World Health Organization

HEALTH EMERGENCIES programme

Pathogens Prioritization

A scientific framework for epidemic and pandemic research preparedness

AGENDA

9 MAY 2024 09:00 – 18:30 Central European Time CET

R&DBlueprint

Powering research
to prevent epidemics

INTRODUCTION

More than 200+ scientists from 53 countries have evaluated the evidence related to 30 viral Families, and one core group of bacteria.

An Expert Group set up for each Family of pathogens used a standardized approach to:

(i) determine whether the family contains ANY pathogens with the potential to cause a Public Health Emergency of International Concern (PHEIC,

(ii) propose pathogens that could be considered as representative pathogens (or Prototype Pathogens) for this family, and

(iii) recommend which pathogens could theoretically become Pathogen X (an unknown pathogen with the potential to trigger a severe global epidemic).

Experts have identified several key characteristics contributing to the risk levels of these pathogens, including but not limited to their transmissibility via respiratory droplets, history of epidemics, high mutation rates, zoonotic origins, ability to transmit from human to human, route of infection, contagiousness during the incubation period or mild symptomatic stage, and dependence on specific host population factors that facilitate disease spread.

In addition, each Family Expert Group identified for their specific family of pathogen key knowledge gaps, which needs to be addressed to facilitate the development of medical countermeasures (MCMs) for that family

What will happen during the forthcoming meeting?

The invited experts will review the outcomes of the Families Expert Groups' discussions, along with available evidence, to finalize the prioritization process.

Drawing on current scientific understanding and the input provided by Families Expert Group members, all invited experts will assess Families and Pathogens based on their ability to cause large epidemics and their potential to trigger Public Health Emergencies of International Concern (PHEIC), their suitability to be used as Prototype pathogens and their potential to become the next Pathogen X, as well as current availability and access to MCMs.

The following specific objectives are proposed for the forthcoming meeting:

Objective 1 – The R for RESEARCH for all Families

To compare the various Viral and Bacterial Families proposed to contain ANY pathogen(s) with the potential to cause a Public Health Emergency of International Concern (PHEIC) or a pandemic. The aim is to comprehensively evaluate and compare families based on a contemporary understanding of their characteristics, which may range from Low to Moderate, or High, and also to define what biological changes might affect risk.

Objective 2 - The D for DEVELOPMENT of MCMs against known threats

To compile a list of individual Priority Pathogens based on those selected by each Family Expert Group, **and to compare them regarding their potential to cause PHEICs and pandemics, their known risk factors, and the current availability of MCMs.**

This list will be constituted and evaluated based on three criteria: (i) Potential to cause PHEICs -the pathogens will be assessed for their ability to trigger widespread outbreaks of disease-; (ii) Potential to cause harm - factors contributing to the likelihood or severity of *harm* caused by a pathogen will be considered-; (iii) Availability of MCMs - i.e. accessibility of treatments, vaccines, or other interventions to combat the infection.

Objective 3 - The D+ for DEVELOPMENT of MCMs using Prototype Pathogens to also prepare for other related pathogens of public health concern.

To enumerate and consider the proposed Prototype Pathogens identified across Families and debate their potential to contribute to the development of MCMs across their family and beyond. These prioritized pathogens were selected as representative examples for research and preparedness planning purposes (regardless of their perceived potential to cause PHEICs or pandemics) with a focus on the development of pathogen-specific MCMs using generalizable approaches to address other related pathogens of public health concern.

Objective 4. The R&D - Preparing for the inevitable

To list and compare the proposed pathogens with the potential to become Pathogen X (an unknown pathogen with the potential to trigger a pandemic).
Also to discuss and define what biological changes might affect the risk for these various pathogens to become Pathogen X.

A Global and a Regional Perspective

Invited experts will be asked to propose strategic research priorities that have broad applicability across diverse regions but also to outline those that are critical for given regions.
To achieve this, the input of invited experts with diverse backgrounds and experiences is crucial. They can suggest global or regional priorities aimed at leveraging known regional risks while mitigating potential global risks.

