

COVID-19 pandemic update

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EPI • WiN

infodemic
MANAGEMENT

Current global situation

As of 08 December 2020, 10:00AM CEST

Over 67 million cases

- 5 countries with highest cumulative number of cases



United States of America



India



Brazil



Russian Federation



France

Over 1.5 million deaths

- 5 countries with highest cumulative number of deaths



United States of America



Brazil



India



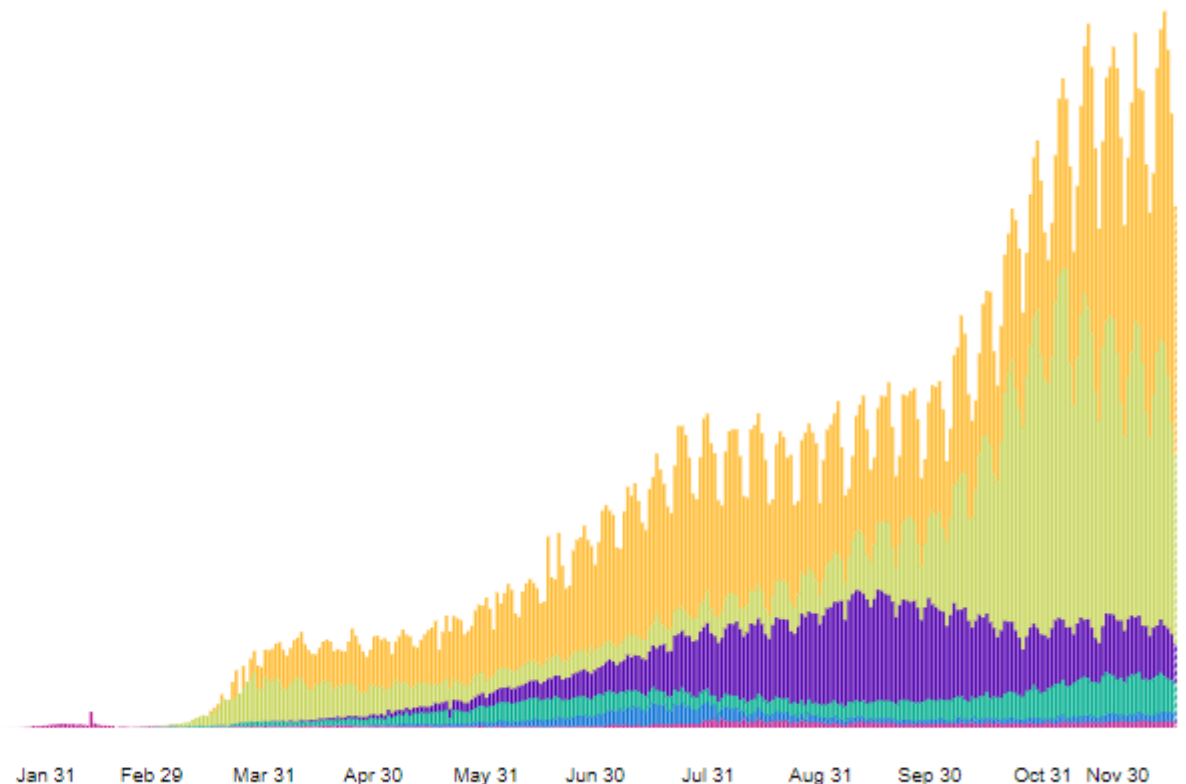
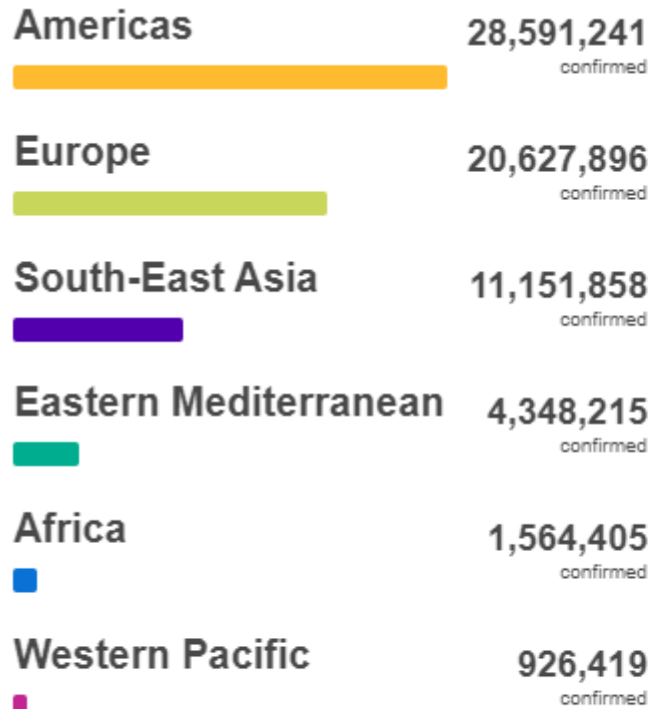
Mexico



