

POLICYBRIEF

October 2026

Best Practices in Global Vaccination Roll-Out to Reduce Health Inequity

Executive Summary

COVID-19 vaccines were developed and deployed at unprecedented speed, yet countries varied widely in their ability to finance, procure, distribute, and administer them. Large differences in the timing and coverage of vaccination caused avoidable disease and economic burden, with the greatest constraints faced by low-income countries and other resource-limited settings. These constraints arose across the full vaccine-readiness pathway: financing, procurement, manufacturing, allocation, delivery, uptake, safety monitoring, and accountability. This brief proposes an operational “equity-by-design” framework for future health emergencies. It calls for pre-agreed, epidemiology-triggered allocation; advance purchase agreements with enforceable equity and access conditions; predictable financing and sustained demand for regional manufacturing; integrated modelling and genomic surveillance; transparent and timely disaggregated data-sharing; and community engagement approaches grounded in behavioural and social science. Governance safeguards should protect technical decisions from partisan and commercial distortion. Together, these measures would make technical innovations more accessible, effective, and equitably deployed across countries. Embedding them in routine preparedness would improve readiness and resilience to emerging threats while strengthening routine immunisation systems.

Context

The COVID-19 pandemic showed that timely vaccination can reduce disease and save lives, but innovation alone does not ensure equitable public health impact. Unequal purchasing power, concentrated manufacturing capacity, export restrictions, fragile supply chains, and differences in health-system capacity shaped when and where vaccines became available. These pressures disproportionately delayed access in low-income countries and other lower-resource settings, while inequalities within countries also affected which communities were reached. The constraints extended across the full vaccine-readiness pathway, including financing, procurement, manufacturing, allocation, delivery, uptake, safety monitoring, and accountability. Delayed protection in lower-resource settings prolonged transmission, increased the risk of variant emergence and slowed economic recovery, weakening health and economic security across borders. Quantitative evidence on vaccine roll-out shows why preparedness must embed “equity by design” in health infrastructure and global governance. The WHO Pandemic Agreement and revised International Health Regulations now provide a basis for turning those commitments into coordinated access to vaccines, diagnostics, and therapeutics, alongside stronger and more resilient health systems.

Problem statement

International commitments to vaccine equity have not yet produced the operational mechanisms required to deliver timely access across countries. During COVID-19, differences in purchasing power, manufacturing capacity, supply chains, health system readiness, and political prioritisation shaped who received vaccines and when. Because unequal access increases the global burden of disease, implementation depends on sustained international cooperation and pre-agreed rules rather than ad hoc action during crises. Drawing on quantitative evidence from COVID-19 roll-out rates, this brief recommends an end-to-end “equity-by-design” framework that connects vaccine development to financing, procurement, manufacturing, allocation, delivery, uptake, safety monitoring and accountability. The aim is a global system that can respond quickly to future health emergencies while directing protection to populations with the greatest need

Vaccine equity: lessons from COVID-19

The COVID-19 pandemic has brought to the forefront issues of vaccine distribution and access. Despite the proven public health

impact of vaccines in reducing disease burden and mortality, disparities in vaccine access and roll-out have persisted. During the peak of the pandemic in 2021 amidst the emergence of several highly transmissible variants of SARS-CoV-2, the pathogen responsible for COVID-19, stark disparities were evident in vaccine distribution globally. Data from the United Nations Development Programme (UNDP) revealed a troubling gap¹: high-income (HIC) and upper-middle-income (UMIC) countries administered at least one dose per person on average, while only one in three people in lower-middle-income countries (LMIC) had one dose, and one in twenty-five people in low-income (LIC) countries had one dose by the end of 2021. These figures measure doses administered, not the proportion of people vaccinated.

Although various initiatives were designed to mitigate these disparities, structural inequities, including production limitations and logistical and financial constraints, disproportionately impacted poorer nations, leading to significant inequity in the global distribution of COVID-19 vaccines. From a historical perspective, however, the COVID-19 pandemic marked the fastest and most equitable introduction and distribution of vaccines across countries to date. In the

