



DELIVERING PANDEMIC RESILIENCE REVISITED

Bottlenecks to breakthroughs: What we've learned
one year into COVID-19 and how we'll be ready for
the next health emergency

DHL CSI – Customer Solutions and Innovation

Revisiting Pandemic Resilience in a nutshell

**Out of the
starting blocks**



**It's a marathon, not a
sprint**



**The home
stretch**



**Getting ready for
the next race**



CHAPTER 1: Out of the starting blocks

**Out of the
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Although the last year was difficult, there are ten key achievements of the global community

● Deep Dive on following slides

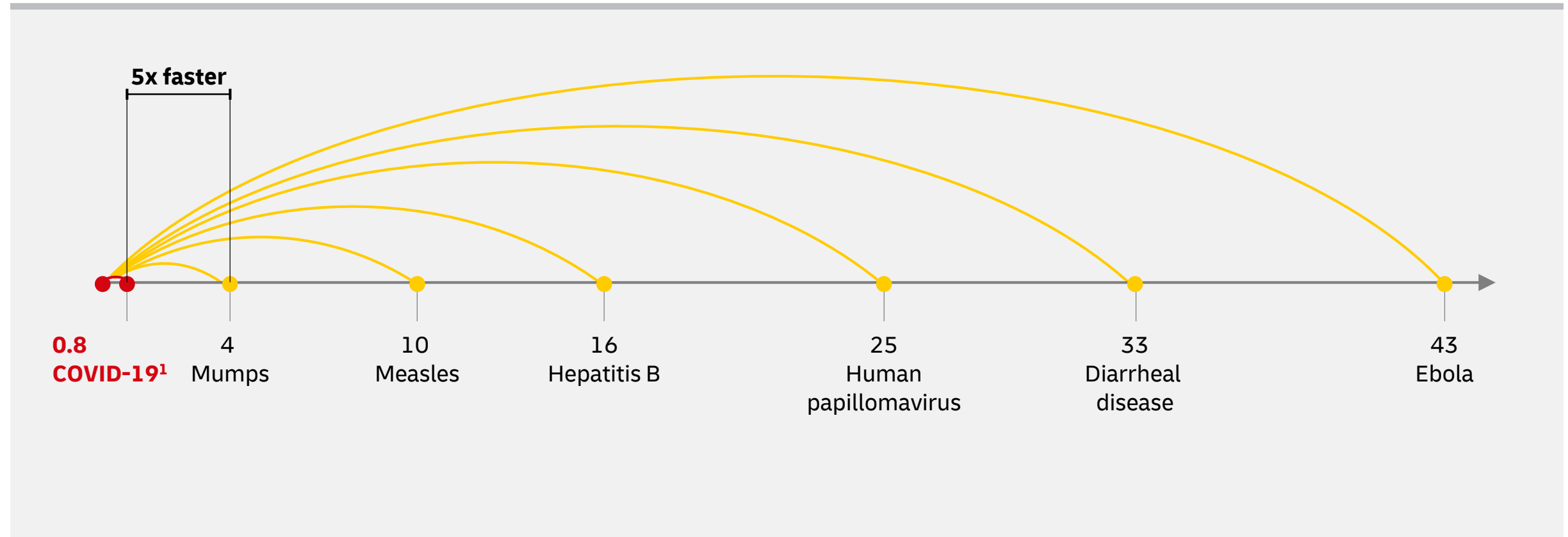
- 1 COVID-19 vaccine development occurred **five times faster than any other vaccine in history**
- 2 Two new vaccine platforms, that **can tackle diseases beyond COVID-19**, have emerged and begun to mature
- 3 Total **global vaccine production quadrupled** within a year
- 4 The complex **global vaccine supply chain was ramped-up** successfully
- 5 **Extreme cold-chain requirements** were met at scale – flawlessly!
- 6 The **vaccination rate already outpaces the infection rate** by a factor of nine
- 7 Multilateral action was taken to **ensure global access to vaccines**
- 8 **Vaccine economics work:** on a per capita basis end-to-end costs for vaccination equal just **one week of lockdown costs**
- 9 **Markets quickly met the high demand** for testing, ancillary supplies, and PPE
- 10 Large-scale **research on therapeutics has been promising**



1 COVID-19 vaccine development occurred five times faster than any other vaccine in history

Vaccination innovation

Time from infectious agent identification to vaccine approval in the US, years



1: Note that COVID-19 vaccines have received Emergency Use Approval, whereas the other vaccines have received biologics license application approval in the stated time.

