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Lessons Learnt from the COVID-19 Pandemic and other Health Crises

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Breaches in species barrier: emerging infections in humans





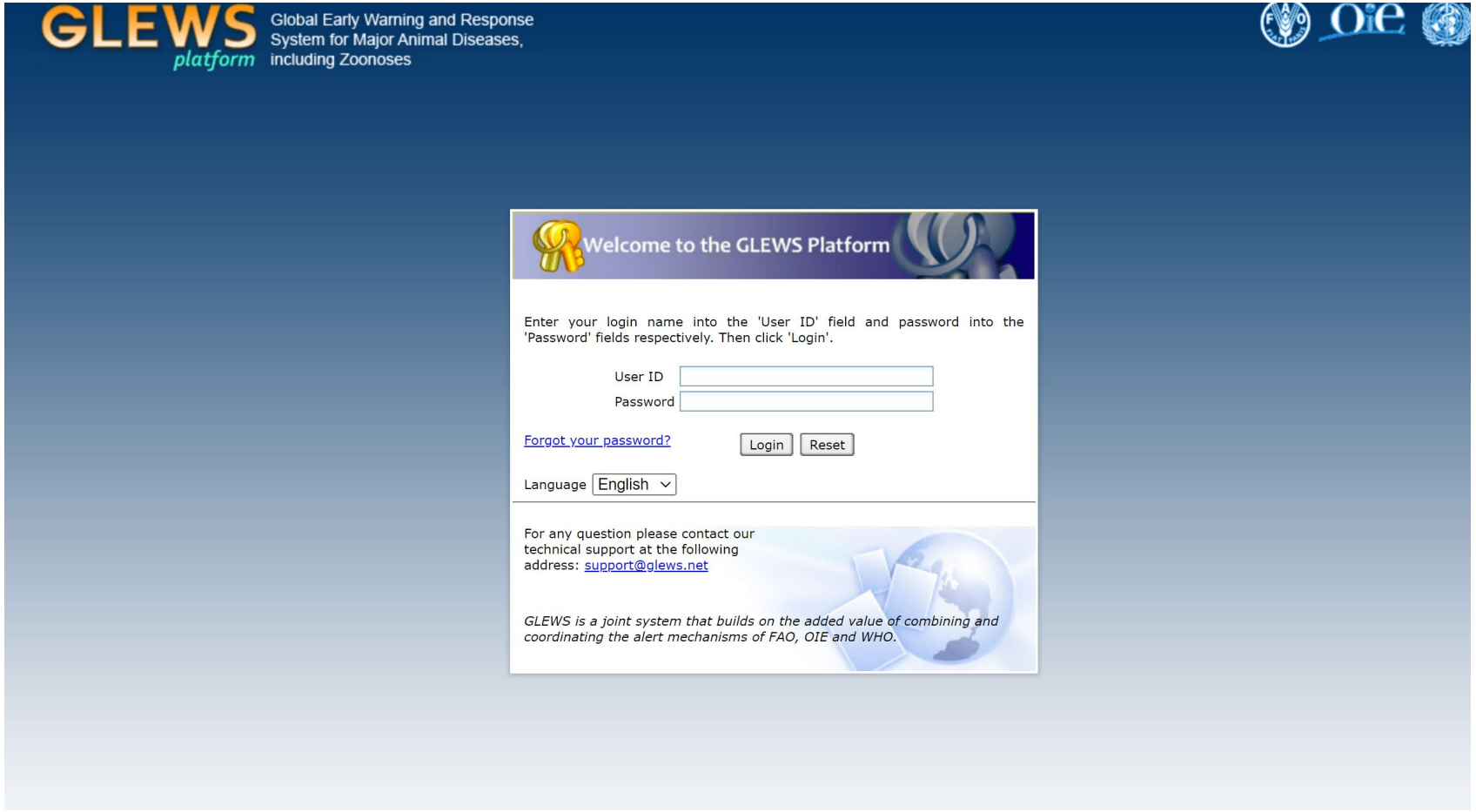


Infection	Animal linked to transmission	Year infection first reported
Ebola virus	Bats	1976
HIV-1	Primates	1981
E. coli O157:H7	Cattle	1982
Borrelia burgdorferi	Rodents	1982
HIV-2	Primate	1986
Hendra virus	Bats	1994
BSE/vCJD	Cattle	1996
Australian lyssavirus	Bats	1996
Influenza A (H5N1)	Chickens	1997
Nipah virus	Bats	1999
SARS coronavirus	Palm civets	2003
Zika virus	Monkey/mosquitos	2007
Influenza A (H1N1)	Swine	2009
MERS coronavirus	Bat/ Dromedary	2012
Influenza A (H7N9)	Poultry	2013
SARS coronavirus 2	?	2019

Lesson Learnt #1: Animal, Human, Environmental and Commercial Sectors Need to Work Together to Prevent Emergence

