

2026 GVN Annual International Scientific Meeting

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March 4–6, 2026



USF Health



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Ensuring treatment sustainability in a pandemic: Lessons from resource constrained settings

GVN Annual International Scientific Meeting ,Tampa, Florida, USA, 4-6 March 2026

Quarraisha Abdool Karim, FRS

John C Martin Chair in Global Health & Associate Scientific Director: CAPRISA

Professor of Clinical Epidemiology: Columbia University

Pro Vice-Chancellor, Health Sciences: University of KwaZulu-Natal

UNAIDS Special Ambassador for Adolescents and HIV

President: The World Academy of Sciences

Overview

- **The challenges facing resource-constrained countries**
- **Biological countermeasures:**
Essential for any pandemic response
- **Lessons from Covid-19**
- **LMICs: Rising to challenge of local production**
- **Conclusion**

Top 5 global challenges

1. Climate Change

- 1.1°C global temperature rise, projected 3-4°C by 2100

2. Global Inequality

- 1% own 46% of wealth, 700m in extreme poverty

3. Wars & Conflicts – uncertain geo-politics

- 54 active conflicts, >100m displaced people

4. Pandemics

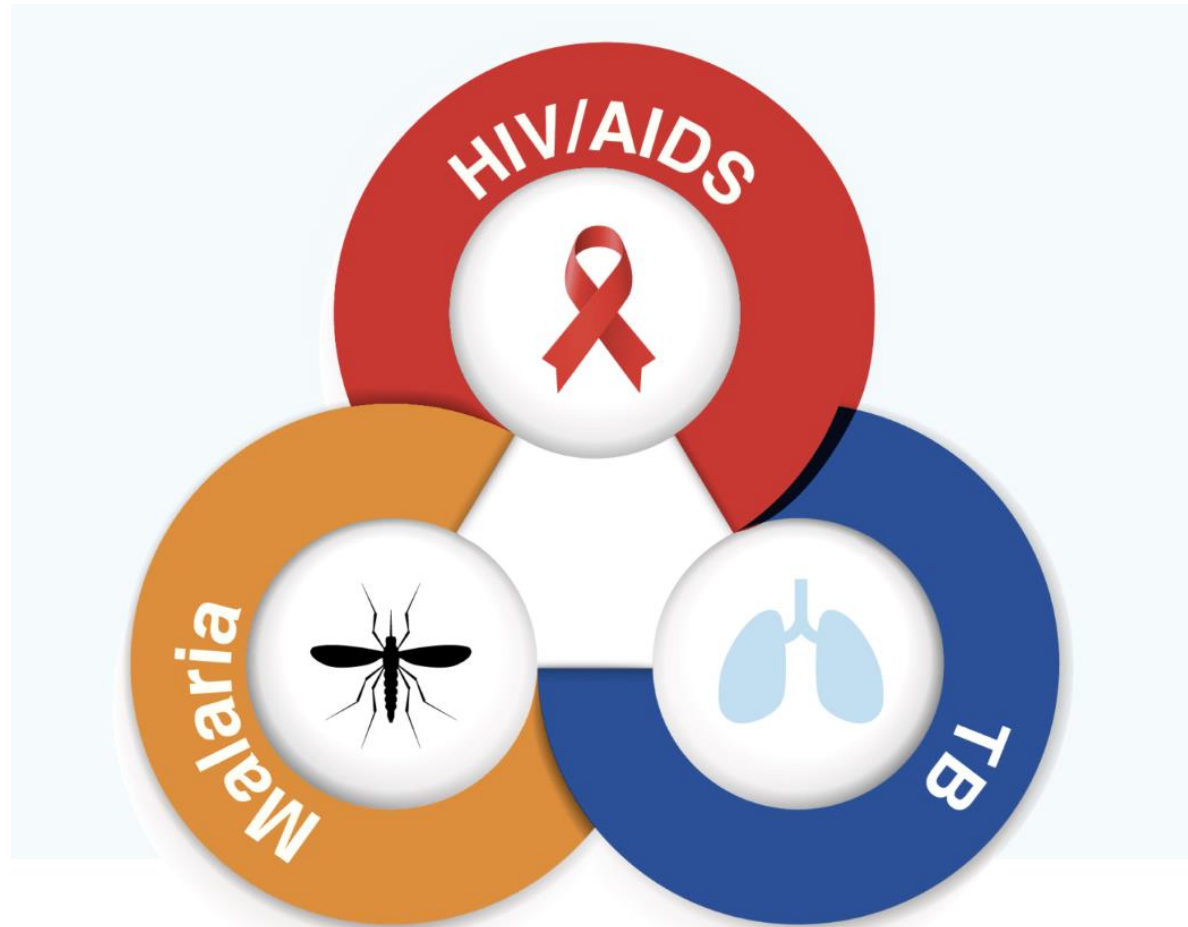
- Over 7m Covid-19 deaths, \$12.5tr economic cost

