World Health Organization

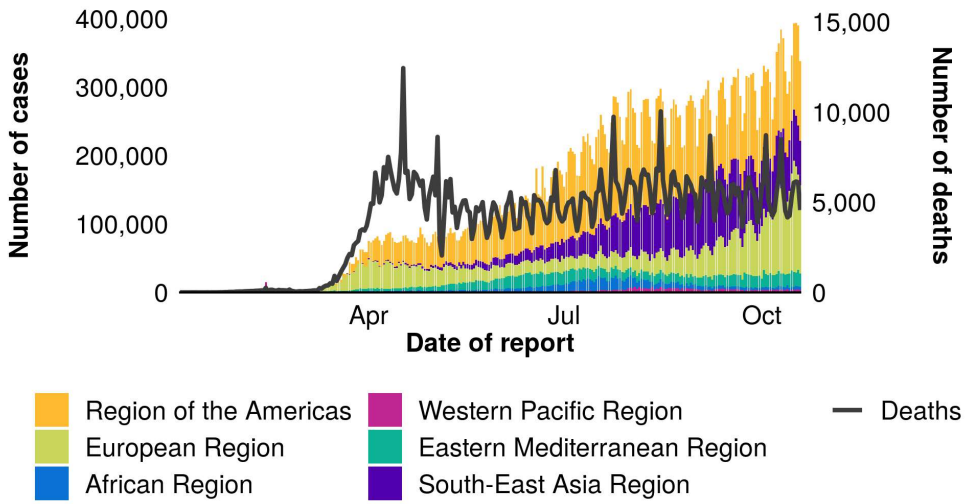
COVID-19 : Lessons for Public Health and Clinical Practice

Dr. Soumya Swaminathan
Chief Scientist

Global Situation

(as of 19 October 10H CEST)

- **Previous 24 hours:**
  - 338,096 new confirmed cases.
  - 4,556 new deaths.
- **Cumulative:**
  - 39,944,882 confirmed cases.
  - 1.1 million deaths.



Countries with the highest number of new cases in previous 24 hours

Country	New Cases	Total Cases	New Deaths	Total Deaths
India	55,722	7,550,273	579	114,610
United States of America	52,508	8,019,237	588	217,659
France	29,833	867,978	85	33,204
Brazil	24,062	5,224,362	461	153,675
United Kingdom	16,981	722,413	67	43,646
Russian Federation	15,982	1,415,316	179	24,366
Argentina	13,510	979,119	384	26,107
Italy	11,705	414,241	69	36,543
Poland	8,536	175,766	49	3,573
Netherlands	8,439	228,234	23	6,751

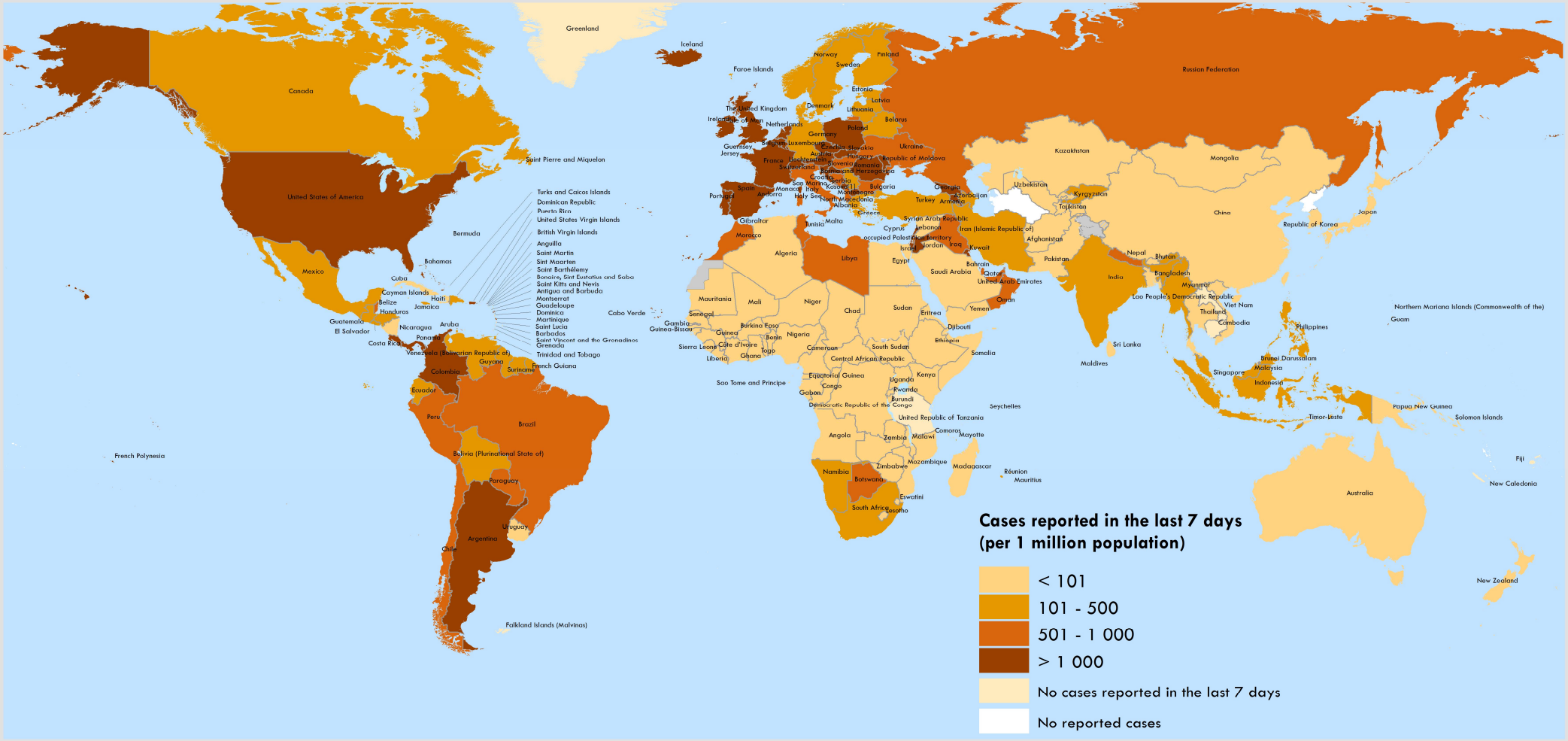
World Health Organization

HEALTH EMERGENCIES programme

COVID-19 cases reported in the last 7 days per 1 million population

(from 12 October 2020, 10:00AM to 18 October 2020, 10:00AM (CEST))

World Health Organization



***Data Source**: World Health Organization,*
United Nations Population Division (population prospect 2020)
***Map Production**: WHO Health Emergencies Programme*

