



# CEPI | Spillover to Disease X: vaccine preparedness for the next pandemic threat

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# CEPI: a global partnership

A dark blue world map is visible in the background of the slide, showing the outlines of continents and countries.

## Vision

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A world in which epidemics and pandemics are no longer a threat to humanity.

## Mission

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To accelerate the development of vaccines and other biologic countermeasures against epidemic and pandemic threats so they can be accessible to all people in need.

CEPI

# Our strategic objectives

1

## Prepare

Develop vaccines and promising biologics against the most prominent known threats, building on COVID-19 achievements and CEPI 1.0

2

## Transform

Harness innovations in technology and systems to significantly reduce the global vulnerability to threats of novel pathogen outbreaks

3

## Connect

Connect Emerging Infectious Diseases stakeholders to enable rapid countermeasure development, effective response and equitable access for those in need

# CEPI's 100 Days Mission

Coupled with improved surveillance, and swift use of non-pharmaceutical interventions, a vaccine in 100 days could defuse the threat of a new pathogen with pandemic potential.

## Definition:

‘Vaccines should be ready for initial authorisation and manufacturing at scale within 100 days of recognition of a pandemic pathogen, when appropriate.’

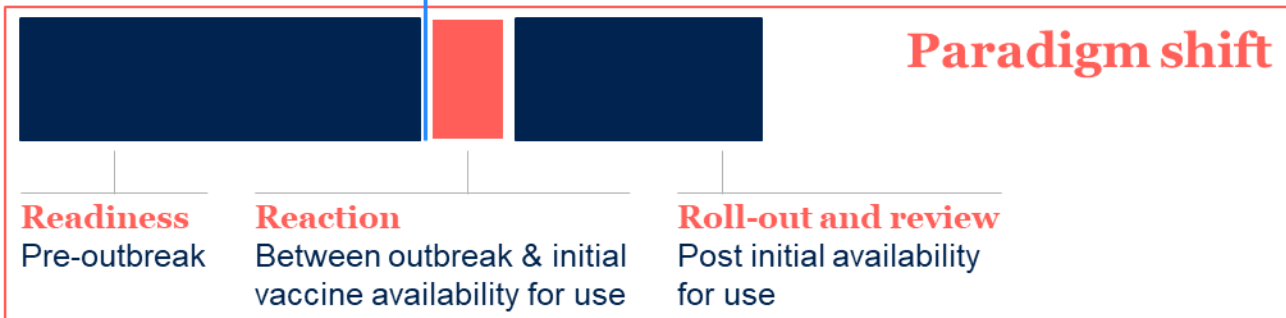
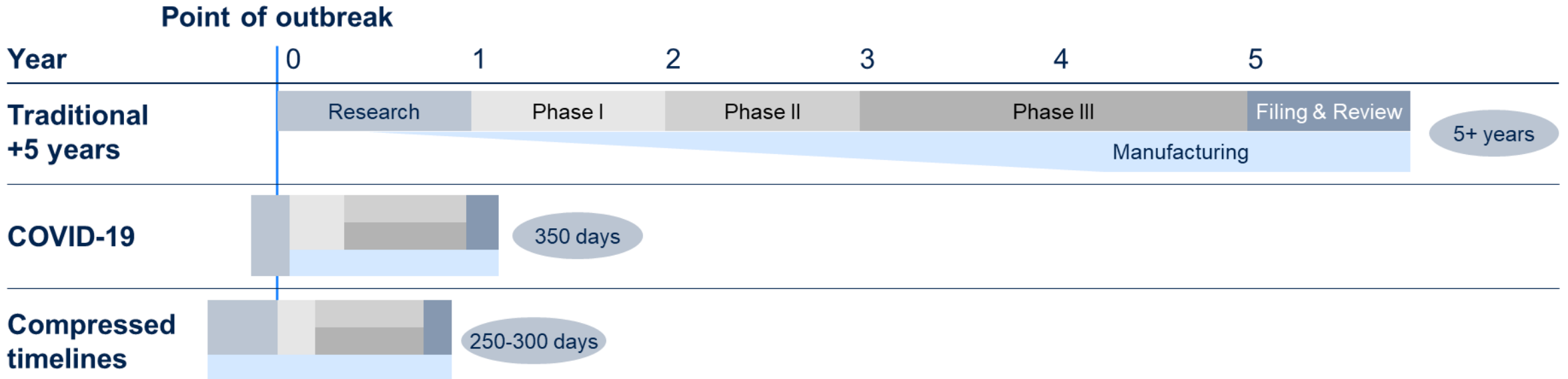


