



# Catalog of Advisory Groups, Networks and Partnerships relevant to Pandemic Preparedness

October 2023



EPIDEMIC  
& PANDEMIC  
PREPAREDNESS  
& PREVENTION

HEALTH  
EMERGENCIES  
programme



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World Health  
Organization

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The updated information for the advisory groups, networks, and partnerships has been provided by their respective secretariats and responsible WHO staff. From July to October 2023, the STAG-IH Secretariat contacted the secretariats of the advisory groups, networks, and partnerships listed in the Catalog to collect updates based on their input from the previous year.

Regarding WHO Collaborating Centres (WHO CCs), the STAG-IH Secretariat identified WHO CCs relevant to pandemic preparedness through the WHO CC database (<https://apps.who.int/whocc/>). The profiles of WHO CCs in the Catalog are based on the information from the database. In particular, the 2022-23 key activities in collaboration with WHO were provided by each WHO CC.

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# Contents

## **Disease-/Pathogen-specific Group**

Global influenza surveillance and response system (GISRS) Expert network	1
Pandemic Influenza Preparedness (PIP) Framework Advisory Group (AG)	2
(Influenza) Partnership Contribution Independent Technical Expert Mechanism (PCITEM)	3
Advisory Group on the Composition of Influenza Vaccines	4
Advisory Group on Influenza Burden Estimations	5
WHO Influenza Incidence Analytics Group & Pandemic Influenza Severity Assessment (PISA)	6
Working Group on Surveillance of Antiviral Susceptibility of Influenza Viruses for GISRS (AVWG)	7
Working Group for the Molecular Detection and Subtyping of Influenza Viruses and the use of next-generation sequencing in GISRS (PCRWG)	8
Working group for the Development of the Global Influenza Surveillance and Response System Pandemic Response Plan (GISRS PRP)	9
Advisory Group to the WHO Global Respiratory Syncytial Virus Surveillance Pilot	10
WHO Technical Expert Group on Special Investigations and Studies for Pandemic Influenza and other Pandemic Respiratory viruses (PSS)	11
WHO reference laboratories providing confirmatory testing for COVID-19	12
Technical Advisory Group on COVID-19 Vaccine Composition (TAG-CO-VAC)	14
Technical Advisory Group on SARS-CoV-2 Virus Evolution (TAG-VE)	15
Technical Advisory Group on the COVID-19 Technology Access Pool	17
Technical Advisory Group on COVID-19 Mortality Assessment	18
Meningitis Technical Taskforce (MTT)	19
Global task force on cholera control (GTFCC)	20
WHO Advisory Committee for Variola Virus Research (ACVVR)	21
Eliminating Yellow fever Epidemics (EYE) Strategy	22
Technical Advisory Group for Arboviruses (TAG-Arbovirus)	24
International Coordinating Group (ICG) for the provision of yellow fever, meningococcal, cholera, and Ebola emergency vaccines	26

## **Other Advisory Groups, Networks and Partnerships**

Strategic advisory group of experts (SAGE) on Immunization	28
Strategic and Technical Advisory Group on Infectious Hazards (STAG-IH) with Pandemic and Epidemic Potential	30
Working Group on Public Health and Social Measures (PHSM) under the STAG-IH	32
Working Group on Trust and Pandemic Preparedness under STAG-IH	33
Emergency Medical Teams (EMT) initiative	34
Global Laboratory Alliance for the Diagnosis of High Threat Pathogens (GLAD-HP)	35
Emerging and Dangerous Pathogens Laboratory Network (EDPLN)	37
Emerging Diseases Clinical Assessment and Response Network (EDCARN)	39
Technical Advisory Group on the WHO Global Clinical Platform	41
Global Outbreak Alert and Response Network (GOARN) Steering Committee	42

Risk Communication Advisory Group (RCAG)	43
Health Security Interface Technical Advisory Group (HSI-TAG)	44
Technical Advisory Group on Biosafety (TAG-B)	46
Global Infection Prevention and Control Network (GIPC Network)	47
WASH in Public Health Emergencies Working Group	50
Scientific Advisory Group for the Origins of Novel Pathogens (SAGO)	51
Technical Advisory Group (TAG) for Universal Health and Preparedness Review (UHPR)	52
Epidemic Intelligence from Open Sources Initiative Coordination Group (EIOS CG)	54
One Health High-Level Expert Panel (OHHLEP)	55

### **WHO Collaborating Centres relevant to Pandemic Preparedness**

Overview: A list of WHO Collaborating Centres relevant to Pandemic Preparedness	56
WHO Collaborating Centre for Studies on the Ecology of Influenza in Animals	61
WHO Collaborating Centre for Reference and Research on Influenza	62
WHO Collaborating Centre for Reference and Research on Influenza	63
WHO Collaborating Centre for Reference and Research on Influenza	64
WHO Collaborating Centre for Studies on Influenza at the Animal-human Interface	65
WHO Collaborating Centre for Surveillance, Epidemiology & Control of Influenza	66
WHO Collaborating Centre for Middle East Respiratory Syndrome (MERS)	69
WHO Collaborating Centre for Viral Hemorrhagic Fevers	71
WHO Collaborating Centre for Reference and Research of Arbovirus and Hemorrhagic Fevers Virology	74
WHO Collaborating Centre for Arbovirus and Haemorrhagic Fever Reference and Research	75
WHO Collaborating Centre for Arboviruses and Viral Haemorrhagic Fevers	76
WHO Collaborating Centre for Arbovirus and Haemorrhagic Fever Reference and Research	77
WHO Collaborating Centre for Arboviruses and Viral Haemorrhagic Fevers (Centre collaborateur de l'OMS pour les Arbovirus et les Virus de Fièvres Hémorragique)	79
WHO Collaborating Centre for Emerging and Re-emerging Arboviruses and other Emerging Zoonotic Viruses	81
WHO Collaborating Centre for Arboviruses	82
WHO Collaborating Centre for Reference & Research on Plague	83
WHO Collaborating Centre on Plague Control and Research	84
WHO Collaborating Centre on Plague Control and Research	85
WHO Collaborating Centre for Smallpox and Other Poxvirus Infections	86
WHO Collaborating Centre for Orthopoxvirus Diagnosis and Repository for Variola Virus Strains and DNA	88
WHO Collaborating Centre for Smallpox Vaccine	89
WHO Collaborating Centre for Reference and Research on Tropical and Emerging Viral Diseases	90
WHO Collaborating Centre for Research and Training on Viral Zoonoses	92
WHO Collaborating Centre for Virus Reference & Research (Special Pathogens)	93
WHO Collaborating Centre for epidemic and pandemic diseases	95
WHO Collaborating Centre for Emerging and Re-Emerging Infectious Diseases	96
WHO Collaborating Centre for Diagnostic Reference, Training and Investigation of Emerging Infectious Diseases	97
WHO Collaborating Centre for Infectious Disease Epidemiology and Control	98
WHO Collaborating Centre for Emerging Infections and Biological Threats	99

---

WHO Collaborating Centre for Infectious Disease Modelling	101
WHO Collaborating Centre for Laboratory Preparedness and Response for High Threat Pathogens and Biorisk	102
WHO Collaborating Centre for Applied Biosafety and Training	103
WHO Collaborating Centre for Biosafety and Biosecurity	104
WHO Collaborating Centre for Biosafety and Biosecurity	105
WHO Collaborating Centre for Mass Gatherings and Global Health Security	106
WHO Collaborating Centre for Global Health Security	107
WHO Collaborating Centre for Travellers' Health	108
WHO Collaborating Centre for Digital Learning in Health Emergencies	109



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# Global influenza surveillance and response system (GISRS) Expert network

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## Date Established

1952

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## Type (Official or Informal)

Official

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## Objectives

Global influenza surveillance has been conducted through WHO's Global Influenza Surveillance and Response System (GISRS) since 1952.

GISRS is a system fostering global confidence and trust for over half a century, through effective collaboration and sharing of viruses, data and benefits based on Member States' commitment to a global public health model.

GISRS is to protect people from the threat of influenza by continuously functioning as a:

- global mechanism of surveillance, preparedness and response for seasonal, pandemic and zoonotic influenza;
- global platform for monitoring influenza epidemiology and disease; and
- global alert for novel influenza viruses and other respiratory pathogens.

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## Terms of Reference

WHO Terms of Reference for National Influenza Centres (NIC), WHO Collaborating Centres, and Essential Regulatory Laboratories -- depending on their expertise and contribution to the GISRS.