- Educate animal traders and live market workers about risks of emerging infections and how to prevent them
- Educate general populations about the risks associated with live animal markets and provide information as to how to prevent emergence
- Develop vaccines and vaccinate animals at wild animal farms
- Introduce legislation making it illegal to sell wild animals
- Conduct risk assessment of animal pathogens crossing the species barrier to cause human infection
- Establish integrated surveillance for early alerts of outbreaks

Global early warning and response system (GLEWS) for major animal disease



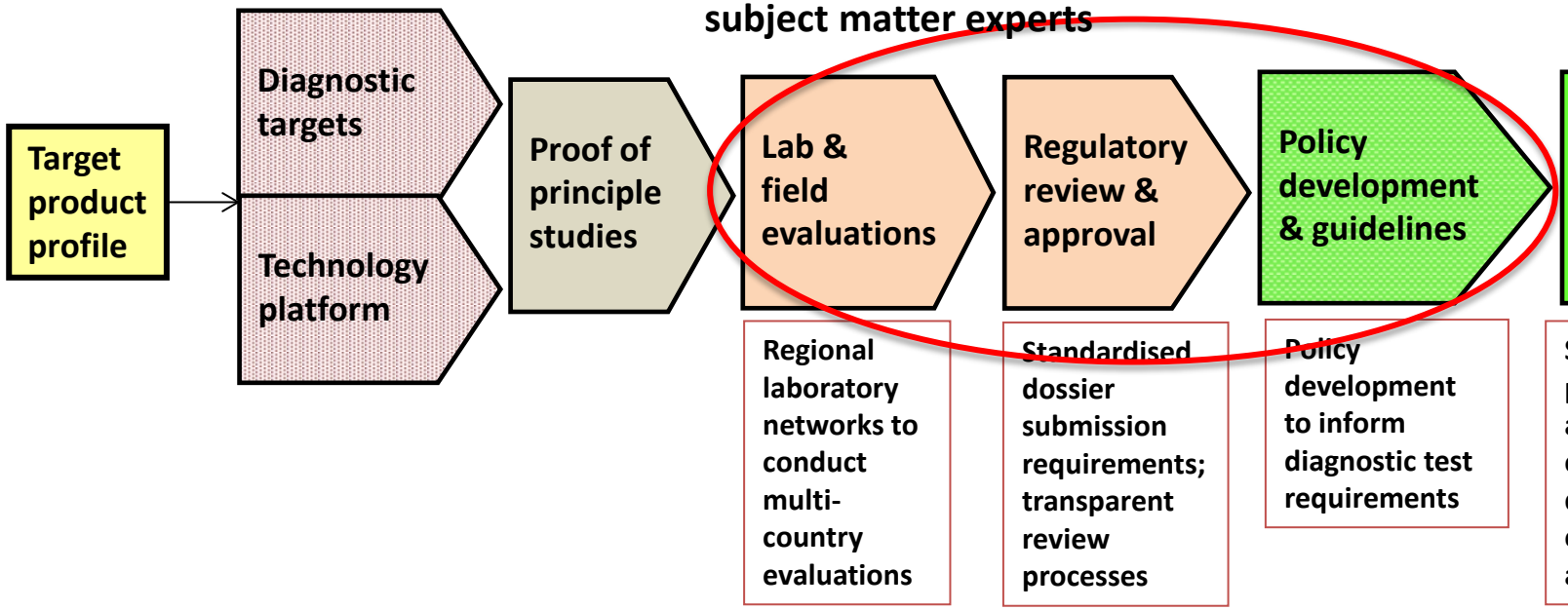
- **Data collection:** FAO support with digital tools to report early warning activities in animals/national preparedness through joint risk assessment
- **Data analysis:** Laboratory support locally or remotely
- **Action:** One Health and cross-sectoral mechanism for risk assessment/response

Lessons Learnt #2: Invest in Regulatory Science and Health Technology Assessment to ensure Quality, Safety and Timely Access to Medical Countermeasures

100-day Mission for Vaccines and Diagnostics

Regional Networks to Streamline and Enhance Timely and Equitable Access: Asia Diagnostics, Vaccine and Therapeutics Network to Counter Epidemics (ADVanCE)

Joint review of diagnostic evaluation protocol and performance data by policy makers, regulators and subject matter experts



