

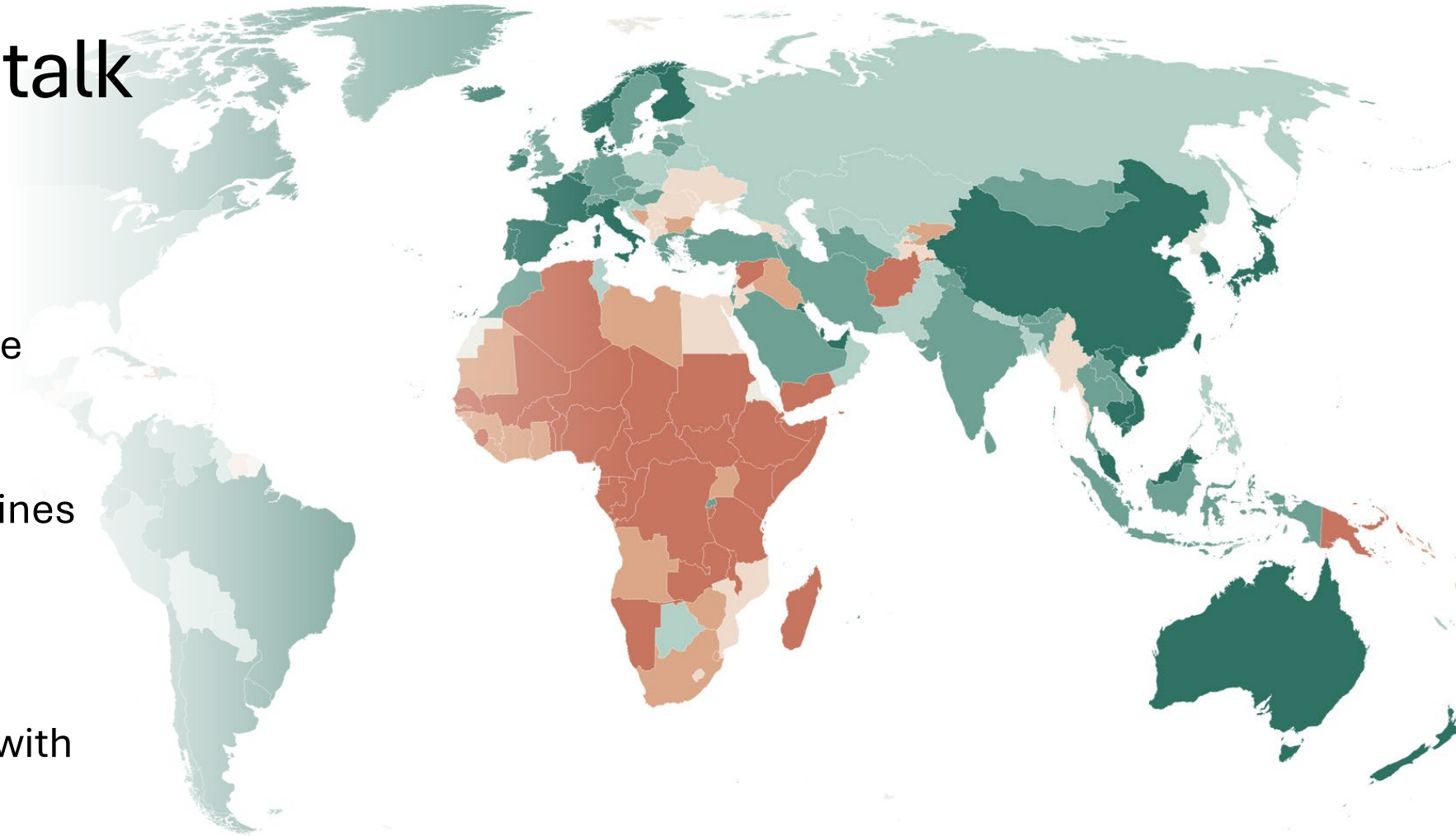
GLOBAL VACCINATION: PROGRESS & CHALLENGES

**Current programs,
obstacles, and future
directions**



What will this talk include?