- NIC TOR here: <https://www.who.int/initiatives/global-influenza-surveillance-and-response-system/national-influenza-centres>.
- WHO CC TOR here: <https://www.who.int/initiatives/global-influenza-surveillance-and-response-system/who-collaboration-center-erl?CxitPEOtTWx0xUd5TJdODSXcnyJqzYd7FZeivpn7xcl=>

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## Members

161 Institutions in 131 countries, areas and territories.

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## Activity Summary (routine)

- Routinely share influenza viruses and data, including genetic sequence data, within the system to contribute to bi-annual vaccine strain selection, virus monitoring, understanding of epidemiology.

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# Pandemic Influenza Preparedness (PIP) Framework Advisory Group (AG)

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## Date Established

2011

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## Type (Official or Informal)

Official

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## Objectives

- Monitor, assess, and report on how the different functions of the Framework are implemented by its components;
- Carry out the necessary assessment of the Framework according to quantitative and qualitative indicators developed from information provided by the WHO Secretariat and other independent sources, if necessary;
- Provide guidance to the Director-General to strengthen the functioning of the Framework;
- To make recommendations to the Director-General on the use of financial and non-financial contributions;
- Present an annual report to the Director-General on its evaluation of the implementation of the Framework.

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## Terms of Reference

Annex 3 of the PIP Framework document: <https://www.who.int/groups/pip-framework-advisory-group>

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## Members

18 members drawn from three Member States in each WHO region, with a skill mix of internationally recognized policy makers, public health experts, and technical experts in the field of influenza.

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## Activity Summary

### Routine Activities

- The Advisory Group meets twice a year in Geneva.
- Its scope is to monitor, assess, and report on the system for sharing H5N1 influenza viruses and other influenza viruses with human pandemic potential, as well as access to vaccines and other benefits of the Framework.
- The institutional components of the Framework to be monitored by the Advisory Group are National Influenza Centres, other authorized laboratories, WHO Collaborating Centres, H5 reference laboratories, and essential regulatory laboratories.

### 2022-23 Highlights

- Virtual meeting held in March 2022, and 2 in-person meetings held in Geneva in October 2022 and March 2023. The Advisory Group received updates on the implementation of the PIP Framework and developed its evidence-based recommendations to the WHO D-G.
- Following the October 2021 PIP Advisory Group meeting, an informal PIP Advisory Group Working Group (AGWG) was established to develop guidance for the D-G on a possible way forward to address the growing concerns around the sharing and use of seasonal influenza viruses. The AGWG held several meetings between February and September 2022 and 5 consultations with stakeholders. The group developed a [report](#) which was presented in October 2022 to the PIP AG, who agreed with the findings and recommendations of the AGWG and recommended that the Director-General consider these recommendations in moving forward.

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# (Influenza) Partnership Contribution Independent Technical Expert Mechanism (PCITEM)

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## Date Established

2017

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## Type (Official or Informal)

Official

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## Terms of Reference

- PCITEM will provide scientific and technical guidance and advice on projects selected for funding under PC funds to the EPP Director. The PCITEM will have the following functions:
- To review and assess the scientific and technical soundness and appropriateness of activities to contribute to the outcome and output targets in work plans submitted for funding under PC funds; and
- To provide additional scientific and technical guidance, as appropriate, on implementation of pandemic preparedness activities under the PIP PC.

The TORs were revised in November 2022: [https://cdn.who.int/media/docs/default-source/pip-framework/pcitem/pcitem-tors.pdf?sfvrsn=7c1d4ac1\\_15](https://cdn.who.int/media/docs/default-source/pip-framework/pcitem/pcitem-tors.pdf?sfvrsn=7c1d4ac1_15)

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## Members

Up to 8 members: 6 independent experts and 2 GISRS laboratory representatives.

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## Activity Summary

### Routine Activities

- PCITEM typically meets in person once per biennium.
- <https://www.who.int/groups/partnership-contribution-independent-technical-expert-mechanism/about>

### 2022-23 Highlights

- Virtual meeting held on 2 November 2022, provided update on implementation under HLIP II and closed the terms of 7/8 members
- New PCITEM members were appointed in June 2023
- Upcoming meeting to be held 3-4 October 2023 in Geneva to discuss implementation of PIP PC funds in 2024-25 under HLIP III

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# Advisory Group on the Composition of Influenza Vaccines

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## Date Established

1971

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## Type (Official or Informal)

Official

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## Objectives

Twice annually, WHO organizes consultations with an advisory group of experts to analyse influenza surveillance data generated by GISRS, and issue recommendations on the composition of the influenza vaccines for the following influenza season.

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## Terms of Reference

Bi-annual vaccine strain recommendations for Northern and Southern hemispheres, and ad hoc risk assessment and on-going advice as needed for novel viruses and other vaccine issues.

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## Members

- Representatives from WHO Collaborating Centres for Influenza
- Representatives from WHO Essential Regulatory Laboratories
- Representatives from National Influenza Centres and WHO H5 Reference Laboratories
- Representatives from the WHO Collaborating Centre for Modelling, Evolution, and Control of Emerging Infectious Diseases
- Representatives from the OIE/FAO Network of expertise on animal influenza

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## Activity Summary (routine)

- Analyse the antigenic and genetic characteristics of contemporary seasonal human influenza viruses, taking into consideration of available epidemiological and clinical information from individual countries and regions and the results of vaccine effectiveness studies.
- Make recommendations on the composition of influenza vaccines for use in the northern or southern hemisphere specific season and present a summary of the findings that supports the recommendations during the WHO Information Meeting on the composition of influenza vaccines to be used in the respective northern or southern hemisphere following influenza season.
- Review the antigenic and genetic characteristics of recent zoonotic influenza viruses including A(H5), A(H7N9), A(H9) and other subtype or variant influenza viruses that the WHO Collaborating Centres of the GISRS received and advise on which new candidate vaccine viruses need to be developed for pandemic preparedness purposes.

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# Advisory Group on Influenza Burden Estimations

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## Date Established

2018

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## Type (Official or Informal)

Official

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## Objectives

To provide substantial evidence of the burden of influenza disease and how to use this information to inform policy decisions, including those related to immunization for influenza.

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## Terms of Reference

The Advisers, in their personal capacity, will:

- Advise WHO on methods of estimating global influenza burden;
- Advise WHO on how to engage with policymakers that burden data are used in policy decisions;
- Provide scientific/technical guidance placing generated estimates; and
- When appropriate, provide links with key stakeholders.

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## Members

6 members

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# WHO Influenza Incidence Analytics Group & Pandemic Influenza Severity Assessment (PISA)

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## Date Established

2018

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## Type (Official or Informal)

Informal

There are 4 working groups:

- PISA global outputs
- PISA threshold setting and
- The informal Influenza Incidence Analytics Group (advanced analytics and modeling).
- The working group on Pandemic Special Studies, which has become a formal working group “WHO Technical Expert Group on Special Investigations and Studies for Pandemic Influenza and other Pandemic Respiratory viruses” (see further under PSS)

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## Terms of Reference

ToRs exist for the different groups. The informal Influenza Incidence Analytics Group is rather a forum for exchange of experience and information.

PISA global outputs (15 members) and WHO threshold setting groups (12 members)

ToR for PISA global outputs:

### Experts will:

- Provide WHO with independent, high-level technical advice on the method for global influenza severity assessments;
- Where appropriate, provide links with key stakeholders;
- Support the global seasonal and pandemic severity “assessment”.

ToR for PISA WHO threshold setting

- Provide WHO with technical advice on methods for threshold setting on the parameters used for severity assessment.

ToR for Influenza Incidence Analytics group

- Exchange forecasting results and discuss results with epidemiologists/virologists for interpretation;
- Discuss potential factors for inclusion;
- Discuss data needs for modeling of influenza.

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# Working Group on Surveillance of Antiviral Susceptibility of Influenza Viruses for GISRS (AVWG)

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## Date Established

2011

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## Type (Official or Informal)

Informal

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## Objectives

To provide practical guidance on GISRS surveillance strategies for influenza antiviral susceptibility.

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## Terms of Reference

- Update on status of neuraminidase and polymerase inhibitors susceptibility of circulating seasonal viruses, zoonotic influenza viruses like A(H5N1), A(H7N9) and other influenza viruses with pandemic potential.
- Review of current antiviral susceptibility surveillance, gaps and needs.
- Review of new antivirals and susceptibility surveillance methods.
- Plan for way forward for WHO External Quality Assessment Programme and training.

