VACCINES BEAT

# VACCINE PPPs FOR PANDEMIC READINESS & BIOSECURITY

Evolving Models That Work

March 2026

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AHF Americas Health Foundation

*"IMMUNIZATION IS A GLOBAL HEALTH AND DEVELOPMENT SUCCESS STORY SAVING MILLIONS OF LIVES EVERY YEAR"*

WORLD HEALTH ORGANIZATION

VACCINES BEAT

# Vaccine PPPs for Pandemic Readiness & Biosecurity

## Evolving Models That Work


As moderators of several discussions at the *World Vaccine Congress*, taking place from March 30 to April 2 in Washington, D.C., **Vaccines Beat** had the opportunity to speak with leading experts ahead of the event on the topic: ***"Vaccine Public–Private Partnerships for Pandemic Readiness & Biosecurity."*** During the conversation, panelists opened a stimulating dialogue that will expand into a full panel session on April 1, focusing on the urgent need to establish pre-arranged agreements among key stakeholders before another global crisis emerges.

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# LETTER FROM EDITOR

**Welcome to Vaccines Beat 21st issue!**

For our *"Coffee with the Expert"* section, as moderators of several discussions at the *World Vaccine Congress*, taking place from March 30 to April 2 in Washington, D.C., **Vaccines Beat** had the opportunity to speak with leading experts ahead of the event on the topic: ***"Vaccine Public–Private Partnerships for Pandemic Readiness & Biosecurity."*** During the conversation, panelists opened a stimulating dialogue that will expand into a full panel session on April 1, focusing on the urgent need to establish pre-arranged agreements among key stakeholders before another global crisis emerges. **The panel: Holger Kissel**, Ph.D., serves as Senior Vice President Scientific Relations & Liaison at BioNTech. **Nikki Romanik**, MD, is the co-founder of BioRadar Public Benefit Company, an AI-powered biosurveillance and early-warning platform designed to detect emerging biological threats before they escalate into global crises. **Julie Barnes-Weise** is the Executive Director of the nonprofit Global Healthcare Innovation Alliance Accelerator (GHIAA). **Shelly Malhotra** is the Vice President of Global Access and External Affairs at the International AIDS Vaccine Initiative (IAVI). **Jack Moss** currently serves as Deputy Commercial Director for Major Programmes at the UK Health Security Agency (UKHSA), where he leads commercial strategy and delivery for large-scale public health initiatives.

In the *Editor's Corner* section, we address how climate change alters environmental conditions—such as temperature, precipitation, ecosystem stability, and extreme weather—which in turn affects disease ecology. These changes expand pathogen reservoirs, shift the geographic range of vectors and animal hosts, and increase opportunities for zoonotic spillover. At the same time, factors like air pollution, heat, malnutrition, and environmental stress can weaken host immunity. Together, these processes facilitate the emergence of infectious diseases, promote transmission to human populations, and increase the likelihood and scale of outbreaks.

In our *Best Practice* section, we revisit the growing evidence supporting single-dose HPV vaccination. Data from major clinical studies—including the Costa Rica Vaccine Trial (CVT), the KEN SHE randomized trials evaluating both bivalent and nonavalent vaccines, the IARC India quadrivalent HPV trial, and the DoRIS dose-reduction immunobridging study—have consistently shown that a single dose of HPV vaccine can provide up to 98% protection against HPV types responsible for cervical cancer. Together, these findings have provided strong scientific support for the WHO recommendation endorsing a single-dose HPV vaccination schedule, a strategy with particular relevance for low- and middle-income countries (LMICs), where simplified schedules can facilitate broader coverage and accelerate progress toward cervical cancer elimination.

Finally, in our Guest Contributor section, the Americas Health Foundation presents its *Latin America Vaccination Scorecard*, developed to address a growing risk to immunization progress in the region. This initiative was developed to provide a clear, comparable assessment of vaccination systems across eight countries, identify strengths and weaknesses, and offer actionable insights to policymakers and stakeholders, ultimately aiming to reinforce political commitment and build more resilient, equitable immunization systems across the region.

As always, this issue features carefully curated and up-to-date information on the *'Latest Scientific Publications'* along with the most recent and important *'News and Alerts'*. We hope you find this March issue both informative and engaging, and we look forward to continuing this shared commitment to advancing global health and building a healthier planet.

Enrique Chacon-Cruz, M.D., MSc
Chief Editor

## Dr. Enrique Chacon-Cruz

Enrique Chacon-Cruz, M.D., MSc, Mexican-born medical doctor with a degree from Guadalajara, Mexico, and further specializations in Pediatrics and Infectious Diseases from institutions in Mexico City and the USA (Eastern Virginia Medical School). He also holds a Master's degree in Vaccinology and Drug Development from the University of Siena, Italy.

Currently, he is the CEO and Founder of "Think Vaccines" (Research, Education, and Consultancy for Vaccines and Vaccinology) based in Houston, Texas.

With over 140 research items published and/or presented at international meetings and more than 500 international lectures, all focused on vaccines, vaccination, clinical trials, and vaccine-preventable diseases. The latter conducted independently or in association with the Centers for Disease Control and Prevention (CDC), the University of California in San Diego, Eastern Virginia Medical School, and several other institutions.

Additionally, He is the President of the Immunization Committee of the Mexican Association of Pediatric Infectious Diseases, he is a member of the Mexican Committee for the Elimination of Measles, Rubella, and Congenital Rubella, member of the Immunization and of the Health Equity Committees of the European Society of Medicine and Overseas Fellow, Royal Society of Medicine, United Kingdom. He is also the former Director of the Mexican Active Surveillance Network for Bacterial Meningitis and the former Head of the Pediatric Infectious Diseases Department and the Research Department at the General Hospital of Tijuana, Baja-California, Mexico.

Coffee with the Expert

# VACCINE PPPs FOR PANDEMIC READINESS & BIOSECURITY

## Evolving Models That Work

*Author:*
*Felicitas Colombo, MPA*

As moderators of several discussions at the *World Vaccine Congress*, taking place from March 30 to April 2 in Washington, D.C., **Vaccines Beat** had the opportunity to speak with leading experts ahead of the event on the topic: ***"Vaccine Public–Private Partnerships for Pandemic Readiness & Biosecurity."*** During the conversation, panelists opened a stimulating dialogue that will expand into a full panel session on April 1, focusing on the urgent need to establish pre-arranged agreements among key stakeholders before another global crisis emerges.


### The panel:

**Holger Kissel**, Ph.D., serves as Senior Vice President Scientific Relations & Liaison at BioNTech. Being a part of the Company since 2013, he assumed this role in 2023. With an extensive background in business development and licensing, he is dedicated to advancing global health initiatives and fostering public-private partnerships.

In his previous roles as Vice President Business Alliances and Director Business Development at BioNTech, Holger played a pivotal role in establishing the Company's extensive corporate and scientific network, resulting in numerous in- and out-licensing deals, including collaborations with Genentech and Pfizer. The latter resulted in the joint development of the Pfizer-BioNTech COVID-19 vaccine. Additionally, Holger was responsible for managing key collaborations with pharmaceutical and biotech companies as well as academic partners.

**Nikki Romanik**, MD, is the co-founder of BioRadar Public Benefit Corporation, an AI-powered biological intelligence infrastructure platform designed to detect emerging biological threats before they escalate into global crises She also serves as an Advisor to Network 20/20, a global leadership network addressing complex international challenges.

Dr. Romanik previously served at the White House as Special Assistant to the President, Deputy Director, and Chief of Staff for the inaugural Office of Pandemic Preparedness and Response Policy (OPPR). In this role, she helped stand up the office and led U.S. preparedness and response efforts for pandemics, outbreaks, including mpox, COVID-19 and Marburg Disease Virus, operating at the intersection of science, policy, and politics.

Following her White House service, Dr. Romanik was a Distinguished Senior Fellow

in Global Health Security at the Brown University School of Public Health.

Earlier in her career, she held senior leadership roles at the Centers for Disease Control and Prevention, the Department of Health and Human Services, and the World Health Organization, where she built durable public–private partnerships and navigated complex domestic and global policy environments.

She holds academic appointments at the Georgetown/MedStar Health National Center for Health Security and Resilience and the Center for Global Health Science and Security at Georgetown University Medical Center. A physician and policy strategist, Dr. Romanik is recognized for translating science into action, forging partnerships, and leading through complexity to advance global health security, pandemic preparedness, and biosecurity.

**Julie Barnes-Weise** is the Executive Director of the nonprofit Global Healthcare Innovation Alliance Accelerator (GHIAA), a nonprofit company that develops, promotes and consults on the use of agreement provisions, access planning and negotiation strategies to increase expedited and equitable access to medical products, and has recently launched its expanded Equitable Access Toolkit.

Barnes-Weise is a lawyer, global health policy consultant, entrepreneur and Certified Licensing Professional. She has also been a senior consultant to CEPI and other funders and is a member of WHO's TAG-MVAC (Technical Advisory Group on Market Access to Vaccines).

Barnes-Weise formerly held a faculty appointment in the Duke University Sanford School of Public Policy and was Director of Business Development at Glaxo Wellcome (now GSK). She has decades of experience negotiating IP licenses, funding, development and alliance agreements as well as advising companies and institutions on partnering and negotiation strategies.

**Shelly Malhotra** is the Vice President of Global Access and External Affairs at the International AIDS Vaccine Initiative (IAVI). She leads the effort to ensure future access to IAVI's innovations and crafts external engagement and resource mobilization strategies to support IAVI's core mission.

Malhotra has worked in global health for two decades, with a focus on harnessing public–private partnerships to support access to innovations for two decades. Previously, as the director of market access at TB Alliance, she oversaw launch planning and introduction for an innovative product development partnership for pediatric and adult TB regimens, including overseeing technical partnerships spanning 20+ high-burden countries to support introduction. Prior to her work with TB Alliance, Malhotra lived and worked in Cambodia, Thailand, and throughout the Asia Pacific region, where she led a range of global health, research, and capacity-strengthening initiatives with organizations including Hope Worldwide, AmeriCares, and the UN Special Envoy for Tsunami Recovery.

**Jack Moss** is a senior commercial leader who currently serves as Deputy Commercial Director for Major Programmes at the UK Health Security Agency (UKHSA), where he leads commercial strategy and delivery for large-scale public health initiatives, including major vaccination programmes and supplier engagements. In this role, Jack applies extensive experience in procurement, commercial negotiation, and category leadership to support UKHSA's critical work in health security and immunization delivery.

Before his current post, he built a career in commercial and supply-chain roles within the public sector, and holds business and professional qualifications including a BBA, MSc, MBA and MCIPS (Member of the Chartered Institute of Procurement & Supply). He also actively shares insights on commercial leadership and national immunization programme contracting on professional networks like LinkedIn.

## Lessons learned

The COVID-19 pandemic fundamentally reshaped how the global health community approaches vaccine development, biosecurity, and pandemic preparedness. The rapid development of multiple COVID-19 vaccines in less than a year demonstrated the extraordinary potential of collaboration between different key stakeholders.

Yet the same crisis also exposed structural weaknesses in the global response, particularly inequities in vaccine access, fragmented funding structures, insufficient preparedness mechanisms, and ongoing conflict of interests.

"We operate in a global landscape where approaches to trade and supply resilience are evolving. The UK aims to further strengthen its thriving life sciences sector and ensure it has reliable access to the essential supplies needed to protect public health. It is important to consider this context when engaging in international cooperation, as there are often competing demands to manage," says Moss.

At the center of the global vaccine response were **public-private partnerships (PPPs)**, collaborative frameworks that combine public sector leadership with private sector innovation. These partnerships enabled governments and global health institutions to mobilize resources while leveraging the scientific expertise, manufacturing capacity, and research infrastructure of biotechnology companies.

Driven by the need to ensure national and international communities, governments, and all sectors of society are better prepared to prevent and respond more equitably to future pandemics, Member States of the World Health Organization adopted The Pandemic Agreement on 20 May 2025 at the Seventy-eighth World Health Assembly.

"The great loss of human life, disruption to households and societies at large, and impact on development are among the factors cited by governments to support the need for lasting action to prevent a repeat of such crises," the agreement states.

At its core, the accord seeks to establish an international instrument under the WHO Constitution to strengthen pandemic prevention, preparedness and response.

## The debate

The experience of COVID-19 has sparked renewed global debate about how such partnerships should be structured in the future. Experts from industry, academia, government, and international health organizations increasingly argue that pandemic preparedness cannot rely on ad-hoc collaborations formed during crises. Instead, sustainable partnerships must be built in advance, supported by clear incentives, robust financing mechanisms, and well-defined governance frameworks.

This perspective highlights a core challenge for future pandemic readiness: balancing urgent public health goals with the economic realities of vaccine research, development, and manufacturing.