- Quick reminder: what are vaccines?
- What is the worldwide situation regarding vaccines and immunization?
- What are some vaccine inequities and why?
- What's coming globally with respect to vaccines?



Share of population receiving at least one dose



20% 35% 50% 65% 80%

First documented innoculation

- May 14, 1796. English physician Edward Jenner injects cow pox (a milder form of smallpox) into a healthy pauper boy. The word “vaccine” originates based on the Latin “vacca” for cow



Two types of vaccinations

- Preventive
 - Smallpox
 - Polio
 - Measles
 - Hepatitis B
 - HPV
 - DTP/DTaP (98% protection against Diphtheria (breathing/heart issues), Tetanus (lockjaw), and Pertussis (severe whooping cough).)
- Mitigation
 - Influenza
 - COVID-19
 - mpox



MAJOR VACCINATION ORGANIZATIONS



World Health Organization (WHO)

Sets global health standards and provides technical vaccination guidance.



Gavi, the Vaccine Alliance

Mobilizes funding and negotiates vaccine prices to expand access.



UNICEF

Procures and delivers vaccines, strengthening logistics for children.



Collaboration & Partnerships

Aligns governments and partners to advance equitable vaccine access.

KEY GLOBAL VACCINES

Measles Vaccine

73% decline in measles deaths (2000–2018). Prevents outbreaks at 95% coverage.

Tetanus Vaccine

Protects newborns and mothers from tetanus.

Polio Vaccine

Near-eradication of polio worldwide. Protects against paralysis.

Pertussis Vaccine

Reduces whooping cough cases. Safeguards infants.

Diphtheria Vaccine

Prevents fatal respiratory disease. Core childhood vaccine.

COVID-19, Pneumococcal, Rotavirus Vaccines

Lowered mortality from COVID-19, pneumonia, and diarrhea.

VACCINATION IMPACT PILLARS



Health Benefits

Lowers disease rates, strengthens herd immunity, and reduces community spread—protecting vulnerable groups.



Educational Benefits

Reduces illness-related absences and helps support cognitive growth by keeping children healthier.



Economic Benefits

Cuts healthcare costs and boosts productivity by reducing disease burden on families and systems.

GOVERNMENTS & NGOS

Regulatory Frameworks

Governments set vaccination policy and safety standards.

Public Health Infrastructure

Governments fund clinics, logistics, and core delivery systems.

Community Outreach

NGOs build trust, raise awareness, and address hesitancy.