5. Infodemic

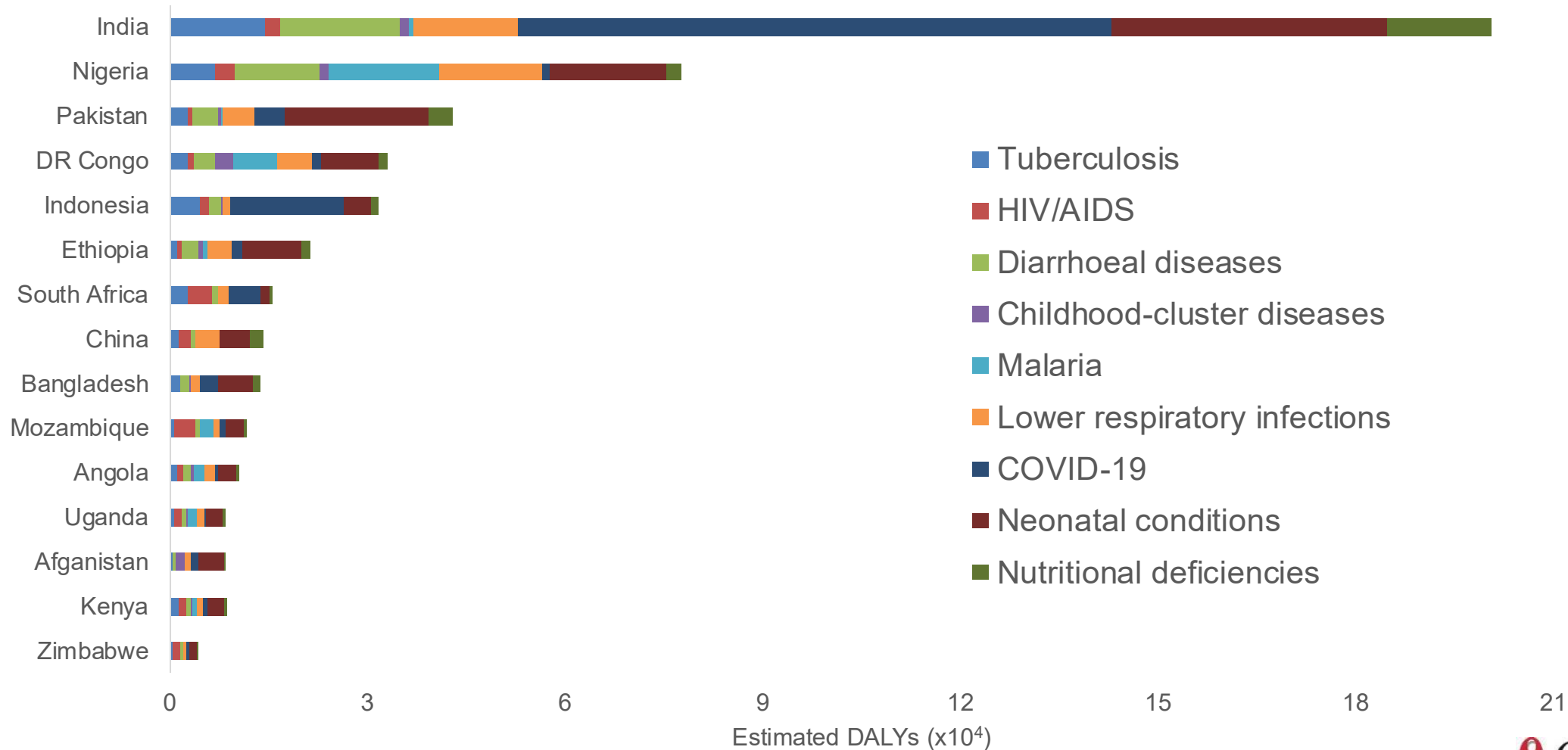
- Disinformation is subverting elections & democracy and reducing the influence of science in society



Current epidemics / pandemics: Taking their toll in poor countries!



High burden of disease: Straining health care resources and services in global south



National burden of disease

Data sourced from WHO Global Burden of Disease (2021). DALYs=disability-adjusted life years. DR Congo=Democratic Republic of the Congo

Multiple new outbreaks: Average of 102 public health events in Africa yearly between 2001 - 2022

BMJ Global Health

Trends in public health emergencies in the WHO African Region: an analysis of the past two decades public health events from 2001 to 2022

Etien Luc Koua,¹ Jobert Richie Nansseu Njingang,¹ Jean Paul Kimenyi,¹ George Sie Williams,² Joseph Okeibunor ,^{1,3} Sakuya Oka,⁴ Abdou Salam Gueye¹

