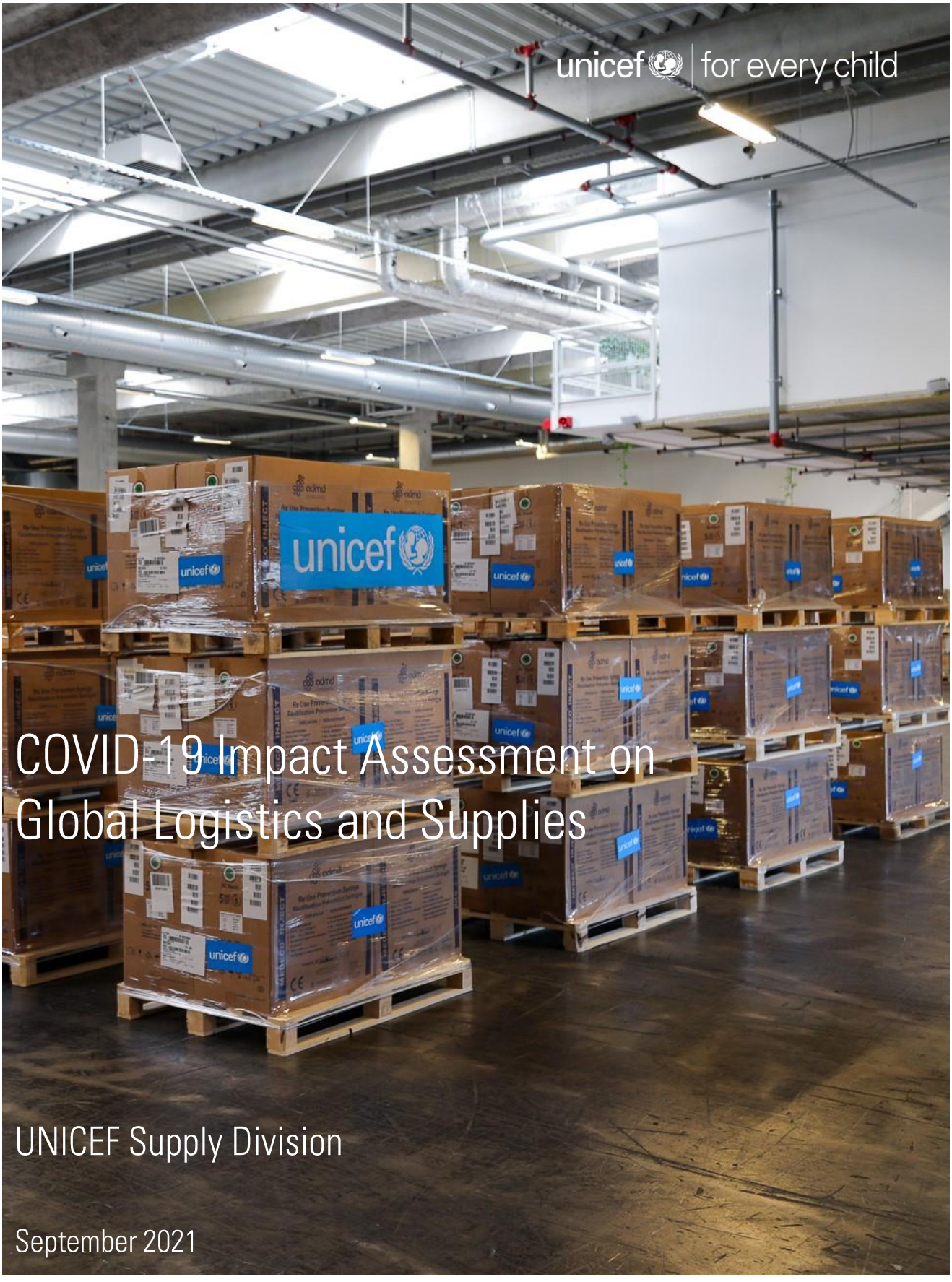

COVID-19 Impact Assessment on Global Logistics and Supplies

UNICEF Supply Division

September 2021

unicef | for every child

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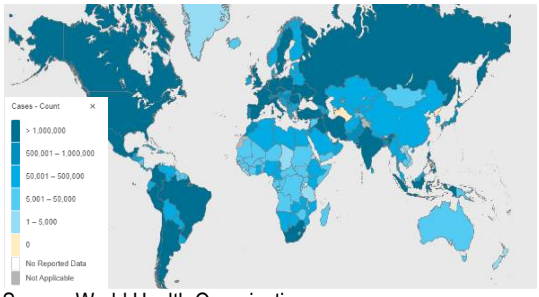
1. Summary

- *The long-term logistical consequences of the COVID-19 pandemic are continuing to have a negative impact on the shipping industry, with unprecedented major challenges to the delivery of critical supplies, including health technology, medicines, water, sanitation, and hygiene supplies to country programmes. Current shipping capacity is extremely tight, with sea carriers preferring to position as many available containers and equipment as possible on the more highly profitable sea lanes between Asia-Europe and Asia-USA. Vessel cancelations continue, with no commitments being made on transit times due to congestion at transhipment hubs. Given tight container fleets, compounded by the shift in trade imbalances, some analysts do not anticipate the normalization of shipping capacity to be resolved over the next 6-12 months.*
- *Shipping container leasing rates have increased by as much as +300 and higher over the past six months period, coupled with global price increases of many commodities and raw materials, which have direct inflationary pressure on many of the finished products UNICEF procures through its suppliers.*
- *As a consequence, following the increased congestion of sea freight carrying capacity at major ports, UNICEF has been observing an increased demand on air freight over the latter part of 2021.*
- *In order to mitigate the impact of reduced shipping capacity, UNICEF is applying a flexible and agile strategy to overcome some of the difficulties, while it continues to identify alternative solutions.*
- *UNICEF encourages programmes, countries, and partners to plan their procurement as early as possible and to coordinate and include UNICEF Copenhagen in any discussions in order to improve supply delivery.*

2. Background

UNICEF provides an overview of the current and anticipated near term impact COVID-19 is having on UNICEF's supply chains for country programmes. The focus is on logistics and key markets for strategic essential supplies for women, children and young people that make up the majority of UNICEF's procurement 'footprint' (by procurement value and volume). Accordingly, it covers health related products, notably *non-COVID-19* vaccines, safe injection equipment (SIE), cold chain equipment (CCE), medicines, nutrition, mosquito nets, education supplies, as well as products related to water and sanitation. UNICEF issues separate updates on COVID-19 specific supplies and maintains a COVID-19 Vaccine Market Dashboard as a public resource for the latest information on the world's COVID-19 vaccine market.

Figure 1 Current Global Spread of COVID-19 Cases



Source: World Health Organization

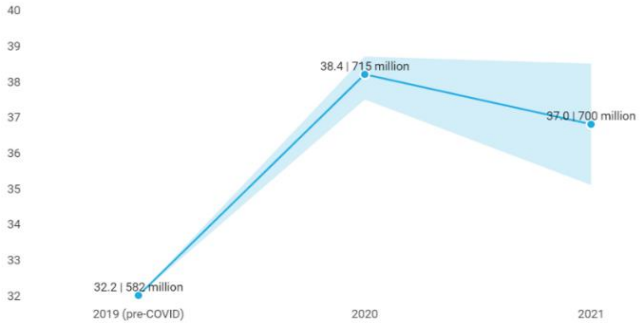
As of September 2021 the total number of confirmed COVID-19 cases globally has surpassed 230 million affecting virtually all countries, regions, and territories (Figure 1). Just five countries, the United States (US), India, Brazil, The United Kingdom, and Russia account for nearly 50 per cent of all confirmed cases since the onset of the pandemic, with over 4,7 million COVID-19-related deaths having been reported globally. The World Health Organization (WHO) publishes the latest epidemiological updates accessible here.[1]

A report issued by WHO, on behalf of the Independent Accountability Panel (IAP) for Every Woman, Every Child, Every Adolescent presents a very grim picture of the effects the COVID-19 pandemic is having on the status of women, children and adolescent health. The progress made to date in reaching women, children, and adolescent health targets under the sustainable development goals (SDGs) by 2030 were already behind target before the outbreak of COVID-19. However, the pandemic has reversed many of the gains made, as countries have coped with the pandemic by diverting already limited

