POLICY BRIEF

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From Aspiration to Action: Leveraging Partnerships and Platforms in Vaccine R&D to Advance Equitable Pandemic Preparedness

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Solidarity for the Achievement of the SDGs

Abstract

The COVID-19 pandemic exposed longstanding inequities in health technology research and development (R&D) and access that undermine effective national, regional, and global public health responses. This was most acute in African countries, where only 28% of people were fully vaccinated by December 2022 compared to 75% in high-income countries. More broadly, only 1% of all vaccines administered are produced locally and only 4% of clinical trials globally are hosted in Africa.

Efforts are strengthening localised vaccine R&D and manufacturing, including through the Afrigen mRNA Vaccine Technology Transfer Hub and African Vaccine Manufacturing Accelerator. Vaccine R&D against emerging infectious diseases (EIDs) like Ebola, Marburg, and Lassa represent opportunities to further bolster expertise, trial capacity, and access in endemic regions. Recent outbreaks, including of Marburg in Tanzania and Rwanda and Ebola Sudan virus in Uganda, underscore the threat EIDs pose to national and global health security.

Investments in regional vaccine R&D and commercialisation are a critical enabler of the Sustainable Development Goals (including SDGs 3.b, 17.6, and 17.8) relating to health, innovation, and international cooperation. Diversified and coordinated domestic, bilateral, and multilateral investments in support of a One Health approach can deliver significant public health and economic returns. These include developing health technologies for local contexts; establishing sustainable, localised vaccine manufacturing; expanding health industries; creating jobs; shoring up resilient health and surveillance systems; and facilitating knowledge sharing, including of platform-based vaccine technologies.

In this brief, we outline how investments in vaccine R&D and commercialisation advance integrated regional health technology ecosystems. Using EIDs as a case study, we demonstrate how these investments contribute to robust pandemic preparedness and response to address existing and future disease threats exacerbated by the climate crisis. Further, we will highlight key North–South, South–South, and triangular regional and international partnerships to scale up this effort. This is a timely opportunity to support regional vaccine priorities, including of institutes like Africa CDC, and global priorities outlined in the Indonesian, Indian, and Brazilian G20 health ministers' declarations, as well as in the WHO Pandemic Agreement.

Keywords: Pandemic, Vaccine, Health Technology, Emerging Infectious Diseases, One Health

Diagnosis

The COVID-19 pandemic exposed longstanding inequities in health research and development (R&D) and access that undermine effective national, regional, and global public health responses. Regional vaccine R&D capacities outside high-income countries (HICs) remain insufficient. This is most acute in Africa, where only 25% of people were fully vaccinated against SAR-CoV-2 by December 2022 compared to 75% in HICs, and no licenced vaccines were developed by African institutions.[1,2] More broadly, only 1% of all vaccines administered are produced locally,[3] and the World Health Organization (WHO) African region hosts only 4% of clinical trials globally despite shouldering at least 20% of the global disease burden.[4,5]

Pandemic preparedness, prevention, and response (PPPR) is a global priority, as per recent G20 declarations and the WHO Pandemic Agreement adopted in May 2025.[6,7,8] Investments in vaccine infrastructure responsive to local needs is a critical enabler of the SDGs (including 3.b, 17.6, and 17.8) relating to health, innovation, and international cooperation. Importantly, the Pandemic Agreement seeks to address persistent barriers to equitable distribution of medical countermeasures during health emergencies.[9]