The United Kingdom

Number of cases by WHO region

Cases reported to WHO as of 09 December 2020, 09:30AM CEST

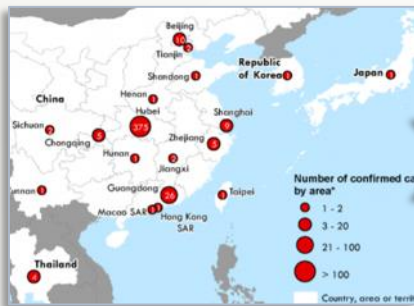


Source: World Health Organization

▨ Data may be incomplete for the current day or week.

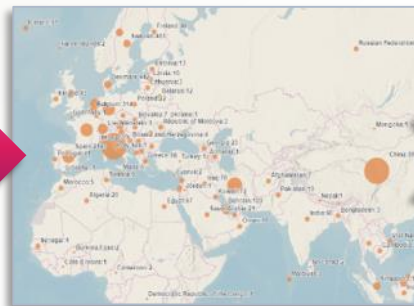
Overview of the COVID-19 pandemic

As the COVID-19 pandemic evolves around the world, it passes through several phases, raising distinct questions and challenges in each



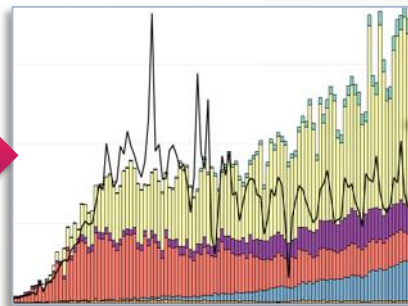
Phase 1

An unknown virus emerges



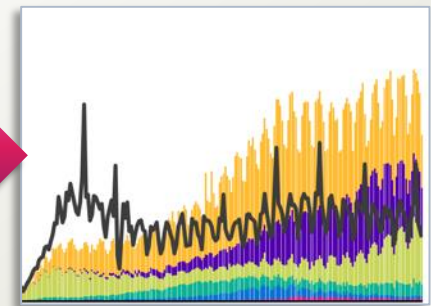