[1] World Health Organization, *Coronavirus Disease (COVID-19) Pandemic*, WHO, Geneva, August 2021.

resources from essential services.[2] The report notes that the pandemic has exposed a lack of preparedness and poor decision-making that could have been largely avoided through genuine accountability.[3]

Figure 2 Prevalence and Number of Children Living in Monetary-poor Households, 2019-2021 (projected)



Source: UNICEF

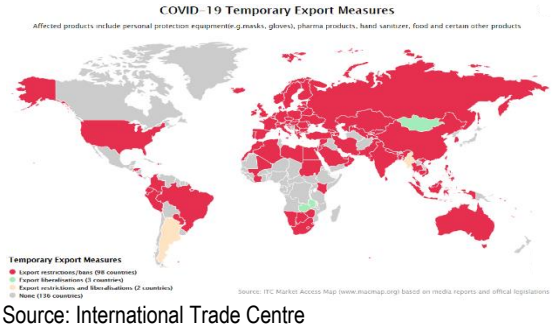
The harmful effects of COVID-19 will not be evenly distributed and will be felt most by those children living in the poorest countries. As families lose their sources of income and fall into poverty, it will undermine their access to social protection. UNICEF estimates the pandemic could push 142 million more children into poverty and poorer households in developing countries. The total number of children living in poor households globally could reach up to 725 million in the absence of any mitigating policies, of which nearly two-thirds live in sub-Saharan Africa and South Asia (Figure 2).[4]

Even though Africa is the region that has been less affected by the pandemic, and currently only has an estimated 2.6 per cent (6 million cases) of the 230 million cases globally reported,[5] this situation could rapidly change. Africa has been heavily affected, especially by the consequences of airline restrictions, notably inter-regional logistics travel inside Africa. This is in addition to the social and economic consequences as a result of mitigation measures. Routes to the African continent have been particularly impacted, although some airlines have resumed partial services.

Africa has a limited capacity to cope with the shock, and WHO has warned that Africa, home to 1.3 billion people, could be the next epicentre of the pandemic, as it faces a severe shortage of tests, personnel, oxygen supplies, and vaccines. As of August 2021, an estimated 4.5 billion COVID-19 vaccine doses have been delivered worldwide to over 205 countries/territories. Of these, an estimated 45.7 per cent have been delivered to East Asia and the Pacific; 19.2 per cent to the Americas, 18.3 per cent to Europe and Central Asia; and 12.6 per cent to South Asia;. However, only 3 per cent have been delivered to the Middle East and North Africa, and 1.2 per cent to sub-Saharan Africa.[6] Whereas Africa has responded rapidly to contain the pandemic, the delivery of vaccines highlights the inequity in access to COVID-19 products.

3. Key Global Trade, Shipping, and Logistics Challenges

Figure 3 COVID-19 Temporary Export Measures September 2021



Source: International Trade Centre

The International Trade Centre (ITC)[7] tracks all COVID-19 **temporary trade measures** enacted by government authorities in relation to the COVID-19 pandemic globally (Figure 3).[8] It seeks to improve the transparency in international trade and market access. Many of the temporary trade measures applied by countries seek to regulate or restrict the export of vital medical supplies and other essential products. The extraordinary situation, in which some regions are seeing third and fourth waves, if not more in some instances, can be subject to rapid change and development.

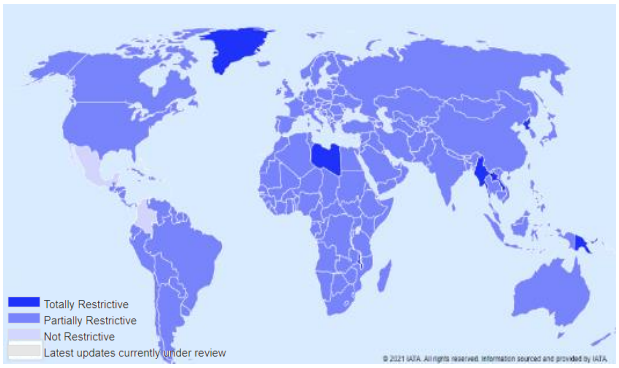
[2] The Independent Accountability Panel for Every Woman, Every Child, Every Adolescent, *The Health of Women, Children, and Adolescents is at the Heart of Transforming our World: Empowering Accountability*, IAP, Geneva, March 2021, p. v.
[3] Ibid.
[4] UNICEF, *COVID-19 and Children, Pushing More Households into Poverty*, UNICEF, Copenhagen, August 2021.
[5] *Coronavirus Disease (COVID-19) Pandemic*, WHO.
[6] UNICEF, *COVID-19 Vaccine Market Dashboard*, UNICEF, Copenhagen, August 2021.
[7] The International Trade Centre (ITC) is a multilateral agency that has a joint mandate with the World Trade Organization (WTO) and the United Nations (UN) through the United Nations Conference on Trade and Development (UNCTD).
[8] International Trade Centre, *Tracking of COVID-19 Temporary Trade Measures*, ITC, Geneva, September 2021.

The ITC also provides a section with status updates on measures taken by countries. Even though many countries are gradually lifting temporary trade measures, some countries are nevertheless still imposing strict export regulations and custom clearances for medical products related to COVID-19.

3.1 Air Freight

Air travel restrictions, notably the disruptions to airfreight that had interrupted and delayed the supply of essential health products to many countries during 2020, were progressively lifted. Air freight capacity has not resumed to pre-COVID-19 levels, because most air freight was shipped using the bellyhold capacity of passenger aircraft, and not dedicated freighters. The situation related to passenger travel is not yet back to normal and many measures remain partially restrictive (Figure 4).[9]

Figure 4 COVID-19 Travel Regulations Map September 2021



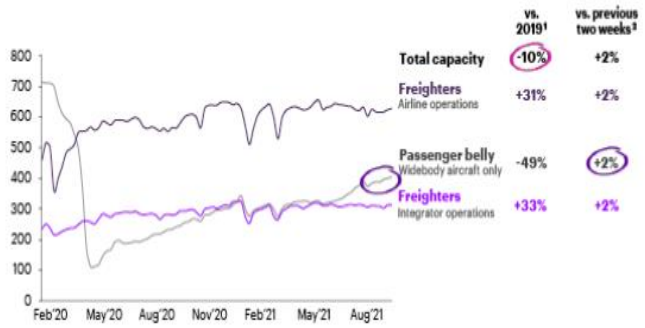
Source: IATA

While industry forecasts predict a slow recovery, there is no indication as to when the situation facing the airline industry will return to pre-COVID-19 levels. Analysts advise that the actual impact on air travel will depend on the duration and magnitude of the current pandemic; the effectiveness of containment measures; the degree of consumer confidence for air travel; as well as, and not least, future ensuing economic conditions. The International Civil Aviation Organization (ICAO) provides a regular updated detailed breakdown of the effects of COVID-19 on civil aviation, its economic impact analysis, and outlook scenarios.[10]

The latest indications received by UNICEF are that

- *India: is slowly recovering from having had operational activities severely affected and is moving towards a situation of having some disruptions or towards normalisation.*
- *China: Reports of new COVID-19 strain is having an effect, in which the impact is currently unknown, but warnings are circulating, and China undertaking partial lockdown measures.*

Figure 5 International Air Cargo Capacity - Feb 2020 - Sep 2021 - Thousand Tonnes per Week



Source: Accenture

Even though globally widebody belly capacity seems to have increased steadily since the pandemic, and freighter operations have remained stable, overall capacity is still 10 per cent less than pre-COVID-19 levels.[11] However, the industry is still vulnerable to disruption. PVG Shanghai air cargo capacity in China has dropped approximately 30 per cent in the last five weeks due to handling manpower constraints due to increasing number COVID-19 cases and partial lock down measures.