#100DaysMission

# Compressing timelines further will require a fundamental shift towards preparedness

ILLUSTRATIVE

## Vaccine development timeline



# What will it take?



**(1) Creating a library of prototype vaccines for representative pathogens across multiple virus families**



**(2) Getting clinical trials networks at the ready**



**(3) Speeding up identification of immune response markers**



**(4) Establishing global capacity to make top-quality, safe, and effective new vaccines quickly**

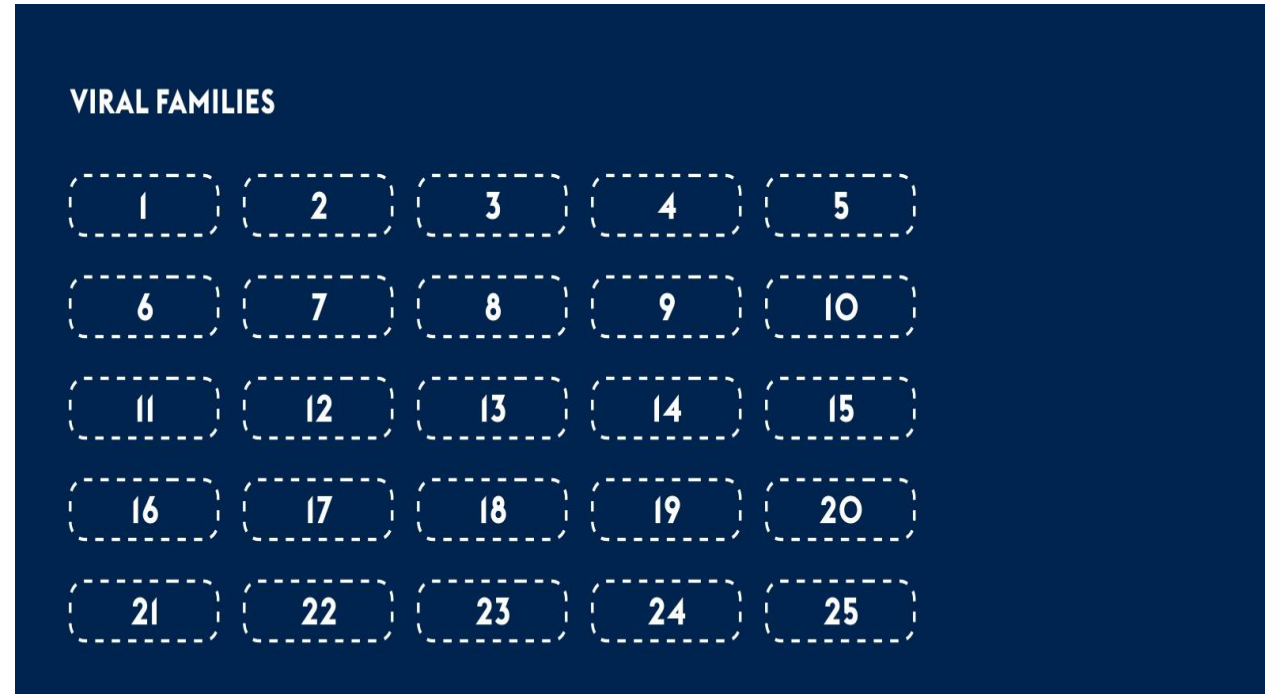


**(5) Strengthening disease surveillance and global early-warning systems**

#100DaysMission

# Creating a library of prototype vaccines for representative pathogens across multiple virus families

- Libraries of vaccine constructs against representative pathogens from virus families with greatest pandemic potential.
- Vaccine platforms to be rapidly adapted to develop vaccines against new threats.