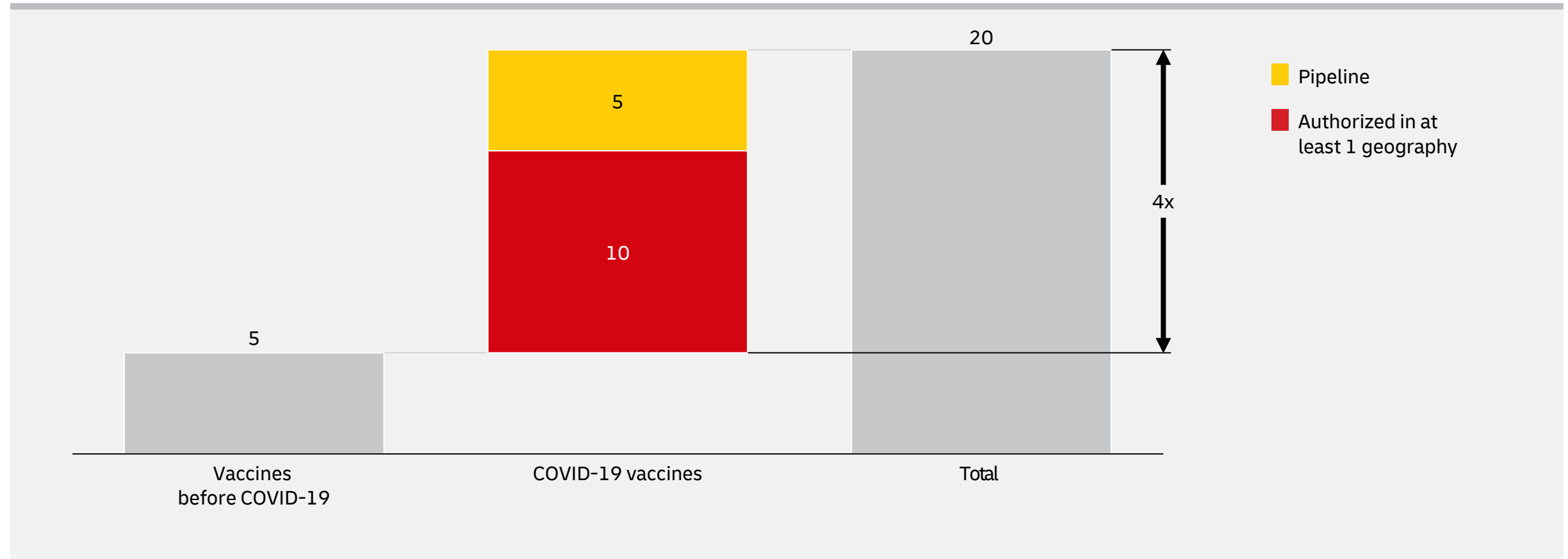
Source: Bernadeta Dadonaite, Max Roser, and Samantha Vanderslott, "Vaccination," Our World in Data; "COVID-19 vaccines," US Food and Drug Administration, fda.gov