Global Harmonization Working Party
GHWP Towards Medical Device Harmonization

INTER-AMERICAN COALITION FOR REGULATORY CONVERGENCE
MEDICAL TECHNOLOGY SECTOR

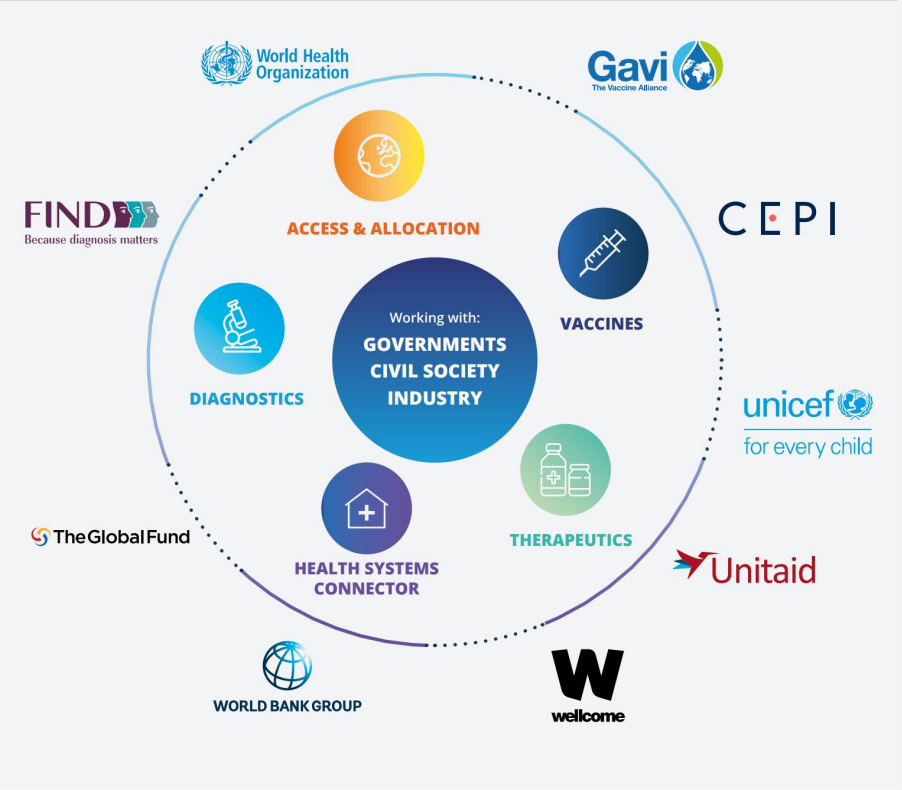
ARPA
Asia Regulatory Professionals Association

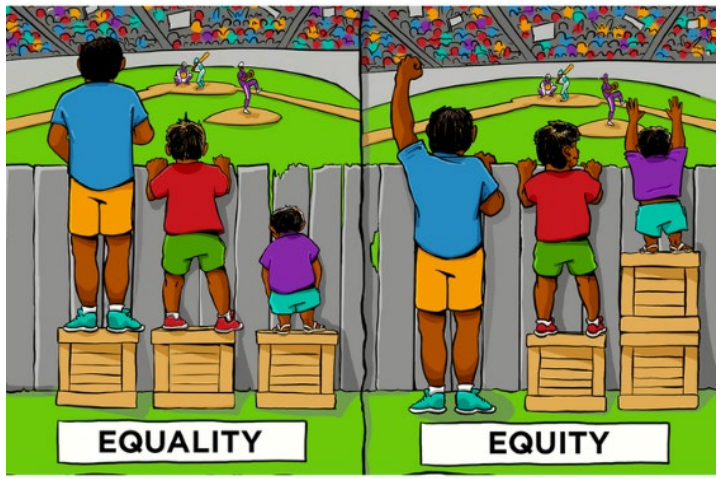
Invest in public/private partnerships for diagnostic development and manufacturing in the region

Lessons Learnt #3: Inequity of Access to Diagnostics and Other Countermeasures within Countries and across Regions

Pandemics do not create new problems, they just make us face problems we have long ignored:

Access to COVID-19 Tools (ACT) Accelerator





A personal take on science and society

World view

By John Nkengasong

Let Africa into the market for COVID-19 diagnostics

Africa is boosting its capacity to respond to COVID-19, but lack of solidarity will cost lives, warns Africa CDC head John Nkengasong.

The first case of COVID-19 in Africa was reported in Egypt on 14 February 2020. Since then, 52 countries in Africa have reported more than 30,000 cases and about 1,400 deaths from the new coronavirus. This count is likely to be an underestimate; Ethiopia has run about 11,000 tests – only 10 for every 100,000 people. Much-richer South Africa has

> "African countries have funds to pay for reagents but cannot buy them."

