VACCINES BEAT

BEYOND ANTIBIOTICS: REIMAGINING VACCINES IN THE FIGHT AGAINST AMR

Prof. Rappuoli offers to transform antimicrobial resistance prevention.

August 2026

ISSN 2997-2833

THINK VACCINES
Research & Consultancy

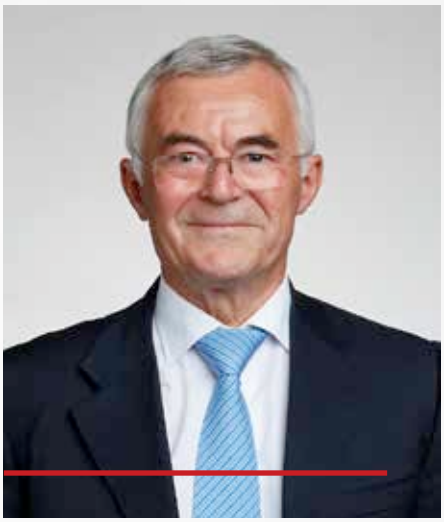
"IMMUNIZATION IS A GLOBAL HEALTH AND DEVELOPMENT SUCCESS STORY SAVING MILLIONS OF LIVES EVERY YEAR"

WORLD HEALTH ORGANIZATION

VACCINES BEAT

Beyond Antibiotics: Reimagining vaccines in the fight against AMR

Prof. Rappuoli offers to transform antimicrobial resistance prevention.



Professor Rino Rappuoli is a renowned Italian vaccinologist and microbiologist whose pioneering work has helped transform modern vaccine development. He is Scientific Director of the Fondazione Biotecnopolo di Siena, where he leads efforts to strengthen preparedness against future pandemics and antimicrobial resistance (AMR), among other initiatives.

A pioneer of reverse vaccinology, Prof. Rappuoli has played a major role in developing innovative approaches to vaccine discovery, including the use of genomics, monoclonal antibodies and, increasingly, artificial intelligence to identify and optimize vaccine targets. His work has contributed to the development of vaccines against major bacterial diseases and to advancing new strategies for addressing drug-resistant infections.

INDEX

LETTER FROM THE EDITOR

Welcome to the **25th issue of Vaccines Beat**!

It is a true pleasure to share that **Vaccines Beat** continues to grow. In the coming months, we will introduce exciting news, including a **Polls** section designed to encourage discussion and exchange ideas with our thousands of subscribers worldwide.

In this issue's **Coffee with the Expert**, we are honored to welcome back **Professor Rino Rappuoli**, one of the world's most influential scientists in vaccinology and immunology. Professor Rappuoli is currently Scientific Director of the Fondazione Biotecnopolo di Siena, Italy's national center for pandemic preparedness and biomedical innovation, where he leads the Foundation's scientific strategy and the National Anti-Pandemic Center (CNAP). He co-founded the field of cellular microbiology, integrating cell biology and microbiology, and pioneered reverse vaccinology, a groundbreaking genomics-based approach that transformed vaccine development by replacing traditional empirical methods with rational, genome-driven design. In this interview, Prof. Rappuoli explores the pivotal role that vaccines and vaccination play in addressing one of the greatest threats to global health: antimicrobial resistance (AMR). His work on reverse vaccinology 3.0 and AI-enabled vaccine/monoclonal antibody development is the scientific centerpiece. He strongly arguments that the policy impact of vaccination on AMR should be reflected in vaccine labels and health-economic evaluations.

In our Editor's Corner, we examine ***The Next Chapter of Ebola Vaccination: Lessons from the 2026 Bundibugyo Outbreak***. This editorial explores how the recent outbreak has reshaped our understanding of Ebola prevention, highlighting the progress achieved through vaccination while exposing the challenges that remain against non-*Zaire* ebolavirus species. We discuss the implications for future vaccine development, outbreak preparedness, global surveillance, and the urgent need for broadly protective vaccines capable of addressing the full diversity of Ebola viruses.

Our ***Best Practice*** section examines ***Influenza Vaccination for the 2026–2027 Northern Hemisphere Season: Updated WHO Recommendations.***

In the ***Guest Contributor*** section, **Felicitas Colombo** talks about Health Ethics as the foundation of trust. How transparency, accountability and equitable Public-Private collaboration empower the vaccine ecosystem.

As always, this issue also features carefully curated summaries of the **Latest Scientific Publications**, together with the most relevant and timely **News and Alerts** from the world of vaccines and infectious diseases.

We hope you find this **August 2026 Issue** both informative and engaging. We look forward to continuing our shared commitment to advancing immunization, strengthening public health, and contributing to a healthier and more resilient world.

Sincerely,

Enrique Chacon-Cruz, M.D., MSc
Chief Editor, *Vaccines Beat*

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

BEYOND ANTIBIOTICS: REIMAGINING VACCINES IN THE FIGHT AGAINST AMR

Prof. Rappuoli offers to transform antimicrobial resistance prevention.

Authors:

Felicitas Colombo
Dr. Enrique Chacon-Cruz

Professor Rino Rappuoli is a renowned Italian vaccinologist and microbiologist whose pioneering work has helped transform modern vaccine development. He is Scientific Director of the Fondazione Biotecnopolo di Siena, where he leads efforts to strengthen preparedness against future pandemics and antimicrobial resistance (AMR), among other initiatives.

A pioneer of reverse vaccinology, Prof. Rappuoli has played a major role in developing innovative approaches to vaccine discovery, including the use of genomics, monoclonal antibodies and, increasingly, artificial intelligence to identify and optimize vaccine targets. His work has contributed to the development of vaccines against major bacterial diseases and to advancing new strategies for addressing drug-resistant infections.

At the Fondazione Biotecnopolo, his work focuses on an end-to-end approach to pandemic preparedness, spanning discovery, preclinical research, clinical development and manufacturing. He has also championed the use of vaccines and human monoclonal antibodies as essential tools in the global response to AMR, alongside antibiotics, diagnostics and other emerging technologies.

Prof. Rappuoli is widely recognized for his contributions to vaccinology and for his leadership in translating scientific innovation into public-health solutions. His many contributions to vaccine science and immunology are nothing short of transformative.

AMR: the silent pandemic

Antimicrobial resistance (AMR) is often described as a "silent pandemic." Unlike COVID-19, it does not arrive as a single global emergency that dominates headlines and transforms societies almost overnight. Yet, its cumulative impact is enormous. For Prof. Rappuoli, the scale of the challenge demands a fundamental change in thinking.

"We lost the war against antimicrobial resistance using only antibiotics," he says. "We need to admit that."

As AMR threatens to undermine some of the most important achievements of modern medicine, Prof. Rappuoli argues that the world

needs to rethink how it approaches AMR and place vaccines, monoclonal antibodies, and other innovative tools as essential components at the center of the response.

He believes that the discovery of antibiotics in the 1930s and 1940s inadvertently led to vaccines receiving less attention as a tool against bacterial disease. As new classes of antibiotics became available, resistance could often be addressed by moving from one antibiotic to another. Over time, however, that approach became increasingly unsustainable.

"Trying to solve the problem of AMR with new antibiotics is a lost war," he argues. "They cannot be used alone."

The alternative, he says, is not to replace antibiotics, but to build a much broader supply that includes vaccines, human monoclonal antibodies, diagnostics, phages and emerging technologies.

Preparing for the next pandemic and AMR crisis

This philosophy is reflected in the mission of the Fondazione Biotecnopolo, an Italian government-funded foundation created in response to the lessons of COVID-19.

Italy was the first European country to experience the pandemic's devastating impact, including significant mortality and economic disruption. The experience exposed gaps in preparedness and prompted the Italian government to invest in an institution capable of connecting research, development, clinical trials and manufacturing.

Prof. Rappuoli, who serves as Scientific Director, describes the foundation as an end-to-end institution, designed to move from discovery through Phase I and Phase II clinical trials and, potentially, toward emergency use of medical countermeasures.

"Our focus is on vaccines and human monoclonal antibodies against viruses with pandemic potential, but with a critical additional priority: antimicrobial resistance," he points out.

That combination distinguishes the Fondazione Biotecnopolo from many other pandemic preparedness initiatives, according to Prof. Rappuoli. While much of the global preparedness agenda has focused primarily on emerging viruses, AMR represents a persistent and growing threat.

"We are building research capabilities that can address both acute pandemic threats and the slower-moving global crisis of drug-resistant infections," he says.

Why bacterial vaccines are so difficult

The scientific challenge is formidable. Pathogens such as Staphylococcus aureus, Escherichia coli, Klebsiella pneumoniae and Pseudomonas aeruginosa continue to cause serious multidrug-resistant infections, particularly in healthcare settings. Developing vaccines against these organisms, however, is considerably more complex than developing vaccines against many viruses.

Prof. Rappuoli points to Klebsiella as an example. The bacterium has more than 100 capsular types, meaning that a conventional vaccine approach could require targeting numerous different polysaccharides.

"It's much more complex than a virus," he explains.

With COVID-19, researchers rapidly converged on a key viral protein as the target for vaccine development. Bacteria present hundreds of potential targets, and researchers must determine which are sufficiently conserved across strains, immunogenic and capable of generating protection.

This is where Prof. Rappuoli's work on reverse vaccinology becomes particularly important.

From reverse vaccinology 1.0 to 3.0

Prof. Rappuoli's team has progressively transformed the way vaccine targets can be identified. The approach begins not simply with the pathogen, but with people who have recovered from infection. Their blood contains antibodies generated during the immune response, including rare antibodies that may provide protection.

Researchers isolate memory B cells individually and screen thousands (sometimes as many as 70,000) to identify those producing antibodies

capable of killing or neutralizing the bacteria.

"Once a protective antibody is identified, we can pursue two paths simultaneously," he continues.

First, the antibody itself can potentially be developed as a monoclonal antibody for prevention or treatment. Second, identifying the antibody's target reveals a potentially protective antigen that can serve as the basis for a vaccine.

This approach, originally described as reverse vaccinology 2.0, has now evolved into what Prof. Rappuoli calls reverse vaccinology 3.0, incorporating artificial intelligence (AI).

AI can accelerate the identification of targets and help researchers design improved antibodies and vaccine antigens. Rather than simply taking an antigen as it exists in nature, researchers can use computational approaches to optimize properties such as stability, immunogenicity, cross-reactivity and temperature tolerance.

"The objective is no longer simply to identify the antigen, but to redesign and optimize it," he says.

Monoclonal antibodies developed in months

The acceleration is not limited to antigen discovery. Before COVID-19, developing a new human monoclonal antibody and bringing it into clinical testing could take two years or more.

During the pandemic, Prof. Rappuoli and his colleagues reduced that timeline to approximately eight months, demonstrating that the process could be dramatically accelerated under emergency conditions. He believes the timeline could eventually be reduced further.

"We are working on new ways of manufacturing antibodies that could take three months," he says.

That raises an intriguing possibility: if a new bacterial or viral threat emerges, therapeutic monoclonal antibodies could potentially be developed and brought into clinical use within a matter of months.

Prof. Rappuoli is cautious about predicting development in days, but he sees two to three months as a realistic target for the future.

"We are not there. But that's my target," he asserts.

Vaccines as part of antimicrobial stewardship

Vaccines have proven highly effective in preventing infectious diseases at scale, while helping to reduce reliance on antibiotics and limiting the selective pressures that contribute to antimicrobial resistance.

For Prof. Rappuoli, vaccines should become an integral component of antimicrobial stewardship, not a secondary intervention against AMR. The idea is not entirely new. In 2021, the World Health Organization (WHO) published a dedicated framework calling for vaccines to be more fully integrated into strategies to prevent and control AMR, including through expanded use of existing vaccines and development of new vaccines specifically relevant to AMR. (WHO)

Yet, vaccines against antibiotic-resistant bacterial pathogens have not received the level of investment that their potential warrants. One reason is economic.