Not applicable

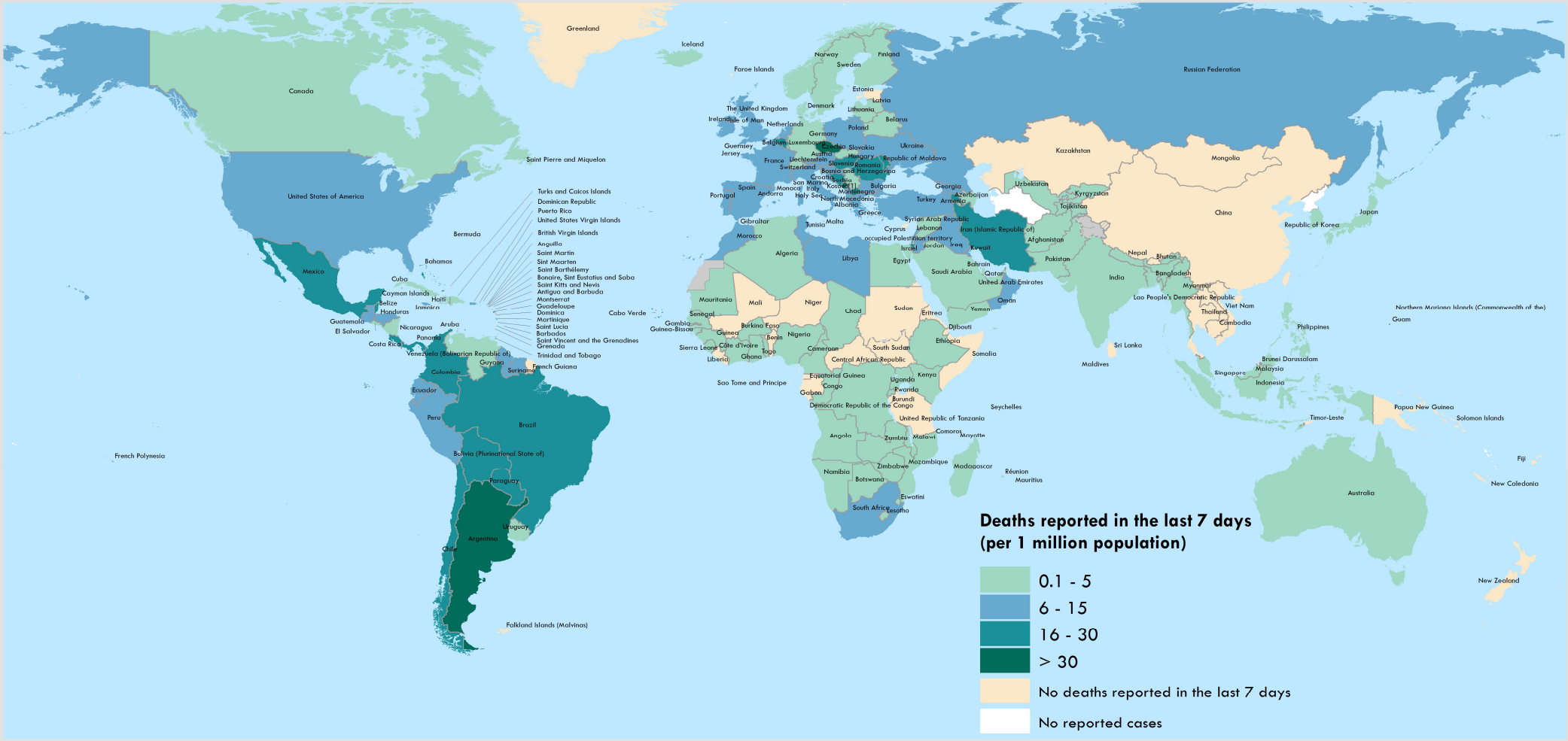
0 2,500 5,000 km

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement. [1] All references to Kosovo in this document should be understood to be in the context of the United Nations Security Council resolution 1244 (1999). Number of cases of Serbia and Kosovo (UNSCR 1244, 1999) have been aggregated for visualization purposes.

COVID-19 deaths reported in the last 7 days per 1 million population

(From 12 October 2020, 10:00AM to 18 October 2020, 10:00AM (CEST))

World Health Organization



***Data Source**: World Health Organization,*
United Nations Population Division (population prospect 2020)
***Map Production**: WHO Health Emergencies Programme*

Not applicable

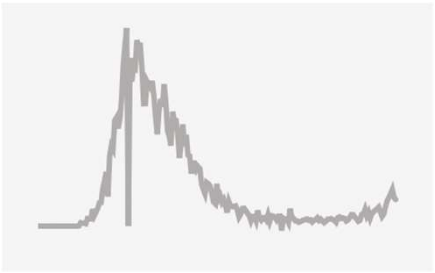
0 2,500 5,000 km

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement. [1] All references to Kosovo in this document should be understood to be in the context of the United Nations Security Council resolution 1244 (1999). Number of cases of Serbia and Kosovo (UNSCR 1244, 1999) have been aggregated for visualization purposes.

COVID-19: currently facing different transmission situations

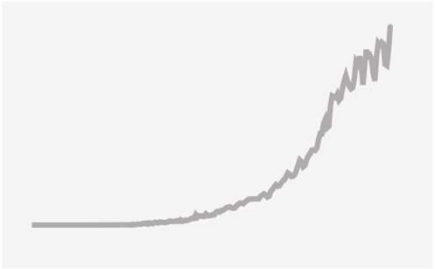
Avoided large outbreaks

Major outbreak brought under control



Major outbreak brought under control, but having eased restrictions, are now seeing resurgence

Intense transmission



COVID-19 Challenges and Lessons Learned

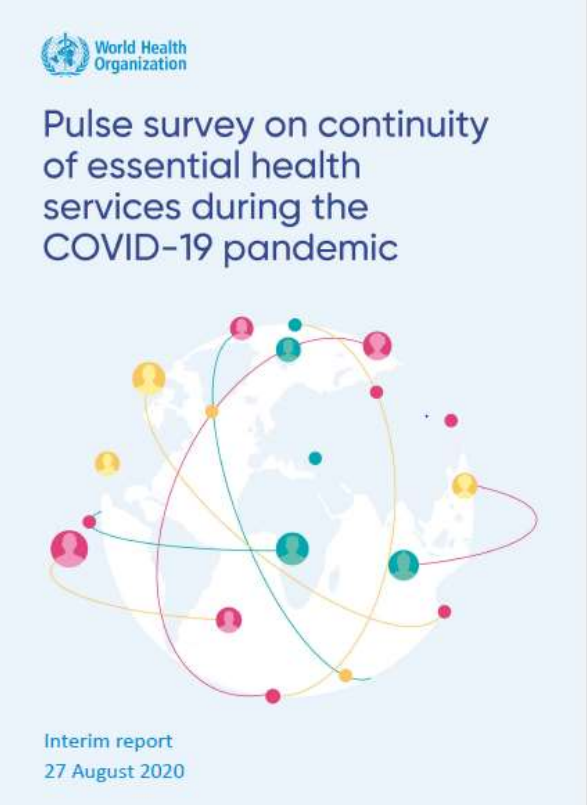
Health systems facing COVID-19 outbreak

- Huge stress posed by increasing demand for care of people with COVID-19
- Lack of supplies and equipment
- Burden on health care workers
- Disruption of essential health services

Dilemma: balance the demands of responding to COVID-19 with strategic planning and coordinated action to maintain quality essential health services

World Health Organization

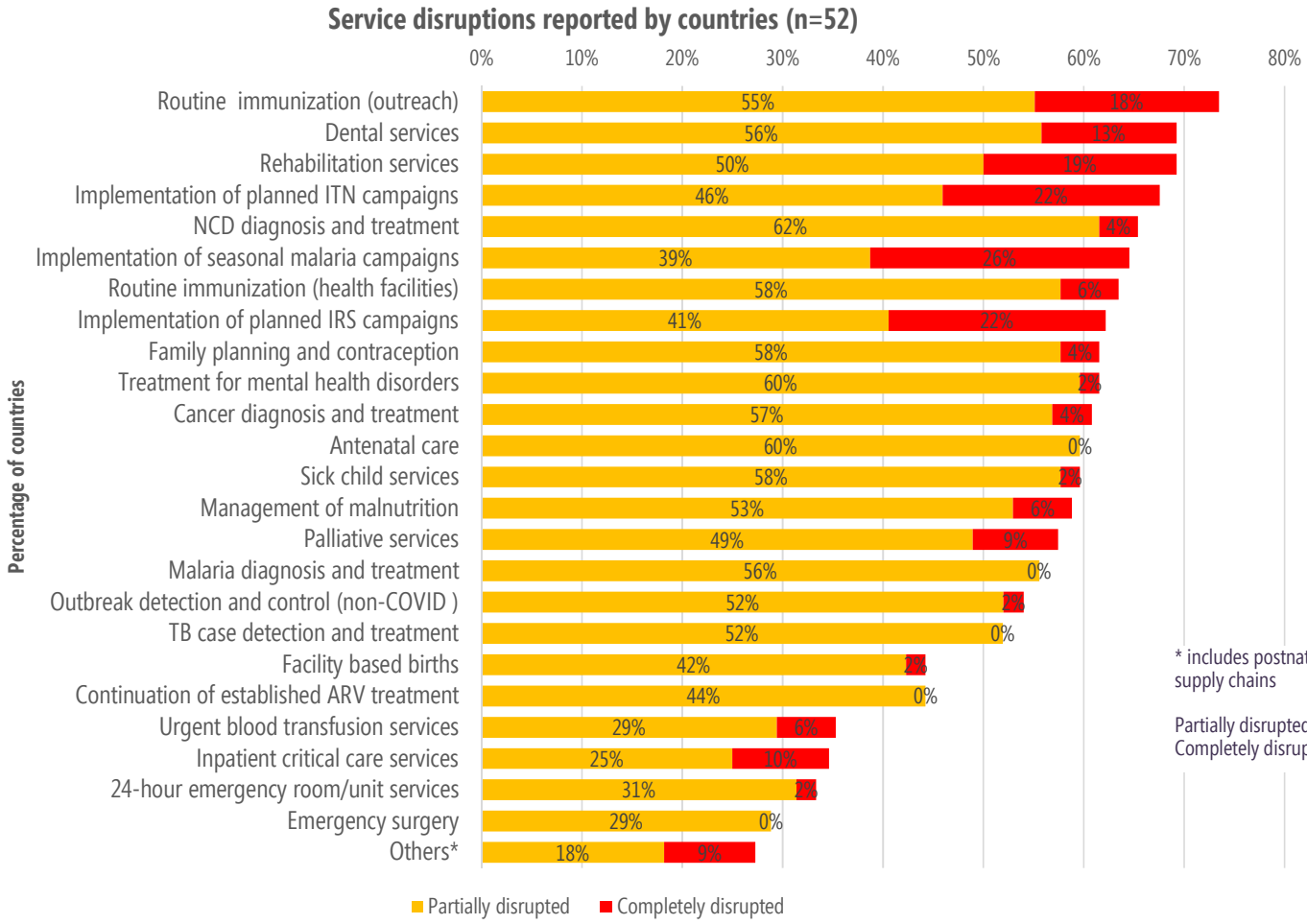
Pulse survey on continuity of essential health services during the COVID-19 pandemic



- 80% of countries had a defined essential health services package prior to the outbreak
- 66% of all countries had identified a core set of services to be maintained during the COVID-19 pandemic
- The Eastern Mediterranean Region was the most affected, followed by the African and the South-East Asia Regions. Essential health services in the countries in the European and the Western Pacific Regions were least affected
- **Most frequently disrupted Essential health services** were routine **immunization** services – outreach services (70%) and facility-based services (61%) – **noncommunicable disease diagnosis and treatment** (69%), **family planning and contraception** (68%)**,** **treatment for mental health disorders** (61%), **antenatal care** (56%) and **cancer diagnosis and treatment** (55%).