3 Total global vaccine production quadrupled within a year

Vaccine production

2021, billion doses



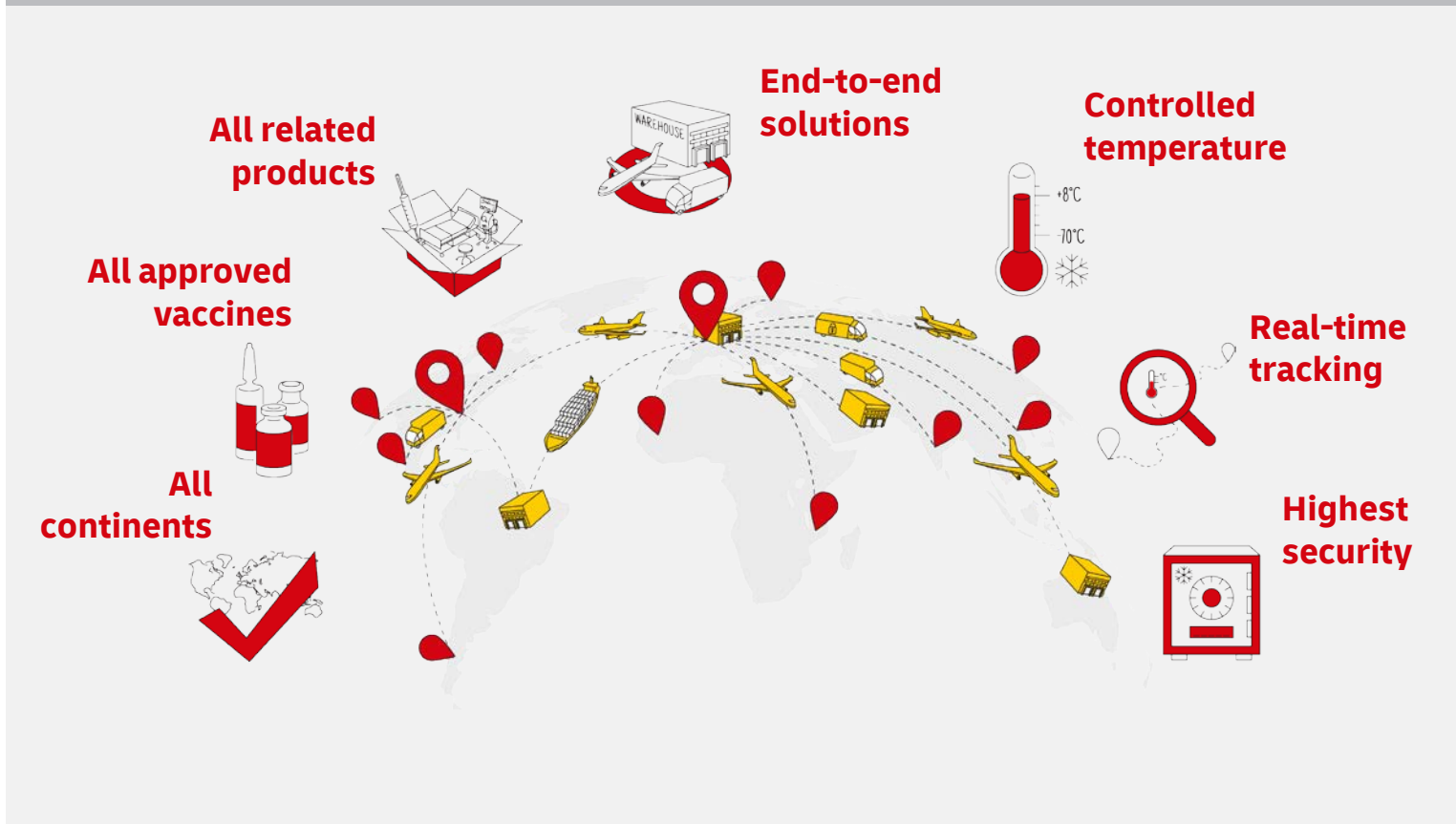
Source: UNICEF COVID-19 production tracker with additional assumptions on realization and shipment timing of announced volumes (per vaccine development stage). Pre-COVID-19 vaccine data based on Airfinity and the WHO Global Vaccine Market Report 2020.



4 The complex global vaccine supply chain was ramped-up successfully

DPDHL is the trusted partner for Covid-19 vaccine logistics worldwide

Key contributions to date



>338 million doses distributed internationally

>140 countries served

>9,000 flights operated to deliver vaccines

>350 DHL facilities involved in the process

>50 collaborations in the pharma & public sector

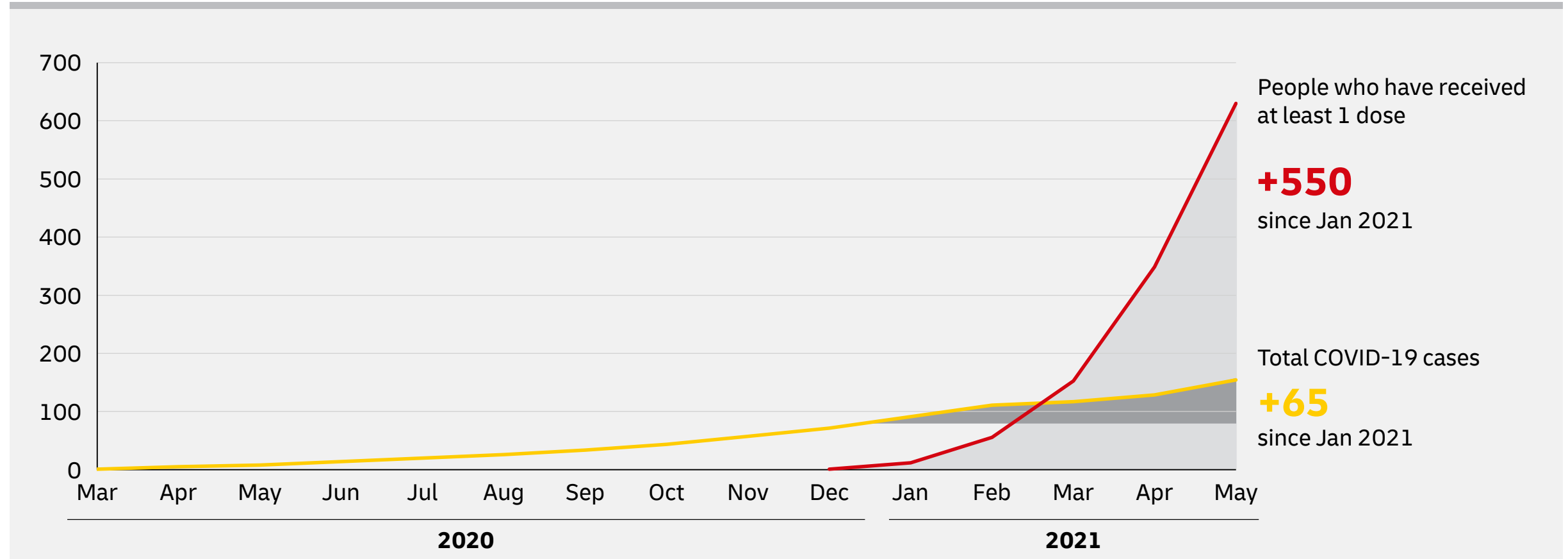
>10 new and dedicated services introduced