"Pandemic preparedness frameworks cannot deliver on innovation without meaningful private-sector engagement. Companies must be at the table to define the conditions required to build, scale, and sustain new capabilities," Dr. Romanik said.

Effective pandemic preparedness therefore requires mechanisms that enable governments and industry to mobilize resources rapidly when a new pathogen emerges. Because vaccine development typically requires years of research, billions of dollars in investment, and extensive manufacturing infrastructure, partnership frameworks must be established long before a crisis occurs. Yet, there's so much changing in real time now.

"We need to plan for the next time everything is in flux by creating an agreed system, including its 'conductor', to coordinate not only a portfolio of pandemic products but also of participating organizations," articulates Barnes-Weise.

At the heart of the debate is how PPPs must evolve to strengthen global biosecurity. Key issues include the role of pre-established frameworks for rapid mobilization of resources, strategies for aligning incentives across sectors, the implications of the WHO Pandemic Agreement, and the creation of resilient partnerships capable of delivering equitable vaccine innovation and access worldwide.

Barnes-Weise adds that "it's important to create partnerships and commitments now, including an access plan to ensure that pandemic tools and products are both available and affordable for the needs we can anticipate." She points to initiatives such as GHIAA's open access MAPGuide, a resource designed to support the

development of agreements including those for equitable outbreak response contracts.

## Frameworks and Pre-Agreements

Several global institutions have emerged to facilitate vaccine PPPs. Organizations such as the Coalition for Epidemic Preparedness Innovations (CEPI), Gavi, and national biomedical agencies have built platforms that coordinate research funding, manufacturing partnerships, and procurement strategies.

These institutions help bridge the gap between early-stage research and large-scale vaccine deployment. However, experts emphasize that the most effective partnerships extend beyond funding agreements and instead foster long-term collaboration networks capable of sustaining innovation between health crises.

"PPPs are critical to developing vaccines for global health threats, but the challenge remains building sustainable business models that allow companies to justify large investments," shares Dr. Kissel, who fostered BioNTech's collaboration with Pfizer to develop one of the first COVID-19 vaccines in record time, demonstrating the value of these alliances.

Governments and international organizations are increasingly investing in advance procurement agreements, flexible funding mechanisms, and platform technologies that can be adapted rapidly to emerging pathogens.

One widely used mechanism is the **advance purchase agreement (APA),** through which governments commit to purchasing vaccines before regulatory approval if they meet established safety and efficacy standards. These agreements reduce financial uncertainty for manufacturers while accelerating vaccine development.

In parallel, governments are investing in strategic manufacturing partnerships to ensure surge production capacity during future health emergencies. For example, the UK Health Security Agency has established long-term agreements with vaccine manufacturers to maintain scalable production capabilities.

"Our strategic partnerships enable us to scale up to significant volumes of vaccine manufacturing, on shored within the UK, within twelve months if a pandemic occurs," Moss shares.

Such agreements illustrate how governments can maintain preparedness while strengthening private-sector capacity to respond rapidly when new biological threats emerge.

"From a government perspective, PPP doesn't always mean investing significant amounts of money or holding a contractual relationship. It can mean having really mature relationships that we can call upon at the points of need," Moss explains.

He also reminds us that a partnership doesn't always equal a contract. But when is a formal agreement needed to guarantee sustainability?

## Aligning Incentives and Access

One of the most complex aspects of PPPs is aligning incentives between stakeholders and access commitments. Governments seek to protect public health, pharmaceutical companies must ensure financial sustainability, and global health organizations prioritize broad and equitable access to life-saving innovations.

Developing vaccines for emerging pathogens often involves significant financial risk, particularly when the potential commercial market is uncertain.

"How do we justify investing hundreds of millions into a vaccine if there is no clear market demand? Governments could help here with pull mechanisms," notes Dr. Kissel.

Such "pull mechanisms" can include guaranteed procurement commitments, advance market incentives, and long-term funding arrangements that ensure vaccines will be purchased if they are successfully developed. Without such incentives, companies may struggle to justify investments.

Unclear market signals can therefore create major barriers to vaccine innovation. Many existing funding mechanisms support isolated stages of vaccine development but fail to establish a coherent end-to-end innovation ecosystem that connects research, development, manufacturing, and distribution.

"When the market signals aren't clear, the mechanisms that usually incentivize innovation are not there. So innovative partnerships and catalytic funding need to step in to close that gap," Malhotra emphasized.

These gaps can delay, or even prevent, promising vaccines from reaching global populations most in need. Ensuring equitable vaccine access requires that investments be coupled with explicit commitments from product developers, including tiered pricing strategies, technology transfer initiatives, and regional manufacturing partnerships that expand global production capacity.

## Evolving Global Funding Roles and the WHO Pandemic Agreement

As mentioned, one of the most significant initiatives sparked by the global response to COVID-19 is the WHO Pandemic Agreement, which aims to strengthen international cooperation in pandemic preparedness, surveillance, and equitable access to medical countermeasures.

The agreement seeks to improve coordination in several areas:

- Pathogen sharing and surveillance
- Research collaboration
- Technology transfer and manufacturing capacity
- Equitable access to vaccines and treatments

A central component of the agreement is the Pathogen Access and Benefit-Sharing (PABS) system, which is designed to ensure that countries sharing pathogen data receive fair access to the resulting vaccines, diagnostics, and treatments. However, negotiations remain complex due to competing national interests and the broader geopolitical challenges facing pandemic governance. Dr. Romanik emphasizes that the agreement must address longstanding tensions in global health.

"Countries that provide essential data frequently see limited benefit when vaccines are developed. The question is how to align incentives ensuring that data sharing is met with fair, timely access to the countermeasures it enables," she explains.

Improved disease surveillance systems will also play a critical role in strengthening pandemic readiness. Early detection can significantly reduce the time required to develop vaccines and deploy public health interventions. Dr. Romanik's work on BioRadar focuses on early detection of emerging and engineered biological threats by integrating metagenomic sequencing with real-time environmental, clinical, and digital data streams to identify anomalies before outbreaks escalate.

The value of this data is undeniable. But what constitutes an equitable balance for the countries that share pathogen data is not clear yet.

"The question is, can all of the negotiating sides agree that there's enough of a balance that they can move forward and sign?" Barnes-Weise asks, referring to the limited remaining negotiating days to finalize the PABS component of the agreement by May 2026.

## Platform Technologies and the 100-Day Vaccine Goal

Another key pillar of pandemic preparedness is investment in adaptable vaccine platforms, particularly mRNA technologies. These platforms enable scientists to design new vaccines rapidly once a pathogen's genetic sequence becomes available, dramatically shortening development timelines.

Building on the lessons of COVID-19, global health organizations have increasingly embraced the concept of **"100-day vaccine development."** This ambitious target aims to design, test, and begin deploying vaccines within three months of identifying a new pathogen.

Achieving this goal will require deep collaboration between academia, industry, regulatory agencies, and governments, once again underscoring the importance of strong PPP frameworks.

One of the most prominent examples of collaboration during the COVID-19 pandemic was the partnership between BioNTech and Pfizer. BioNTech contributed its pioneering mRNA technology, while Pfizer provided global clinical trial expertise, regulatory support, and large-scale manufacturing capacity.

"Our background is science-driven business development and alliance management. Building partnerships across the biotech and pharmaceutical sectors made the COVID-19 vaccine collaboration possible," says Dr. Kissel.

The success of the Pfizer–BioNTech vaccine illustrates how strategic alliances within the private sector can significantly accelerate vaccine innovation and deployment during global health emergencies.

## Regional Manufacturing and Supply Chains

One of the most important lessons from the COVID-19 pandemic has been the need to diversify global vaccine manufacturing capacity. As a result, there is a growing trend toward **regional health security strategies**.

"We are seeing countries and regions increasingly investing in their own manufacturing and health security systems, which creates tension between global cooperation and national priorities," highlighted Malhotra, adding that balancing national self-reliance with global collaboration will therefore remain a key challenge for future pandemic preparedness.

Malhotra points out that pandemic preparedness requires long-term commitments rather than temporary crisis spending. Hence, PPPs must be supported by financing structures capable of sustaining research, manufacturing readiness, and global health infrastructure between pandemics.

Collaboration between stakeholders will enable vaccines to be developed, manufactured and distributed at rapid speed. However, fragmented funding structures, inequitable vaccine access, and insufficient preparedness mechanisms could undermine future health emergencies.

Strengthening pandemic preparedness will therefore require more robust partnership frameworks, ones that align incentives across sectors, support regional manufacturing capacity, and ensure equitable access to life-saving technologies.

As experts emphasize, successful pandemic response depends not only on scientific innovation, but on building partnership systems capable of sustaining that innovation over time. In a world where emerging infectious diseases remain a constant threat, resilient PPPs will continue to be among the most powerful tools for safeguarding global health and biosecurity.

## News & Alerts

# MOST RELEVANT MONTHLY NEWS ON VACCINATION AND EMERGING DISEASES WITH BIBLIOGRAPHIC ALERTS

*A summary of the latest News & Alerts in the fields of vaccinology, vaccines, vaccination, and vaccine-preventable diseases. We curate the latest information on regulatory updates, emerging trends, breakthroughs in vaccine technology, vaccine safety and efficacy, global immunization developments and outbreak alerts, as a resource to keep our community informed.*

**Meningococcal B vaccination does not reduce gonorrhoea, trial results show.**
Contrary to existing evidence from observational studies, the meningococcal B vaccine (4CMenB) has no effect on preventing the acquisition of gonorrhoea, according to the results of the world's largest randomised control trial (RCT) into possible efficacy, conducted by Griffith University's Institute for Biomedicine and Glycomics and the Kirby Institute at UNSW Sydney. The results were presented today by Professor Kate Seib from Griffith University at the Conference on Retroviruses and Opportunistic Infections in Denver, Colorado.
***Published: February 24, 2026.***
https://www.unsw.edu.au/newsroom/news/2026/02/meningococcal-b-vaccination-does-not-reduce-gonorrhoea-trial-shows

**European Medicines Agency's Committee for Medicinal Products for Human Use Adopts Positive Opinion Recommending Marketing Authorization of mCOMBRIAX, Moderna's mRNA Combination Vaccine Against Influenza and COVID-19.**
mCOMBRIAX is the world's first flu plus COVID combination vaccine to receive a positive CHMP opinion recommending marketing authorization and represents Moderna's fourth vaccine to receive a positive CHMP opinion mCOMBRIAX will be made available in the European Union, subject to final European Commission authorization and national regulatory and access procedures.
***Published: February 27, 2026.***
https://www.newswire.com/news/european-medicines-agencys-committee-for-medicinal-products-for-human-use.

**One vaccine may provide broad protection against many respiratory infections and allergens.**
Stanford Medicine researchers and their colleagues invented a new vaccine that protects mice from respiratory viruses, bacteria and allergens — the closest yet to a universal vaccine. But still a long journey to undergo.
***Published: February 19, 2026.***
https://med.stanford.edu/news/all-news/2026/02/universal-vaccine.html

**Bolivia confirms 5th death from Chikungunya fever as cases spike.**
Bolivia recorded its fifth death from Chikungunya outbreak in the eastern department of Santa Cruz while infections from the virus keep surging, the Departmental Health Service reported Thursday. Director of the institution Julio Cesar Koca said 901 new cases were reported last epidemiological week, which means the epidemiological curve has not reached its peak. According to Koca, there have been 3,938 confirmed cases so far in 2026.
***Published: February 27, 2026.***
https://www.thestar.com.my/news/world/2026/02/27/bolivia-confirms-5th-death-from-chikungunya-fever-as-cases-spike

**WHO: Recommendations for influenza vaccine composition for the 2026-2027 northern hemisphere season.**
For vaccines for use in the 2026-2027 northern hemisphere influenza season, WHO recommends the following:
Egg-based vaccines:
- an A/Missouri/11/2025 (H1N1)pdm09-like virus;
- an A/Darwin/1454/2025 (H3N2)-like virus; and
- a B/Tokyo/EIS13-175/2025 (B/Victoria lineage)-like virus.

Cell culture-, recombinant protein- or nucleic acid-based vaccines:
- an A/Missouri/11/2025 (H1N1)pdm09-like virus;
- an A/Darwin/1415/2025 (H3N2)-like virus; and
- a B/Pennsylvania/14/2025 (B/Victoria lineage)-like virus.