World Health Organization

Countries reporting disruptions (partially or completely) across 25 essential health services

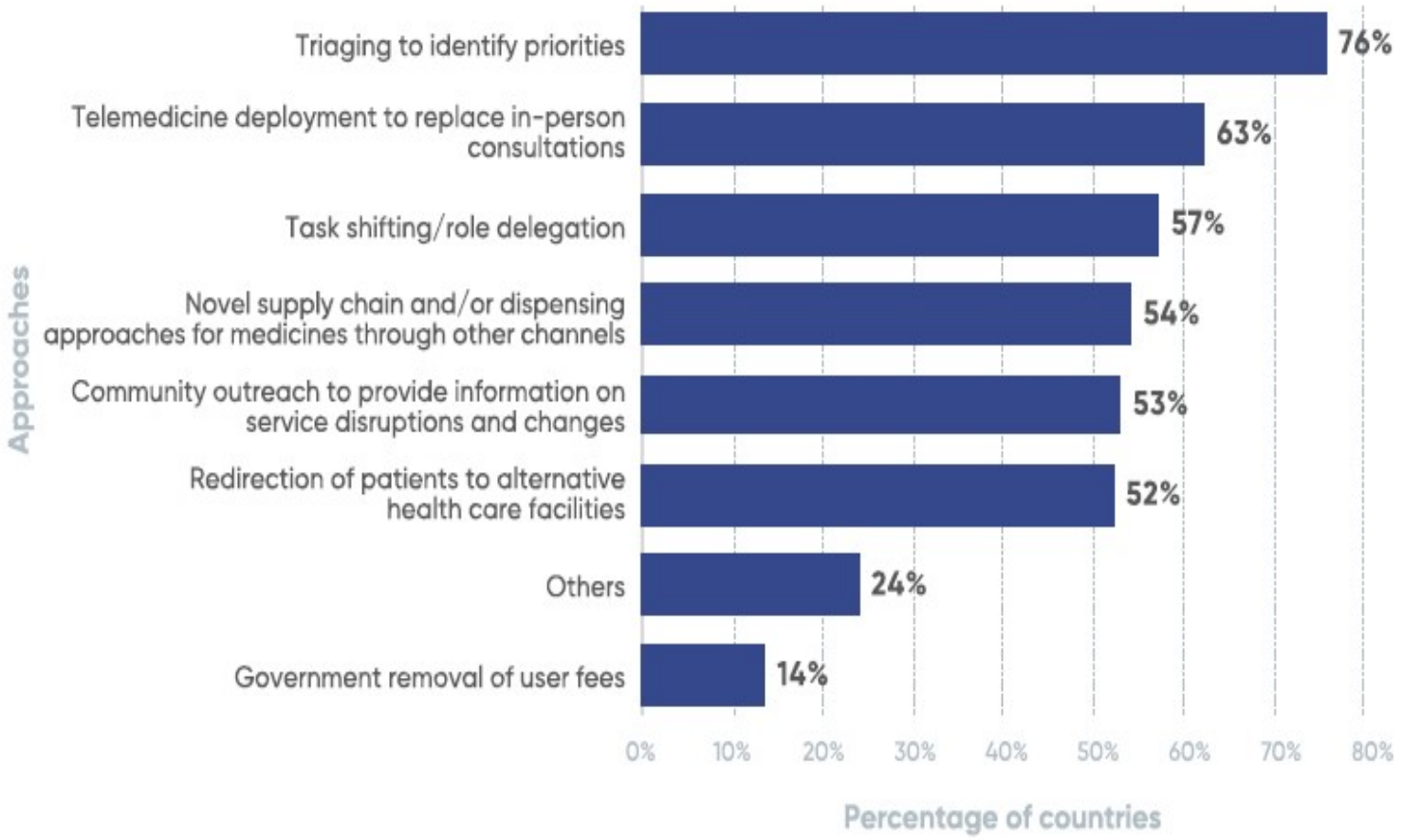


* includes postnatal care, school-based programmes, elective surgery, and medicine supply chains

Partially disrupted: 5% to 50% of patients not treated as usual
Completely disrupted: more than 50% of patients not treated as usual

World Health Organization

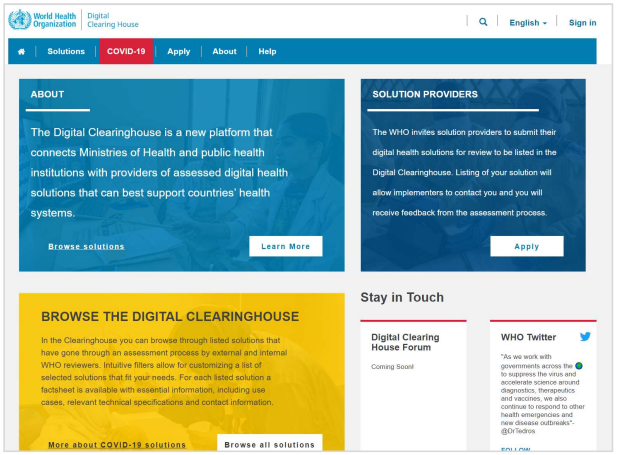
Approaches for overcoming health services disruptions

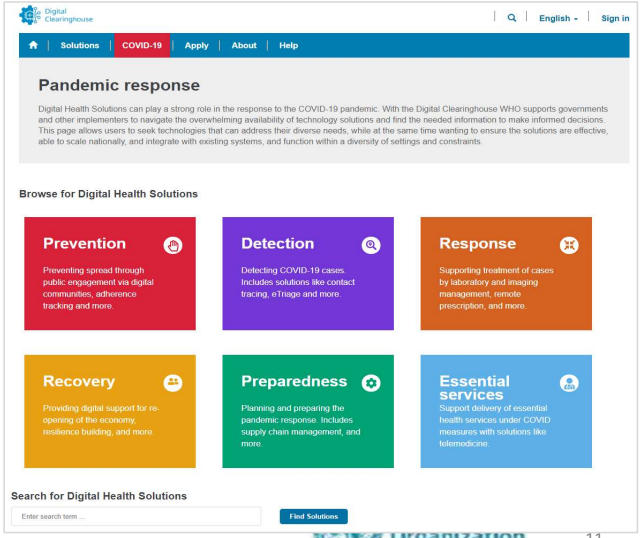


World Health Organization

Digital Health technologies

- Telemedicine
- Global Learning Collaborative Platforms (eg ECHO)
- Electronic, portable health records
- What technologies can be considered public health goods?
- WHO Digital Health Clearing House (A **digital platform** that connects **Ministries of Health** with **providers of assessed digital health solutions** that can best support **countries' response to COVID-19 and other health domains)**





A new paradigm - (Virtual) Shared Medical Appointments

BENEFITS FOR PATIENTS

Improved patient engagement

Higher patient knowledge & satisfaction

Shorter waits for appointments

Higher compliance to medications

Higher follow-up rates over time
as patients form bonds with their peers

Improved clinical outcomes

Reduced flare-ups and emergency room visits

BENEFITS FOR PROVIDERS

Higher productivity

Expanded access

Reduced cost of no shows

Reduced long-term patient costs

Reduced repetition → higher quality interactions

Greater doctor satisfaction

Lower environmental footprint

COVID-19 Country Case Studies

- Strong political leadership and successful mobilization of resources using a whole-of-society approach
  - Gain the trust of the public and ensure public compliance with public health measures
  - Whole-of- Government response to the pandemic
- **Government cash assistance** to people unemployed by the lockdown
- Early activation of a strong response system
- Long-term country investment to strengthen the health emergency response after previous epidemics and essential public health services
- Early contact tracing, quarantine and travel restriction measures
- Assessment of risks (existing and projected) at all levels of healthcare facilities
- Identifying extra 'surge' capacity each healthcare facility needs to cope with COVID-19 and non-COVID-19 related health emergencies

Figure: The message of the King of Bhutan on the website's homepage of the Royal Government of Bhutan.