"There is not economic incentive for companies to invest in vaccines for bacteria resistant to antibiotics," Prof. Rappuoli says. "The scientific challenge is significant, but so is the difficulty of establishing a sufficiently attractive market."

That creates a task for governments and policymakers: if AMR is a major health and economic threat, society must create the incentives necessary to develop the tools capable of addressing it.

"It's a cultural problem," he says. "How do we convince and provide the data that this is an investment that humanity has to make at some point?"

The missing number in vaccine health economics

Perhaps Prof. Rappuoli's most striking policy proposal concerns how vaccines are evaluated.

Health technology assessments and cost-effectiveness analyses routinely consider outcomes such as deaths prevented, morbidity

avoided and hospitalizations reduced. But, he argues, they often fail to capture another major benefit of vaccination: **the reduction in antibiotic resistance**.

"If you look at the cost-effectiveness of vaccines against bacteria, they usually miss a huge parameter," he says. "The benefit vaccines can provide in addressing antibiotic resistance."

This perspective is increasingly supported by global evidence. A 2024 World Health Organization analysis of 44 vaccines targeting 24 pathogens found that vaccination could play a substantial role in reducing antibiotic use, AMR-related disease and associated economic costs. The report underscores the need to incorporate these broader benefits when considering the value of vaccines. (WHO)

The WHO estimates that optimizing the use of vaccines against the pathogens assessed could reduce antibiotic use by 2.5 billion doses annually, while potentially saving approximately US$730 billion in hospital costs associated with AMR if vaccines against all evaluated pathogens were successfully rolled out. (WHO)

This omission can have important consequences. If the AMR benefit is not quantified, it is difficult for policymakers to incorporate it into decisions about vaccine implementation.

Prof. Rappuoli proposes an ambitious but straightforward change: **the impact on antibiotic resistance should be explicitly recognized in vaccine labeling and subsequently incorporated into health-economic assessments**.

His proposal echoes a growing body of health-economic research. Experts have argued that conventional vaccine economic evaluations should capture the broader health-system, epidemiological and ecological effects of vaccination on antimicrobial use and resistance, not simply the infections directly prevented by the vaccine. (OBS)

He uses pneumococcal vaccination as an example. A vaccine's label could explicitly recognize its ability to prevent antibiotic-resistant pneumococcal disease, with the associated economic benefit incorporated into cost-effectiveness analyses.

For Prof. Rappuoli, this could trigger a broader policy cascade. Including AMR in the recognized benefits of vaccination could influence regulatory processes, advisory committee decisions, health-economic assessments, investment priorities and ultimately immunization policies.

"If it's not in the label, it will never be part of any other consideration," he says.

One Health: vaccinating animals

The argument extends beyond human health. Prof. Rappuoli emphasizes that vaccination of animals can also contribute to reducing antimicrobial use and resistance, making AMR a quintessential One Health challenge.

The One Health dimension is increasingly recognized in global AMR policy. WHO has emphasized the role of vaccination in reducing reliance on antimicrobials in animal husbandry, reinforcing the idea that human and animal vaccination should be considered together within broader AMR strategies. (WHO)

Prof. Rappuoli recalls the example of salmon farming in Norway, where large quantities of antibiotics were once used in production. When vaccination was introduced, concerns emerged that reducing antibiotic use would damage the industry's economics. The opposite happened. Salmon production increased, while the use of antibiotics in the fjords was dramatically reduced. (Barnes et al 2022)

This principle, he argues, can be applied more broadly across animal health.

"Vaccination can simultaneously deliver a public health benefit, reduce antimicrobial use and generate an economic benefit," Prof. Rappuoli affirms.

The promise and limits of AI

AI is rapidly transforming vaccine and antibody development. But Prof. Rappuoli offers an important warning against excessive confidence in computational predictions.

"Artificial intelligence, from my point of view, is not so intelligent, but it's very powerful," he says.

He describes AI as an extremely powerful calculator whose performance depends heavily on the quality of the data it receives.

For protein science, the situation is particularly promising because researchers have access to extensive databases of protein structures. This enables highly accurate predictions in many circumstances.

But proteins are dynamic. They can change shape and exist in multiple conformations. AI may recognize the beginning and end states without necessarily capturing every intermediate state.

He recommends using AI to accelerate scientific discovery, improve predictions and guide experimental work. However, its predictions must still be validated in the laboratory.

"Never trust it. Go back and check," Prof. Rappuoli shares his unequivocal advice to scientists.

Three priorities for the next decade

Looking ahead, Prof. Rappuoli identifies a clear direction for the global response to AMR.

1. **Recognize the limits of antibiotics alone**. The world needs to acknowledge that the antibiotic-only approach cannot resolve AMR.

2. **Invest in tools that already exist**. Vaccines and human monoclonal antibodies have demonstrated their potential and should be developed more aggressively against resistant pathogens.

3. **Continue searching for new solutions**. Even vaccines and monoclonal antibodies will not be enough to address a problem of this magnitude. He points to phages, CRISPR-Cas technologies and other emerging approaches as part of a broader scientific arsenal.

"The challenge, however, is not only scientific. It is also cultural and economic," he says. "What concerns me the most about the future of AMR and vaccines are two issues: complexity and investment."

Science has the tools to make significant progress against some of the most important bacterial pathogens, he believes. But identifying the right targets is substantially more complicated than it was for COVID-19, and developing vaccines will require significant resources, time and sustained commitment.

The scientific community increasingly understands that AMR cannot be solved by continually developing new antibiotics. The technologies to broaden the response already exist, from vaccines and monoclonal antibodies to AI-enabled discovery, diagnostics and phage-based approaches.

What remains is to align science, policy and economics around the urgency of the problem. That may ultimately be the central task.

"The fight against AMR may be a long one. But if vaccines become a central part of the strategy, it may also become a fight with a much broader, and powerful, arsenal," he concludes.

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.

World Hepatitis Day 2026. The World Hepatitis Day 2026 theme, *"Hepatitis: Let's break it down"*, is a call to remove the barriers that stand between people and the services that can save their lives.
Viral hepatitis continues to be a major cause of preventable illness and death worldwide. The tools needed to eliminate viral hepatitis already exist. Effective vaccines, accurate diagnostics, curative treatments for hepatitis C, and lifelong therapies for hepatitis B can prevent infections, save lives, and reduce liver cancer and cirrhosis. Despite this, millions of people remain undiagnosed, untreated, or unable to access care due to stigma, limited awareness, health system gaps, and persistent inequalities.
Published: July 28, 2026.
https://www.who.int/campaigns/world-hepatitis-day/2026

First volunteer vaccinated in the world's first Bundibugyo ebolavirus vaccine trial.
The University of Oxford's Oxford Vaccine Group has today successfully vaccinated the first volunteer in the world's first clinical trial of a vaccine designed to protect against Bundibugyo ebolavirus (BDBV).
Published: July 24, 2026.
https://www.ox.ac.uk/news/2026-07-24-first-volunteer-vaccinated-in-the-worlds-first-bundibugyo-ebolavirus-vaccine-trial#:~:text=The%20University%20of%20Oxford%27s%20Oxford,Innovation%20and%20spin%2Douts.

Chile issues first-ever preventive hantavirus health alert.
Chile's Health Ministry has issued its first-ever preventive health alert for hantavirus across 13 of the country's 16 administrative regions to strengthen the healthcare system's response to the disease's rising fatality rate and the simultaneous presence of other health risks, including dengue, yellow fever and avian influenza. As of last week, authorities had recorded 46 infections and 18 deaths, representing a fatality rate of 39%.
Published: July 30, 2026.
https://www.upi.com/Top_News/World-News/2026/07/30/latam-chile-hantavirus-alert/7461785418638/

Europe's heatwaves are fueling infectious diseases, health agency warns.
As summers are getting longer and hotter, health experts warn that higher temperatures are creating the perfect conditions for infectious diseases to spread across Europe.
Published: July 30, 3036.
https://www.euronews.com/health/2026/07/30/europes-heatwaves-are-fuelling-infectious-diseases-health-agency-warns

Legionnaire's Diseases Outbreak in New York.
The NYC Health Department is currently investigating a community cluster of Legionnaires' disease in the Upper East Side neighborhoods of Carnegie Hill and Yorkville (ZIP codes 10028, 10128, and

10075). We are confident the source of the *Legionella* bacteria has been eliminated.
Published: July 27, 2026.
https://www.nyc.gov/site/doh/health/health-topics/legionnaires-disease.page.

Cyclospora infections increase in 2 US outbreaks. Confirmed domestically acquired cases top 6,700 nationwide.
Cases are still being added to the huge outbreak affecting people in Illinois, Indiana, Kansas, Kentucky, Michigan, Ohio, Oklahoma, Pennsylvania, and West Virginia. Interviews with people sickened with cyclosporiasis indicate that many in those states ate at a Taco Bell restaurant and ate lettuce distributed by Taylor Farms de Mexico. That lettuce has since been recalled. However, the number of cases in the *Cyclospora* outbreak that's unrelated to the massive nine-state lettuce-related cluster has increased from 72 to 93, the US Food and Drug Administration (FDA) shared yesterday.
Published: July 30, 2026.
https://www.cidrap.umn.edu/cyclospora/cyclospora-infections-increasing-2-us-outbreaks

Dengue cases continue rise in Bangladesh and Sri Lanka.
The Bangladesh Directorate General of Health Services (DGHS) reported an additional 450 dengue fever cases in the past 24 hours, bringing the total cases year to date to 12,020. In addition, one more death was reported, bringing the death toll this year to 39. The number of cases reported in July alone is 5,916.
Published: July 23, 2026.
https://outbreaknewstoday.substack.com/p/dengue-cases-continue-rise-in-bangladesh

NIAM 2026.
National Immunization Awareness Month is in August, giving organizations and coalitions the opportunity to work together to capture the public's attention on immunizations. This page serves as a convenient guide to posting on social media throughout the month.
Published: August 2026.
https://www.voicesforvaccines.org/niam-2026/

Outbreak News Roundup: Thailand.
In Thailand, Department of Disease Control (DDC) issued a health warning as deaths from leptospirosis and melioidosis stand at 107 since the beginning of 2026. Dr Montien Kanasawat, director-general of the DDC, revealed that data from the Division of Epidemiology's Digital Disease Surveillance system recorded 2,190 cases of leptospirosis between 1 January and 21 July 2026. The outbreak resulted in 30 deaths, representing a case fatality rate of 1.37 per cent.
Published: August 3, 2026.
https://outbreaknewstoday.substack.com/p/outbreak-news-roundup-thailand

Evolutionary history may help explain why some people develop more severe COVID-19 than others.
Every time a virus invades a person, it collides with thousands of years of human history. A study led by researchers at the USC Dornsife College of Letters, Arts and Sciences and Howard University suggests that some of the genes involved in the body's immune response today bear the marks of ancient battles with infectious diseases.
Published: August 4, 2026.
https://medicalxpress.com/news/2026-08-evolutionary-history-people-severe-covid.html

Moderna begins first human trial of Bundibugyo Ebola vaccine.
Moderna on Tuesday said it has begun its first human trial of an experimental vaccine to protect against Bundibugyo ebolavirus, a strain of Ebola that has killed more than 1,650 people so far and currently has no approved vaccine.
Published: August 4, 2026.
https://www.reuters.com/business/healthcare-pharmaceuticals/moderna-begins-first-human-trial-bundibugyo-ebola-vaccine-2026-08-04/

Universal Influenza Vaccine Technology Landscape.
The Landscape is a database that compiles and summarizes publicly available information on the global R&D pipeline of universal, broadly protective, and next-generation influenza vaccine candidates, as defined in the Influenza Vaccines R&D Roadmap (IVR). Vaccine candidates profiled in the Landscape are designed to provide broader and more durable protection against seasonal and pandemic influenza, compared with current strain-specific influenza vaccines.
Published: July 30, 2026.
https://ivr.cidrap.umn.edu/universal-influenza-vaccine-technology-landscape