POLICY BRIEF ARCHITECTURE

From COVID-19 evidence to equitable protection

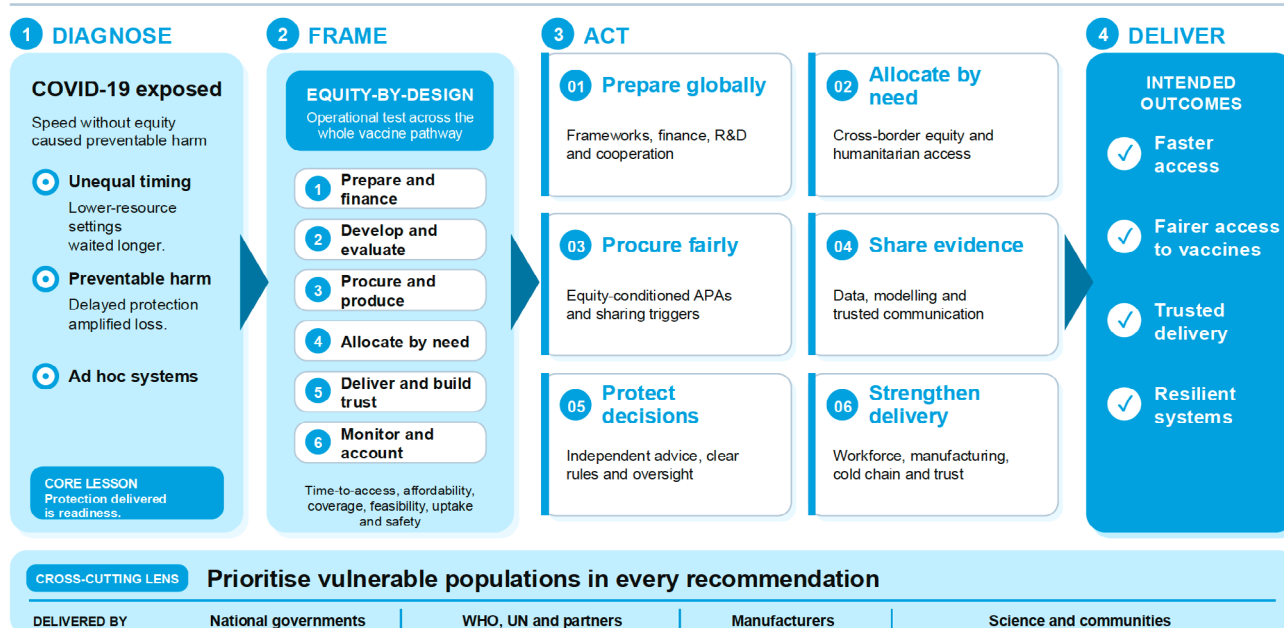


Figure 1. Equity by design across the vaccine readiness pathway.

past, there were often delays of 10-30 years before vaccines that were introduced in HICs became available in LICs, such as with Haemophilus influenzae type b (Hib)² and human papillomavirus (HPV)³ vaccines. In stark contrast, COVID-19 vaccines were distributed globally within a much shorter time frame owing to the unprecedented international collaboration and funding mechanisms like COVAX, which prioritised equitable access.

It is important to recognise that the rapid deployment of COVID-19 vaccines occurred under the extraordinary circumstances of

a global health crisis⁴, where worldwide urgency mobilised exceptional resources, although economic and logistical constraints persisted. While such a level of immediacy and broad international cooperation might not be replicable in 'peacetime' scenarios, where non-emergency conditions prevail, the successes and lessons learned from this pandemic provide a blueprint for improving future vaccine distribution⁵.

Economic, social, institutional, and geographical heterogeneities across nations significantly influence their capacity to