#100DaysMission

# What do virus family vaccine libraries look like?



Virus family prioritization and virus selection

Spillover project v2.0

Immunogen design

Optimized antigen sequences for stability, expression, antibody and T-cell responses

Extensive knowledge base

Viruses, receptors, structure-based phylogenetic analysis

Subset of designs put in cDNA plasmid and expressed as recomb. proteins

- Conformational verification
- Immunotools

Immunogen designs tested in different platforms

- e.g. mRNA, ChadOx, other
- Preclinical safety and efficacy

Exemplar vaccine candidates

- Clinical testing for safety and immunogenicity
- Stockpiling



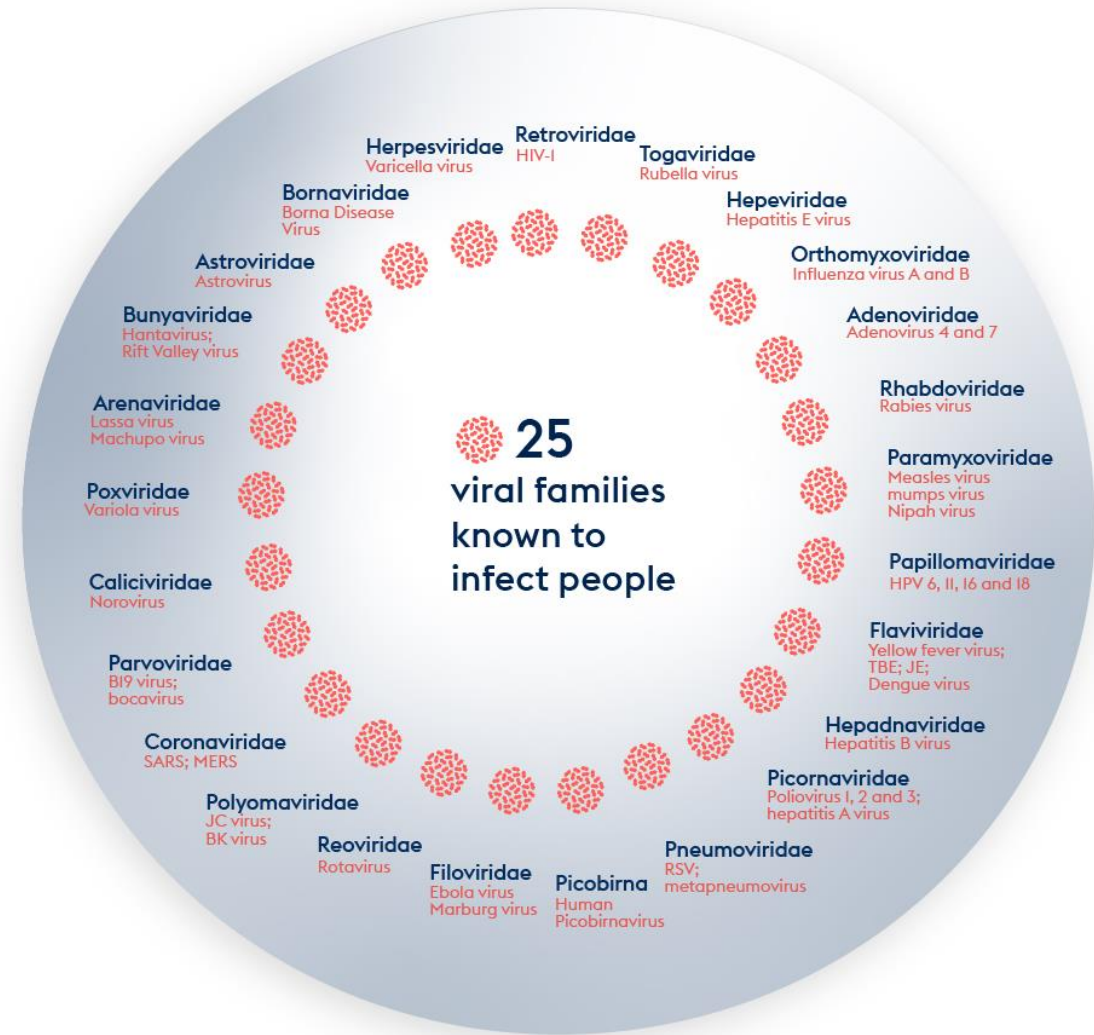
Access to data, materials and vaccine candidates through our equitable access provisions