***Published: February 27, 2025.***
https://www.who.int/news/item/27-02-2026-recommendations-for-influenza-vaccine-composition-for-the-2026-2027-northern-hemisphere-season

**Malaria vaccination reduces hospitalizations, deaths of children in northwestern Nigeria.**
One year after the malaria vaccine was added to the routine immunization schedule in Nigeria's Kebbi State, health authorities and caregivers are counting the gains.
***Published: March 2, 2026.***
https://www.gavi.org/vaccineswork/kebbi-malaria-vaccination-rolls-back-hospitalisations-deaths-children

**Building the evidence for smarter HPV prevention.**
Launching a harmonized, multi-country research study requires far more than scientific design alone. Complex logistics, standardized laboratory procedures, and extensive field training are essential to ensure data quality and comparability at scale. Global Burden Estimation of Human Papillomavirus (GLOBE-HPV) is a case in point. The study is led by the International Vaccine Institute in collaboration with the London School of Hygiene and Tropical Medicine, Karolinska Institutet, and the U.S. Centers for Disease Control and Prevention. Its purpose is to generate data on the prevalence of human papillomavirus among girls and women aged 9 to 50 years in low- and middle-income countries across South Asia and sub-Saharan Africa, regions where significant data gaps exist.
***Published: March 2026.***
https://www.ivi.int/building-the-evidence-for-smarter-hpv-prevention/

**Mauritania: how "desert vaccinators" track outbreaks among the dunes.**
In Mauritania's Adrar region, vaccination teams travel hundreds of kilometers across dunes and rocky plains to reach nomadic families constantly on the move.
***Published: February 23, 3036.***
https://www.gavi.org/vaccineswork/mauritania-how-desert-vaccinators-track-outbreaks-among-dunes

**New research from the US and Sweden suggests the HPV vaccine is beating cervical cancer.**
Two new studies confirm the HPV vaccine offers lasting protection against cervical cancer, but geography still determines who benefits. A US study shows that nationally cervical cancer rates in women aged 20–31 have dropped 27% since HPV vaccination was introduced. In some states, rates have fallen by more than half, but progress varies widely depending on vaccine coverage. Meanwhile, a large Swedish study following women for up to 18 years found no evidence that the protection offered by the HPV vaccine fades. Those vaccinated before age 17 had around a 79% lower risk of invasive cervical cancer.
***Published: March 3, 2026.***
https://www.gavi.org/vaccineswork/new-research-us-and-sweden-shows-hpv-vaccine-beating-cervical-cancer

**WHO: Genetic and antigenic characteristics of zoonotic influenza A viruses and development of candidate vaccine viruses for pandemic preparedness.**
The development of influenza candidate vaccine viruses (CVVs), coordinated by the World Health Organization (WHO), remains an essential component of the overall global strategy for influenza pandemic preparedness. Selection and development of CVVs are the first steps towards timely vaccine production and do not imply a recommendation for initiating manufacture. National authorities may consider the use of one or more of these CVVs for pilot lot vaccine production, clinical trials and other pandemic preparedness purposes based on their

assessment of public health risk and need.
***Published: February 2026.***
https://cdn.who.int/media/docs/default-source/vcm-northern-hemisphere-recommendation-2026-2027/c.-27-feb-2026_zoonotic_vaccinvirus-update.pdf?sfvrsn=8532151e_5

**First wild polio case of 2026 was confirmed in Sindh.**
The National Emergency Operations Centre for Polio Eradication (NEOC) on Thursday confirmed Pakistan's first wild polio case of 2026 in a four-year-old child from Sujawal district in Sindh. The case was reported through the polio surveillance network and confirmed by the Regional Reference Laboratory for Polio Eradication at the National Institute of Health (NIH), Islamabad. The Polio Eradication Initiative (PEI) assesses the best response to prevent further transmission.
***Published: March 5, 2026.***
https://tribune.com.pk/story/2595946/first-wild-polio-case-of-2026-confirmed-in-sindh

**New guidance on the conduct of clinical trials during public health emergencies in the EU.**
The Accelerating Clinical Trials in the EU (ACT EU) initiative has published a draft guidance document outlining how clinical trials should be conducted during public health emergencies (PHEs). The guidance, now open for stakeholder consultation, is intended for sponsors and all parties involved in the design and conduct of clinical trials in the EU.
***Published: March 5, 2026.***
https://www.ema.europa.eu/en/news/new-guidance-conduct-clinical-trials-during-public-health-emergencies-eu

**Tony Blair Institute for Global Change: Vaccine Sovereignty as a Strategy for the UK's Future Health, Wealth and National Security.**
"The lesson is clear: vaccine sovereignty is not about isolation or self-sufficiency, but strategic resilience. The UK must be able to act quickly and independently in a crisis, while remaining a reliable partner to allies. That requires sustained investment in domestic capability, alongside deepened international collaboration with trusted partners".
***Published: February 27, 2026.***
https://institute.global/insights/public-services/vaccine-sovereignty-uk-health-national-security

**Daily Report of the Measles Outbreak in Mexico (in Spanish).**
Up to March 10th, 2026, Mexico has reported since this outbreak (epidemic) begun, almost 13,000 confirmed cases and 33 deaths.
***Published: March 10, 2026.***
https://www.gob.mx/cms/uploads/attachment/file/1064302/INFORME_DIARIO_SARAMPION_20260310.pdf

**Epidemic and emerging disease alerts in the Pacific as of 10 March 2026.**
Dengue, measles, pertussis, norovirus, among others.
***Published: March 10, 2026.***
https://reliefweb.int/map/world/epidemic-and-emerging-disease-alerts-pacific-10-march-2026

**CDC: Measles Cases and Outbreaks.**
As of March 5, 2026, 1,281 confirmed measles cases were reported in the United States in 2026. For the full year of 2025, a total of 2,283 confirmed measles cases were reported in the United States.
***Published: March 6, 2026.***
https://www.cdc.gov/measles/data-research/index.html

**Gavi: Six major health threats that could shape 2026: here's what experts are watching.**
A new Gavi insight paper highlights six immediate threats to global and regional health in 2026, and some of the initiatives, tools and solutions designed to keep them at bay.
***Published: February 19, 2026.***
https://www.gavi.org/vaccineswork/six-major-health-threats-could-shape-2026-heres-what-experts-are-watching

**Chikungunya in Argentina 2026.**
Since late 2025, an increase in chikungunya fever transmission has been observed in the Region of the Americas, with outbreaks in neighboring countries. In Bolivia, a sustained increase in cases has been recorded, with outbreaks in the border municipalities of Yacuiba and Bermejo (Tarija Department), characterized by high population mobility and frequent transit with northern Argentina. In this context, imported cases have been reported in various jurisdictions in Argentina, and since early January 2026, cases with no travel history have been reported

in the province of Salta, with outbreaks in Profesor Salvador Mazza (General José de San Martín Department) and Aguas Blancas (Orán Department). Likewise, at the end of February 2026, confirmed cases with no travel history were reported in Yerba Buena (Tucumán).
***Published: March 9, 2026.***
https://outbreaknewstoday.substack.com/p/chikungunya-in-argentina-2026

**WDR 2026: Climate change, vaccine hesitancy, migration breeding grounds for harmful information.**
The IFRC's *World Disasters Report 2026*, published last Thursday, says "climate change, vaccine hesitancy and migration" are issues on which "harmful information thrives, crossing borders and … being reshaped by local contexts, narratives and political agendas."
***Published: March 8, 2026.***
https://www.climatecentre.org/16808/wdr-2026-identifies-climate-change-vaccine-hesitancy-migration-as-breeding-grounds-for-misinformation/

**Mosquito-borne viruses, vaccine-borne hope.**
From chikungunya and dengue to yellow fever and Zika, mosquitotransmitted diseases are spreading with urbanization, travel and climate change. A new generation of vaccines, trials and publichealth tools aim to keep ahead of the threat.
***Published: March 9, 2026.***
https://www.nature.com/articles/d41591-026-00014-6

**Scientists turn mosquitoes into "flying vaccines".**
Researchers are investigating whether vaccine-carrying mosquitoes and edible vaccines could help reduce the spread of rabies and Nipah virus from bats to humans. Scientists are testing giving a modified form of a virus to mosquitoes so they can then infect wild bats, vaccinating them against diseases that commonly spread to humans. Bats are natural reservoirs for a wide range of viruses that can be dangerous to humans or livestock, including rabies, Nipah, Hendra and some coronaviruses. Giving them vaccines could be an ideal solution, but there's no easy way to do it. Researchers are also trialing edible vaccines for bats given through mineral-rich drinking stations.
***Published: March 12, 2026.***
https://www.gavi.org/vaccineswork/scientists-turn-mosquitoes-flying-vaccines

**Death toll from dengue outbreak in East Timor rises to 22.**
The Ministry of Health reported a total of 3,501 cases.
***Published: March 6, 2026.***
https://www.plataformamedia.com/en/2026/03/06/timor-leste-dengue-outbreak-22-deaths-3501-cases/

**Methods and operational framework of GALFLU: Individually randomized pragmatic controlled trial of high- versus standard-dose influenza vaccination in older adults.**
GALFLU is a pragmatic, individually randomized, open-label clinical trial comparing HD-IIV and SD-IIV in adults aged 65-79 years in Galicia, Spain, during the 2023-2024 and 2024-2025 influenza seasons. The trial embedded individual randomization into the regional vaccination program and exploited digital health registries for comprehensive, low-burden data collection under real-world conditions. The primary outcome is relative vaccine effectiveness (rVE) against a composite of influenza- or pneumonia-related hospitalizations. GALFLU provides a reproducible blueprint for future pragmatic evaluations embedded in routine public health settings. The trial was registered in EU Clinical Trials Register (2023-506,977-36-00); ClinicalTrials.gov (NCT06141655).
***Published: March 2026.***
https://read.qxmd.com/read/41806760/methods-and-operational-framework-of-galflu-individually-randomized-pragmatic-controlled-trial-of-high-versus-standard-dose-influenza-vaccination-in-older-adults

**Ontario Rheumatology Association: ORA Summary of Immunization Recommendations for Immunocompromised Adults.**
Herpes Zoster, Influenza, COVID, Pneumococcus, RSV, HPV, MMR, and TdaP.
***Published: March 2026.***
https://ontariorheum.ca/ora-summary-of-immunization-recommendations-for-immunocompromised-adults

## Latest Relevant Publications

# LATEST PUBLISHED PAPERS AND COMMENTARIES FROM THE CHIEF EDITOR

*Latest impactful scientific publications that stand out for their potential bearing on healthcare. We introduce groundbreaking research findings, innovative treatment modalities, results from phase 1 to 3 vaccine clinical trials, or paradigm-shifting discoveries that redefine our understanding of infectious diseases and therapeutic approaches for all vaccine-preventable diseases.*

01

Symes R, Whitaker HJ, Ahmad S, Arnold D, Banerjee S, Evans CM, Gore R, Hart J, Heaney K, Kon OM, Melhuish A, Ortale Zogaib M, Pelosi E, Rahman NM, Woltmann G, McKeever T, Zambon M, Watson CH, Lim WS, Lopez Bernal J; HARISS network collaborators. **Vaccine effectiveness of a bivalent respiratory syncytial virus (RSV) pre-F vaccine against RSV-associated hospital admission among adults aged 75-79 years in England: a multicentre, test-negative, case-control study.** *Lancet Infect Dis.* 2025 Oct 27:S1473-3099(25)00546-8.
**doi:** https://doi.org/10.1016/S1473-3099(25)00546-8

**Editorial comment:** This multicenter, test-negative case–control study used data from England's national hospital-based acute respiratory infection sentinel surveillance system (HARISS), including 14 hospitals. Vaccine effectiveness (VE) against RSV-associated hospitalization was 82.3% (95% CI 70.6–90.0), increasing to 86.7% (75.4–93.6) among patients with severe disease requiring oxygen. VE was 88.6% (75.6–95.6) for admissions due to lower respiratory tract infection (including pneumonia), 77.4% (42.4–92.8) for exacerbations of chronic lung disease, and 78.8% (47.8–93.0) for exacerbations of chronic heart disease, lung disease, and/or frailty. Among immunosuppressed individuals, VE remained substantial at 72.8% (39.5–89.3). Overall, the findings demonstrate strong protection against RSV-related hospitalization, including in high-risk and immunocompromised populations.

02

Anywaine Z, Serwanga J, Ggayi AM, Abaasa AM, Wright D, Gombe B, Ejou P, Namata T, Kigozi A, Tukamwesiga N, Basajja V, Ankunda V, Mulondo DJ, Nambaziira F, Kakande A, Kakeeto W, Nabaggala P, Jenkin D, Lawrie A, Folegatti P, Tran N, Hansen C, Elliott AM, Hill AVS, Warimwe GM, Kaleebu P. **Safety, tolerability, and immunogenicity of the ChAdOx1 RVF vaccine against Rift Valley fever among healthy adults in Uganda: a single-centre, single-blind, randomised, placebo-controlled, dose-escalation, phase 1 trial.** *Lancet Infect Dis.* 2025 Nov 11:S1473-3099(25)00565-1.
**doi:** https://doi.org/10.1016/S1473-3099(25)00565-1

**Editorial comment:** This single-centre, single-blind, randomized, placebo-controlled phase 1 dose-escalation trial was conducted in Masaka, Uganda, among 30 healthy adults (median age 25 years). Participants were RVF-seronegative and had not previously received adenovirus-vectored vaccines. The ChAdOx1 RVF vaccine was safe and well tolerated, with mostly mild to moderate, self-limiting adverse events. The highest dose ($5.0 \times 10^{10}$) induced the strongest immune responses, with sustained antibody responses at day 28 (100%) and day 84 (90%). Antibody responses were preceded by early anti-Gn/Gc IgG and interferon-γ T-cell responses. Overall, a single dose demonstrated a favorable safety profile and robust humoral and cellular immunogenicity, supporting further evaluation in larger and more diverse populations in RVF-endemic areas.

