IATA CARGO WEBINARS

24 November 2020

Three-Part Webinar Series

Webinar 2: Global Distribution and the Flow of Vaccines Throughout the Supply Chain

Welcome

Global Distribution and Flow of Vaccines Throughout the Supply Chain

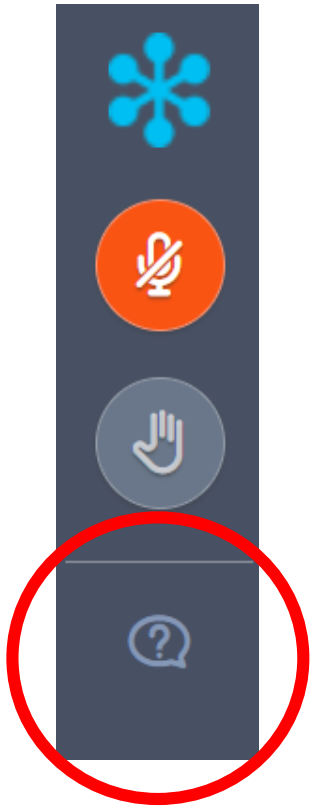
Andrea Gruber
Head, Special Cargo
IATA

IATA CARGO WEBINARS

This session is conducted under the Competition Law Compliance

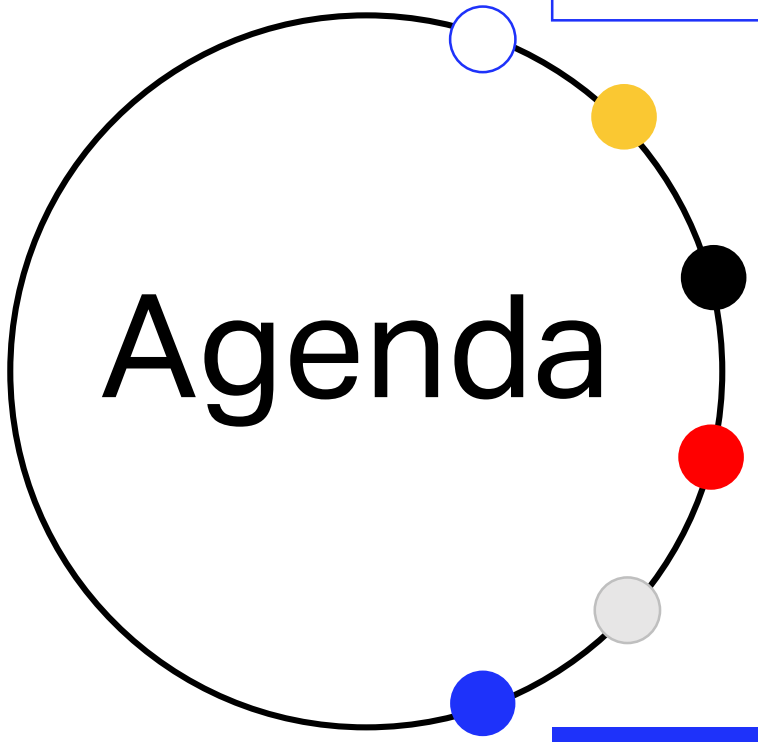
Microphones have been muted

Please submit your questions through the **Question box** and **send to Everyone**



The webinar is being recorded and will be made available afterwards, including the PPT slides.

Transport of Vaccines and Life Science Products by Air



Welcome Address

UNICEF Global logistics preparedness

Lessons learned by vaccine manufacturers

Collaborative efforts initiated in the crisis

Airline opportunities in a time of crisis

Handling Operational Challenges

Speaker biographies are available on the IATA website

Focus on industry readiness to manage globally a temperature-controlled supply chain for vaccines, health, and humanitarian supplies

Call-to-Action

- Information Sharing - Global Collaboration
- Plan – Prepare – Perform
- Engage and communicate with partners/suppliers on scale up projects and initiatives to support COVID-19 vaccines distribution or humanitarian aid

COVID-19 vaccine UNICEF Global logistics preparedness

Mounir Bouazar
Emergency Logistics Manager
& Logistics Lead COVAX
UNICEF

COVID-19 vaccine
UNICEF Global logistics preparedness

November 24, 2020

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COVAX Facility - Overview

Goals of the COVAX facility

To support the largest actively managed portfolio of vaccine candidates globally

To deliver 2 billion doses by end of 2021

To offer a compelling return on investment by delivering COVID-19 vaccines as quickly as possible

To guarantee fair and equitable access to COVID-19 vaccines for all participants

To end the acute phase of the pandemic by the end of 2021

Thanks to industry as a key partner in this endeavor

COVAX Facility focused on transparency, global access and impact

Bold ideas and brilliant innovation for the worst global health crisis in 100 years

Pooled demand

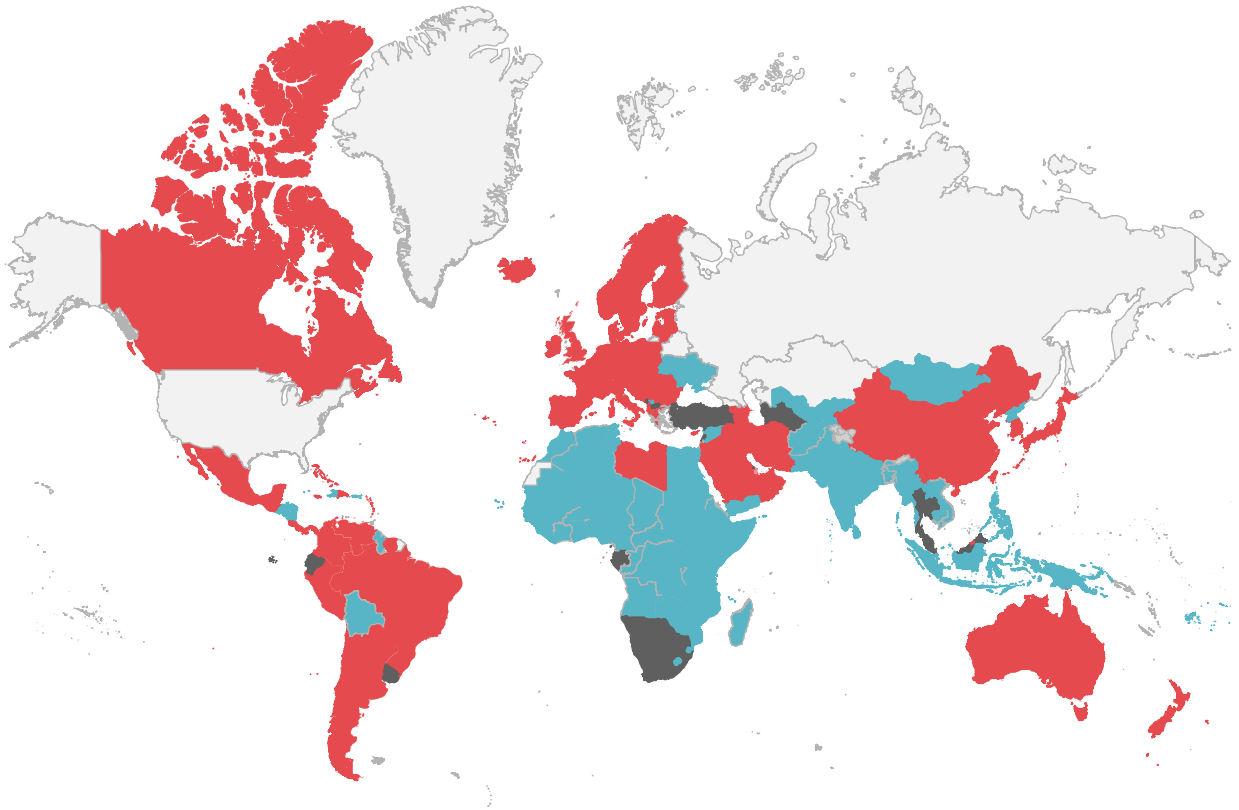
Pooled supply

Consolidates buying power and provides participants access to a broad and actively-managed portfolio

Provides manufacturers access to a massive, demand-assured market

61 Self Financing Participants & Team Europe join the 92 AMC participants for a total of 182 participants

representing over >80 % of the world's population



	Number of participants
Fully Self-Financing	90
AMC92	92
Total	**182**

Allocation of vaccines: update, status and next steps

Allocation of vaccines: update, status and next steps

Phase 1: Proportional allocation up to 20% of population

Countries receive doses proportionally to their total population given the ubiquity of the threat

Countries progressively receive doses until all countries reach 20% of their population (or less if they so requested).

The pace at which countries receive vaccines depends on country readiness[1] and the availability of doses (not on threat and vulnerability)

The allocation moves on to phase 2 once all countries have reached 20% coverage (or less if they so requested).

Phase 2 may start ahead of this if available doses are unable to be allocated due to lack of readiness, funding or territory issues

Phase 2: Weighted allocation beyond 20% (if supply severely constrained)

Timing may be based on consideration of vulnerability and COVID-19 threat:

In the case of a severely restricted supply, the timing of country shipments would be based on a risk assessment based on Threat and Vulnerability

Countries with a higher risk would receive the doses they need faster than others, although all countries will receive some doses in each allocation round

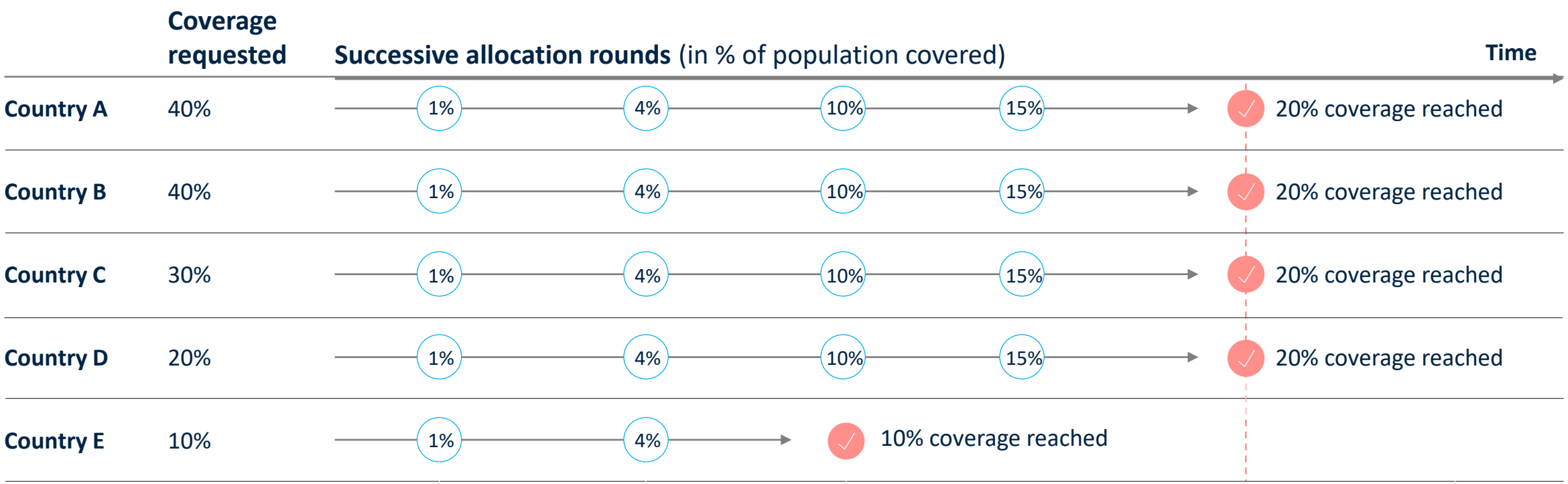
Threats and Vulnerabilities will be based on metrics defined closer to the end of phase 1, potentially related to the country's vulnerability to severe disease and its healthcare system.