PAHO - Situation Report #8: Measles in the Americas Region. 31 July 2026.
Between epidemiological week (EW) 1 and EW 29 of 2026 (ending on 25 July 2026), the Region of the Americas reported 47,026 confirmed measles cases from 17 countries and territories, representing approximately a 5-fold increase compared to the same period in 2025. Guatemala (30,040), Mexico (12,233), the United States (2,318) and Canada (1,107) accounted for the majority (97%) of confirmed cases. Additionally, 48 deaths have been reported.
Published: August 1, 2026.
https://www.paho.org/en/documents/situation-report-8-measles-americas-region-31-july-2026

Climate Change Is Expanding Mosquito-Borne Disease Risk.
A new analysis by Climate Central found that **95% of major U.S. cities now experience more "mosquito disease days"**—days with temperatures favorable for the transmission of **West Nile virus.** Compared with the early 1970s, cities have gained an average of **18 additional risk days per year**, with the largest increase occurring in the **Southeast, Northeast, and Northwest.** These findings highlight another important consequence of climate change: the expanding window for mosquito-borne disease transmission, underscoring the need for stronger surveillance, vector control, and public health preparedness.
Published: ***July 22, 2026.***
https://www.climatecentral.org/climate-matters/mosquito-disease-days

CDC: *Salmonella* Outbreak Linked to Jalapeños.
CDC and public health officials in several states are investigating a multistate outbreak of *Salmonella* infections linked to jalapeño peppers. Businesses should check their inventory for the recalled jalapeño peppers and not sell or serve them. To date, 345 cases and 36 hospitalizations have been confirmed.
Published: August 5, 2026.
https://www.cdc.gov/salmonella/outbreaks/javiana-08-26/index.html

Africanews: Invasive mosquito sparks malaria fears across Africa.
A fast-spreading invasive mosquito is raising alarm across Africa, as scientists warn it could fuel a resurgence of malaria in major cities. The mosquito, known as *Anopheles stephensi*, is unlike traditional malaria carriers. It thrives in densely populated urban areas, breeding in water containers around homes and buildings, making it far harder to control. Even more concerning, the species has developed resistance to nearly every major insecticide currently used to fight mosquitoes, undermining one of the world's most effective malaria control strategies.
Published: August 5, 2026.
https://www.africanews.com/2026/08/05/invasive-mosquito-sparks-malaria-fears-across-africa/

FDA approves Moderna's mRNA flu vaccine.
The agency on Wednesday approved mFlusiva, previously known as mRNA-1010, for use against seasonal influenza in all adults at least 50 years of age.
Published: August 6, 2026.
https://www.biopharmadive.com/news/moderna-fda-approve-mflusiva-seasonal-influenza/826864/

Good news in South Africa's fight against TB.
The M72 vaccine is currently on phase three trials in five countries, including South Africa. The Health Department is gearing up for the arrival of a breakthrough tuberculosis (TB) vaccine, a potential gamechanger that could help wipe out the epidemic as a public health threat by 2030. The department said the M72/ASOIE vaccine is currently in phase three trials in five countries, including South Africa.
Published: August 3, 2026.
https://www.citizen.co.za/news/south-africa/health-department-gears-up-breakthrough-tb-vaccine/

WHO: Ebola disease caused by Bundibugyo virus - Democratic Republic of the Congo.
This outbreak—initially confined to the Mongbwalu health zone in Ituri Province, over the last two months, the outbreak has expanded to five provinces (Ituri, North Kivu, South Kivu, Haut-Uélé and Tshopo), now affecting 49 health zones. The outbreak is now the largest Ebola outbreak ever reported in the Democratic Republic of the Congo. As of 30 July 2026, a total of 3605 confirmed cases, including 1587 deaths, have been reported, corresponding to a crude case fatality ratio (CFR) of 44%.
Published: August 1, 2026.

https://www.who.int/emergencies/disease-outbreak-news/item/2026-DON614

World Health Organization. Immunization coverage. 2026.
Zero-dose children fell by nearly 750 000 in the past year, but drop-out numbers high and stagnant, increasing risk of disease outbreaks.
Published: July 15, 2026.
https://www.who.int/news/item/15-07-2026-global-childhood-immunization-coverage-inches-forward-despite-conflict-and-hesitancy---unicef--who

Cholera outbreak kills 13, infects 240 in Chad since official declaration.
A cholera outbreak in Chad has killed 13 people and infected nearly 240 others since the government officially declared the epidemic in late July, as health authorities continue efforts to contain the spread of the disease, the Health Ministry announced Thursday.
Published: August 7, 2026.
https://sana.sy/en/health/2334961/

WHO position paper on COVID-19 vaccines - July 2026.
This WHO Position Paper updates WHO recommendations on the use of COVID-19 vaccines in the context of sustained SARS-CoV-2 circulation, high levels of population immunity, and the availability of variant-adapted vaccines. It also identifies evidence gaps and research priorities and provides guidance to support national immunization policies and vaccination programs as countries integrate COVID-19 vaccination into long-term disease management strategies.
Published: July 31, 2026.
https://www.who.int/publications/i/item/who-wer10130-138-156.

Chikungunya virus disease worldwide overview.
Since the start of 2026, and as of 5 August 2026 (data collection period 3–5 August, data available up to 28 July), 219 522 chikungunya virus disease (CHIKVD) cases and 81 associated deaths have been detected in 25 countries, excluding EU/EEA countries and territories.The majority in the Americas.
Published: August 2026.
https://www.ecdc.europa.eu/en/chikungunya-monthly

EMA Validates Marketing Authorization Application for Pfizer/Valneva's Lyme Disease Vaccine Candidate.
The European Medicines Agency (EMA) has validated the Marketing Authorization Application (MAA) for PF-07307405, Pfizer and Valneva's six-valent outer surface protein A (OspA)-based Lyme disease vaccine candidate and will now begin its formal assessment. There are currently no approved human vaccines for Lyme disease anywhere in the world.
Published: August 14, 2026.
https://www.biopharminternational.com/view/ema-validates-marketing-authorization-application-for-pfizer-valneva-s-lyme-disease-vaccine-candidate

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

Thongsriratch S, Thongseiratch T, Pairoh S, Khantee P. **The Vaccine That Was Never Mentioned: A Comparative Medico-Legal Analysis of the Duty to Inform and Document Preventive Immunization, with Proposed Practice Guidelines.** *Vaccines*. 2026; 14(8):664.
doi: https://doi.org/10.3390/vaccines14080664

Editorial comment: Healthcare professionals often associate vaccine-related litigation with adverse events following immunization. However, this thought-provoking review highlights another emerging legal concern: the potential consequences of not discussing or recommending vaccines. While current evidence does not establish a universal legal duty to recommend every available vaccine, failure to assess eligibility, counsel patients, document discussions, or revisit vaccination opportunities may become increasingly relevant in medico-legal practice. The authors propose the ADRR framework—Assess, Discuss and disclose, Recommend or refer, and Record and revisit—as a practical approach to strengthen clinical practice and documentation. Although not yet a validated legal or clinical standard, ADRR offers a structured strategy to promote informed decision-making, improve vaccine uptake, and potentially reduce legal risk.

As adult and maternal immunization continue to expand and immunization schedules become more complex, ensuring that appropriate vaccines are discussed may become as important as administering them. This review serves as a timely reminder that the vaccine conversation itself is an essential component of high-quality preventive care.

02

Khatiwada M, Chen Y-T, Dochez C, Delputte P. **Mapping the Global Landscape of Vaccine Acceptance Among the General Population from 2009 to 2024: A Systematic Review Across COVID-19 Pandemic Phases, Vaccine Categories, and Economic Strata.** *Vaccines*. 2026; 14(8):663.
doi: https://doi.org/10.3390/vaccines14080663

Editorial comment: A large systematic review of more than 650,000 participants from 97 countries found that global vaccine acceptance remained relatively stable at around 71% between 2009 and 2024. However, acceptance varied considerably by vaccine type, region, and income level. Childhood vaccines had the highest acceptance, while influenza vaccines had the lowest. Interestingly, vaccine acceptance tended to be higher in African and South-East Asian countries than in many high-income regions. These findings reinforce that vaccine confidence is highly context-dependent and that tailored, evidence-based communication strategies remain essential to improve immunization coverage worldwide.

03

Jamrozik E, Abeler-Dörner L, Chaudhari A, Cheah PY, Hinch R, Jarman R, Johnson T, Parker M, Vegvari C, Wressnigg N, Fraser C. **Ethical challenges in outbreak trial design: from Ebola to Nipah.** *Vaccine*. 2026 Jul 18;89:128858.
doi: https://doi.org/10.1016/j.vaccine.2026

Editorial comment: Developing vaccines for Nipah virus, a highly lethal but sporadic disease, presents unique scientific and ethical challenges. Because outbreaks are short and unpredictable, traditional randomized clinical trials may be difficult to complete before transmission ends. This review discusses alternative trial designs, the ethical balance between scientific rigor and participant protection, and the importance of early community engagement. The authors also emphasize the need to ensure rapid access to effective vaccines for control-group participants once efficacy has been demonstrated.

04

Ezeja L, Ezeala OM, Westrick SC, Qian J. **Adverse events and vaccine administration errors following RSV vaccination: Findings from the United States VAERS database, 2023-2025.** *Vaccine*. 2026 Jun 29;89:128896.
doi: https://doi.org/10.1016/j.vaccine.2026.128896

Editorial comment: Three respiratory syncytial virus (RSV) vaccines are currently licensed for adults in the United States: Arexvy® (GSK), Abrysvo® (Pfizer), and mRESVIA® (Moderna). Among them, only Abrysvo® is approved for maternal immunization during pregnancy to protect newborns against severe RSV disease during the first months of life. This post-marketing analysis of more than 8,300 VAERS reports confirms that most reported adverse events were non-serious, reinforcing the favorable safety profile established in clinical trials. However, the study identified a concerning number of vaccine administration errors, including unnecessary extra doses, administration to individuals outside the recommended age groups, and the use of Arexvy® during pregnancy, despite its lack of approval for this indication. As RSV immunization programs continue to expand, these findings highlight that successful implementation depends not only on safe and effective vaccines but also on accurate vaccine selection and administration. Ongoing healthcare provider education, adherence to current recommendations, and robust immunization record systems will be essential to maximize the public health benefits of RSV vaccination.

05

Morris SE, O'Halloran A, Sundaresan D, Olson SM, Chung JR, Ellington S, Bozio CH, Iuliano AD, Biggerstaff M, Reed C. **Public health benefits of maternal influenza vaccination among pregnant women and infants <6 months in the United States, 2011-2020.** *Vaccine*. 2026 Jun 30;89:128895.
doi: https://doi.org/10.1016/j.vaccine.2026.128895

Editorial comment: Pregnant women and infants younger than six months are among the populations at highest risk for severe influenza, yet newborns are too young to receive influenza vaccines. This study demonstrates that maternal influenza vaccination significantly reduces hospitalizations and ICU admissions in both mothers and their infants, reinforcing its value as a strategy that protects two vulnerable populations with a single intervention. The authors also found that higher vaccination coverage and earlier immunization during pregnancy could prevent hundreds of additional hospitalizations each influenza season. These findings underscore the importance of strengthening maternal immunization programs and ensuring timely influenza vaccination during pregnancy as a key public health priority.

06

Madhi SA, Snaggs H, Skogeby Z, Feng Y, Barnabas S, Baker J, Fairlie L, Beeslaar J, Radley D, Jiang HQ, Silmon de Monerri NC, Simon R, McLaughlin L, Gaylord M, Skinner J, Munjal I, Anderson AS, Gurtman A. **Maternal 6-valent group B Streptococcus vaccine in non-pregnant and pregnant females: a randomized phase 1/2 trial.** *Nat Med.* 2026 Jul 28.
doi: https://doi.org/10.1038/s41591-026-04558-5

Editorial comment: Group B Streptococcus (GBS) remains a leading cause of neonatal sepsis and meningitis worldwide, yet no vaccine has been licensed despite decades of research. This phase 1/2 trial showed that the investigational hexavalent maternal GBS conjugate vaccine (GBS6) was well tolerated in pregnant women and elicited strong antibody responses, with efficient transfer of protective antibodies to infants. Although larger efficacy studies are still needed, these encouraging results represent an important milestone toward a maternal vaccine that could substantially reduce the global burden of neonatal GBS disease.