03

Wagner L, Obersriebnig M, Hochreiter R, Kadlecek V, Larcher-Senn J, Hegele L, Maguire JD, Murphy T, Derhaschnig U, Bézay N, Jaramillo JC, Eder-Lingelbach S, Messier M. **Immunogenicity and safety of an 18-month booster dose of the VLA15 Lyme borreliosis vaccine candidate after primary immunisation in children, adolescents, and adults in the USA: a randomised, observer-blind, placebo-controlled, phase 2 trial.** *Lancet Infect Dis.* 2025 Nov 7:S1473-3099(25)00541-9.
**doi:** https://doi.org/10.1016/S1473-3099(25)00541-9

**Editorial comment:** This ongoing, randomized, observer-blind, placebo-controlled phase 2 trial is being conducted at 14 sites in Lyme borreliosis–endemic regions of the United States. A total of 625 participants received the primary vaccination series, and 449 received a month 18 booster.

One month after the booster, geometric mean titres (GMTs) in both VLA15 schedules exceeded levels observed after the primary series, with particularly strong responses across serotypes. Antibody responses were higher in paediatric cohorts than in adults, consistent with earlier findings.

The month 18 booster demonstrated a safety and tolerability profile comparable to the primary doses. Overall, VLA15 elicited robust anamnestic immune responses, supporting its potential use to enhance anti-OspA antibody levels before tick season in children, adolescents, and adults.

04

Sahin U, Schmidt M, Derhovanessian E, Cortini A, Vogler I, Omokoko T, Godehardt E, Attig S, Newrzela S, Grützner J, Bidmon N, Bolte S, Brachtendorf S, Stuhlmann T, Langer D, Brüne D, Blake J, Feldner A, Lindman H, Schneeweiss A, Eichbaum M, Türeci Ö. **Individualized mRNA vaccines evoke durable T cell immunity in adjuvant TNBC.** *Nature.* 2026 Feb 18.
**doi:** https://doi.org/10.1038/s41586-025-10004-2

**Editorial comment:** Triple-negative breast cancer (TNBC) carries a high risk of early metastatic relapses. In this study, investigators evaluated a personalized neoantigen mRNA vaccine in 14 patients with TNBC after surgery and standard neoadjuvant or adjuvant therapy. Eleven patients remained relapse-free for up to six years following vaccination, while three experienced recurrence. The vaccine induced durable, functional neoantigen-specific T-cell responses, supporting the feasibility of individualized RNA vaccines in TNBC and offering insights into potential immune escape mechanisms to inform future strategies.

05

Boyce MR, Sell TK. **Support for vaccine-related priorities included in the Make Our Children Healthy Again Assessment and impacts on trust in vaccine safety: a national survey of parents in the United States.** *Vaccine.* 2026 Feb 11;76:128336.
**doi:** https://doi.org/10.1016/j.vaccine.2026.128336

**Editorial comment:** This online survey (n = 1,042) assessed public support for enhanced safety policies—specifically longitudinal and targeted safety testing—for both new and existing childhood vaccines, and their potential impact on trust. Approximately two-thirds of respondents supported additional longitudinal and targeted testing for new (67% and 63%) and existing vaccines (68% and 61%). More than half reported that their trust in vaccine safety would increase if existing vaccines underwent further longitudinal (57%) or targeted (56%) testing. Additionally, 42% indicated increased trust following the recent dismissal of the CDC's Advisory Committee on Immunization Practices (ACIP). Overall, the findings suggest substantial public support for expanded safety monitoring and a potential link between enhanced testing policies and increased vaccine confidence.

06

Bailey AL, Stapleton JT. **Time for a New Yellow Fever Vaccine.** *J Infect Dis.* 2026 Mar 9:jiag152.
**doi:** https://doi.org/10.1093/infdis/jiag152

**Editorial comment:** This review provides a comprehensive analysis of currently available egg-based yellow fever vaccines, highlighting their proven efficacy and long-standing role in global disease control while also discussing their inherent limitations, including production constraints, rare adverse events, and dependence on embryonated eggs. The authors effectively contextualize these strengths and weaknesses and underscore the need for next-generation vaccine platforms—such as cell-culture, recombinant, or nucleic acid–based technologies—to improve scalability, safety, and global preparedness for future yellow fever threats.

07

Stuart R, Theopold N, Miall N, Kobayashi E, Vernam S, Taskin T, Dull PM. **The role of HPV single-dose vaccination in expanding access in GAVI-supported countries during a period of supply constraints**. *Vaccine*. 2026 Mar 7;75:128187.
**doi:** https://doi.org/10.1016/j.vaccine.2025.128187

**Editorial comment:** This study estimated the target population for HPV vaccination in Gavi-supported countries using UNICEF shipment data (2023–2024), national dosing schedules, and adjustments for vaccine wastage. The shift to a single-dose schedule in 2023–2024 could have prevented up to 370,000 additional future cervical cancer cases if all doses had been fully utilized, and approximately 297,000 based on actual uptake. Overall, the findings highlight the substantial impact of the single-dose HPV strategy in accelerating cervical cancer prevention, particularly in low- and middle-income countries facing vaccine supply constraints.

08

Zhang P, Yang X, Chen B. **Effectiveness of Influenza Vaccine in Wuhan, China During the 2024–2025 Season: A Test-Negative Case–Control Study.** *Vaccines*. 2026; 14(3):243.
**doi:** https://doi.org/10.3390/vaccines14030243

**Editorial comment:** A test-negative case–control study was conducted among patients with influenza-like illness (ILI) attending outpatient and emergency departments at 41 healthcare institutions in Wuhan, China. The analysis included 23,302 RT-PCR–confirmed influenza cases and 99,424 test-negative controls.

The overall adjusted vaccine effectiveness (VE) was 35% (95% CI: 30–40%). VE was higher among adults aged 19–59 years (63%; 95% CI: 50–73%) and 60–69 years (60.7%; 95% CI: 46–72%), while lower protection was observed in children aged 0.5–5 years (25%; 95% CI: 17–33%) and 6–18 years (25%; 95% CI: 14–36%).

Overall, influenza vaccination provided measurable protection during the 2024–2025 season in Wuhan, with greater effectiveness among individuals vaccinated during the current season or in consecutive seasons.

09

Mendes D, Kang M, Law A. **What Form of RSV Protection Do Women Prefer: Maternal Vaccination or Infant Immunisation? A Cross-Sectional Survey in Europe.** *Vaccines*. 2026; 14(3):238.
**doi:** https://doi.org/10.3390/vaccines14030238

**Editorial comment:** This study assessed women's awareness of RSV, intentions regarding RSV immunization, and factors influencing vaccination decisions in Finland, France, Germany, Italy, Spain, and the UK. A cross-sectional survey conducted between November and December 2024 included 740 women. Among women who were pregnant or trying to conceive, 68% were likely to initiate a discussion about RSV immunization with a healthcare provider, while 21% were unlikely to do so. If recommended by a healthcare provider, 76% reported they would likely accept RSV vaccination. Overall, 52% preferred maternal vaccination over infant immunization, and among those open to RSV immunization with a clear preference, 68% favored maternal vaccination. Overall, the findings indicate high acceptance of RSV immunization among European women, with a clear preference for maternal vaccination over infant immunization.

10

May M. **Mosquito-borne viruses, vaccine-borne hope**. *Nat Med*. 2026 Mar 9.
**doi:** https://doi.org/10.1038/d41591-026-00014-6

**Editorial comment:** This article provides a thoughtful and timely review of the current and emerging vaccine landscape addressing the growing global burden of mosquito-borne diseases. It summarizes progress in vaccine development for major arboviruses and highlights the scientific, epidemiological, and implementation challenges that accompany their expanding geographic spread. By outlining both existing candidates and next-generation platforms, the review offers valuable insight into future strategies needed to prevent and control these increasingly important vector-borne infections worldwide.

11

Helble M, Nannei C, Friede M, Nicholson MW. **Pathways to economically viable and sustainable vaccine manufacturing in LMICs.** *Vaccine*. 2026 Feb 14:128273.
**doi:** https://doi.org/10.1016/j.vaccine.2026.128273

**Editorial comment:** This review examines efforts by low- and middle-income countries (LMICs) to expand regional vaccine manufacturing as part of pandemic preparedness and health security. Establishing sustainable manufacturing is complex due to high capital costs, strong global competition, and uncertainty in capturing market share. The authors highlight that strong government commitment, investment, and supportive policy environments are essential for new manufacturers to succeed. Over time, governments should focus on strengthening local scientific ecosystems, which can lower production costs through innovation, address workforce skill gaps, and enable the development of vaccines targeting regional health needs. Regional collaboration is also critical for economic viability. Sustained investment in research and development can generate new vaccine pipelines, support prevention of endemic diseases, and create stable demand that helps maintain manufacturing capacity and pandemic preparedness.

12

Tagarro A, Gastesi I, Hotterbeekx A, Aguilera-Alonso D, Konnova A, Gupta A, Salso S, Berkell M, Plata MDC, Domínguez-Rodríguez S, Ballesteros Á, Manzanares Á, Oltra M, Villanueva S, Pinto C, Guillén R, Giaquinto C, Moraleda C, Kumar-Singh S. **Short- and Long-term Humoral Response of Immunosuppressed Children to SARS-CoV-2 BNT162b2 Vaccine.** *Pediatr Infect Dis J.* 2026 Mar 1;45(3):258-263.
**doi:** https://doi.org/10.1097/INF.0000000000005042

**Editorial comment:** This prospective cohort study evaluated immune responses in 35 children aged 5–11 years (20 healthy and 15 immunosuppressed) after complete BNT162b2 vaccination—two doses for healthy children and three for immunosuppressed participants. No significant differences were observed between groups in anti-Spike IgG, anti–RBD IgG, or neutralizing antibody levels at 1 and 6 months post-vaccination. Humoral responses declined significantly by 6 months in healthy children but remained stable in immunosuppressed participants. Cellular immunity at 6 months strongly correlated with humoral responses ($R \geq 0.74$).

Overall, vaccination produced protective immune responses for up to six months in both groups, with only one breakthrough infection reported in a healthy child.

13

Athan E, Greenberg RN, Baker DA, Shah R, Dubhashi S, Badat A, Thurlow C, Schlessinger J, Wronski A, Zakrzewski M, Turner D, Bindi I, Basile V, Galletti B, Spensieri F, Brazzoli M, Zigon G, Cilio GL, Ranzato G, Lattanzi M, Pellegrini M; Staph aureus 208833 study group. **Safety, Efficacy, and Immunogenicity of a Multivalent Adjuvanted S. aureus Vaccine in Adults with Recent Skin And Soft Tissue Infections: An Observer-blind, Randomized, Placebo-controlled, Multinational Phase 1/2 Trial.** *Clin Infect Dis*. 2026 Mar 9:ciag162.
**doi:** https://doi.org/10.1093/cid/ciag162

**Editorial comment:** This randomized two-part study evaluated a five-antigen *Staphylococcus aureus* vaccine (SA5Ag). Phase 1 assessed safety and dose escalation in 32 healthy adults aged 18–50 years, testing half or full antigen doses with or without the AS01E adjuvant. Following a favorable safety profile, a phase 2 proof-of-principle trial enrolled 194 adults aged 18–64 years with recent *S. aureus* skin and soft-tissue infections (SA-SSTIs). Participants received two doses of adjuvanted SA5Ag or placebo two months apart and were followed for 12 months. Although the vaccine induced strong functional immune responses to three antigens (CP5, CP8, and Hla), it showed no efficacy in preventing recurrent SA-SSTIs (vaccine efficacy -38.1%). Local adverse events were more frequent in the vaccine group but were mostly mild or moderate, and rates of medically attended and serious adverse events were similar between groups.

14

Nellore A, Bajema K, Belden K, Blumberg D, York E, Falck-Ytter Y, Baden LR. **IDSA 2025 Guidelines on the use of vaccines for the prevention of seasonal COVID-19 infections in immunocompromised patients**. *Clin Infect Dis*. 2026 Feb 25:ciag115.
**doi:** https://doi.org/10.1093/cid/ciag115 Epub ahead of print. PMID: 41739597.