All countries will receive the total doses they have requested as rapidly as possible in phase 2.

The allocation will run in successive 'rounds'

(Illustrative)

Illustrative example for Phase 1 of multiple rounds of allocation with increasing supply



Rounds: Each allocation round is done in advance of production based on forecasts. It covers a time period in which there is at least enough supply to allocate to all countries in theory (e.g., enough to cover 1% of population in all countries). Each round will usually combine multiple shipments.

Proportionality: All countries cover the same share of their population at the same time (where possible)

Dose request: Countries that chose to request less than 20% will stop receiving further doses beyond this

Timing: In theory, all countries that requested 20% or more reach 20% coverage at the same time

Procurement updates

2

billion

The initial target of COVAX is to deliver at least 2 billion doses of Covid-19 vaccine by the end of 2021

Preliminarily split

- 92 AMC economies (estimated at least 950 million doses, with potential additional doses subject to funding and supply availability)
- At least 90 self-financing economies (estimated range from 550-950 million doses)
- Buffer for humanitarian use (100 million doses)

As country participation in the COVAX Facility is firmed up, these demand forecasts will continue to be refined and the latest estimates will be communicated in due course

Request for Proposal launched last week to secure access to at least 2 billion doses of vaccine to be delivered by end 2021

Purpose	Gavi, as COVAX Facility Secretariat, can establish advance purchase commitments - APCs UNICEF and PAHO will establish procurement and supply arrangements based on the APCs UNICEF, as COVAX Procurement Coordinator, establishes key basic terms that COVAX self-financing self-procuring participants reference in their supply agreements with manufacturers.

Objectives	1. **Speed** Expedite access to Covid-19 vaccines by building on push and pull contracts (established by BMGF, CEPI and Gavi) for the COVAX participating economies 2. **Volumes** ACT-A target is to secure at least 2bn doses by end 2021 3. **Price** Drawing on the financing and de-risking provided by the push and pull contracts and the pooled COVAX volumes, COVAX targets to achieve the lowest price on the market 4. **Balanced Portfolio** Balanced geographically diverse portfolio across multiple vaccine platforms

Global logistics preparedness

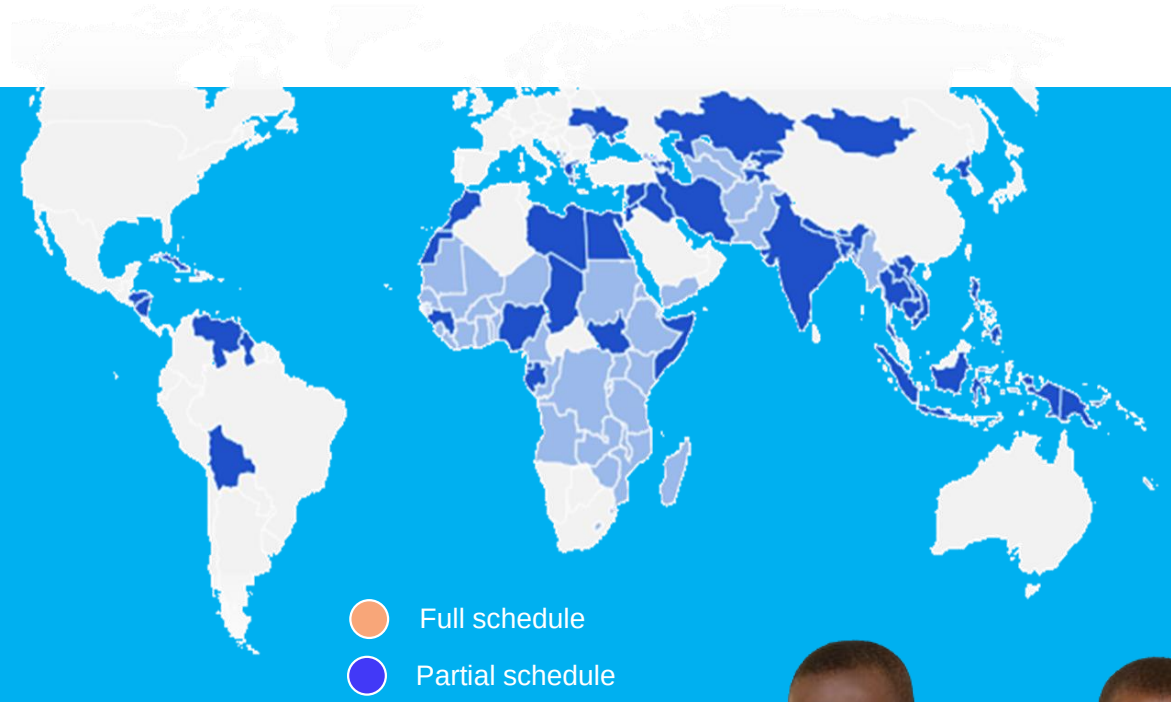
UNICEF in 2019

45%
of children under five reached, in over 100 countries *(through only 5% of the global market share)*

25
vaccines with different product presentations

2.4
billion
doses procured in 2019

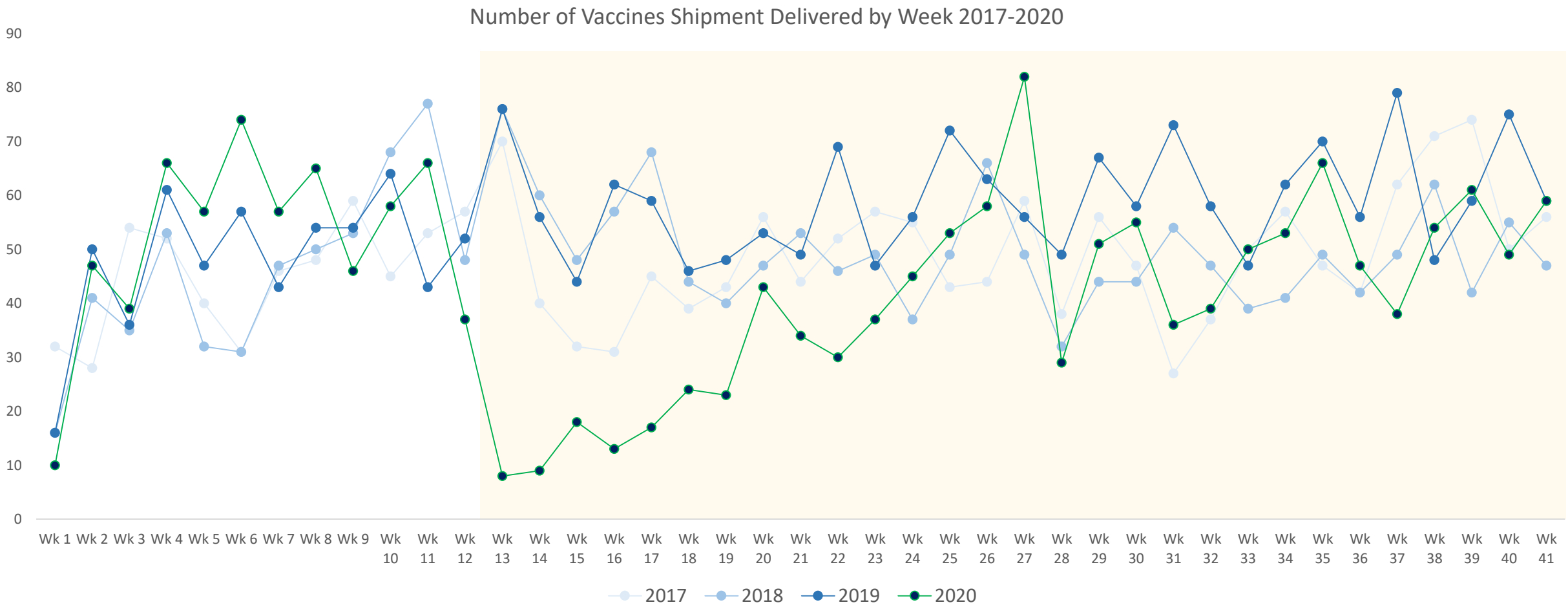
1.66
billion USD
throughput in 2019



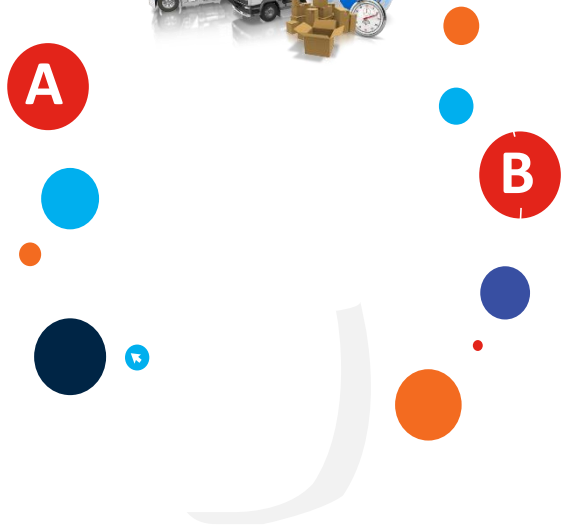
Source: UNICEF Supply Division

This map does not reflect a position by UNICEF on the legal status of any country or territory or the delimitation of any frontiers.

After a dramatic dip in March- April, weekly vaccine shipments gradually recovered to pre-Covid levels



Requirements for the development of the COVAX Global Logistics Operational Plan



Origin

Incoterm with suppliers: Origin

Priority

Capacity (airlines and forwarders) and space available

Destination

Time of loading

Freight validity period

Size of the cargo

in containers for sea freight, in chargeable weight (weight and volume) for air freight, truck load for road

Mode of transport

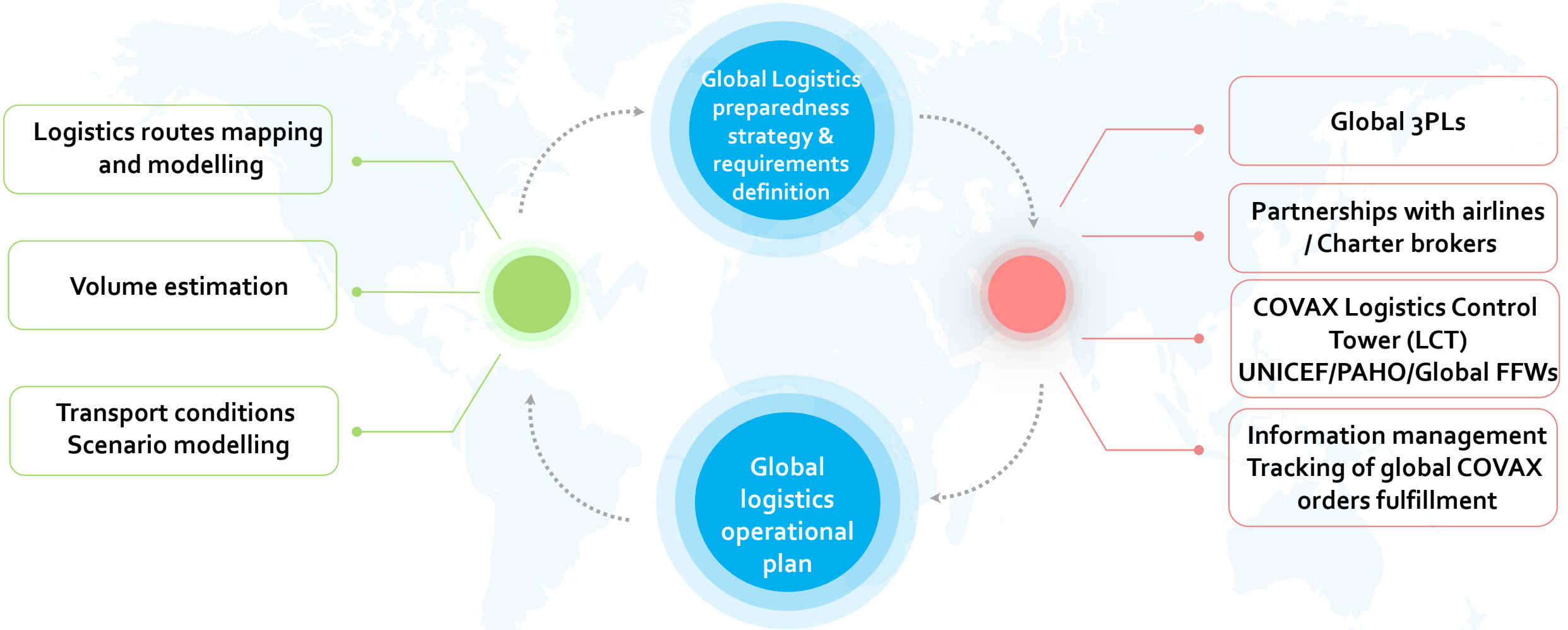
Air, Sea, Road, Multimodal

Type of commodity

Dangerous goods, temperature controlled (range), cold chain, etc.

