The biggest logistics project ever

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Already on the front line and proven critical to the world's economy, performance in the global supply chain is now being catapulted into the public gaze like never before. While the uptake of COVID-19 vaccination programmes in several countries is high, many regions have yet to roll out vaccines at a similar rate. Some Southeast Asian countries such as Vietnam and Taiwan, where death rates were low during the first wave, are now suffering as vaccination rates are low across their populations. It is estimated that only 1.1% of the African population has been jabbed. At the end of June, it was reported that only 4% of people in India had received their vaccines. Necessarily, supplies and the distribution of COVID-19 vaccines will be ramped up significantly in the coming months.

It is hard to imagine a comparable product with a wider 'value' associated with the well-being of the global population, societal benefits and the impact on the global economy. As such, the distribution of COVID-19 vaccines has been labelled the 'biggest logistics project ever.'

Without the inevitable emotion attached to its distribution, one could argue that the vaccine is similar to any other valuable, sensitive cargo. The basics remain constant: identify the characteristics of the cargo to ensure its integrity is maintained; understand the location of manufacturing, delivery, routing and volumes, as well as value; then determine the appropriate strategies to adopt for safe and secure transport. Yet, there are considerable differences in distributing this particular freight – whichever vaccine is considered.

Risk at every juncture

Critical challenges exist in maintaining integrity in the temperature-controlled vaccine supply chain, including accurate instructions and communications between stakeholders. Risks exist at every juncture, including packaging, packing, transport and unpacking. Such sensitive shipments will be vulnerable to the slightest error or discrepancy. Vaccines, specifically, are not just perishable but also subject to tight regulations concerning transport. Of particular relevance are the necessary controls regarding traceability and evidence of integrity throughout the journey.

The availability of transport equipment might be an interesting challenge in the current circumstances. Air freight capacity has remained tight throughout the pandemic despite increased passenger aircraft conversions to all-freight configurations. Sea freight might provide additional capacity. While it isn't a traditional mode of choice for such pharmaceutical goods, the nature of this particular supply chain and the fact that there will inevitably be various production batches suggests that sea freight could be a good fit. That said, the current troublesome accessibility to containers in many regions of the world may restrict the attraction or feasibility of utilising the maritime mode.

There might also be the requirement to use reefers for some vaccine types. It may, however, be more difficult to increase the production of this specialist and costly equipment. Semi-active and passive solutions may be more readily scaled up to meet peak and ongoing demands.

Contamination risks will be amplified, given the sensitive nature of the cargo. Carrying equipment will need to be clean, clear of debris, free of visible pests, and controlled to ensure that previous loads will not lead to taint or odour. Ship stowage planning may also require increased attention.

Counterfeit rings

There have been many reported spikes in counterfeit medicines and related criminal activity across the globe. It may be anticipated that COVID-19 vaccines are a prime contender for counterfeiters to target. The heightened regulatory environment may only partially mitigate this risk for the transportation of these particular pharmaceutical products.

In a recent major operation, Europe's Interpol broke up global counterfeit rings, closing more than 100,000 bogus online pharmacies, making nearly 300 arrests and seizing more than $20m worth of phoney items in the process. Mainly targeting counterfeit COVID-19 testing kits, this operation followed other examples. These have included discovering counterfeit networks in China and South Africa and producing fake vaccines from simple, widely available ingredients such as saline solution and mineral water.

Despite these law enforcement breakthroughs, the world's fight against the coronavirus pandemic has been further undermined by a booming trade in counterfeit personal protective equipment, COVID-19 testing kits, vaccine passports and other products, disrupting the preventative efforts and contributing to the spread of the virus.

Photo: Canva

In India, police reports speak of around 2,000 people injected with fake COVID-19 vaccines in Mumbai and another 500 in Kolkata – some of them disabled. Vaccination rates rose sharply in early July after the centre made shots free following a devastating pandemic surge in April-May. Still, the rush to be jabbed allowed counterfeiters to benefit by supplying fake vaccines of saline solution. In Kolkata, police arrested a man posing as a civil servant with a master's degree in genetics who reportedly ran as many as eight spurious vaccination camps.

In the case of COVID-19 vaccines, as opposed to other high-value pharmaceuticals, only governments and multilateral agencies have access to the limited number of closely monitored suppliers meaning there is little room for so-called 'bad actors' to acquire genuine supplies. But the very tightness of supply allows these bad actors in the world of counterfeiting to exploit the imbalances in the supply of the vaccine and associated products against the enormous global demand.

Intensified security strategies

It is a near-perfect supply/demand situation to encourage counterfeit vaccines, which has not been helped by the expense of developing vaccines at a national level. There is a very high research and development cost behind producing a genuine product, making access difficult, especially for poorer countries. It has ultimately led to unequal global access to vaccines, with much of the world's supply being controlled by the most powerful countries.

In attempting to achieve some semblance of equanimity of distribution to poorer nations, and those not taking up vaccine orders early, national policymakers will determine approvals and demographic priorities. However, realistic or not, widespread expectations will be that distribution and availability are immediate, or at least imminent. There will inevitably be those who fall outside of a defined demographic willing to pay for expedient access. Consequently, the black-market environment will likely continue for some time into the future.

Very early in this pandemic, items such as face masks and anti-bacterial hand gel became key targets for perpetrators of cargo crime. Unless distribution plans are perfectly executed within the expectations of any given population, which is unlikely, the vaccine supply chain will see a far greater multiplication of these threats.

The stakes could not be higher, far beyond theft or cybercrime; here, cybersecurity will need to defeat industrial espionage. Pharmaceutical regulations alone will be insufficient to support the necessary tracking, tracing and transparency through the end-to-end supply chain; intensified security strategies need to be developed and implemented. The menace of cybersecurity risks in this instance should put all on the highest alert. In general, freight crime rarely attracts media attention; it may be expected that the theft, loss or damage of COVID-19 vaccines would be front-page news.

The ultimate consignee

The scale of the logistical challenge can't be over-estimated. Many supply chains during the pandemic period have suffered stress and disruption, and there are regular reports of port congestion, shortage of containers, lack of reefer point capacity and strains on limited air cargo solutions. Significant volumes of the vaccine in need of distribution are to be anticipated well into the future. While some countries are considering local manufacturing and distribution, the logistics requirements are expected to stretch capacity and capability.

Distribution will eventually become global, necessitating careful planning and due diligence. While air freight is widely expected to support the primary movement of the vaccine, the global distribution requirement will necessitate substantial involvement from surface intermodal actors. The likely multiple transfers will require the most careful management of all aspects. The ultimate consignee in the context of the vaccine is, of course, you and me; delivery to a destination country or local region is not the end of the supply chain since final mile logistics involving truckers and temporary storage could prove complex. For the very final link in the supply chain, we will remain in debt to our medical professionals. ■