<https://www.who.int/teams/global-influenza-programme/laboratory-network/quality-assurance/antiviral-susceptibility-influenza/polymerase-acidic-protein-inhibitor>

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## Members

The AVWG includes representatives from the WHO Collaborating Centres for Reference and Research on Influenza (WHO CCs), National Influenza Centres (NICs), public health institutes and research laboratories with expertise in influenza antiviral susceptibility surveillance. Experts from the broader scientific community will be included as needs arise.

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# Working Group for the Molecular Detection and Subtyping of Influenza Viruses and the use of next-generation sequencing in GISRS (PCRWG)

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## Date Established

2009

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## Type (Official or Informal)

Official

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## Terms of Reference

The WHO working group for the Molecular Detection and Subtyping of Influenza Viruses and the use of Next Generation Sequencing (NGS) will provide advice to WHO on the use of PCR and NGS in GISRS, through:

- Reviewing the current published WHO recommended PCR protocols, identify gaps and follow up actions.
- Review of new developments in the PCR technology and its possible application to GISRS.
- Discussing quality assessment issues and providing guidance for the current WHO External quality assessment programme (EQAP).
- Reviewing and updating the objectives, functions and operational mechanisms of the WG.
- Reviewing and providing guidance on the use of NGS in GISRS and its importance for risk assessment and rapid response in influenza epidemics or pandemic events.

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## Members

The PCRWG includes representatives from the WHO Collaborating Centres for Reference and Research on Influenza (WHO CCs), National Influenza Centres (NICs), public health institutes and research laboratories with expertise in influenza molecular diagnosis and sequencing. Experts from the broader scientific community will be included as needs arise.

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# Working group for the Development of the Global Influenza Surveillance and Response System Pandemic Response Plan (GISRS PRP)

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## Date Established

2018

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## Type (Official or Informal)

Informal

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## Terms of Reference

The Technical Working Group (WG) will develop the GISRS pandemic response plan in collaboration with broad GISRS members including Collaborating Centres (CC), Essential Regulatory Laboratories (ERL) and National Influenza Centers (NIC). The WG will:

- Review existing related pandemic response plans.
- Develop content on specific subjects.
- Provide input and review the components of the GISRS pandemic response plan.

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## Members

The WG of CCs will comprise up to 6 members from 6 CCs and WG of ERLs will comprise up to 4 members from 4 ERLs. The members will be appointed by their respective institute. The WG of NICs will comprise up to 12 members from all 6 regions, selected jointly by WHO GIP and Regional Offices.

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# Advisory Group to the WHO Global Respiratory Syncytial Virus Surveillance Pilot

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## Date Established

2016

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## Type (Official or Informal)

Official

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## Terms of Reference

To provide strategic and technical guidance on the RSV surveillance, that is built on the WHO Global Influenza Surveillance and Response System (GISRS). This includes testing of feasibility, practicality and sustainability of RSV surveillance building on GISRS.

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## Members

The Advisory Group will consist of up to six Temporary Advisors with extensive experience and high standing in the areas covering RSV epidemiology, virology, disease surveillance and/or policy.

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# WHO Technical Expert Group on Special Investigations and Studies for Pandemic Influenza and other Pandemic Respiratory viruses (PSS)

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## Type (Official or Informal)

Informal

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## Objectives

Global collaboration aiming to ensure that countries have open access to the necessary protocols and data/information-sharing processes that will allow them to rapidly respond to pandemic influenza.

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## Terms of Reference

The WHO Technical Expert Working Group provides advice to WHO to:

- Ensure sufficient and relevant study protocols and tools are available to conduct influenza risk assessment, research and evaluation of public health measures in the event of an influenza pandemic, as part of the broader pandemic influenza preparedness and response agenda; and
- Identify a network of sites in key locations around the world that are primed to undertake the required range of special studies for a new and emerging influenza virus.

---

## Members

The WHO Technical Expert Working Group members will comprise of influenza and other respiratory diseases experts (epidemiologists, laboratory specialists, researchers, etc.) from countries or institutions that have proven ability to conduct expert studies during the 2009 pandemic, or based on expertise, ability of expert's institution and/or country to conduct a study during a pandemic.

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# WHO reference laboratories providing confirmatory testing for COVID-19

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## Date Established

2020

Evolution to WHO Coronavirus Network (CoViNet) scheduled for October 2023

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## Type (Official or Informal)

Official

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## Objectives

- Build a functional global diagnostic reference network and expert group based on WHO core values that can provide coordinated diagnostic outbreak response for SARS-CoV-2.
- Establish collaboration, building SARS-CoV-2 diagnostic capacity, develop guidance documents and create a platform to enable improved diagnostic testing. outbreaks and towards rapid development, validation and implementation of accurate and accessible diagnostics for SARS-CoV-2.
- Collaborate on cross-cutting diagnostic and virology challenges regarding SARS-CoV-2 including research and development, data and sample sharing, effective utilization of new diagnostic technology, platform for data sharing, quality assurance in outbreak settings, biosafety and biosecurity and rapid and safe transportation of infectious substances to reference laboratories, and surveillance viral evolution to rapidly detect the potential change in viral characteristics or a negative impact on the developed countermeasures.
- Empower member states to perform diagnostics for SARS-CoV-2 by promoting development of and access to innovative technologies that assure safe and reliable diagnostic testing.

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## Terms of Reference

In coordination with the WHO Global Laboratory Alliance for the Diagnosis of High threat Pathogens (GLAD-HP), each of the laboratories participating in the Network will:

- Support capacity building of laboratories, particularly those in lower and middle-income countries, for diagnosis of COVID-19;
- Provide a global reference resource of well-characterized viral strains and sequences;
- Track the evolution of the virus causing COVID-19 and identify changes that may be relevant to diagnostic tests, vaccine development and/or antiviral treatment;
- Develop and implement state-of-the art methods and develop assays to perform the laboratory's tasks arising from its participation in the Network;
- Depending on the further evolution of the COVID-19 epidemic, assay development may inter alia include: (a) development or refinement of molecular assays (b) development of protocols for antiviral resistance testing; (c) antigenic characterization; (d) development/assessment of specific tests for diagnostic humoral immune responses; and (e) development of tests for infectivity of recovering patients.

The details of ToR can be found here: <https://www.who.int/publications/m/item/terms-of-reference-for-who-reference-laboratories-providing-confirmatory-testing-for-covid-19>

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## Members

List of reference laboratory member institutes can be found here: [WHO reference laboratories providing confirmatory testing for COVID-19](#)

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## 2023 Activity Summary

- Ensuring global access to timely and reliable diagnostics for SARS-CoV-2 including:
  - Regional training on the use of the molecular assay and genetic sequencing
  - Confirmatory testing to validate diagnostic capacity in laboratories by the reference laboratories
  - Peer-to-peer support from reference laboratories to laboratories requiring support to establish adequate molecular capacity or to support genomic sequencing
  - Other training and capacity building activities: e.g. the experts provide input in the Laboratory Community of Practice webinars on topics that include virology, diagnostics and laboratory quality and biosafety issues. And upon request to regional webinars organized.
- In the 4th year of the COVID-19 pandemic, WHO decided to broaden and revise the scope, objectives and terms of reference of WHO SARS-CoV-2 Reference Laboratory Network to also include, among other things: (i) expertise in animal health and environmental surveillance, (ii) other coronaviruses, including MERS-CoV, and (iii) enhance capacities for the identification of novel coronaviruses that could negatively affect human health.
- It was also decided that the WHO SARS-CoV-2 Reference Laboratory Network, with its expanded and revised scope, objectives and terms of reference, would be renamed and thereafter referred to as the “WHO Coronavirus Network”, i.e. the CoViNet. Reference laboratories of CoViNet will be selected and the network will be formally established in Q4 2023

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# Technical Advisory Group on COVID-19 Vaccine Composition (TAG-CO-VAC)

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## Date Established

September 2021

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## Type (Official or Informal)

Official

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## Objectives

TAG-CO-VAC contributes to the regular production and review of the available evidence will be critical to assess the impact of Variants of Concerns on countermeasures, issue timely recommendations on potential modifications, and identify needs for further research and investigations.

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## Terms of Reference

The TAG-CO-VAC shall have the following functions:

- Make recommendations to WHO on the methods to assess the impact of VOCs on vaccines;
- Provide interpretation of available evidence on the effect of VOCs on vaccines, including but not limited to vaccine effectiveness; and
- Recommend to WHO, for each COVID-19 vaccine platform, adaptations (if any) needed so that vaccines continue to safely provide WHO-recommended levels of protection against VOCs.

