A year into the COVID-19 pandemic, a high speed journey. Where are we now?

THE LATEST ON THE COVID-19 GLOBAL SITUATION & HOW THE PANDEMIC SPREAD
Current global situation
Cases reported to WHO as of 28 February 2021, 10:00AM CEST

- > 113 million cases
- > 2.5 million deaths

* Data are incomplete for the current week. Cases depicted by bars; deaths depicted by line
Overview of the COVID-19 pandemic
A high-level overview of emerging issues

As the COVID-19 pandemic evolves, several distinct questions and challenges arise...

Stage 1
An unknown virus emerges

Stage 2
A pandemic unfolds

Stage 3
The pandemic accelerates

Stage 4
A multi-faceted pandemic

Stage 5
Medical counter measures
Stage 1
An unknown virus emerges

- Some cases are linked to a sea food market, in Wuhan, Hubei province, China
- Some patients die, especially older people and those with other medical conditions
- The new disease is caused by a novel coronavirus, a family of viruses known to infect animals & humans
- The infection causes respiratory disease ranging from mild to severe disease

Following advice from the IHR Emergency Committee for COVID-19, on 30 January 2020 – with around 7700 confirmed cases in China and 82 cases outside of China – WHO declares the outbreak to be a Public Health Emergency of International Concern.

At that time, no death related to COVID-19 is recorded outside China
AN UNKNOWN VIRUS EMERGES

Stage 1
Initial response to the virus

31st Dec 2019: Cluster of pneumonia detected in Wuhan
1st Jan 2020: WHO activates Incident Management Team
5 Jan: WHO issues first Disease Outbreak News
23 Jan: First IHR Emergency Committee meeting
23 Jan: Restrictions in Wuhan, all transport in & out of Wuhan suspended
30 Jan: WHO declares Public Health Emergency of International Concern
4 Feb: Strategic Preparedness & Response Plan issued
11 Mar: WHO describes COVID-19 as a pandemic
Stage 1
Research for diagnostics, vaccines and therapeutics began immediately

• After the West Africa Ebola outbreak in 2014-2016, the World Health Organization (WHO) adopted a plan for research and development (R&D) – this is known as the R&D Blueprint

• The R&D Blueprint is a global strategy to enable rapid activation of research during epidemics and fast-track development of diagnostics, vaccines and medicines.


1 https://www.who.int/teams/blueprint/covid-19
A PANDEMIC UNFOLDS

Stage 2
A pandemic unfolds

By 12 March 2020, there were **over 120,000 cases** and **over 4,600 deaths**
Stage 2
COVID-19 spreads outside China

- Mass gatherings such as religious events in the city of Daegu in South Korea, religious gatherings in Qom, Iran and the Champions League football match in Bergamo, Italy **play a key role in the spread of COVID-19**
- The case fatality ratio is higher in Italy than was reported in China. Early information that **older people are at higher risk of severe disease is reinforced**
- On **11 March 2020**, WHO characterizes the outbreak as a **pandemic**
Stage 2
Four scenarios for COVID-19 response

1. No reported cases
2. Sporadic cases
3. Cluster of cases
4. Community transmission

- Stop transmission & prevent spread
- Slow transmission, reduce case numbers & end community outbreaks
Stage 2
In many countries, spread of COVID-19 leads to community transmission

- ‘Flattening the curve’ is important as in every country, there are limited numbers of hospitals, nurses and doctors
- The capacity of the health system can be exceeded if too many people seek healthcare at the same time
- Testing, isolating positive cases, contact tracing and PHSM are important to flattening the curve
- 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
Stage 2
Implementation of Public Health & Social Measures

WHAT

- Personal protective measures
  - Hand hygiene
  - Respiratory etiquette
  - Face masks

- Social distancing measures
  - Contact tracing
  - Isolation of sick individuals
  - Quarantine of exposed individuals
  - School measures / closures
  - Workplace measures / closures
  - Avoiding crowding

- Travel-related measures
  - Travel advices
  - Travel restrictions
  - Border closure
  - Entry and exit screenings

- Environmental measures
  - Surface and object cleaning
  - Increased ventilation

HOW

The Swiss Cheese Respiratory Virus Pandemic Defence
Recognising that no single intervention is perfect at preventing spread

Each intervention (layer) has imperfections (holes).
Multiple layers improve success.