Phase 2

A pandemic unfolds



Phase 3

The pandemic accelerates

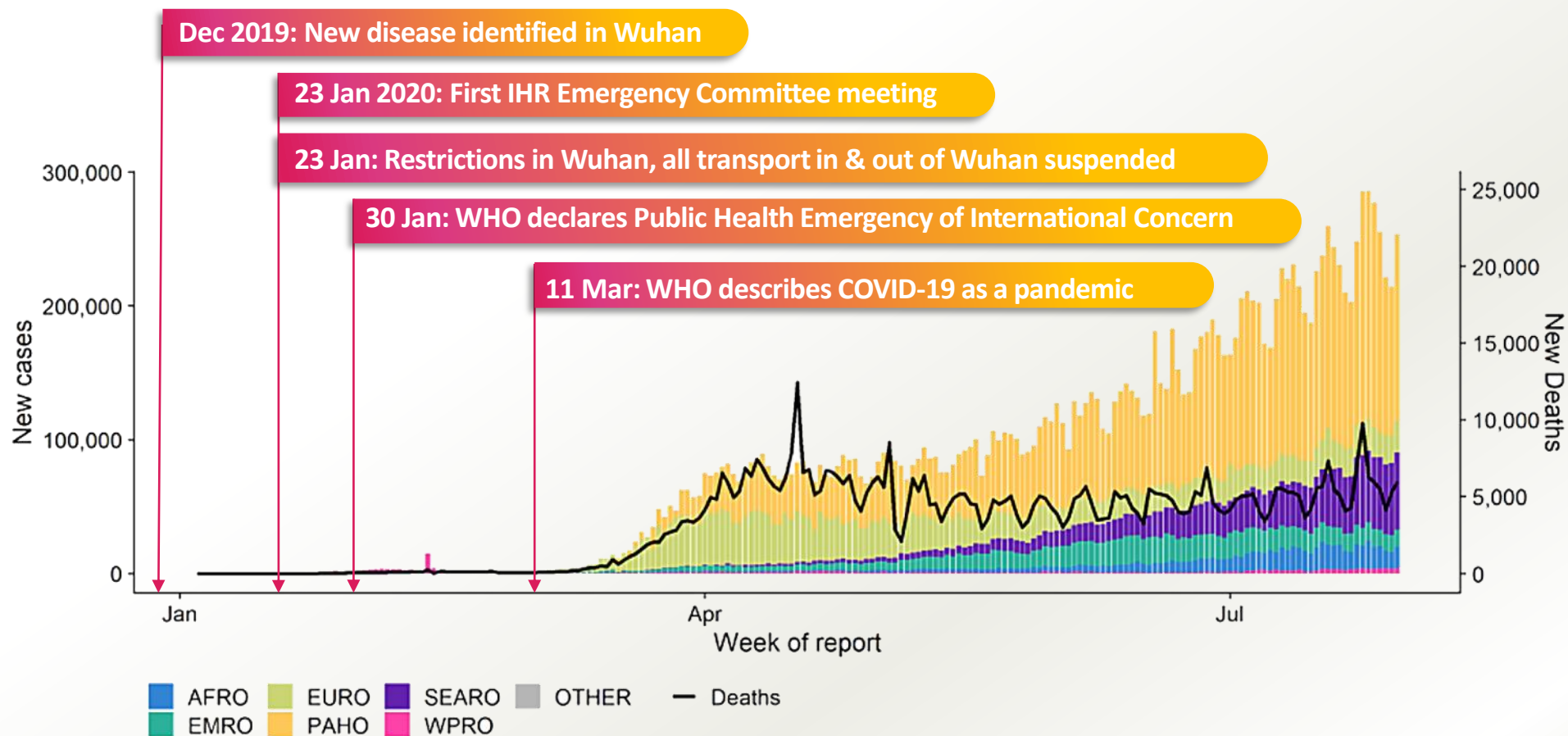


Phase 4

Where we are now

Phase 1

Initial response to the virus



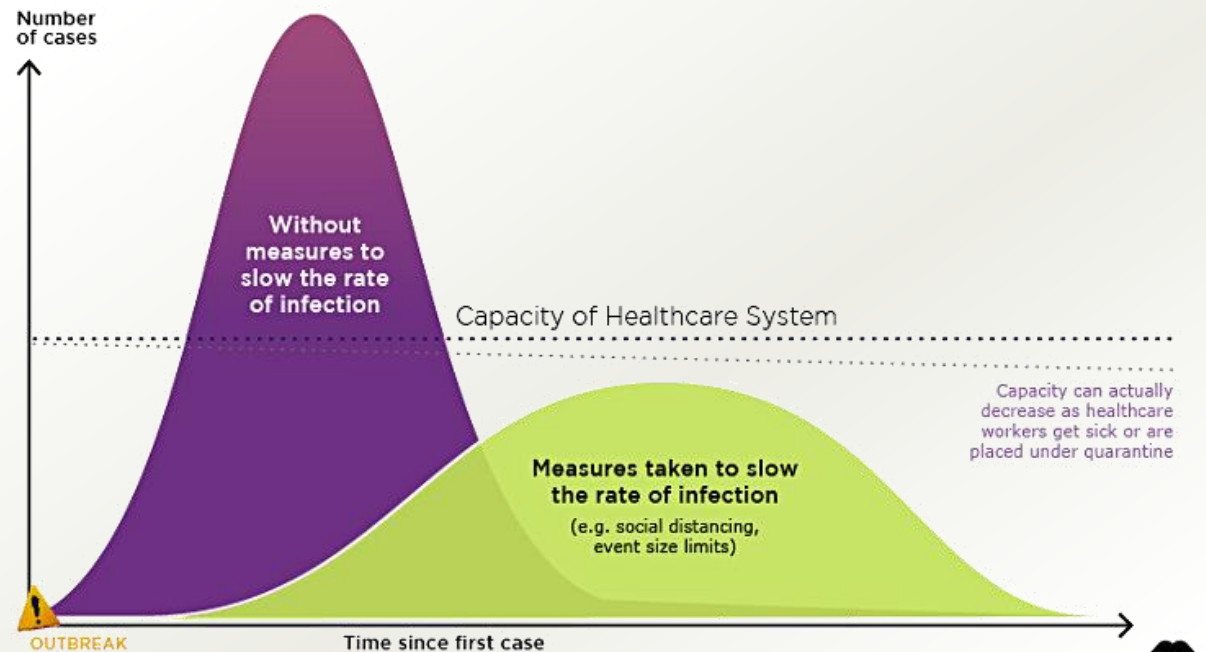
Other: two international conveyances

Phase 2

In many countries, spread of COVID-19 leads to community transmission

- Some countries manage to stop transmission with control measures
- Many countries close schools, shops, workplaces, bars, restaurants as well as borders and ask people to stay home to limit the spread of the virus