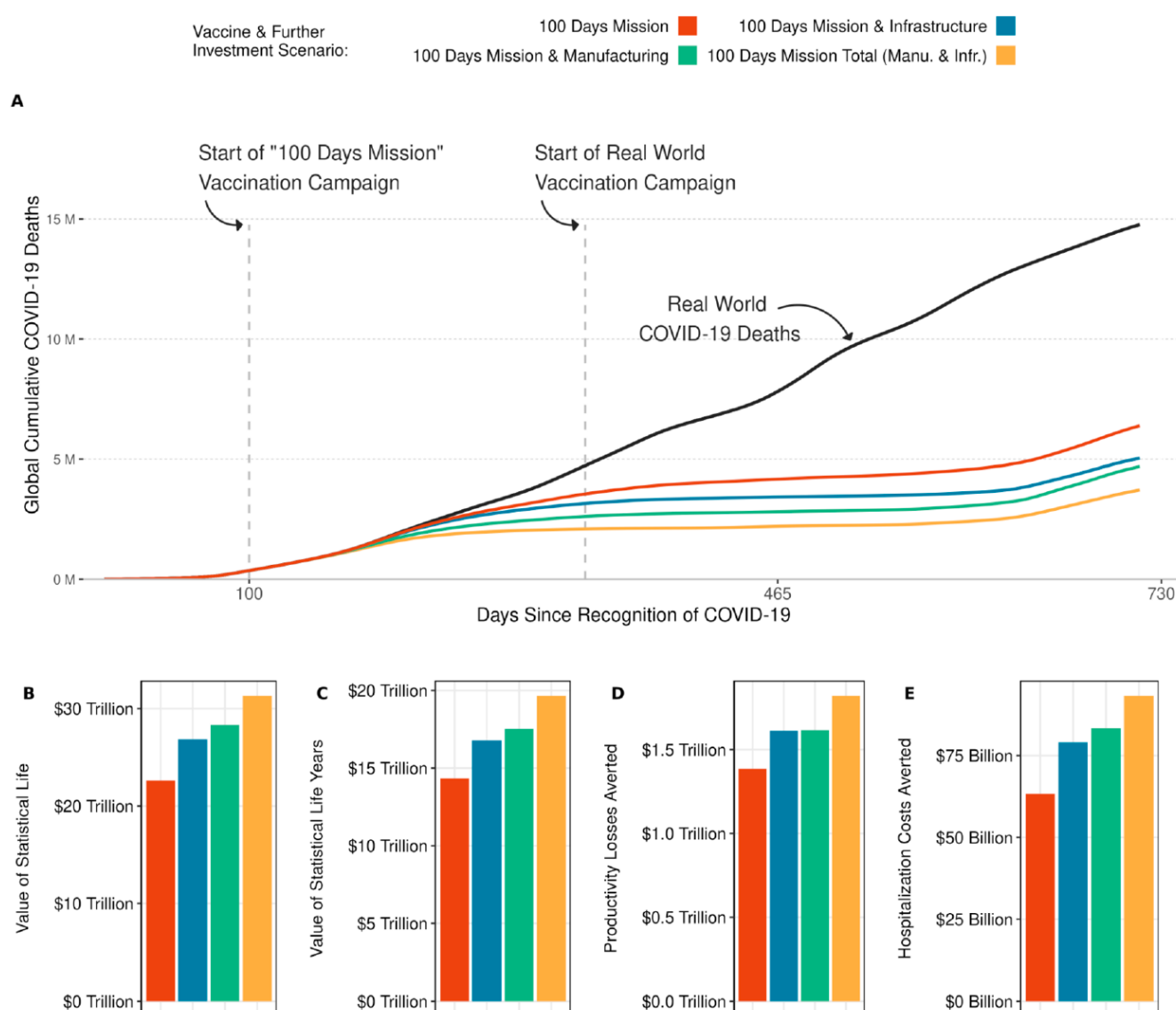


Figure 2. Cumulative COVID-19 deaths up to the end of 2021 and the impact of global vaccine roll-out starting 100 days after sequencing the virus (100 Days Mission) and additional scenarios considering additional investment in global vaccine manufacturing and health system infrastructure (A). The associated global health economic impacts of the different investment scenarios calculated from deaths averted on the basis of value of a statistical life (B), value of a statistical life-year (C), the losses averted on the basis of productivity losses due to illness (D), and hospitalisation-associated costs (E). The scenario shown retains historical non-pharmaceutical interventions. See ref15 for more details on the modelling analysis.

respond to public health emergencies^{6,7}. To enhance global vaccine equity, it is important to evaluate and improve our vaccination best practices to ensure timely distribution and preparedness for the next public health emergency. Analysing the relationship between vaccine roll-out rates, coverage, and their impact on disease and economic burdens enables the identification of optimal vaccination programmes and supports advocacy for data-driven decision-making in public health.

Rapid vaccine development and equitable deployment reduce disease burden

Studies estimate large differences in lives saved by COVID-19 vaccination^{8–11}. Vaccination averted far fewer deaths per capita in low-income countries, particularly in the Eastern Mediterranean and African regions, than in high-income countries⁸. Limited fiscal resilience also constrained the use of non-pharmaceutical interventions and access to health care while vaccines remained scarce^{12,13}. Financing, distribution capacity, and political priority compounded supply constraints. If lower-middle- and low-income countries had matched high-income roll-out rates, as many as half of their COVID-19 deaths might have been averted by 1 October 2021¹⁰. More equitable redistribution of existing supply could have prevented 1.3 million deaths globally by the end of 2021⁹.

Building on these insights, improving vaccine equity in future pandemics requires a fundamental shift away from the competitive scramble for limited supplies that defined previous crises. To meaningfully improve equity, the global health community must move beyond ad hoc responses and instead prioritise the institutionalisation of regionally distributed manufacturing alongside resilient, pre-established preparedness frameworks. Initiatives like the 100 Days Mission¹⁴, which seeks to accelerate the availability of vaccines, diagnostics, and therapeutics, illustrate the importance of swift action. Complementing these efforts with substantial investment in global vaccine manufacturing and health system infrastructure is vital to enhance the capacity to respond equitably. Ensuring that future responses are more equitable and that

the most vulnerable populations receive timely access to life-saving interventions is essential for mitigating the impact of global health crises and reducing deaths across all regions.

Modelling estimates suggest that starting the global vaccine roll-out 100 days after sequencing the virus could have saved over 8 million lives by the end of 2021 under historical non-pharmaceutical interventions, with the statistical life-years saved valued at US\$14 trillion, primarily by reducing deaths, healthcare costs, and lost productivity (Figure 2)¹⁵. Notably, the majority of lives saved would have been in LMICs, as high vaccine coverage could have been achieved before the Delta variant spread in early 2021. However, rapid vaccine development alone is insufficient; improvements in global manufacturing capacity and health system infrastructure are essential to enhance vaccine coverage and prevent supply shortages, potentially saving an additional 3 million lives and further \$5 trillion in economic losses. Faster, more equitable vaccine roll-out would also have allowed countries with lower coverage to relax non-pharmaceutical interventions earlier while also protecting high-risk groups.