unicef

Work plan activities for the implementation of the COVAX logistics operations



The current estimation is subject to a large uncertainty of a factor of 10

Vaccine logistics assumptions and conclusions

Vaccine, boxed and ready for shipping

	Material number	Mat description	Doses/ vial	Qty of vials / inner carton	Number of inner cartons	Qty vials/ carton	Qty doses/ carton	Total weight (kg)	Total volume (cbm)	Doses/ cbm	Doses / kg
vials + diluent 10 dose vial scenario (sanofi)	S359351	Measles-10	10	300	6	1800	18000	72.5	0.37	48k	248
Only vials 10 dose without diluent (SII)	S359129	DTP-HepB-Hib vac.,liquid,vial of 10 dose	10	50	24	1200	12000	33.5	0.12	102k	358
20 doses vial + diluent (SII)	S359114	BCG vaccine, vial of 20 doses	20	50	50	2500	50000	25.1	0.12	410k	1992
20 doses per vial + diluent (AJ vaccine)	S359806	BCG vaccine, vial of 20 doses	20	50	60	3000	60000	61.0	0.21	280k	984

All analyses assume **Measles-10 vaccine as the benchmark**

This **conservative assumption** is intended to **avoid underestimation of required transport capacity**

Transport requirements differ by factor of 10 between vaccines

Two BCG vaccines differ by factor of 2 in number of doses per kg

To keep in mind

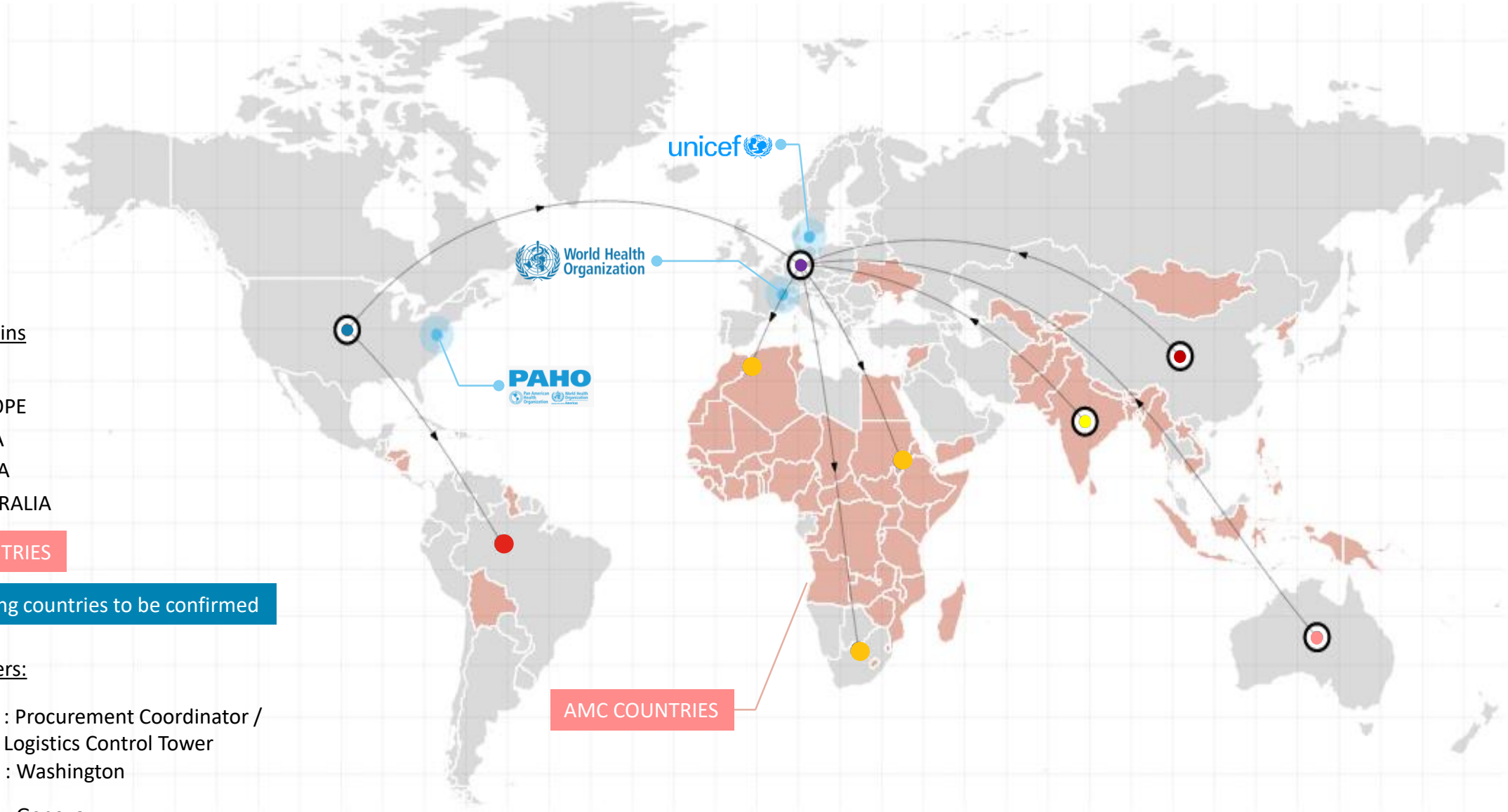
The final transport volume could even be higher until further specifications by suppliers are present

With natural uncertainty on some inputs on at this stage, conservative assumptions have been chosen to ensure preparedness

Main model uncertainties

Area	Main uncertainty
Packaging	Existing vaccines differ by **factor of 10** in terms of number of doses per kg; i.e. required transport volume could to be lower than assumed
Number of doses	Assumed **2 per person** – could also be only one or more
Freight capacity and cost	Might change over time – currently **treated as static**
Supply	Reliable **forecast on availability** and **timing not possible** - latest COVAX forecast used
Allocation order and sources	Supplier and its **location unknown** – iterative process including procurement decisions
Country intake capacity	Rough proxy used **based on historical 2019 data** – GAVI/WHO survey will generate more insights

COVAX logistics preparedness – data mapping



Key origins

- US
- EUROPE
- INDIA
- CHINA
- AUSTRALIA

AMC COUNTRIES

Self financing countries to be confirmed

Key members:

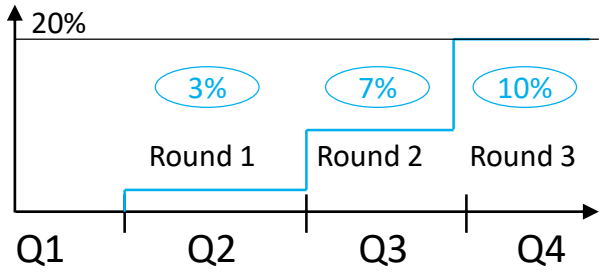
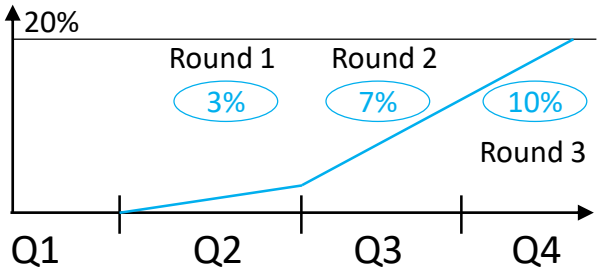
unicef : Procurement Coordinator / Logistics Control Tower

PAHO : Washington

World Health Organization : Geneva

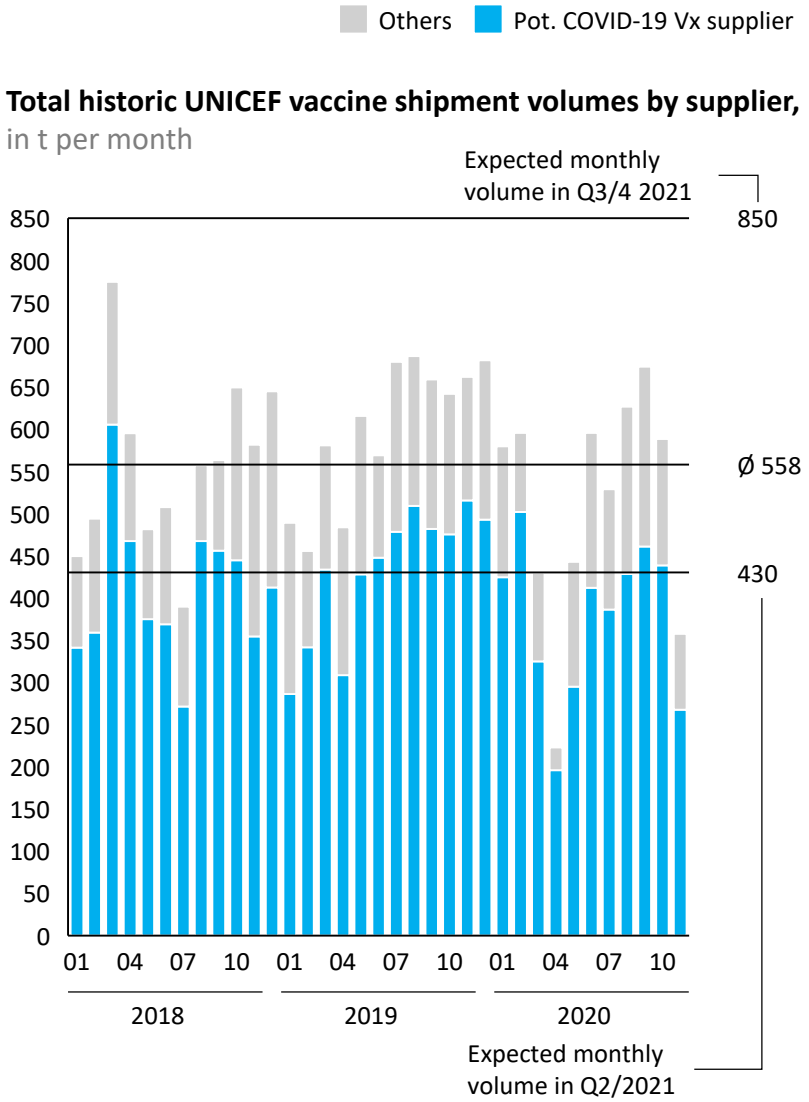
Supply scenarios used: instant supply and current COVAX prediction

x% Doses to vaccinate x% of the population Not used

	Instantaneous supply scenario	COVAX prediction	Very limited supply scenario
Characteristic	All vaccines of an allocation round are available **instantaneously** at the PODs at the start of an allocation round All volume is sourced from one single location	Vaccines of an allocation round get available **continuously** 1/4th of doses from each possible sourcing locations (EU, US, India, China)	Supply is below realistic supply scenario
Cumulated supply availability			
Relevance	Identification of **bottlenecks** – instantaneous supply is most challenging scenario for supply chain **Preparedness** for **unexpected** events – e.g. when larger amounts of vaccines become available	Realistic modelling of **interference** between supply and **allocation** Creation of **order processing plans** **Robustness** analyses	**None** - since low volume is not challenging for logistics