Flattening the COVID-19 Case Curve



Source: Adapted from Drew Harris, CDC

Phase 2

Health systems are under pressure even in wealthy countries

- Hospitals and health workers face rising demand to attend to a growing number of COVID-19 patients
- **Materials are in short supply:**
 - Personal protective equipment
 - Oxygen and ventilators
 - COVID-19 diagnostic tests
- **Health workers** are affected, many **lose their lives:** of all detailed case reports submitted to WHO by October 2020, 14% are health workers
- **Surge capacity** limited/non-existent in most settings
- **Usual health care is cancelled** or postponed with a major impact on other endemic or chronic diseases as well as on preventive activities such as routine immunization



Phase 3

The pandemic accelerates: impact on all of society

- **National restrictions** have a huge impact on businesses and individuals lose jobs
- The International Monetary Fund forecast global output to fall to 5% this year
- The travel sector is greatly affected by **international movement restrictions**
- Most countries introduce financial support for businesses and individuals
- Pressure mounts to re-open societies, including schools to minimize social and economic damage

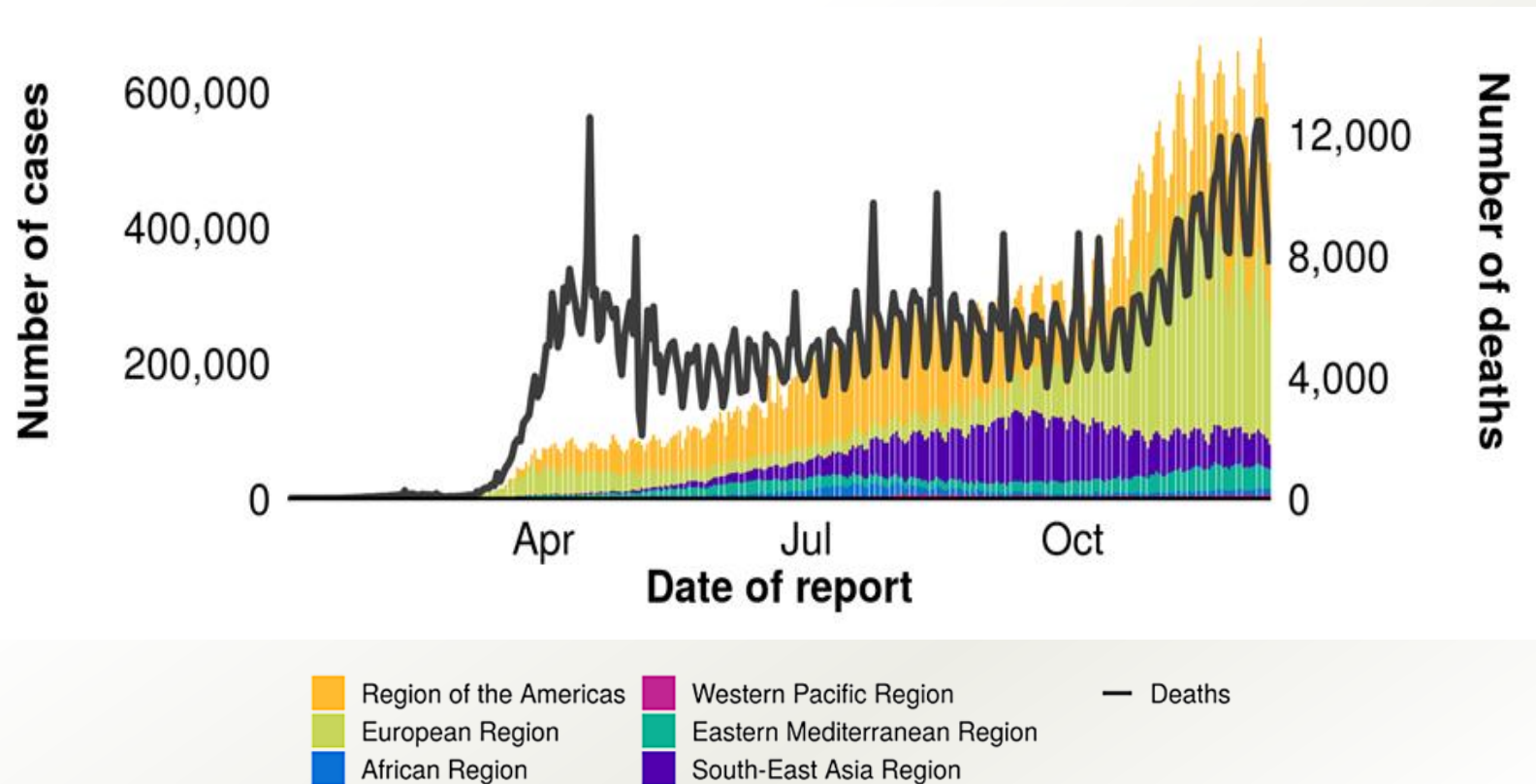
Source: www.weforum.org/agenda/2020/06/imf-lockdown-recession-covid19-coronavirus-economics-recession/