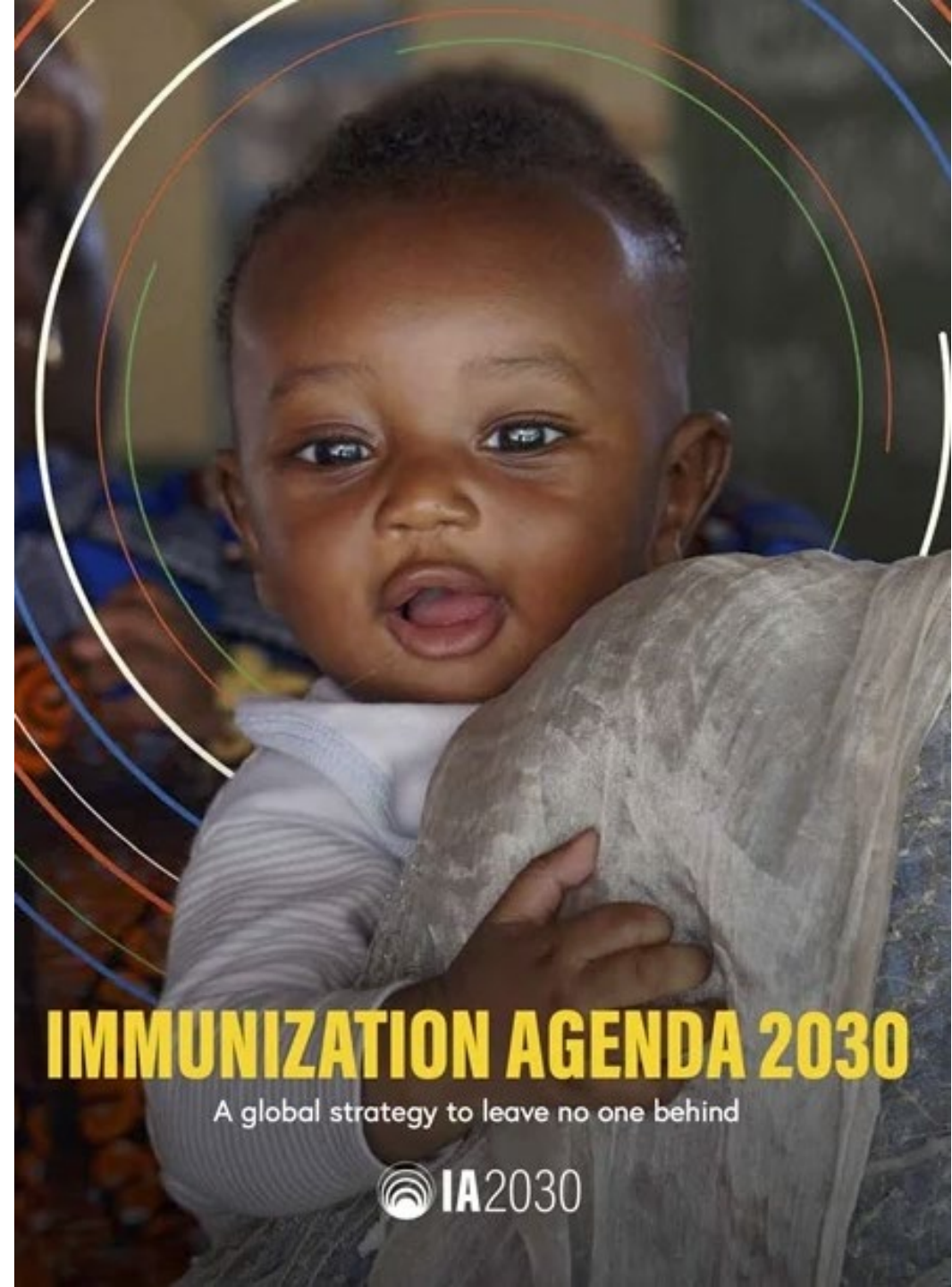
Training & Partnerships

Joint programs strengthen training and delivery reliability.