07

Blakney AK, Top KA, Cowling BJ, Larson HJ, Shattock RJ, Sadarangani M. **Safety and efficacy of mRNA vaccines: a mechanistic and public health perspective.** *Lancet.* 2026 Jul 18;408(10551):275-288.
doi: https://doi.org/10.1016/S0140-6736(26)00512-X

Editorial comment: Following the administration of billions of doses worldwide, mRNA vaccines have demonstrated an excellent safety profile and remarkable effectiveness, transforming the field of vaccinology. This comprehensive review confirms that mRNA vaccines do not integrate into the human genome, are rapidly degraded after fulfilling their function, and are fundamentally different from gene therapy. Beyond COVID-19, this versatile platform is poised to revolutionize the prevention of infectious diseases and holds enormous promise for cancer immunotherapy and autoimmune diseases, making it one of the most important innovations in modern medicine.

08

Lai X, Abbas K, Pouwels KB, Jit M, Fang H. **Global, regional, and national impact of the Expanded Programme on Immunization against 14 pathogens from 1974 to 2024: an economic evaluation.** *Lancet Glob Health.* 2026 Jul;14(7):103965.
doi: https://doi.org/10.1016/j.langlo.2026.103965

Editorial comment: Since its launch by the World Health Organization in 1974, the Expanded Programme on Immunization (EPI) has become one of the most successful public health initiatives in history. This landmark economic analysis estimates that over the past 50 years, EPI has generated more than US$15 trillion in economic benefits, returning approximately US$16 for every dollar invested. Among all vaccines, measles vaccination provided the greatest economic return. The findings reaffirm that immunization not only saves millions of lives but also remains one of the most cost-effective and economically rewarding investments, particularly in low-income and high-burden countries.

09

Fafi I, Levy C, Varon E, Cohen R, Béchet S, Valtuille Z, Birgy A, Bonacorsi S, Delobbe JF, Batard C, Assad Z, Jaboyedoff M, Lenglart L, Basmaci R, Ouldali N. **RSV shapes serotype-specific invasive pneumococcal disease dynamics in children: an observational study.** *J Infect Dis.* 2026 Aug 4:jiag401.
doi: https://doi.org/10.1093/infdis/jiag401

Editorial comment: This French surveillance study provides new evidence that RSV circulation influences the serotypes responsible for invasive pneumococcal disease (IPD) in children. During RSV seasons, pneumococcal serotypes with lower intrinsic invasive potential were more likely to cause IPD, suggesting that RSV facilitates progression from nasopharyngeal colonization to invasive disease. These findings reinforce the close relationship between viral and bacterial respiratory pathogens and suggest that effective RSV prevention—including maternal immunization and monoclonal antibodies—may also reduce the burden of pneumococcal disease, an important consideration for future vaccination strategies.

10

Angamarca-Iguago J, Cagua-Ordóñez J, Parise-Vasco JM, de Mora D, Escobar-Naranjo M, Bruno A and Simancas-Racines D. **Regional, altitudinal, and age-specific heterogeneity of bronchiolitis hospitalization seasonality in Ecuador, 2007–2024, and implications for RSV immunoprophylaxis timing.** *Front. Public Health.* 2026; 14:1892098.
doi: https://doi.org/10.3389/fpubh.2026.1892098

Editorial comment: A nationwide study from Ecuador found that RSV-associated bronchiolitis seasonality changed after the COVID-19 pandemic, with important regional differences influenced by geography and altitude. While the coastal region showed a stable seasonal pattern, the Andes and Amazon remained more variable. These findings highlight that the timing of maternal RSV vaccination and nirsevimab administration should be guided by local epidemiology rather than a one-size-fits-all approach, maximizing protection for infants during periods of highest RSV circulation.

11

Rodriguez-Morales AJ, Rodríguez-Sabogal IA, Sucari A, Moncada W, Hernández-Serrano LV, Escarrá F, Quispe-Torrez PP, Membrillo FJ, Orduna T, Lloveras S, Chaves TSS, Cabada MM, Perret C, Echavarría R, Ribeiro AF, Tanabe M, Bazzino F, Ramirez M, Diaz B, Morejón KML, Daly K, Rosas R, Lopez MB, Miranda C, Fernandez ML, Özsürekçi Y, Matsee W, Carrero Y, Biscayart C, Cimerman S, Avila-Aguero ML, Debbag R, Brea J, Risquez A, Acosta-España JD, Ulloa-Gutierrez R, Espinal C, Torres-Martinez CN, González-Sanz M, Abbara A, Weatherhead J, Cordero B, Lezcano V, Guerrero A, Maldonado H, Cuellar L, Ceron I, Roque Y, Florentin M, Infante R, Carvajal A, Soto-Ávila LM, Hernández M, Villaroel H, Miozzi G, Navas R, Hernández M, Pérez-Vega C, Mérida M, Forero-Peña DA, Navarro JC, Beltrán-Arroyave C, Masana M. **Reducing communicable-disease risk after earthquakes: Vaccination and prevention lessons for Venezuela's doublet.** *Travel Med Infect Dis.* 2026 Jul 4:103009.
doi: https://doi.org/10.1016/j.tmaid.2026.103009

Editorial comment: Natural disasters often create the perfect conditions for outbreaks of vaccine-preventable diseases. This timely review discusses the essential preparedness and response measures needed to minimize these risks, drawing attention to events such as the recent earthquake in Venezuela.

12

Puebla YP, Nicholls H, Fitz-Patrick D, Horton LE, Gawel MW, Martinez RD, Wang X, Keep G, Xu X, Gomme E, et al. **Phase 3 Randomized Study Investigating the Safety, Tolerability, and Immunogenicity of a Combination Modified Messenger RNA Vaccine Against Influenza and COVID-19 in Healthy Adults.** *Vaccines.* 2026; 14(8):677.
doi: https://doi.org/10.3390/vaccines14080677

Editorial comment: In a large phase 3 trial involving more than 6,600 adults aged 18–64 years, an investigational combined mRNA vaccine against influenza and COVID-19 demonstrated an acceptable safety profile and generated robust immune responses against influenza A and SARS-CoV-2. Although immune responses against influenza B did not fully meet the predefined non-inferiority criteria, the results are encouraging and support further optimization of the formulation. If successful, a single combination vaccine could simplify seasonal immunization, improve vaccine uptake and adherence, reduce healthcare visits, and take full advantage of the flexibility of the mRNA platform for protection against multiple respiratory pathogens.

13

Fiuza A, Garcia-Colon C, Molfetta C, Schwab J, Gurumurthy M, Thomas P, Friedman S. **SARS-CoV-2 Antibody Prevalence and Associated Factors in COVID-19-Unvaccinated Children: A Cross-sectional Study.** *Pediatr Infect Dis J.* 2026 Aug 1;45(8):e288-e291.
doi: https://doi.org/10.1097/INF.0000000000005210

Editorial comment: This study highlights an important aspect of pediatric COVID-19 epidemiology: among unvaccinated inner-city children, nearly 70% had evidence of prior SARS-CoV-2 infection, underscoring the widespread circulation of the virus during the pandemic. Notably, children living with at least one vaccinated adult had significantly lower rates of SARS-CoV-2 antibodies than those in households without vaccinated adults, suggesting that adult vaccination may have provided indirect protection. In contrast, masking, participation in school or extracurricular activities, household size, and reported household illness were not significantly associated with infection. While the cross-sectional design limits causal inference, these findings reinforce the concept that vaccination benefits extend beyond the individual, helping reduce viral transmission within households and offering indirect protection to children who remain unvaccinated.

14

Qiu L, Pan H, Liang Q, Chen Z, Zhang M, Liu S, Liao M, Chen L, Liu X, Hu J, Li C, Li J, Xu J, Zhuang C, Huang S, Wang W, Han J, Jia J, Chu X, Zhu H, Cheng T, Su Y, Ye X, Quan Y, Wu T, Zhang J, Xia N. **Immunogenicity and Safety of Two-dose Schedules With Different Intervals of an ORF7-deficient Live Vaccine Candidate for Varicella: A Randomized, Double-blind, Controlled, Phase 2b Trial.** *Pediatr Infect Dis J.* 2026 Aug 1;45(8):733-741.
doi: https://doi.org/10.1097/INF.0000000000005184

Editorial comment: The live-attenuated Oka strain varicella vaccine has dramatically reduced the global burden of chickenpox, but its ability to establish latent infection has prompted efforts to develop even safer next-generation vaccines. In this phase 2b trial, the novel live-attenuated v7D vaccine induced a 100% seroconversion rate after two doses, with antibody responses comparable to the licensed Oka vaccine and an excellent safety profile. Most adverse events were mild and transient, and no vaccine-related serious adverse events were reported. Although these findings are encouraging, the true promise of v7D lies in its potential to reduce latent neuronal infection and, ultimately, the risk of herpes zoster—a benefit that will require long-term follow-up and efficacy studies to confirm. If validated, this candidate could represent an important advance in the evolution of varicella vaccination.

15

Ly QT, Tran QK, Lam TNX, Nguyen TND, Huynh MT, Espinoza JL. **Inflammatory Markers as Predictors of Complications in Pediatric Measles: Evidence From a Vietnamese Cohort.** *Pediatr Infect Dis J.* 2026 Aug 1;45(8):e310-e315.
doi: https://doi.org/10.1097/INF.0000000000005219

Editorial comment: Despite being vaccine-preventable, measles continues to cause substantial morbidity, particularly in low-resource settings. This study highlights the value of simple, widely available clinical and laboratory markers for identifying children at greatest risk of complications. Malnutrition emerged as a strong predictor of measles pneumonia, while elevated C-reactive protein and the neutrophil-to-lymphocyte ratio were associated with intestinal infections and prolonged hospitalization. These inexpensive and accessible markers could help clinicians prioritize monitoring and treatment during outbreaks, especially where healthcare resources are limited. The findings also reinforce that preventing measles through high vaccination coverage remains far more effective than managing its often-severe complications.

16

Quipildor MO, Rapetti Salik G, Bonnin FA, Silveti M, Moreno J, Aguilera M, Schamún M, Bravo G, Falco A, Talarico LB. **Perinatal Transmission of Dengue Virus Type 2 in Northern Argentina: A Series of 6 Cases.** *Pediatr Infect Dis J.* 2026 Mar 10.
doi: https://doi.org/10.1097/INF.0000000000005212

Editorial comment: Although dengue is not traditionally associated with congenital infection, vertical transmission is an important and often underrecognized complication during outbreaks. This case series from Argentina demonstrates that maternal dengue infection around the time of delivery can result in symptomatic neonatal disease, including thrombocytopenia, respiratory distress, and even severe dengue with plasma leakage. Fortunately, all infants recovered with supportive care. These findings emphasize the need for heightened clinical suspicion of dengue in pregnant women with acute febrile illness and in newborns presenting with nonspecific symptoms in endemic areas. As dengue continues to expand geographically, increasing awareness among obstetricians and neonatologists—and advancing effective dengue vaccination strategies where appropriate—will be essential to reducing maternal and neonatal morbidity.

17

Locci M, Pardi N. **Immunological mechanisms of mRNA vaccines for infectious diseases.** *Nature.* 2026 Jun;654(8120):892-901.
doi: https://doi.org/10.1038/s41586-026-10599-0

Editorial comment: mRNA-lipid nanoparticle (mRNA-LNP) vaccines transformed the response to COVID-19, preventing millions of deaths worldwide and demonstrating the remarkable potential of this vaccine platform. This review highlights how these vaccines generate robust innate and adaptive immune responses while emphasizing that important questions remain regarding the immunostimulatory role of lipid nanoparticles, the pathways responsible for durable protection, and the relationship between immunogenicity and reactogenicity. Addressing these knowledge gaps will be critical for designing next-generation mRNA vaccines that are both more effective and better tolerated. Beyond COVID-19, continued refinement of mRNA-LNP technology could accelerate the development of vaccines against challenging infectious diseases for which current preventive strategies remain inadequate.