Inside Chicago O'Hare International Airport, United States of America

Phase 4

Where we are now



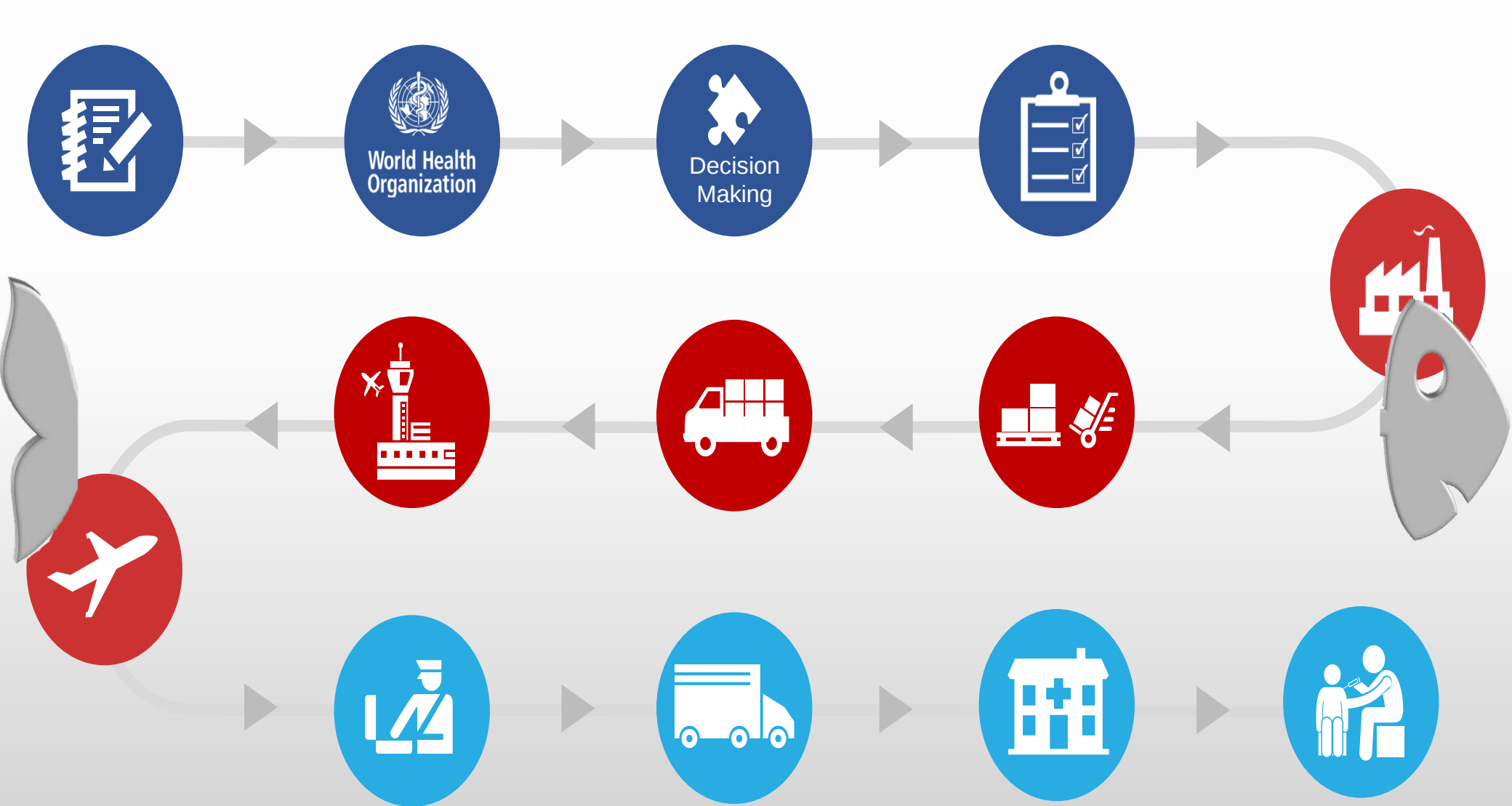
Source: WHO 09 December 2020

What if ... there is no coordination of equitable allocation of finite supplies

- First come, first serve
- Rich versus poor
- Security versus public health impact
- Wastage
- Lower public trust in safety and efficacy
- Harmful use



End to End process from vaccine discovery, production, allocation, distribution and imunization



Equitable allocation of counter-measures during epidemics

The aim is to reduce mortality (number of deaths)

- target population prone to severe disease e.g. elderly , people with underlying conditions
- Could be combined with therapeutics (e.g. antivirals in nursing home for influenza)