Figure: mobile COVID-19 testing laboratory Morocco.

COVID-19: THAILAND
Suvarnabhumi International Airport

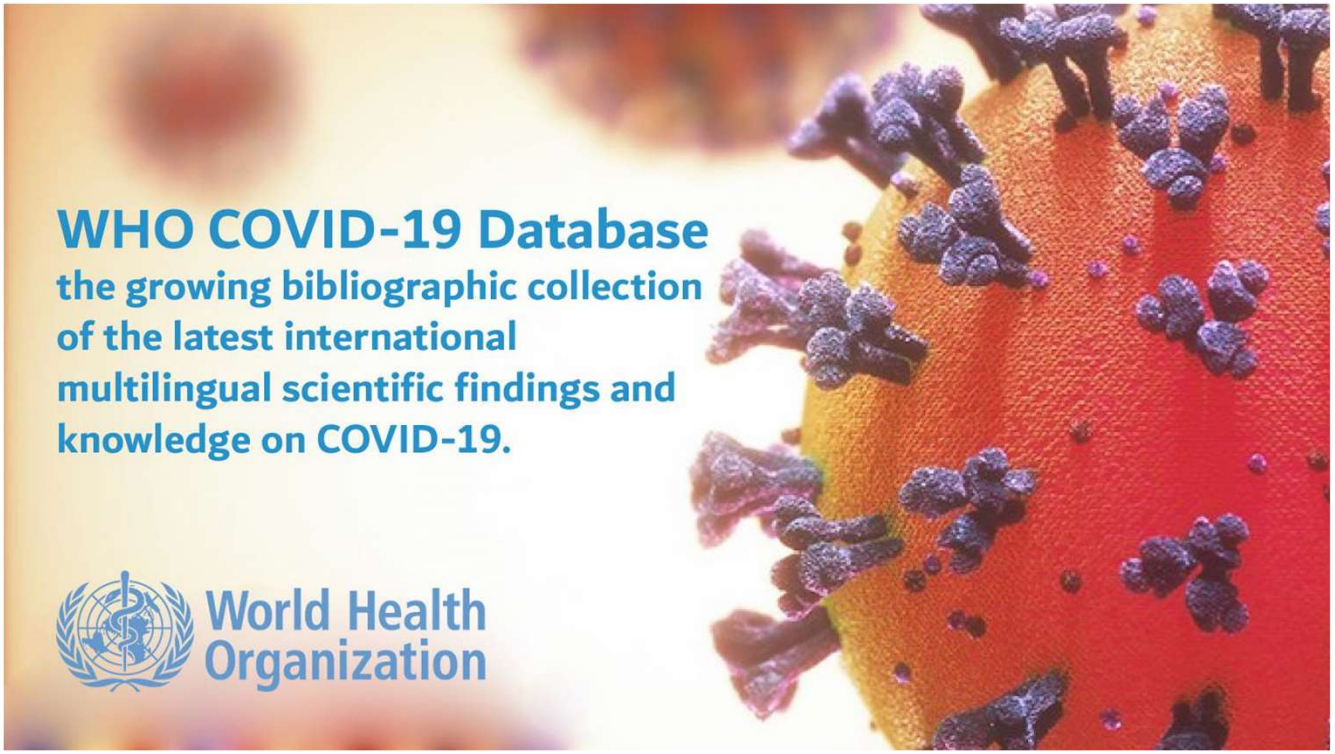
Doctors and nurses of a major hospital in Viet Nam, Bach Mai hospital, expressed their commitment and solidarity with the rest of the world in the fight against COVID-19. Photo credit: WHO Viet Nam

WHO providing on the job support to Seke District RRT team at Beatrice Isolation Centre in Mashonaland East Province. Here, WHO is helping them enter new cases into the ODK platform

World Health Organization

WHO COVID-19 Database of scientific publications

- ✓ 90,000 citations and growing since March 2019
- ✓ Extended scope with inclusion of preprints and clinical trials
- ✓ More powerful software for screening and generating backbone of content
- ✓ 3000+ active users/day
- ✓ User feedback on one-stop convenience



https://search.bvsalud.org/global-literature-on-novel-coronavirus-2019-ncov/

World Health Organization

WHO's normative function: leading policy & technical guidance

Steering policy through:
- HQ-Regional leadership
- 45 Global Health Leaders
- STAG-IH

Convening experts for guidance development:
- Technical guidance published by WHO

- Surveillance
- Clinical management
- Laboratory
- Supply & logistics
- Modeling
- Infection prevention & control

hundreds experts
100s calls

Critical preparedness, readiness and response actions for COVID-19	Surveillance, rapid response teams, and case investigation	Surveillance, rapid response teams, and case investigation
Country-level coordination, planning, and monitoring	Clinical care	Infection prevention and control/WASH
The Unity Studies: Early Investigations Protocols	Essential resource planning	Guidance for schools, workplace and institutions
Risk communications and community engagement	Virus origin/Reducing animal-human transmission	Points of entry/mass gatherings

As of 12 May 2020

Update on published SARS-CoV-2 seroepidemiology

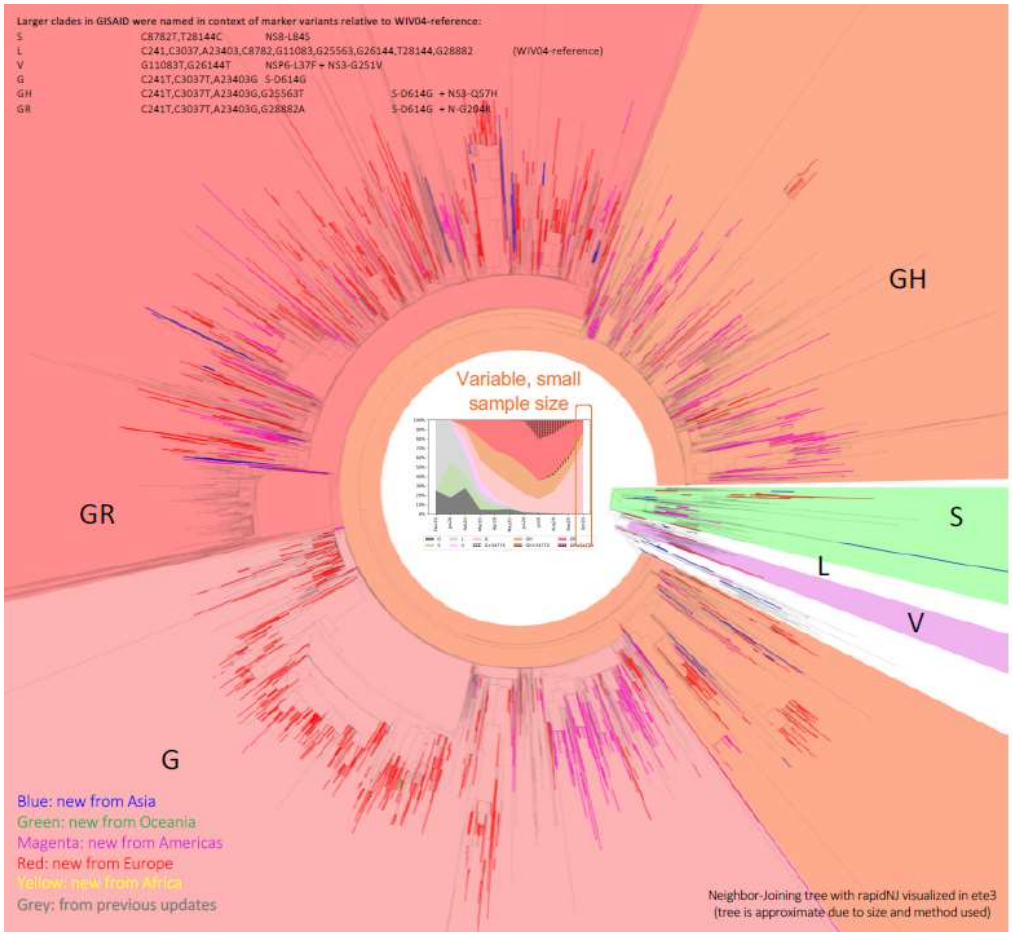
As of end September 2020:

- **>140** peer-reviewed publications and pre-print manuscripts plus **>10** government reports

Available results

- Most study results suggest <10% seroprevalence
- Few studies suggest >20% in areas of higher transmission intensity and/or among frontline workers
- Serial sampling studies show an increasing fraction of the population has been exposed to SARS-CoV-2
- Few studies have stratified results by age or by the same age categories;
  - available studies suggest that younger children appear to have lower rates of infection when compared to adults; adolescents appear to have similar seroprevalence to adults
- Longitudinal cohort and individual studies are limited, so there is currently limited information on persistence of immunity

Full genome tree derived from all outbreak sequences 2020-10-20



Full genome tree derived from all outbreak sequences 2020-10-20

Notable changes:

138,569 full genomes (+2,864) (excluding low coverage, out of 148,257 entries)

Updated clades:
S clade 6,417 (+59)
L clade 4,214 (+33)
V clade 5,258 (+7)
G clade [#S477X] 32,192 [101] (+1,221 [+9])
GR clade [#S477X] 54,064 [7,357] (+887 [+6])
GH clade [#S477X] 32,574 [671] (+644 [+53])
Other clades 3,850 (+13)

We gratefully acknowledge the Authors from Originating and Submitting laboratories of sequence data on which the analysis is based.