⑥ The vaccination rate already outpaces the infection rate by a factor of nine

Covid-19 vaccination vs. cases

Million people



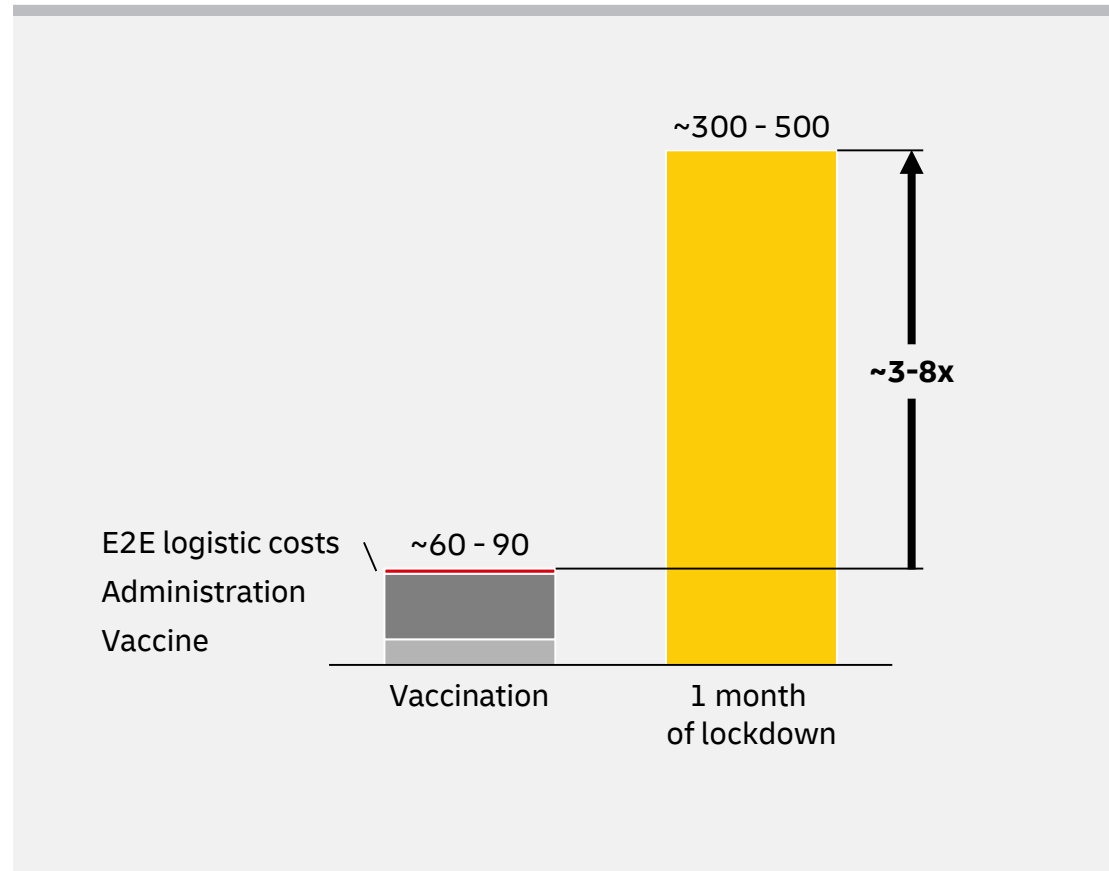
Source: Our World in Data COVID-19 data explorer, Apr 28, 2021

DHL CSI – Customer Solutions & Innovation | Bonn | June 2021



Vaccine economics work: on a per capita basis end-to-end costs for 8 vaccination equal just one week of lockdown costs

COST PER PERSON EUR



E2E logistics represent
<1% of the **total**
vaccination cost

Simplified illustration based on a sample calculation for 3 industrial countries. Lockdown and vaccination costs for the adult population over 18 years. Vaccination costs vary based on used vaccines, as well as points of vaccination in the different countries. Lockdown costs (total economical costs due to the closure of e.g., shops and restaurants) are based on estimates by independent economic researchers.