At the onset of the pandemic, the air transport industry ground to a halt, globally, due to border closures and travel restrictions. As flights slowly restarted operations during mid-2020, **the rates** being charged to carry air cargo increased two-, or in some instances three-fold, and higher, than pre-COVID-19 levels. During the last quarter of 2020, air carriers began to operate

[9] International Air Transport Association, *COVID-19 Travel Regulations Map*, IATA, Montreal, September 2021.
[10] The International Civil Aviation Organization, *Effects of Novel Coronavirus (COVID-19) on Civil Aviation: Economic Impact Analysis*, ICAO, Montreal, 22 September 2021.
[11] Accenture, *COVID-19: Impact on Air Cargo Capacity*, Accenture, Copenhagen, September 2021.

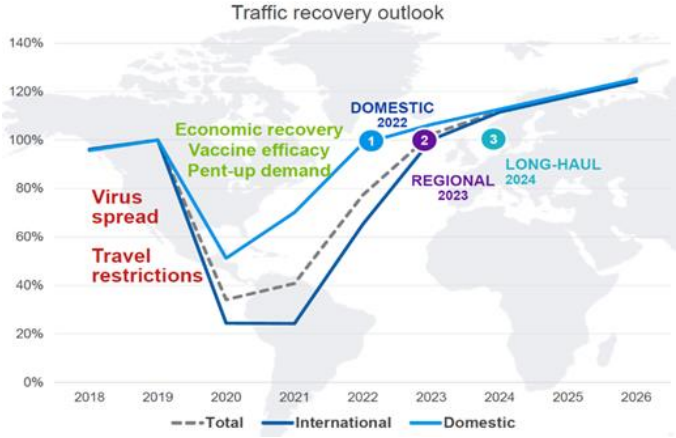
more frequently, even though most did not return to regular flight schedules. They operated when their aircrafts could be filled with enough passengers and cargo to ensure flights provided an economic return. The high rates they charged reflected the costs to cover their return flights empty from destinations that offered little or no return passenger or cargo traffic.

Pre-COVID-19, most air freight carriers offered UNICEF fixed rates that covered the summer period (1st April-30th September) and the winter period (1st October-30th March). During 2020, and for the first quarter of 2021, carriers were not prepared to commit to issuing fixed rates, or rates with any long validity periods.

Over the summer period 2021, a limited number of carriers issued rates for a few routes, and a few routes were covered by more than one carrier. Some carriers also issued rates having a two- and three-month validity. UNICEF is currently waiting to receive updates from carriers on any revised validity or possible rate fluctuations. Some transport industry observers are quietly optimistic that carriers currently offering fixed rates will maintain their rates and extend them through the autumn. However, UNICEF has recently seen instances in which carriers have increased their rates considerably due to current increased shipping constraints, combined with the increasing surge in the higher demand for air freight (as there is a shift reversal from sea freight back to air freight).

Whilst carriers may offer fixed rates to UNICEF, if cargo space is limited, UNICEF can be forced to pay premium rates to secure space.

Figure 6 Air Traffic Recovery Outlook



Source: KN

In terms of forecast, as European and international borders increasingly reopen and cross-border travel increases, UNICEF anticipates the market will increasingly stabilize as more flights open and re-schedule their operations. Carriers experienced an unprecedented severe economic impact during 2020, from which the recovery process will be slow and cautious. UNICEF expects that there will be a return to fixed pricing with longer validity periods, which will likely start with routes having full or near-full secured capacity. UNICEF does not project the air freight industry to return to pre-COVID-19 services and pricing levels likely before 2023-24.

Even though the domestic flight sector will most likely be the first to recover, which will not have a significant impact on UNICEF operations, UNICEF considers the recovery in other sectors, such as regional and long-haul flight will likely be driven by the introduction of new factors, such as a change in type of aircraft, freighter service loop planning, use of hub models, amongst others.

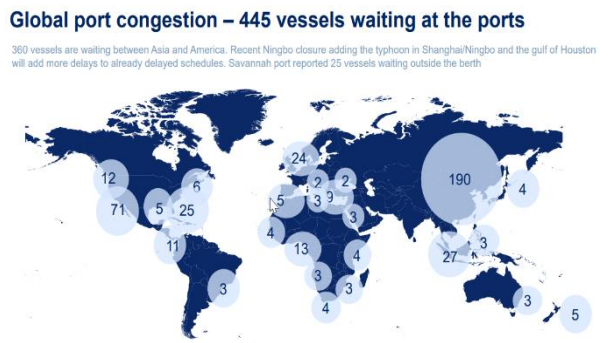
3.2 Sea Freight

In terms of **global seafreight**, the earlier and sudden impact of reducing international air freight capacity at a global level in 2020 saw many transport companies (shippers) shift their mode of transport from air freight to sea freight. They sought to use the container shipping capacity as an alternative means in an attempt to cover the drop and disparity in air freight capacity.

Even though the shipping industry was relatively stable, with some impact on freight capacity and shipping rates, and therefore on UNICEF operations, since the end of 2020 and over the latter part of 2021, UNICEF has observed a trend reversal as a consequence of the increasingly large congestion build-up of sea freight carrying capacity at major ports. To be specific, in August, there were 409 container vessels loaded with 2,732,133 20ft containers anchored off some of the world's largest container ports filled with goods for retail and industry waiting in line to be unloaded.[12] In September, this increased to 445 container vessels (Figure 7 - next page).[13] So, besides the impact on the sea freight industry, this shift back to air freight, could have an increasing impact on air freight industry capacity.

[12] ShippingWatch, *2.7 Million Containers Queued Off The World's Ports*, ShippingWatch, Copenhagen, August 2021.
[13] DSV, *DSV Market Update*, DSV, Hedehusene, 20 September 2021.

Figure 7 Global Port Sea Freight Congestion



A critical global shortage of shipping containers, as a consequence of the economic impact of COVID-19 containment measures, coupled with a general downsizing of shipping capacity and equipment, has heavily affected sea freight operations. This in turn, has severely affected UNICEF's supply operations and those of its contracted freight forwarders, and the ability to organize the timely shipment and delivery of essential supplies to country programmes.

Source. DSV

UNICEF's (UN) direct agreements with key ocean carriers remains unchanged, but it has proven difficult for these carriers to allocate UNICEF enough space and equipment to ensure that supplies are timely dispatched from their port of origin. And this remains a core problem, not only for UNICEF, but for all UN organizations, aid programmes, and global trade. It affects shipping globally. As a consequence, the cost of shipping has increased dramatically, especially from the Far East Asia, by an order of magnitude of +300 percent, and higher, compared to pre-COVID-19 pandemic.

Note: The cost to rent a container vessel carrying 8,500 20ft equivalent units (TEU) has increased USD 15,000 a day in July 2020 to reach USD 115,000 USD a day, currently

- Equipment shortages (containers), which are a direct result of border closures, compounded by the difficulty of carriers to return and collect empty containers, combined with the current challenges of trying to secure constrained space availability on ships, are no longer the only factors affecting sea freight.
- Whereas the delays in unloading ships, and the ability to return equipment due to port closures were major issues, carriers are now having to return empty ships across sea lanes just to collect empty containers, and ship these empty containers back to their ports of origin, just to meet equipment shortages at these ports of origin. In other words, trade has been largely one directional. Containers have been shipped one way, and not returning.
- Blank sailings and the loss of capacity has cost carriers heavily,[14] and which are costs that are being passed on to shippers.
- The current congestion is no longer limited due to port closures. The congestion has been occurring in many key European ports due to the increase and ongoing arrival of vessels. The waiting time to enter many ports now extends in some cases by up to 2-3 weeks. European ports are now heavily affected. It has been widely reported that ocean carrier vessels arriving from Asia are being delayed at port entry by up to 20 days or more.
- Recent reports received by UNICEF, as an example, indicate that Maersk and MSC are extending the deletion of their call on Hamburg by a further four weeks, solely due to the high yard density and the exceptional waiting times for their vessels.
- Many carriers are not calling in at congested ports without having the certainty of when they could return. This differs from one carrier to another, depending on the continued congestion and scheduled routes.
- The current situation is so fluid and volatile that updates and changes are being reported on a daily basis.