Reality can only be between these extremes

The logistics challenge of COVID-19 outbound logistics is unprecedented – more information from RfP required



Key insights

The expected outbound volume of 850t per month expected in Q3/4 2021 is **unprecedented**, even to **all current UNICEF suppliers combined**

A comparison with **the proposed volumes** in the currently ongoing COVID-19 vaccines **RFP** could reveal which producer will face **the highest outbound logistics challenges**

Even in instantaneous supply scenario 800/T week throughput not exceeded at any airport

PRELIMINARY

Amount of vaccine shipments to be handled if supply exclusively from one region, in tons per week

Key information

4 scenarios with infinite supply at the beginning of Q2, Q3 and Q4

Not clear so far: How much is usable for cold chain?

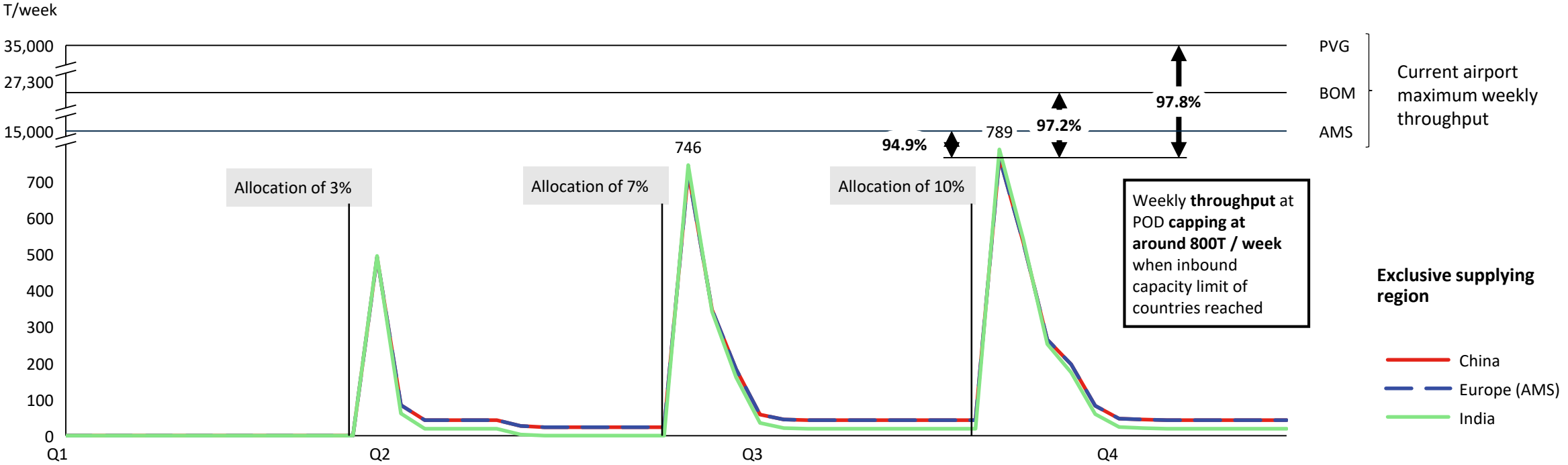
US not planned through one airport but several, therefore not comparable

Recommended next steps

Do RFI with freight forwarders to clarify **available cold chain capacity** at airports - can 800T be stored?

Reserve required cooling capacity at airports and potentially **extend**

Verify airport capacity for possible other PODs, e.g. in US



1. Remaining shipments of allocation neglected for beginning of next allocation, India shipments from other regions are included

Source: Website: https://www.schiphol.nl/en/cargo-statistics/ (accessed 09.11.2020); https://www.statista.com/statistics/589187/indian-airports-freight-traffic/ (accessed 10.11.2020); https://en.wikipedia.org/wiki/List_of_busiest_airports_by_cargo_traffic (accessed 10.11.2020(

Capacity: Logistics will, with few considerations, be able to execute exactly according to the allocation – however, allocation need to take into account SC considerations for the overall efficiency of the distribution

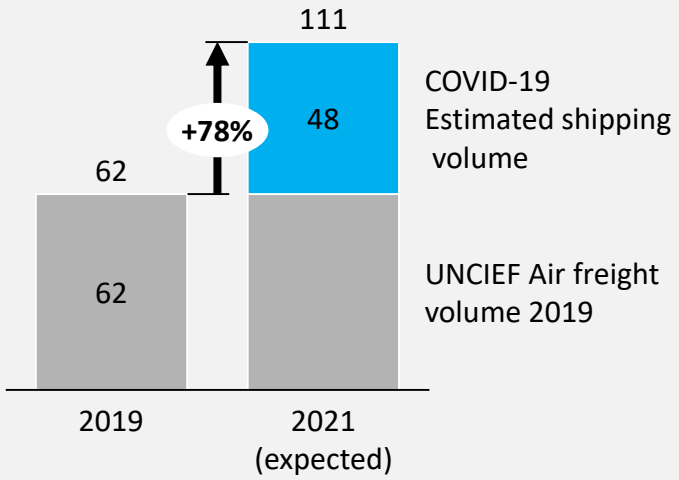
1 **Required air cargo capacity for vaccine distribution large – but not a bottleneck on a global scale**

2 **Structuring allocation rounds of small countries could further simplify distribution**

(see deep-dive)

UNICEF SD air freight volume, in thousand cbm

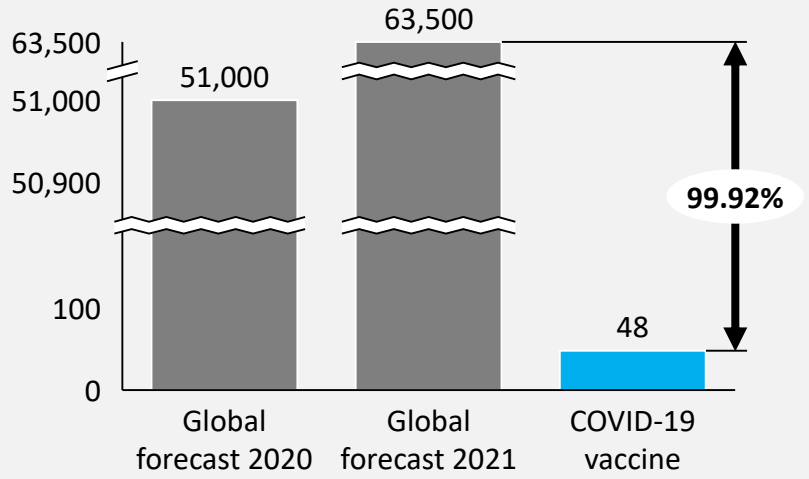
Conservative assumptions on packaging, including all FSF and AMC92 countries to be supplied with vaccines for 20% of population



UNICEF SD air freight volume increase below doubling

Global air freight volume, in thousand cbm

Conservative assumptions on packaging, including all FSF and AMC92 countries to be supplied with vaccines for 20% of population



Vaccine distribution to countries is expected to be about 1% of global air freight volume

Sources: UNICEF, IATA

Logistics does not constrain overall vaccine delivery in most cases – Supply chain needs the priority provided by COVAX/allocation

The prioritization by COVAX on programmatic requirements suggested

1% of critical life saving vaccines

Vaccines to cover 20% of the population of COVAX countries need to be procured and shipped in 2021 – from currently unknown origin with changing supply forecast

Vaccines needed to immunize … %, tons

	3%	7%	10%	20%	Population, bn
1 **How much** needs to be shipped?					
UNICEF (AMC 82)	950	2,216	3,166	6,331	3.93
PAHO (AMC10)	12	27	38	77	0.05
FSF countries	412	960	1,372	2,743	1.70
Total	**1,372**	**3,203**	**4,575**	**9,151**	**5.68**

2 **What airlines** are interested/relevant to be involved?

Currently **expected freight volumes** per airline – subject to changes depending on place of production facility

3 **What are current assumptions** on temperature, weight and volume?

Current planning assumes **2-8 °C cold chain** for transportation: recent news regarding Pfizer/BioNTech vaccine may heavily complicate things

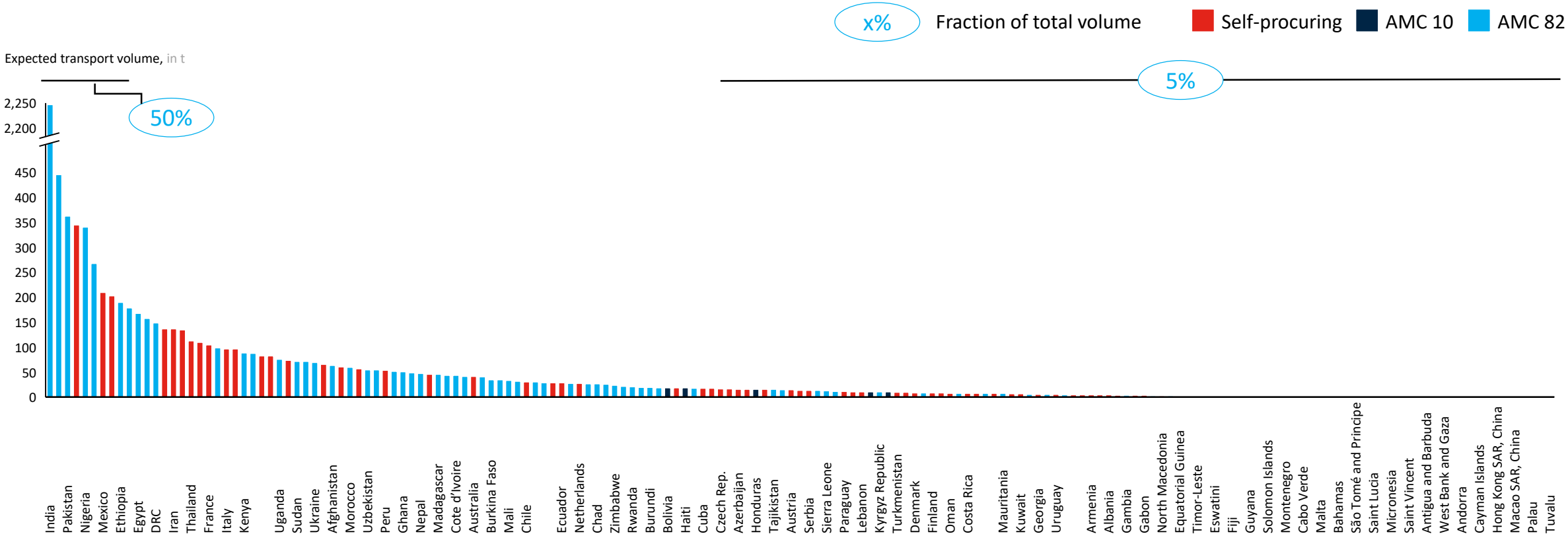
Limitations on dry ice per plane not yet included: difficult to obtain as no clear rules