**Editorial comment:** Using the GRADE framework, the panel reviewed seven effectiveness and four safety studies of COVID-19 vaccination in immunocompromised individuals. Vaccination reduced hospitalization (33–56%), critical illness, mortality, and healthcare visits, while serious adverse events were rare. With moderate certainty of benefit and low certainty of harm, the panel strongly recommends the 2025–2026 COVID-19 vaccine for all immunocompromised persons ≥6 months of age, with timing adjusted to immunosuppressive therapy and clinical context. Vaccination of household contacts and early antiviral access remain important, while further research should clarify durability, correlates of protection, optimal timing, and real-world effectiveness and safety.

15

Tan CS, Anjan S, Ariza-Heredia EJ, Magana F, Minniear TD, Kaur D, Falck-Ytter Y, Baden L. **IDSA 2025 Guidelines on the use of vaccines for the prevention of seasonal RSV infections in immunocompromised patients**. *Clin Infect Dis*. 2026 Mar 2:ciag117.
**doi:** https://doi.org/10.1093/cid/ciag117

**Editorial comment:** Using the GRADE framework, evidence from two test-negative case-control studies showed that RSV vaccination reduced RSV-associated hospitalization by about 70% in immunocompromised adults, with indirect evidence suggesting strong protection against critical illness. Safety data from randomized trials showed similar rates of serious adverse events between vaccinated and unvaccinated groups, with Guillain-Barré syndrome remaining rare. Based on substantial protection and low risk of harm, the panel strongly recommends age-appropriate RSV vaccination for immunocompromised adults and adolescents, with individualized timing according to treatment or transplant status. Shared decision-making is advised for patients <18 years, while vaccination of household contacts and coadministration with influenza and COVID-19 vaccines are encouraged. Further research should address durability, correlates of protection, safety in specific immunosuppressed groups, and booster needs.

16

Goepfert P, Katz MJ, Kaul D, Sharma T, Kaur D, Falck-Ytter Y, Baden L. **IDSA 2025 Guidelines on the use of vaccines for the prevention of seasonal Influenza infections in immunocompromised patients.** *Clin Infect Dis*. 2026 Feb 28:ciag116.
**doi:** https://doi.org/10.1093/cid/ciag116

**Editorial comment:** A systematic review (2023–2025) using the GRADE framework found that influenza vaccination reduced influenza-associated hospitalization by 32% in immunocompromised individuals, with indirect evidence showing additional reductions in ICU admission and mortality. No increased risk of Guillain-Barré syndrome or serious adverse events was observed. Based on moderate certainty of benefit and low risk of harm, IDSA strongly recommends the 2025–2026 age-appropriate influenza vaccine for all immunocompromised persons ≥6 months, with timing tailored to immunosuppressive therapy and clinical context. Vaccination of household contacts is also encouraged, while further research should clarify correlates of protection, optimal timing, and effectiveness in patients with impaired immune responses.

17

Aregay A, Friese J, Porrez S, Leroux-Roels I, Meineke R, Osterhaus ADME, Wichgers Schreur PJ, Rimmelzwaan GF, Prajeeth CK. **Induction of a Th1-Type Polyfunctional T Cell Response by the four-segmented Rift Valley Fever candidate vaccine in humans.** *J Infect Dis*. 2026 Mar 9:jiag138.
**doi:** https://doi.org/10.1093/infdis/jiag138

**Editorial comment:** The live-attenuated four-segmented Rift Valley fever vaccine candidate (hRVFV-4s) demonstrated strong safety and tolerability in a first-in-human trial, inducing both neutralizing antibodies and robust cell-mediated immunity. Vaccination generated early, polyfunctional CD4⊠ and CD8⊠ effector memory T-cell responses—primarily targeting the N protein and, to a lesser extent, Gn and Gc glycoproteins—with a clear Th1-type cytokine profile detectable within two weeks after a single dose.

18

Tramuto F, Randazzo G, Santino A, Sferlazza G, Previti A, Graziano G, Costantino C, Mazzucco W, Amodio E, Vitale F, Maida CM. **Indirect effect of pneumococcal conjugate vaccines on pneumococcal colonization: persistence and dynamics of vaccine serotypes in Sicily (Italy) eleven years post-introduction, 2009 to 2020.** *J Infect Dis.* 2026 Mar 7:jiag150.
**doi:** https://doi.org/10.1093/infdis/jiag150

**Editorial comment:** This study assessed pneumococcal carriage and serotype dynamics from 2009–2020 following the introduction of PCV13. Overall carriage was 27.1%, highest in children aged 2–4 years (51.6%) and about 10% in adults. Vaccination led to a marked decline in PCV serotypes initially, followed by the emergence of non-vaccine serotypes and later partial re-emergence of some vaccine serotypes, including invasive strains. Serotype distribution varied by age, and viral co-infections—particularly with RSV—were associated with increased colonization. Despite high pediatric vaccination coverage, pneumococcal carriage remained substantial across all age groups. Viral coinfection, particularly with hRSV, appeared to facilitate colonization.

19

Tan YY, Ho RWL, Lim JT, Chiew CJ, Lim SK, Lye DCB, Tan KB, Wee LE. **Real-world effectiveness of sequential pneumococcal vaccination in older adults: a cohort study.** *J Infect Dis.* 2026 Mar 6:jiag147.
**doi:** https://doi.org/10.1093/infdis/jiag147

**Editorial comment:** In this population-based retrospective cohort study of 656,337 Singaporeans aged 65–89 years (2020–2024), sequential vaccination with PCV13 followed by PPSV23 was associated with significant reductions in pneumococcal-related disease, pneumonia hospitalizations, and all-cause mortality. PCV13 alone also conferred protection, though with smaller effects. These findings support the effectiveness of sequential pneumococcal vaccination strategies in older adults.

20

Tamrakar D, Shahi SB, Jung E, Naga S, Shrestha B, Roka PB, Pokharel RS, Chapagain RH, Tamrakhar A, Mahato M, Madhup SK, Shrestha R, Doyle K, Bogoch II, Luby SP, Garrett DO, Cheirakul W, Andrews JR. **Effectiveness of the TYPHIBEV® (Vi-CRM197 conjugate) Vaccine Introduction in Nepal: A Test-Negative, Case-Control Study.** *J Infect.* 2026 Mar 8:106719.
**doi:** https://doi.org/10.1016/j.jinf.2026.106719

**Editorial comment:** In a test-negative case–control study (Oct 2022–Dec 2024) in Nepal including 40 typhoid cases and 113 controls, receipt of the typhoid conjugate vaccine (TCV) was significantly higher among controls (84%) than cases (51%). Vaccine effectiveness was estimated at 89% (95% CI: 65–97%) over 30 months after national introduction, with higher protection in children aged 5–15 years than in those <5 years. These findings indicate that TYPHIBEV® provides strong real-world protection against typhoid fever, with effectiveness comparable to Typbar-TCV®.

21

Basu M. **Using mosquitoes to vaccinate bats could curb the spread of deadly diseases.** *Nature.* 2026 Mar 11.
**doi:** https://doi.org/10.1038/d41586-026-00795-3

**Editorial comment:** Mosquitoes engineered to carry vaccines in their saliva have been explored as a novel strategy to immunize bats against viruses such as rabies and Nipah. Researchers are investigating whether this approach could help prevent these pathogens from spilling over from bats to humans. However, some scientists remain sceptical about whether such a strategy could be effectively implemented in natural settings. Bats harbor a wide range of zoonotic viruses, often without becoming ill, serving as long-term reservoirs. Vaccinating bat populations could reduce the risk of these viruses infecting other animals, including humans. Yet delivering vaccines to bats presents major logistical challenges, as many species roost in caves, form large colonies, and travel long distances.

22

Machalek D, Rees H, Chikandiwa A, Munthali R, Travill D, Mbulawa Z, Petoumenos K, Delany-Moretlwe S, Kaldor J; **HOPE Study team. Impact of one and two human papillomavirus (HPV) vaccine doses on community-level HPV prevalence in South African adolescent girls: study protocol and rationale for a pragmatic before-after design.** *BMJ Open*. 2022 Feb 10;12(2):e059968.

**doi:** https://doi.org/10.1136/bmjopen-2021-059968

**Editorial comment:** The Human Papillomavirus One- and Two-Dose Population Effectiveness Study is a hybrid impact evaluation of South Africa's national HPV vaccination program. Since 2014, the program has targeted grade 4 girls aged ≥9 years in public schools with a two-dose vaccination schedule, while a single-dose catch-up campaign was implemented in one district in 2019. A baseline survey conducted in 2019 measured HPV prevalence among girls who were ineligible for vaccination, either because they were older than the target age or beyond the eligible grade under both the national program and the single-dose campaign in the selected district. Follow-up HPV prevalence surveys were conducted in 2021 in the selected district and in 2023 across four provinces. Researchers will estimate prevalence ratios for HPV types 16 and 18, comparing vaccinated cohorts—those receiving a single dose (2021) and two doses (2023)—with the vaccine-ineligible baseline cohort (2019). Findings will be disseminated through peer-reviewed publications, scientific conferences, technical reports, and community engagement forums.

Editor's Corner

# THE IMPACT OF CLIMATE CHANGE ON INFECTIOUS DISEASE DYNAMICS AND THE POTENTIAL OF VACCINATION AS A MITIGATION TOOL

## Introduction

Vaccine-preventable diseases continue to represent a substantial public health burden worldwide, despite the availability of safe and effective immunizations. Climate is a fundamental determinant of the transmission dynamics, geographic distribution, and seasonality of many infectious diseases, including numerous pathogens for which vaccines exist. Ongoing climate change—through rising temperatures, altered precipitation patterns, extreme weather events, and ecological disruption—is increasingly reshaping these dynamics, facilitating the emergence, re-emergence, and geographic expansion of vaccine-preventable infections.

Understanding how climate change influences the epidemiology of vaccine-preventable diseases is therefore a critical priority for public health research and policy. In this article, we synthesize current evidence on the interactions between climate change and infectious disease risk, with a particular focus on the role of vaccines and vaccination programs as essential tools to mitigate this growing global threat and strengthen population resilience in an era of environmental change.

## Environment and Infectious Disease Transmission

Climate change is increasingly reshaping the ecological conditions that govern infectious disease transmission. Environmental alterations driven by rising temperatures, changing precipitation patterns, and ecosystem disruption can expand pathogen reservoirs and host populations, shift their geographic ranges, and increase the frequency of spillover events into human populations (Figure 1). At the same time, climate-related stressors may impair host health and immunity, further facilitating successful transmission and outbreaks.

By modifying temperature, humidity, and rainfall, climate change can enhance pathogen survival and replication, extend transmission seasons, and increase the abundance or reproductive capacity of vectors and reservoirs. These effects can amplify disease burden within animal populations and increase opportunities for human exposure. Short-term climate variability, such as extreme rainfall or temperature fluctuations, may trigger sudden population surges in reservoir species by increasing food availability or reducing predator pressure, thereby heightening spillover risk. A classic example is the 1990s hantavirus outbreak in the southwestern United States, linked to a climate-driven expansion of deer mouse populations following ecological disruption.

Longer-term climate change can also alter the geographic distribution of reservoir hosts, vectors, and pathogens, leading to novel ecological interactions and new transmission pathways. Ecosystem degradation may force wildlife, domestic animals, and humans into closer contact as they compete for increasingly scarce resources, such as water. For instance, reduced surface water availability can concentrate wildlife and human populations at shared water sources, increasing opportunities for pathogen transmission. Similarly, climate-driven shifts in wildlife migration have been implicated in the southward expansion of flying fox populations in Australia, contributing to spillover of Hendra virus into horses and humans.

At a global scale, infectious disease diversity increases toward the equator, a pattern thought to reflect environmental conditions—such as higher temperatures and precipitation—that favor pathogen persistence and transmission. Modeling studies suggest that ongoing warming and increased rainfall may accelerate the transmission of pathogens associated with bats and birds to wildlife, livestock, and humans. The emergence of SARS-CoV-2, likely originating from bat reservoirs, underscores how altered ecological interfaces can facilitate the emergence of novel zoonotic pathogens.