For details, please visit: <https://www.who.int/publications/m/item/terms-of-reference-for-the-technical-advisory-group-on-covid-19-vaccine-composition>

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## Members

15 independent experts, expanding to up to 25 in 2023

[https://www.who.int/groups/technical-advisory-group-on-covid-19-vaccine-composition-\(tag-co-vac\)/about](https://www.who.int/groups/technical-advisory-group-on-covid-19-vaccine-composition-(tag-co-vac)/about)

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## 2023 Activity Summary

- 14 April 2023: Report of the meeting of the WHO Technical Advisory Group on COVID-19 Vaccine Composition (TAG-CO-VAC) held on 16-17 March 2023 - [https://www.who.int/news/item/14-04-2023-report-of-the-meeting-of-the-who-technical-advisory-group-on-covid-19-vaccine-composition-\(tag-co-vac\)-held-on-16-17-march-2023](https://www.who.int/news/item/14-04-2023-report-of-the-meeting-of-the-who-technical-advisory-group-on-covid-19-vaccine-composition-(tag-co-vac)-held-on-16-17-march-2023)
- 18 May 2023: Statement on the antigen composition of COVID-19 vaccines - <https://www.who.int/news/item/18-05-2023-statement-on-the-antigen-composition-of-covid-19-vaccines>

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# Technical Advisory Group on SARS-CoV-2 Virus Evolution (TAG-VE)

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## Date Established

2021

The TAG-VE has evolved from the prior SARS-CoV-2 Evolution Working Group (EvoWG) which was a working group within the COVID-19 reference laboratory network.

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## Type (Official or Informal)

Official

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## Objectives

The TAG-VE regularly reviews the available evidence on SARS-CoV-2 variants to determine if specific mutations and combinations of mutations alter the behaviour of the virus. The evolution of SARS-CoV-2 and the emergence of variants may result in changes in transmission and clinical presentation or severity, or the performance of COVID-19 public health and social measures, diagnostics, therapeutics and vaccines.

---

## Terms of Reference

The TAG-VE shall have the following functions:

- Advise WHO on strengthening mechanisms to identify and prioritize (potential) relevant mutations of SARS-CoV-2, including the strengthening of global capacity to assess SARSCoV-2 variants;
- Develop and apply a framework for analysing and assessing SARS-CoV-2 variants and their impact on transmissibility, severity of the disease, antigenicity and diagnostics or therapeutics;
- Provide regular and updated recommendations to WHO on the global characterization of SARS-CoV-2 VOIs and VOCs and the classification of VOCs;
- Alert WHO on relevant mutations/variants, and advise on their potential impact related to viral characteristics (e.g., in virulence, transmission) and countermeasures (e.g., diagnostics, vaccines and therapeutics);
- Recommend to WHO specific investigations on the impact of specific mutations (including the laboratory controlled *in vitro* and *in vivo* studies of mutants);
- Advise WHO on mitigation strategies to reduce the negative effect of SARS-CoV-2 mutations, VOIs, and VOCs that might impact viral behaviour or countermeasures; and
- Advise WHO, as appropriate, on other relevant topics related to this area of work.

[https://www.who.int/publications/m/item/terms-of-reference-for-the-technical-advisory-group-on-sars-cov-2-virus-evolution-\(tag-ve\)](https://www.who.int/publications/m/item/terms-of-reference-for-the-technical-advisory-group-on-sars-cov-2-virus-evolution-(tag-ve))

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## Members

Up to 20 Members. The TAG-VE is composed of a subset of the larger COVID-19 lab expert network plus few additional to cover missing expertise or key players in the field, as well as observers.

Expertise covered: sequencing, bioinformatics (e.g. phylogeny and mutations), *in vitro* studies (e.g. cloning and cell culture infectivity), and *in vivo* studies (e.g. animal transmission studies), epidemiology, clinical management.

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## 2023 Activity Summary

- Evaluation of identified mutations and potential changes in transmissibility, immune escape and severity of variant viruses
  - 27 October, 2022 TAG-VE statement on Omicron sublineages BQ.1 and XBB - <https://www.who.int/news/item/27-10-2022-tag-ve-statement-on-omicron-sublineages-bq.1-and-xbb>
  - 3 January, 2023 TAG-VE statement on the meeting of 3 January on the COVID-19 situation in China - <https://www.who.int/news/item/04-01-2023-tag-ve-statement-on-the-3rd-january-meeting-on-the-covid-19-situation-in-china>
  - 16 March 2023: Statement on the update of WHO's working definitions and tracking system for SARS-CoV-2 variants of concern and variants of interest - <https://www.who.int/news/item/16-03-2023-statement-on-the-update-of-who-s-working-definitions-and-tracking-system-for-sars-cov-2-variants-of-concern-and-variants-of-interest>
  - 17 August, 2023 Updated working definitions and primary actions for SARS-CoV-2 variants - <https://www.who.int/publications/m/item/updated-working-definitions-and-primary-actions-for-sars-cov-2-variants>
- Tracking of circulating Variants of concern, variants of interest and variants of concern: <https://www.who.int/activities/tracking-SARS-CoV-2-variants>

Risk assessments: Found at: <https://www.who.int/activities/tracking-SARS-CoV-2-variants>

- XBB.1.5 - January, February, June 2023
  - XBB.1.16 – April, June 2023
  - EG.5 – August 2023
- Publications:
    - Towards the development of a SARS-CoV-2 variant risk assessment tool: expert consultation on the assessment of scientific evidence on emerging variants: Nathalie Worp, Lorenzo Subissi, Mark D Perkins, Maria D Van Kerkhove, Anurag Agrawal, Meera Chand, Janko van Beek, Bas B Oude Munnink, Marion P G Koopmans. <https://www.thelancet.com/journals/lanmic/article/PIIS2666-5247%2823%2900179-9/fulltext>
    - 20 August, 2023- SARS-CoV-2 Risk evaluation : <https://www.who.int/publications/i/item/WHO-2019-nCoV-Variants-Risk-assessment-2023.1>

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# Technical Advisory Group on the COVID-19 Technology Access Pool

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## Date established

2020

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## Type (Official or Informal)

Official

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## Objectives

The Group will advise the WHO COVID-19 Technology Access Pool (C-TAP) Secretariat on priority health products to be considered as C-TAP candidates and provide other independent advice on the scientific, technical and strategic matters related to C-TAP.

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## Terms of Reference

The TAG shall have the following functions:

- To provide independent advice on the scientific, technical and strategic matters related to the WHO COVID-19 Technology Access Pool (C-TAP);
- To advise the WHO C-TAP Secretariat on relevant information and know-how packages on C-TAP candidate health products to be made available in the C-TAP database and disseminated;
- To advise and make recommendations to the WHO C-TAP Secretariat regarding license negotiations and other technology transfer agreements taking into account C-TAP partners' existing mechanisms for negotiations;
- To advise on how C-TAP could promote transparent and access-oriented licensing or technology transfer agreements;
- To review and advise on best practices to facilitate technology transfer and local production for needed COVID-19 technologies and how to work with the implementing partners and other stakeholders to implement them.

[https://www.who.int/groups/who-technical-advisory-group-on-the-covid-19-technology-access-pool-\(c-tap\)/about](https://www.who.int/groups/who-technical-advisory-group-on-the-covid-19-technology-access-pool-(c-tap)/about)

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## Members

Between 6 and 10 members.

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## 2021-2023 Activity Summary

- Appointment of members in July 2021 - [https://www.who.int/groups/who-technical-advisory-group-on-the-covid-19-technology-access-pool-\(c-tap\)](https://www.who.int/groups/who-technical-advisory-group-on-the-covid-19-technology-access-pool-(c-tap))
- Convened 10 TAG meetings between 2021 and 2023
- Provided scientific, technical and strategic advice and recommendations that facilitated the selection and securing of 12 products offered to C-TAP (TAG report on the US NIH Licenses to C-TAP: <https://www.who.int/publications/m/item/tag-report-nih-licenses-publication>).
- Provided advice and recommendations on the C-TAP Review methodology and findings and on models for the future C-TAP model – A face-to-face meeting of TAG was held from 3 to 5 April 2023

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# Technical Advisory Group on COVID-19 Mortality Assessment

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## Date established

2021

Jointly established the World Health Organization (WHO) and the United Nations Department of Economic and Social Affairs (UN DESA).