All information regarding volume and weight based on conservative estimates: remaining **high degree of uncertainty** regarding correct numbers

Currently **unknown vaccine origin with changing supply**: will constantly develop over coming months

9,100 tons of vaccines will be shipped to 182 countries – 5 % of volume going to more than half of them while 9 countries receive 50% of volume

Expected COVID-19 vaccine transport volume in 2021, with target to cover 20% of population, countries sorted by population size



Key insights

High number of small countries to serve

50% of volume will go to largest 9 COVAX countries

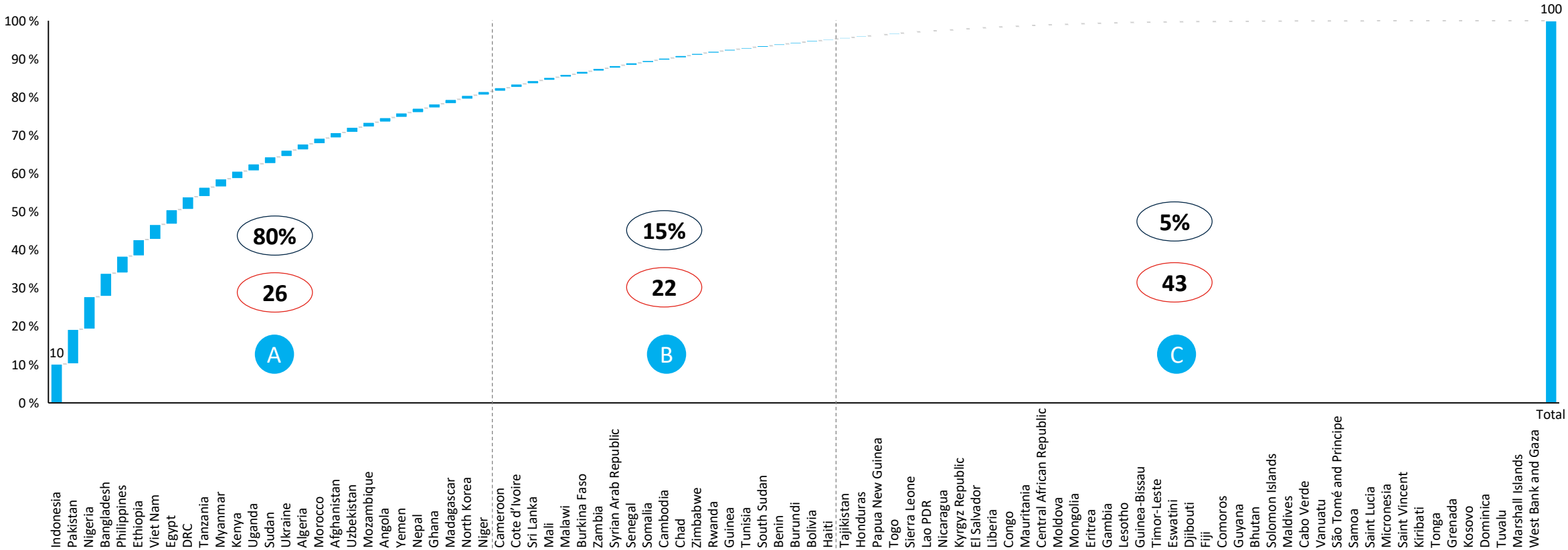
Just above half of the AMC92 countries require 5% of vaccine air freight

Relative share of vaccines per AMC92 country[1]

x # of countries

x% Fraction of population in AMC92 countries, Excluding India

ILLUSTRATIVE



Key insights

43 countries responsible for less than 5% of total vaccine volume

Allocation between the countries, especially the small ones, is key driver for overall complexity of logistics

1. India excluded since presumably handled differently from logistical standpoint

Accessibility: Only 2% of AMC92 population can not be directly accessed from all regions via commercial flights

Clustering of countries and their access to commercial flights[1]

x% Of AMC92 population

Approach

Four freight forwarders (FFS) have been asked for outbound traffic their regions (EU, India, US, China)

Following analysis is for orientation and subject to changes over time

No commercial route from US and CN <0.1%

Marshall Islands

No commercial route from US <0.1%

Solomon Islands

Kosovo

No commercial route from CN and EU 0.6%

Mongolia
São Tomé and Principe
Micronesia
Eswatini
Saint Lucia
Syrian Arab Republic
Kiribati
Dominica
Saint Vincent
Lesotho
Grenada

No commercial route from EU, US, CN 1.7%

North Korea
West Bank and Gaza
Samoa
Eritrea
Timor-Leste
Yemen
Tonga
Lao PDR
Tuvalu
Vanuatu
Bhutan

1. Availability of commercial flights reported from Freight Forwarders. However, available freight volumes not known in all cases.

Key insights

India reported to have commercial connections **to all AMC92** countries

Remaining countries with some restrictions with respect to commercial flight make **2% of AMC92 population**

Chartering of flights unlikely to be necessary at a large scale

Note limited availability of data

Some connections reported as available, however no capacity reported

Connections and their capacity subject to changes over time

COVAX supply chain success criteria

- **Availability of vaccines: manufacturing and logistics capacity of manufacturers**
- Clear allocation process ensuring supply chain considerations taken into account
- **Efficient information flow & collaboration with logistics stakeholders to ensure capacity adjustment, availability and affordable pricing**
- Close coordination with countries during shipment planning based on storage availability absorption capacity and countries' readiness

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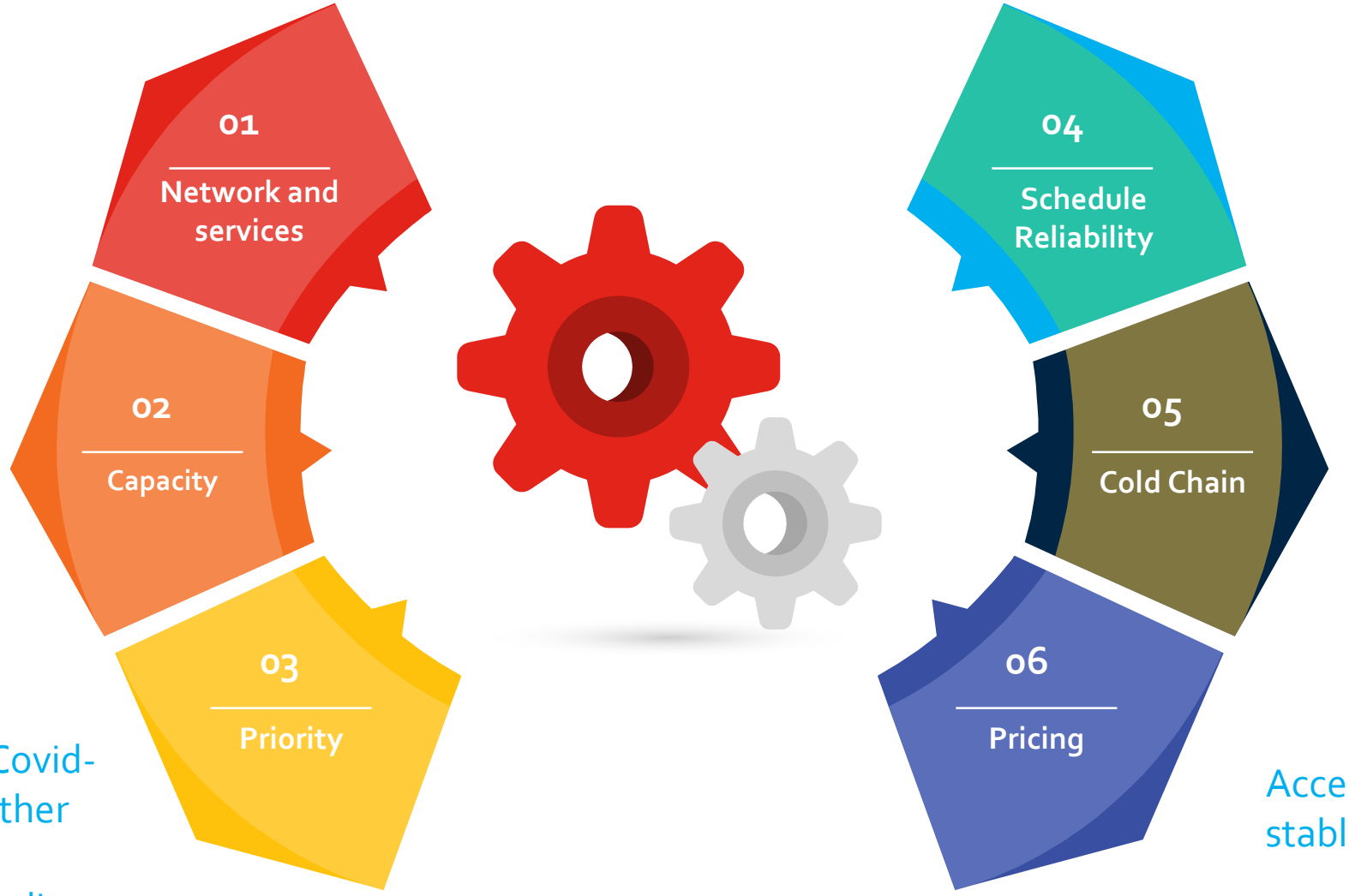
Logistics industry contribution to UNICEF/COVAX efforts

Access to countries

Secure the necessary logistics capacity for Covid-19 vaccines as well as existing vaccine shipments

Giving priority to Covid-19 vaccine and other vaccines and humanitarian supplies



Transport schedules

Temperature control management for cold chain during transit an at arrival

Access to preferred and stable pricing

Q&A

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What do we need to address as a global community for successful COVID-19 vaccine deployment? Lessons learned by vaccine manufacturers from both routine and emergency scenarios

Leena Scaria
Global Vaccine Public Policy
Merck

What do we need to address as a global community for successful COVID-19 vaccine deployment?

Lessons learned by vaccine manufacturers from both routine and emergency scenarios

Leena Scaria
Global Vaccine Public Policy, MSD
Co-lead, IFPMA COVID-19 Distribution Working Group

IFPMA

The “vaccination” value chain is complex and stretches from R&D by biopharma to vaccination of target populations

Safe, effective, quality vaccines that are delivered as safely, quickly, and efficiently as possible

Research & Development

Clinical development
Regulatory submission & approval

Manufacturing & Packaging

Manufacturing at scale
Formulation
Filling
Packaging
Lot release

Cold chain
Air cargo, cross-border transfers, in-country freight & storage

Point of Vaccination

Vaccine administration
Waste management

Vaccines are heavily regulated across the value chain. This adds complexity, which can increase time to vaccine access for populations.

