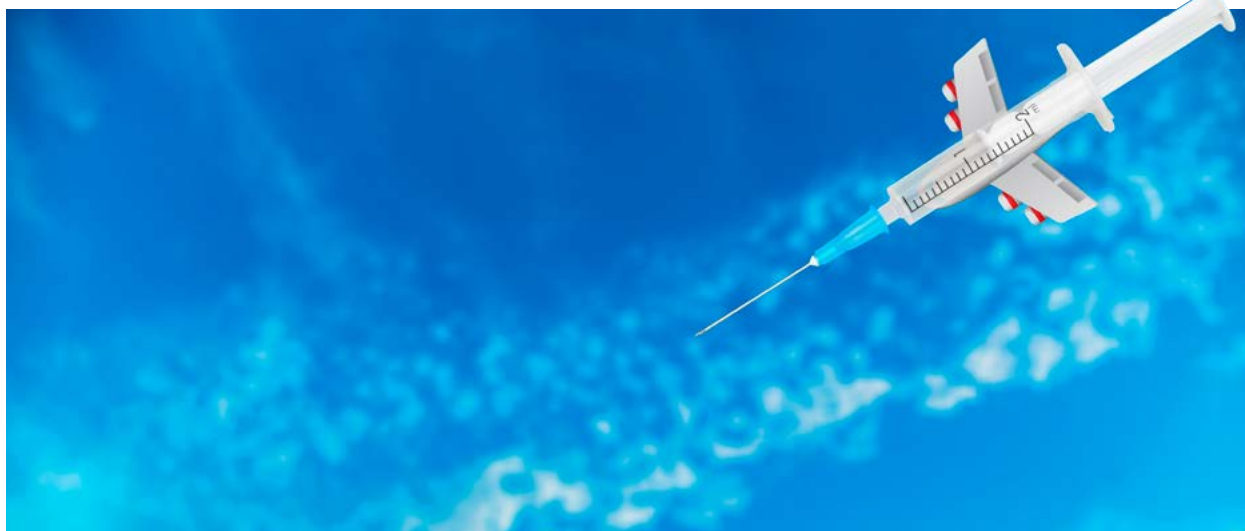
Nearly all the member respondents have set up a special COVID-19 vaccines internal task force across departments and geographies within their organisation. Internal task forces such as those of Astral Airlines, Cargo Service Center, Etihad Cargo and GRU Airport are being chaired at the most senior level such as the CEO. Such internal task forces enable information transparency and knowledge sharing. AirBridgeCargo Airlines have an internal and

is part of local community task forces such as Air Cargo Netherlands and Air Cargo Community Frankfurt. The airline has also set up 'Vaccine Sprint' work group with their contractors and customers.

Some members have established dedicated COVID-19 teams as the main point of contact to handle fast-paced changes to shipments. In addition to a COVID-19 Leadership Team, Etihad Cargo has implemented a dedicated COVID-19 email address with a 24/7 response service level to their customers' requests. Trainings have been reinforced to handle temperature-sensitive vaccines in various temperature conditions, technical requirements, and regulations. ALHA Group, for instance, has put in place a special department with a project supervisor equipped with cold chain expertise in each of the two main airport cargo terminals in Milan Malpensa and Rome Fiumicino to address gaps and solve problems instantly, 24 hours a day. ALHA Group has changed the way they work and report emergencies. Peru-based cargo handler SAASA has formed a dedicated team of experts, who are trained to follow CEIV Pharma procedures, to be in charge of COVID-19 vaccines shipments.