# Vaccine libraries will target high-risk virus families

- **Virus family:** ICTV classification of viruses into families, subdivided into subfamilies and genera based on their genetic sequences and degree of divergence
- **Virus family prioritization:** Ranking of virus families for their Disease X likelihood emergence based on methodology in development
- **Virus selection:** For each virus family, 10-15 viruses are selected to have an antigen designed for the antigen sequence “vaccine” library
- Engagement with CEPI’s partners (NIAID, WHO)



# Background

- Developed through the UC Davis-led PREDICT Project
- Building on the 2021 Grange et al. publication "Ranking the risk of animal-to-human spillover for newly discovered viruses" in *PNAS*
- Spillover is an online tool that compares hundreds of virus, host and environmental risk factors to identify viruses with the highest risk of zoonotic spillover from wildlife to humans.

<https://spillover.global/>

The screenshot shows the homepage of the Spillover Viral Risk Ranking tool. At the top, there are logos for USAID, PREDICT, GLOBAL HEALTH PROTECT PROJECT, and UC DAVIS. Navigation links for 'RANKING COMPARISON', 'RANK YOUR VIRUS', and 'DISCUSSION' are visible. The main heading is 'SPILLOVER VIRAL RISK RANKING'. Below this, a paragraph explains that the tool compares hundreds of virus, host, and environmental risk factors to identify viruses with the highest risk of zoonotic spillover. There are three buttons: 'LEARN MORE', 'RANKING COMPARISON', and a search box labeled 'SEARCH FOR A VIRUS'. The lower section is titled 'Curious?' and features three columns of text and graphics. The first column shows a diagram of a zoonotic virus cycle between a frog, a human, and a chicken. The second column shows a world map with highlighted regions. The third column shows a risk score gauge. Each column has a short paragraph of text.

USAID PREDICT GLOBAL HEALTH PROTECT PROJECT UC DAVIS

LOGIN | REGISTER

RANKING COMPARISON RANK YOUR VIRUS DISCUSSION

# SPILLOVER


## VIRAL RISK RANKING

Developed by infectious disease scientists, SpillOver: Viral Risk Ranking explores and directly compares hundreds of virus, host and environmental risk factors to identify viruses with the highest risk of zoonotic spillover from wildlife to humans.


LEARN MORE RANKING COMPARISON

SEARCH FOR A VIRUS

### Curious?




Zoonotic viruses have caused many of the world's epidemics and pandemics. To prevent the next one, we need to know: how and why does a wildlife virus become zoonotic? Which viruses pose the greatest threat? how can we change our behavior to prevent disease outbreaks and protect wildlife essential to our ecosystem and life on earth?



Scientists have developed SpillOver for policy makers, scientists and the general public to assess the likelihood that a wildlife virus will spillover and spread in humans.

For more information, see [publication by Grange, Mazet et al.](#)



Using the best science available and expert opinion, SpillOver creates a spillover risk report for each virus using a comprehensive database of viral findings in wildlife and associated animal, virus and environmental risk factors.

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# Thank you

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