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## Type (Official or Informal)

Official

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## Objectives

The primary role of the TAG is to advise and support efforts to assist WHO and UN Member States to obtain accurate estimates of numbers of deaths attributable to the direct and indirect impacts of the pandemic.

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## Terms of Reference

The TAG shall have the following functions:

- To critically appraise current approaches to measuring excess mortality attributable to COVID-19, defined as deaths directly attributable to COVID-19 as well as those due to the indirect impacts of the pandemic on mortality from other causes of death.
- To develop a comprehensive, pragmatic and policy-relevant set of measurement methods to track excess deaths due to COVID-19 in countries, including the certification of COVID-19 deaths, all in the context of the implementation of the UN Legal Identity Agenda, a holistic approach to civil registration, vital statistics and identity management.
- To review and offer guidance on methods for estimating the global death toll from COVID-19.

<https://www.who.int/data/technical-advisory-group/covid-19--mortality-assessment/terms-of-reference>

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## Members

Up to 40 members

<https://www.who.int/data/technical-advisory-group/covid-19--mortality-assessment/membership>

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# Meningitis Technical Taskforce (MTT)

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## Date Established

2018

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## Type (Official or Informal)

Informal

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## Objectives

Global goals of the Defeating meningitis by 2030 strategy:

- Eliminate bacterial meningitis epidemics;
- Reduce cases and deaths from vaccine-preventable bacterial meningitis;
- Reduce disability and improve quality of life after meningitis due to any cause.

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## Terms of Reference

The responsibility of the Technical Taskforce is to lead and coordinate the implementation of the WHO *Defeating Meningitis by 2030 Global Road Map*, globally and regionally, by providing a forum for technical exchange and cooperation on meningitis and road map related activities.

The Global Road Map was endorsed by Member States in the 73<sup>rd</sup> World Health Assembly (2020).

[https://www.who.int/publications/m/item/defeating-meningitis-by-2030-a-global-road-map-technical-taskforce-\(ttf\)--terms-of-reference](https://www.who.int/publications/m/item/defeating-meningitis-by-2030-a-global-road-map-technical-taskforce-(ttf)--terms-of-reference)

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## Members

Major technical partners historically engaged in meningitis control, including but not limited to the Centers for Disease Control and Prevention, the London School of Hygiene and Tropical Medicine, Meningitis Research Foundation, Médecins sans Frontières, PATH, UNICEF; and WHO.

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## 2021-2022 Activity Summary

- Official launch of the Global Road Map in September 2021.
- Establishment of the Strategy Support Group, to facilitate the implementation of the global road map, and raise the profile of meningitis on the global health agenda.

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## 2022-2023 Activity Summary

- Finalization of Investment Case.
- Finalization of PAHO regional framework.
- Initiation of EMRO regional framework.
- Prequalification of multivalent ACWYX meningococcal conjugate vaccine.
- Creation of TTF Surveillance WG to advance on Surveillance Pillar of the Roadmap

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# Global task force on cholera control (GTFCC)

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## Date Established

1992; revitalized in 2012-2014

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## Type (Official or Informal)

Official

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## Objectives

- Support the design and implementation of global strategies to contribute to capacity development for cholera prevention and control globally
- Provide a forum for technical exchange, coordination, and cooperation on cholera-related activities to strengthen countries' capacity to prevent and control cholera -- especially those related to implementation of proven effective strategies, monitoring of progress, and dissemination and implementation of technical guidelines, operational manuals, etc.
- Support the development of a research agenda, with emphasis on evaluating innovative approaches to cholera prevention and control in affected countries
- Increase the visibility of cholera as an important global public health problem

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## Terms of Reference

- To support the design and implementation of global strategies to contribute to capacity development for cholera prevention and control globally.
- To provide a forum for technical exchange, coordination, and cooperation on cholera-related activities to strengthen countries' capacity to prevent and control cholera, especially those related to implementation of proven effective strategies and monitoring of progress, dissemination and implementation of technical guidelines, operational manuals, etc.
- To support the development of a research agenda with special emphasis on evaluating innovative approaches to cholera prevention and control in affected countries.
- To increase the visibility of cholera as an important global public health problem through integration and dissemination of information about cholera prevention and control, and conducting advocacy and resource mobilization activities to support cholera prevention and control at national, regional, and global levels.

<https://www.gtfcc.org/wp-content/uploads/2019/10/gtfcc-terms-of-reference.pdf>

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## Members

- More than 50 partner institutions (e.g., non-governmental organizations, international and intergovernmental organizations, public health institutes, universities, hospitals etc.).
- Secretariat and planning support provided by WHO, acting through the Department of Infectious Hazard Management.
- Five working groups: Laboratory, Epidemiology, Case Management, WASH, Oral Cholera Vaccines

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# WHO Advisory Committee for Variola Virus Research (ACVVR)

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## Date Established

1999

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## Type (Official or Informal)

Official

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## Objectives

As per the Resolution WHA52.10, the ACVVR 'will establish what research, if any, must be carried out to reach global consensus on the timing for destruction of existing variola virus stocks'.

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## Terms of Reference

- Advise WHO on all actions to be taken with respect to variola virus;
- Develop a research plan for priority work on the variola virus;
- Devise a mechanism for reporting of research to the global health community; and
- Outline an inspection schedule to confirm the strict containment and ensure a safe and secure research environment for variola virus work.

[https://www.who.int/docs/default-source/documents/health-topics/smallpox/tors-acvvr.pdf?sfvrsn=21ce40c3\\_4](https://www.who.int/docs/default-source/documents/health-topics/smallpox/tors-acvvr.pdf?sfvrsn=21ce40c3_4)

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## Members

18 members serving in their individual expert capacity, and as per the terms of reference, representing a broad range of areas of expertise including inter alia the relevant scientific disciplines, biotechnology, biosecurity, public health preparedness and bioethics, as well as geographic and gender representation.

The Chair is a member of the committee.

Advisors to the committee and presenters are invited as needed.

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## Activity Summary (routine)

- Annual meeting to review research needs and gaps and approved research using variola virus.
- Oversight of the inspections of the variola virus research labs:
  - Smallpox Facility and Repository at the Federal Budgetary Research Institution (FBRI), State Research Center of Virology and Biotechnology (SRC VB) VECTOR, Rospotrebnadzor, Novosibirsk Region, Russian Federation
  - Research facility for Smallpox and Other Poxviruses at the National Centre for Emerging and Zoonotic

# Eliminating Yellow fever Epidemics (EYE) Strategy

## Date Established

2017

## Type (Official or Informal)

- Multi-partner initiative
- Formal governance structure regulated by a partner-vetted governance document that will soon be made available online
- WHO serves as Secretariat

## Objectives

The long-term (2017-2026) global strategy to “Eliminate Yellow Fever Epidemics” (EYE) aims at:

- protecting at-risk populations;
- preventing international spread; and
- containing outbreaks rapidly.

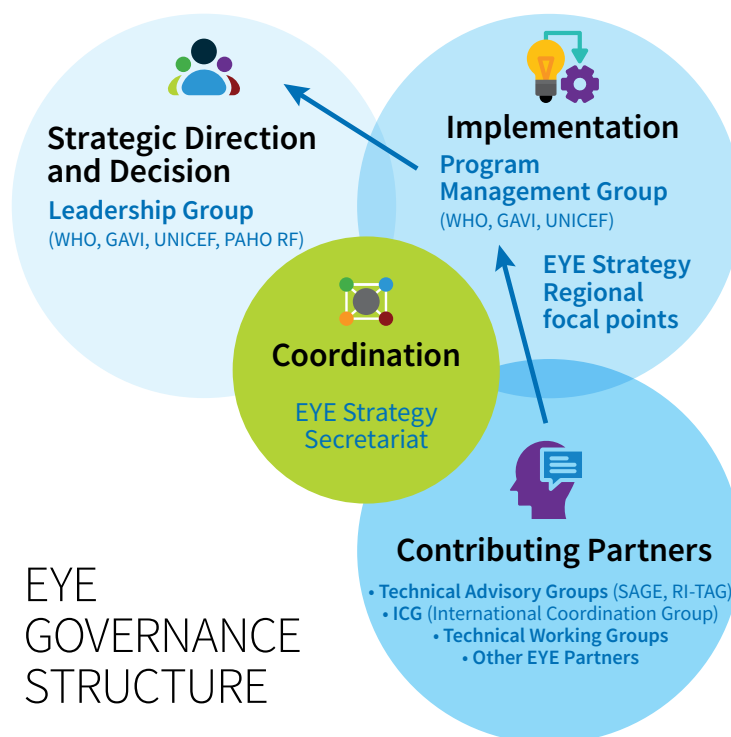
## Terms of Reference

The EYE Leadership Group (LG), comprising senior management of the three core partner agencies (WHO, UNICEF, GAVI), is responsible for the high-level direction of the EYE strategy and decision-making. The leadership group is a standing body of the EYE governance structure. Its role is to provide political and strategic direction to the PMG and to engage and identify partners and donors in high-level discussions related to the strategy.