CHAPTER 2: It's a marathon, not a sprint

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**The home
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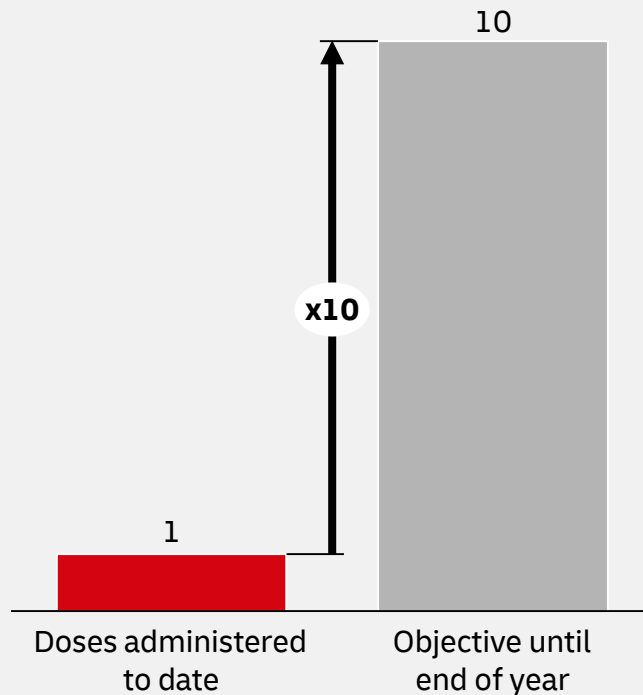




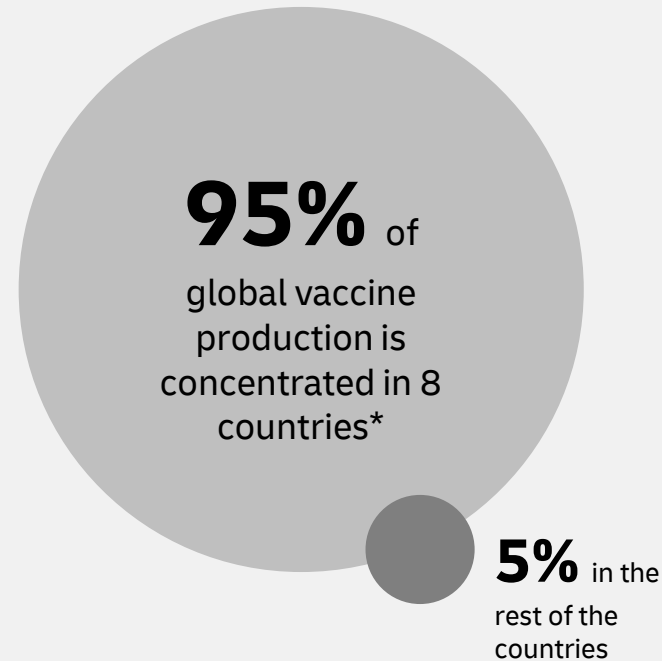
Only a small fraction of vaccination rollout achieved – upcoming phase will be challenging

With 1 of 10 bn of the required doses administered, ...