- **The aim is to reduce morbidity (number of cases) - impact : absenteeism, burden on health system)**

- E.g. Children and young adults to reduce asymptomatic or pauci-symptomatic transmitters
- All population

- **The aim is to protect essential services and health care system**

- Target population: health workers , essential workers



When and how to vaccinate?

When ?

- Reactive vaccination: when the outbreak has started
- Pre-emptive vaccination: just before the outbreak
- Preventive vaccination: to prevent outbreaks or protect specific populations

How to implement ?

- Routine vaccination all year round or seasonal
- Vaccination campaign.

May 2020: developing scenarios

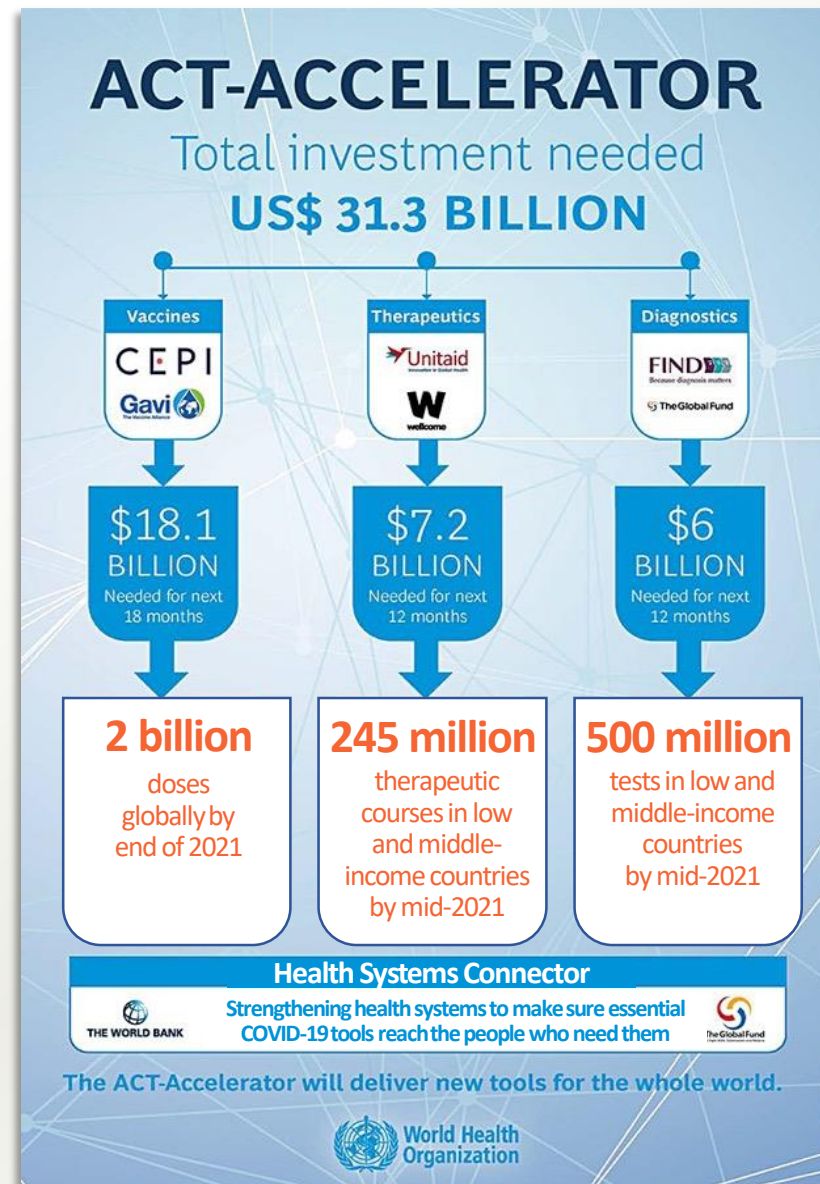
Overview of goals, hypothesis and global estimations