2.4 Special Handling and Unique Commodity Code for COVID-19 Related Shipments

Airlines such as Etihad Airways have introduced a unique commodity code for COVID-19 vaccines and related shipments under COVAX. The unique commodity code is tied to a set of refined SOPs and lead time performance. Others such as Singapore Airlines have indicated mandatory handling code SHL (Save Human Life) for all COVID-19 vaccine shipments. The carrier has developed a SOP, which includes services such as dedicated facilities at Singapore hub, expedited processes and guaranteed





TURANT - CSC

← Cargo Tracking Details

Event Description:	Shipment Accepted (TDG)
Update On:	Apr 15 2021 3:17PM
Event Value:	Pkgs = 1 GrWt. = 10.000 Chrg Wt. = 10.000 TDG Date : 15 Apr 2021 15:17; Zone : Z1; Temperature : 22.7°C; Timestamp : 15/04/2021 15:15
Event Description:	Let Export Order attached (LEO)
Update On:	Apr 15 2021 9:52PM
Event Value:	SBNo:1112161 - LeoNo:4/69 - LeoDt:15042021
Event Description:	Documents Accepted
Update On:	Apr 15 2021 11:05PM
Event Value:	Remarks :
Event Description:	Cargo Handed Over to Airlines (BAG)
Update On:	Apr 15 2021 11:06PM
Event Value:	Pieces : 1; BAGDt: 15/04/2021 23:06; Zone : Z5; Temperature : 22.9°C; TimeStamp : 15/04/2021 23:04
Event Description:	Export General Manifest(EGM)
Update On:	Apr 16 2021 1:40PM
Event Value:	5400 / 16/04/2021

TURANT - CSC

CSC at your Doorstep

TURANT - IMMEDIATE



TURANT - CSC

← Cargo Tracking

Domestic **International**

Cargo **Courier**

Location:

AWB Number: -

PROCEED

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uplift for COVID-19 vaccine shipments. All COVID-19 vaccine shipments are closely monitored through the airline's digital control tower, which provides 24/7 real time visibility and alerts, enabling pro-active management of any temperature deviations and immediate service recovery actions where necessary.

2.5 Dry Ice Management

In maintaining the ultra-low temperature for some of the vaccines, dry ice is used in passive containers and packaging. However, the amount of dry ice allowed onboard aircraft is subject to different sublimation rate assumptions and aircraft types. Regulated by the Dangerous Goods Regulations (DGR), dry ice may pose as potential risk of increased concentrations of carbon dioxide gas to flight crew and passengers on board, as well as to ground staff responsible for loading and unloading the cargo compartments.

Recognizing the need to know all requirements in detail for vaccine delivery on board all types of aircraft, AirBridgeCargo Airlines, Cathay Pacific, Etihad Airways and Singapore Airlines have co-ordinated with vaccine manufacturers and packaging providers to obtain more data and worked with their local regulators and aircraft manufacturers to revisit dry ice limitation. Information is cascaded to the relevant staff within the airline.

Cargo handlers such as ALHA Group have designed a comprehensive and mandatory training programme for dry ice and dangerous goods handling. Passive containers using dry ice and active container are monitored every four hours. Both ALHA Group and SAASA have suppliers ready to provide dry ice to airports within 24 hours if the client requires it.

2.6 Cold Chain Infrastructure and Equipment

Active Container Charging Stations

In anticipation of a surge in COVID-19 vaccine shipments transported in active containers, cargo handlers such as SAASA have invested in additional electrical charging stations.

Airside Shelter

Some members are handling transit of vaccines by air. Airports such as HKIA has opened up an on-tarmac shelter for fast tail-to-tail transfer solution. Equipped with electric power, the shelter allows for active containers to be plugged in.

Cool Dollies

Some members have invested in new or additional cool dollies in order to maintain a temperature-controlled airport environment. Cool dollies are delivery units keeping temperature-sensitive products cool during transportation on tarmac when loading and unloading from an aircraft. Cool dollies can be loaded with ULDs, pallets or passive packaging. Data loggers attached within and outside of the dollies track and record temperature.

Cargo handlers such as ALHA Group had partnered with an Italian company to design and manufacture their own cool dollies for the ramp. Vaccines shipments in transit through Milan Malpensa and Rome Fiumicino can request this refrigerated cool dolly that help maintain the precise temperature requirements.





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Deira

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☎ +971 4 259 6767
✉ info@firstprioritycargo.com

Warehouse

📍 Sharjah International Airport,
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Logistics Simplified.