Note: Once at port, some suppliers are using the containers they lease as an alternative means of storage for extended periods of time due to congested access to warehousing and services. This practice ties up a significant share of containers held at seaports globally.

The current shipping capacity varies across geographical regions, with sea carriers preferring to position as many available containers and equipment as possible on the more highly profitable sea lanes between Asia-Europe and Asia-USA. As such:

[14] Blank sailing programmes are when vessels skip one or more ports along a planned route or cancel the entire voyage. They have been implemented by almost all carriers to and from China due to the reduction in available export volumes.

- There continues to be vessel cancellations and omitting[15] with short or without prior notice.
- There are no commitments made on transit times due to congestion at transhipment hubs.
- The high level of bookings from China is reducing India's capacity on connected services.
- The limited access to available containers is also driving up the purchase price of new containers. Manufacturers know that the demand is high, and supply is limited, so the price is now at a premium. One Chinese container manufacturer that currently dominates the market has increased the cost of a new container from USD 1,500 to now USD 3,500, representing an increase of 133 per cent.
- Similarly, shipping container leasing rates have also significantly increased, and continue to do so, over the past six months period.
- Inventory levels in Europe and the US remain at their lowest levels on record, leading to stock outs on some products. This means even once retail demand declines, Mærsk anticipates cargo volumes to continue to remain strong as inventory levels need to be rebuilt.

3.3 The risk to COVAX deliveries is limited

UNICEF procures and delivers COVID-19 vaccines on behalf of the COVAX Facility. It managed to reach agreements with major carriers to prioritize the booking of all COVID-19 / COVAX related supplies, to ensure that the delivery of safe COVID-19 vaccines and personal protection equipment (PPE) go as planned. COVAX activities are at present not affected by any of the constraints currently affecting air or sea freight. However, while the delivery of emergency supplies like vaccines, diagnostics, therapeutics, and PPE have been made possible by use of commercial airliners, the shipments of other supplies, i.e. education, water, sanitation, and hygiene products have been challenged by the disruptions to global shipping.

3.4 Impact mitigation

UNICEF recognizes that the current situation requires extremely creative and critical thinking to mitigate and circumvent the impact the current global shipping constraints is having on the delivery of essential supplies to country offices, and the inherent risks to programmes. As a result, UNICEF has adopted an interim strategy with service providers to overcome some of these obstacles while looking for alternative solutions.

One of the measures is to adopt greater flexibility. Under normal circumstances, UNICEF's freight forwarders are required to only work with the major ocean carriers with which UNICEF has existing agreements. In markets like Asia and South-East Asia, where current capacity is extremely low, UNICEF has allowed freight forwarders to work with smaller local carriers, when none of the ranked UN carriers have available equipment, and where these smaller carriers have space available at the time cargo is ready. UNICEF also allows freight forwarders to use 20ft containers, as opposed to a previous requirement of only using 40ft containers, notwithstanding that smaller containers increase handling, shipping, and port fee costs, amongst others. These measures have improved and expanded UNICEF's access to the available pool of containers.

UNICEF's agile approach has yielded results. During the first quarter of 2021, through its global freight forwarding arrangements, UNICEF shipped more than 4,500 TEUs, compared to an average of 3,500 TEUs for the same period over the past three years. In addition, UNICEF shipped more than USD 34 million worth of PPE supplies out of its warehouse in Shanghai during the first quarter 2021, clearing most of the backlog caused by the recent disruption in sea freight.

Going forward, UNICEF and its partners will continue to look for additional, alternative, longer-term, stable, reliable, and flexible solutions. These current challenges are only temporary and will last until such time as the market recovers from the effects of the recent COVID-19 lock down measures.

[15] Vessel omitting is an industry term that means a container did not make it onto the vessel. Not having container loaded onto a ship can occur due to customs issues, overbooking, or vessel omissions. Normally a carrier will reschedule a shipment and place it on the next departing ship.

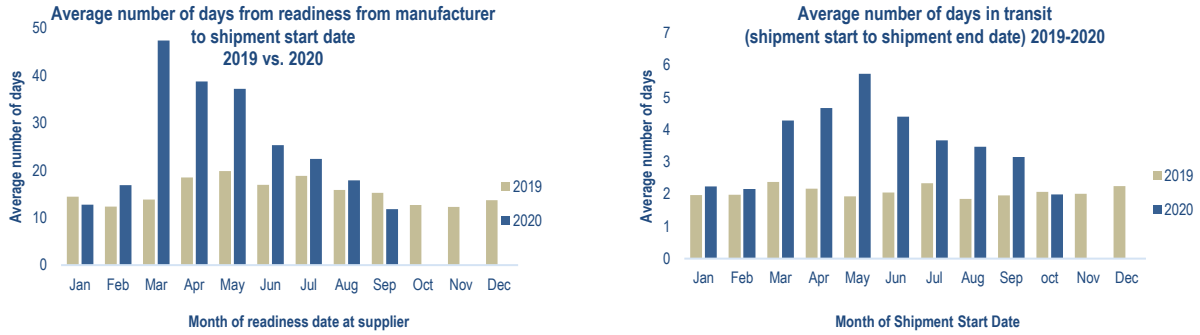
In December 2020, UNICEF and the World Economic Forum (WEF) signed an industry-led Charter,[16] with 18 leading transport and logistics companies to support the equitable and safe distribution of COVID-19 related supplies, under the auspices of WEF's supply chain and transport Industry Action Group (IAG). To date, several signatories of the charter have stepped forward offering solutions to mitigate the effect of global supply system disruptions, including CMA-CGM, Dubai Ports World (DP World), Mærsk, the Port of Antwerp, and UPS, amongst others.

In partnership with the International Air Transport Association (IATA), UNICEF engaged the world's airlines to support the distribution of COVID-19 related supplies, with a particular focus on time-sensitive delivery of vaccines.[17] UNICEF launched the Humanitarian Airfreight Initiative,[18] bringing together airlines covering routes to over 100 countries. These airlines agreed to prioritize shipments of vaccines and other life-saving supplies, as well as taking measures such as temperature control and security, and adding freight capacity to routes where needed. Their support has been and continues to be critical to the timely and secure delivery of vaccines and other COVID-19 supplies.

4. Non-COVID-19 Vaccines

Recalling that nearly all vaccine shipments are shipped by air given their cold chain requirements, even though many vaccine shipments were initially affected in 2020 by national lockdown measures and the grounding of airlines worldwide, the vaccine shipments have since recovered well during 2020 (Figure 8). Vaccines are mostly shipped using the belly hold capacity of passenger planes, which led to a significant drop in vaccine shipments. Many freight forwarders scrambled to secure dedicated cargo planes, of which there are a lot fewer than passenger planes. At the same time, some passenger airlines refurbished and repurposed some of their passenger planes to accommodate cargo, thereby increasing airfreight capacity.

Figure 8 UNICEF Vaccine Deliveries Comparison 2019-2020



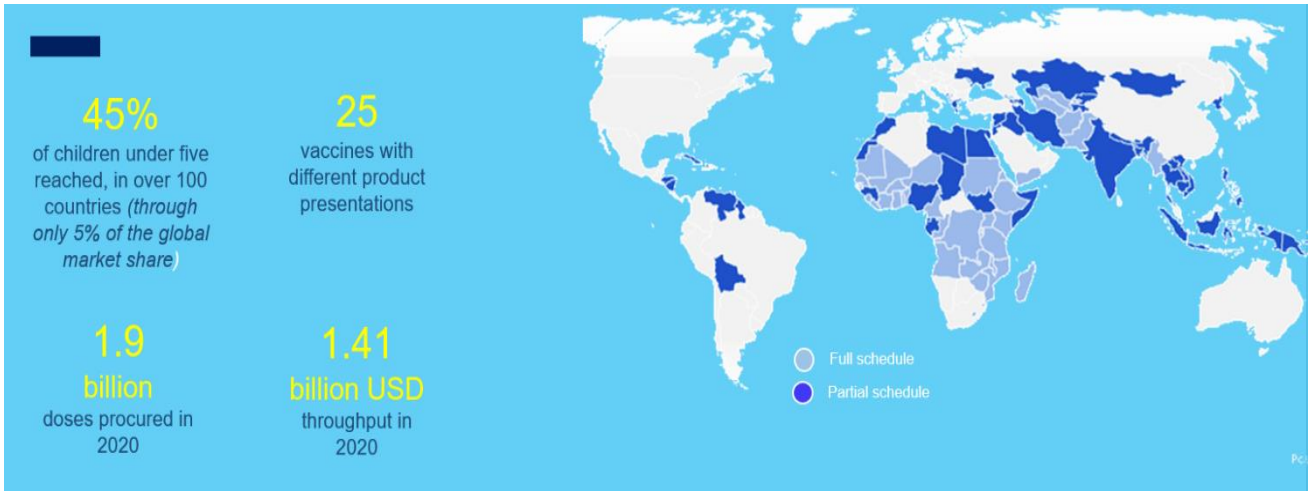
Source: UNICEF Supply Division

For 2020, in terms of volume supplied through UNICEF, which represents approximately 44 per cent of all the vaccines shipped worldwide, all routine vaccines forecasted demands were fully materialized, some with even a 5-15 per cent increase. Some notable issues to call out refer to:

- **Pentavalent (DTwP-HepB-Hib) vaccines:** Whereas all country demand for this vaccine was met with an incremental increase (+3%), there were some supply interruptions from two manufacturers during the year that were non-COVID-19 related. There were some challenges, notably delays in the provision of funds for co-financing requirements and self-financing countries, as well as for additional freight costs.
- **Bacillus Calmette-Guérin (BCG) Vaccine:** The overall demand for this vaccine was stable and all country demand was met with increase (+10%) against initial forecasts.
- **Measles containing vaccine (MCV):** After an initial decrease in routine immunization activities with this vaccine, and the postponement of campaigns at the onset of the COVID-19 pandemic due to lockdown measures and the cancelation of supplementary immunization activities (SIAs), most countries that procured through UNICEF reinstated their campaigns and started to resume their routine services.

[16] UNICEF, The World Economic Forum, *World Economic Forum Supply Chain and Transport Industry Charter in Support of UNICEF and COVAX Vaccine Distribution*, The World Economic Forum, December 2020.
[17] International Air Transport Association, *The Time to Prepare for COVID-19 Vaccine Transport is Now*, IATA, Montreal, September 2020.
[18] UNICEF, *The UNICEF Humanitarian Airfreight Initiative*, UNICEF, Copenhagen, February 2021.

- **Yellow fever vaccines (YFV):** UNICEF encountered substantial delays in the implementation of reactive campaigns to outbreaks using this vaccine, due to countries shifting the timing of large preventive mass vaccination campaigns, although some were implemented during 2020.
- **Oral cholera vaccine (OCV):** Since the onset of the Covid-19 pandemic, the demand for this vaccine for both outbreak response and preventive campaign activities declined. The demand forecast during 2020 was down to only 8.5 million doses compared to an initial 30 million doses (i.e. -70%). This was due to challenges countries had to determine their demand forecasts for preventive campaign activities. UNICEF anticipates this situation will likely continue throughout the duration of the COVID-19 pandemic.
- **Bivalent oral polio vaccine (bOPV):** The cancelation of polio campaigns and reduced country demand for this vaccine due to the uncertainties regarding any restart, resulted in the actual levels of vaccine demand being well below their initially forecasted levels (-34%).
- **Inactivated polio vaccines (IPV):** On the other hand, the demand for this vaccine was stable and the supply for routine immunization increased by 11 per cent against its initial country forecasts. This was due mainly to a number of increased approvals for routine immunization, and the early draw down on the requirements for 2021, due to insufficient allocation during 2020.



So far for 2021

In terms of an impact on supply, the overall level of routine procurement has been back to normal levels in 2021 and there has not been any major challenges with regards to sourcing supply so far this year, with the exception of some delays with a small number of Indian suppliers. These issues relate to human resource issues and the release of products by the national regulatory authorities (NRA) on account of prioritising COVID-19 vaccines.

However, despite the progress being made to date, when compared to the situation in 2020, more than one third of respondent countries (37 per cent) of countries still report to be experiencing some level of disruption to their routine immunization services.19 Mass immunization campaigns are also still being disrupted. According to new data, 60 lifesaving campaigns have been postponed in 50 countries, which is putting approximately 228 million people - mostly children - at risk of highly infectious diseases such as measles, polio, and yellow fever. Over half of the 50 affected countries are in Africa, highlighting yet further the protracted inequity communities in Africa face in getting access to critical immunization services. Vaccines are a wide and complex portfolio. A few vaccines to highlight and call out relate to:

- **Tetanus-diphtheria (Td) vaccines:** One Indian manufacturer cancelled all their existing supply UNICEF awarded for 2021, as they needed to reallocate their production line and resources for the freight forwarding of COVID-19 vaccines necessary to meet the domestic needs in India. The manufacturer will revisit their situation during the 4th quarter in 2021 for 2022.

[19] World Health Organization, *COVID-19 Continues to Disrupt Essential Health Services in 90% of Countries*, WHO, Geneva, 23 April 2021.

- **Monovalent oral polio vaccine 2 (mOPV2), novel OPV2 (nOPV2), and trivalent OPV (tOPV):** Whereas there were no issues affecting the supply of these vaccines reported during 2020, there has since been an impact on the capacity of suppliers to fill and finish some of these products for UNICEF, notably for **nOPV2** and **tOPV** for polio outbreak response. This is due to a reduction in production facility workforce and the need for suppliers to supply COVID-19 vaccines to meet domestic needs. UNICEF anticipates that there will be a 2-3 months delay in availability. One manufacturer is no-longer able to honour their contractual obligations to UNICEF to have vaccines ready for shipment within an agreed 72 hours for outbreak response. The manufacturer requires at least 7 days to prepare orders for any outbreak response shipments.
- **nOPV and IPV:** The supply of these vaccines is also starting to experience longer lead times for batch releases due to the constrained capacity of NRA. For now, this has only been extended by a couple of weeks, but the impact could increase further as more COVID-19 vaccines require NRA reviews.
- **Pneumococcal conjugate vaccine (PCV):** One manufacturer has reported to have a reduced capacity due to their COVID-19 production and having competing resource allocations between the production of their **PCV** and COVID-19 vaccine. The manufacturer is recruiting additional labour to backfill their **PCV** team, which is currently supporting the production of their COVID-19 vaccine. The manufacturer will take 4 months to hire new staff and ensure their training. The manufacturer expects there to be a shortage of supplies during the in months of June-August should they not be able to secure additional supplies; and should some countries not switch to alternative products to mitigate risks, reduce demand, and avoid supply interruptions. UNICEF is currently in ongoing discussions with countries, suppliers, and partners to alleviate any impact.
- **Typhoid conjugate vaccines (TCV):** One manufacturer report delays in supply due to challenges on human resources, and the reallocation of resources to COVID-19 vaccine development.

Some manufacturer representatives have called out some of the key concerns and challenges they face in producing vaccines. These include:

Input to production processes

- Some manufacturers report having difficulty in obtaining raw materials and have been faced with a limited availability of consumable components such as filters, tubing, vials, syringes, and ampoules.
- Some manufacturers have been heavily consuming their stockpiled reserves and supply buffer stocks, and as such, are starting to face difficulties in replenishing these, as well as to secure supply commitments from their suppliers. The main reason cited is that suppliers are prioritising the production of COVID-19 vaccines, with reference to the United States Council on Foreign Relations Defense Production Act.[20]
- On the 5th of February, the US administration announced plans to leverage the Defense Production Act to bolster COVID-19 vaccine production, to boost the availability of at-home and point-of-care (POC) virus tests, and to increase the supply of critical shortages in PPEs such as masks, shields and gloves.[21]

Manufacturing process

- The overall fill and finish capacity of some vaccine manufacturers both internal and outsourced is considered to be a challenge and the bottleneck in the supply availability of some vaccines, and which may have impact on vaccine availability in the near future.
- Manufacturers observe an increasing extensive use of contract manufacturing organizations (CMOs) for COVID-19 vaccine production,[22, 23] which affects expansion plans and reduces the flexibility to access existing production slots.
- Since the outbreak of COVID-19 the vaccine contract manufacturing market, globally, has experienced very rapid growth. This has been driven by vaccine innovation and the rapid acceleration of RNA-based COVID-19 vaccines. Contract manufacturing companies have been working to increase the availability of COVID-19 vaccines worldwide.