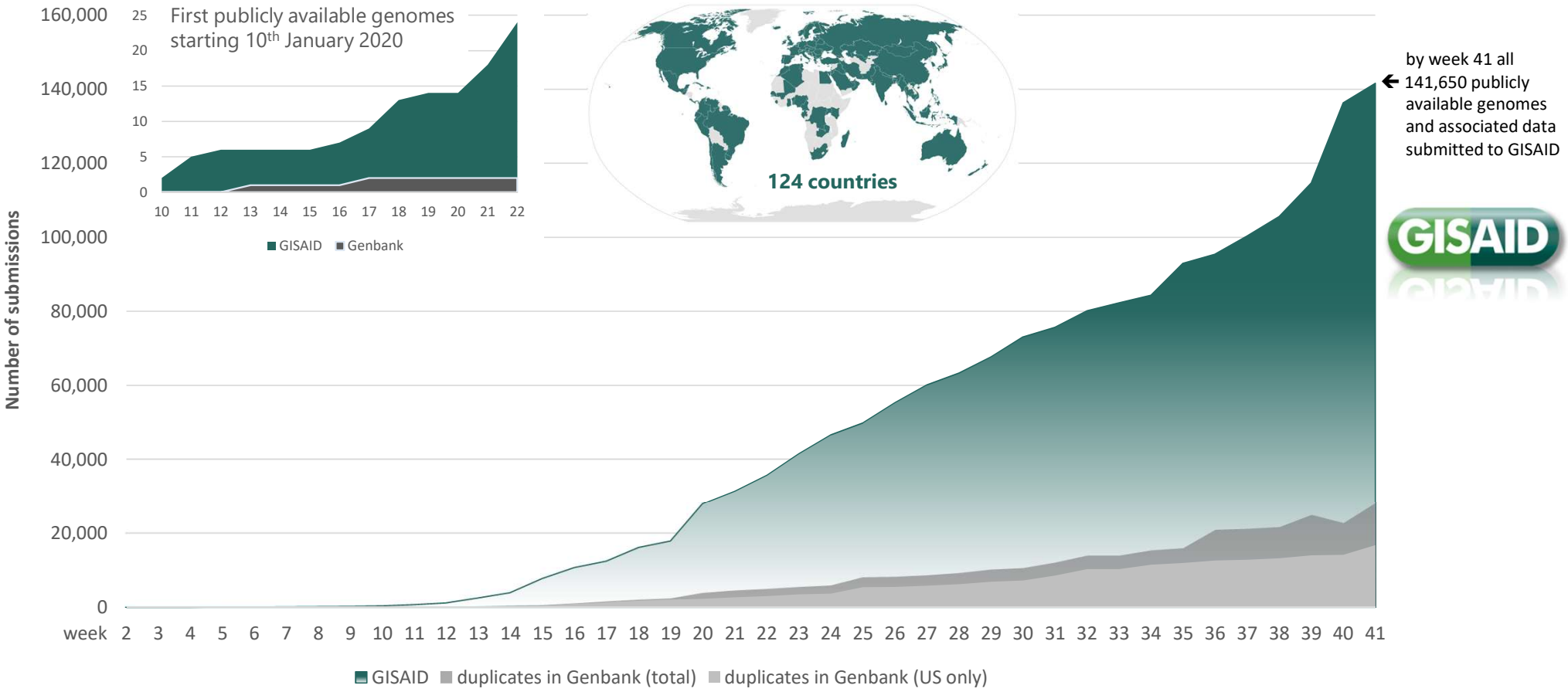
GISAID

by BII/GIS, A*STAR Singapore

World Health Organization

Real-time data sharing is not achieved by governmental Regulations

… it is incentivized by the confidence in transparent sharing mechanisms



Genomic sequence data is important for the response

- Development of first diagnostics kits and refinement through ongoing surveillance for mutations
- Identification of potential drug and vaccine targets through repurposing
- Genomic epidemiology allows analysis of the exportation and importation events of viruses between countries, contact-tracing in countries, or identification of nosocomial transmission chains
- Evidence that the virus has not drifted to significant strain difference, with in particular the cell receptor binding pocket appearing stable
- Identification of animal precursors (in bats and pangolins)

World Health Organization

GISAID was ready for Disease X ==> newly emerging coronavirus

XINHUANET

31-Dec-2019

Viral pneumonia cases reported in central China

14-Jan-2020

World Health Organization (WHO) @WHO

Replying to @WHO @WHOWPRO and @DrTedros

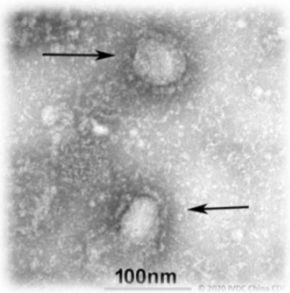
Whole genome sequences for the novel #coronavirus (2019-nCoV) from the Chinese authorities were shared with WHO and have also been submitted by Chinese authorities to the GISAID platform so that they can be accessed by public health authorities, laboratories and researchers.

CORONAVIRUS (2019-nCoV)