The EYE Programme Management Group (PMG) is a standing body of the EYE governance structure and serves a technical function as well as a coordinating function to ensure implementation of the EYE strategy.

Subject to the sustainable availability of sufficient human and financial resources for this purpose, Secretariat and planning support for the EYE Strategy are provided by WHO, acting through the Department of Health Emergency Interventions (HEI). The EYE Secretariat is based in WHO Headquarters. Its role is to provide organizational support and ensure smooth and efficient operation of all activities of the leadership group, program management group, and contributing partners.

Technical Working Groups are also part of the EYE strategy governance. They are specific and specialized advisory groups to the PMG and inform the three core partner organizations on specific technical issues. The working groups are designed to provide more in-depth technical expertise and advice to the EYE Strategy and its implementation. Working groups that undertake standard-setting activities must follow WHO rules



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regarding standard setting. Technical needs have been identified as priorities and specialized working groups created accordingly: 1) Risk Analysis Working Group (RAWG), 2) Demand and Supply Working Group (DSWG), 3) Laboratory Technical Working Group (LTWG), and 4) Vaccine Delivery Working Group (VDWG).

## Members

Coalition of multiple partners and countries steered by three core agencies (WHO, UNICEF, and GAVI), with WHO also serving as Secretariat. The EYE partnership involves more than 50 global partners of varied mandates and expertise (e.g., NGOs, research institutes, academia, multilateral agencies, disease control centers).

## 2022 Activity Summary

### Vaccination:

- **Reactive vaccination (outbreak response):**
  - 4.9 million people protected in Africa (Cameroon, Chad, Central African Republic (CAR), Kenya, Niger)
- **Routine Immunization:**
  - 18 million children protected in Africa
- **Preventive Mass Vaccination and Reactive Vaccination Campaigns:**
  - 52.6 million protected in Africa
  - 1.8 million protect in Latin America & the Caribbean

### Laboratory:

- One multi-country level workshop for plaque reduction neutralization tests (PRNT) by Regional Reference Laboratories (RRLs) to strengthen laboratory diagnostic capacities and data management.
- Serology accreditation in Ghana – total of 18 national laboratories now accredited.
- Eleven onsite technical support (eight new labs & three operational with technical issues)

**Capacity building:** 12 countries in Africa benefitted from training on YF outbreak investigation and response conducted by the YF Incident Management Support Team (IMST).

### Midterm evaluation of the EYE Strategy conducted.

### Other:

- Country profiles for 9 high-risk countries were completed and can be found by clicking here: Argentina, Bolivia, Brazil, Colombia, Ecuador, Guyana, Panama, Paraguay, Peru, Suriname, Trinidad & Tobago, Venezuela.
- YF outbreak toolbox launched.
- Four countries (Niger, Togo, Nigeria, Mauritania) have completed / are undergoing training for their SURGE team members deployed to support emergency responses.
- 86.7 million doses of YF vaccine procured through UNICEF.
- Technical assistance (TA) map for Uganda for yellow fever vaccine (YFV) introduction into RI programme.
- TA for Uganda PMVCs; multi-year TA for Uganda, including micro-planning and implementation to improve
- immunization coverage, to facilitate activities of the national immunization surveillance expert committees, and orientation of new health administrations on surveillance.
- Research completed into exploration of difference in vaccination rates for the YFV and measles-containing vaccine (MCV).

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# Technical Advisory Group for Arboviruses (TAG-Arbovirus)

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## Date Established

2021

The TAG-Arbovirus establishment follows the creation of the internal Zika Task Force in 2017. WHO is working with the regions and member states on implementing the Global Arbovirus Initiative (GLAI) an integrated approach to tackle arboviral diseases with epidemic and pandemic potential. The Technical Advisory Group on Arbovirus (TAG-Arbovirus) is an independent and multidisciplinary group of experts that provides WHO technical, scientific and strategic considerations on arboviruses.

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## Type (Official or Informal)

Official

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## Objectives

The Technical Advisory Group on Arbovirus (TAG-Arbovirus) meets regularly to discuss and analyze the impact of arboviruses globally and provide technical, scientific and strategic considerations on arboviruses and the Global Arbovirus Initiative.

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## Terms of Reference

The TAG shall have the following functions:

- to provide independent evaluation of the scientific, technical and strategic aspects of the Global Arbovirus Initiative (GLAI);
- to recommend priorities on Arbovirus research within WHO;
- to advise WHO on GLAI approaches and/or strategies to be pursued in WHO Member States; and advise WHO on matters pertaining to the review of progress in the GLAI implementation; and
- to make recommendations to WHO on any necessary modifications and/or updates to the GLAI.

[https://cdn.who.int/media/docs/default-source/emergency-preparedness/terms-of-reference-tag-on-arbovirus.pdf?sfvrsn=7d2a34cf\\_5](https://cdn.who.int/media/docs/default-source/emergency-preparedness/terms-of-reference-tag-on-arbovirus.pdf?sfvrsn=7d2a34cf_5)

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## Members

16 members serving in their individual expert capacity, and as per the terms of reference, representing a broad range of areas of expertise including the relevant scientific disciplines, epidemiology, clinical management, laboratory, genomic surveillance, entomological surveillance and vector control, community engagement, as well as geographic and gender representation. The Chair is a member of the committee. Advisors and observers to the committee are invited as needed.

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## 2022-23 Activity Summary

- The TAG-Arbovirus was officially established in October 2021.
- The Global Arbovirus Initiative was launched in March 2022, in collaboration with Yellow Fever EYE strategy and Dengue (outside of WHE).
- The TAG meetings were held physically in Accra, Ghana on June 20-22, 2022, and virtually on December 13, 2022 and provided recommendations about the priority actions for the upcoming years on arboviruses:
  - Integrated data systems are key to monitor transmission of known arboviruses and early detect the introduction of emerging arboviruses. The TAG highlighted the importance of data sharing,

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collaboration, transparency and integration of epidemiological, laboratory, entomological and environmental data are pivotal to better understand the transmission dynamics of the known arboviruses and prepare for the emergence of arboviruses with epidemic and pandemic potential.

- Develop preemptive vector control surveillance and interventions for implementation during inter-epidemic periods in urban development strengthening capacities in integrated vector surveillance and control building multisectoral collaborations for vector surveillance and control and integrating urban readiness for yellow fever vector control in susceptible urban centers.
  - The TAG also discussed the role of genomics in arbovirus surveillance, which should not detract from basic diagnostic capacity building and access but will be pivotal to strengthen molecular diagnostic target matching, determining genotype circulation and association with vector transmissibility and disease severity.
  - Develop innovative platforms for community and partners engagement to strengthen community engagement and resilience for arboviruses.
  - Inventory of partners working on arboviruses to expand partnerships for next steps of implementation of the Global Arbovirus Initiative.
- The full meeting report is currently under review by the TAG members for publication, and it is expected to be available online soon.

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# International Coordinating Group (ICG) for the provision of yellow fever, meningococcal, cholera, and Ebola emergency vaccines

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## Date Established

1997 (meningococcal vaccine stockpile)

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## Type (Official or Informal)

Informal

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## Terms of Reference

The Governance Oversight Committee (GOC) for the ICG mechanism, comprising senior management of the four core partner agencies (IFRC, MSF, UNICEF, and WHO) and Gavi, is responsible for: i) providing strategic direction to the ICG to review performance of the process to agreed indicators, ii) ensuring alignment of the ICG mechanism with its founding principle of rapidly providing vaccines for emergencies based on technical needs assessment and according to principles of equitable access and, iii) advising on linkages between activities and decisions in other disease control initiatives for yellow fever, cholera and meningitis.

The core function of the ICG mechanism is the decision-making on allocation of limited vaccines. Furthermore, it includes a broad range of functions and activities contributing to the financing and procurement of vaccines, forecasting of vaccine demand and supply, deployment and implementation of vaccination. An ICG accountability framework describes these activities and the roles and responsibilities of partners involved in the mechanism and provides measures against which the performance of the ICG mechanism is assessed.