Accelerating evidence on vaccine effectiveness during pandemics

The development of vaccines against pathogens predicted to be potential causes of future pandemics is already ongoing. Pre-clinical and early-stage clinical studies can be carried out in pre-pandemic times to assess vaccine candidates' safety and immunogenicity. However, direct estimates of vaccine efficacy or effectiveness generally require a setting of disease transmission, as these measures are based on comparing the frequency of cases in vaccinated and unvaccinated groups¹⁶. Clinical trial protocols can also be pre-approved in pre-pandemic periods to reduce delays in starting the trial. Epidemiological modelling and trial simulation can be employed to design clinical trials that are best suited to the outbreak and deliver results as quickly as possible. In the case of an outbreak caused by pathogen X, such as SARS-CoV-2, the development of vaccine platforms, for which much of the safety information can also be collected in inter-epidemic periods,

can help to accelerate the development of pathogen-specific vaccines that can be deployed in the outbreak. There are also other routes to licensure for diseases where the limited or sporadic nature of outbreaks makes classical clinical trials infeasible. For example, a vaccine can be studied in animals that are exposed to the disease-causing pathogen, comparing outcomes in vaccinated and unvaccinated animals, subject to specific regulatory criteria. Accelerated approval may also be possible using a validated surrogate endpoint or an immune correlate that is reasonably likely to predict clinical benefit, although confirmatory evidence may still be required¹⁷.

Incorporating genomic surveillance to enhance vaccine response preparedness

COVID-19 demonstrated the value of genomic surveillance in understanding and limiting infectious disease spread^{18–20}. Surveillance identifies high-risk variants, tracks their evolution, detects immune escape, guides vaccine updates and directs deployment to areas where risk is rising. Pathogen sequencing allows scientists to track evolutionary changes in real time, assess transmissibility and potential vaccine resistance, and inform

vaccine updates and deployment. Rapid detection and reporting of the SARS-CoV-2 Omicron variant in Southern Africa prompted global vaccine strategy adjustments. Genomic surveillance can also support broadly protective vaccines against pathogen groups such as sarbecoviruses, including SARS-CoV and SARS-CoV-2. Long-term finance for sequencing facilities and regional reference laboratories in low- and middle-income countries should be matched with training for laboratory staff, scientists and analysts, avoiding cycles of emergency investment and decline^{21,22}. These capacities support timely variant detection, improve local decisions and enable countries to contribute to global health data. Genomic surveillance therefore supports vaccine equity by helping to ensure that protection remains effective across populations.

Future preparedness should link genomic surveillance to vaccine research, development and distribution through explicit triggers for updating products and targeting supply²³. Combining surveillance, virology and vaccine research can support broadly protective vaccines that, once their safety, protection and storage requirements are established, could be stockpiled as an initial line of defence while pathogen-specific products are developed. For

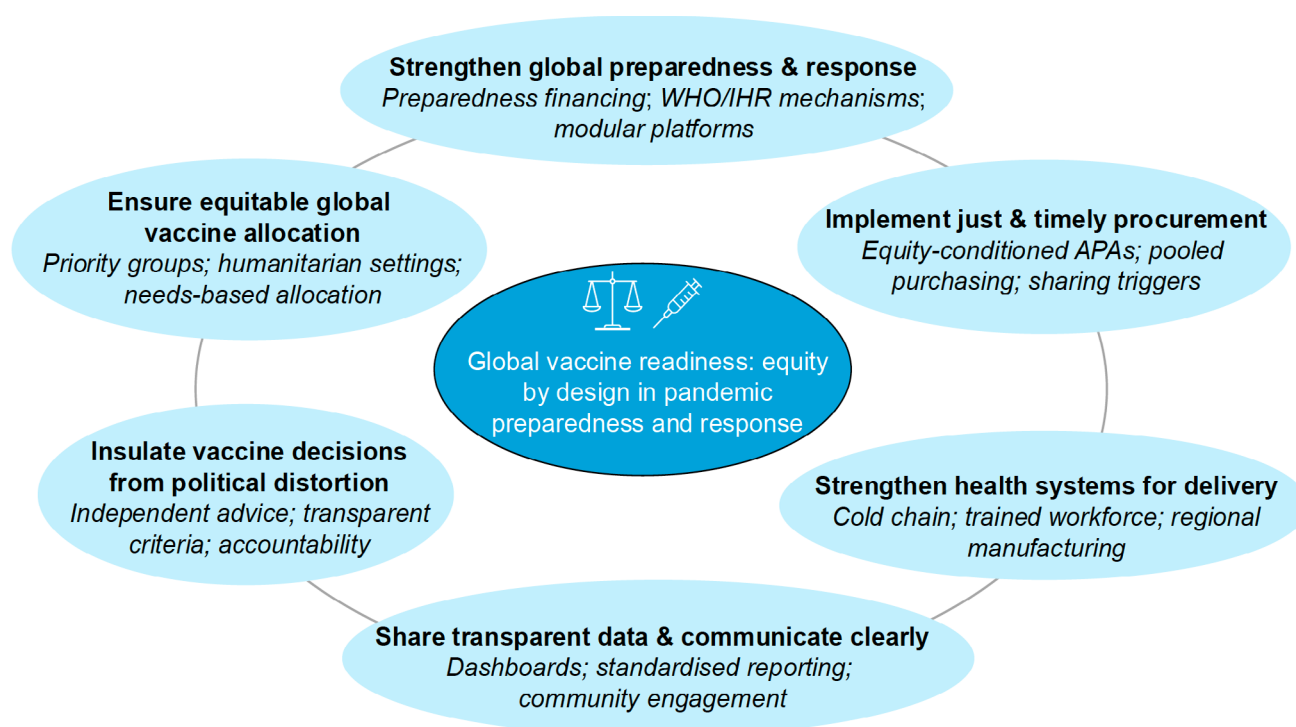


Figure 3. Key strategic areas aimed at improving global preparedness and reducing inequity in vaccine access and distribution.

low-incidence diseases such as Nipah virus, licensure may need to rely on immunogenicity or other alternative endpoints because conventional efficacy trials may be infeasible, as experience with chikungunya vaccine development indicates²⁴. Agreed surveillance-to-strategy pathways would allow earlier^{24,25} detection, faster formulation changes and more efficient allocation.