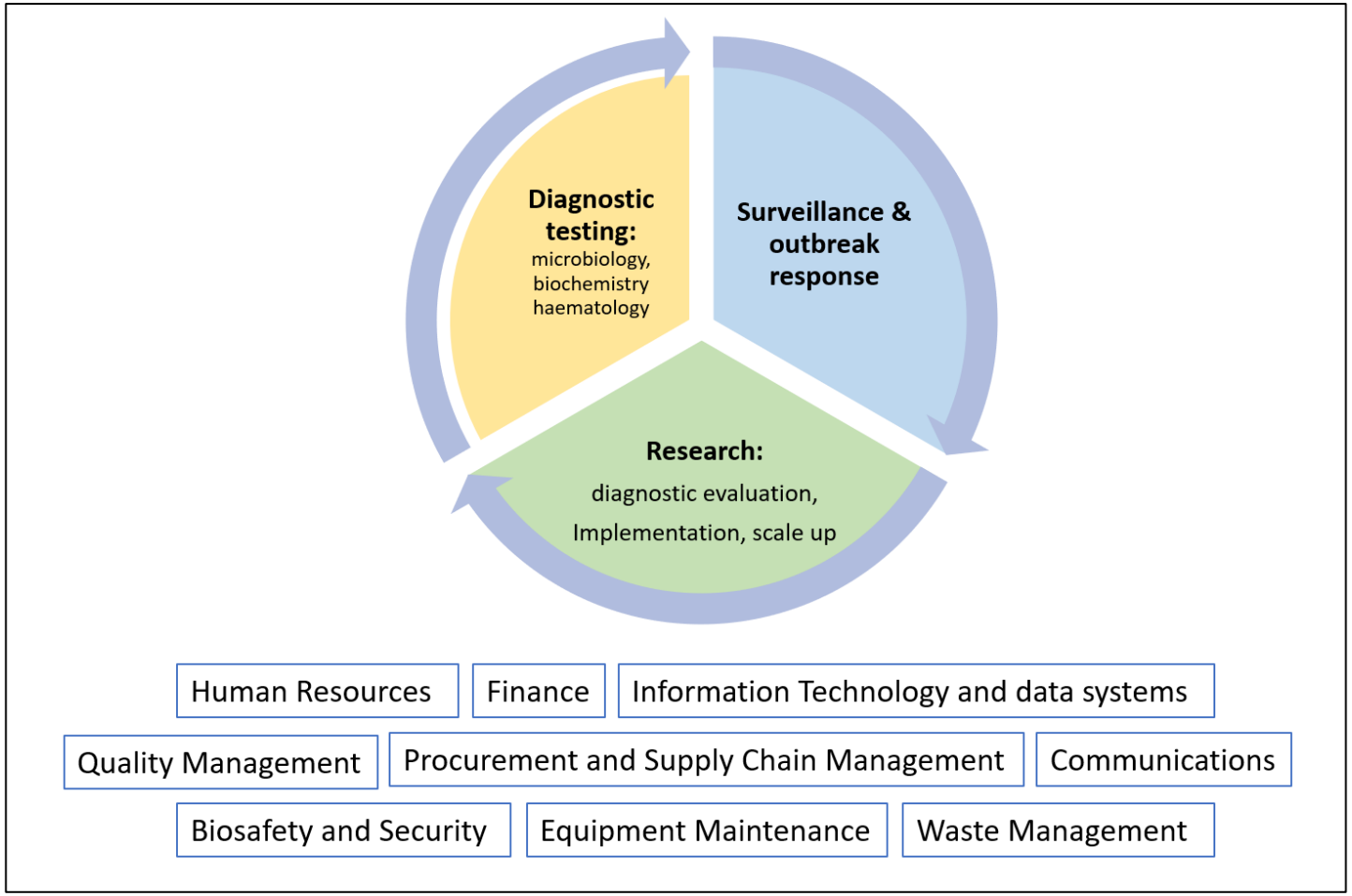
buyers fighting for a seat at the table.

Cooperation across Africa is starting to happen. Africa CDC has a plan to distribute one million test kits by mid-May, which we started implementing earlier this month.

The strategy to increase testing for COVID-19 is fourfold. First, we need to pool the procurement and distribution of tests across the continent. This will create synergies and block counterproductive competition. Second, we have to work with non-government laboratories and the private sector to roll out testing on the subnational level. In many countries, samples must be shipped to a centralized diagnostic laboratory, which adds cost and delay. Third,

https://media.nature.com/original/magazine-assets/d41586-020-01265-0/d41586-020-01265-0.pdf 30 April 2020

Lessons Learnt #4: Need for a Public Health Infrastructure to mount a swift and efficient response and translate research to policy and implementation