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## Members

The ICG is made up of four member agencies in charge of the decision-making process: IFRC, MSF, UNICEF, and WHO. UNICEF Supply Division conducts wide scale vaccine procurement and shipment. Gavi, the Vaccine Alliance is the principal funder of the vaccine stockpiles and serves as an observer to the ICG decision-making process.

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## Objectives

The ICG's main objective is to make equitable decisions at the global level regarding the stockpiling and deployment of vaccines for four epidemic-prone diseases. The aim is to:

- Rapidly deliver vaccines to respond to disease outbreaks.
- Provide equitable vaccine allocation through careful risk assessment, based on epidemiologic and operational criteria.
- Coordinate the use of limited amounts of vaccines and essential medicines.
- Reduce wastage of vaccines and supplies.
- Advocate for readily available, low-cost vaccines and medicines.
- Work with manufacturers through UNICEF and WHO to guarantee availability of vaccine emergency stockpiles at global levels.
- Follow standard operating procedures and establish financial mechanisms to purchase emergency vaccine supplies and ensure their sustainability.

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## 2022 Activity Summary

- ICG annual meeting for cholera, meningitis, yellow fever, and Ebola: 25 – 27 October 2022.

### Meningococcal meningitis

- A total of two vaccine requests from one country for 998,000 doses of meningococcal vaccine were made in 2022, of which 816,000 doses were approved by the ICG.
- Regarding the ICG's key time performance indicators, the mean decision time for the two requests was 1 day and mean vaccine delivery time was 15 days. Mean time to campaign start after vaccine arrival was 23 days.
- The ICG also repurposed a total of 157,000 doses of meningococcal vaccine with short shelf-life from the emergency stockpile to conduct a preventive vaccination campaign targeting high-risk populations in one country.
- Additionally, the ICG released a total of 27,600 vials of ceftriaxone to support meningitis outbreaks in 4 countries.

### Yellow fever

- In 2022, a total of 7 requests from 6 countries were submitted to the ICG for 10.5 million doses of yellow fever vaccine, of which 4.1 million doses were approved by the ICG.
- Regarding the ICG's key time performance indicators, the mean decision time for the requests was 2.3 days and mean vaccine delivery time was 17.8 days. Mean time to campaign start in-country was 65 days.

### Cholera

- In 2022, a total of 23 requests from 12 countries were submitted to the ICG for 62.2 million doses of oral cholera vaccine (OCV), of which 40.6 million doses were approved.
- In October 2022, the ICG temporarily suspended the standard two-dose vaccination regimen in cholera outbreak response campaigns, using instead a single-dose approach, due to the limited global supply of OCV.
- Regarding the ICG's key time performance indicators, the mean decision time for requests was 1.8 days and the median for vaccine delivery time for the approved requests was 18.5 days. Median time to campaign start was 24 days.

### Ebola virus disease

- A total of two vaccine requests from one country for 2,500 doses of Ebola vaccine were made in 2022, and the same quantity was approved by the ICG.
- Concerning the ICG's key performance indicators, the decision of both requests was made the same day they were shared with the ICG members. The mean vaccine delivery time was 6 days.
- Additionally, a total of 12,000 doses of Ebola vaccine with short shelf-life were repurposed to one country for a preventive vaccination campaign of frontline healthcare workers.

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# Strategic advisory group of experts (SAGE) on Immunization

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## Date Established

1999

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## Type (Official or Informal)

Official

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## Terms of Reference

SAGE is the principal advisory group to WHO for vaccines and immunization. It is charged with advising WHO on overall global policies and strategies, ranging from vaccines and technology, research and development, to delivery of immunization and its linkages with other health interventions. SAGE is concerned not just with childhood vaccines and immunization, but all vaccine-preventable diseases.

In its capacity as an advisory body to WHO, SAGE shall provide:

- **Policy advice on vaccines and on immunization** – This is based on the synthesis of scientific and technical information with considerations of programme implementation to form normative guidance, e.g., for vaccine use published as WHO vaccine position papers.
- **Strategic advice** – This is based on the technical review and appraisal of vaccine-preventable disease (VPD) control or global vaccine and immunization strategies developed by WHO and partners. SAGE reviews the evidence base for strategies, targets and objectives; identifies gaps or areas for improvement; and determines whether to endorse the reviewed strategies.
- **Monitoring and evaluation** – This consists of providing external independent appraisal on progress toward vaccine and immunization goals defined by the global community and to provide advice on ongoing efforts, need for and approaches to course corrections.
- **Strategic foresight and innovation** – This consists of identifying research needs and areas that require innovation in order to achieve VPD control targets more effectively.

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## Members

- SAGE shall have up to 20 members. Currently, SAGE is comprised of 15 members, who serve in their personal capacity and represent a broad range of disciplines encompassing many aspects of immunization and vaccines - epidemiology, public health, vaccinology, paediatrics, internal medicine, infectious diseases, immunology, drug regulation, programme management, immunization delivery, health-care administration, health economics, and vaccine safety.
- SAGE meets at least twice a year, with working groups established for detailed review of specific topics prior to discussion by the full group. Priorities of work and meeting agendas are developed by the Group in consultation with WHO.
- UNICEF, the Secretariat of the GAVI Alliance, and WHO Regional Offices participate as observers in SAGE meetings and deliberations. WHO also invites other observers to SAGE meetings, including representatives from WHO regional technical advisory groups, non-governmental organizations, international professional organizations, technical agencies, donor organizations and associations of manufacturers of vaccines and immunization technologies. Additional experts may be invited, as appropriate, to further contribute to specific agenda items.

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## Current SAGE working groups

- SAGE Working Group on Covid-19 vaccines (established June 2020)
- SAGE Working Group on Dengue Vaccines (established November 2022)

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- SAGE Working Group on Ebola Vaccines and Vaccination (established November 2014)
  - SAGE Working Group on potential contribution of HPV vaccines and immunization towards cervical cancer elimination (established June 2018)
  - SAGE Working Group on meningococcal vaccines and vaccination (established May 2019)
  - SAGE Working Group on Pneumococcal Vaccines (adjusted December 2019)
  - SAGE working group on polio (Established August 2008)
  - PAG for the Malaria Vaccine Implementation Programme (established May 2016)
  - Smallpox and monkeypox vaccines (established April 2022)

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## Upcoming SAGE working groups

SAGE working group on RSV

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## 2023 Activity Summary

SAGE meets twice per year (March and September). Exceptional meetings are convened in case of the need for immunization guidance within a public health emergency.

- SAGE held a meeting on 20-22 March 2023 and discussed the following agenda:
  - Global Reports
  - Regional reports with deep dive on measles
  - Partnering with regions and countries to identify priority pathogens for new vaccines
  - Roadmap for COVID-19 vaccination in the era of Omicron
  - Status of new TB vaccine candidates intended for adults and adolescents: preparing the pathway for use
  - Polio
  - Malaria
- Meeting reports including background documents are available online <https://www.who.int/groups/strategic-advisory-group-of-experts-on-immunization/meetings>
- WHO Vaccines Position Papers are available online (regularly updated) <https://www.who.int/groups/strategic-advisory-group-of-experts-on-immunization/meetings> COVID-19 vaccines technical documents are available online (regularly updated) <https://www.who.int/groups/strategic-advisory-group-of-experts-on-immunization/covid-19-materials>
- Interim statements and news are available online <https://www.who.int/groups/strategic-advisory-group-of-experts-on-immunization/sage-newsroom> Key information on current routine immunization recommendations available in summary tables <https://www.who.int/teams/immunization-vaccines-and-biologicals/policies/who-recommendations-for-routine-immunization---summary-tables>

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# Strategic and Technical Advisory Group on Infectious Hazards (STAG-IH) with Pandemic and Epidemic Potential

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## Date Established

2018

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## Type (Official or Informal)

Official

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## Objectives

The Strategic and Technical Advisory Group on Infectious Hazards with Pandemic and Epidemic Potential (STAG-IH) provides independent advice and analysis to WHO on the infectious hazards that may pose a potential threat to global health security. It has an umbrella function as the overarching group advising WHO on relevant infectious hazards.