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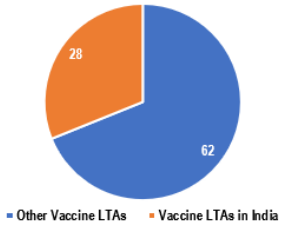
[20] Siripurapu, Anshu, *What Is the Defense Production Act?*, United States Council on Foreign Relations, Washington, 26 January 2021.
[21] Karbassi, Shayan, *Understanding Biden's Invocation of the Defense Production Act*, Lawfare, Washington, 4 March 2021.
[22] European Pharmaceutical Review, *COVID-19 Manufacturing Requirements are Lucrative for CMOs, Says GlobalData*, EPR, 30 April 2021.
[23] A contract manufacturing organization (CMO), is a company that serves other companies in the medical industry on a contractual basis to provide comprehensive services such as product development through to product manufacturing. Major bio medical companies outsource some aspects of their business to help with aspects such as scalability, or to free resources, so that they can focus on other priorities, product development, or marketing.

- However, there is a limit to the necessary available highly experienced workforce (i.e. laboratory staff and biomedical engineers), and so these resources are high in demand and are being allocated to where the need is greatest, and most urgent, on COVID-19.
- The landscape of vaccine manufacturers has changed quite significantly. Approximately ¾ of pharmaceutical and biotech companies have in one form or another entered into mergers, acquisitions, or agreements with contract manufacturers to develop COVID-19 vaccines. The outsourcing of this work has offered significant advantages such as end-to-end manufacturing solutions and expertise in vaccine manufacturing. However, the required high-level capital expenditure involved, together with high end level of manufacturing complexity required, limits the entry of new players.[24]



Release and distribution of the vaccines produced

The batch releases of vaccines by manufacturers and national regulatory authorities (NRAs) are also being affected by delays, as the release of COVID-19 vaccines are being prioritized over all others.

UNICEF has currently 90 long-term arrangements (LTAs) with vaccine manufacturers for the supply of 23 different vaccines from 15 countries. Of those 28 LTAs, (or 31per cent), are in India.

Manufacturers also report some constraints related to shipping and logistics, as there is a shortage of transportation capacity combined with a significant increase in freight costs, which has more than tripled.

Decision-making and other operational challenges

- The financial impact on some manufacturers and their liquidity (cash flow) could be substantial, as some report that their sales and export numbers dropped in 2020.
- Some manufacturers also highlight that there is a potential that some vaccines with low prices could face a high risk of being deprioritized or discontinued by some manufacturers over other more profitable products.
- There are concerns for the long-term sustainability of some manufacturer operations, above and beyond the existing infrastructure that is in place for other antigens.
- Manufacturers also report that there are some late-stage development programmes that are being delayed, for example postponed or paused, such as clinical trials, due to changes in priority, financial constraints, or the limited availability of CMOs, amongst others.
- COVID-19 vaccine production and deployment may have an impact on the availability of other health products such as biotherapeutics. Supply chain interruptions of biotherapeutics could, for example, result from a limited availability of raw materials and other components used in COVID-19 vaccine production, or from a reduced storage and cold chain capacity that the rollout of the COVID-19 vaccine can induce.

5. Immunization Equipment

UNICEF has a geographically well diversified supplier base of WHO prequalified SIE to support supply security and injection safety. UNICEF has secured the necessary volumes to supply all routine immunization programme demand until the end of 2021, and has made provisions to respond to initial COVID-19 vaccine (COVAX) requests with the establishment of a stockpile of 520 million syringes and associated safety boxes.

The 0.5ml auto disable (AD) syringe supply is currently constrained due to the high demand for COVID-19 vaccinations globally, which use the 0.3ml AD syringe. UNICEF has secured the forecasted supply for routine immunization and COVID-19 advance market commitment (COVAX AMC) countries procuring through UNICEF and have awarded additional suppliers to support responding to unforecasted additional demand.[25]

The supply of 0.3ml AD syringes is restricted in the short term, even though there are now multiple WHO prequalified suppliers, which serves to show that early planning is critical to ensure supply availability. Long-term funded forecasts will be key to enable industry and procurement agents to make informed decisions on developing and securing the required supply capacity

[24] Research and Markets, *Global Vaccine Contract Manufacturing Market Outlook Report 2021-2026: Cost-Effective And Time-Saving Services of Contract Manufacturers Enabling Growth*, Intrado GlobeNewsWire, Los Angeles, 21 April 2021.
[25] Gavi, the Vaccine Alliance, *COVAX AMC*, Gavi, Geneva, 2020

to meet the forecast demand and maintain market stability. PATH is currently undertaking an expanded 0,5ml AD market study (funded by the Bill and Melinda Gates Foundation) to look at the longer-term demand and supply scenarios that included an industry dialogue co-hosted by UNICEF and PATH at the end of June 2021.

6. Cold Chain Equipment

The global supply of immunization CCE is well diversified, with key suppliers of WHO prequalified CCE concentrated in China, Europe, and India. However, following the developments of the COVID-19 pandemic, and despite sufficient production capacity, all suppliers, in all locations, are facing highly increased demand for their products while they are reporting challenges to source components, notably electrical parts like compressors. Suppliers are also increasingly experiencing delays in supply delivery lead times resulting in demands for LTA price increases.

Due to the impact COVID-19 is having on shipping, suppliers also report delays in securing containers and bookings, as well as delays of shipments in-transit, which also results in additional storage costs.

Microchips are critical components of temperature monitoring devices, used to track the temperature of sensitive products. There have been reported delays in supply as well as price increases, due to the supply chain challenges, although there has to date not been any order cancellations.

During 2020, UNICEF was able to supply and fulfil all its orders. In 2021, UNICEF experienced a surge in demand due to CCE requirements related to the delivery of COVID-19 vaccines across all regions and countries, including in Latin America, which is a region traditionally served by the Pan American Health Organization (PAHO). The rapid growth in demand is also fuelled by the increased availability of funding for CCE through many traditional, as well new donors, in addition to COVAX to procure supplies. Whereas the capacity in China appears to be well prepared to accommodate demand, sourcing supplies from other regions, notably India, has been met with challenges due to the impact of the recent surge in cases.
In addition, some manufacturers of cold boxes and vaccine carriers have been reporting challenges in sourcing primary materials (plastic) for use in production.[26]

In terms of CCE project implementation and installation services at the country level, lockdowns and restrictions on importation in some countries have resulted in full or partial suspension of in-country logistics and installation activities. In several countries, this has resulted in increased costs, mainly caused by increased storage costs of CCE in country.

UNICEF is monitoring the production, delivery and implementation status with the suppliers and partners on a weekly basis and adjusting timelines and priorities in view of the changing situation.

7. Non-COVID-19 Diagnostics

The COVID-19 pandemic has also had a significant impact on non-COVID-19 molecular and serology diagnostics, such as malaria rapid diagnostic tests (mRDTs), where the products are subject to WHO prequalification and the number of suppliers is limited. From March 2020 until June 2020, there were serious mRDT constraints in the market, in addition to there being price increases from one of the other few mRDT suppliers, by an average of 7.93 per cent. However, in collaboration with the global malaria community, the market has since stabilized, noting that production lead times are longer than prior the COVID-19 pandemic.

Many suppliers, in particular of mRDTs, other RDTs, and molecular diagnostics have shifted or re-purposed their production lines to pursue COVID-19 diagnostics. This has had an impact on the overall production lead-times for products, including with machines, and decreased the number of suppliers interested to supply pregnancy RDTs, due to an increased focus on COVID-19 diagnostics.