18

Couper LI, Sipin TJ, Sambado S, Rennie Z, Shanebeck KM, Lyberger KP, Collender PPA, Ngo V, Remais JV, MacDonald AJ. **Dengue transmission risk in California under climate and land-use change: a semi-mechanistic modelling study.** *Lancet Reg Health Am.* 2026 May 26;60:101509.
doi: https://doi.org/10.1016/j.lana.2026.101509

Editorial comment: As climate change, urbanization, and international travel continue to reshape the epidemiology of vector-borne diseases, dengue is no longer confined to traditional tropical regions. This important modeling study suggests that nearly 18 million Californians already live in areas with seasonal conditions favorable for local dengue transmission, with another 4 million potentially at risk by mid-century under projected climate and urban growth scenarios. While the overall risk remains seasonal and geographically concentrated, the findings underscore the growing importance of integrated surveillance, rapid identification of travel-associated cases, and sustained mosquito control efforts. For clinicians and public health authorities, dengue should increasingly be considered an emerging domestic health challenge rather than solely an imported disease.

19

Tartof SY, Aliabadi N, Zasowski E, Goodwin G, Slezak JM, Hong V, Frankland TB, Ackerson B, Liu Q, Shaw S, Welsh S, Kapadia B, Spence BC, Davis GS, Lewnard JA, Chowdhry H, Dutro M, Chilson E, Jodar L, Gessner BD, Begier E. **Bivalent RSVpreF effectiveness against RSV-associated hospital or emergency department care over two seasons: a retrospective test-negative case control study**. *Lancet Reg Health Am*. 2026 May 27;60:101520.
doi: https://doi.org/10.1016/j.lana.2026.101520

Editorial comment: Real-world evidence continues to reinforce the value of RSV vaccination in older adults. This two-season study found that the bivalent RSVpreF vaccine provided sustained protection against RSV-related hospitalization and emergency department visits, with vaccine effectiveness remaining above 75% through a second RSV season. Importantly, protection persisted among adults aged ≥75 years, individuals with chronic medical conditions, those with frailty, and across both RSV A and B subtypes. Although effectiveness declined modestly over time—particularly among immunocompromised adults—the findings support the substantial and durable public health benefits of RSV vaccination. These data also highlight the need for continued evaluation of optimal revaccination strategies in populations with impaired immune responses.

20

Flichman DM, Lema JM, Pereson MJ, Espíndola SL, Agote F, Albrecht A, Alter A, Anhel S, Blanco C, Blanco S, Borda M, Bouzon N, Campo C, Carrizo LH, Cettina A, Figueroa Reyes MI, Galeano D, Gallego S, García Plichta A, Luna SG, Marranzino G, Nicolorich MV, Pilar S, Prado A, Rainero K, Rossi A, Romanazzi JS, Spotti M, Martínez AP, Baré P, Di Lello FA. **Dengue seroprevalence and transfusion risk in three regions of viral circulation in Argentina: a cross-sectional study**. *Lancet Reg Health Am*. 2026 May 25;60:101511.
doi: https://doi.org/10.1016/j.lana.2026.101511

Editorial comment: Dengue continues to expand rapidly across Argentina, with this seroprevalence study revealing that more than half of blood donors had anti-DENV IgG antibodies by 2025, a dramatic increase from 23% just two years earlier. The findings suggest that approximately 10.2 million infections occurred during the recent epidemics—far exceeding the 575,000 officially reported cases and highlighting substantial underascertainment. The detection of DENV RNA in blood donors also raises concerns about transfusion-transmitted dengue, particularly in highly affected regions. These data underscore the urgent need for strengthened surveillance, integrated vector control, consideration of targeted vaccination strategies, and enhanced blood safety measures as dengue becomes an increasingly important public health challenge in South America.

21

Kao CM, Bahakel H, Heald-Sargent TA, Minniear TD, Statler VA, Thomas SJ, Weakley KE, Cao Q, Ardura MI, Danziger-Isakov L, Foca M, Herold BC. **Influenza, COVID-19, and RSV Vaccinations for Immunocompromised Children and Household Contacts.** *Pediatrics*. 2026 Aug 1;158(2):e2026075971.
doi: https://doi.org/10.1542/peds.2026-075971

Editorial comment: Immunocompromised children—including transplant recipients, oncology patients, and those receiving immunosuppressive therapies—remain among the populations at greatest risk for severe influenza, COVID-19, and RSV. Yet, despite their vulnerability, vaccine recommendations for these patients are still largely based on evidence from healthy children or immunocompromised adults, highlighting a major gap in pediatric vaccinology. This review underscores the urgent need to improve vaccine uptake in these children and among their close contacts, particularly in the face of increasing vaccine hesitancy and persistent viral circulation. It also emphasizes the importance of optimizing vaccine schedules, formulations, and immunogenicity through dedicated research to provide stronger and longer-lasting protection for this growing high-risk population.

Editor's Corner

THE NEXT CHAPTER OF EBOLA VACCINATION: LESSONS FROM THE 2026 BUNDIBUGYO OUTBREAK

Nearly 50 years after the first recognized Ebola outbreaks in 1976, Ebola virus disease (EVD) remains one of the world's most feared infectious diseases. Characterized by severe hemorrhagic fever, case-fatality rates that can exceed 50%, and the ability to rapidly overwhelm fragile healthcare systems, Ebola continues to pose a significant threat to global health security. The recent 2026 outbreak caused by Bundibugyo ebolavirus (BDBV) serves as a timely reminder that despite remarkable advances in vaccine development, the fight against Ebola is far from over. While effective vaccines now exist against **Zaire ebolavirus (EBOV)**, the species responsible for the devastating West African epidemic of 2014–2016, no licensed vaccine currently provides broad protection against all ebolaviruses. The current outbreak highlights both the extraordinary achievements and the remaining challenges of Ebola vaccinology. [1,2]

From Crisis to Success: The First Generation of Ebola Vaccines

For decades after its discovery, Ebola was considered an almost untouchable target for vaccine development. Sporadic outbreaks limited commercial incentives, and the logistical challenges of conducting clinical trials in outbreak settings slowed progress. The unprecedented West African epidemic changed everything. More than 28,000 cases and 11,000 deaths transformed Ebola from a neglected tropical disease into an international public health emergency. [3]

One of the greatest successes emerging from that crisis was the development of rVSV-ZEBOV (Ervebo®), a live recombinant vesicular stomatitis virus vaccine expressing the glycoprotein of Zaire ebolavirus. Clinical trials demonstrated remarkable efficacy, and ring-vaccination strategies contributed significantly to outbreak control in Guinea and later in the Democratic Republic of the Congo. In 2019, Ervebo® became the first licensed Ebola vaccine, representing a historic milestone in vaccinology. [4,5]

A second licensed strategy followed: the heterologous two-dose regimen consisting of Ad26.ZEBOV (Zabdeno®) and MVA-BN-Filo (Mvabea®). This platform provides durable immunity and is particularly useful for preventive vaccination in high-risk populations. Together, these vaccines transformed preparedness and response capabilities against Zaire Ebola virus disease. [6,7]

Yet the success of these vaccines also revealed an important limitation: they primarily target a single Ebola species.

The Challenge of Multiple Ebolaviruses

The genus *Orthoebolavirus* contains several species capable of causing human disease, including Zaire, Sudan, Bundibugyo, and Taï Forest ebolaviruses. Although these viruses share biological similarities, immune protection against one species does not necessarily confer adequate protection against another. [8]

The 2022 Sudan ebolavirus outbreak in Uganda highlighted this vulnerability. Despite the availability of highly effective vaccines against Zaire ebolavirus, no licensed vaccine existed for Sudan virus. Several candidate vaccines were rapidly evaluated, but the outbreak underscored the dangers of relying on species-specific vaccine approaches. [9]

The current **Bundibugyo ebolavirus (BDBV)** outbreak presents a similar challenge. Bundibugyo virus was first identified during an outbreak in Uganda in 2007 and remains relatively understudied compared with Zaire Ebola virus. Although existing vaccines may provide some degree of cross-reactive immunity, robust evidence supporting protection against **BDBV** is lacking. Consequently, public health authorities continue to rely heavily on traditional outbreak control measures, including surveillance, isolation, contact tracing, infection prevention, and community engagement. [10]

The Emerging Vaccine Pipeline

Recognizing these gaps, researchers have expanded efforts to develop vaccines targeting multiple ebolavirus species.

Several recombinant vesicular stomatitis virus (rVSV) candidates targeting Sudan and Bundibugyo viruses are currently under development. Similarly, adenovirus-vectored platforms are being evaluated for broader filovirus protection. Lessons learned from the rapid development of COVID-19 vaccines have accelerated regulatory pathways and strengthened international collaborations among governments, academic institutions, WHO, and vaccine manufacturers. The Coalition for Epidemic Preparedness Innovations (CEPI) will urgently accelerate development of three investigational vaccines targeting the **BDBV** that has caused a rapidly spreading epidemic in the Democratic Republic of the Congo (DRC) and neighboring Uganda. With no licensed vaccines available for **BDBV** and none in clinical development, CEPI's action reflects the critical need to produce tools to help curtail the outbreak, complementing ongoing public health interventions by affected countries. CEPI will invest in a portfolio of candidates under development from longstanding partners with proven capabilities. These include candidates developed by IAVI; Moderna; and the University of Oxford, which will be manufactured at the Serum Institute of India (SII). As work on these candidates begins, CEPI will continue to evaluate additional promising candidates to strengthen the pipeline, including through

an open Call for Proposals, and expects to announce additional partnerships shortly.

The current outbreak - declared a Public Health Emergency of International Concern (PHEIC) and a Public Health Emergency of Continental Security (PHECS) by the WHO and Africa CDC, respectively - has already caused more than 900 suspected cases and more than 220 suspected deaths, making it the third largest Filovirus outbreak in history. [11,12].

Perhaps the most exciting area of research is the pursuit of multivalent and pan-ebolavirus vaccines. These candidates aim to induce protective immunity against multiple Ebola species simultaneously. Structural biology and immunogen design are helping researchers identify conserved viral epitopes capable of generating broadly neutralizing immune responses. Although still largely in preclinical or early clinical development, these approaches may ultimately overcome the limitations of species-specific vaccines. [13]

The Promise of mRNA Technology

The success of mRNA vaccines during the COVID-19 pandemic has revolutionized vaccine development. The platform offers several advantages highly relevant to Ebola preparedness, including rapid design, scalable manufacturing, and flexibility for updating vaccine compositions in response to emerging threats. [14]

Multiple mRNA-based Ebola vaccine candidates are currently under evaluation. These vaccines can be designed to encode glycoproteins from multiple ebolavirus species, potentially creating multivalent formulations capable of protecting against Zaire, Sudan, Bundibugyo, and other filoviruses simultaneously. Early animal studies have demonstrated promising immunogenicity and protection, although clinical data remain limited. [15]

Beyond antigen design, mRNA technology may significantly shorten the time required to respond to emerging outbreaks. In future epidemics, candidate vaccines could potentially move from genetic sequencing to clinical evaluation within months rather than years, dramatically improving outbreak preparedness.

Beyond Vaccines: The Remaining Challenges

Despite impressive scientific progress, several challenges remain.

First, vaccine availability does not guarantee vaccine access. Outbreaks continue to occur primarily in regions with limited healthcare infrastructure, making rapid deployment difficult. Manufacturing capacity, cold-chain requirements, regulatory processes, and funding remain critical bottlenecks. [16]

Second, surveillance remains essential. Recent discoveries of Bombali ebolavirus and other novel filoviruses in bats demonstrate that our understanding of filovirus diversity remains incomplete. Emerging species could potentially evade existing vaccines and therapeutics. [17]

Third, the duration of protection and correlates of immunity remain incompletely understood. While current vaccines induce robust immune responses, the extent and duration of cross-species protection require further investigation. [18]

Fourth, public trust and community engagement remain indispensable. As demonstrated repeatedly during Ebola outbreaks, even the most effective vaccines cannot succeed without community acceptance and strong public health systems.