bn vaccine doses



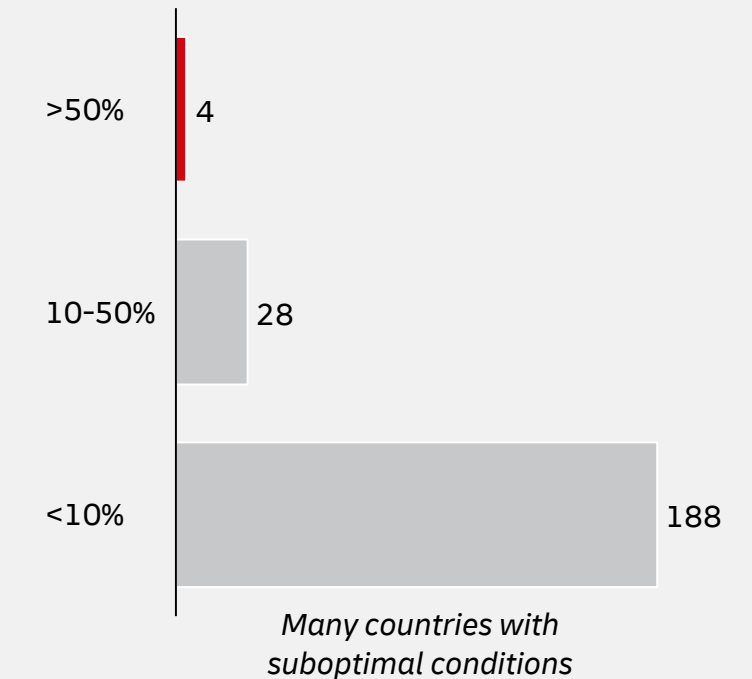
... a concentrated production footprint



* US, BE, DE, RU, IN, CN, ZA, UK

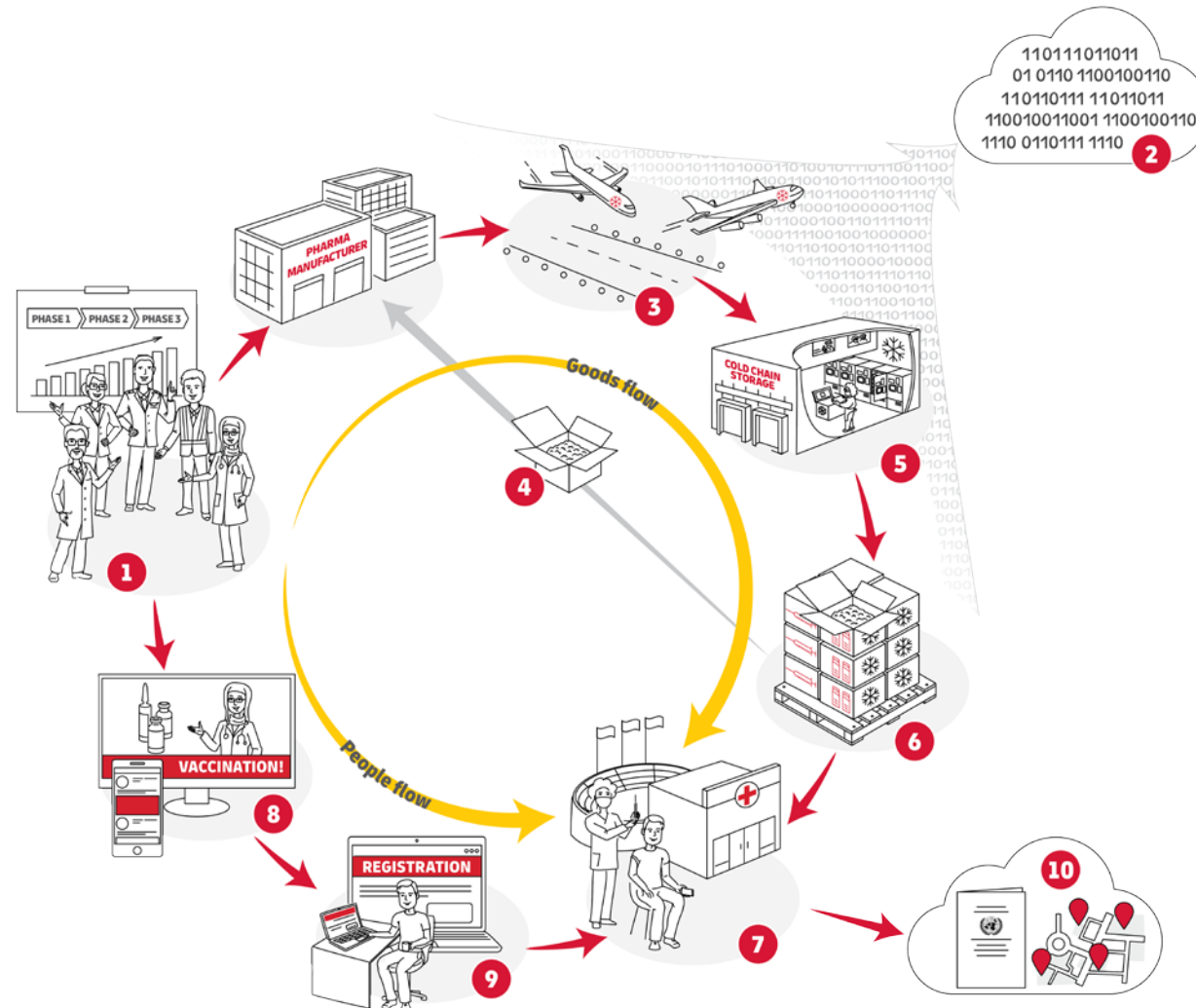
... and the rollout to 220 countries pose challenges for logistics

Number of countries clustered by the share of people fully vaccinated



* US, UK, IL, CL

10 building blocks to go from 4 to 220 countries with successful vaccination campaigns