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[1] World Health Organization African Region, "COVID-19 Vaccination in the WHO African Region," *Monthly Bulletin*, no. 10 (December 10, 2022), https://iris.who.int/bitstream/handle/10665/365353/CV-20221210-eng.pdf.
[2] Bassey Edem et al., "COVID-19-related research in Africa: a cross-sectional review of the International Clinical Trial Registration Platform (ICTRP)," *Trials*, 2021 Oct 7;22(1):682. doi: 10.1186/s13063-021-05621-x.
[3] Nupur Parikh and Matthew Price, "What Will It Take to Build Africa's Vaccine Industry?," ONE Data and Analysis, February 25, 2025, https://data.one.org/analysis/manufacturing.
[4] Our World in Data, "Global Disease Burden by Region." (Accessed April 7, 2025). Available at https://ourworldindata.org/grapher/disease-burden-by-region
[5] Amine Mansouri, "Transforming Healthcare in Africa: Key Trends for 2025," *IQVIA*. (March 10, 2025). [Accessed April 7, 2025). Available at https://www.iqvia.com/locations/middle-east-and-africa/blogs/2025/03/transforming-healthcare-in-africa-key-trends-for-2025
[6] "Chair's Summary: Health Minister's Meeting of the G20," Indonesia G20 Health Ministers Meeting, 2022, http://www.g20.utoronto.ca/2022/Chairs-Summary-G20-Health-Ministers-Meeting-27-28-October-2022.pdf.
[7] "Outcome Document and Chair's Statement," India G20 Health Ministers Meeting, 2023, https://g20.utoronto.ca/2023/230819-health.html.
[8] "Rio de Janeiro Declaration of the G20 Health Ministers," Brazil G20 Health Ministers Meeting, 2024, https://www.g20.utoronto.ca/2024/241031-health-declaration.html
[9] WHO, "Proposal for the WHO Pandemic Agreement", April 16, 205, Available at https://apps.who.int/gb/ebwha/pdf_files/WHA78/A78_10-en.pdf

Notably, Article 9 calls for sustained support of and investment in global R&D partnerships that prioritise equity across the research-to-implementation pipeline, including strengthening and centring institutions in low-income countries with high disease burdens.

EIDs: A growing global health security threat

Outbreaks of emerging infectious diseases (EIDs) likely to cause public health emergencies of international concern are increasing globally.[10] At least 60% are zoonotic, originating in animals before human transmission. About 40 EIDs have been discovered since 1970,[11] and the WHO warns EIDs will continue to arise at an accelerated rate.[12]

Viral haemorrhagic fevers (VHFs) are of particular concern, posing significant health threats in endemic countries in West and Central Africa. Recent outbreaks of the Ebola Sudan virus in Uganda (January 2025), Marburg virus in Rwanda (September 2024) and Tanzania (January 2025), and seasonal Lassa virus outbreaks in West Africa, underscore the threat of EIDs to national and global health security, including as bioterror threats.

A lack of sustained funding, insufficient regional research and manufacturing infrastructure, and inconsistent political commitments to advance clinical development have resulted in a shortage of approved treatment and prevention products for emergency use.[13] For example, despite the high case fatality rates of VHFs, vaccines are only licensed against Ebola Zaire virus.[14]

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[10] Shen Wang et al, "Emerging and reemerging infectious diseases: global trends and new strategies for their prevention and control," Sig Transduct Target Ther 9, 223 (2024). https://doi.org/10.1038/s41392-024-01917-x
[11] "Emerging Infectious Diseases," Baylor College of Medicine, March 31, 2025, https://www.bcm.edu/departments/molecular-virology-and-microbiology/emerging-infections-and-biodefense/emerging-infectious-diseases.
[12] The World Health Organization, *The World Health Report 2007: A Safer Future*, 2007, https://iris.who.int/bitstream/handle/10665/43713/9789241563444_eng.pdf.
[13] Gary Wong and Xiangguo Qiu, "Funding Vaccines for Emerging Infectious Diseases," *Human Vaccines & Immunotherapeutics* 14, no. 7 (January 16, 2018): 1760–62, doi: 10.1080/21645515.2017.1412024.
[14] IAVI, *Emerging Infectious Diseases Vaccines*, 2025, www.iavi.org/wp-content/uploads/2025/01/iavi_fact_sheet_emerging-infectious-diseases-vaccines.pdf.

The response is further complicated by an incomplete understanding of the epidemiology of these pathogens, in part due to insufficient surveillance and the seasonal or infrequent nature of outbreaks.