Finally, this outbreak—initially confined to the Mongbwalu health zone in Ituri Province, over the last two months, the outbreak has expanded to five provinces (Ituri, North Kivu, South Kivu, Haut-Uélé and Tshopo), now affecting 49 health zones. The outbreak is now the largest Ebola outbreak ever reported in the Democratic Republic of the Congo. As of 30 July 2026, a total of 3605 confirmed cases, including 1587 deaths, have been reported, corresponding to a crude case fatality ratio (CFR) of 44%. The continued increase in cases, expanding geographic spread, and persistently high mortality underscore the rapidly evolving nature of this public health emergency. —serves as a stark reminder of the persistent threat posed by emerging ebolaviruses. The public health risk is amplified by delayed diagnosis resulting from limited access to rapid, reliable point-of-care diagnostic tools, particularly in the resource-limited settings where Ebola outbreaks most

commonly occur. Adding to these challenges, there is currently no licensed vaccine or approved virus-specific therapy for Bundibugyo ebolavirus (BDBV).

Beyond its immediate impact, the outbreak exposes critical vulnerabilities in regional and global epidemic preparedness, including gaps in surveillance systems, laboratory capacity, healthcare workforce readiness, community engagement, outbreak response logistics, and the availability of broad-spectrum medical countermeasures. Collectively, these shortcomings increase the likelihood of delayed outbreak detection, sustained transmission, cross-border spread, and substantial health, social, and economic consequences. The 2026 BDBV outbreak therefore underscores the urgent need to accelerate the development of next-generation, broadly protective Ebola vaccines and therapeutics, while simultaneously strengthening preparedness and response capacities at both national and international levels. [19-23].

Conclusions

The history of Ebola vaccine development represents one of the greatest achievements in modern vaccinology. Within a decade, the global scientific community transformed Ebola from a disease without preventive tools into one for which highly effective vaccines now exist. However, the 2026 Bundibugyo outbreak reminds us that success against a single ebolavirus species does not equate to preparedness against all ebolaviruses.

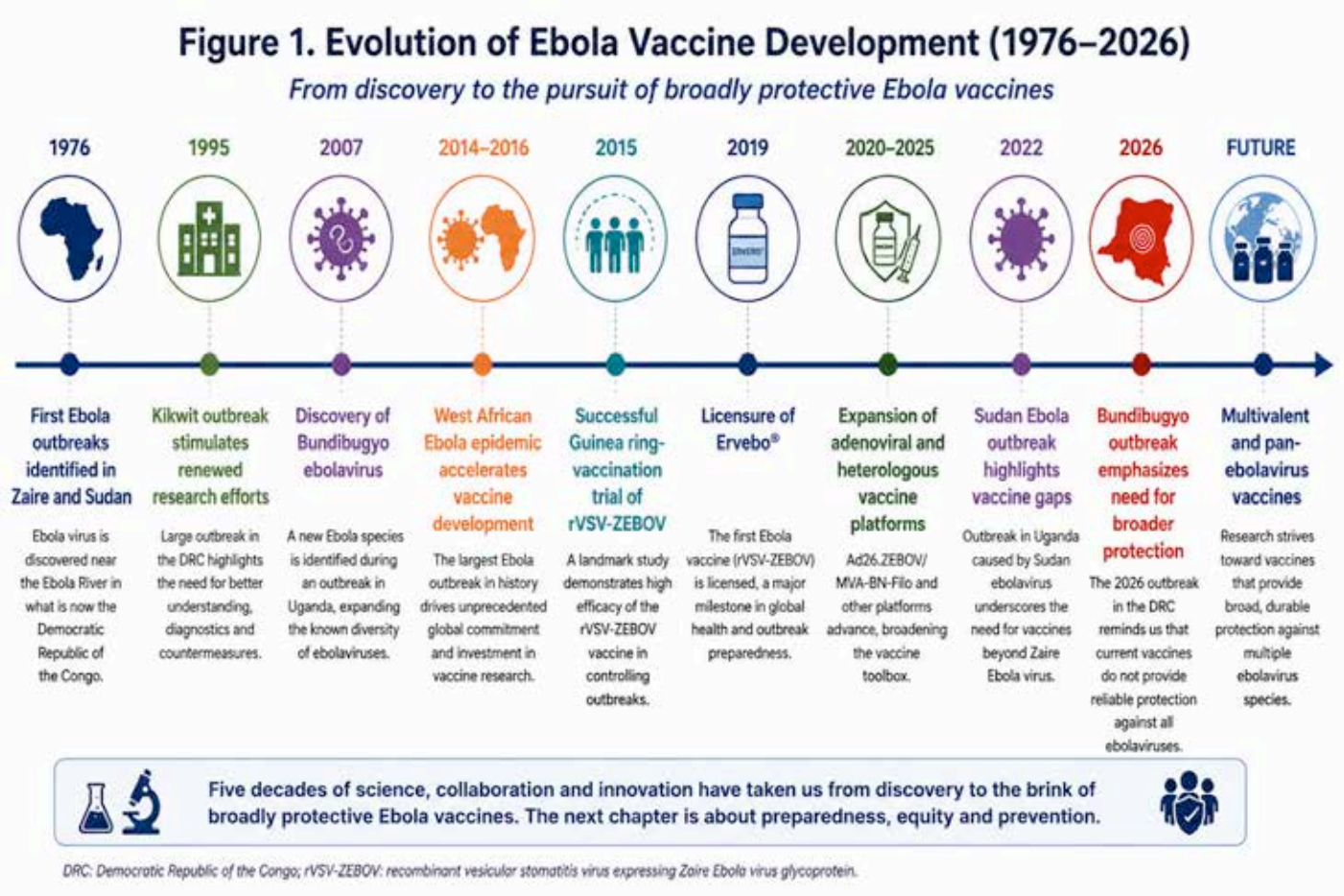
The next chapter of Ebola vaccination must focus on broadly protective, rapidly deployable, and globally accessible vaccines capable of protecting against multiple ebolavirus species. Advances in mRNA technology, multivalent vaccine design, and pan-ebolavirus immunogens offer unprecedented opportunities to achieve this goal.

Importantly, the 2026 outbreak also highlights a reality that cannot be ignored: infectious diseases do not respect borders. In an era of unprecedented global travel, trade, migration, urbanization, and environmental change, an outbreak that begins in a remote region can rapidly spread across countries and continents. Although Ebola has not yet caused a global pandemic on the scale of COVID-19, the repeated cross-border transmission events observed during recent outbreaks demonstrate that the risk is real and cannot be underestimated. The emergence of a more transmissible ebolavirus, or one capable of spreading silently for longer periods before detection, could have profound international consequences.

The ultimate objective is therefore no longer simply to respond to outbreaks—it is to prevent them before they begin. Achieving this goal will require sustained investment in surveillance, diagnostics, therapeutics, and next-generation vaccines, as well as stronger international collaboration to ensure that future Ebola outbreaks remain local public health emergencies rather than global crises.

Table 1. Current and Future Ebola Vaccine Landscape

Vaccine	Platform	Target Species	Status
Ervebo® (rVSV-ZEBOV)	Live recombinant viral vector	Zaire	Licensed
Zabdeno® + Mvabea®	Ad26/MVA heterologous regimen	Zaire	Licensed
cAd3-based vaccines	Adenoviral vector	Sudan, Zaire	Clinical development
rVSV-SUDV	Recombinant viral vector	Sudan	Clinical development
rVSV-BDBV	Recombinant viral vector	Bundibugyo	Preclinical/Early development
Multivalent mRNA vaccines	mRNA-LNP	Multiple species	Preclinical
Pan-ebolavirus vaccines	Various platforms	Multiple species	Research stage



References
1. Feldmann H, Geisbert TW. Ebola haemorrhagic fever. Lancet. 2011 Mar 5;377(9768):849-62. doi: 10.1016/S0140-6736(10)60667-8.
2. Jacob ST, Crozier I, Fischer WA 2nd, Hewlett A, Kraft CS, Vega MA, Soka MJ, Wahl V, Griffiths A, Bollinger L, Kuhn JH. Ebola virus disease. Nat Rev Dis Primers. 2020 Feb 20;6(1):13. doi: 10.1038/s41572-020-0147-3.
3. WHO Ebola Response Team; Aylward B, Barboza P, Bawo L, Bertherat E, Bilivogui P, Blake I, Brennan R, Briand S, Chakauya JM, Chitala K, Conteh RM, Cori A, Croisier A, Dangou JM, Diallo B, Donnelly CA, Dye C, Eckmanns T, Ferguson NM, Formenty P, Fuhrer C, Fukuda K, Garske T, Gasasira A, Gbanyan S, Graaff P, Heleze E, Jambai A, Jombart T, Kasolo F, Kadiobo AM, Keita S, Kertesz D, Koné M, Lane C, Markoff J, Massaquoi M, Mills H, Mulba JM, Musa E, Myhre J, Nasidi A, Nilles E, Nouvellet P, Nshimirimana D, Nuttall I, Nyenswah T, Olu O, Pendergast S, Perea W, Polonsky J, Riley S, Ronveaux O, Sakoba K, Santhana Gopala Krishnan R, Senga M, Shuaib F, Van Kerkhove MD, Vaz R, Wijekoon Kannangarage N, Yoti Z. Ebola virus disease in West Africa--the first 9 months of the epidemic and forward projections. N Engl J Med. 2014 Oct 16;371(16):1481-95. doi: 10.1056/NEJMoa1411100.
4. Henao-Restrepo AM, Camacho A, Longini IM, Watson CH, Edmunds WJ, Egger M, Carroll MW, Dean NE, Diatta I, Doumbia M, Draguez B, Duraffour S, Enwere G, Grais R, Gunther S, Gsell PS, Hossmann S, Watle SV, Kondé MK, Kéïta S, Kone S, Kuisma E, Levine MM, Mandal S, Mauget T, Norheim G, Riveros X, Soumah A, Trelle S, Vicari AS, Røttingen JA, Kieny MP. Efficacy and effectiveness of an rVSV-vectored vaccine in preventing Ebola virus disease: final results from the Guinea ring vaccination, open-label, cluster-randomised trial (Ebola Ça Suffit!). Lancet. 2017 Feb 4;389(10068):505-518. doi: 10.1016/S0140-6736(16)32621-6. Epub 2016 Dec 23. Erratum in: Lancet. 2017 Feb 4;389(10068):504. doi: 10.1016/S0140-6736(16)32633-2. Erratum in: Lancet. 2017 Feb 4;389(10068):504. doi: 10.1016/S0140-6736(17)30210-6.
5. Regules JA, Beigel JH, Paolino KM, Voell J, Castellano AR, Hu Z, Muñoz P, Moon JE, Ruck RC, Bennett JW, Twomey PS, Gutiérrez RL, Remich SA, Hack HR, Wisniewski ML, Josleyn MD, Kwilas SA, Van Deusen N, Mbaya OT, Zhou Y, Stanley DA, Jing W, Smith KS, Shi M, Ledgerwood JE, Graham BS, Sullivan NJ, Jagodzinski LL, Peel SA, Alimonti JB, Hooper JW, Silvera PM, Martin BK, Monath TP, Ramsey WJ, Link CJ, Lane HC, Michael NL, Davey RT Jr, Thomas SJ; rVSVΔG-ZEBOV-GP Study Group. A Recombinant Vesicular Stomatitis Virus Ebola Vaccine. N Engl J Med. 2017 Jan 26;376(4):330-341. doi: 10.1056/NEJMoa1414216.
6. Pollard AJ, Launay O, Lelievre JD, Lacabaratz C, Grande S, Goldstein N, Robinson C, Gaddah A, Bockstal V, Wiedemann A, Leyssen M, Luhn K, Richert L, Bétard C, Gibani MM, Clutterbuck EA, Snape MD, Levy Y, Douoguih M, Thiebaut R; EBOVAC2 EBL2001 study group. Safety and immunogenicity of a two-dose heterologous Ad26.ZEBOV and MVA-BN-Filo Ebola vaccine regimen in adults in Europe (EBOVAC2): a randomised, observer-blind, participant-blind, placebo-controlled, phase 2 trial. Lancet Infect Dis. 2021 Apr;21(4):493-506. doi: 10.1016/S1473-3099(20)30476-X.