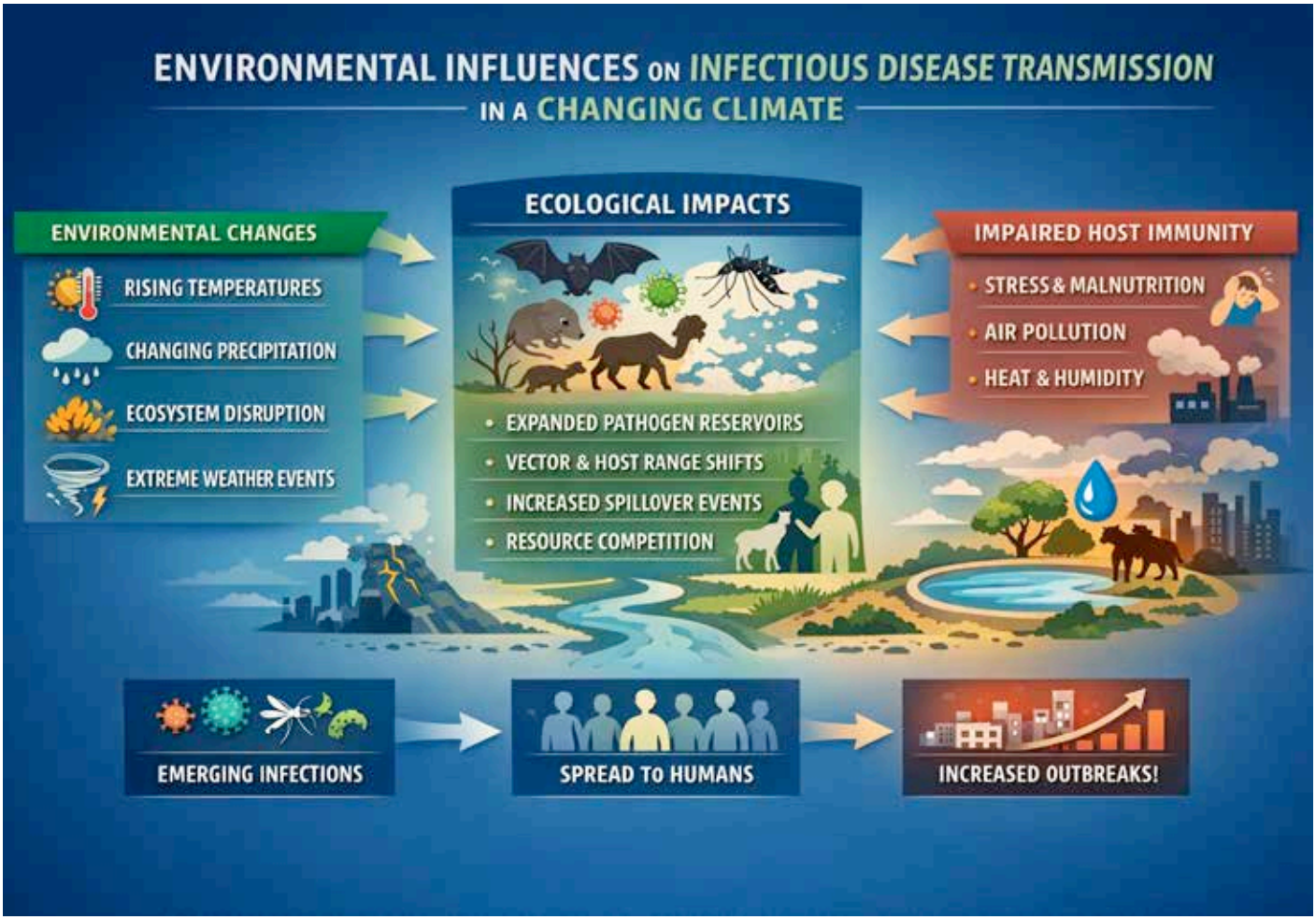
Vector-borne diseases are particularly sensitive to climate change. Mosquitoes, ticks, and other arthropod vectors respond rapidly to changes in temperature, rainfall, and extreme weather, influencing vector survival, population density, and pathogen development. As a result, climate change is altering the distribution and transmission intensity of diseases such as dengue, malaria, chikungunya, zika, West Nile virus, and Lyme disease, which together account for a substantial proportion of emerging infectious disease events worldwide.

Climate change also affects water- and air-borne disease transmission. Increased rainfall and flooding can contaminate drinking water supplies, elevating the risk of outbreaks caused by enteric pathogens such as *Salmonella*, *Cryptosporidium*, and *Vibrio cholerae*. In climate-vulnerable regions, these effects may occur alongside expanding vector-borne disease transmission, compounding public health risks. In parallel, climate change can worsen air pollution, with combined effects that impair host immune function and increase susceptibility to respiratory infections. Chronic exposure to air pollutants and extreme temperature or humidity can disrupt immune responses, exacerbate underlying respiratory disease, and prolong pathogen survival in aerosols, particularly among vulnerable populations.

Together, these interconnected environmental, ecological, and immunological effects illustrate how climate change is reshaping infectious disease risk. By altering transmission routes, expanding pathogen reservoirs, and increasing host vulnerability, climate change is accelerating the emergence and spread of infectious diseases, underscoring the urgent need for integrated surveillance, prevention, and mitigation strategies.

All of these can be summarized in Figure-1:

**Figure-1: Environmental Influences on Infectious Disease Transmission in a Changing Planet:**



## Novel Technologies for Monitoring and Screening Emerging Infectious Diseases

Addressing the growing threat of climate-sensitive emerging infectious diseases (EIDs) requires surveillance systems that are faster, more sensitive, and more integrated than traditional approaches. Experience from recent epidemics and pandemics has shown that effective prevention and containment depend on multidisciplinary, multinational collaboration and the integration of diverse data streams across multiple platforms.

**Genomic surveillance** has emerged as a cornerstone of modern outbreak detection and response. Large-scale sequencing networks, exemplified during the COVID-19 pandemic, have enabled rapid pathogen identification, real-time tracking of transmission pathways, detection of variants of concern, and early recognition of drug resistance. When combined with epidemiologic data, genomic surveillance can clarify outbreak origins, reveal hidden transmission chains, and inform vaccine and therapeutic strategies. Despite its transformative potential, global genomic surveillance remains limited by uneven access to sequencing capacity, bioinformatics infrastructure, and representative sampling—particularly in low-resource settings.

**Epidemiologic analyses**, including active case finding and contact tracing, remain essential for defining transmission dynamics, estimating key parameters such as reproductive numbers, and identifying high-risk populations. The integration of epidemiologic data with climate, mobility, and demographic information can substantially improve outbreak prediction and response, as demonstrated by traveler-based surveillance networks that have detected previously unrecognized international outbreaks. In this context, sewage surveillance should be mandatory, as it enables the detection of pathogens even before widespread human transmission occurs, allowing earlier and more effective preventive measures to be implemented.

**Predictive modeling and simulation**, increasingly supported by artificial intelligence and machine learning, offer powerful tools to integrate genomic, epidemiologic, and environmental data. These models can forecast outbreak trajectories, evaluate intervention strategies, and guide policy decisions on vaccination, resource allocation, and non-pharmaceutical interventions. Their credibility and utility, however, depend on data quality, transparency, and sustained investment.

**Geoinformatics, satellite imagery, and remote sensing technologies** provide additional layers of early-warning capacity by monitoring environmental conditions associated with spillover risk, such as changes in vegetation, water availability, and climate extremes. These tools enable the identification of geographic hotspots for disease emergence and support targeted surveillance, vaccination planning, and rapid response, particularly in remote or resource-limited regions.

**Mobile applications and digital health tools** are increasingly used to support real-time surveillance, symptom reporting, contact tracing, and treatment adherence. While these technologies have demonstrated value—especially during the COVID-19 pandemic—their broader adoption depends on careful attention to data governance, privacy protections, and public trust.

Finally, **biosensors and point-of-care diagnostics** represent critical advances for early detection and containment. Wearable, ingestible, and portable diagnostic technologies—combined with rapid molecular assays—can enable timely diagnosis at the community level, facilitate immediate clinical and public health action, and improve outbreak control. Integration of these tools with digital reporting systems could further strengthen surveillance and response efforts.

Together, these emerging technologies highlight a paradigm shift toward integrated, data-driven surveillance systems. Expanding equitable access to these innovations and embedding them within coordinated global health networks will be essential to mitigate the accelerating risk of climate-driven infectious disease emergence.

## From Surveillance to Prevention: The Role of Vaccines and Vaccination in Mitigating Emerging Infectious Diseases:

The coming decades will be increasingly shaped by the disruptive and potentially devastating

**Figure 2. Strategies to Prevent and Mitigate Climate-Driven Emerging Infectious Diseases:**


**Figure 3. The Role of Vaccines in Addressing Climate-Driven Infectious Diseases:**


consequences of a warming climate, including the amplification and geographic expansion of climate-sensitive infectious diseases, posing a major global threat to human health. Figure 2 summarizes the key impacts of climate change on infectious disease emergence and transmission, as well as potential mitigation strategies. Proactive and coordinated action indicating prevention and mitigation is therefore essential to reduce future health consequences.

Vaccines represent some of the most cost-effective public health interventions available and have already led to dramatic reductions in the burden of multiple infectious diseases, with several eliminated entirely in many regions. For a number of the infectious diseases, safe and highly effective vaccines are already available. Strategic use of these vaccines has the potential to substantially reduce community vulnerability and protect populations against both endemic and emerging infections whose transmission is increasingly influenced by climate change.

By reducing disease incidence and severity, vaccination can strengthen health system resilience and enhance the capacity of communities to cope with the broader health

impacts of climate change, including extreme weather events and resource constraints. Importantly, widespread immunization offers a feasible and scalable near-term mitigation strategy, particularly when compared with the longer timelines required to achieve structural improvements in public health infrastructure or to address the root drivers of the climate crisis itself—especially in low- and middle-income countries.

In addition, vaccination can contribute to addressing the persistent and growing threat of antimicrobial resistance (AMR). By preventing infections that would otherwise require antibiotic treatment, vaccines reduce antibiotic use and selective pressure for resistance, reinforcing their role as an essential component of integrated strategies to combat AMR while simultaneously mitigating climate-related infectious disease risks.

## Conclusion

Climate change is an accelerating global health threat that is already reshaping the epidemiology of infectious diseases. Although evidence continues to evolve, it is clear that climate-driven changes in ecosystems, human behavior, and health systems are increasing vulnerability to emerging and re-emerging infections. These effects interact with non-climatic determinants—such as globalization, socioeconomic conditions, and public health capacity—underscoring the need for integrated and coordinated responses.

Urgent action is required. Strengthening prevention and mitigation strategies must be prioritized alongside continued research and surveillance. Vaccination, in particular, represents a highly effective, scalable, and immediately deployable tool to reduce climate-sensitive infectious disease risk, especially in vulnerable populations and low- and middle-income countries. Expanding access to existing vaccines, accelerating development of new vaccines, and embedding immunization strategies within climate adaptation frameworks should become global public health priorities. Without decisive investment and coordination now, the health consequences of climate change will continue to intensify.

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Best Practice

# UPDATED GUIDELINES FOR GLOBAL STRATEGY TO ACCELERATE THE ELIMINATION OF CERVICAL CANCER AS A PUBLIC HEALTH PROBLEM

Although human papillomavirus (HPV) causes cancers in multiple epithelial tissues, the primary goal of large-scale HPV immunization is the prevention of cervical cancer in women, which accounts for approximately 82% of all HPV-related cancers. The World Health Organization **(WHO) Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem (2020)** recommends that HPV vaccines be included in all national immunization programs and that 90% of girls be fully vaccinated by age 15 by 2030. Evidence from major clinical trials—including the Costa Rica Vaccine Trial (CVT), the KEN SHE randomized trials with

bivalent and nonavalent vaccines, the IARC India quadrivalent HPV trial, and the DoRIS dose-reduction immunobridging study—demonstrated that a single dose of HPV vaccine can provide up to 98% protection against cervical cancer. These findings informed the WHO recommendation supporting a one-dose HPV schedule, particularly for low- and middle-income countries (LMICs).

This strategy includes the following:

- The WHO Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem envisions a world in which cervical cancer is no longer a public health threat, defined by an incidence of fewer than 4 cases per 100,000 women-years.
- To place countries on track for elimination by 2030, the strategy establishes the 90–70–90 targets:
  - 90% of girls fully vaccinated with the HPV vaccine by age 15 years;
  - 70% of women screened with a high-performance test by 35 years of age and again by 45 years of age;
  - 90% of women identified with cervical disease appropriately treated, including 90% of women with precancer and 90% of women with invasive cancer.
- Mathematical modeling indicates that achieving the 90–70–90 targets by 2030 in low- and lower-middle-income countries would result in substantial reductions in disease burden.
- Median cervical cancer incidence is projected to decline by 42% by 2045 and by 97% by 2120, preventing more than 74 million new cases.
- The cumulative number of cervical cancer deaths averted is estimated at 300,000 by 2030, more than 14 million by 2070, and over 62 million by 2120.