GOAL	Description (in accordance with goal hypothesis)	All (1 vaccine dose/ treatment course per person)	Adjusted considering a vaccine wastage rate of 15%
A - Reduce mortality 	Treatment for all severe and critical cases	93 mio	N/A
	Treatment for all mild and moderate cases	372 mio	N/A
	Vaccine for all people in high risk groups (obese, aged 65+, people with cardiovascular diseases, diabetes)	1,8 bio	2,1 bio
B- Reduce morbidity (& protect economy) 	Vaccine to prevent the disease in young and otherwise healthy adults (people aged 20-65)	4,4 bio	5,1 bio
C - Reduce spread of the virus (and protect international travel)	Vaccine for 60% of all population	4,6 bio	5,3 bio
	Post-exposure treatment prophylaxis for contacts	[930 mio – 4,6 bio] 7,7 bio	N/A 8,9 bio
	Vaccine for 100% of all population		
D - Protect essential services, health care system and vulnerable populations 	Vaccinate Health Care Workers	41 mio	47 mio
	Vaccinate people who work in essential services	[155 mio – 387 mio]	[178 mio – 445 mio]
	Vaccinate refugees, asylum seekers and internally displaced people	51 mio	59 mio

Phase 4

Global partnership

- **Access to COVID-19 Tools (ACT) Accelerator** is a global collaboration to accelerate development, production, and access to COVID-19 vaccines, therapeutics and diagnostics
 - Vaccines in development as of 26 Nov 2020
 - **164 in preclinical evaluation**
 - **49 in clinical evaluation**
 - **13 in phase III trials**
 - All top candidate vaccines are for intra-muscular injection
 - Most are designed for a two-dose schedule
 - Dexamethasone has been confirmed as a useful therapeutic treatment for severe cases
 - An antigen-based rapid diagnostic test has been approved



COVID-19 vaccine candidates in Phase III trials

- As of 26 Nov 2020 there are **49 COVID-19 candidate vaccines** in clinical evaluation of which **13 in Phase III trials**
- There are another **164 candidate vaccines in preclinical** evaluation
- Phase III trials usually require **30,000 or more participants**
- All top candidate vaccines are for **intra-muscular** injection
- Most are designed for a **two-dose** schedule (exceptions with a * in table are single dose)

10 CANDIDATE VACCINES IN PHASE III CLINICAL EVALUATION	VACCINE PLATFORM	LOCATION OF PHASE III STUDIES
Sinovac	Inactivated virus	Brazil
Wuhan Institute of Biological Products / Sinopharm	Inactivated virus	United Arab Emirates
Beijing Institute of Biological Products / Sinopharm	Inactivated virus	China
Bharat Biotech	Inactivated virus	India
University of Oxford / AstraZeneca	Viral vector *	USA
CanSino Biological Inc. / Beijing Institute of Biotechnology	Viral vector *	Pakistan
Gamaleya Research Institute	Viral vector	Russia
Janssen Pharmaceutical Companies	Viral vector	USA, Brazil, Colombia, Peru, Mexico, Philippines, South Africa
Novavax	Protein subunit	The United Kingdom
Anhui Zhifei Longcom Biopharma/ Institute of Microbiology, Chinese Academy of Sciences	Protein subunit	China
Moderna / NIAID	RNA	USA
BioNTech / Fosun Pharma / Pfizer	RNA	USA, Argentina, Brazil
Medicago Inc	VLP	Canada