Policy recommendations

This policy brief offers recommendations for a range of stakeholders involved in global public health and vaccination efforts. The recommendations are designed to guide action and decision-making at various levels, including:

- I. National governments and ministries of health, which coordinate inclusive vaccination campaigns, stockpiling and pre-purchasing, should use evidence and modelling to forecast needs and impacts, apply equity criteria and draw on independent technical advisory bodies that adapt international guidance to local epidemiological and social conditions.
- II. UN and intergovernmental organisations, including WHO, Gavi and CEPI co-led COVAX, which can coordinate action on vaccine inequity should retain pooled demand and needs-based allocation while securing earlier finance and links to regional manufacturing.
- III. Pharmaceutical companies, whose agreements with governments and intergovernmental organisations should provide fair pricing and timely supply through transparent advance purchase agreements, flexible delivery and proactive technology transfer.
- IV. Scientists, practitioners, social scientists, behavioural researchers, anthropologists, community leaders, activists, journalists and other responsible actors should support inclusive access to vaccination and reliable information, trusted communication and accountability within and between countries.

These recommendations provide an end-to-end framework for translating lessons from COVID-19 into equity-by-design

policies (Figure 3). They are core pillars for turning commitments in the WHO Pandemic Agreement and revised International Health Regulations into actionable strategies that deliver equitable outcomes.

1. Prepare before the next health emergency

The adoption of the WHO Pandemic Agreement in May 2025 and the entry into force of amended International Health Regulations for most State Parties in September 2025 create a basis for stronger global prevention, preparedness and response^{5,26}. Equity is an ethical duty and a condition of effective preparedness^{27,28}. Pooled mechanisms should be designed before emergencies for new vaccines and, where useful, for existing products, including support for countries that are ineligible for Gavi assistance but cannot rapidly finance emergency procurement²⁹. Preparedness should connect pathogen surveillance and data sharing with vaccine research, scalable manufacturing, reliable supply chains, regional stockpiles and reciprocal sharing agreements.

Action steps:

- I. Strengthen existing frameworks for global pandemic prevention, preparedness and response: develop a comprehensive framework that includes guidelines for vaccine development, procurement and deployment, data access and sharing, and international cooperation, ensuring that all countries can respond swiftly to health emergencies.
- II. Fund research and development before emergencies: invest in pre-clinical and clinical research, modular vaccine platforms, faster regulatory pathways and genomic surveillance. Acceleration must include enforceable access commitments so early supply is not concentrated in high-income countries. Technical preparedness should also cover real-time cold-chain monitoring and behavioural and social science tools for building trust.
- III. Strengthen international cooperation: coordinate equitable distribution of vaccines and medical supplies during health emergencies. Support scalable manufacturing and supply-chain systems for sustainable vaccine production,

procurement, demand aggregation and needs-based allocation. Distributed manufacturing is not a stand-alone solution: regional production requires long-term demand signals, predictable finance, quality-assured systems, regulatory convergence, access to raw materials and specialised inputs, fill-finish capacity, liability frameworks and a skilled workforce. Establish ensemble modelling hubs, similar to ECDC's RespiCast³⁰, to pool forecasts and share insights across countries.

Expected impacts:

- Stronger international cooperation and scientific coordination for health emergencies.
- Minimised pandemic impact on public health, economies, and social well-being through effective pre-emptive actions during peacetime.
- Enhanced global readiness through improved preparedness and responsiveness to emerging infectious diseases, supported by advanced research and development infrastructure.
- Reduced response time by accelerating the development, manufacture, and distribution of vaccines, diagnostics and therapeutics during emergencies, underpinned by enhanced genomic surveillance capabilities that allow for rapid identification and characterisation of evolving threats.

2. Allocate vaccines equitably between nations

Equitable access between nations can reduce illness and death and reduces uncontrolled transmission, variant emergence and later waves in every region. COVAX established useful mechanisms but exposed weaknesses in early supply, finance and enforcement. A future framework led by WHO and supported by UN agencies should combine pooled demand and needs-based allocation with enforceable access conditions, human-rights obligations and transparent accountability.

Action steps:

- I. Establish a global vaccine equity framework: WHO and UN partners should define allocation rules, financing duties and

accountability measures that operationalise the health-related Sustainable Development Goals and human-rights obligations, including the Convention on the Rights of the Child^{31,32}. Decisions should use transparent indicators of health need and national economic vulnerability, including fiscal and procurement capacity, so that economically disadvantaged countries can secure timely supply.