Regulatory harmonization can enable the movement of high volumes of COVID-19 vaccines across the globe in a short amount of time

- Regulatory reliance
- Streamlined labeling requirements
- Streamlined packaging and artwork
- GMO authorization
- Dynamic expiry dates
- Accelerated post-approval changes

COVID-19 vaccines have to be delivered rapidly to vaccination sites to conserve shelf life but distribution obstacles can slow their movement

Air cargo capacities

Product entry into countries

In-country cold chain transport & storage systems

! BSL classification

! Customs procedures

! Testing on importation

! Existing cold chain

IFPMA

Successful deployment of vaccines during a pandemic will require a broader systems approach

- Air cargo capacities
- Alignment of delivery (and disposal) of ancillary supplies
- Product entry into countries
- Education & capabilities building of teams along the supply chain
- In-country cold chain transport & storage systems
- Immunization information systems

IFPMA

Now and in the future: what we need to get right to distribute vaccines as quickly, safely, and efficiently as possible

Partnership and coordination	• Invest time upfront to understand processes, communication and resource needs, and operational supply chain requirements and align • Coordinate on deliverables: documentation, release procedures, request/delivery timelines, communication flow, etc.
Regulatory pathways	• Advocate for use of regulatory reliance particularly for epidemics and pandemics as critical enabler of safe and rapid distribution of vaccines globally • Appropriate regulatory framework in place to allow use of pre-licensure products (e.g. emergency use regulations) • Ensure appropriate authorizations are in place for product shipment, reception and distribution
Vaccine distribution & logistics	• Systems approach for end-to-end visibility of distribution process for increased performance • Define chain of command, expectations, and responsibility for team members through each node of supply chain • Consolidated distribution systems for more efficient ordering and distribution worldwide (e.g. regional hubs)

Q &A

Leena Scaria
Global Vaccine Public Policy, MSD
Co-lead, IFPMA COVID-19 Distribution Working Group

IFPMA

Showcasing the collaborative efforts initiated in the crisis

Patricia Cole
Global Head of Temperature Management Solutions
DGF

PUBLIC

DHL GLOBAL FORWARDING

LOGISTICAL CONSTRAINTS AND LESSONS LEARNED DURING GLOBAL CRISIS

Patricia Cole
November 2020

DHL Global Forwarding

What does it take to deliver 10bn vaccine doses worldwide?

Starting from Q4 2020 vaccines for emergency use are expected to be shipped around the globe; Emerging actors like governments and NGOs face similar challenges in orchestrating vaccine distribution as for PPE – yet the stakes are even higher.

10+ bn vaccines needed

=

7.8 bn global population

×

~70% immunization in population to achieve herd immunity

×

~1.8 avg. doses/person needed for immunization

200,000
Movements by pallet shippers

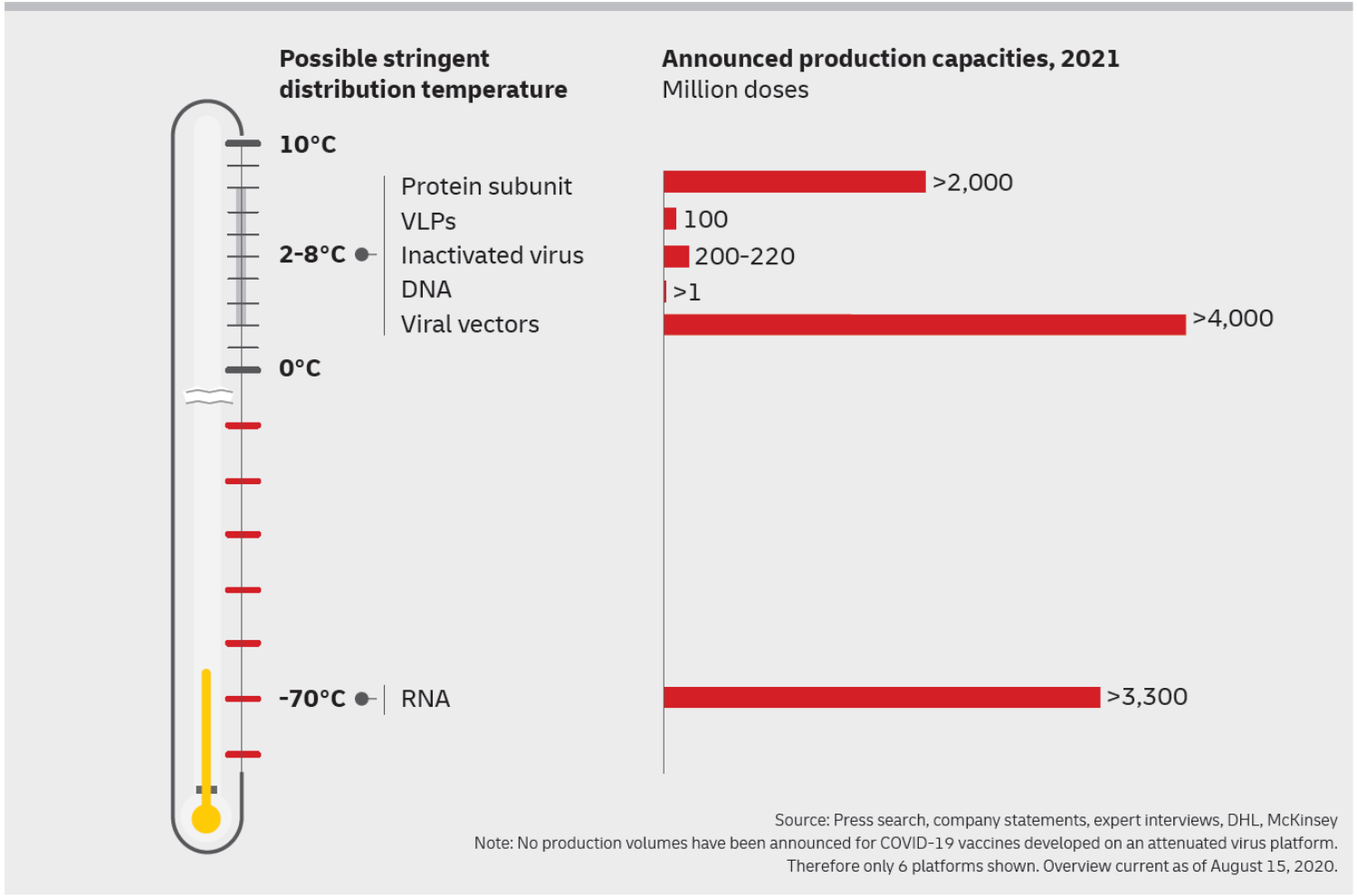
15,000,000
Deliveries in cooling boxes

15,000
Flights

Source: World Bank; DHL; McKinsey

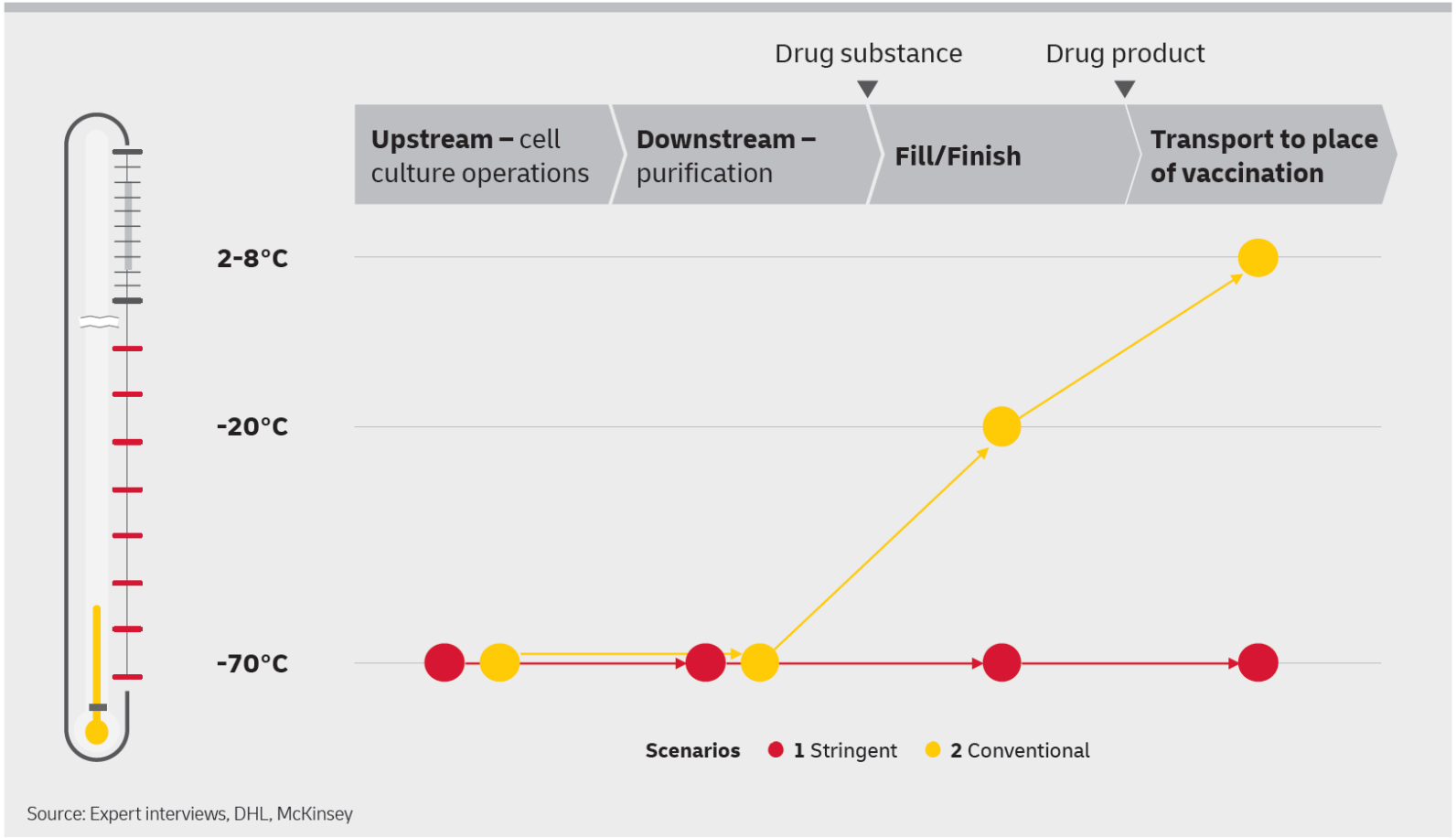
The shortened development cycle of vaccines to meet ambitious schedules can require distribution at deep-frozen temperatures for a potentially sizeable volume share

- Today, most vaccines are distributed at 2 – 8°C for broader use
- As COVID-19 has been leapfrogging phases to reduce time, stringent temperature requirements might be imposed due to lack of stability data
- Temperature requirements might also vary across technical vaccine platforms