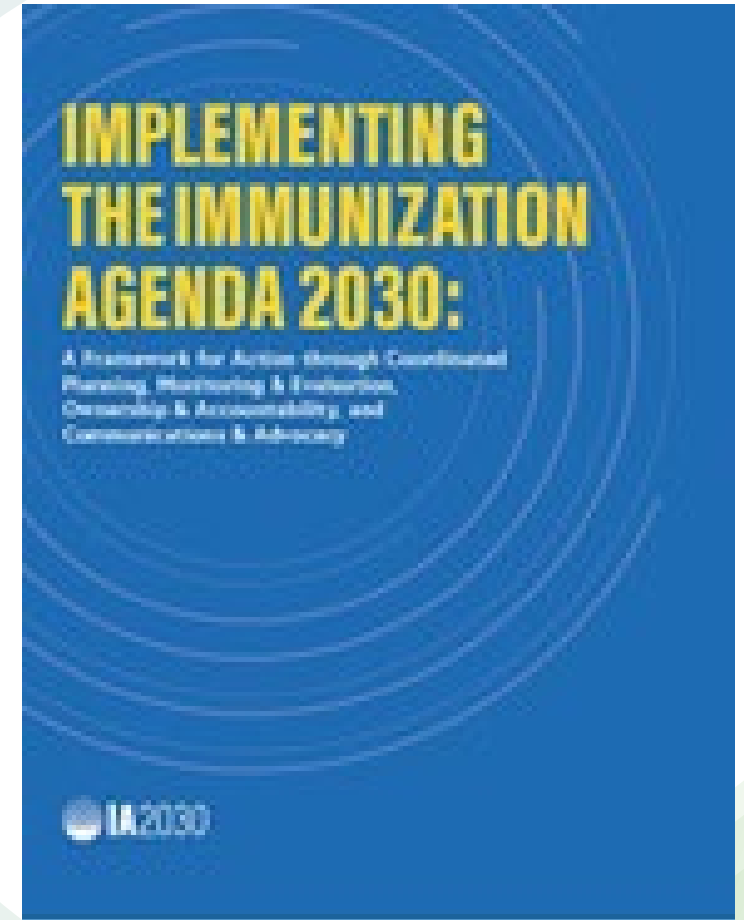
WHO Global Vaccination Planning

- Key Vaccines: The [World Health Organization](#) (WHO) recommends 14 vaccines, including BCG (tuberculosis), diphtheria, polio, measles, HepB, and HPV.
- Successes: Smallpox was officially declared eradicated worldwide on May 8, 1980, by the 33rd World Health Assembly, making it the first and only human disease to be completely eliminated
- Successes: Polio is on the verge of eradication, with cases reduced by 99% since 1988.
- Immunization Agenda 2030: IA2030 sets an ambitious, overarching global vision and strategy for vaccines and immunization for the decade 2021–2030
- Challenge: The COVID-19 pandemic disrupted routine immunizations, leaving 1.4 million more "zero-dose" children in 2024 compared to pre-pandemic levels.



Key Facts

- Globally in 2024, there were 14.3 million children missing out on any vaccination – so-called zero-dose children.
- Global coverage for the first dose of HPV vaccine in girls grew from 27% in 2023 to 31% in 2024.
- Coverage of yellow fever vaccine in the countries at risk of it is 52%, well below the recommended 80%.



INCREASING VACCINATION RATES

86%

DPT COVERAGE IN 2019 (UP FROM 72% IN 2000)

Expanded immunization is linked to ~50% lower under-five mortality, but gaps persist in conflict and poverty.

Measles – Successes and Challenges

- Before measles vaccines were introduced in the 1960s, measles was a leading cause of child morbidity and mortality worldwide, responsible for more than 2 million deaths annually.
- Between 2000 and 2018, stronger health systems and increased measles vaccination coverage resulted in a 73% global decrease in mortality.
- The proportion of children receiving a first dose of measles vaccine was 84% in 2024, still not at the 2019 level of 86%.
- Regional elimination has not, however, been achieved or sustained, and an alarming resurgence in measles cases and deaths has been seen around the world in recent years

• Source: WHO IA2030



DISEASE ERADICATION SUCCESSES

1980

SMALLPOX ERADICATED

Landmark global vaccination win; cases: Smallpox 0, Polio 350k, Measles 873k.

2000

MEASLES TURNING POINT

Baseline for sustained campaigns; measles deaths down 73% since 2000.

2023

POLIO NEARLY ENDED

>99% decline; endemic transmission in two countries; cases: Polio 5k, Measles 236k.

Global Polio Eradication Initiative

- Launched in 1988, GPEI is co-led by WHO in partnership with Rotary International, the US CDC, UNICEF, the Gates Foundation, and Gavi, The Vaccine Alliance
- Polio paralyzed or killed over half a million people worldwide every year at its peak in the 1940s and 1950s
- Global incidence of polio has decreased by 99.9% since GPEI's foundation. An estimated 20 million people today are walking who would otherwise have been paralyzed by the disease, and more than 1.5 million people are alive, whose lives would otherwise have been lost.
- Source: <https://polioeradication.org/who-we-are/>