Our Journey

2012 *Bon Voyage*

First Priority begins its journey in Dubai - U.A.E. with a vision to become a leading global freight forwarder. The focus being leading service provider providing the best solution on schedules, transit times, competitive rates and customer tailored handling.

2013 *Strategic partners.*

Airlines are key to global trade. We have partnered with the best of airlines with block space with Emirates, Ethad, and Turkish which guides us a distinct edge over other forwarders. We thank Sharjah Airport, where the company is headquartered and its warehouses are located for the provision of support 24 hours a day, seven days.

2016, 2017, 2018 *and still onboard.*

We became sole partners with Ethiopian Airlines, thus expanding our presence in Africa, a truly emerging market. Trade is key to Africa's growth and we are helping in our own small way. We fly six full flights a month to Lagos and Kano from where the cargo gets distributed across Africa. Ethiopian Airlines is connected to 120 destinations in five continents, giving us opportunity to serve our customers to almost any destination. First Priority cargo incorporated with Ethiopian airlines have initiated the concept of transporting cargo on Freighters.

2020 *Foray Into PHARMA.*

We would not have spent over a decade in Sharjah, and on our way to build the first cold storage facility which would hold and store Temperature controlled pharma products and perishables. This plan is in the final stage and we are on target. Sharjah airport, already handles huge volumes of perishables on its passenger and cargo flights.

The relationship is built over a decade of trust and honest business and being humble, today we stand as the biggest operator of the airport in terms of volumes and flights.



3. Security

COVID-19 vaccines are currently one of the world's most precious commodities and this presents physical and cyber security risks including but not restricted to counterfeit activities, theft, cargo tampering, cyberattacks etc. An established chain of custody made of people who are identifiable or who know each other will create a secured chain.

In Hong Kong, as part of security measures, the Hong Kong Police provides support in the transportation of vaccines from the airport to the distributor's warehouse.



4. Transparency

4.1 Pre-Shipment Notifications

Airlines require advance shipment information from freight forwarders and vaccine manufacturers for adequate reaction time. This would allow them to be able to provide pre-shipment notifications to their cargo handlers to plan ahead of the shipment arrival. AirBridgeCargo Airlines and Cathay Pacific are sending pre-shipment notifications to their handlers to ensure vaccine shipments are processed with the highest priority. SAASA cited that airline pre-alerts have enabled them to take the necessary steps to guarantee the airport cold chain. However, not all airlines have the same pre-shipment notification procedures and information.

Members cited two types of critical advance information: shipment information such as delivery schedule and weight, and product information including handling and storage specifications, packaging and dry ice shelf life, contingency plans, and even stability data.

4.2 Temperature loggers and Data-sharing Platforms

End-to-end and real-time transparency enables tighter community collaboration and responsiveness.