7. Anywaine Z, Whitworth H, Kaleebu P, Praygod G, Shukarev G, Manno D, Kapiga S, Grosskurth H, Kalluvya S, Bockstal V, Anumendem D, Luhn K, Robinson C, Douoguih M, Watson-Jones D. Safety and Immunogenicity of a 2-Dose Heterologous Vaccination Regimen With Ad26.ZEBOV and MVA-BN-Filo Ebola Vaccines: 12-Month Data From a Phase 1 Randomized Clinical Trial in Uganda and Tanzania. J Infect Dis. 2019 Jun 5;220(1):46-56. doi: 10.1093/infdis/jiz070.
8. Walker PJ, Siddell SG, Lefkowitz EJ, Mushegian AR, Dempsey DM, Dutilh BE, Harrach B, Harrison RL, Hendrickson RC, Junglen S, Knowles NJ, Kropinski AM, Krupovic M, Kuhn JH, Nibert M, Rubino L, Sabanadzovic S, Simmonds P, Varsani A, Zerbini FM, Davison AJ. Changes to virus taxonomy and the International Code of Virus Classification and Nomenclature ratified by the International Committee on Taxonomy of Viruses (2019). Arch Virol. 2019 Sep;164(9):2417-2429. doi: 10.1007/s00705-019-04306-w.
9. Kabami Z, Ario AR, Harris JR, Ninsiima M, Ahirirwe SR, Ocero JRA, Atwine D, Mwebesa HG, Kyabayinze DJ, Muruta AN, Kagirita A, Tegegn Y, Nanyunja M, Kizito SN, Kadobera D, Kwesiga B, Gidudu S, Migisha R, Makumbi I, Eurien D, Elyanu PJ, Ndyabakira A, Naiga HN, Zalwango JF, Agaba B, Kawungezi PC, Zalwango MG, King P, Simbwa BN, Akunzirwe R, Wanyana MW, Zavuga R, Kiggundu T; Uganda Ebola Response Team. Ebola disease outbreak caused by the Sudan virus in Uganda, 2022: a descriptive epidemiological study. Lancet Glob Health. 2024 Oct;12(10):e1684-e1692. doi: 10.1016/S2214-109X(24)00260-2.
10. Towner JS, Sealy TK, Khristova ML, Albariño CG, Conlan S, Reeder SA, Quan PL, Lipkin WI, Downing R, Tappero JW, Okware S, Lutwama J, Bakamutumaho B, Kayiwa J, Comer JA, Rollin PE, Ksiazek TG, Nichol ST. Newly discovered ebola virus associated with hemorrhagic fever outbreak in Uganda. PLoS Pathog. 2008 Nov;4(11):e1000212. doi: 10.1371/journal.ppat.1000212.
11. CEPI fast-tracks three Bundibugyo ebolavirus vaccine candidates. https://cepi.net/cepi-fast-tracks-three-bundibugyo-ebolavirus-vaccine-candidates.
12. Ebola disease caused by Bundibugyo virus, Democratic Republic of the Congo & Uganda. https://www.who.int/emergencies/disease-outbreak-news/item/2026-DON605.
13.
14. Xu D, Powell AE, Utz A, Sanyal M, Do J, Patten JJ, Moliva JI, Sullivan NJ, Davey RA, Kim PS. Design of universal Ebola virus vaccine candidates via immunofocusing. Proc Natl Acad Sci U S A. 2024 Feb 13;121(7):e2316960121. doi: 10.1073/pnas.2316960121.
15. Pardi N, Hogan MJ, Porter FW, Weissman D. mRNA vaccines - a new era in vaccinology. Nat Rev Drug Discov. 2018 Apr;17(4):261-279. doi: 10.1038/nrd.2017.243.
16. Schäfer A, Marzi A, Furuyama W, Catanzaro NJ, Nguyen C, Haddock E, Feldmann F, Meade-White K, Thomas T, Hubbard ML, Gully KL, Leist SR, Hock P, Bell TA, De la Cruz GE, Midkiff BR, Martinez DR, Shaw GD, Miller DR, Vernon MJ, Graham RL, Cowley DO, Montgomery SA, Schughart K, de Villena FPM, Wilkerson GK, Ferris MT, Feldmann H, Baric RS. Mapping of susceptibility loci for Ebola virus pathogenesis in mice. Cell Rep. 2024 May 28;43(5):114127. doi: 10.1016/j.celrep.2024.114127.
17. Frieden TR, Damon I, Bell BP, Kenyon T, Nichol S. Ebola 2014--new challenges, new global response and responsibility. N Engl J Med. 2014 Sep 25;371(13):1177-80. doi: 10.1056/NEJMp1409903.
18. Goldstein T, Anthony SJ, Gbakima A, Bird BH, Bangura J, Tremeau-Bravard A, Belaganahalli MN, Wells HL, Dhanota JK, Liang E, Grodus M, Jangra RK, DeJesus VA, Lasso G, Smith BR, Jambai A, Kamara BO, Kamara S, Bangura W, Monagin C, Shapira S, Johnson CK, Saylors K, Rubin EM, Chandran K, Lipkin WI, Mazet JAK. The discovery of Bombali virus adds further support for bats as hosts of ebolaviruses. Nat Microbiol. 2018 Oct;3(10):1084-1089. doi: 10.1038/s41564-018-0227-2. Epub 2018 Aug 27. Erratum in: Nat Microbiol. 2018 Dec;3(12):1486. doi: 10.1038/s41564-018-0315-3.
19. Kahusu CM, Peckeu-Abboud L, Goovaerts O, Matungulu É, Heyndrickx L, Ariën KK, Oostvogels S, Mubiala A, Milua S, Mbilizi IM, Shamamba S, Bayoka N, Ishara-Nshombo E, Tshimanga C, Nkuba A, Peeters M, Bazola B, Sabue J, Ngimba M, Mukanya N, Tshita P, Kinzungu C, Kasumba DM, Tshiani O, Mbala-Kingebeni P, Liesenborghs L, Mukadi-Bamuleka D, Mulangu S, Kavunga-Membo H, Adriaensen W. Long-term antibody responses to the Ebola virus and the vaccine vector after rVSV-ZEBOV vaccination in DRC. Vaccine. 2025 Aug 30;62:127537. doi: 10.1016/j.vaccine.2025.127537. Epub 2025 Jul 23. Erratum in: Vaccine. 2025 Oct 3;64:127719. doi: 10.1016/j.vaccine.2025.127719.
20. Nachega JB, Mbala-Kingebeni P, Mulangu S, Ndembi N, Preiser W, Skinner D, Sam-Agudu NA, Ntoumi F, Tegally H, Baxter C, Oliveira T, Bosa HK, Kaleebu P, Kallay O, Uthman OA, Mills EJ, Rosenthal PJ, Zumla A, Muyembe-Tamfum JJ. Ebola outbreak caused by Bundibugyo virus: challenges and priorities for epidemic preparedness and response. Lancet. 2026 Jun 9:S0140-6736(26)01141-4. doi: 10.1016/S0140-6736(26)01141-4.
21. Bosa HK, Wayengera M, Kagirita A, Lubwama B, Muruta A, Nabadda S, Nsawotebba A, Olaro C, Atwine D, Aceng JR. Cross-border transmission of Ebola virus disease caused by Bundibugyo virus into Uganda, 2026. Lancet Infect Dis. 2026 Jun 1:S1473-3099(26)00288-4. doi: 10.1016/S1473-3099(26)00288-4.
22. Belizaire MR, Chamla D, Janabi M. Bundibugyo virus disease outbreak in DR Congo: current trajectory and potential risk for a Pandemic Emergency. Lancet Infect Dis. 2026 Jun 5:S1473-3099(26)00298-7. doi: 10.1016/S1473-3099(26)00298-7.
23. WHO: Ebola disease caused by Bundibugyo virus - Democratic Republic of the Congo. https://www.who.int/emergencies/disease-outbreak-news/item/2026-DON614.
24. WHO calls for Phase III Ervebo vaccine trial amid Bundibugyo Ebola outbreak. https://www.clinicaltrialsarena.com/news/who-calls-for-phase-iii-ervebo-vaccine-trial-amid-bundibugyo-ebola-outbreak/.

Best Practice

INFLUENZA VACCINATION FOR THE 2026–2027 NORTHERN HEMISPHERE SEASON: UPDATED WHO RECOMMENDATIONS

Influenza remains one of the world's most important vaccine-preventable respiratory diseases, causing substantial morbidity and mortality every year despite the availability of safe and effective vaccines. According to the World Health Organization (WHO), seasonal influenza epidemics result in approximately one billion infections annually, including 3–5 million cases of severe illness and 290,000–650,000 respiratory deaths worldwide. Beyond its direct health impact, influenza places a considerable burden on healthcare systems through increased outpatient visits, hospitalizations, and absenteeism from work and school.

The epidemiology of influenza is highly dynamic. Influenza A viruses, particularly the A(H1N1) pdm09 and A(H3N2) subtypes, are responsible for most seasonal epidemics and are characterized by continuous antigenic drift, allowing them to evade pre-existing immunity. Influenza B viruses, now represented almost exclusively by the B/Victoria lineage following the apparent disappearance of the B/Yamagata lineage, continue to contribute significantly to disease burden, especially in children. The timing, intensity, and dominant circulating strains vary from season to season and across geographic regions, underscoring the importance of continuous global surveillance.

To address these ongoing viral changes, the WHO Global Influenza Surveillance and Response System (GISRS)—a network of laboratories operating in more than 120 countries—continuously monitors circulating influenza viruses throughout the year. Based on these data, WHO convenes experts twice annually to recommend the optimal vaccine composition for the Northern and Southern Hemisphere influenza seasons.

Updated Vaccine Composition

For the **2026–2027 Northern Hemisphere influenza season**, WHO continues to recommend **trivalent influenza vaccines**, reflecting the global transition away from quadrivalent formulations after the apparent disappearance of the B/Yamagata lineage.

For **egg-based vaccines**, the recommended strains are:

- **A/Missouri/11/2025 (H1N1)pdm09-like virus**
- **A/Darwin/1454/2025 (H3N2)-like virus**
- **B/Tokyo/EIS13-175/2025 (B/Victoria lineage)-like virus**

For **cell culture-, recombinant protein-, and nucleic acid-based vaccines**, the recommended strains are:

- **A/Missouri/11/2025 (H1N1)pdm09-like virus**
- **A/Darwin/1415/2025 (H3N2)-like virus**
- **B/Pennsylvania/14/2025 (B/Victoria lineage)-like virus**

The slight differences between egg-based and non-egg vaccine strains reflect manufacturing characteristics and antigenic optimization for the different vaccine production platforms.

Why These Changes Matter

The 2026–2027 formulation represents an important update, with **all three vaccine components replaced** compared with the previous Northern Hemisphere season. These changes reflect the ongoing evolution of circulating influenza viruses, particularly the emergence of new antigenic variants within the A(H3N2) lineage.

Although influenza vaccine effectiveness varies from season to season depending on the match between vaccine and circulating strains, annual vaccination consistently reduces the risk of severe disease, hospitalization, intensive care admission, and influenza-associated death. Even in years with moderate effectiveness against infection, vaccination continues to provide meaningful protection against serious clinical outcomes.

Who Should Be Vaccinated?