Polio elimination threatened by cutbacks

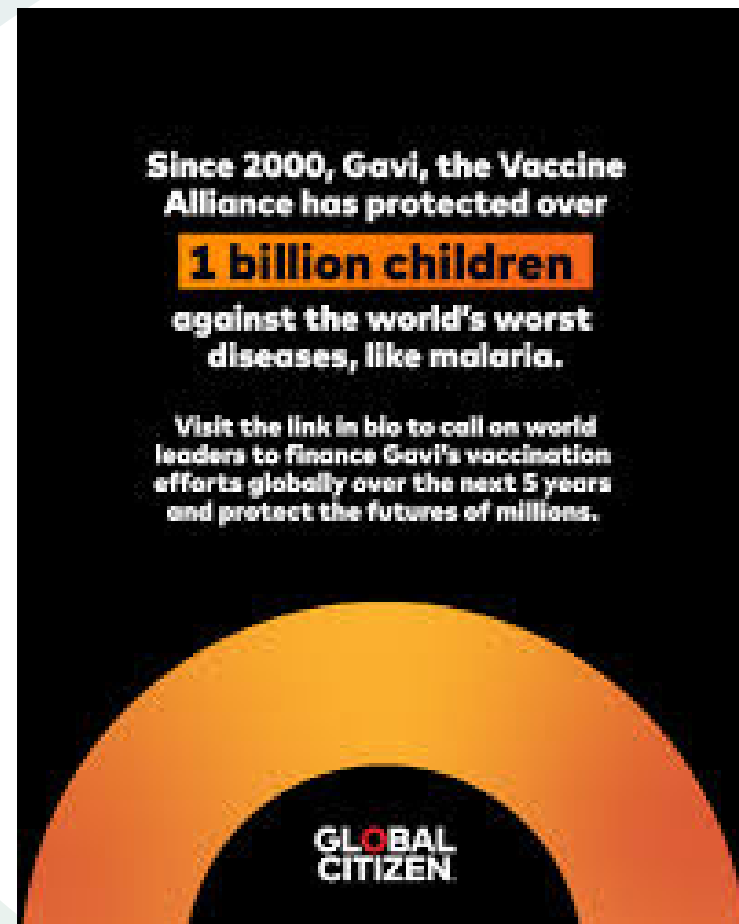
- Cases decreased from an approximately 350,000 cases in 1998 in more than 125 endemic countries to 12 reported cases in 2023
- USAID cuts included \$131 million grant to UNICEF's polio immunization program, which paid for planning, logistics and delivery of vaccines to millions of children
- In 2024, wild poliovirus type 1 remains in two countries: Pakistan and Afghanistan
- “We are at a tipping point. Either we invest now to finish the job or risk a global resurgence.”

U.S. Terminates Funding for Polio, H.I.V., Malaria and Nutrition Programs Around the World

- Source: New York Times, Feb 27, 2025

Gavi – Global Alliance for Vaccines and Immunization

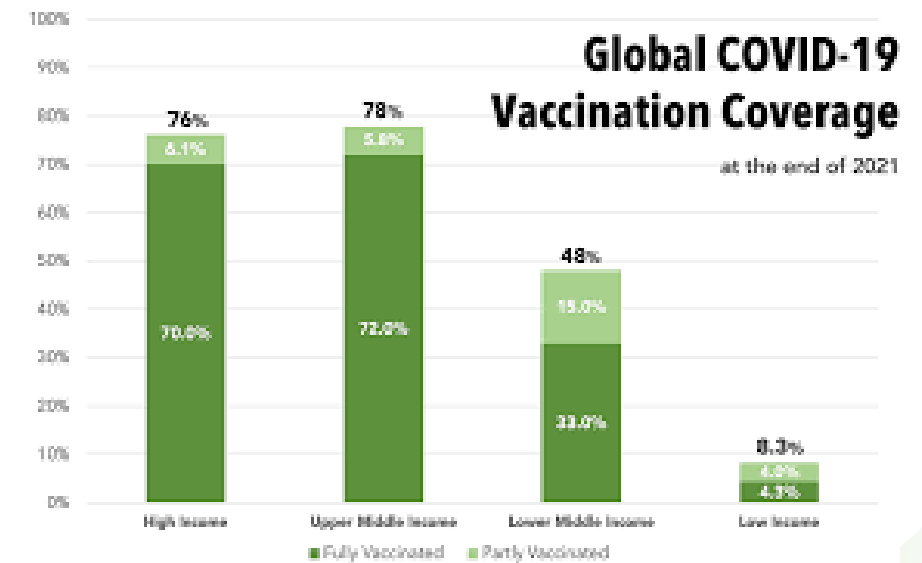
- Gavi supports vaccines against 20 infectious diseases, including Ebola, malaria, mpox and rabies in low- and middle-income countries (LMIC)
- Since 2000, Gavi has helped to immunize over 1.2 billion children, helping to halve child mortality in 78 lower-income countries
- The largest donors to Gavi, the Vaccine Alliance, are primarily high-income governments and the Bill & Melinda Gates Foundation.
- Key contributors for the 2026–2030 period include the United Kingdom (its largest funder), the Gates Foundation, Norway, and Germany. The U.S. has historically been a top donor, though its future funding is uncertain.