The threat of urbanisation and the climate crisis

Increased contact between humans and animal hosts drives the risk of EID outbreaks, including through rising urbanisation, changing land use, and climatic shifts expanding animal host ranges and accelerating zoonotic spillover.[15] Human population centres across equatorial Africa, India, and Southeast Asia face particular risk. In West Africa alone, it is estimated that zoonotic spillover events could at least double by 2070, while the number of people exposed to Lassa virus could climb a staggering 600%.[16] Increasingly intense outbreaks of other vector-borne diseases such as Chikungunya and Dengue, both transmitted by mosquitoes, are already occurring, with outbreaks reported in the Americas.[17]

Towards equitable, regionally led PPPR

Reciprocal partnerships are crucial to facilitate access to biomedical innovations. During the COVID-19 pandemic, South African researchers shared genomic sequence data for the Omicron variant with researchers worldwide, yet vaccines developed in HICs using these sequences were largely inaccessible to most people in Africa.[18] Following the adoption of the Pandemic Agreement, WHO member states will now negotiate the Pathogen Access and Benefit-Sharing

[15] Neil M. Vora et al., "Interventions to Reduce Risk for Pathogen Spillover and Early Disease Spread to Prevent Outbreaks, Epidemics, and Pandemics," Emerging Infectious Diseases 29, no. 3 (March 2023): 1–9, doi: 10.3201/eid2903.221079.
[16] Raphaëlle Klitting et al., "Predicting the Evolution of the Lassa Virus Endemic Area and Population at Risk Over the Next Decades," *Nature Communications* 13, no. 1 (September 27, 2022), doi: 10.1038/s41467-022-33112-3.
[17] "Geographical Expansion of Cases of Dengue and Chikungunya beyond the Historical Areas of Transmission in the Region of the Americas," World Health Organization, March 23, 2023, https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON448.
[18] Nicaise Ndembi et al., "The Pandemic Agreement: Achieving an African Win for Health Security Inequity," *Journal of Public Health in Africa* 15, no. 1 (May 21, 2024), doi: 10.4102/jphia.v15i1.618.

(PABS) Annex, which will outline conditions critical to ensure access to pathogen samples, sequence data, and potential benefits – including vaccines.[19]

Meanwhile, North–South collaboration has supported local centres of research excellence, such as Medical Research Council The Gambia and Institut Pasteur de Dakar (IPD) in West Africa. A growing focus on South–South collaboration has recently led to commitments from the ASEAN Leaders' Declaration on Vaccine Security and Self-Reliance,[20] as well as technology transfer and capacity strengthening in Latin America and the Caribbean through the India–UN Development Partnership Fund.[21] Yet, foreign institutions still dominate local research[22] and most vaccine R&D funding comes from foreign donors, largely in the US and Europe.[23]

Robust and well-resourced vaccine infrastructure in low- and middle-income countries is critical for regionally self-sufficient PPPR. In Africa, for example, initiatives such as the Afrigen mRNA Vaccine Technology Transfer Hub and African Vaccine Manufacturing Accelerator are strengthening regional capacities.

Recommendations

To facilitate coordinated and equitable regional vaccine ecosystems, we propose a series of recommendations (Figure 1).

[19] WHO, "Proposal WHO Pandemic Agreement"
[20] Jerome H. Kim and Colin McCann, "The Emergence of a South-South and Triangular Cooperation Approach to Vaccine Development," *Journal of Global Health Science* 3, no. 1 (2021), https://doi.org/10.35500/jghs.2021.3.e6.
[21] "The India-UN Development Partnership Fund - Projects," UNOSSC, https://unsouthsouth.org/indiaunfund/#projects.
[22] Nadia A. Sam-Agudu et al., "Building Sustainable Local Capacity for Global Health Research in West Africa," *Annals of Global Health* 82, no. 6 (March 15, 2017): 1010, doi. 10.1016/j.aogh.2016.10.011.
[23] Impact Global Health, "Landscape of Emerging Infectious Disease Research & Development report: Lessons Learned," *G-FINDER* (September 25, 2024). Available at https://cdn.impactglobalhealth.org/media/EID%20G-FINDER%20report%202024.pdf

Figure 1. Recommendations to reinforce coordinated and equitable regional vaccine ecosystem centred on a One Health approach.