Storage and transport requirements along Supply Chain phases

Example for sensitive vaccines

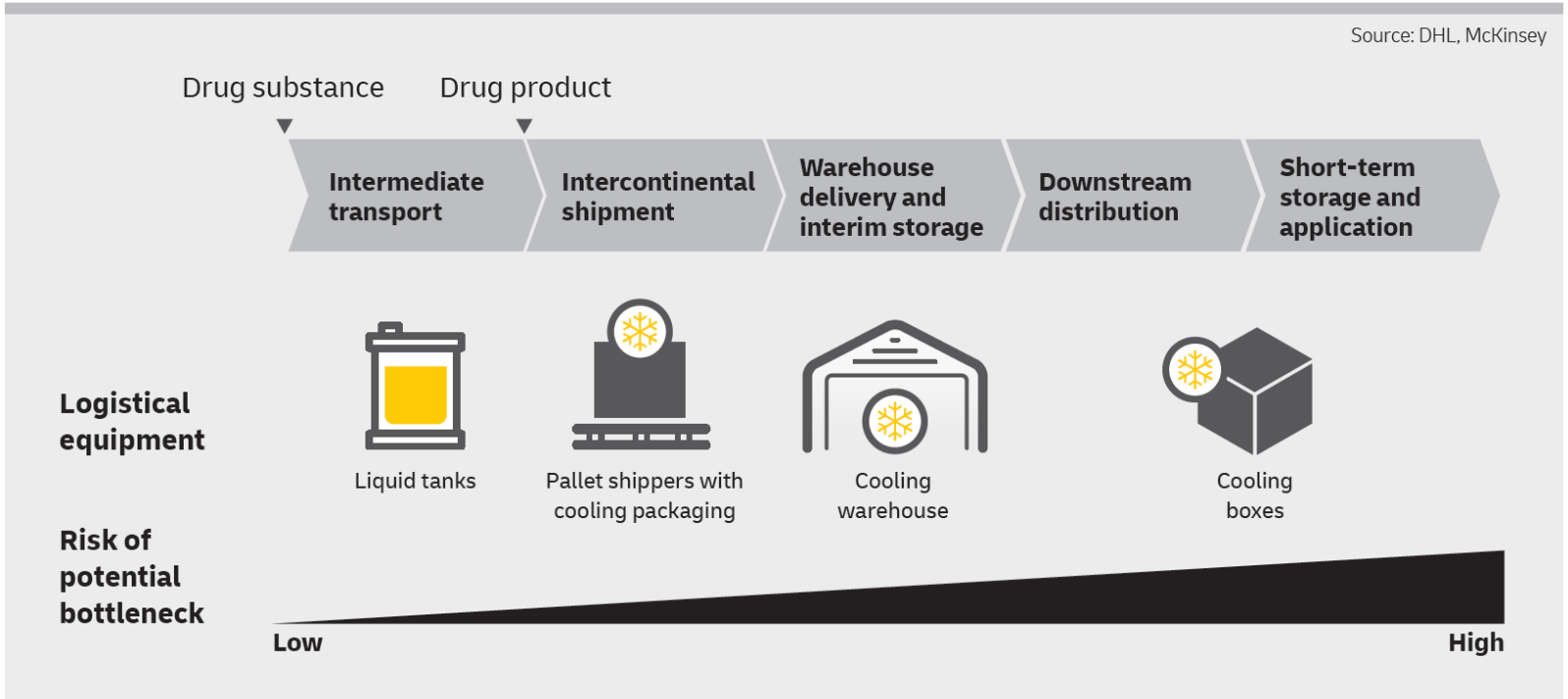


Source: Expert interviews, DHL, McKinsey

1. **Stringent Scenario**
   Requirement to keep drug substances and finished product at frozen temperature during the end to end Supply Chain
2. **Conventional Scenario**
   Opportunity to distribute finished products at conventional 2 – 8C

Logistical implications of cold chain requirements

Equipment example for a potential Supply Chain setup



Highest risk of bottlenecks expected in downstream distribution, due to:

1. **The sheer number of shipments**
   Imagine 15mn cooling boxes –with the required volume of cooling bricks or dry ice
2. **Ensuring consistent temperature**
   Increased complexity for ~50 boxes/ parcels than it is for one pallet shipper
3. **Handling of ultra-deep frozen shipments**
   Special requirements, processes and training for couriers and consignees

Vaccine distribution addressing 2 levels of Supply Chain temperature stringency and 3 Supply Chain archetypes

2 TEMPERATURE SCENARIOS

Stringent scenario
(-70 to -80°C)

Expected to be multi-dose vials, densely packed **without syringe and additional contents** to maximize frozen chain efficiency

Conventional scenario
(2 to 8 °C)

Typically single dose vials, individually packed **with syringe and additional space** to improve convenience for end users

Packaging and temperature management

Cooling bricks + Dry ice

Cooling bricks

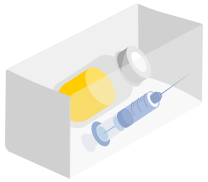
Dosing per vial

Multi dose – 4 doses per vial

Single dose – 1 dose per vial

Packaging and complements

Only vial



Vial + single packaging + syringe

3 SUPPLY CHAIN ARCHETYPES

Direct shipment
Direct shipment of cooling box (or pallets) from fill-finish to point of use

Local cross-docking
Shipping in cooling boxes on pallets, local crossdocking in destination country for last mile in cooling boxes

Local warehousing
Shipping in pallets with warehouse storage in destination region, breakdown and last mile in cooling boxes

Challenge of vaccine distribution lies in transporting within destination

Background

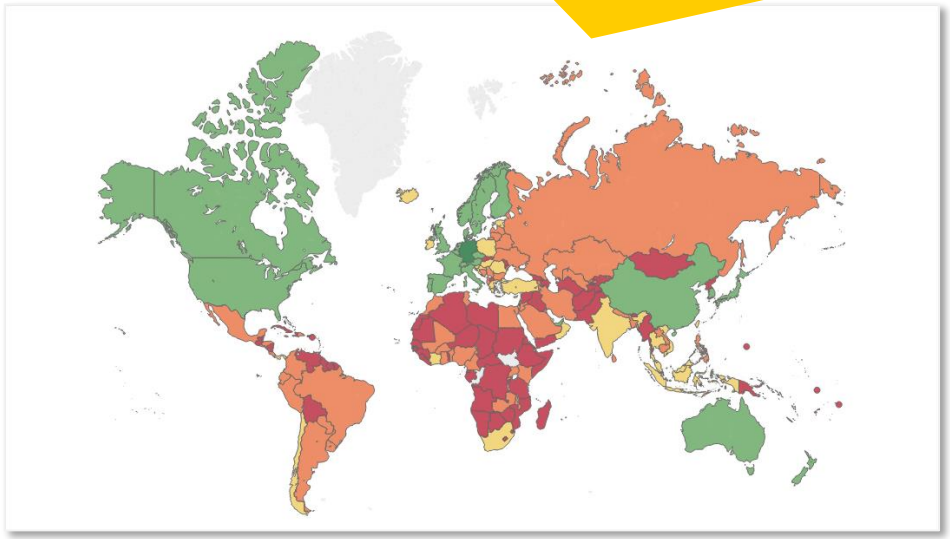
- Due to **early stage instability** COVID vaccines will likely to be **first transported in frozen form** and later at **refrigerated temperature**
- Specific transportation requirements in different states raise different **challenges on existing in-country logistics** worldwide

In-country logistics at destination

Feasibility: Low — High

Stringent scenario

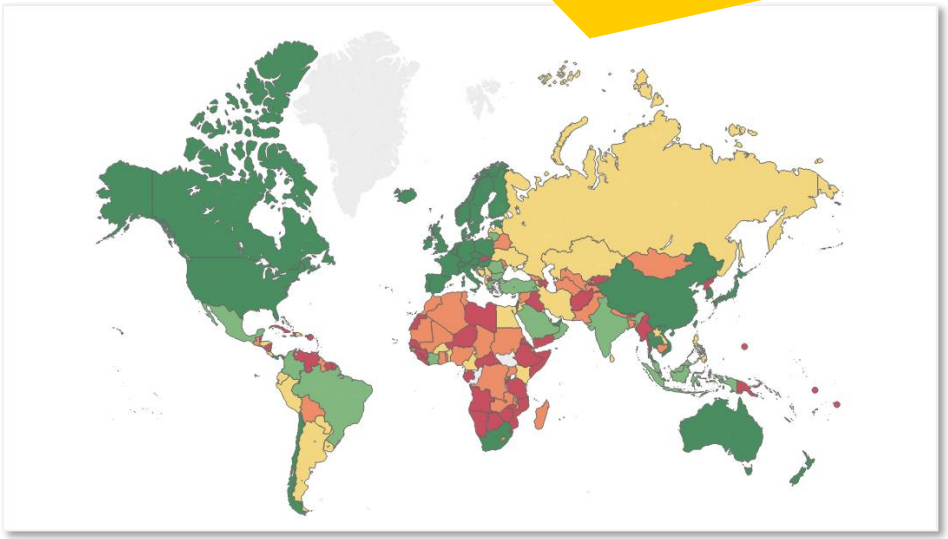
Feasible[1] to distribute in **25 countries** with total **population** of **2.5bn**



- Cold chain capacity to ship **frozen vaccines (<-20°C or <-70°C)** has to be **built up and scaled worldwide** for emergency use

Conventional scenario

Feasible[1] to distribute in **60 countries** with total **population** of **5.0bn**



- In conventional scenario, **refrigerated vaccines (2~8°C)** can be shipped **leveraging existing infrastructures**

Source: World Bank Global Logistics Performance Index, DHL;
1) “Feasible” considered as high and relatively high feasibility to distribute COVID-19 within destination countries (marked with dark green and green color code)

Delivering a vaccine will face other challenges and opportunities

Limited production capacity in different parts of the supply chain may further stress the distribution of the vaccine

Supply chain capacity

LOGISTICS REPORT

From 'Freezer Farms' to Jets, Logistics Operators Prepare for a Covid-19 Vaccine

The distribution operation – taking drugs from far-flung manufacturing sites to medical teams via warehouses, cargo terminals, airports and final storage points (..) promises to be a logistics high-wire act with risks at every stage. Breakdowns in refrigeration equipment, transportation delays, broken packaging [..] could leave many thousands of doses useless."

- Can vaccines be transported **in bulk** on all trade lanes?
- Do airports have sufficient **cool facilities** to accommodate vaccines?
- Will **temperature-controlled containers** form a bottleneck? How to manage their **imbalance**?

Air cargo security

TAPA WARNS OF A SIGNIFICANT SPIKE IN CARGO THEFTS

In April alone, the Associations […] recorded as a series of seven-figure losses, including thefts of two million face masks in Spain, sports equipment in the United Kingdom and mobile phones in Kenya.

- What measures need to be taken to guarantee **safe & secure** transport?
- How to ensure vaccines can't be **tampered** with?

Required accessories

Without Vials and Needles, a Virus Vaccine Is Just a Formula

"When a vaccine is finally approved for manufacture, the rush to stock up on ancillary products will be unprecedented. […] Manufacturers of vaccine ancillaries, accustomed to sedate and reliable cycles of demand, will have to meet a near-instantaneous clamor for their products"

- Will **medical equipment** (e.g. vials, syringes, needles) be transported by air?
- Will **raw materials** for vaccines and accessories require air capacity?
- Will **dry ice** limitations be a bottleneck to transport the vaccine in bulk?

Source: Seabury

Dry Ice the need and limitations

- The ultra frozen vaccine can require up to 276kg of dry ice per pallet. Currently the acceptable amounts of dry ice per flight can range from 1000kg to 15000 kg dependent on the aircraft type.
- The number of pallets per flight can be as little as 4 pallets for the lower rated aircraft. These ranges will ultimately limit the amount of vaccines that can be transported to certain areas creating a greater gap in the supply and demand for capacity.
- Training will also be required for the handling of dry ice as is the requirement for any dangerous goods materials.