Global research priorities across various families and pathogens

Moreover, experts will utilize the identified knowledge gaps to generate a comprehensive list of research priorities to address broader public health concerns and advance the development of MCMs.

Collaboration

An expected result of the consultation process is to encourage collaborative research efforts spanning all viral and bacterial families, nurturing of partnerships, and facilitation of the sharing of knowledge and resources to collectively address emerging threats.

Expected outcomes of the meeting:

1. List of ALL **FAMILIES containing at least one pathogen that could cause a PHEIC** or pandemic including a comparative description of the criteria that led those Families to be included.
   Proposed changes to list from Phase 1, noting the rationale for any changes.
   Research priorities identified across families.

2. List of **SELECTED** individual **PRIORITY PATHOGENS** contrasted across Families using the defined criteria.
3. Proposed changes to list from Phase 1, noting the rationale for any changes.
   R&D priorities identified for Priority Pathogens

4. List of **SELECTED** individual **PROTOTYPE PATHOGENS** reviewed using the defined criteria.
   Proposed changes to list from Phase 1, noting the rationale for proposed changes.
   R&D priorities identified for Prototype Pathogens

5. List of **SELECTED** individual **PATHOGEN X** from Phase 1 described using the defined criteria.
   Proposed changes to list from Phase 1, noting the rationale for any changes.
   Definition of what biological changes might affect the risk of various pathogens.
   R&D priorities identified for Pathogen(s) X.

Day 1- 9 May 2024
OPEN SESSION

Chairperson: Barney Graham, Morehouse School of Medicine, USA

Time	Topic	Proposed Speaker
09:00 - 09:05	**Welcoming remarks**	Dr Michael J Ryan Executive Director, WHO Health Emergencies programme (WHE) & Deputy Director-General, WHO
09:05 - 09:15	**Objectives** of the meeting & methodology	Ana Maria Henao-Restrepo WHO R&D Blueprint for Epidemics
Introduction		
09:15 - 09:25	**Why a Family approach?**	Barney Graham Morehouse School of Medicine, the USA
09:25 - 09:40	**Methods and Key definitions** Overview of the outcomes of the Phase 1	Patrick Lydon WHO R&D Blueprint for Epidemics
09:40 - 10:10	**Discussing criteria and knowledge gaps** o What criteria were the *perceived* main drivers in the Family Groups` decisions? o What were the major knowledge gaps?	Moderated by Philip Krause, WHO consultant Chairpersons of Families Expert Groups
10:10 - 10:20	Clarification questions regarding criteria and knowledge gaps noted by Family Groups	Plenary
10:20 - 10:35	**Coffee-break**	
Session 1 – The R for RESEARCH in All Families To compare the various Viral and Bacterial Families proposed to contain ANY pathogen(s) with potential to cause a Public Health Emergency of International Concern (PHEIC) or a pandemic		
10:35 – 10:50	**Pathogen surveillance and discovery**: what priority research for Viral & Bacterial Families?	W Ian Lipkin Columbia University, the USA
10:50 – 11:05	**What research across ALL Families is critical?** Outcomes of the Jan 2024 WHO consultations	Cristina Cassetti NIAID/NIH, the USA
11:15 – 11:30	**Identification of the main immunogenic epitopes**, structure, and the basis for neutralization.	Priya Vada Acharya Duke University, the USA
11:30 – 11:45	**COMPARE** – ALL Families characterized.	Laura Merson, Esteban Garcia & Amanda Rojek ISARIC/PSI, University of Oxford, the United Kingdom
11:45 – 12:30	COMPARE ALL Families and discuss considerations to classify them as Low to Moderate, to High priority	Panel discussion moderated by Helen Rees, University of Witwatersrand, South Africa