Fostering collaboration

- 1 Partnerships without borders
- 2 Supportive data backbone

Securing inbound flows

- 3 Transportation capacity management
- 4 Packaging sustainability

Setting up the last mile for success

- 5 Strategic warehousing
- 6 Synchronized flow of goods
- 7 Vaccination points

Maximizing demand for vaccines

- 8 Well-informed population
- 9 A User-Friendly Process
- 10 Incentives convincing last movers

CHAPTER 3: The home stretch

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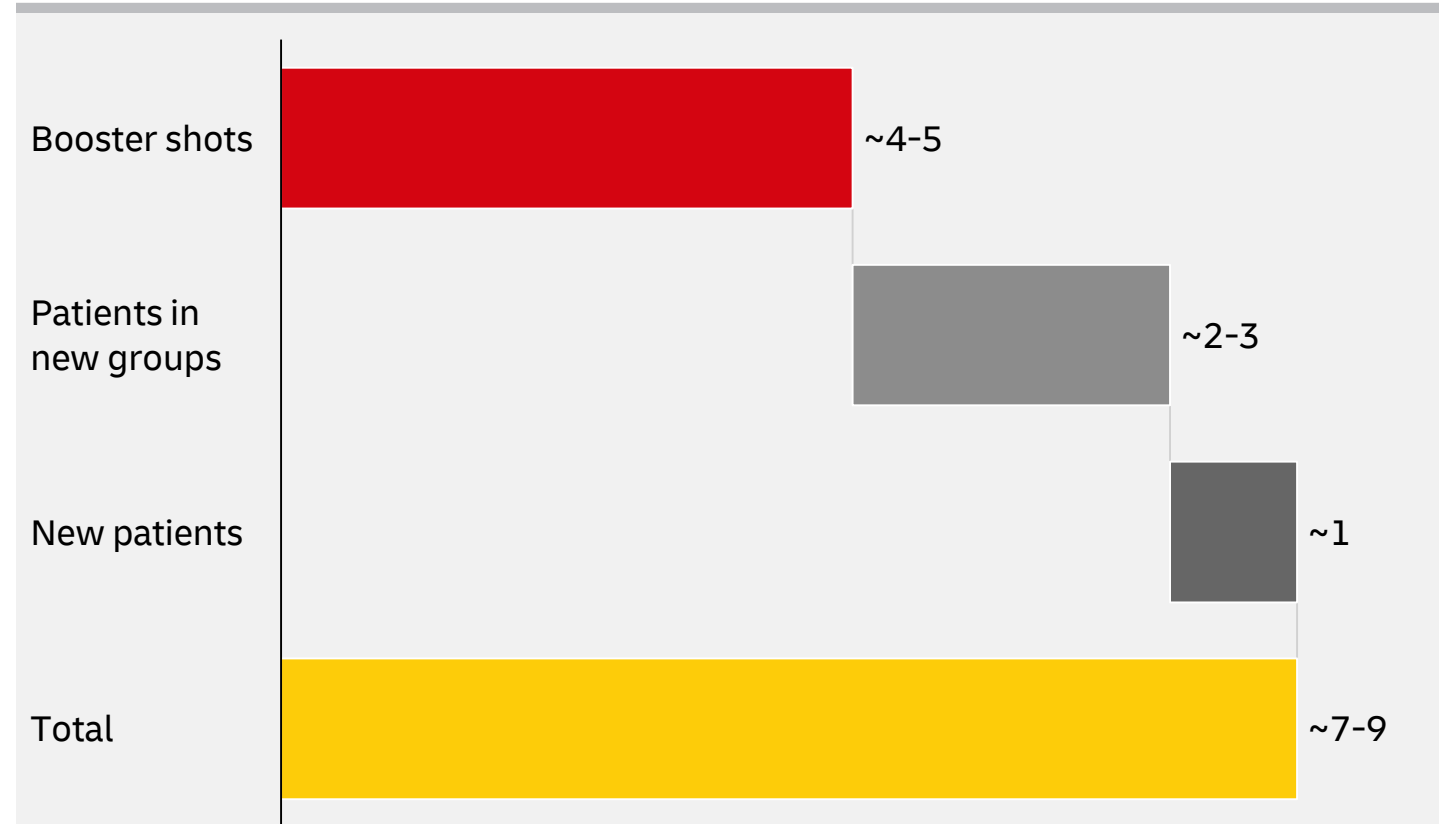




Going forward, 7-9 bn additional doses will be needed annually to keep COVID-19 in check

Estimated additional vaccine quantities for 2022 and beyond

Billions



The need for an additional 7-9 billion doses will be driven by three factors:

4-5 billion doses will account for **"booster shots"** to **maintain the immunity** of people who were vaccinated in 2021.