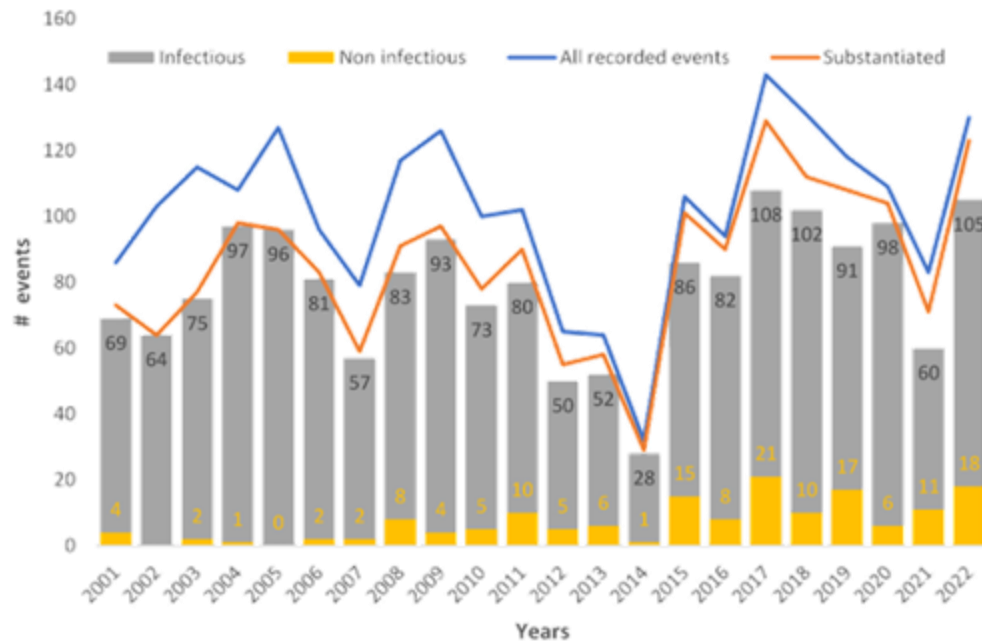


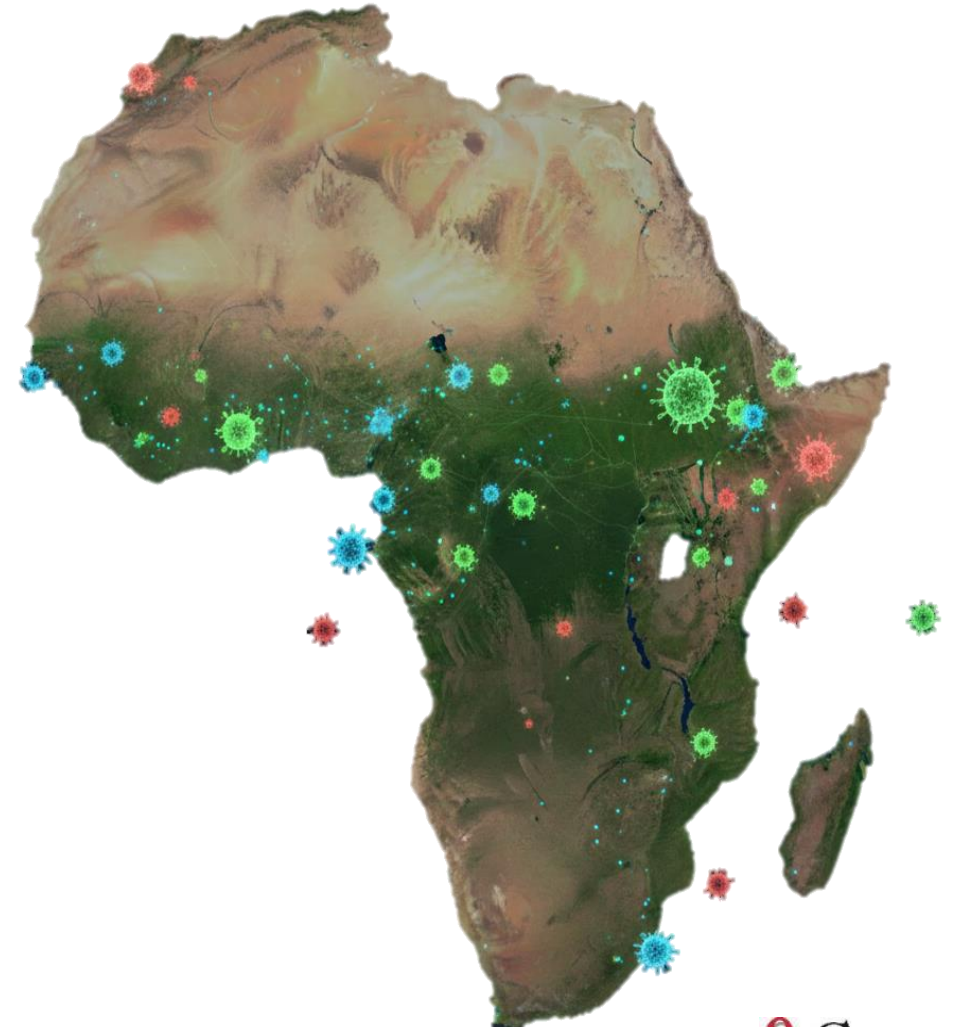
Figure. Trends in the number of events in the WHO African Region, 2001–2022

- **2001-2022: 2,234 public health events recorded in the WHO African Region (84% were substantiated)**
- **92% were infectious diseases (n=1,730), 30% zoonoses (n=566) and 5% humanitarian crises (n=95)**

Constrained response capacity: Africa matters to global pandemic preparedness

Pandemic risk is global but capacity is uneven

- Pathogens do not respect borders
- Africa is deeply connected to global health security
- Weak detection anywhere threatens everyone everywhere
- Outbreaks lead to epidemics; epidemics lead to pandemics



Pandemics: Infectious diseases no longer confined to the global south – they are a global challenge

■ Global North vs ■ Global South

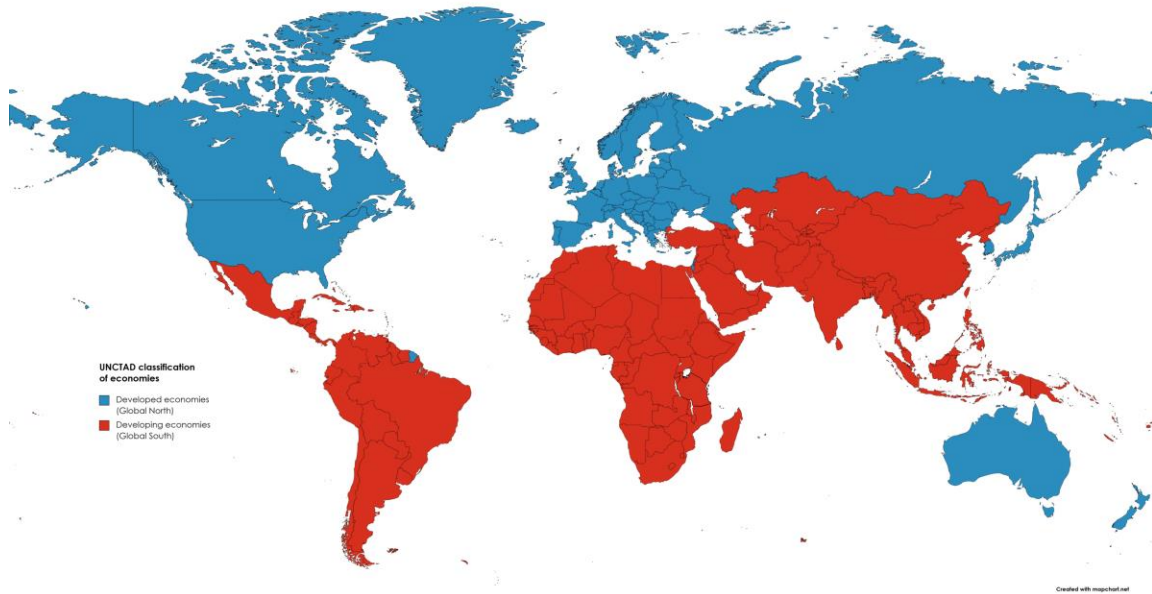


Figure (left). Global North vs Global South as per UN Trade and Development (UNCTAD) classification of economies.