Author: Ian M Mackay, PhD (EIC) https://virologydownunder.com/wp-content/uploads/2020/12/SwissCheese-ver3.0_MUG-version.png#main
A PANDEMIC UNFOLDS

Stage 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, of all detailed case reports submitted to WHO by October 2020, 14% of the cases are health workers. Capacity building and access to adequate personal protective equipment & measures lead to the decrease of this percentage.¹

• 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

¹ Globally aggregated weekly surveillance data based on cases notified to WHO
https://apps.who.int/iris/handle/10665/336265
The pandemic accelerates

By 1 July 2020, there were over 10.3 million cases and over 503,000 deaths in 215 countries or areas and two cruise ships.

Source: WHO

The epicentre moves from Europe to the Americas
THE PANDEMIC ACCELERATES

Stage 3
Beyond the health crisis: impact on all of society

- **National restrictions** have a huge impact on businesses and individuals lose jobs
- The travel sector is greatly affected by **international movement restrictions**
- Pressure mounts to re-open societies, including schools to minimize social and economic damage

Countries start re-opening societies

The ‘first wave’ passes in countries first affected which see cases declining

Some country borders re-open and restrictions are eased, in particular during holidays in the northern hemisphere

THE PANDEMIC ACCELERATES

Stage 3
How the pandemic affects the African Region

• **In many African countries, case numbers are low.** The reported **mortality is also low** compared to European countries. There are many hypothesis to explain these differences including: low testing capacity, underreporting, young population, pre-existing cross immunity and the use of local treatments.

<table>
<thead>
<tr>
<th>WHO Dashboard</th>
<th>European region</th>
<th>African region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative cases COVID-19</td>
<td>11.1 million</td>
<td>1.3 million</td>
</tr>
<tr>
<td>Cumulative deaths COVID-19</td>
<td>285,135</td>
<td>29,785</td>
</tr>
<tr>
<td>Population size</td>
<td>750 million</td>
<td>1.3 billion</td>
</tr>
</tbody>
</table>

*Source: COVID-19 Dashboard, WHO 02 Nov 2020*
Stage 3
COVID-19 spreads more easily in certain settings

- Certain situations and activities (such as singing, exercising, shouting) are identified to be at higher risk for COVID-19 transmission:
  - Crowded places
  - Close-contact settings
  - Confined and enclosed spaces with poor ventilation
Stage 4
A multifaceted pandemic

There is sustained transmission in the US and India, a new increase of cases in Europe (2nd wave); while other countries remain COVID-19 free (e.g. New Zealand)

By 01 November, there are nearly 46 million cases and over 1.19 million deaths

Source: WHO 01 November 2020
Stage 4
Global partnership

- Access to COVID-19 Tools (ACT) Accelerator is a global collaboration end to end process, to accelerate development, production, and access to COVID-19 vaccines, therapeutics and diagnostics
  - Vaccines in development as of 1\textsuperscript{st} November 2020:
    - 154 in preclinical evaluation
    - 44 in clinical evaluation
    - 10 in phase III trials
  - Dexamethasone has been confirmed as a useful therapeutic treatment for severe cases
  - An antigen-based rapid diagnostic test has been approved
- Information on vaccines
- More information on the ACT Accelerator
Stage 4
Reaching for global solidarity

WHO has developed a framework for equitable and fair allocation of ACT accelerator products

No one is safe until everyone is safe

Tedros Adhanom Ghebreyesus
Director-General, World Health Organization

www.who.int/publications/m/item/fair-allocation-mechanism-for-covid-19-vaccines-through-the-covax-facility
Stage 4
Mis- and disinformation complicates the picture