DHL Life Sciences & Healthcare: combining forces during the global crisis

Where you need us **globally**

A network strategically positioned and developed where our customers and their partners need us

- **Industry leading capabilities and network** for Air and Ocean Freight in **> 150 countries worldwide**
- **Global network of Life Sciences certified stations represented in > 40 countries across all continents**
- **DHL Regional Hubs** in Panama, Istanbul, Dubai and Singapore providing market access to next tier growth markets globally

… at the **right** LS&H **quality and service level**

A wide range of services that consistently meet the highest quality standards in the industry

- Market leading **Life Sciences qualified Air and Ocean Freight capabilities**
  - DHL Air & Ocean Thermonet
  - LS Freighter
  - Ocean Secure
  - ‘White glove’: LifeConEx
  - ‘Time critical’: DHL Same Day
- **115+ DHL Air Thermonet** Life Sciences certified stations
- **Global quality organization and global, GxP level, auditable quality standards** (temperature management/cold chain)

… **allowing you to focus** on your core

A Global Expert Community dedicated to serving our customers with industry competence

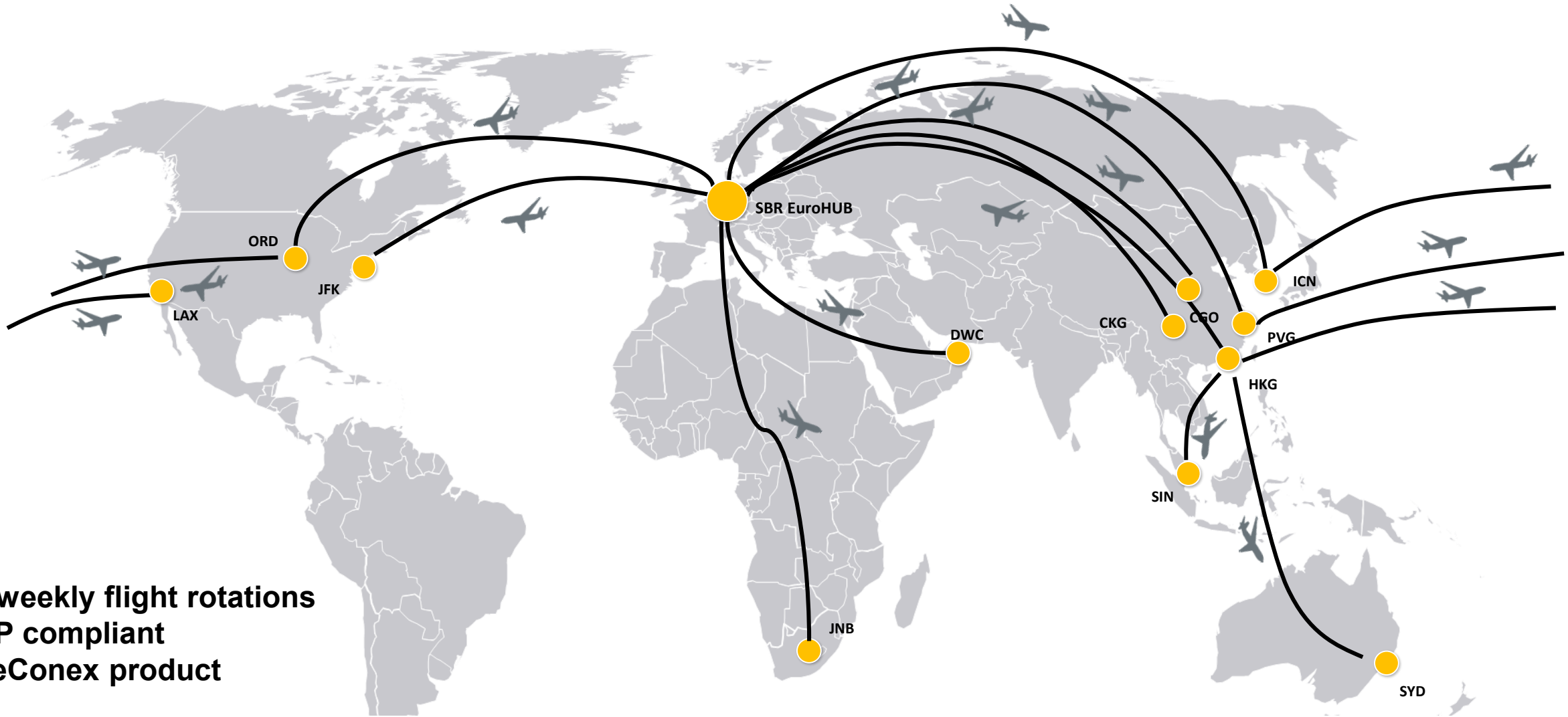
- Proven excellence for **business processes/data management services** complementing logistics services
  - Control tower and lead logistics services
  - Customs brokerage services
- Value added services around cold chain, e.g., **procurement, management and conditioning** of packaging materials, gel packs, ULDs and reefers

… **extending your brand’s reach** to your customers

Wide range of services consistently meeting the highest performance standards

- Providing and managing Road Freight services to your customers’ door complementing air and Ocean Freight
- Providing time-critical, door-to-door transport services for medical shipments with **DHL Same Day**
- Further ‘last mile’ services available via other divisions in DHL

Global Star broker Flight Network



41 weekly flight rotations
GxP compliant
LifeConex product

Current network valid until Dec. 15th 2020

Deutsche Post DHL has globally leading capabilities in logistics for life science and healthcare goods...

CAPABILITIES DELIVERING HEALTHCARE TO THE WORLD

AIR THERMONET

118 life sciences–certified air freight stations (IATA CEIV)

OCEAN THERMONET

30+ certified reefer competence center for ocean freight

GDP COMPLIANCE - VISIBILITY - ANALYTICS

- ➔ Customer specific operational procedures & GDP compliant SOPs
- ➔ Global validated life sciences dedicated IT platform (LifeTrack)
- ➔ Trade lane risk assessment & data analytics

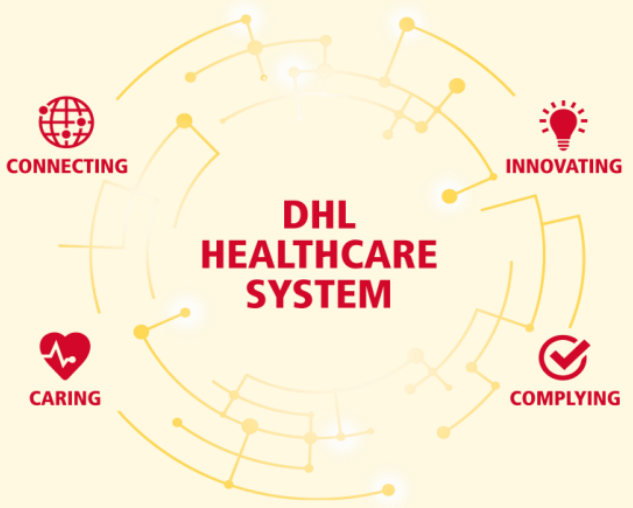
170+
GDP-qualified warehouses in 43 countries

23
clinical trials depots serving 80 countries

90
countries served via **Medical Express**

250
pharmacists in our warehouses

TEMPERATURE
15-25°C
2-8°C
up to **-196 °C**



A more connected experience for customers **along the entire patient journey** from clinical trials to the point of care and everything in between delivered by **9.000+ dedicated Life Sciences & Healthcare Specialists**

THANK YOU

Opportunities in a Time of Crisis

Kirsten de Bruijn
Senior Vice President,
Cargo Sales and Network Planning
Qatar Airways Cargo

QATAR AIRWAYS القطرية | CARGO

Opportunities in a Time of Crisis

Kirsten de Bruijn

Senior Vice President Cargo Sales & Network Planning

Tuesday, 24 November 2020

LESSONS LEARNT

- Manpower & Decision Making
- Partners
- Aircraft type & Aircraft Capacity
- Product Strategy

Moved by people

QATAR AIRWAYS القطرية | CARGO

WE QARE

Concrete air cargo actions, creating a positive impact

Built on four fundamental pillars of sustainability:
Economy, Environment, Society and Culture

We not only remain focused on business. Care is reflected in everything we do.
The We Qare project was triggered by the crisis caused due to the COVID-19 pandemic

‘1 Million Kilos’ – The First Chapter, where charities use the services of Qatar Airways Cargo to transport humanitarian aid and medical supplies all over the world*, free of charge

**until the end of December 2020*

QATAR AIRWAYS القطرية | CARGO

THANK YOU

Operational and Infrastructure Challenges

Rupert Batstone
Vice President Business Support
Swissport

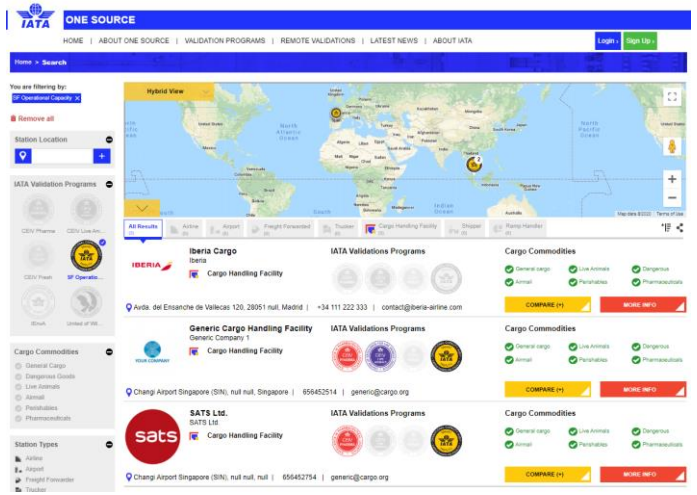
Swissport Interview

- Introduction
- Capabilities & Infrastructure
- Operations
- Collaboration and partnership
- Opportunities
- Expectations

Industry Call To Action

- **Sharing information - Global Collaboration**
  - "*Continuous improvement is better than delayed perfection*" quote from Mark Twain
  - Edition 1 accessible on iata.org/cargo
    Stay tuned for Edition 2

- **Capabilities & infrastructure industry platform – ONE Source**
  - Visibility and demonstrated competencies
  - Showcase adherence to quality standards



Additional Outreach & Resources

THREE-PART WEBINAR SERIES : TRANSPORT OF VACCINES AND LIFE SCIENCE PRODUCTS BY AIR CARGO

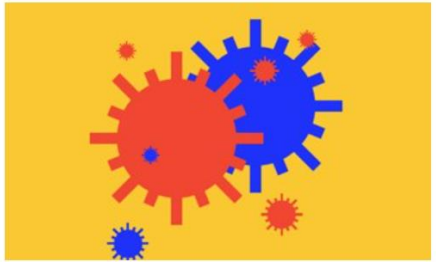
Webinar 1: Readiness for vaccine and life science products transportation - 21 October 2020

Webinar 2: Global distribution and the flow of vaccines throughout the supply chain - 24 November 2020

Webinar 3: Key learnings in the aftermath of the vaccine distribution effort and paving the way for the future - 2021

VISIT iata.org/events/webinars/

Action Cargo: COVID-19



Enabling global trade

Airlines transport over 52 million metric tons of goods a year, representing more than 35% of global trade by value but less than 1% of world trade by volume. That is equivalent to $6.8 trillion worth of goods annually, or $18.6 billion worth of goods every day. Find out more interesting air cargo facts (pdf)

VISIT iata.org/cargo

Transportation of COVID-19 Vaccine

Air cargo plays a key role in the distribution of vaccines through well-established temperature-sensitive distribution systems, using cutting-edge technology and procedures.

This capability will prove crucial to the quick and efficient transport of COVID-19 vaccines once available. This will naturally require careful planning by every segment in the entire cargo supply chain to ensure full preparedness when vaccines for COVID-19 are approved and ready for distribution.

Supporting the industry

IATA offers solutions and services to support cold chain capacity and resources for the anticipated scale of transporting and distributing COVID-19 vaccines.

CERTIFICATION | PUBLICATION | TRAINING | WEBINARS | ONESOURCE | CONTACT US

VISIT iata.org/vaccine-transport

Thank you

- Please visit **iata.org/vaccine-transport** to register for the upcoming webinars
- Please visit **iata.org/cargo** for all COVID-19 resources

For further information, contact us at **cargo@iata.org**