World Health Organization Western Pacific and Tedros Adhanom Ghebreyesus

08-Jan-2020

It is a novel coronavirus



2020-01-08

Complete genomes sequenced

Less than 48 hours

2020-01-10

Shared with the world via GISAID

FASTA

>hCoV-19/Wuhan/IVDC-HB-01/2019|EPI_ISL_402119|

ATTAAAGGTTTATACCTTCCCAGGTAACAAACCAACCAACTTTCGA

AATCTGTGTGGCTGTCACTC

AT

10-Jan-2020

BetaCoV/Wuhan/IVDC-HB-01/2019 EPI_ISL_402119 via GISAID EpiCoV™

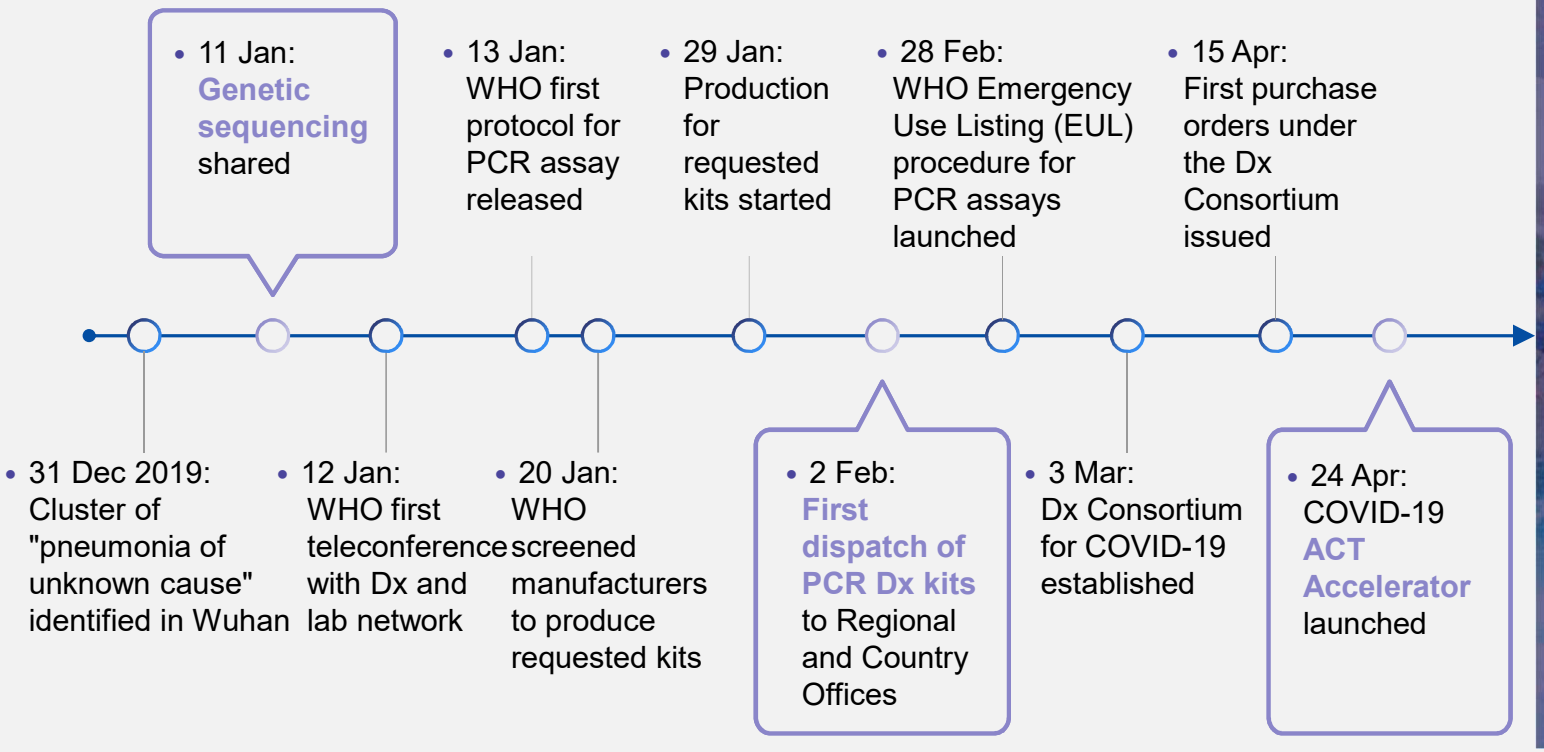
World Health Organization

COVID-19 Therapeutics, Diagnostics and Vaccines

ACT Accelerator

- Accelerate the development of diagnostics, therapeutics and vaccines
- Ensure fair and equitable access across the world
- Led by WHO with countries and many global partners
- Covax the vaccine pillar
- Over 200 vaccines in development, 40 in clinical trials
- 60 to 70% of the world's population will need to be immunized
- Public health and social measures needed till 2022

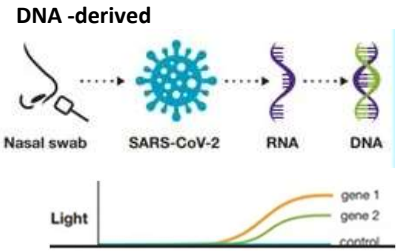
Development of diagnostics for COVID-19 has followed an accelerated timeline



To date: **23 million tests procured** across partners (Global Fund, GDF/StopTB, PAHO, UNDP, Unicef, WHO) with **over 18 million in transit or delivered**

SARS-CoV-2 Diagnostics

- Nucleic Acid Amplification Test (e.g. rRT-PCR)
  - Reference method for diagnosis of active infection
  - More sensitive than viral culture
  - Limited access globally, especially outside major cities

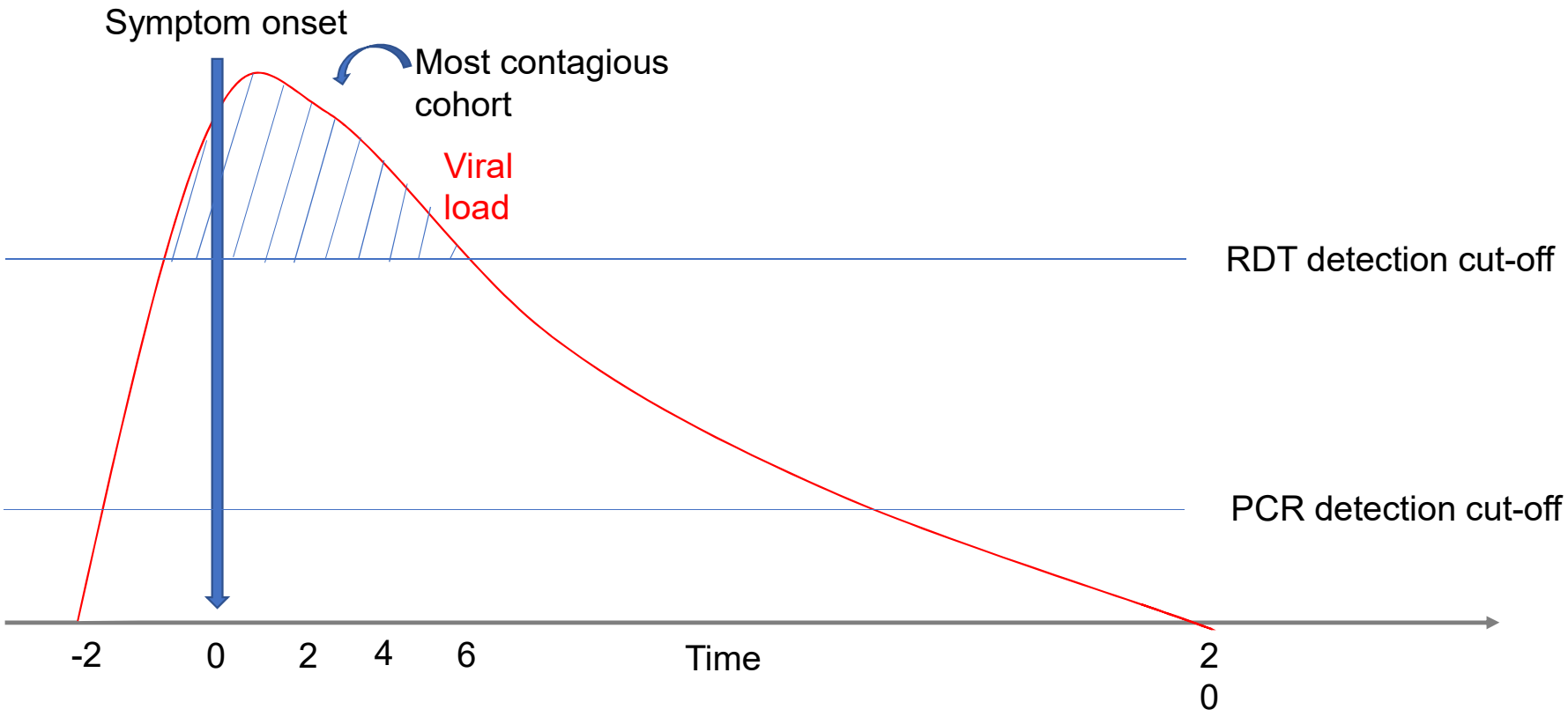


- Antigen detection (Ag RDT)
  - Simple-to-use lateral flow format, relatively inexpensive, fast
  - Detects most infectious individuals
  - Sensitivity and specificity lower than PCR

- Antibody detection
  - Reliably sensitive only after 2nd to 3rd week of illness
  - Useful in epidemiologic studies, not for acute patient management

World Health Organization

Who can be detected with an Ag RDT?



Repurposed antiviral drugs for COVID-19
Interim WHO SOLIDARITY trial results

Results submitted to the
New England Journal of Medicine,

and posted on MedRxiv on October 15, 2020
https://www.medrxiv.org/content/10.1101/2020.10.15.20209817v1

DISCLAIMER: interim SOLIDARITY trial results does not necessarily represent the views of the WHO.