Prioritise One Health to advance PPPR

G20 ministers of health should prioritise One Health[24] approaches informed by the interdependent factors driving disease outbreaks. EID vaccine R&D can be optimised through multi-disciplinary research, including between the human and veterinary sectors, drawing on scientific synergies to facilitate greater resource efficiency in a development-to-implementation pipeline that is adaptable and resilient to climate disruptions.[25] This approach can further marry R&D with data

[24] The WHO defines One Health as an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes that the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent. (See https://www.who.int/health-topics/one-health#tab=tab_1)

[25] Nidhee Jadeja et al., "Climate and Health Strategies Must Take Vaccination into Account," *Nature Microbiology* 8, no. 12 (November 29, 2023): 2215–16, doi: 10.1038/s41564-023-01537-1.

on regional weather patterns, human migration, global disease and zoonotic virus surveillance, and development indicators, among others.[26]

Optimise existing and novel initiatives and partnerships

Coordinated North-South and South-South partnerships among G20 states, with endemic countries in the driving seat, can better situate vaccine development in local and regional contexts. G20 health ministers, together with relevant ministries for science and innovation, can adapt practices from other disease responses, including for HIV, tuberculosis, and Ebola. Existing South-South networks, such as SANTHE (sub-Saharan African Network for TB/HIV Research), the BRICS TB Research Network, and the Health Development Partnership for Africa and the Caribbean (HeDPAC) can serve as blueprints, building on established partnerships, expanding scopes of work where feasible, and providing proven governance structures. This can in turn reinforce autonomous vaccine development and commercialisation capacities, shoring up disease response capabilities and cultivating the next generation of public health leadership.[27,28]

Such approaches support regional priorities, including those outlined in "A New Public Health Order for Africa" of the AU and African Centres for Disease Control and Prevention (Africa CDC), which calls for the strengthening of Africa's vaccine manufacturing and strategy to strengthen the continent's health security agenda.[29] Resulting initiatives include the Partnerships for African Vaccine Manufacturing, African Vaccine Manufacturing Accelerator, and African Vaccine Acquisition Task Team. Regional institutions, such as the Africa CDC and the nascent African Medicines Agency, are uniquely positioned to lead

[26] Ibid.
[27] Giovanni Rezza and Scott C. Weaver, "Chikungunya as a Paradigm for Emerging Viral Diseases: Evaluating Disease Impact and Hurdles to Vaccine Development," *PLOS Neglected Tropical Diseases* 13, no. 1 (January 17, 2019), doi: 10.1371/journal.pntd.0006919.
[28] Tara Kirk Sell et al., "Building the Global Vaccine Manufacturing Capacity Needed to Respond to Pandemics," *Vaccine* 39, no. 12 (March 2021): 1667–69, doi: 10.1016/j.vaccine.2021.02.017.
[29] "Call To Action: Africa's New Public Health Order," Africa CDC, September 21, 2022, https://africacdc.org/news-item/call-to-action-africas-new-public-health-order/.

and coordinate regionally sensitive vaccine development, and global health R&D more broadly.

Open and transparent science is critical to facilitate, among others, rapid data sharing and technology transfer.[30,31] The forthcoming PABS Annex of the Pandemic Agreement will provide a relevant mechanism to support this. G20 health ministries can work together through the Intergovernmental Working Group responsible for managing the next steps of the Pandemic Agreement to ensure the PABS Annex effectively informs equitable practices to maximise public health impact.