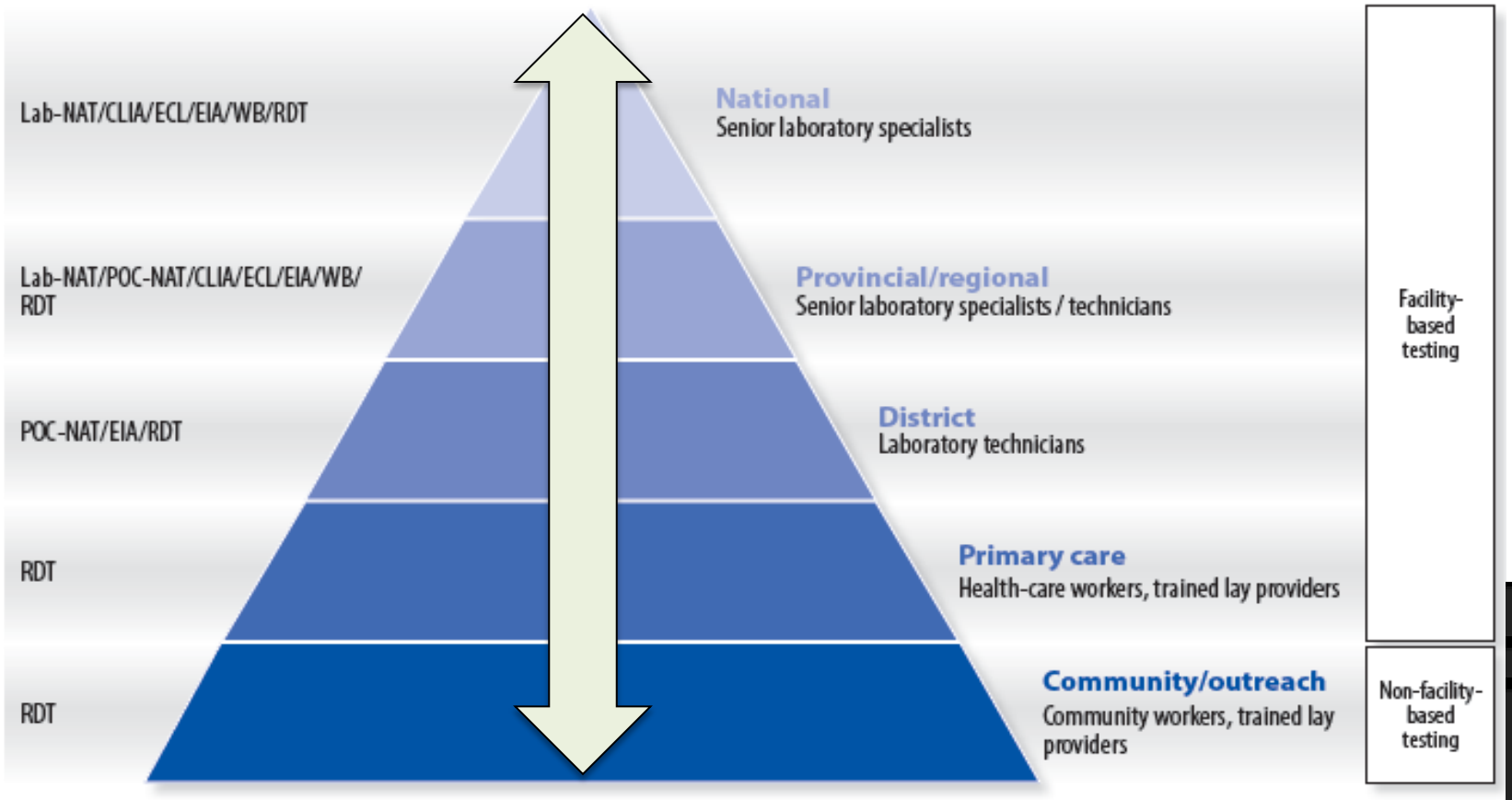


Core Functions of a Laboratory for Emergency Preparedness and Response. https://emergencies.pubpub.org/pub/laboratory-capacity/release/3?readingCollection=36ef2bb3

During the COVID pandemic, Brazil scaled up testing by passing legislation to allow its 94,000 pharmacies to offer COVID testing

This led to the discovery of millions of people who only use pharmacies and have never accessed the formal healthcare system

Lessons Learnt #5: Data systems and Connectivity

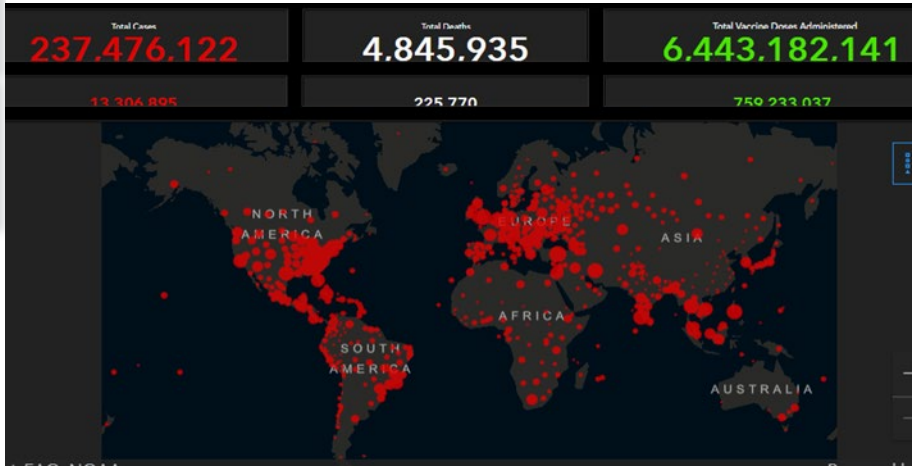


NAT: Nucleic acid tests: Lab-NAT: laboratory-based; POC-NAT: at point-of-care;
CLIA: chemiluminescence immunoassay; ECL: electrochemiluminescence immunoassay;
EIA: enzyme immunoassay; RDT: rapid diagnostic test

Source: Adapted from WHO 2017 Guidance for procurement of *in-vitro* diagnostics and related laboratory items and equipment