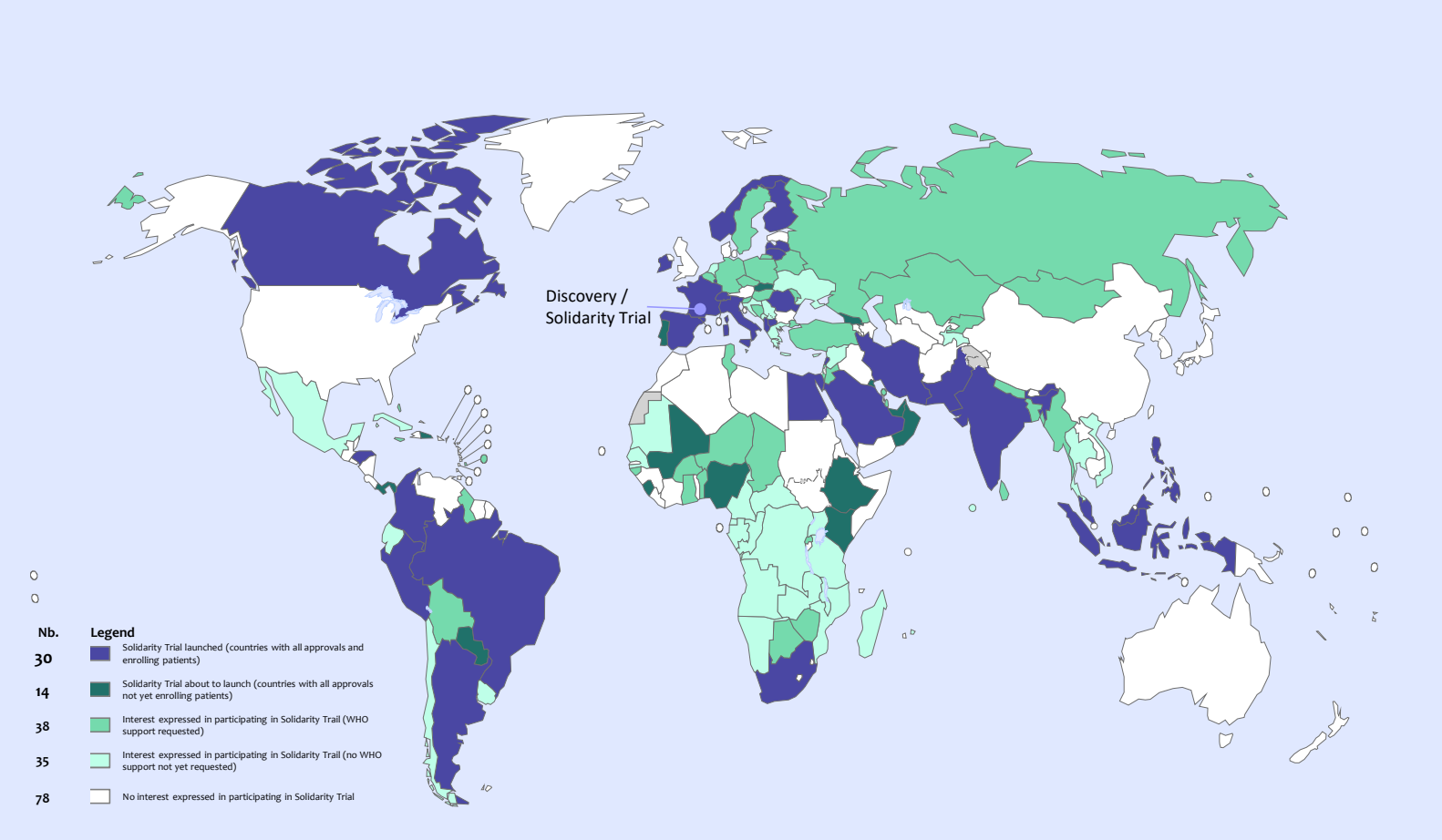
World Health Organization

WHO SOLIDARITY randomised trial of 4 drugs for hospitalised COVID

- **Remdesivir (intravenous)**
  - Day 0, 200mg; days 1-9, 100mg.
- **Hydroxychloroquine (oral)**
- **Lopinavir-ritonavir (oral)**
- **Interferon ß1a (mainly subcutaneous)**

WHO Solidarity COVID therapeutics trial

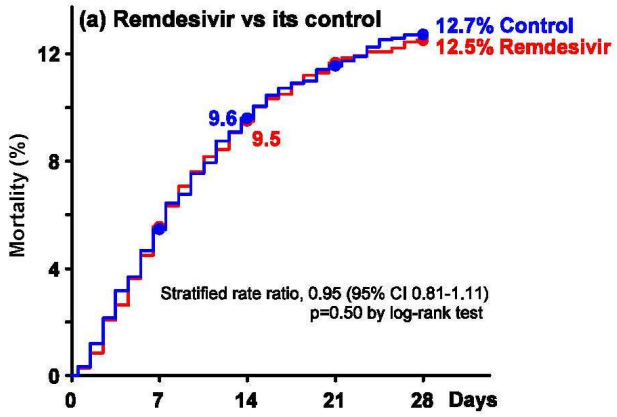
>400 hospitals in >30 countries (purple: already started) enrolling >12,000 inpatients



World Health Organization

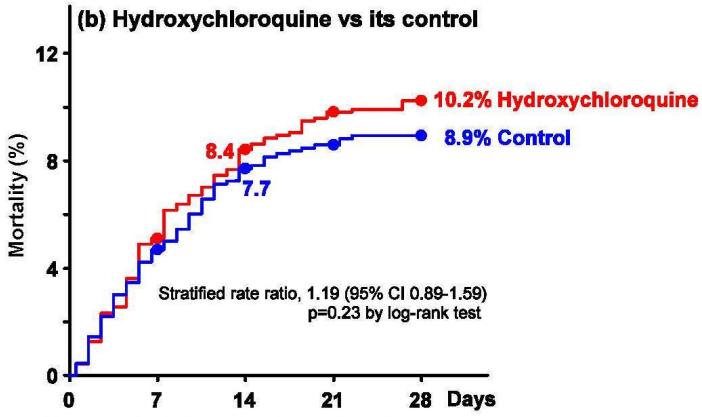
R&DBlueprint
Powering research to prevent epidemics

Little effect of the 4 study drugs on 28-day mortality



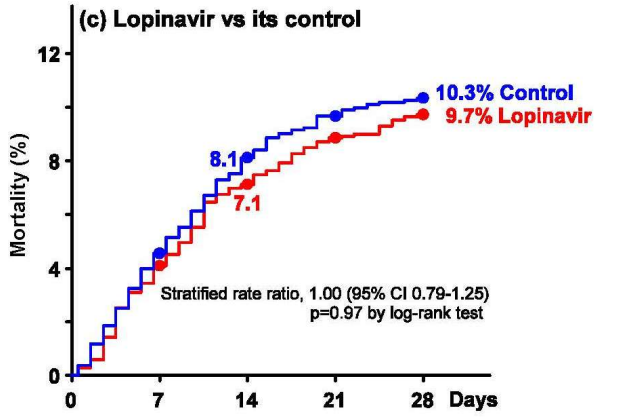
Nos. at risk at start of each week, and nos. dying

Remdesivir	2743	129	2159	90	2029	48	1918	18	1838	16
Control	2708	126	2138	93	2004	43	1908	27	1833	14



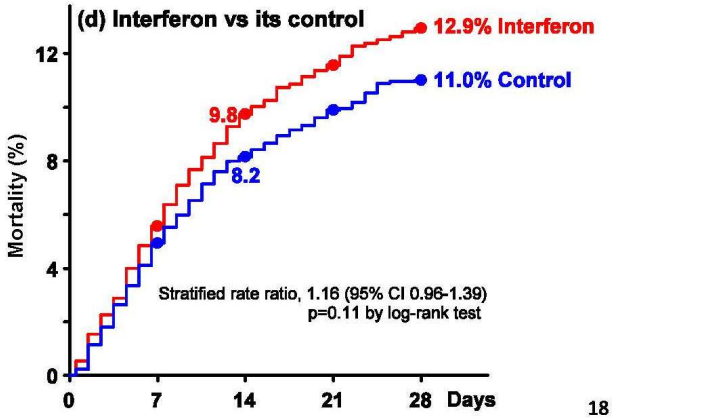
Nos. at risk at start of each week, and nos. dying

Hydroxychlor.	947	48	889	31	854	13	838	6	833	6
Control	906	42	853	27	823	8	814	4	809	3



Nos. at risk at start of each week, and nos. dying

Lopinavir	1399	57	1333	42	1282	24	1257	15	1243	10
Control	1372	62	1293	48	1239	21	1216	10	1203	5



Nos. at risk at start of each week, and nos. dying

Interferon	2050	101	1669	73	1554	31	1483	24	1410	14
Control	2050	91	1725	58	1636	31	1563	21	1498	15