The current situation prevailing in India has affected some production sites, whereby suppliers are working with limited staff, and that has causes production delays. The shipment of all non-COVID-19 diagnostic tests (i.e. cholera, HIV, and syphilis) has also been affected by much longer shipment timelines as well as there being no flights available due to flights being reserved for COVID-19 shipments.

[26] Intrado GlobeNewsWire, *The Market Was Negatively Impacted Due to COVID-19 Outbreak in 2020*, Intrado GlobeNewsWire, Los Angeles, 5 May 2021.

8. Non-COVID-19 Medicines

UNICEF procures pharmaceutical products globally from various regions with 45 per cent (USD 44 million) being sourced from India, and 7.8 per cent (USD 7.8 million) from China. Both countries represent an exposure for UNICEF of just under 53 per cent. A large portion of the remaining pharmaceuticals are sourced from other regions. UNICEF, in collaboration with WHO and partners, is closely monitoring the production and access to essential medicines.

Of the 17 manufacturers contracted by UNICEF to supply antimalarials, eight are based in India. Nine of UNICEF's 11 contracted antiretroviral (ARV) suppliers are based in India, with none in China. Indian manufacturers supply generic ARV products, for which alternative originator manufacturers exist outside of India. As for other essential medicines, the majority (80 per cent) of essential medicine suppliers are from India, with only four per cent (three) are in China. Alternative suppliers are available in Europe for the injectable antibiotics sourced from China.

Indian pharmaceutical suppliers source almost 70 per cent of their active pharmaceutical ingredients (APIs) from China, and with the resumption and normalization of production of APIs and finished pharmaceutical products in China, there is currently adequate API supplies to cover their operations. However, the recent challenges with availability of shipping containers is impacting deliveries.

The COVID-19 surge in India, which resulted in lockdowns in some states, affected some manufacturer's production capacity as well as introduced logistical challenges. This raises the possibility of increased lead times for some of the medicines sourced from India. As a result, UNICEF anticipates that price increases and supply disruptions due to logistics and shipping issues remain a possible risk that UNICEF continues to monitor closely in real time with partners. However, where possible, UNICEF is using its suppliers from other regions.

UNICEF has experienced ARV price increases for mainly generic boosted lopinavir, boosted atazanavir and paediatric oral liquids like nevirapine and lamivudine. UNICEF's LTA holders have been reverting on orders with price increases as per below:

- Lopinavir / ritonavir prices have increased by 14-47 per cent,
- Atazanavir / ritonavir prices increased by 15 per cent,
- Nevirapine and lamivudine oral liquid prices increased by 15-25 per cent,

Besides pricing, the formulation production lead-times for these products are also noted to be very long. On the other hand, UNICEF has received price reductions for a number of ARV adult formulations, notably reductions for the formulations containing dolutegravir ranging between 8-17 per cent.

Countries should mitigate the impact of any disruptions by working to maintain supply chains and engagement with communities to ensure access to health services and the delivery of critical medicines including ARVs and work to overcome any in-country logistical challenges.

UNICEF has also noted that the prices for disinfectants from our LTA holders have been increasing and suppliers have been experiencing challenges in meeting timely delivery for these products. Suppliers attribute this to the fact that the global demand for disinfectants has increased due to COVID-19.

9. Nutrition products

Manufacturers of specialized nutrition products are geographically well spread across the globe. UNICEF has currently 21 LTAs for ready-to-use therapeutic food (RUTF) across most regions, including in Africa, the Americas, the Caribbean, Europe, and India. The supplier base for therapeutic milk is more constrained with only one main LTA holder, located in France, and a second supplier in South Africa, but both suppliers have built up sufficient stocks. UNICEF procures approximately 80 per cent of global production for both products and is monitoring closely the supply situation. During the lockdowns in Haiti, India, and South Africa, economic activity was temporarily suspended, but most RUTF manufacturers were able to get an exemption as the product is considered as essential (food) business and have either continued or resumed production. The surge in COVID-19 cases in India again had some impact on production, but more disruptive are the interruptions in freight, logistics and other services like inspection and testing.

UNICEF is also receiving RUTF as a contribution-in-kind (CIK), sourced from manufacturers in the United States (US), with so far, no problems reported. A sub-section of the same RUTF suppliers are also producing ready-to-use supplementary food and other lipid-based nutrient supplements (LNS) products for UNICEF. Overall, an increase in the cost of raw materials and freight services on the global market has been reported, which is already been factored into a higher price for some of the finished products.

Other commodities used in nutrition programmes such as multiple micronutrient powders (MNPs) and anti-anaemias (iron folic acid and others) can be delivered from UNICEF's warehouse stock in Copenhagen or directly from manufacturers. The replenishment of UNICEF's warehouse inventory in Copenhagen is being increased and brought forward to ensure that there is enough buffer stock. The supplier base for MNPs is healthy with a large production capacity in Africa, Asia, and Europe. The same goes for the anti-anaemias with suppliers in Europe and Asia, although production is currently constrained with one of UNICEF's suppliers responding to a negative quality audit. For Vitamin A capsules (Retinol), both UNICEF and the donor of the CIK are using the same supplier base in Canada, which has been able to produce as planned. The product is delivered to UNICEF programmes and partners from UNICEF's warehouse in Copenhagen. The manufacturing of high energy biscuits and supercereal products is progressing as usual.

However, these products are primarily used in emergencies and represent a significant volume. UNICEF procures an estimated 75-80 per cent of the global demand for RUTF, averaging 49,000 metric tons (MT) per year over the last four years, suitable to treat 3.5 million children, representing a need for more than 4,000 standard 20ft shipping containers, and are therefore vulnerable to disruptions in global freight. The extensive network of RUTF manufacturers UNICEF has now established allows for products to be produced closer to where the products are used. This reduces the requirements for international transport, shipping and handling costs, as well as the distances to be used for sea or air freight, as well as, but not least to ensure that critical supplies are closer to communities, and that their production can also contribute to supporting local business development.

Logistics bottlenecks created by border closures, export bans, reduced sea and air freight and trucking capacity, and more recently the availability of shipping containers can also have an impact on the production and the cost of finished products as most of the manufacturers of the above products rely on the importation of raw materials, packaging, and active pharmaceutical ingredients, which cannot be sourced locally.

10. Mosquito Nets

UNICEF's procurement of long-lasting insecticidal nets (LLINs) can vary substantially in volume from year-to-year, as it is in accordance with country requirements and financing cycles. In general, countries procure large volumes of new and replacement LLINs for distribution in mass campaigns on a two- to three-year cycle, with smaller volumes in between for routine distribution. UNICEF procures LLINs on behalf of countries and partners in support of malaria control and prevention programmes, using either programme funds or available country financing from sources such as the US President's Malaria Initiative (PMI), and the Global Fund to Fight AIDS, Tuberculosis and Malaria (the Global Fund) amongst others. UNICEF only procures quality assured LLINs that have been prequalified by WHO, which currently lists 20 prequalified LLINs from 12 manufacturers spread across the world.

UNICEF established ten LTAs with manufacturers to secure access to more than 140 million LLINs over 2019-2022, including for new and innovative products. UNICEF is applying with industry supply chain cost and sustainability considerations in its procurement to address some of the programmatic and supply chain challenges undermining environmental sustainability, as well as the risks associated with LLIN shipments and packaging.[27]

However, COVID-19 pandemic's global impact on freight operations has had an impact on LLINs. The reduced workforce at ports and constrained access to any available 40ft containers has been a major challenge from all free carrier (FCA)[28] ports where UNICEF ships LLINs, notably Chennai, Haiphong, Ho Chi Minh, Karachi, Shanghai, and Tianjin.

[27] UNICEF, *Long-lasting Insecticidal Nets Market and Supply Update*, UNICEF, Copenhagen, December 2020.
[28] Free carrier (FCA) is a trade term requiring the seller of goods to deliver those goods to a named airport, shipping terminal, warehouse, or other carrier location specified by the buyer. Once the seller delivers the goods to the carrier, the buyer assumes all responsibility for the goods.