- II. Strengthen support for initiatives similar to COVAX and address its weaknesses: preserve pooled demand, needs-based allocation and country-readiness support. Add earlier, predictable finance; enforceable access commitments; transparent procurement; links to regional manufacturing; pre-defined dose-sharing triggers; and public tracking of roll-out timelines. Target additional finance and logistics to countries whose economic constraints limit procurement and delivery.
- III. Use diplomacy to expand sharing: remove export restrictions on vaccine components and raw materials; support the sharing of doses, technology and manufacturing knowledge; and build partnerships between manufacturers and low-income countries. Regional production hubs should be established before emergencies so they can supply local and neighbouring populations when demand rises.
- IV. Allocate according to health need and economic vulnerability: prioritise refugees, internally displaced people, persecuted minorities and populations affected by armed conflict³³. Plans should anticipate disrupted transport, cold chains and workforce security through pre-agreed humanitarian access, flexible documentation, mobile and community-based delivery, suitable thermostable products and partnerships with humanitarian organisations and trusted local actors.

Expected impacts:

- Promoted global solidarity and cooperation in responding to health crises, emphasising the integration of economic considerations to ensure equitable vaccine access.
- Increased fairness in terms of vaccine access for those in need and less socio-economically advantaged groups.

- Strengthened global health governance mechanisms.

3. Secure timely and equitable vaccine procurement

Timely procurement allows vaccination campaigns to start before disease and economic burdens rise. Plans should prioritise vulnerable populations when supply is limited and establish rules for sharing excess doses between countries. Because prioritisation does not by itself remove socio-economic barriers to uptake, procurement must be linked to delivery and community engagement.

Action steps:

- I. Develop comprehensive procurement plans: prioritise vulnerable populations when doses are scarce and establish rules for redistributing excess supply, within and between WHO regions according to need. Priority groups should reflect the pathogen, host and vaccine and be grounded in evidence^{34–36}. Transparent procurement can support pooled negotiation and shared access during shortages.
- II. Use equity-conditioned advance purchase agreements and stockpiles: early commitments can support vaccine development and manufacturing capacity, but contracts should require transparent prices, flexible delivery, pooled allocation and automatic dose-sharing under agreed triggers when supply is constrained. Agree triggers before an emergency, using domestic coverage of high-risk groups, supply milestones, epidemic acceleration, variant emergence, health-system stress, excess mortality, humanitarian vulnerability and modelled global benefit. Countries should review stockpiles regularly and use modelling to identify priority groups and deployment scenarios^{37–39}.
- III. Diversify vaccine portfolios and model impact: procure products with different characteristics to reduce supply and product-specific risks. Model vaccines and combinations with antivirals before full evidence is available, report uncertainty in efficacy, effectiveness and uptake, and

assess health impact, affordability and cost-effectiveness^{40,41}.

Expected impacts:

- Mitigated shortages during critical periods, and ensured adequate vaccine supply for timely vaccination campaigns within nations.
- Established resource-sharing mechanisms between nations, facilitating the redistribution of excess supplies during global emergencies.
- Enabled fair and efficient vaccination roll-out, reducing disease burden and mortality, particularly among vulnerable populations who are most at risk.
- Enhanced decision-making through predictive modelling, enabling countries to anticipate the effectiveness of vaccination strategies and adjust plans dynamically.

4. Promote transparent data sharing and effective communication

Timely, disaggregated data are needed to monitor roll-out, locate equity gaps and assess impact. Countries should report cases, hospital admissions, deaths, vaccine adverse events following vaccination and clinical-trial results, alongside vaccination by age, sex, geography and risk group. Transparent evidence supports course correction and can counter misinformation, but confidence also depends on sustained community engagement. Social scientists, anthropologists, communication specialists, religious leaders and other trusted actors should help design messages and understand likely responses before an emergency.

Open, statistically sound data, disaggregated by age, sex, geography and risk group, can show who benefits from vaccination and help counter misleading reports of vaccine side effects. Clear communication of vaccine benefits and risks can build trust across demographic groups⁴². Strong health information systems and appropriately protected line-list data can identify at-risk groups and detailed disease outcomes. Linking these platforms with genomic surveillance can track variants and feed antigenic mapping and product updates. Standing ensemble modelling hubs should integrate genomic,

clinical and behavioural data to support rapid policy adjustment.

Action steps:

- I. Standardise reporting: adopt machine-readable formats that support cross-border comparison while protecting privacy.
- II. Share vaccination evidence: report effectiveness, adverse events, roll-out rates and demographic data for vaccinated and unvaccinated groups. Use appropriate denominators and account for differences between comparison groups; distinguish events following vaccination from those shown to be caused by it. Explain benefits and risks clearly to counter misinformation and build trust.
- III. Use data in public health decisions: publish the evidence and criteria used to adjust vaccination programmes and hold institutions accountable.
- IV. Improve access: provide researchers, policymakers and the public with timely data and dashboards on disease spread, coverage and equity gaps.
- V. Support global data collaboration: agree shared platforms and standards, pool analytical capacity and maintain regular communication between participating institutions. Preparedness plans should include misinformation monitoring and community-engagement programmes designed with communication specialists before a crisis occurs.