COVID-19 cases globally

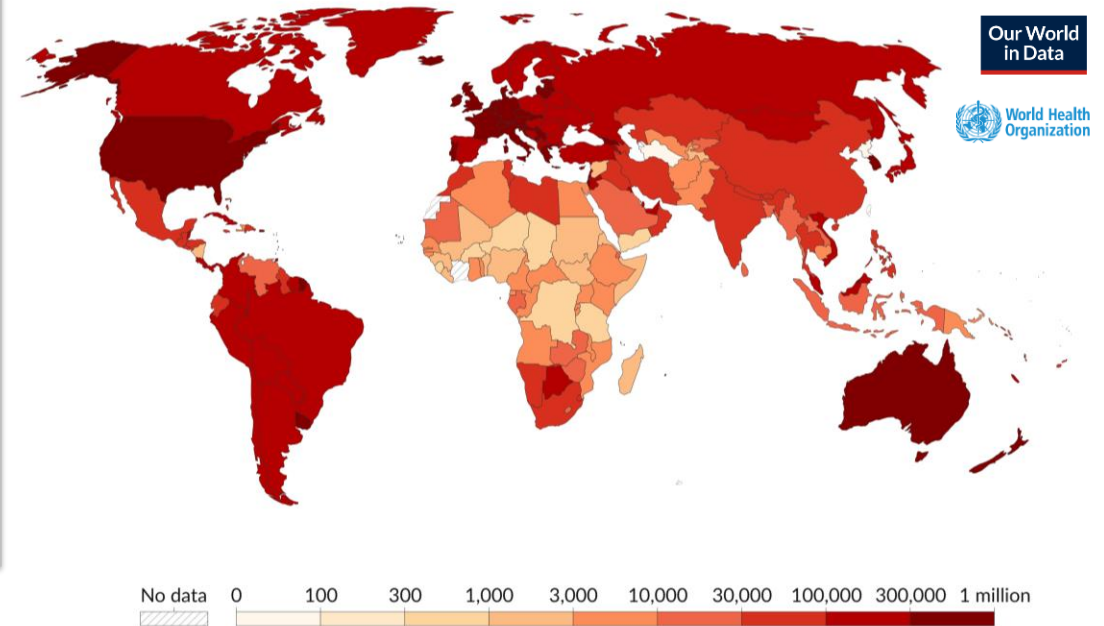


Figure (right). Cumulative confirmed COVID-19 cases per million people, Sep 7, 2025. Our World in Data.

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Components of a pandemic preparedness plan

1. Surveillance and Epidemic Intelligence

2. Medical Countermeasures

- diagnostics, vaccines, therapeutics
- devices, e.g. respirators, oximeters, etc.

3. R&D biotechnology capacity

4. Health care system preparedness

5. Communications and public outreach

6. All of society approach : Regional and international co-operation














Biological countermeasures : Essential to a pandemic response

- **Diagnostics** : **Laboratory-based, Rapid tests**
- **Vaccines** : **Up-to-date vaccines for active immunisation**
- **Therapeutics** : **Treatments to reduce morbidity and mortality – biologicals like passive immunity & chemical options like small molecules**

Overview

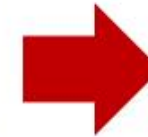
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Impressive scientific innovations in diagnostics, therapeutics and vaccines

	Company (Vaccine)	Efficacy (pre-existing variants)
mRNA	Pfizer BioNTech (BNT162) 	92%
	Moderna (mRNA-1273) 	>90%
Viral vector	J&J (Ad26.COV2-S)  Beth Israel Lahey Health Beth Israel Deaconess Medical Center 	64-72%
	Gamaleya (Sputnik V rAd5, rAd26) 	92%
	Oxford-AstraZeneca (AZD1222) 	67-76%
	CanSinoBio (Ad5-nCoV) 	65%
Protein	Vector Institute (EpiVacCorona) 	unknown
	Novavax (NVX-CoV2373) 	89%
Inactivated	Sinopharm 	78%
	Sinovac 	51%-84%
	Sinopharm-Wuhan 	73%
	Bharat Biotech (BBV152) 	78%



Laboratory-based PCR



Rapid point-of-care test

nature A DELUGE OF NEW DRUGS FOR COVID

Two years into the pandemic, the pipeline of COVID-19 therapeutics is on track to pump out innovative treatments – and new uses for familiar ones. **By Heidi Ledford**