WHO continues to recommend annual influenza vaccination, prioritizing individuals at greatest risk of severe disease, including:

- Older adults
- Pregnant women
- Young children
- Individuals with chronic medical conditions
- Immunocompromised patients
- Healthcare workers

Countries should adapt their vaccination strategies according to local epidemiology, healthcare priorities, vaccine availability, and national immunization policies.

Looking Ahead

Influenza viruses continue to evolve rapidly, making annual surveillance and vaccine updates essential. The continued use of **trivalent influenza vaccines**, combined with updated viral strains selected through the WHO GISRS network, represents an evidence-based strategy to maximize protection against the viruses most likely to circulate during the upcoming season.

As influenza increasingly co-circulates with SARS-CoV-2 and respiratory syncytial virus (RSV), annual influenza vaccination remains a cornerstone of respiratory disease prevention.

Maintaining high vaccine coverage among high-risk populations and healthcare workers will continue to be critical for reducing severe illness and alleviating pressure on healthcare systems.

References
1. World Health Organization. Recommended composition of influenza virus vaccines for use in the 2026–2027 Northern Hemisphere influenza season. https://www.who.int/news/item/27-02-2026-recommendations-for-influenza-vaccine-composition-for-the-2026-2027-northern-hemisphere-season.
2. World Health Organization. Influenza (Seasonal). https://www.emro.who.int/health-topics/influenza/influenza-seasonal.html.
3. World Health Organization. Global Influenza Programme (GISRS). https://www.who.int/initiatives/global-influenza-surveillance-and-response-system.
4. U.S. Food and Drug Administration. Influenza Vaccine Composition for the 2026–2027 U.S. Influenza Season. https://www.fda.gov/vaccines-blood-biologics/vaccines/influenza-vaccine-composition-2026-2027-us-influenza-season.
5. Centers for Disease Control and Prevention. Seasonal Influenza (Flu). https://www.cdc.gov/flu/prevention/index.html.
6. EU recommendations for 2026/2027 seasonal flu vaccine composition.
7. https://www.ema.europa.eu/en/news/eu-recommendations-2026-2027-seasonal-flu-vaccine-composition.

Guest Contributors

HEALTH ETHICS AS THE FOUNDATION OF TRUST

Transparency, Accountability and Equitable Public-Private Collaboration empower the Vaccine Ecosystem

By Felicitas Colombo, MPA - Public Affairs, Intelligethics

Vaccines represent one of humanity's greatest public health achievements. Since the establishment of the World Health Organization's Expanded Programme on Immunization (EPI) in 1974, vaccination has saved an estimated **154 million lives** over the past five decades, making immunization one of the most successful public health interventions in history.[1]

Vaccination has prevented millions of deaths annually, eliminated smallpox, brought polio to the brink of eradication, and dramatically reduced the burden of diseases such as measles, meningitis, hepatitis B, pneumococcal disease, rotavirus, and human papillomavirus (HPV). Yet unlike many medical innovations, vaccines depend on something that cannot be manufactured in a laboratory: **trust.**

Trust is built on science but sustained by ethics.

As the global vaccine ecosystem becomes increasingly interconnected -with governments, biotechnology companies, pharmaceutical manufacturers, academia, international organizations, philanthropic foundations, healthcare professionals, and civil society working together- ethical conduct has emerged as a strategic determinant of successful immunization programmes. Scientific excellence alone is no longer sufficient. Transparency, accountability, equity, and integrity now define whether innovations translate into public confidence and high vaccination coverage.

The COVID-19 pandemic is a good example of the extraordinary capabilities of public-private collaboration while simultaneously exposing vulnerabilities that continue to shape vaccine confidence worldwide. It reminded us that ethical leadership is not an abstract philosophical concept but a practical necessity for global health security.

Ethics Beyond Compliance

Ethics is often mistakenly viewed as synonymous with regulatory compliance. In reality, ethical leadership extends well beyond legal obligations.

Health ethics is grounded in universally recognized principles including beneficence, non-maleficence, justice, autonomy, transparency, solidarity, and accountability.[2] These principles guide decisions that affect not only individual patients but also entire populations.

Vaccination differs fundamentally from many therapeutic interventions because it generates both personal protection and collective benefit through herd immunity. Consequently, ethical decision-making extends beyond the physician-patient relationship to encompass resource allocation, procurement, manufacturing priorities, emergency authorizations, communication strategies, surveillance, and equitable access.

Every stakeholder within the vaccine ecosystem shares responsibility for protecting public confidence.

Public-Private Partnerships require Public Trust

The rapid development of COVID-19 vaccines demonstrated what can be achieved when governments, research institutions, regulators, manufacturers, multilateral organizations, and investors work toward a common objective.

Within a year of the identification of SARS-CoV-2, multiple highly effective vaccines had been developed, evaluated, authorized, manufactured, and distributed globally -an unprecedented scientific accomplishment made possible through decades of investment in vaccine research and robust public-private partnerships.[3] However, the pandemic also illustrated that speed must never compromise transparency.

Emergency Use Authorizations required regulators to communicate evolving evidence clearly and transparently, while manufacturers navigated heightened attention to clinical trial data, manufacturing quality, adverse event reporting, and production capacity. The lesson is clear: accelerated innovation demands equally strong ethical governance.

Public-private partnerships succeed only when each participant maintains scientific independence, transparent decision-making, clearly managed conflicts of interest, and open communication regarding risks and uncertainties.[2]

When Ethics Fail, Public Health Suffers

History offers numerous examples of how unethical conduct can undermine decades of scientific progress. Many examples come to mind. And what they all have in common is that the damage continues until today.

Consequences extend far beyond one isolated incident, illustrating how scientific or institutional misconduct creates long-lasting public health harm.

Ethical failures need not involve outright fraud. Selective reporting of positive findings, delayed disclosure of safety information, inadequate informed consent, undisclosed conflicts of interest, misleading communication, or inequitable distribution policies can all weaken confidence in immunization programmes.[2]

Trust, once lost, can require generations to rebuild.

Transparency is the New Standard

Today's healthcare professionals expect more than regulatory approval… they expect openness.

Clinical trial protocols, safety monitoring plans, pharmacovigilance data, effectiveness studies, benefit-risk assessments, and post-marketing surveillance increasingly shape professional confidence. Transparency should also characterize relationships between industry, governments, academic institutions, and international organizations.[2]

Public-private partnerships inevitably involve financial investments, intellectual property considerations, and shared governance. Transparent disclosure of funding arrangements, advisory roles, procurement processes, and potential conflicts of interest strengthens the credibility of scientific collaboration.

The willingness to acknowledge uncertainty also represents ethical leadership. Scientific knowledge evolves continuously, particularly during emerging infectious disease outbreaks. Communicating evolving evidence honestly reinforces confidence because it demonstrates that decisions are guided by data rather than ideology.

Equity: an Ethical and Strategic Imperative

The COVID-19 pandemic highlighted one of the greatest ethical challenges in modern vaccinology: unequal access.

While many high-income countries rapidly secured sufficient doses to immunize their populations several times over, numerous low- and middle-income countries waited months for meaningful access despite facing severe disease burdens. This imbalance exposed weaknesses in global manufacturing capacity, supply chains, procurement mechanisms, and technology transfer.

Ethical vaccine ecosystems should prioritize equitable access through regional manufacturing, diversified supply chains, voluntary technology transfer, sustainable financing, and stronger regulatory systems.

Initiatives led by WHO, Gavi, CEPI, UNICEF, and regional organizations have demonstrated that global collaboration can substantially improve vaccine access.[1,8,9] However, long-term resilience requires building manufacturing capacity closer to where vaccines are needed. Latin America and Africa have increasingly recognized this strategic priority.

Developing regional manufacturing hubs is no longer simply an economic objective, it is an ethical commitment to reducing dependency, improving preparedness, and ensuring more

equitable access during future pandemics.

Ethics in the Era of Pandemic Preparedness

Negotiations surrounding the WHO Pandemic Agreement have reinforced the central role of ethics in global health governance.[10]

Discussions regarding equitable access to pathogens, benefit-sharing mechanisms, technology transfer, surveillance, and manufacturing capacity all reflect broader ethical questions concerning solidarity and shared responsibility.

Similarly, initiatives to strengthen regional regulatory authorities and organizations such as the African Medicines Agency represent important efforts to improve accountability, regulatory harmonization, and equitable access across regions.[11]

Preparedness cannot be measured solely by stockpiles or manufacturing capacity. It must also be measured by the strength of ethical governance before the next emergency occurs.

Countries that establish transparent regulatory systems, trusted communication strategies, resilient public-private partnerships, and equitable procurement mechanisms will be better positioned to respond effectively to future outbreaks.[3]

Artificial Intelligence and New Ethical Frontiers

The vaccine ecosystem is entering another period of rapid transformation… it's called Artificial Intelligence.

AI is accelerating antigen discovery, optimizing clinical trial design, improving pharmacovigilance, and strengthening outbreak prediction. Genomic surveillance is enabling faster identification of emerging pathogens, while messenger RNA technologies continue expanding beyond COVID-19 toward influenza, respiratory syncytial virus (RSV), cancer therapeutics, and neglected tropical diseases.[12]

All these innovations bring new ethical questions.

Who owns health data used to train AI systems? How should algorithmic bias be addressed? How can genomic information be protected while enabling scientific collaboration? What constitutes equitable access to next-generation vaccine technologies? How do I discern which information is accurate?

And, in an increasingly complex information environment… Who can we trust?

Looking Ahead

The future of immunization will depend upon unprecedented collaboration between governments, industry, academia, multilateral organizations, and healthcare professionals.

Scientific innovation will undoubtedly continue producing safer, more effective, and increasingly sophisticated vaccines. However, innovation alone will not determine success. As science advances, stakeholders' commitment to ethical principles must advance alongside.

The defining challenge of the coming decade will be sustaining public trust amid rapid technological change, evolving misinformation, geopolitical uncertainty, and persistent inequities.

Ethics provides the foundation upon which this trust can be built.

References

1. World Health Organization. *Expanded Programme on Immunization (EPI): 50 years of saving lives*. Geneva: WHO; 2024.
2. World Medical Association. *Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Subjects*. 2024 Revision.
3. World Health Organization. *COVID-19 Strategic Preparedness and Response Reports*. Geneva: WHO; 2021–2023.
4. Godlee F, Smith J, Marcovitch H. Wakefield's article linking MMR vaccine and autism was fraudulent. *BMJ*. 2011;342:c7452.
5. Hviid A, Hansen JV, Frisch M, Melbye M. Measles, mumps, rubella vaccination and autism: a nationwide cohort study. *Ann Intern Med*. 2019;170(8):513–520.
6. Omer SB, Salmon DA, Orenstein WA, deHart MP, Halsey N. Vaccine refusal, mandatory immunization, and the risks of vaccine-preventable diseases. *N Engl J Med*. 2009;360:1981–1988.
7. Emanuel EJ, Wendler D, Grady C. What makes clinical research ethical? *JAMA*. 2000;283(20):2701–2711.
8. Gavi, the Vaccine Alliance. *2026–2030 Strategy*. Geneva: Gavi.
9. Coalition for Epidemic Preparedness Innovations (CEPI). *The 100 Days Mission*. Oslo: CEPI.
10. World Health Assembly. *WHO Pandemic Agreement*. Geneva: WHO; 2025.
11. African Union. *Agreement Establishing the African Medicines Agency (AMA)*. Addis Ababa: African Union.
12. World Health Organization. *Ethics and Governance of Artificial Intelligence for Health*. Geneva: WHO; 2021.
13. Larson HJ. *The State of Vaccine Confidence*. Various annual reports, Vaccine Confidence Project, London School of Hygiene & Tropical Medicine.

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.

Chief Editor

Enrique Chacon-Cruz, M.D., MSc
Think Vaccines, LLC

Managing Editor

Felicitas Colombo, MPA
Intelligethics, LLC

ISSN: 2997-2833

For any information required, please write to:
info@vaccinesbeat.org

Visit: https://vaccinesbeat.org

SPONSORS

PARTNERS