Inequities in Vaccination Rates

- Vaccination for Hepatitis B among infants is as high as 79% in the WHO Western Pacific Region, while it is estimated at only 17% in the WHO African Region
- For the Hib (Haemophilus influenzae type b) vaccine, the WHO European Region is estimated to have 93% coverage, while it is only 34% in the WHO Western Pacific Region
- Maternal and neonatal tetanus persist as public health problems in 10 countries: Afghanistan, Angola, Central African Republic, Nigeria, Pakistan, Papua New Guinea, Somalia, Sudan, South Sudan and Yemen.
- Of the 19.9 million, around 55% of these children live in 10 countries: Afghanistan, the Democratic Republic of the Congo, Ethiopia, India, Indonesia, Nigeria, Pakistan, the Philippines, Sudan and Yemen

• Source: <https://www.who.int/news-room/fact-sheets/detail/immunization-coverage>



VACCINE ACCESS GAP



High Coverage, High Accessibility

Strong health systems enable broad vaccine access—typically high-income nations.



High Coverage, Low Accessibility

Good coverage despite access challenges—often urban middle-income regions.



Low Coverage, High Accessibility

Infrastructure exists, but coverage remains low due to instability or hesitancy.



Low Coverage, Low Accessibility

Vulnerable areas: weak infrastructure and conflict reduce access and coverage.

VACCINE HESITANCY

WHO lists vaccine hesitancy among the top global health threats, amplified by social-media misinformation and cultural mistrust.

In some regions, up to ~30% report reluctance due to safety fears or conspiracy beliefs; responses work best via targeted messaging and trusted community advocates.