Photo credit: Reuters



Paxlovid

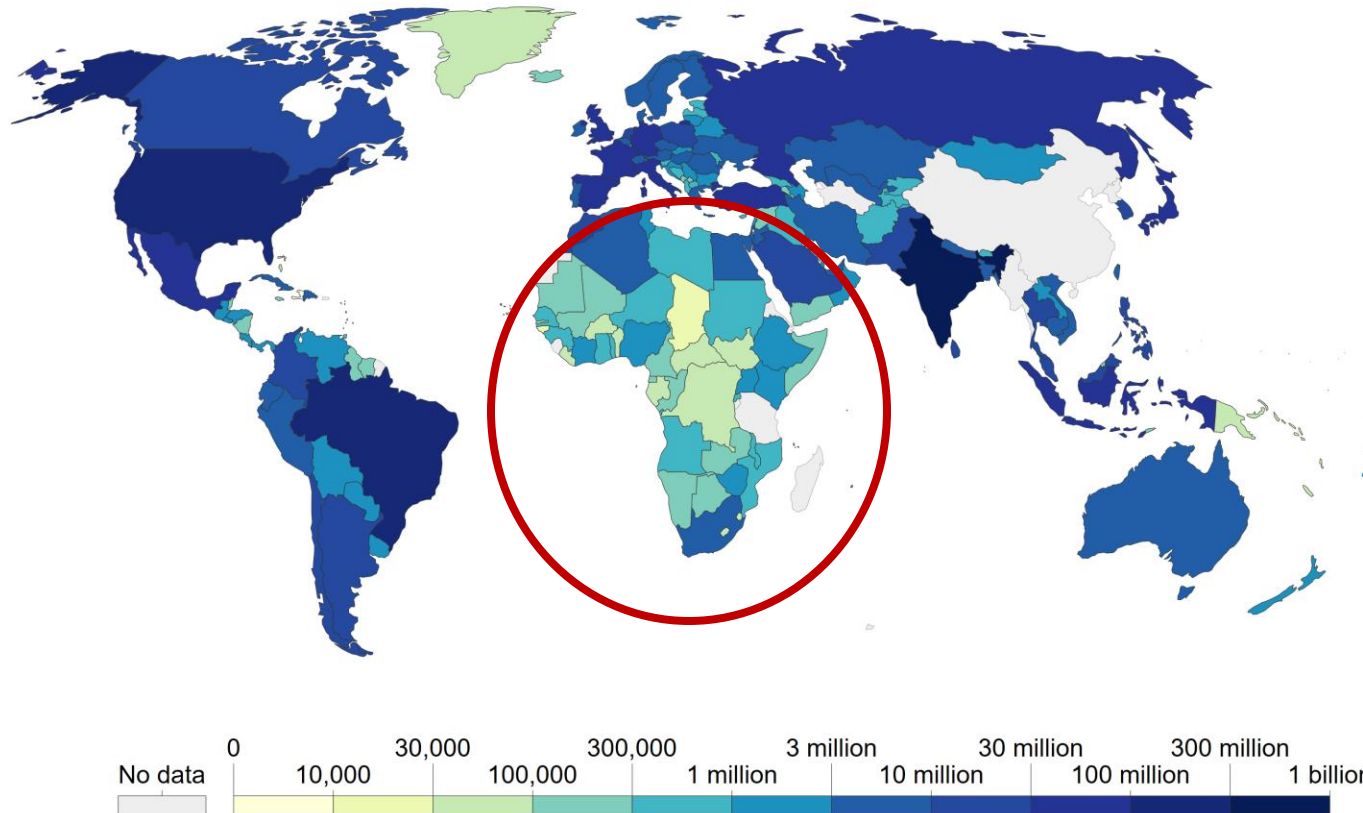
Experiences during Covid-19: Africa at the back of the queue for all biological counter-measures

- **Diagnostics**
 - Access to PCR kits, PCR machines & Reagents
 - Lab Infrastructure to deal with high throughput
 - Trained laboratory personnel
- **Vaccines:**
 - High demand during pandemics - Constrained access
 - Join end of queue even if funds are available
 - Access, affordability and infrastructure to deploy
- **Treatment**
 - Constrained access – availability and cost
 - Need capacity to innovate and manufacture
 - Health care delivery systems
 - Skilled personnel to identify patients, confirm diagnosis & initiate treatment

Access? Lack of vaccine doses in poor countries due to vaccine nationalism

Number of people who received at least one dose of COVID-19 vaccine
 Total number of people who received at least one vaccine dose.

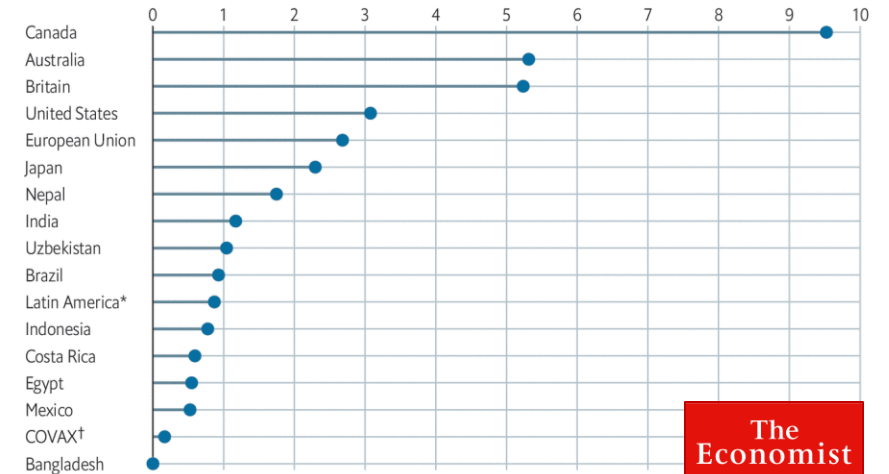
Our World
 in Data



Rich countries grab half of projected Covid-19 vaccine supply

Calling the shots

Covid-19, confirmed orders of vaccine doses per person, 2020



Sources: Duke Global Health Innovation Centre; GAVI; World Bank *Excluding Brazil †An organisation working for equitable access to vaccines

The Economist

The
 Economist

Source: Official data collated by Our World in Data. This data is only available for countries which report the breakdown of doses administered by first and second doses.
 CC BY

Consequences of Covid-19 impacting HIV services without available biological counter-measures



By Quarraisha Abdool Karim and Salim S. Abdool Karim

The GeneXpert cartridge-based platform is used routinely at the CAPRISA clinic in Durban, South Africa, to rapidly test for tuberculosis and HIV viral load, but it is now also being used to test for COVID-19.

PERSPECTIVES

VIEWPOINT: COVID-19

COVID-19 affects HIV and tuberculosis care

The COVID-19 response should be balanced with the need to manage other diseases

366 24 JULY 2020 • VOL. 369 ISSUE 6302

Science
AAAS

By Quarraisha Abdool Karim and Salim S. Abdool Karim

Shortly after instituting coronavirus disease 2019 (COVID-19) mitigation measures, such as banning air travel and closing schools, the South African government implemented a national lockdown on 27 March 2020 when there were 402 cases and the number of cases was doubling every 2 days (1). This drastic step, which set out to curb viral transmission by restricting the movement of people and their interactions, has had several unintended consequences for the provision of health care services for other prevalent conditions, in particular the prevention and treatment of tuberculosis (TB) and HIV, key resources that had been extensively built up over decades for the control of HIV and TB are now being redirected to control COVID-19 in various countries in Africa, particularly South Africa. These include diagnostic platforms, community outreach programs, medical care access, and research infrastructure. However, the COVID-19 response also provides potential opportunities to enhance HIV and TB control.