<https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines>

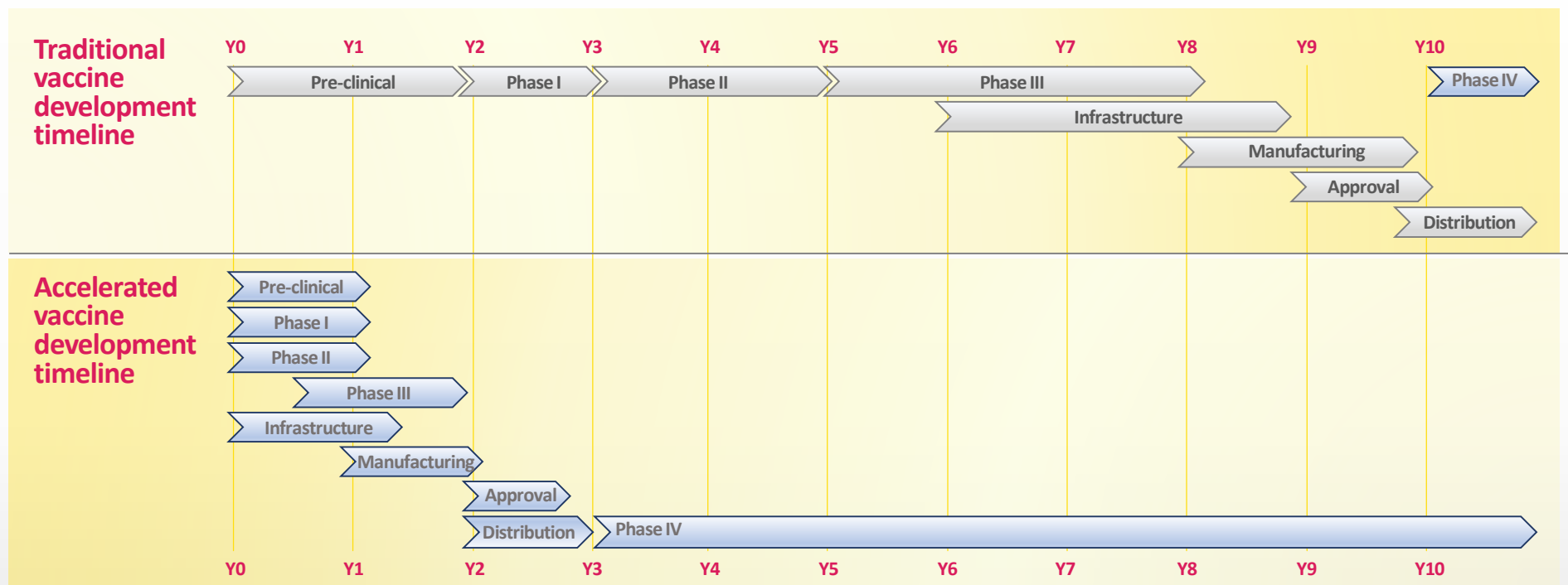
* Single dose schedule

The latest COVID-19 vaccine trial results

Company	Type	Doses	How effective*	Storage
Oxford Uni-AstraZeneca	Viral vector (adenovirus modified to carry the spike protein)	x2 	62-90%	Regular fridge temperature
Moderna	mRNA (part of virus genetic code)	x2 	95%	-20°C up to 6 months
Pfizer-BioNTech	mRNA	x2 	95%	-70°C
Gamaleya (Sputnik V)	Viral vector	x2 	92%	Regular fridge temperature

*all the efficacy results are not yet peer-reviewed

COVID-19 vaccine accelerated development



- Normal vaccine development performs each step in sequence
- To accelerate COVID-19 vaccine development, steps are done in parallel
- All usual safety and efficacy monitoring mechanisms remain in place; such as adverse event surveillance, safety data monitoring & long-term follow-up
- **Phase IV post-marketing surveillance** for side effects is critical and essential

Why there are so many COVID-19 vaccines in development

- There are many different COVID-19 vaccines in development because it is not yet known which ones will be effective and safe
- Based on experience, **roughly 7% of vaccines in preclinical studies** succeed. Candidates that reach **clinical trials have about a 20% chance of succeeding.**
- Different vaccine types may be needed for different population groups
- For example, some vaccines may work in older persons and some may not, as the immune system weakens with older age

Can we all go back to our normal life once vaccinated

- The Pfizer and Moderna vaccine trials show that COVID-19 vaccines are effective in preventing severe disease
- However, neither the Pfizer nor the Moderna vaccine trials tested whether the vaccines prevent people from being infected with the virus, that means that it's not clear whether vaccinated people could still develop asymptomatic infections and infect others
- We still don't know the duration of the immunity conferred by the vaccine
- In addition, it will take time to vaccinate everyone. Until that happens and until it's clear how well the vaccines prevent transmission, other safety measures such as physical distancing and wearing of masks may still be needed.

<https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biontech-conclude-phase-3-study-covid-19-vaccine>

<https://investors.modernatx.com/news-releases/news-release-details/modernas-covid-19-vaccine-candidate-meets-its-primary-efficacy>

<https://www.sciencenews.org/article/covid-19-coronavirus-vaccines-questions-social-distance-mask-transmission>



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www.who.int/epi-win