Monitoring supplies:

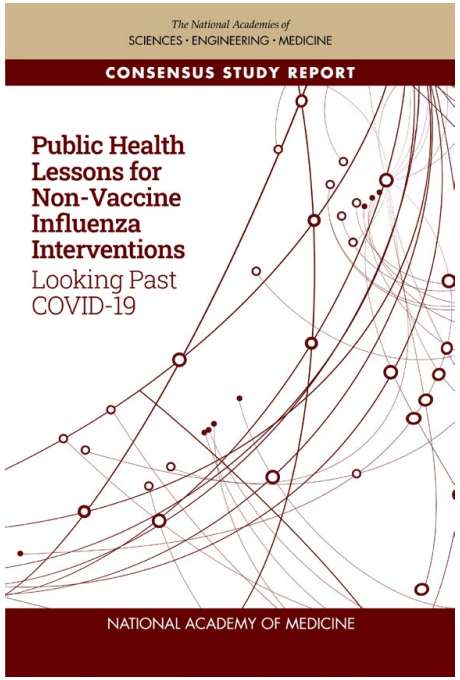
Data Display: dashboards



Investing in Connected Diagnostics for Health Security

Countries need to invest in a robust and connected **diagnostic and laboratory infrastructure that forms the backbone of a healthcare system**, serving as the eyes and ears of the system, sounding alarms of unusual disease patterns, sending early outbreak alerts, and monitoring the effectiveness of the response.

Ref: Peeling et al. Diagnostics for COVID-19: Moving from pandemic response to control. Lancet Dec 20 2021

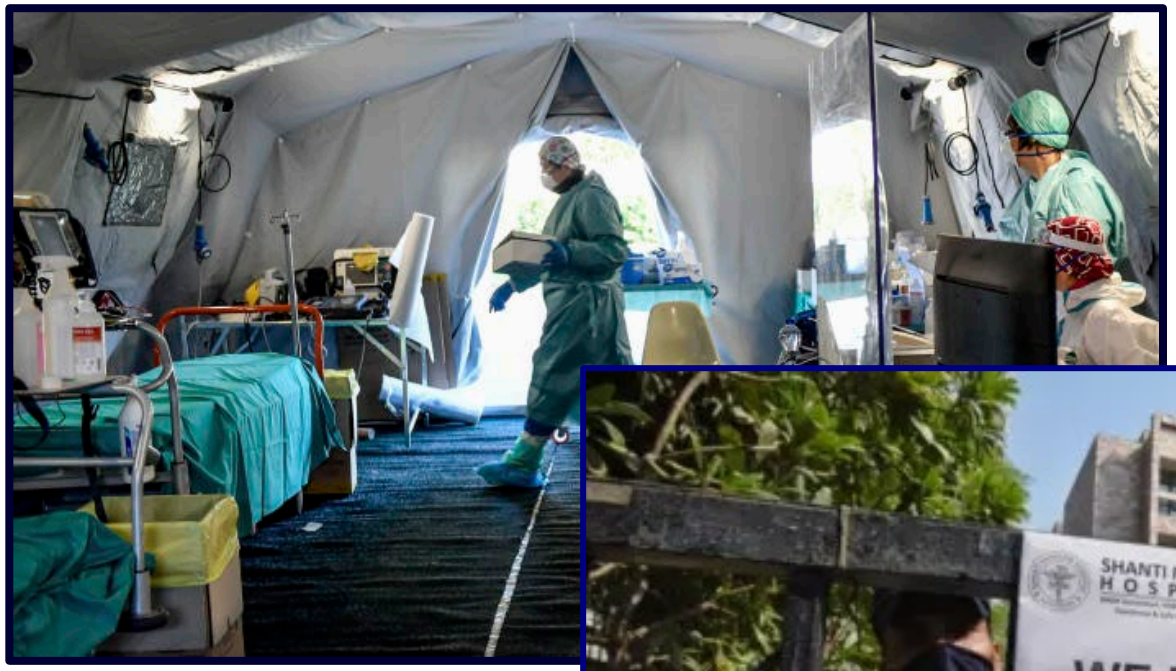


the U.S. Academies of Science, Engineering and Medicine published a study report entitled, "Public Health Lessons for Non-Vaccine Influenza Interventions: Looking Past COVID-19", which noted:

"Countries should institute surveillance as the backbone of their health care systems, which should include submitting aggregated clinical data feeding into public health agencies. To ensure that policy makers have access to accurate, timely, and comprehensive risk assessments, national authorities—with the advice and assistance of regional and global public health agencies—should establish more robust surveillance systems, involving public hospitals and academic medical centers, manufacturers of diagnostics, and social network platforms."

https://www.nationalacademies.org/flu-countermeasures

Lessons Learnt #6: Health System Resilience



COVID-19 Italy

COVID-19 India

https://www.who.int/teams/primary-health-care/health-systems-resilience

The Community as an Important Component of a Resilient Health System

Community-based surveillance: detection and reporting of public health events within communities by community members.