In Africa, the COVID-19 epidemic is unfolding against a backdrop of the longstanding TB and HIV epidemics. South Africa ranks among the worst-affected countries in the world for both diseases. Despite having just 0.7% of the world's population, South Africa is home to ~20% (7.7 to 7.9 million people) of the global burden of HIV infection (2) and ranks among the worst affected countries in the world for TB, with the fourth highest rate of HIV-TB coinfection (59%) (3). South Africa has made steady progress since 2010 in controlling both diseases. Increased access to antiretroviral drugs for treatment and for prevention of mother-to-child transmission of HIV has resulted in a 23% reduction in AIDS-related deaths between 2010 and 2018 (2). Similarly, the death rate among TB cases has declined from 224 per 100,000 population in 2010 to 110 per 100,000 population in 2018 (3). Have the strategies implemented for COVID-19 mitigation, particularly the lockdown, inadvertently threatened these gains in HIV and TB?

HIV and TB polymerase chain reaction (PCR) tests are key to treatment initiation and monitoring to achieve the United Nations goals for the control of HIV and TB. Disturbingly, these diagnostic tests declined during the lockdown. The 59% drop in the median number of daily GeneXpert TB tests—a cartridge-based PCR test capable of diagnosing TB within 2 hours while simultaneously testing for drug resistance—was

sciencemag.org SCIENCE



The impact of the COVID-19 lockdown on HIV care in 65 South African primary care clinics: an interrupted time series analysis

Jienchi Dorward, Thokozani Khubone, Kelly Gate, Hope Ngobese, Yukteshwar Sookrajh, Siyabonga Mkhize, Aslam Jeeva, Christian Bottomley, Lara Lewis, Kathy Baisley, Christopher C Butler, Nomakhosi Gxagxisa, Nigel Garrett

- **Lockdown reduced patient attendance at health facilities in South Africa:**
 - 57%* (n=339) apprehensive to visit clinics/hospital during lockdown
- **HIV testing ↓ 47.6% in April 2020**
- **ART initiations ↓ 46.2% in April 2020**

*The Ask Afrika COVID-19 Tracker

Variants evolving in an immuno-compromised HIV+ patient with a persistent 7-month infection

	Position	wildtype	Timepoint						
			D0	D6	D20	D34	D71	D106	D190
NTD	9	P					L		
	142	G	V						
	144	Y				-	-	-	-
	190	R					K		K
RBD	417	K					T		
	427	D							Y
	455	L						F	
	456	F						L	
	484	E		K	K	K			
	490	F					S	S	S
	501	N							Y
	614	D	G	G	G	G	G	G	G
	796	D	Y				Y		Y
	1078	A		V					

SARS-CoV-2 aa substitutions and deletions over time

- Started with a D614G variant
- 11 new mutations / deletions in spike protein (7 in RBD)
- E484K at day 6
- K417T at day 71
- N501Y at day 190
- Patient recreated the 3 key RBD mutations of Beta variant (501Y.V2)

Price of inequitable access to interventions: The pathogen thrives - new SARS-CoV-2 variants

THE LANCET

Omicron SARS-CoV-2 variant: a new chapter in the COVID-19 pandemic

Salim S Abdool Karim and Quarraisha Abdool Karim

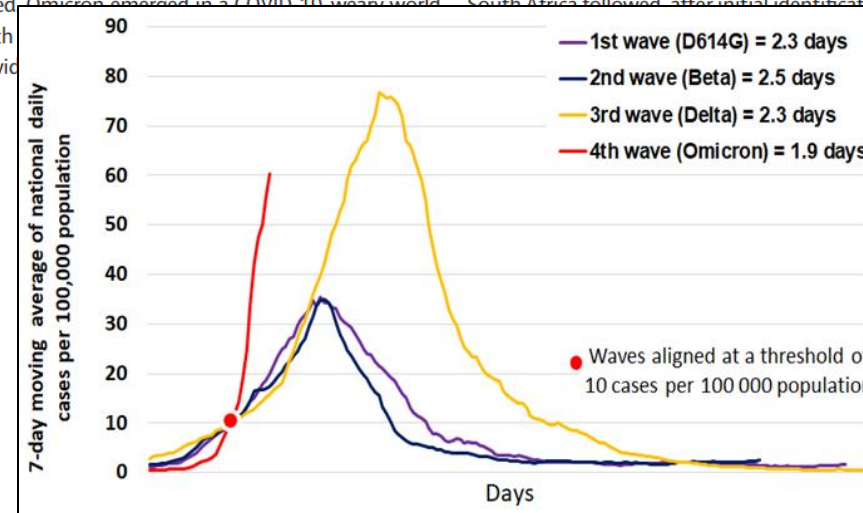


Omicron SARS-CoV-2 variant: a new chapter in the COVID-19 pandemic

Published Online
December 2, 2021
[https://doi.org/10.1016/S0140-6736\(21\)02758-6](https://doi.org/10.1016/S0140-6736(21)02758-6)
This online publication has been corrected. The corrected version first appeared at thelancet.com on January 6, 2021

On Nov 25, 2021, about 23 months since the first reported case of COVID-19 and after a global estimated 260 million cases and 5.2 million deaths,¹ a new SARS-CoV-2 variant of concern (VoC), omicron,² was reported. Omicron emerged in a COVID-19 wave world in which amid wide

The first sequenced omicron case was reported from Botswana on Nov 11, 2021, and a few days later another sequenced case was reported from Hong Kong in a traveller from South Africa.⁸ Several sequences from South Africa followed after initial identification that the omicron variant was a result of a PCR target failure deletion.