• An infodemic is the tsunami of information – some accurate, some not – that spreads alongside an epidemic or pandemic

• Managing the infodemic has become more challenging with rapid spread of mis- and disinformation through social media

• In some countries, misinformation has generated mistrust in governments, public health authorities and science

• Managing the infodemic management is critical to managing the pandemic

More information on infodemics and risk communication

https://www.who.int/teams/risk-communication/infodemic-management
The increase of cases in Europe and the USA (2\textsuperscript{nd} wave) continues;
The first COVID-19 vaccines are rolled out;
There is growing concern about emerging variants
As of January 3\textsuperscript{rd}, more than 83 million cases and over 1.8 million deaths

Source: WHO
**Stage 5**

COVID-19 vaccine accelerated development

- As of 2\textsuperscript{nd} March 2021, there are **76 COVID-19 candidate vaccines** in clinical development of which **12 are in Phase III and 4 in Phase IV trials**
- There are another 182 candidate vaccines in preclinical development
- More than 90% of all top candidate vaccines will be delivered through **intra-muscular** injection
- Most are designed for a **two-dose schedule**

Source: 2\textsuperscript{nd} March 2021
[https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines](https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines)
Stage 5
COVID-19 vaccine development

As of 3\textsuperscript{rd} March, more than \textbf{265 million vaccine doses have been administered}:

- Different vaccines (3 platforms) have been administered (Pfizer, Moderna, Oxford/AZ, SII, Gamaleya, Sinopharm, Sinovac, Bharat Biotech)

\textbf{From Bloomberg COVID-19 vaccines tracker on Global Distribution (28\textsuperscript{th} Feb 2021)}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{chart.png}
\end{figure}

\textbf{\% of population given at least 1 dose}

- Israel: 52\%
- UAE: 35\%
- U.K.: 30\%
- Bahrain: 20\%
- Chile: 17\%
- U.S.: 15\%
- Serbia: 13\%
- Malta: 10\%
- Morocco: 10\%

\begin{itemize}
\item \url{https://www.bloomberg.com/graphics/covid-vaccine-tracker-global-distribution/}
\item \url{https://ourworldindata.org/}
\end{itemize}
## Stage 5
### COVID-19 vaccine development candidates

### 4 CANDIDATES VACCINES IN PHASE IV CLINICAL

<table>
<thead>
<tr>
<th>Vaccine platform</th>
<th>WHO EUL</th>
<th>Already in use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pfizer/BioNTech + Fosun Pharma*</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Moderna + National Institute of Allergy and Infectious Diseases (NIAID)</td>
<td>RNA based vaccine</td>
<td>X</td>
</tr>
<tr>
<td>AstraZeneca + University of Oxford*</td>
<td>Viral vector (Non-replicating)</td>
<td>X</td>
</tr>
<tr>
<td>Sinovac Research and Development Co., Ltd</td>
<td>Inactivated virus</td>
<td>X</td>
</tr>
</tbody>
</table>

### 12 CANDIDATES VACCINES IN PHASE III CLINICAL EVALUATION

<table>
<thead>
<tr>
<th>Vaccine platform</th>
<th>Already in use</th>
</tr>
</thead>
<tbody>
<tr>
<td>CureVac AG</td>
<td>RNA based vaccine</td>
</tr>
<tr>
<td>CanSino Biological Inc./Beijing Institute of Biotechnology</td>
<td>Viral vector (Non-replicating)</td>
</tr>
<tr>
<td>Gamaleya Research Institute ; Health Ministry of the Russian Federation</td>
<td>Viral vector (Non-replicating)</td>
</tr>
<tr>
<td>Janssen Pharmaceutical</td>
<td>Viral vector (Non-replicating)</td>
</tr>
<tr>
<td>Sinopharm + China National Biotec Group Co + Wuhan Institute of Biological Products</td>
<td>Inactivated virus</td>
</tr>
<tr>
<td>Sinopharm + China National Biotec Group Co + Beijing Institute of Biological Products</td>
<td>Inactivated virus</td>
</tr>
<tr>
<td>Institute of Medical Biology + Chinese Academy of Medical Sciences</td>
<td>Inactivated virus</td>
</tr>
<tr>
<td>Research Institute for Biological Safety Problems, Rep of Kazakhstan</td>
<td>Inactivated virus</td>
</tr>
<tr>
<td>Bharat Biotech International Limited</td>
<td>Inactivated virus</td>
</tr>
<tr>
<td>Novavax</td>
<td>Protein subunit</td>
</tr>
<tr>
<td>Anhui Zhifei Longcom Biopharmaceutical + Institute of Microbiology, Chinese Academy of Sciences</td>
<td>Protein subunit</td>
</tr>
<tr>
<td>Zydus Cadila</td>
<td>DNA based vaccine</td>
</tr>
</tbody>
</table>