Examples:

- **Influenza-like illness (ILI) surveillance: community-based reporting with based on symptoms and/or self-testing for COVID or COVID/influenza/RSV rapid diagnostic tests**

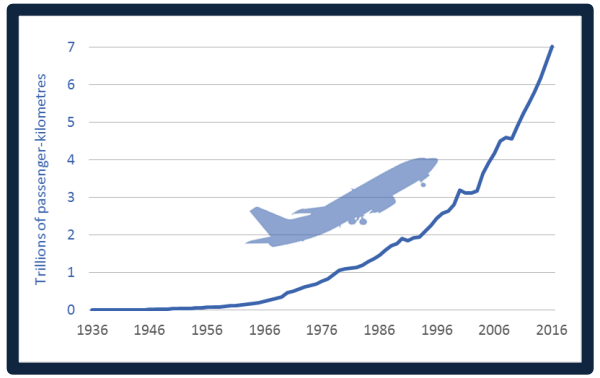
"The integration of community pharmacy into the health system may translate into better access for patients to primary care services, contribute to cost effectiveness, and promulgate the sustainability of the system."

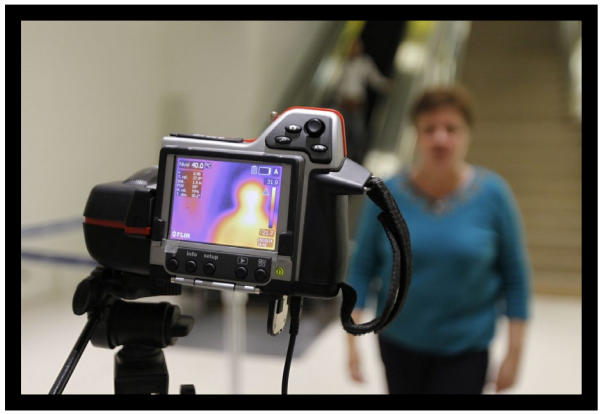
Lab Information Systems

Byrne A, Nichol B (2020) A community-centred approach to global health security: implementation experience of community-based surveillance (CBS) for epidemic preparedness, Global Security: Health, Science and Policy, 5:1, 71- 84, 2020. DOI: 10.1080/23779497.2020.1819854

Celia Piquer-Martinez C et al. Integration of community pharmacy in primary health care: The challenge. Research in Social and Administrative Pharmacy, Vol 18 (8): 3444-7, 2022. https://doi.org/10.1016/j.sapharm.2021.12.005.

Lessons Learnt #7: Effectiveness of Border Control Measures on Transmission of SARS-CoV-2: Systematic Review





- Symptomatic screening measures were not particularly effective, but diagnostic-based screening methods were more effective at identifying infected travellers
- Quarantine of inbound travellers was likely effective at reducing transmission, but only with relatively long quarantine periods, and came with important economic and social effects
- There is little evidence that most travel restrictions, including border closure and those implemented to stop the introduction of new variants of concern, were particularly effective
- Border control measures need to be coupled with strong domestic public health measures
- In future outbreaks, if border control measures are to be adopted, they should be seen as part of a broader strategy that includes other non-pharmaceutical interventions

Grepin et al. 2023. Effectiveness of international border control measures during the COVID-19 pandemic: a narrative synthesis of published systematic reviews *Phil. Trans. R. Soc. A.***381**20230134 http://doi.org/10.1098/rsta.2023.0134

Comparison of Total COVID-19 Death Rates
(up to 19 February 2023)

Country	COVID-19 deaths per million population
Japan	566
South Korea	680
Singapore	294
Italy	3,150
USA	3,344
UK	3, 038

Source: WHO

Lesson Learnt #8: Healthy Populations to reduce COVID-19 Deaths Associated with Co-morbid Conditions

Country	Chronic Lung Disease	Obesity	Diabetes	Hypertension
Japan	~10% of deaths [1]	Low prevalence	~13% of deaths [1]	~20% of deaths [1]
South Korea	Limited data	Limited data	~15% of deaths	~22% of deaths
Singapore	Limited data	Limited data	~20% of deaths	~25% of deaths
Italy	~15% of deaths	~10–15% of deaths	~30% of deaths	~35% of deaths
USA	~20% of deaths	~40% of deaths	~33% of deaths	~50% of deaths
UK	~18% of deaths	~30% of deaths	~26% of deaths	~45% of deaths

Data source: communication from Prof David Heymann, advisor to WHO

Lessons Learnt #9: Develop Good Governance and Collaborative Relationships in Inter-epidemic Periods

Policy decision-making needs to be:

- **Science-based**
- **Inclusive** – not limited to:
  - Public health, health professionals
  - Education
  - Civil societies e.g. indigenous groups, disabled persons
  - Finance
  - Trade
  - Tourism
  - Border security
- **Context specific**: political, cultural, social, and economic
- **Agile** – evolve with pandemic trends and new issues:
  - Variants of concern
  - Vaccination
- **Conveyed in clear and compelling messages to the public**