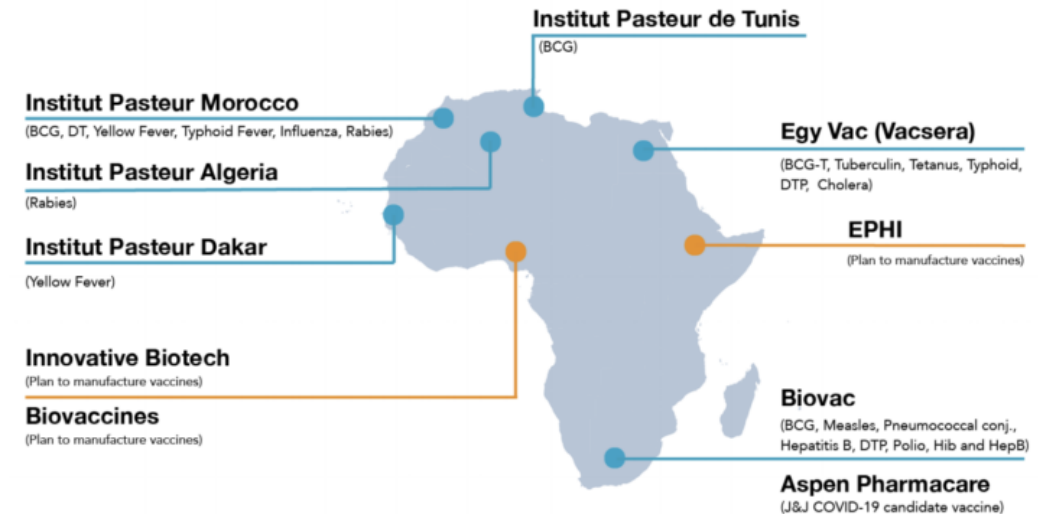
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Building African regional manufacturing of vaccines is necessary, but not sufficient

The African Vaccine Manufacturing Landscape

- 25 active AVM projects across Africa
- Significant Fill & Finish (DP) capacity already installed
- Drug Substance (DS) capacity remains limited and uneven
- Most tech transfers focus on **drug product**, not full value chain



Limited vaccine manufacturing capacity



African Vaccine Manufacturing Sites

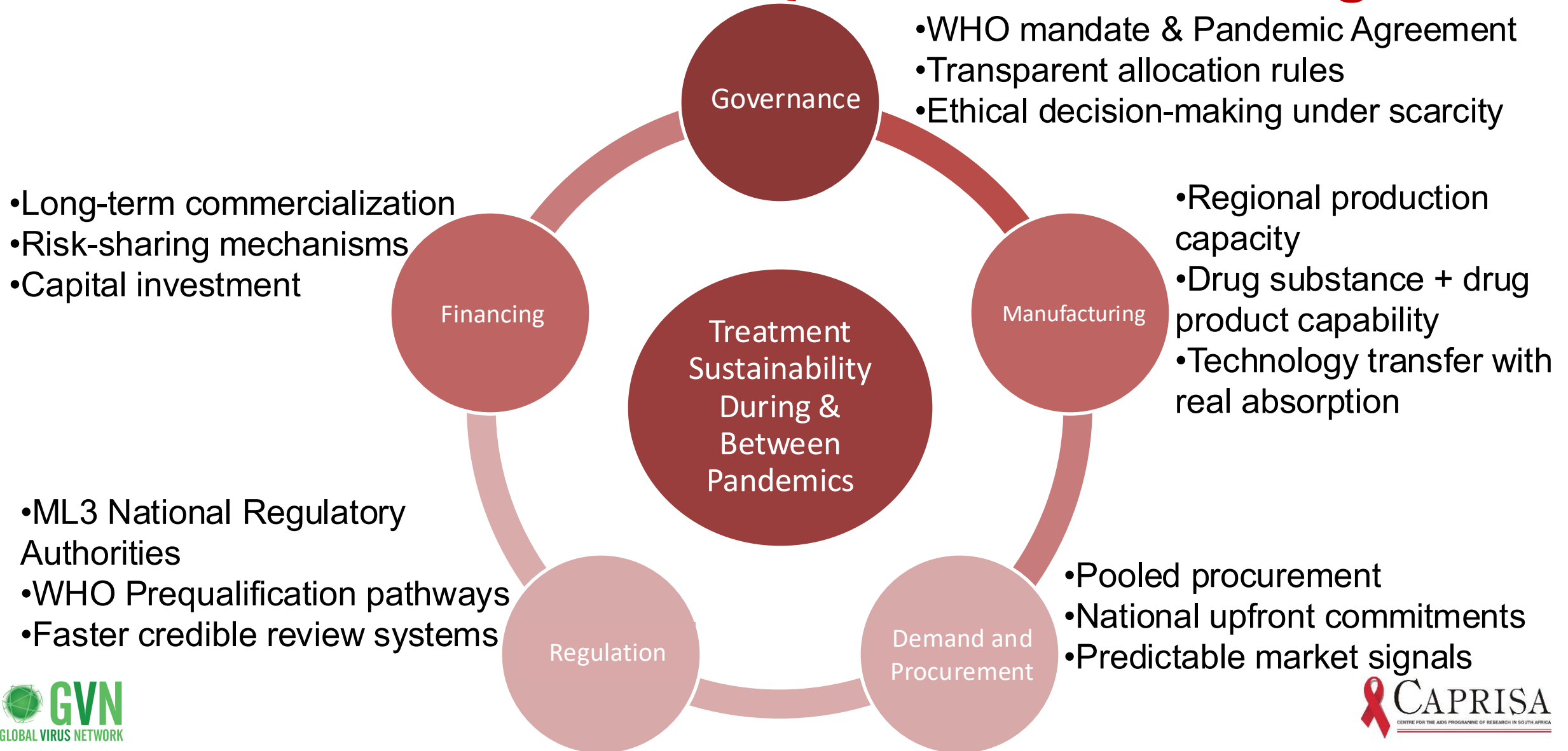
The real bottleneck: To build sustainable vaccine manufacturing, need demand & financing