Expected impact:

- Enhanced ability for policymakers and researchers to assess vaccination strategies effectively and make informed decisions. Open data access accelerates scientific progress and becomes a critical resource, enabling comprehensive studies on vaccine effectiveness, adverse events, and long-term impacts.
- Improved public trust and confidence in vaccination programmes through the transparency and accessibility of vaccination data, which helps reduce vaccine hesitancy through clear communication of vaccine

benefits and risks.

- Promoted accountability and transparency in vaccine distribution and reinforced public confidence in the process.
- Facilitated informed public communications by providing continuous updates and easy access to reliable data sources, which help counter misinformation and support ongoing public engagement and awareness efforts.

5. Insulate vaccine decisions from political distortion

Vaccine decisions should be guided by scientific evidence, public health needs, and transparent, pre-agreed criteria. International bodies such as WHO and the European Medicines Agency play important roles in emergency assessment and safety standards, while national political and commercial interests should not distort vaccine approval, procurement, allocation, or communication. The reporting of outbreaks and variants with increased public health risk must also be protected from political pressure. During COVID-19, punitive responses, including travel restrictions, may have discouraged timely reporting by countries concerned about economic consequences. Transparent reporting should therefore be supported and rewarded, with proportionate responses that enable rapid global action rather than penalising early disclosure.

Action steps:

- I. Strengthen international regulatory frameworks: support the role of WHO in setting global standards and national and regional regulators in assessing vaccines and making decisions under their legal frameworks, ensuring that these guidelines are evidence-based and rigorously evaluated for ethical and scientific considerations.
- II. Form national committees to tailor global guidelines to local contexts: establish national committees composed of impartial and independent experts from diverse fields such as medicine, humanities, ethics, and economics. These committees should adapt international guidelines to reflect the health needs and social dynamics of the local population, ensuring decisions are

protected from partisan and commercial distortion.

- III. Promote independent oversight and public engagement: encourage the formation of independent oversight bodies and mechanisms that enhance transparency and public accountability in vaccine decision-making. This step should include creating clear channels for public engagement and communication that allow for community input and scrutiny, thereby maintaining public trust and ensuring decisions are made transparently and with safeguards against partisan and commercial interference.

Expected impact:

- Enhanced trust in vaccination programmes, achieved by protecting decision-making from partisan and commercial distortion while retaining public accountability and centring the process around scientific and ethical considerations.
- Greater alignment of vaccination strategies with public health needs, ensuring that vaccines are distributed efficiently and equitably, focusing on populations at greater risk.
- Stronger international cooperation based on recognised standards, pre-agreed rules and

incentives for transparent reporting.

6. Strengthen delivery systems and regional capacity

Vaccines have public health impact only when health systems can store, distribute, administer and monitor them safely. Readiness therefore requires facilities, trained staff, cold chains, coverage and safety data, fill-finish capacity, quality control, regulatory science and pharmacovigilance. Digital stock management and real-time temperature monitoring can identify failures before they interrupt access. Public-private initiatives such as Project Last Mile⁴³ and the CEPI-Institut Pasteur de Dakar manufacturing partnership⁴⁴ illustrate practical support for logistics and regional production. Regional manufacturing, shorter supply chains and products designed for constrained settings - such as thermostable formulations, simpler dosing and less reliance on ultra-cold storage - can improve delivery in low-resource and conflict-affected areas. Investment should strengthen routine immunisation as well as emergency capacity.

Action steps:

- I. Invest in healthcare infrastructure: governments should allocate resources towards building and upgrading healthcare