Another 2-3 billion doses will be earmarked for **patient groups**, such as **children** under the age of 12, who will likely be **eligible after the conclusion** of ongoing **clinical trials**.

With time **willingness to get vaccinated** will likely **increase**, these new patients will account for an additional ~1 billion doses (assuming a 10-percentage point uptake).



3 watchouts needed to be implemented to ensure that today's supply chain provides a solid platform for the next years

Players need to implement 3 measures:



Remain prepared for high patient and vaccine volumes



Maintain logistics infrastructure and capacity

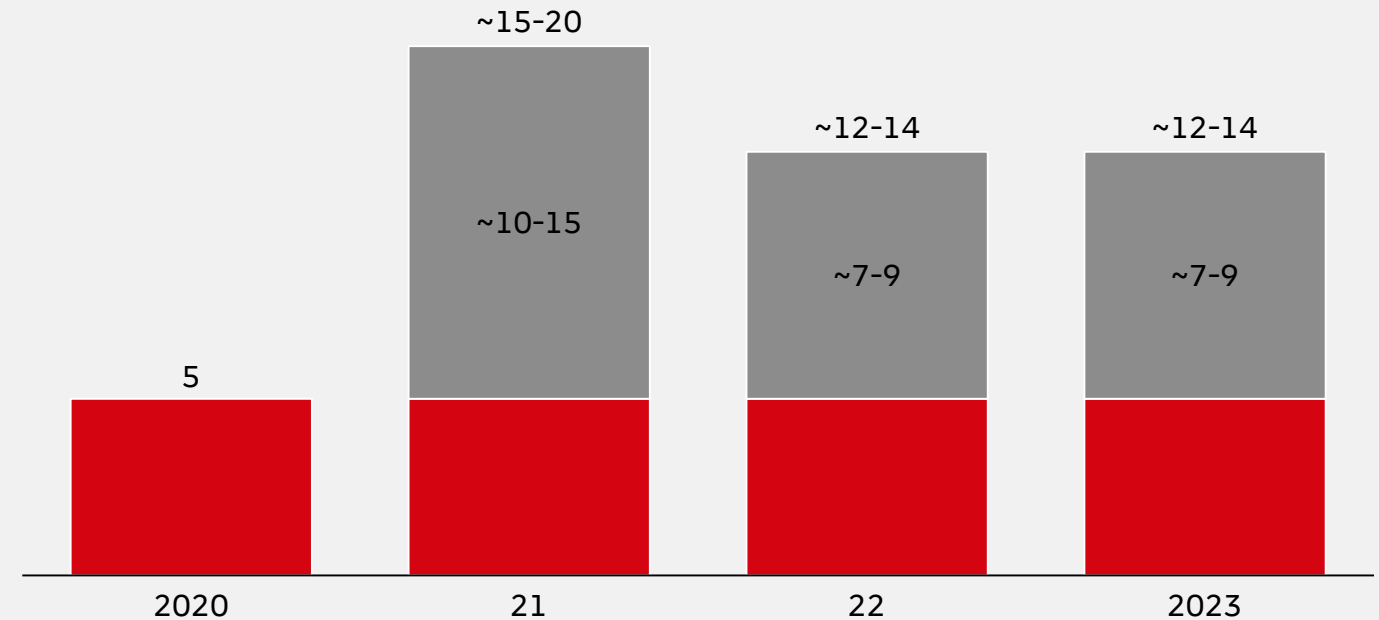


Plan for seasonal fluctuations

... then supply chain provides solid platform due to 30% lower volume

Projected global vaccine shipping volumes

Billion doses



CHAPTER 4: Getting ready for the next race

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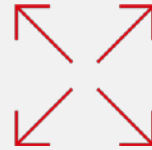
Getting ready for the next race: 10 strategic actions governments and other stakeholders should consider pursuing now

Prevention and early identification



- 1 Institutionalize active partnerships and systems
- 2 Double down on global early-warning systems
- 3 Create and follow through on integrated epidemic-prevention agenda
- 4 Invest in targeted research and development to improve diagnostics, therapeutics, and vaccines

Containment and countermeasures



- 5 Implement national containment and escalation plans
- 6 Leverage digital contact tracing and monitoring app
- 7 Establish an emergency stockpile and associated “supplies and logistics” emergency system

Medication rollout capacity



- 8 Maintain “ever-warm” manufacturing capacity
- 9 Define blueprint research, production, and procurement plan for diagnostics, therapeutics, and vaccines
- 10 Maintain and expand rollout capabilities for diagnostics, therapeutics, and vaccines