Source: 26 February 2021
[https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines](https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines)

*Coronavirus disease (COVID-19) Pandemic – Emergency Use Listing Procedure (EUL)
Stage 5
New emerging SARS-CoV-2 variants and their implications

• New SARS-CoV-2 variants:
  ➢ Sept. 2020, a variant emerged in Denmark related to mink farming
  ➢ Variant detected in the United Kingdom in December 2020
  ➢ Variant detected in South Africa in December 2020
  ➢ 9th January 2021, variant detected in Japan among persons coming back from Brazil

• All these variants involve genetic mutations coding for the spike protein

• The spike protein of SARS-CoV-2 is targeted by most vaccines currently approved or in development; mutations of the spike protein are closely monitored

• The mode of transmission of the virus variants has not changed

• The same preventive measures continue to be effective and should continue to be implemented¹

Stage 5
Economic impacts of the COVID-19 pandemic

> 4% contraction of GDP in 2020

88-115 million people living in extreme poverty due to the crisis

9% of global working hours lost in 2020 – the equivalent of 225 million full time jobs

Lakner et al. (2020) [updated], PovcalNet, Global Economic Prospects
Stage 5

Extreme poverty is predicted to increase sharply

- Baseline analysis by the World Bank Group estimated that COVID-19 could push an additional 88 million people into extreme poverty in 2020. In the worst case scenario, it could be 115 million people.
- The largest share of the ‘new poor’ are living in South Asia and Sub-Saharan Africa.

Sources: Lakner et al. (2020) [updated], PovcalNet, Global Economic Prospects

Note: Extreme poverty is measured as the number of people living on less than $1.90 per day.
Resources

WHO Coronavirus Disease (COVID-19) Dashboard
https://covid19.who.int/

R&D Blueprint and COVID-19
https://www.who.int/teams/blueprint/covid-19

Global research and innovation forum to mobilize international action in response to the novel coronavirus (2019-nCoV) emergency

Considerations for implementing and adjusting public health and social measures in the context of COVID-19

Non-pharmaceutical public health measures for mitigating the risk and impact of epidemic and pandemic influenza
https://apps.who.int/iris/bitstream/handle/10665/329438/9789241516839-eng.pdf?ua=1

Keep health workers safe to keep patients safe: WHO

Prevention, identification and management of health worker infection in the context of COVID-19: interim guidance, 30 October 2020
https://apps.who.int/iris/handle/10665/336265

IMF: New predictions suggest a deeper recession and a slower recovery
Resources (2)

Three factors help you make safer choices during COVID-19
https://www.who.int/teams/risk-communication/covid-19-transmission

Infodemic management
https://www.who.int/teams/risk-communication/infodemic-management

COVID-19 vaccines

Fair allocation mechanism for COVID-19 vaccines through the COVAX Facility
https://www.who.int/publications/m/item/fair-allocation-mechanism-for-covid-19-vaccines-through-the-covax-facility

Draft landscape and tracker of COVID-19 candidate vaccines
https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines

Bloomberg
https://www.bloomberg.com/graphics/covid-vaccine-tracker-global-distribution/

Our World in Data
https://ourworldindata.org/

World Bank

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