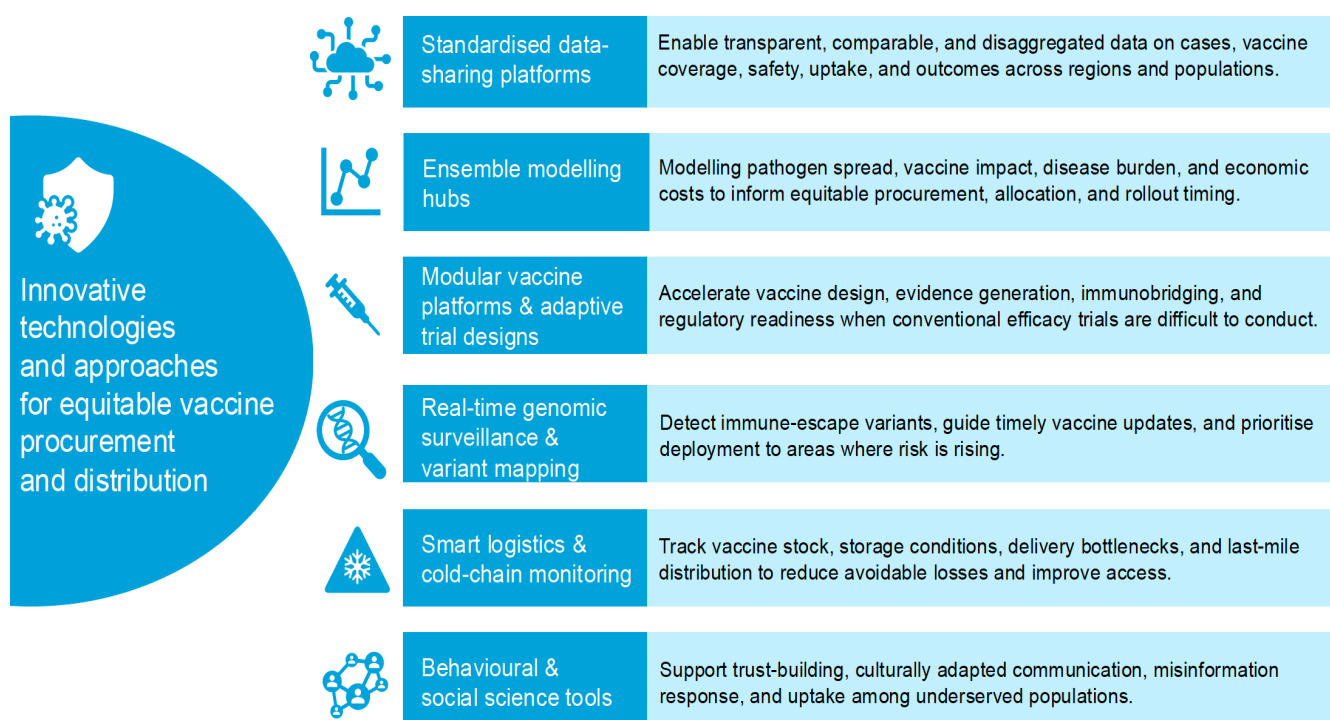


Figure 4. Overview of innovative technologies and approaches that can improve equitable vaccination strategies.

facilities, including vaccination centres and medical equipment, to enhance service delivery capacity.

- II. Train healthcare workforce: provide comprehensive training for healthcare workers in vaccine administration, cold chain management, and infection prevention and control to ensure high standards of care and safe administration.
- III. Improve cold-chain and logistics systems: maintain appropriate storage and transport, select products that reduce ultra-cold requirements and use real-time temperature and stock monitoring.
- IV. Implement public awareness campaigns: initiate widespread public awareness efforts to educate communities about the benefits of vaccination and combat vaccine hesitancy.

Expected impacts:

- Increased capacity of healthcare systems to manage and scale up vaccination operations effectively.
- Safe and efficient vaccine distribution and administration ensured through improved infrastructure and trained personnel.
- Elevated public trust in vaccination programmes, achieved by transparent communication and the professionalism of healthcare providers.
- Strengthened resilience of healthcare systems to respond more effectively to health crises, enhancing overall public health preparedness.

Cross-cutting focus: Identify and prioritise vulnerable groups within nations

Within nations, equitable vaccine distribution is critical to addressing disparities that affect the most vulnerable populations, including those based on age, health status, socio-economic conditions, and geographic locations. Effective policies must be tailored to identify and support these groups, utilising epidemiological modelling to ensure that vaccines are allocated based on public health needs rather than economic or political factors. Integrating equity considerations into epidemiological modelling can significantly

improve its relevance to allocation decisions. By explicitly accounting for how pre-existing disadvantages in the vulnerable populations and those at risk of severe disease manifest in outcomes such as the number of lives saved by vaccination per subgroup, in both absolute and population-adjusted terms, researchers can improve the accuracy and relevance of their models.

Action Steps:

- I. Develop targeted vaccine allocation strategies: implement national strategies that prioritise vaccine distribution to vulnerable and high-risk groups, based on a multi-dimensional understanding of vulnerability including health, age, socio-economic status, and ethnicity.
- II. Use epidemiological modelling: apply models that represent health and socio-economic vulnerability, compare scenarios as conditions change and, where comparable data permit, inform national and cross-border decisions.
- III. Establish independent national oversight: technical advisory bodies should adapt international guidance to local epidemiological and social conditions, with transparent conflict-of-interest safeguards.

Expected Impacts:

- Enhanced fairness and accessibility of vaccine distribution within nations by prioritising at-risk and underserved populations.
- Lower disparities in disease and mortality through vaccination strategies that reflect vulnerability and expected benefit.
- Elevated public trust in vaccination programmes, achieved by transparent communication and the professionalism of healthcare providers.

Final remarks

Future preparedness should be judged by whether vaccines reach people in time, especially those at greatest risk. The six recommendations connect preparedness

agreements, equitable allocation, timely procurement, transparent data, protected technical decision-making and capable health systems. The technologies and approaches in Figure 4 can support these recommendations. Their value depends on sustained international financing and cooperation, appropriate technology and accountability between emergencies. Embedding equity across this pathway can turn vaccine innovation into timely protection and strengthen routine immunisation. Our collective action now will determine our resilience in the face of future pandemics, reinforcing the global commitment to health as a fundamental human right.

This policy brief draws on the evidence and peer-reviewed discussion in Ghafari M et al., “Global vaccine readiness: equity-by-design in pandemic preparedness and response”, Expert Review of Vaccines (2026). <https://doi.org/10.1080/14760584.2026.2732508>

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