Additionally, even more recent evidence from the ESCUDDO trial, a large, randomized study comparing one versus two doses of HPV vaccine, further supports dose reduction strategies. Results published in the New England Journal of Medicine in December 2025 reported outcomes from more than 20,000 girls aged 12–16 years enrolled in Costa Rica beginning in 2017. Participants were randomized to receive either one or two doses of the bivalent HPV vaccine (Cervarix) or the nonavalent HPV vaccine (Gardasil 9). Across all four groups, vaccine effectiveness exceeded 97%. The investigators concluded that a single dose provided protection against HPV types 16 and 18 comparable to that of a two-dose schedule.

## Benefits of a Single-Dose HPV Vaccination Schedule

### 1. Durable and Long-Lasting Protection

- The inclusion of a single-dose schedule in the WHO HPV vaccine recommendations is supported by multiple studies demonstrating efficacy and duration of protection comparable to two-dose schedules.
- A single dose of HPV vaccine has shown approximately **92% efficacy against persistent HPV types 16 and 18 infection**, a validated surrogate for cervical cancer prevention.
- No statistically significant differences in efficacy have been observed between one-, two-, or three-dose schedules across several randomized and observational studies.
- Longitudinal studies indicate that a single dose induces a **stable and sustained immune response**, with follow-up extending up to **16 years** in some cohorts.
- Based on immunological and epidemiological modeling, a single dose is projected to provide protection for **at least 20 years**, covering the period of highest cervical cancer risk.

### 2. Simplified Programmatic Implementation

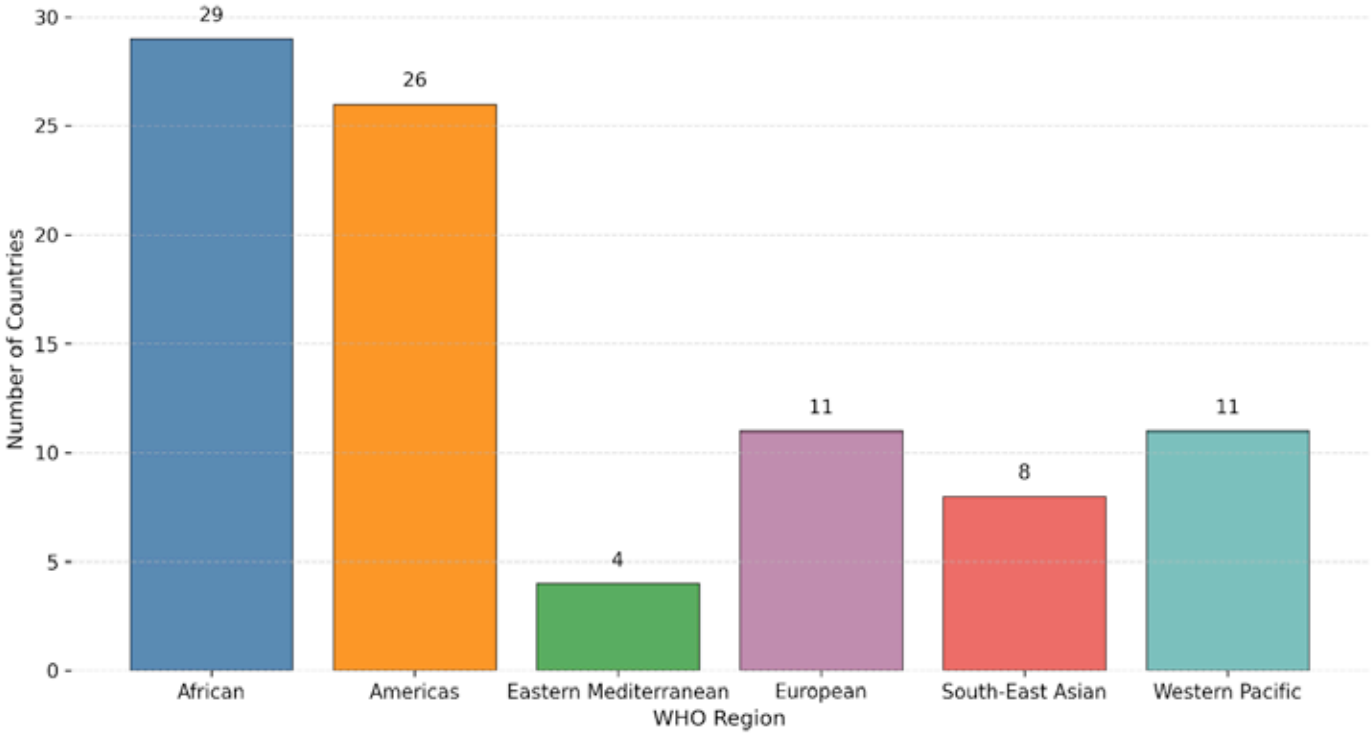
- HPV vaccination primarily targets adolescents aged **9–14 years**, a population with limited interaction with routine immunization services.
- Multi-dose schedules increase programmatic complexity due to the need for tracking, reminders, and follow-up for missed second doses.
- A single-dose schedule reduces logistical

and administrative burdens, improving feasibility, coverage, and completion rates, particularly in settings with limited health system capacity.

**3. Substantial Economic and Health System Benefits**

- Vaccine procurement represents the largest cost component of HPV immunization programs; reducing the schedule to one dose effectively halves these costs.
- Delivery costs are also significant, as HPV vaccines are often administered in **schools or community settings**, requiring additional health worker training, travel, and social mobilization efforts.
- Modeling studies show that a single-dose schedule markedly reduces costs related to service delivery, including personnel per diems, transportation, fuel, cold-chain maintenance, and waste management.
- Analyses from four low- and middle-income countries indicate that although the cost per dose may increase, the **cost per fully immunized adolescent decreases by up to 50%** when switching from a two-dose to a single-dose schedule.
- The transition to a single-dose HPV schedule in 2023–2024 could have prevented up to 370,000 future cervical cancer cases with full utilization, and about 297,000 based on actual uptake.
- These savings are particularly critical for **non-Gavi-eligible countries** and those transitioning out of Gavi support and could be reinvested to expand coverage or implement **catch-up vaccination for older girls**, accelerating cervical cancer elimination.

**Figure-1. Global Adoption of Single-Dose HPV Vaccination, by WHO Region (adapted from View-Hub: Single-Dose HPV Vaccination**
https://view-hub.org/topics/single-dose-hpv#:~:text=In%20December%202022%2C%20the%20WHO,of%2037%2C%200r%2092%25%29



**A continuing challenge.**
Despite the growing body of evidence supporting a single-dose HPV vaccination schedule, this policy has not yet been adopted globally. As shown in Figure 1, substantial geographic heterogeneity persists in implementation, reflecting differences in regulatory decisions, programmatic capacity, vaccine supply, and financing. Achieving the WHO targets for cervical cancer elimination will therefore require a coordinated global effort, including accelerated policy adoption, strengthened health systems, sustained financing, and targeted support for countries with the highest disease burden, to effectively scale up HPV vaccination coverage worldwide.

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Guest Contributors

# STRENGTHENING IMMUNIZATION SYSTEMS IN LATIN AMERICA: INSIGHTS FROM THE LATIN AMERICA VACCINATION SCORECARD

Mariana Rico-Restrepo, Medical Director, Americas Health Foundation

### *Why We Developed the Latin America Vaccination Scorecard*

Few public health interventions have transformed human health as profoundly as vaccination. Over the past five decades, vaccines have saved an estimated 154 million lives worldwide and continue to prevent millions of deaths every year. These numbers represent children who grew up healthy, families that remained whole, and communities able to prosper because diseases were prevented.

Yet vaccination programs often become victims of their own success. Because many societies today have not witnessed the devastating consequences of diseases such as measles, polio, or diphtheria, the perceived risk of these illnesses has diminished. When the threat becomes less visible, public attention to immunization weakens, and maintaining strong vaccination systems requires constant vigilance.

In Latin America, this dynamic is particularly relevant. The region has historically maintained a strong culture of vaccination through robust National Immunization Programs (NIPs), regional cooperation, and support from institutions such as the Pan American Health Organization (PAHO). These efforts have contributed to historic public health achievements, including the elimination of poliomyelitis and the interruption of endemic measles transmission.

However, recent years have shown the fragility of these advances. Outbreaks of previously controlled diseases have reemerged in several countries, coverage gaps persist across the region, and inequities in access are significant. Additionally, broader global trends, including shifts in funding priorities and evolving public narratives around vaccines, are creating new pressures on NIPs.

These realities motivated the Americas Health Foundation (AHF) to develop the Latin America Vaccination Scorecard, with the support of Pfizer. The initiative was designed to assess how vaccination systems are functioning across the region and to identify concrete opportunities for strengthening them. Our intention was not merely to produce another report or diagnostic exercise. Rather, we wanted to generate a clear and comparable picture of the status of vaccination programs and, more importantly, to help translate these insights into action.

By examining the institutional foundations of NIPs across eight Latin American countries, the Scorecard aims to provide policymakers, public health leaders, and civil society organizations with practical insights into where systems are performing well, where gaps remain, and what steps could strengthen protection for populations across the region. Ultimately, our objective is that these findings and recommendations will help reinforce political commitment to immunization and accelerate the transition toward stronger, more resilient vaccination systems across the life course. The full regional report, detailed country profiles, and accompanying infographics can be downloaded at: https://www.americashealthfoundation.org/projects/cmbfoxtqd001az9u6906n3jy5

### *How the Vaccination Scorecard Works*

Vaccination coverage is often discussed in terms of individual vaccines or national coverage rates. While these metrics are essential, they do not fully capture the broader institutional and policy environment that determines whether immunization programs succeed.

NIPs depend on a wide range of components: legal frameworks, financing mechanisms, surveillance systems, data infrastructure, communication strategies, and service delivery models. When one of these elements is weak, it can undermine the effectiveness of the entire system.

The Latin America Vaccination Scorecard was designed to evaluate these structural dimensions. Rather than focusing exclusively on coverage, the Scorecard examines the policy and system architecture that supports vaccination across the region.

The project assessed NIP frameworks in eight Latin American countries: Argentina, Brazil, Chile, Colombia, Ecuador, Guatemala, Mexico, and Peru.

Seventeen indicators were developed to capture key dimensions of vaccination systems. Each indicator was scored using a standardized rubric from 1 to 5 and weighted according to its relative importance. The results were then aggregated to produce a composite score for each country, allowing for comparison across the region.

Indicators examined multiple aspects of immunization programs, including the existence of national vaccination policies and legal frameworks, the functioning of national immunization technical advisory groups (NITAGs), the availability of digital vaccination registries, financing mechanisms, adverse event surveillance systems, public communication strategies, and the transparency and accessibility of vaccination data.

Data were compiled exclusively from publicly available official sources from the past decade, including national Ministry of Health documents, immunization schedules, WHO and PAHO databases, and published research.

To complement this desk research, AHF convened multidisciplinary expert roundtables in each country. These discussions brought together policymakers, clinicians, public health specialists, and representatives of civil society to validate the findings, clarify contextual issues, and provide additional insight into implementation challenges. By combining quantitative scoring with expert dialogue, the project sought to create a robust and realistic picture of vaccination systems across Latin America.

### *Key Regional Findings*

The results of the Scorecard highlight both important achievements and significant gaps.

Across the eight countries analyzed, composite scores ranged from **2.7 to 4.3 out of 5**, with a regional average of **3.5**. These results reflect a broader regional pattern: many countries have strong institutional foundations for NIPs, but implementation issues limit their effectiveness.