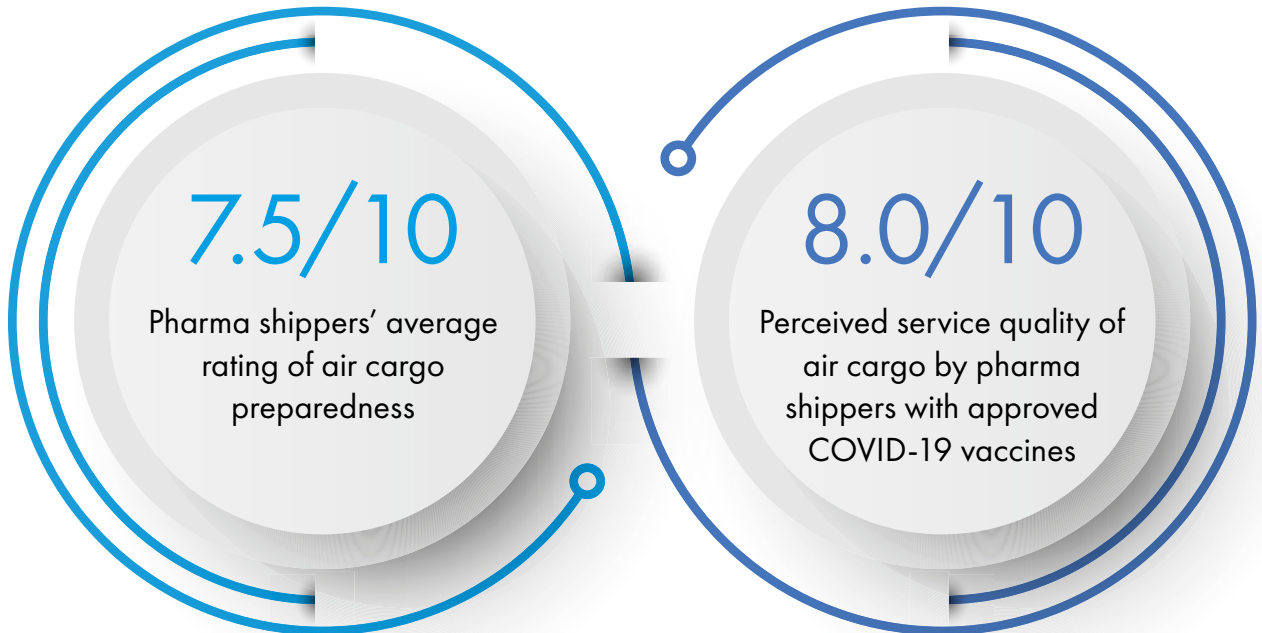
Cathay Pacific, for instance, has introduced an industry-leading track and trace system - Ultra Track for their COVID-19 shipments through data loggers which allows near real-time visibility of shipment conditions from airport to airport, increased data metrics for their customers and down to unit level tracking. Cathay Pacific outlined that the data loggers read and collect, track the temperature and other metrics periodically and send the collected information to a cloud platform via Bluetooth. The readers are installed at the origin airport, as well as the destination airport. A dedicated team, called the Operation Control Center, monitors the data and reacts to any deviations immediately.

As part of data visibility management, India-based cargo handler Cargo Service Center has introduced a mobile application so that the shippers can see in a real-time basis location and temperature data of their shipments.

Some airports are considering a complete community data-sharing solution supporting all supply chain partners sharing data and working together to offer full transparency of pharma shipments, beyond standards shipment milestones.



Pharma Shippers' Initial Feedback



12

When asked to rate how the air cargo industry has fared in the initial global rollout of COVID-19 vaccines with respect to the four criteria of Speed, Reliability, Security and Transparency, our pharma shippers viewed that the industry has performed well in relation to security. This could be attributed to their stringent selection of logistics partners. The pharma shippers cited that most of their vaccines shipments have been accorded priority treatment and fast transit time. While none have reported vaccines being spoiled or damaged during the air transportation process, there were a few incidents where shipments were short-shipped and mis-shipped. In the longer term, as vaccine volumes to be shipped by air are expected to increase, pharma shippers expressed concerns about potential delays arising from capacity availability and irregular flight schedules. This was especially so with the ongoing challenges including air crew availability, slow return of passenger flights and ocean disruptions.

In relation to the four criteria, more could be done to enhance shipment visibility. Pharma shippers generally opined that shipment visibility is reduced once the products leave their facilities. On multi-stop routes, transparency is lacking at transit airports.

A collective call was made by the pharma shippers for the air cargo industry to maintain the current strong attention to details, high service levels and close partnerships that have been forged in association to the COVID-19 vaccines shipments.



Conclusion

Despite the initial fears that large volumes of temperature-sensitive COVID-19 vaccines shipments would result in bottlenecks in the air cargo supply chain, the air cargo industry has performed generally well during the initial global rollout of COVID-19 vaccines. Open communication, behind-the-scenes local and global public and private collaboration and early preparations have played a huge part in ensuring effective handling and air transportation of the shipments.