Time	Topic	Proposed Speaker
	○ **Debate** how Families compare to other families, based on the expert responses and a contemporary understanding of their characteristics. ○ **Discuss** if the earlier conclusions would change if a Regional perspective were considered. ○ **Propose research priorities** across Families (with generalizability in mind) to address broader public health concerns and advance the development of MCMs.	Members of the PAC including Chairpersons of Families Expert Groups
12:30 -13:30	**Lunch-break**	
Session 2 - The D for DEVELOPMENT of MCMs against known threats (PRIORITY PATHOGENS) To compile the proposed list of individual Priority Pathogens and compare them regarding their potential to cause PHEICs and pandemics, their known risk factors, and the availability of MCMs		
13:30 – 13:40	**Broad-spectrum antivirals**	Eric J Snijder Leiden University, Netherlands
13:40 - 13:50	**Broad-spectrum pan-genus and pan-family virus vaccines**	Lin-Fa Wang Duke-NUS Medical School, Singapore
13:50 – 14:00	**Developing vaccines for PRIORITY pathogens** Challenges developing vaccines & techno- logies available to facilitate development of vaccines for priority pathogens.	Rino Rappouli Biotecnopolo di Siena Foundation, Italy
14:00 – 14:15	**CONTRAST** – Selected Priority Pathogens Characterized considering their PHEIC/ pandemic risk potential.	Laura Merson, Esteban Garcia & Amanda Rojek ISARIC/PSI, University of Oxford, the United Kingdom
14:15 - 15:00	CONTRAST different Priority Pathogens based on the proposed criteria: (i) Potential to cause PHEICs (ii) Potential to cause harm (iii) Availability of MCMs. ○ **Debate** how the selected Priority Pathogens contrast based on the risk of causing PHEICs and a contemporary understanding of their characteristics. ○ **Discuss** if the earlier conclusions would change if a Regional perspective were considered. ○ **Propose** research priorities, with a focus on the development of pathogen-specific MCMs and approaches to address other pathogens of public health concern.	Panel discussion moderated by Peter Figueroa, University of West Indies, Jamaica Members of the PAC including Chairpersons of Families Expert Groups
15:00 -15:15	**Coffee-break**	

Session 3 - The D+ for DEVELOPMENT of MCMs using PROTOTYPE PATHOGENS to also prepare for other pathogens of public health concern. To enumerate and consider the proposed Prototype Pathogens identified across Families and debate their potential to contribute to the development of MCMs across their family and beyond.		
15:15-15:25	**What are the critical considerations for the selection of Prototype Pathogens** and how would they be assessed through the development process?	Theodore Pierson NIAID/NIH, the USA
15:25 -15:35	**An update on PREMISE** (Pandemic REsponse REpository through Microbial & Immune Surveillance & Epidemiology)	Daniel Douek PREMISE Project, NIH/NIAID, the USA
15:35 -15:45	**REVIEW** – Prototype Pathogens based on outcomes of Family Groups' deliberations	Colin Sanderson LSHTM, the United Kingdom
15:45 -16:30	REVIEW Prototype Pathogens o **Debate** their potential to contribute to the development of MCMs across their family and beyond. o **Discuss** if conclusions on the earlier point would change if a Regional perspective is considered o **Propose research priorities**, with a focus on generalizable features of pathogen biology and pathogenesis to address broader public health concerns and advance the development of MCMs.	Panel discussion moderated by Barney Graham Members of the PAC including Chairpersons of Families Expert Groups
Session 4. The R&D - Preparing for the inevitable To list and compare the proposed pathogens with the potential to become Pathogen X (an unknown pathogen with the potential to trigger a pandemic)		
16:30 – 16:45	**ARIA** – A WHO / CERN collaboration to assess airborne risk transmission in indoor settings: can it contribute to monitoring the potential Pathogen X?	Andre Henriques CERN, Switzerland
16:45 - 17:00	**DESCRIBE** –Pathogens X based on outcomes of Family Groups' deliberations	Colin Sanderson LSHTM, the United Kingdom
17:00 -17:45	DESCRIBE considerations while defining a potential Pathogen X o **Describe** the proposed Pathogen(s) X and debate their potential to cause future pandemics. o **Discuss what biological changes** might affect the risk of various pathogens. o **Propose** how to monitor them and advance research.	Panel discussion moderated by Petro Terblanche, AFRIGEN, South Africa Members of the PAC including Chairpersons of Families Expert Groups
17:45 - 18:00	Key messages from Day 1	Chairperson - WHO
18:00	**ADJOURN - END OF OPEN SESSION**	
18:30	**RECEPTION**	