20%

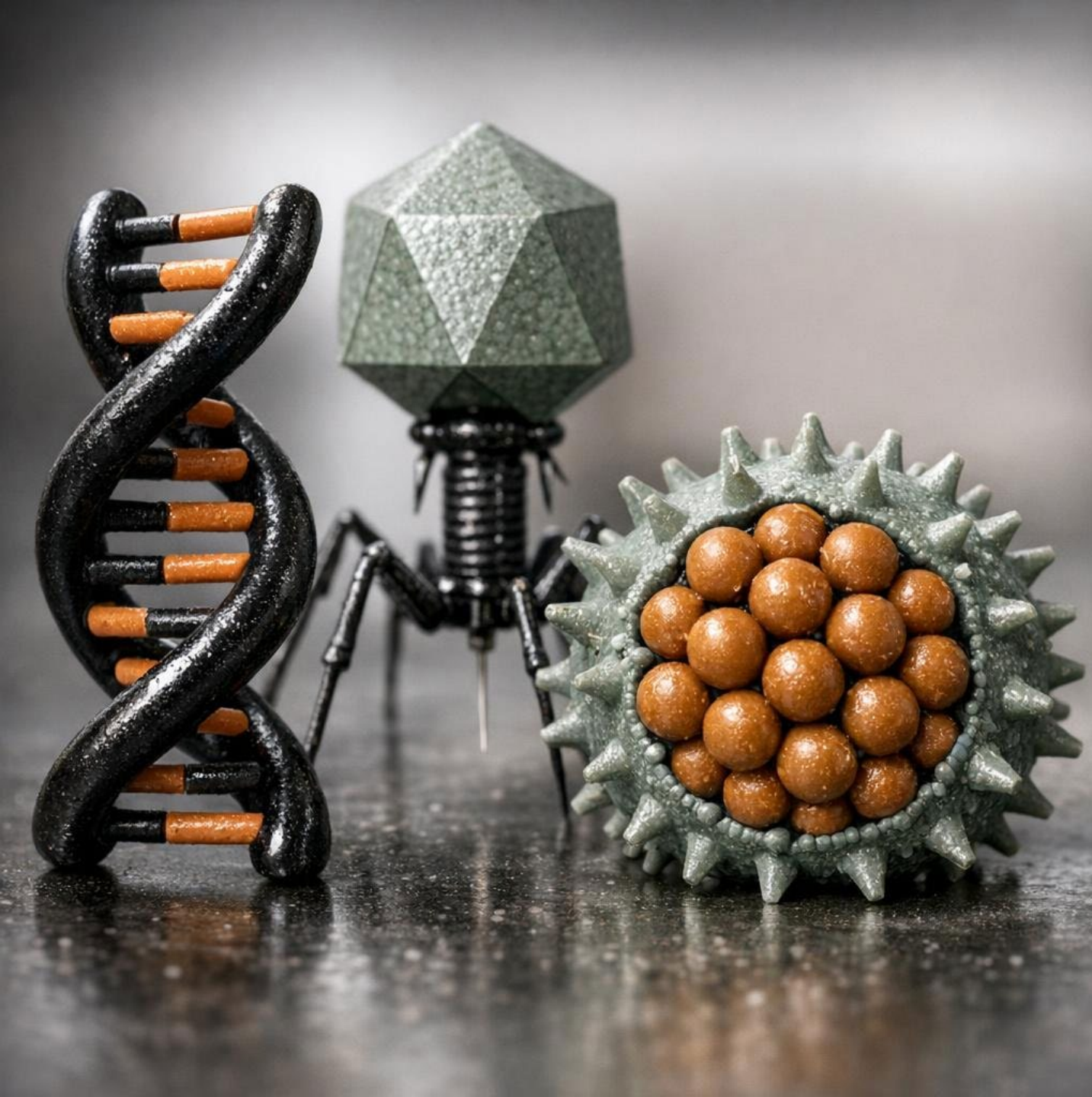
LOGISTICAL & FINANCIAL BARRIERS

Cold chain maintenance can account for up to 20% of vaccine delivery costs.

Pharma Development of New Vaccines: Ebola

- Coalition for Epidemic Preparedness Innovations (CEPI) invests \$30 million to make Merck's Ebola vaccine cheaper to make and more accessible
- Developed during the 2014-2016 West African Ebola outbreak
- Make it easier and cheaper to produce at scale
- Goal is to enable it to be stored in a regular refrigerator, instead of a freezer at ultra-low temperatures





INNOVATIONS IN VACCINES

FASTER PLATFORMS

mRNA, viral vectors, and nanotech enable rapid redesign as threats evolve.

BROADER PROTECTION

Universal flu and pan-coronavirus candidates target shared viral features.

EASIER DELIVERY

Thermostable formulations reduce cold-chain reliance to reach remote areas.

IMPROVING COVERAGE STRATEGIES

Primary Healthcare Integration

Embed vaccination within routine care for better accessibility.

Community Engagement

Build trust and encourage participation through local outreach.

Digital Tools & Data

Use real-time platforms to track coverage and gaps.

Address Social Determinants

Reduce barriers like poverty and access for equity.

Behavioral Insights

Apply strategies to decrease hesitancy and inform choices.

Public-Private Partnerships

Mobilize resources and speed innovation via collaboration.