Utilise proven vaccine platform technologies and trial design

G20-led research networks can harness established vaccine technology and trial design to accelerate vaccine development, stockpiling, and response during unpredictable disease outbreaks while reinforcing resilient, regional vaccine research infrastructure. For example, licensed and investigational vaccines using the recombinant vesicular stomatitis virus (rVSV) vaccine vector platform[32] have been critical to responding to and controlling recent Ebola outbreaks in sub-Saharan Africa. In February 2025, WHO launched a ring vaccination trial of IAVI's rVSV-based Ebola Sudan vaccine candidate within four days of declaring an outbreak.[33,34] Locally tailored community engagement was critical – both during and between outbreaks.[35] The G20 can also support the development of climate

[30] Olalekan A. Uthman et al., "Gaps in vaccine clinical trials in Africa: A mixed scoping review and bibliometric analysis before, during, and post- COVID-19 pandemic," *Human Vaccines & Immunotherapeutics*, 21(1), doi: 10.1080/21645515.2025.2481802

[31] Izuchukwu A. Okafor et al., "Institutionalizing Open Science in Africa: Limitations and Prospects," *Front Res Metr Anal*, 2022 Apr 15;7:855198, doi: 10.3389/frma.2022.855198.

32 The recombinant vesicular stomatitis virus (rVSV) vaccine vector platform is made up of five proteins, its viral envelope, and genomic RNA. Already proven against Ebola, this vector shows broad potential for use against pathogens such as Lassa Virus and beyond.

[33] Jean-Jacques Muyembe et al., "Ebola Outbreak Response in the DRC with RVSV-ZEBOV-GP Ring Vaccination," *New England Journal of Medicine* 391, no. 24 (December 19, 2024): 2327–36, doi: 10.1056/nejmoa1904387.

[34] Paul Adepoju, "Uganda Launches Vaccine Trial for Sudan Virus Disease," The Lancet Microbe 6, no. 4 (April 2025): 101110, doi: 10.1016/j.lanmic.2025.101110.

[35] Gnakub Norbert Soke et al., "Continuous Community Engagement Is Needed to Improve Adherence to Ebola Response Activities and Survivorship During Ebola Outbreaks," *Global Health: Science and Practice* 12, no. 4 (July 31, 2024), doi: 10.9745/ghsp-d-23-00006.

resilient vaccine technologies, including those that limit reliance on cold chains, such as thermo-stable formulations and solar-powered storage.[36]

Champion domestic and regional investments

G20 ministries of health and finance can work together to increase and sustain investments in regional vaccine infrastructure, aligned with provisions in articles 9 and 20 of the Pandemic Agreement.[37] Such investments can expand local industry, create jobs, bolster resilient surveillance systems, and improve health outcomes. Global and regional initiatives can be leveraged to raise the necessary funding and inform financing mechanisms of novel, joint efforts.[38] Initiatives such as the African Development Bank, the Science for Africa Foundation's Grand Challenges Africa Initiative, and the Asian Development Bank's Asia Pacific Vaccine Access Facility provide proven examples to unlock regional funding. Key global examples include the Pandemic Fund, which has awarded almost $900 million in grants and mobilised an additional $6 billion in resources for PPPR, and CEPI, which has supported the development of over 30 vaccine candidates against priority pathogens. Alongside multilateral and HIC funding, domestic investments from endemic countries, including through joint, regional mechanisms, can sustain locally owned and led research.[39]

Conclusion

By investing in integrated regional vaccine ecosystems, the G20 can address longstanding inequities in access to health technologies and establish fit-for-purpose infrastructure. Best practices can be applied from successful global

[36] Gavi, "Climate, health and immunisation: Gavi's role in response and prevention," (Accessed April 7, 2025), Available at https://www.gavi.org/our-alliance/climate-health-immunisation
[37] WHO, "Proposal WHO Pandemic Agreement"
[38] Wong and Qiu, "Funding Vaccines for Emerging Infectious Diseases."
[39] Cathryn M Edwards et al., "Rebalancing the Research Equation in Africa: Principles and Process," *BMJ Open* 12, no. 2 (February 2022), doi: 10.1136/bmjopen-2021-049781.

health initiatives. Leadership must be firmly situated in endemic regions, in close collaboration with G20 ministries of health, finance, and science.

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