Stakeholders in healthcare settings

- Hospitals

- Care homes for the elderly

- Clinics/doctor's offices

- Nursing stations in remote settings

Stakeholders in non-healthcare settings:

- Pharmacies

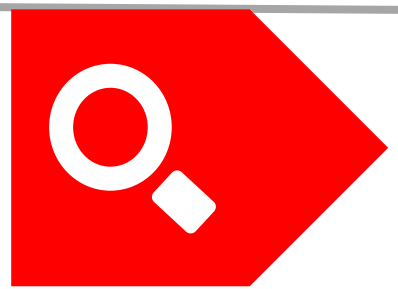
- Schools

- Workplaces

- Mass gatherings

- Border crossings

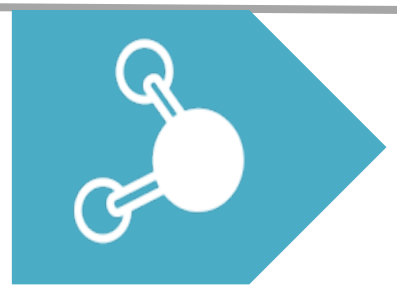
Summary:
Lesson Learnt from the COVID-19 Pandemic and other Health Crises



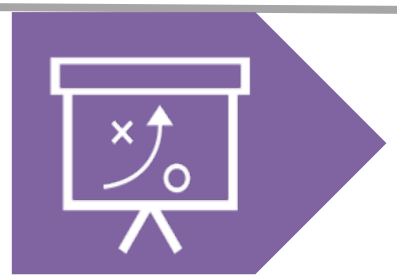
Strengthen public health infrastructure by improving laboratory and surveillance capacity to provide outbreak alerts and mount a swift and effective response

Accelerate timely and equitable access to diagnostics, therapeutics and vaccines by building regional networks such as ADVanCE

Build health system resilience by building capacity for community testing and vaccinations, and developing a road map for improving health system resilience



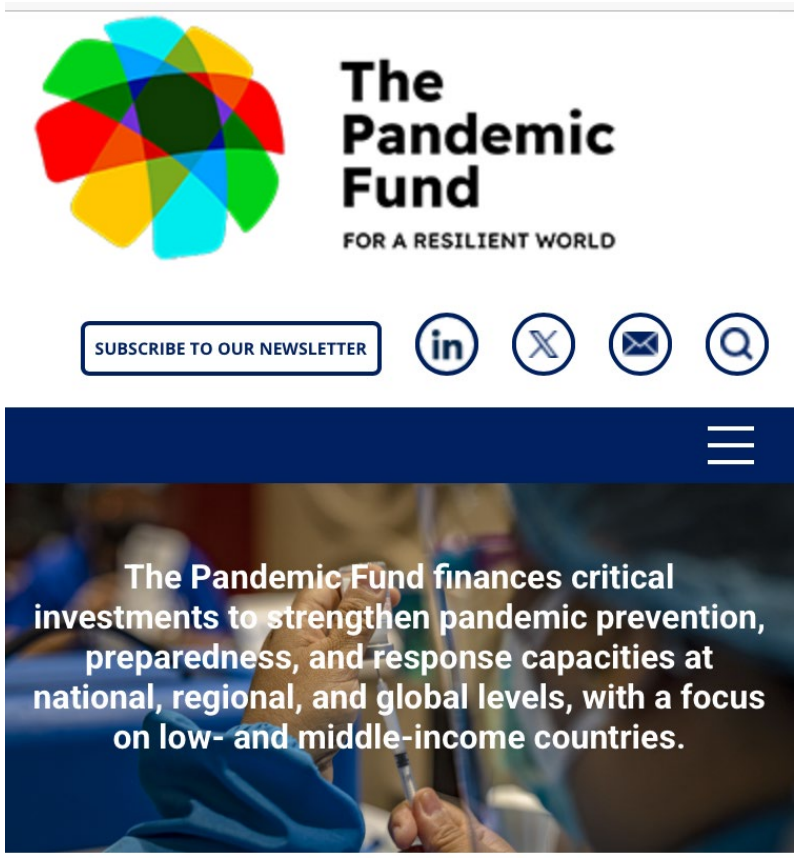
Invest in ecosystems for data connectivity to turn data into real-time intelligence to inform and monitor the effectiveness of public health interventions



Ensure the health of the population to avert serious outcomes of infection by early detection and treatment of co-morbid conditions

Develop good governance and collaborative relationships based on trust among different stakeholders and with the public during inter-epidemic periods and not during infectious disease emergencies

Pandemic Fund



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Netherlands
United Arab Emirates
United Kingdom
United States
Wellcome
European Commission
Bill & Melinda Gates Foundation
The Rockefeller Foundation

Is it the most optimal approach for countries to compete for financing preparedness with decisions made by a distant review body?


Thank you