**Figure 1 illustrates the regional Scorecard results, providing a visual comparison of how the eight countries scored across the indicators.**

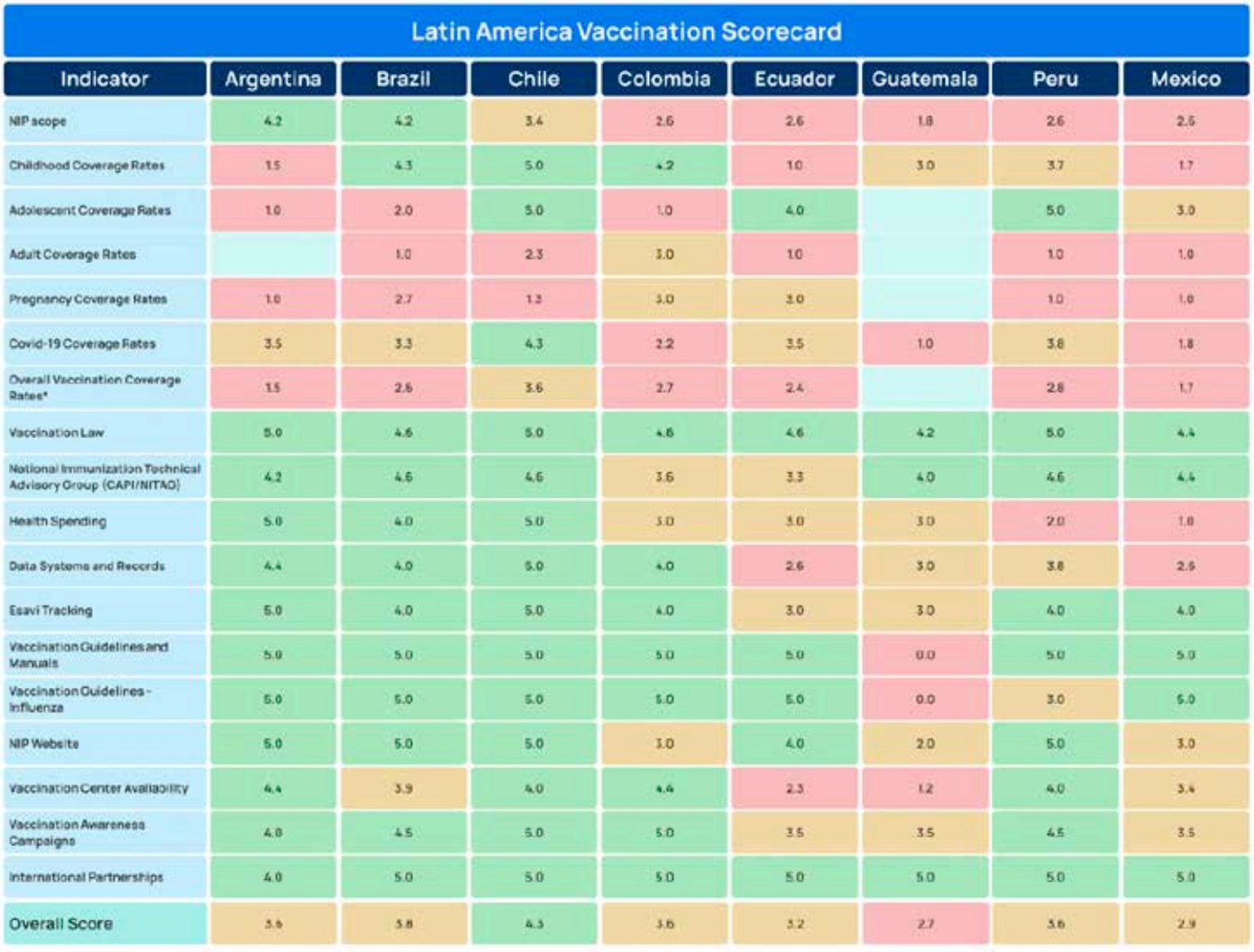
## Governance

The Scorecard findings highlight that most countries in Latin America have established the core governance structures necessary to support strong NIPs, including national vaccination policies, legal frameworks, and technical advisory bodies. However, the effectiveness of these governance arrangements varies considerably across countries. In most cases, gaps exist in policy coordination, institutional leadership, and the regular review and updating of national immunization strategies.

NITAGs play a particularly important role within this governance architecture by providing independent scientific guidance on vaccine policy, including recommendations on vaccine introduction and updates to immunization schedules. While all of the countries analyzed have established NITAGs, the Scorecard findings suggest that their institutional strength and influence vary considerably. In several cases, limited resources, irregular meeting schedules, or weak integration into national decision-making processes reduce their ability to fully inform vaccination policy.

Strengthening the governance of NIPs will require reinforcing the technical and institutional capacity of NITAGs, ensuring that their recommendations are systematically considered in policy decisions, and establishing regular processes for reviewing and updating NIP calendars. Strong governance structures are essential for enabling

**Figure 1.**



Latin America Vaccination Scorecard

| Indicator | Argentina | Brazil | Chile | Colombia | Ecuador | Guatemala | Peru | Mexico |
|---|---|---|---|---|---|---|---|---|
| NIP scope | 4.2 | 4.2 | 3.4 | 2.6 | 2.6 | 1.8 | 2.6 | 2.6 |
| Childhood Coverage Rates | 1.5 | 4.3 | 5.0 | 4.2 | 1.0 | 3.0 | 3.7 | 1.7 |
| Adolescent Coverage Rates | 1.0 | 2.0 | 5.0 | 1.0 | 4.0 | | 5.0 | 3.0 |
| Adult Coverage Rates | | 1.0 | 2.3 | 3.0 | 1.0 | | 1.0 | 1.0 |
| Pregnancy Coverage Rates | 1.0 | 2.7 | 1.3 | 3.0 | 3.0 | | 1.0 | 1.0 |
| Covid-19 Coverage Rates | 3.5 | 3.3 | 4.3 | 2.2 | 3.5 | 1.0 | 3.8 | 1.8 |
| Overall Vaccination Coverage Rates* | 1.5 | 2.6 | 3.6 | 2.7 | 2.4 | | 2.8 | 1.7 |
| Vaccination Law | 5.0 | 4.6 | 5.0 | 4.6 | 4.6 | 4.2 | 5.0 | 4.4 |
| National Immunization Technical Advisory Group (CAPI/NITAG) | 4.2 | 4.6 | 4.6 | 3.6 | 3.3 | 4.0 | 4.6 | 4.4 |
| Health Spending | 5.0 | 4.0 | 5.0 | 3.0 | 3.0 | 3.0 | 2.0 | 1.0 |
| Data Systems and Records | 4.4 | 4.0 | 5.0 | 4.0 | 2.6 | 3.0 | 3.8 | 2.6 |
| Esavi Tracking | 5.0 | 4.0 | 5.0 | 4.0 | 3.0 | 3.0 | 4.0 | 4.0 |
| Vaccination Guidelines and Manuals | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 0.0 | 5.0 | 5.0 |
| Vaccination Guidelines - Influenza | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 0.0 | 3.0 | 5.0 |
| NIP Website | 5.0 | 5.0 | 5.0 | 3.0 | 4.0 | 2.0 | 5.0 | 3.0 |
| Vaccination Center Availability | 4.4 | 3.9 | 4.0 | 4.4 | 2.3 | 1.2 | 4.0 | 3.4 |
| Vaccination Awareness Campaigns | 4.0 | 4.5 | 5.0 | 5.0 | 3.5 | 3.5 | 4.5 | 3.5 |
| International Partnerships | 4.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| Overall Score | 3.6 | 3.8 | 4.3 | 3.6 | 3.2 | 2.7 | 3.6 | 2.9 |

*Legend: NIP: National Immunization Program; NITAG: National Immunization Technical Advisory Group; ESAVI: Adverse Events Supposedly Attributable to Vaccination or Immunization*
*Blank spaces indicate data was not found.*

evidence-based decision making, coordinating stakeholders across the health system, and ensuring that immunization policies remain responsive to evolving public health needs.

## Life-Course Vaccination

One of the most consistent findings across countries was the continued strength of pediatric vaccination programs. Early childhood vaccination remains the backbone of NIP efforts in Latin America, and most countries continue to maintain relatively robust schedules for infants and young children.

In contrast, vaccination strategies for adolescents, adults, older adults, and pregnant women remain significantly less developed. Many NIPs still operate primarily under a pediatric model of immunization, with limited institutional adaptation to life course vaccination approaches.

Even in countries with relatively high overall scores, important gaps persist in adult and maternal vaccination coverage, as well as in the availability of reliable data for these populations.

This imbalance reflects both historical and structural factors. NIPs in Latin America were originally designed with a strong focus

on childhood vaccination, and much of the institutional architecture, including funding mechanisms and performance indicators, remains oriented toward pediatric coverage.

## Financing

Financing for NIPs is often insufficient or fragmented. Vaccine procurement budgets are often not adjusted as the programs expand their scope; and in many countries, resources for implementation such as workforce training, outreach, communication campaigns, and surveillance are limited. Additionally, resources specifically allocated for life-course strategies are not in place in most countries.

## Data Systems

Data systems and epidemiological surveillance are incomplete, particularly beyond early childhood vaccination. While most countries maintain relatively robust monitoring systems or registries for pediatric vaccines, the availability of reliable coverage data for adults, older adults, and pregnant women remains limited. In many countries, national reporting systems do not systematically track vaccination coverage for these populations, and epidemiological surveillance for vaccine preventable diseases is still largely oriented toward childhood indicators.

This gap has important implications for public health planning. Without consistent and disaggregated data, it becomes difficult for health authorities to accurately assess population immunity, identify coverage gaps, or design targeted vaccination strategies for vulnerable groups. The absence of reliable surveillance and monitoring systems for maternal and adult vaccination also limits the ability of governments to evaluate program performance, forecast vaccine needs, and allocate resources efficiently.

Although several countries have begun implementing digital vaccination registries, these systems are not always fully operational or interoperable across health institutions. Reporting delays, incomplete data entry, and fragmentation between public and private providers further limit the ability of policymakers to track vaccination coverage accurately or respond quickly to emerging gaps.

## Access and Education

The Scorecard revealed persistent inequities in access, particularly among rural populations, migrants, and marginalized communities. Structural barriers such as geographic distance, limited availability of vaccination sites, and restricted service hours limit access for many populations. In several countries, vaccination services are primarily offered during standard working hours, which can make it difficult for working adults and caregivers to attend appointments. Addressing these inequities will require more flexible service delivery models, including extended clinic hours, expanded vaccination sites, and targeted outreach strategies that reduce the social, economic, and geographic barriers that continue to affect immunization uptake across the region.

In terms of communication, many countries rely heavily on campaign-based messaging during outbreaks or vaccination drives, but sustained education efforts to reinforce the value of routine immunization are less common. As a result, vaccination communication is often reactive rather than proactive, focusing on short term responses to emerging threats instead of building long-term public understanding and confidence in immunization. Strengthening communication strategies will require continuous engagement with communities, clear public health messaging about the benefits of vaccines across the life course, and better integration of communication efforts into routine healthcare delivery.

## The Importance of a Life Course Approach

Perhaps the most important insight from the Scorecard is the need to transition toward a life course approach to immunization. As populations in Latin America age and the epidemiological profile of the region evolves, vaccination strategies must expand beyond childhood. Protecting adults, pregnant women, and older adults will become increasingly important for preventing disease, reducing health system costs, and protecting vulnerable populations.

The life course approach recognizes that vaccination is not a one-time intervention in early childhood but a continuous strategy for maintaining health throughout life. Achieving this shift will require adjustments in policy, financing, service delivery, and public communication. Health systems must integrate vaccination systematically into primary care services, prenatal care programs, and adult health initiatives and

ensure healthcare personnel are up to date on vaccination recommendations for all age groups.

**Figure 2 outlines the key regional priorities identified through the Scorecard for strengthening NIPs.**

## Why This Project Matters

The Latin America Vaccination Scorecard is not intended to rank countries or assign blame. Rather, its goal is to support evidence-based policy dialogue and encourage collaboration across the region.

By identifying where systems are strong and where they require reinforcement, the Scorecard provides a practical tool for policymakers and public health leaders seeking to strengthen immunization programs.

Equally important, the project demonstrates the value of regional cooperation. Many of the challenges identified in the Scorecard are shared across countries. Addressing them will require collective solutions, including the exchange of best practices, coordinated research, and sustained political commitment to vaccination.

At AHF, we believe that strengthening vaccination systems is one of the most important investments countries can make in the health of their populations. Immunization protects individuals, reduces the burden on health systems, and contributes to broader social and economic development.

## Looking Forward

The findings of the Vaccination Scorecard highlight both the resilience and the vulnerability of immunization programs in Latin America. The region has strong foundations: experienced public health institutions, decades of successful vaccination campaigns, and a deep culture of regional collaboration. These strengths must be reinforced through continued investment, improved data systems, and policies that expand immunization across the life course. Protecting the progress achieved over the past decades will require renewed commitment from governments, healthcare professionals, researchers, and the general public.

### Figure 2. Regional Priorities to Improve NIPs

VACCINES BEAT

## Who we are

At Vaccines Beat, we understand that vaccines and immunization have become a crucial topic of discussion at the center of any public health analysis. Therefore, timely, relevant, accessible, and well-curated information for all vaccine preventable diseases is key to advancing better health policies.

For this reason, a team of passionate vaccine professionals has created Vaccines Beat and each month diligently works to share with the healthcare ecosystem information, knowledge, and insights to improve global health.

## Vision

Vaccines Beat aims to become the beacon of insight in the public health ecosystem through its distinctive monthly newsletter. With an in-depth 360 perspective, carefully curated information and expert analysis, this novel platform fosters collaboration among a diverse global network of stakeholders.

## Mission

Vaccines Beat's main task is to inform through the review of the most recent developments in vaccines, immunization, and vaccine preventable diseases. Our mission extends to sharing best practices from successful initiatives worldwide while building bridges through editorial collaboration with regional and international stakeholders.

Vaccines Beat highlights the importance of information sharing & collaborative efforts within the public health community to boost vaccination campaigns, R&D, public policy, access, awareness, and equity.

Vaccines Beat encourages stakeholders to take action and promote sustainable commitment with continued support through multi-stakeholder synergies.



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