Pre-COVID, the biopharmaceuticals market is expected to grow at a CAGR of 7.3% over the period 2021-2026⁴. On a yearly basis, around 5 billion doses of vaccines are being produced and distributed. With more COVID-19 vaccine candidates receive approval, and more doses are produced, there are concerns whether the air cargo industry's preparedness and responsiveness for the pharmaceuticals sector will hold up. An area that is not addressed in the paper is last mile distribution of the COVID-19 vaccines and delivering the shipments to remote or less-resourced regions.

Working collectively with logistic partners in the supply chain, government agencies, vaccines manufacturers, and the community to highlight potential problems, to share knowledge openly and to exchange lessons learned is key and will be even so post-pandemic in the face of growing pressure on air cargo.

A lifeline in supporting the global economy and essential player in the life-saving endeavour, we applaud all stakeholders in the air cargo supply chain for the proactivity, comradery and incredible response to the initial global COVID-19 vaccines roll-out.

Annex A

Project Participants

Survey Respondents

- AirBridgeCargo
- Alha Group
- Astral Aviation
- Bolloré Logistics
- Cargo Service Center
- Cathay Pacific
- Dallas Fort Worth Airport
- DHL Global Forwarding
- Etihad Airways
- Euro Airport
- First Priority Cargo
- Guarulhos Airport
- Hong Kong International Airport
- SAASA
- Sharjah Airport
- Singapore Airlines
- Turkish Cargo

One-on-One Interviews

- AirBridgeCargo
- Alha Group
- Bolloré Logistics
- Cathay Pacific
- Etihad Airways
- Hong Kong International Airport
- SAASA

Pharma Shipper Respondents

- GlaxoSmithKline
- Johnson & Johnson
- MSD Merck & Co.
- Pfizer
- Zoetis

⁴Source: Mordor Intelligence

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Online attendance

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Full price (registration after 30 June 2021): € 800 (€ 560 for Pharma.Aero members)

The online registration includes Master Class documentation.

On campus attendance (regular registration)

Early bird fee (registration before 30 June 2021): € 900 (€ 630 for Pharma.Aero members).

Full price (registration after 30 June 2021): €1.200 (€ 840 for Pharma.Aero members)

The regular registration includes dinners, coffee breaks, site visits and Master Class documentation.

Scientific Committee 

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Prof. dr. Pierre Van Damme (co-chair)

Dr. Sven Buyle

Prof. dr. Wouter Dewulf

Prof. dr. Christa Sys

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Antwerp Belgium



For more information

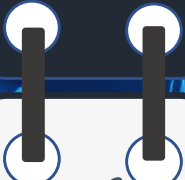


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**DAY 1
SEP 7**

Air transport &
Pharmaceuticals



Air transport & pharmaceuticals: A commodity, specialistic or valuable product for air transport? Economic and operational challenges when flying Pharmaceuticals & Vaccines in Europe

**DAY2
SEP 8**

Pharmaceuticals &
Vaccines



How are they made? The cooking recipes, the storage and handling conditions. How and why?

Visit to Vaccinopolis

Pharmaceuticals & Vaccines: The supply chain from the American perspective

**DAY3
SEP 9**

Cost Chain Model &
Maritime transport of
Pharmaceuticals



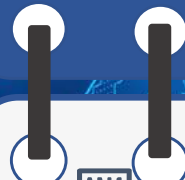
The maritime sector and
Pharmaceuticals?

Logistical costs in supply chains, including pharma

The pharmaceutical supply chain Europe versus 'Operation Wharfspeed': The COVID-19 vaccine distribution case

**DAY 4
SEP 10**

Site visits
Pharmaceutical
Production Plant &
Air Cargo Belgium
BRUcure
Brussels Airport
Company



Site visits:
GlaxoSmithKline site
Site visit Brussels Airport
Pharma Hub

The Covid-19 distribution and digitalization case at
Air Cargo Belgium:
project BRUcure

Masterclass dinner

**DAY 5
SEP 11**

Pharmaceutical last
mile distribution
Challenges



The last mile challenges for
pharmaceutical distribution
in Europe

The last mile challenges for
pharmaceutical distribution
in Europe and the USA -
similarities and differences

Panel discussion and
Masterclass wrap-up by
chair



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