18

World Health Organization

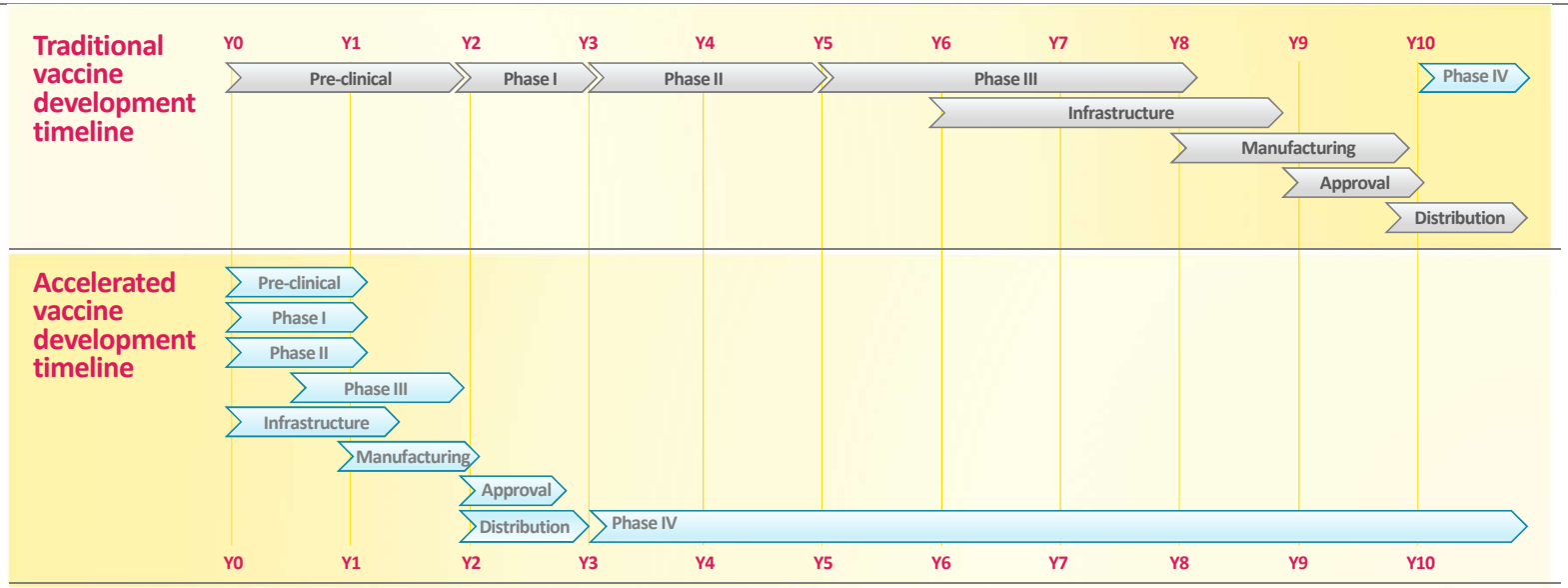
Solidarity Trials Therapeutics : Conclusions

Combining data from all 4 trials, the Remdesivir vs not death rate ratio (RR) is 0.91 (95% CI 0.79-1.05), p=0.20

- This slightly favourable Remdesivir result could have arisen just by chance if Remdesivir does nothing and the real death rate ratio is 1 in all trials.
- Narrower confidence intervals would be helpful (particularly for Remdesivir), but the main need is for better treatments."

- **There could be a small benefit in lower-risk patients, but not a big one. More evidence is needed, but BETTER DRUGS are needed even more.**

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

COVID-19 vaccine candidates in Phase III trials

- As of 02 October 2020 there are **42 COVID-19 candidate vaccines** in clinical evaluation of which **10 in Phase III trials**
- There are another **151 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)

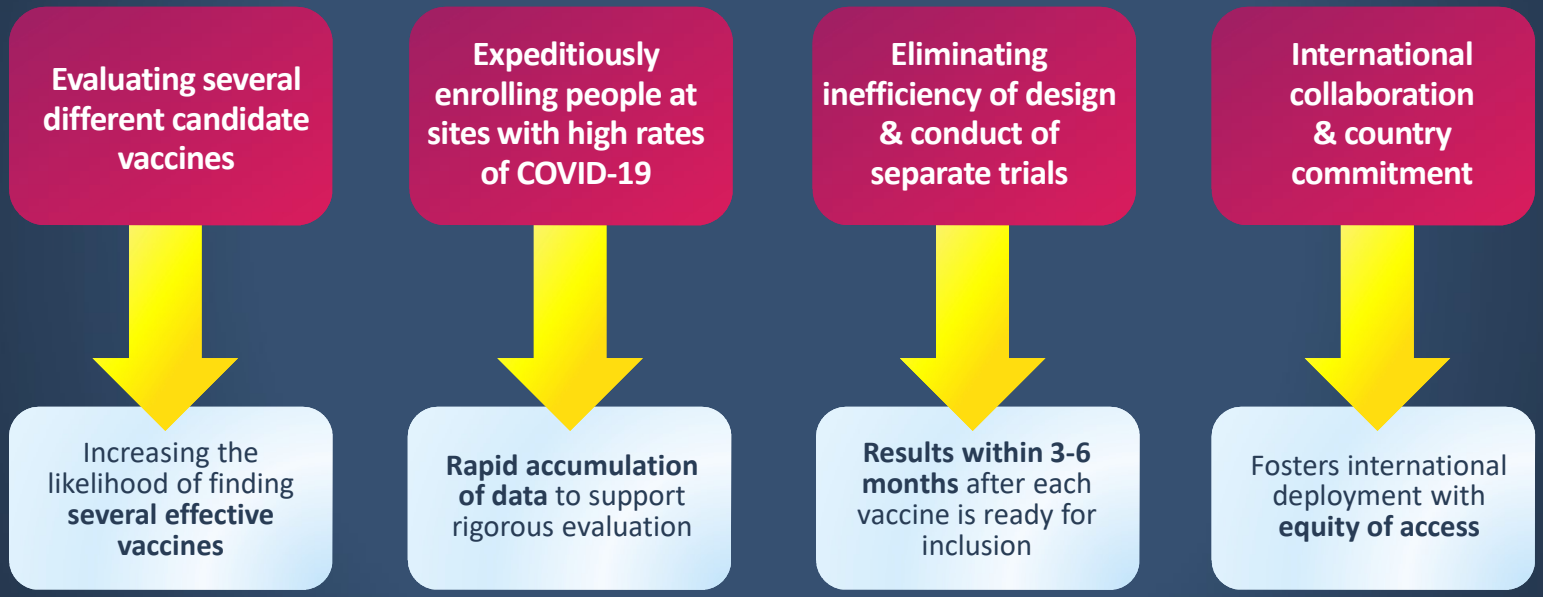
10 CANIDATE VACCINES IN PHASE III CLINICAL EVALUATION	VACCINE PLATFORM	LOCATION OF PHASE III STUDIES
Sinovac	Inactivated virus	Brazil
Wuhan Institute of Biological Products / Sinopharm	Inactivated virus	United Arab Emirates
Beijing Institute of Biological Products / Sinopharm	Inactivated virus	China
University of Oxford / AstraZeneca	Viral vector *	United States of America
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
Moderna / NIAID	RNA	USA
BioNTech / Fosun Pharma / Pfizer	RNA	USA, Argentina, Brazil

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

* Single dose schedule

WHO Solidarity vaccine trial

Achieving rapid progress towards global objectives



https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31821-3/fulltext

Key ethical considerations during COVID-19 pandemic

- Build on preexisting guidance to develop guidance materials fit for purpose in COVID-19
- Identify principles for research and their application (SOPs, Solidarity trials, human challenge studies)
- Develop allocation principles for clinical management, vaccines, diagnostics, & therapeutics
- Ethics of AI based applications, contact tracing Apps, immunity passports etc


Ethical considerations to guide the use of digital proximity tracking technologies for COVID-19 contact tracing

Interim guidance
28 May 2020

World Health Organization

Ethical Considerations to Guide the Use of Digital Proximity Tracking Technologies for COVID-19 Contact Tracing

Resource Allocation and Priority Setting Policy Brief

Global burden of diseases and injuries, 1990-2009 Findings

- Sustained improvements in health over the past 70 years
- Maternal and child mortality have decreased, as has the burden of TB, HIV, and malaria; All of these were part of the Millennium Development Goals
- But across the world there is rising exposure to crucial risk factors related to the noncommunicable diseases such as diabetes, heart and lung diseases and cancer, including such risks as high blood glucose and particulate air pollution.

Ref: GBD 2019 (https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30925-9/fulltext)

World Health Organization

Identified Gaps

- Health systems are ill-prepared for the projected rapid rise in NCDs and disabilities
- Public health has failed to stop the increase in critical risk factors
    - There is a pressing need to tackle wider determinants of health
    - The rise in exposure to key risk factors and deaths from cardiovascular disease indicates a turning point in global life expectancy gains
- The pandemic in context raises difficult questions about the direction of global health:
    - We must pay more attention to the socio-demographic index—which is related to income, education, and fertility rates.

Ref: GBD 2019 (https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30925-9/fulltext)

World Health Organization

It is not about a single pandemic

As Richard Horton, the editor of *The Lancet,* has written: “The pandemic is not the making of a single coronavirus, but the combination of three epidemics: the virus, the chronic conditions that make people more susceptible to it, and a situation of deepening poverty and inequality. A single pandemic is too simple a narrative to capture this reality. What we’re faced with in Britain,’ he says, is a ‘syndemic’– a synthesis of epidemics.”

The pandemic has shown us that we will only achieve health for all when we address all socioeconomic factors and widespread inequalities.

How are health and healthcare going to be transformed by the current crisis?

- Every government sector now has to be involved in outbreaks
- Early, widespread, accurate communication of information, including WHAT IS NOT KNOWN, is absolutely critical
- Communities must be engaged from the very beginning—bottom up, not top down
- We have to communicate early and often
- We must engage the entire range of experts working on outbreaks, including from the social and behavioural sciences, from the very beginning
- We must prepare now for the next pandemic!

World Health Organization

Thank you!