UNICEF has been splitting large orders into smaller delivery batches or loading them into smaller 20ft containers to counter due to the shortage of containers, and which impacts the overall freight cost. UNICEF is trying to place orders with suppliers for larger orders/campaigns as early as possible to include extra time for container availability.

Source: UNICEF Supply Division

In 2019 and 2020, UNICEF procured 60.4 million nets on behalf of 30 countries. So far during 2021, UNICEF has procured 21 million LLINs for 22 countries, and anticipates procuring an additional 25 million nets by the end of the year. This includes LLINs for the mass campaigns in five countries: Afghanistan, Angola, Burundi, Somalia, and Sudan. These shipments represent a total of 907 40 ft containers. The mosquito nets are produced in facilities located in seven port cities in five countries: China, India, Pakistan, Tanzania, and Viet Nam (see map). The Global Fund has suspended the procurement from facilities in Pakistan for ethical reasons. and as such procurement is also suspended through UNICEF, and others.

The disruptions to sea freight due to COVID-19 will continue to have an effect on freight operations, with a major impact on shipments out of China and Viet Nam, including for LLINs for low- and middle-income countries (LICs and MICs). The current situation will continue to develop further over the immediate to near term depending on the trend and prevalence of COVID-19, and which will limit UNICEF's access to available LLINs, but also due to:

- The supply of LLINs to some countries is restricted because of product acceptability. Some countries have registered only a limited number of products, as they prefer specific types of nets, whether BPO treated nets,[29] polyester, or polyethylene.
- The ports in China are partly under lock-down and Ho Chi Minh district in Viet Nam has been placed under lock-down until the 15th of September, which has extended transit times.
- As such, UNICEF has not been able to secure any carrier bookings due to container shortages in China, India, and Viet Nam.
- The freight costs to ship LLINs have increased two- to three-fold the price offered during the 2nd quarter in 2021 and are still increasing.

- UNICEF encourages countries to plan their procurement of LLINs as early as possible, as lead times have increased up to 18 weeks, representing a 50 per cent increase in lead time, over standard anticipated arrival date in country;
- UNICEF encourages country offices to coordinate with UNICEF's focal points in Copenhagen as early as possible any discussions related to LLIN procurement and product selection in order to improve service delivery.
- UNICEF also encourages governments to accept multiple brands and types of WHO prequalified LLINs to ensure that they have timely access to a diverse supply base of LLINs.

11. Education Supplies

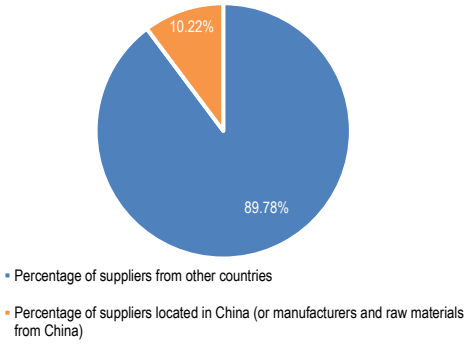
UNICEF holds an emergency stock of four main types of education kit:

i.) school in a box,
ii.) recreation kit,
iii.) early childhood development kit,
iv.) and Arabic kit.

Over 120 different items form part of these kits, all of which are packed at UNICEF's warehouse in Copenhagen. Due to the varied market nature of education products, UNICEF sources primarily all its education supplies from traders, as it is not efficient or effective for UNICEF to procure directly from manufacturers. UNICEF holds over 170 LTAs to cover all commodities, for which it has on average 1-5 LTAs per item to ensure a healthy and secure supply chain.

[29] PBO: piperonyl butoxide, a new class of chemical synergist that inhibits the enzymes in the natural defence mechanisms in insects. It prevents the detoxification of pyrethroids. As a result, the pyrethroid in LLINs remains potent against mosquitoes despite increasing insecticidal resistance. PBO-pyrethroid-treated LLINs appear to have similar or better efficacy against resistant mosquitoes.

Figure 9 Origin of Supplies Per Cent 2018-2021



Source: UNICEF Supply Division

UNICEF's education supplier base is located primarily (up to 90 percent) in China (Figure 9). The share of non-Chinese-based suppliers are for products with a low turn around and are not affected by the current challenges. Despite several market assessments to look at geographically diversifying its supplier base, most education products are either sourced from China, or the raw materials used to make the products are from China. The global impact on freight operations impact international supply chains, including those used for education supplies, which are products mostly shipped by sea. UNICEF anticipates the current situation will continue to develop over the near and immediate term, and is dependent on the trend, development, and prevalence of the effects of COVID-19 pandemic.

- Even though UNICEF endeavoured to geographically diversify its source of suppliers for education products to mitigate any short and long-term supply chain risks, most global education product suppliers either import their raw materials from China, or source their finished products from China. As such, UNICEF is continuing to explore other possibilities.
- Country demand for education supplies stabilized during the 3rd and 4th quarter in of 2020, following a shift in country COVID-19 lockdown measures having had a different impact in different geographic locations, in line with school closures. UNICEF was able to meet emergency responses measures using its pre-positioned stocks through its warehouses located in Accra, Copenhagen, Dubai, and Panama.
- The current global logistics constraints, notably container shortages and shipments out of China, has been compounded port lockdowns China, which have seriously decreased port handling capacity resulting in port congestions at the main ports in China, namely Ningbo and Tianjin.
- UNICEF is also experiencing price volatility, with suppliers asking for between 35-85 per cent price increase, resulting in spot bidding with only up to one-week validity period.
- Many of the frequent price increase requests from suppliers are due to raw material price index increases.
- Product price increases also emanate from the long shipment delay, as it forces suppliers to store their goods for up to between 4-10 months longer than originally planned, which has an impact on storage capacity, and carries financial implications with payment delays, as most of education contracting are on FCA incoterms.

Given the current prevailing situation, UNICEF may ship emergency education supplies with missing items and/or use alternative kit components to replace missing regular items that may have been delayed. This approach will not undermine the product's quality or safety standards. UNICEF will continue to monitor the market and any changes and improvement to avoid using alternative products.

12. Water, Sanitation, and Hygiene (WASH) Supplies

UNICEF procures most water, sanitation, and hygiene (WASH) related products for use in emergencies. Many of which are available in local markets (i.e. soap, buckets, jerrycans, handwashing stations, amongst others). UNICEF procures other critical products, such as water purification tablets from suppliers that are geographically well spread across Europe and South America. These products are generally shipped by sea freight and as such have been affected by current shipping challenges and disruptions. To mitigate supply constraints, UNICEF retains an emergency buffer stock at its warehouse in Copenhagen and continually monitors stock availability through its regular contact with suppliers. However, even though UNICEF can still currently place all necessary orders, some suppliers have been delaying the delivery of non-emergency orders for some products such as handpumps (India). These delays are also due in part to the current challenges in securing shipment bookings, even though most suppliers are operating close to normal production capacity.

The procurement of hand sanitizers has been stable following the initial market shortages experienced at the start of the pandemic and due to the surge in demand on account of COVID-19. UNICEF has established supply agreements with guaranteed prices for the next two years, with possible extensions by an additional two. UNICEF country offices continue to procure hand sanitizers locally to avoid transport challenges, delays, and any potential cost increases.
For further questions or additional information, please contact:

Jean-Cedric Meeus
Chief Transport Centre
UNICEF Supply Division
+45 24 29 30 64
jcmeeus@unicef.org

Philipp Kalpaxis
Chief a.i. Markets, Supplier Financing
UNICEF Supply Division
+45 45 33 57 90
kalpaxis@unicef.org

Aadrian Sullivan
Communication Manager
UNICEF Supply Division
+45 45 33 57 68
asullivan@unicef.org

Other UNICEF information notes can be found at: https://www.unicef.org/supply/market-notes-and-updates

UNICEF issues market and information notes on products and supplies that are essential for the needs of children, and by extension their families. While some products are easily available and affordable, the availability of others can be limited, or in some instances, non-existent in the quality and price required. UNICEF places a strategic focus on these supplies to shape healthy markets. UNICEF seeks to influence the market to achieve greater coverage, affordable prices, diversified supplier bases, competitive market landscapes, and product quality that is fit for purpose and in the right form for children.