Commercial sustainability remains fragile

- ~\$250M funding gap across near-to-market African manufacturers
- Financing terms often short-term, not aligned for long commercialization
- UNICEF market share capped for new entrants
- No guaranteed off-take commitments



Ensuring sustainability of local production of treatments in the next pandemic - challenges



Effective partnerships & collaborations essential

- **Premised on mutual respect and trust**
- **Each partner has to make a contribution**
 - Contributions initially may be unequal
 - Have to work towards equity
 - Training and capacity building; fill skills gaps
- **Partnerships that enable synergy**
 - By coming together more can be accomplished than individually
- **Outputs – bring added value and equitable benefit**

Success story: Increasing O₂ supplies and local manufacture of ventilators in South Africa

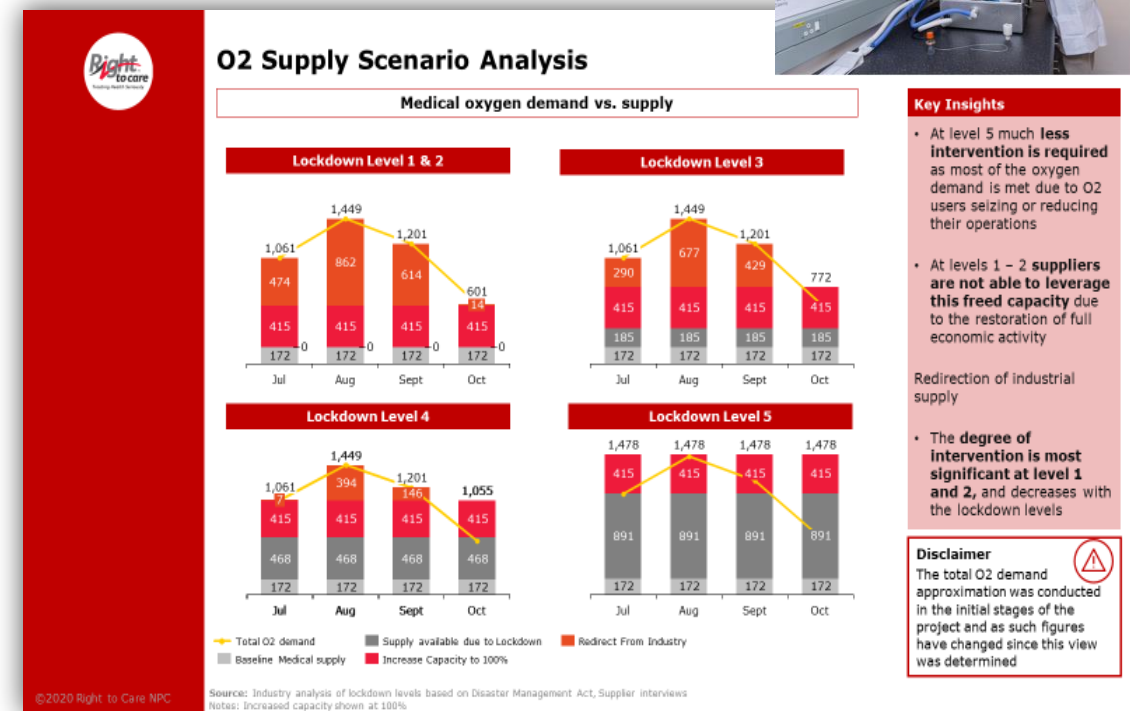
Defy ventilator project:

- 1st African ICU ventilator designed & manufactured in South Africa



Securing O₂ supplies

- 4 companies brought together to carefully plan O₂ supplies:
 - Supply reconfigured to meet modelled demand as per MAC advisory
 - During wave 1 and 2 - no hospital (public/private) ran out of liquid O₂



Key Insights

- At level 5 much **less intervention is required** as most of the oxygen demand is met due to O₂ users seizing or reducing their operations
- At levels 1 – 2 **suppliers are not able to leverage this freed capacity** due to the restoration of full economic activity

Redirection of industrial supply

- The **degree of intervention is most significant at level 1 and 2**, and decreases with the lockdown levels

Disclaimer

The total O₂ demand approximation was conducted in the initial stages of the project and as such figures have changed since this view was determined

Success story: Long-term training programs like the Fogarty AITRP built scientific capacity

Columbia University –South Africa Fogarty AIDS International Training & Research Program



Trained over 600 South African scientists in AIDS & TB research



Bi-directional training



In-country training by US trainees



Success story: Leveraging HIV research capacity in Africa for COVID-19 response

COVID-19 benefited from earlier investments

- HIV/TB molecular platforms repurposed
- Influenza surveillance adapted
- Existing trial networks mobilised
- HIV & TB sequencing expertise
- Bioinformatics capacity
- Data-sharing norms in place



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5 key lessons from past epidemics in Africa – for interventions in future pandemics

1. **Global interdependence – global / regional / country leadership**
2. **Community involvement – valuing collectivism (Ubuntu) – I am safe, when you are safe**
3. **Working together for early identification (surveillance)**
4. **Evidence-based policy and decision making - Comprehensive approach to epidemic control and not banking on a silver bullet**
5. **Global solidarity (e.g., COVAX challenging vaccine nationalism)**



The New York Times

Pope Francis: A Crisis Reveals What Is in Our Hearts

To come out of this pandemic better than we went in, we must let ourselves be touched by others' pain.



“The (Covid-19) pandemic has exposed the paradox that while we are more connected, we are also more divided....

“The pandemic has reminded us that no one is saved alone. What ties us to one another is what we commonly call solidarity. Solidarity is more than acts of generosity, important as they are; it is the call to embrace the reality that we are bound by bonds of reciprocity.

- Pope Francis