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## Terms of Reference

The main functions of the STAG-IH are to:

- Provide independent assessment of the global context and horizon scanning of infectious diseases with pandemic and epidemic potential including newly emerging and re-emerging zoonosis;
- Advise WHO on the prioritization of WHO's strategies and activities in prevention, preparedness and response related to infectious hazards with pandemic and epidemic potential;
- Upon requests by WHO and as the overarching group advising WHO on infectious hazards with pandemic and epidemic potential, to support the Organization in the coordination of, and in providing oversight on, its various mechanisms involved in infectious hazard prevention and control (e.g., technical/scientific advisory groups on specific diseases) for greater global health security;
- Upon request by WHO, review information about new and emerging infectious diseases and ongoing outbreaks and provide advice on further investigation, prevention and control, research and innovation;
- Support WHO in providing technical and scientific advice to external or independent groups (e.g., Global Preparedness Monitoring Board (GPMB)) on issues related to infectious hazards with pandemic and epidemic potential.

[https://www.who.int/publications/m/item/strategic-and-technical-advisory-group-on-infectious-hazards-with-pandemic-and-epidemic-potential-\(stag-ih\)-terms-of-reference](https://www.who.int/publications/m/item/strategic-and-technical-advisory-group-on-infectious-hazards-with-pandemic-and-epidemic-potential-(stag-ih)-terms-of-reference)

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## Members

30 members

[https://www.who.int/groups/strategic-and-technical-advisory-group-for-infectious-hazards-\(stag-ih\)](https://www.who.int/groups/strategic-and-technical-advisory-group-for-infectious-hazards-(stag-ih))

**Note:** STAG-IH was approved to have a transitional arrangement with 30 members compared to 25 described in the ToR to ensure good continuity of the excellent performance of the STAG-IH.

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## 2022-2023 Activity Summary

- The 2022 annual meeting was held in Geneva from 24<sup>th</sup> to 26<sup>th</sup> October 2022 by convening chairs of advisory groups and WHO Collaborating Centres (WHO CCs) relevant to pandemic preparedness. As a result of the meeting, the annual report titled “Epidemic and pandemic preparedness and response 2023 Annual Report: Future Surveillance” was published.
- STAG-IH has provided strategic and technical advice to WHO in terms of COVID-19 pandemic response inclusive of updating COVID-19 reporting requirements for Member States.
- STAG-IH participated in the external consultation process for [GPMB](#) monitoring framework by reviewing indicators related to surveillance, laboratory capacity and One Health. This contribution helped improve the monitoring framework.
- In August 2023, STAG-IH established “Working Group on Trust and Pandemic Preparedness” to advise WHO on the evidence-informed implementation, monitoring and evaluation of public health and social measures during health emergencies. The Working Group is in the process of developing a workplan and targeted deliverables.
- The 2023 annual meeting of STAG-IH will be held from 23<sup>rd</sup> to 24<sup>th</sup> November 2023 at WHO HQ in Geneva, aiming to 1) explore ‘New Vulnerabilities’ (infectious disease threats) driven by climate and biodiversity change, increasing human-animal interfaces, cyber and information threats, biosecurity issues, and humanitarian crises, 2) review our capabilities against infectious disease threats and 3) recommend priority actions for WHO Health Emergencies Programme (WHE). Additionally, the meeting intends to synergise efforts and boost collaborations with other relevant advisory groups, networks and WHO CCs toward pandemic preparedness.

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# Working Group on Public Health and Social Measures (PHSM) under the STAG-IH

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## Date Established

2021

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## Type (Official or Informal)

Official

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## Objectives

In close coordination with the overarching advice provided by the STAG-IH, the working group on PHSM will advise WHO on the evidence-informed implementation, monitoring and evaluation of PHSM during health emergencies.

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## Terms of Reference

In its capacity as an advisory body to WHO, the working group has the following functions:

- To review the existing evidence on public health and social measures to identify key priorities and challenges and determine research priorities;
- To advise on the development and application of methodologies to monitor and evaluate the effectiveness and broader health, social and economic impact of public health and social measures during health emergencies;
- To advise on a framework and recommend activities to promote the systematic and harmonized implementation, monitoring and evaluation of public health and social measures during health emergencies.

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## Members

The working group shall have up to 15 members from the STAG-IH, who shall serve in their personal capacities to represent the broad range of disciplines relevant to measuring the effectiveness and broader health, social and economic impact of public health and social measures during health emergencies. In the selection of the working group members, consideration shall be given to attaining an adequate distribution of technical expertise, geographical representation and gender balance.

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## 2022-2023 Activity Summary

- Contribution of the PHSM working group and STAG-IH members to the development of an IHR benchmark on PHSM
- Contributed to PHSM global research priority survey
- Participated in the second global technical consultation on PHSM during health emergencies (21-23 November 2023, Geneva)

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# Working Group on Trust and Pandemic Preparedness under STAG-IH

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## Date Established

August 2023

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## Type (Official or Informal)

Official

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## Terms of Reference

The Working Group will provide advice to WHO to:

- Advance global research on the role of trust in pandemic preparedness by convening a diverse and representative community of researchers to collate, synthesize and generate the evidence necessary to define the dimensions of trust.
- Develop a high-level index to measure in real-time the levels of trust prior to and during epidemics and pandemics.
- Define a package of interventions that can be adapted/ localized to build trust prior to epidemics and pandemics and to sustain trust during.
- Build a global community of research and practice for exchange of good practice and to support implementation of the initiative.

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## Members

The Working Group comprises up to 15 members, who shall serve in their personal capacities to represent the following disciplines: “global health histories, health equity, access to countermeasures, faith, social sciences, infodemic management, pandemic preparedness and others”. The members of the Working Group are selected and appointed by WHO in consultation with the STAG-IH. Additional members may be invited by the Working Group Chair to join a specific workstream where there is a gap in expertise.

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## 2023-24 Activities (planned)

Since the Working Group was established in August 2023, the following workstreams are being considered for 2023-24 activities.

- Develop guidance and interventions to foster cooperation in low trust settings
  - Develop a Trust Pulse (survey tool)
  - Identify interventions to protect/sustain existing trust
  - Promote evidence-driven policy by exchanging knowledges/practices and embedding trust in a key consideration in national pandemic preparedness and response efforts
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# Emergency Medical Teams (EMT) initiative

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## Date Established

- EMT Initiative initiated 2014-2015.
- EMT Strategic Advisory Group (SAG) established 2016.
- EMT Core Support Group (CSG) established 2016.
- EMT Regional Groups established as of 2016 (Americas), 2017 (Western Pacific), 2018 (Europe region), 2018 (SE Asia region); Regional Groups being established in Africa, and Eastern Mediterranean in 2020 and beyond, following EMT SAG's decision of 2017 to regionalize the EMT Initiative in line with the WHO regions. Member state led process, but NGO working groups also established in AMRO and EURO.

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## Type (Official or Informal)

Official

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## Objectives

- Support and implement EMT capacity strengthening, preparedness, and training activities at national, regional and international levels, including by developing guidance and tools for national response activation and coordination.
- Promote and lead (or support, as relevant) establishment of EMT Coordination within the Health EOC of Ministries of Health for efficient and timely activation and coordination of national and international medical team response following a sudden-onset disaster, outbreak, and/or other emergency requiring a surge in clinical care.
- Continuously develop, agree on, and promote clinical, technical, and operational minimum standards for EMTs responding to disasters and outbreaks, and the adaptation of these standards and coordination mechanisms in armed conflict settings; identify and share best practices among EMTs and countries, based on research and lessons learned.
- Provide a framework for quality assurance of EMTs, and manage the peer review and classification process of international EMTs; support countries developing their national EMT accreditation systems.
- Ensure commitment and ownership of the EMT initiative by EMTs and their organizations and Member States as well as other relevant national, regional and international stakeholders.

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## Terms of Reference

Available for SAG; CSG and for all Regional Groups

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## Members

- 130 Member States have EMT focal points and are active members of their respective regional groups as well as being open to all NGOs with EMTs. These form regional groups to inform the SAG through their chairs.
- 6 EMT Regional Groups, Regional groups are also open to organizational focal points from all active NGO and IO EMTs. Each region has a Regional chair and 2 Vice-chairs (incoming and outgoing).
- EMT SAG: 27-30 (Global Chair, 1 Regional Chair, and 2 Vice-Chairs per region, 2 representatives from the CSG, 2 representatives from regional organizations, IFRC, ICRC, and MSF [observers], UN OCHA, 1 recently affected country, Global Health Cluster, GOARN, EMT Secretariat, WHO EMO, WHO Regional Offices).
- EMT CSG: EMT Global Chair (chair), representatives of all countries that provide support (financial or in-kind) to the EMT Initiative, WHO: Director, Emergency Operations & Manager, Resource Mobilization, WHO-WHE, Geneva and Global and regional WHO EMT secretariat.
- 32 WHO Classified Teams globally.
- 100 teams in the process of international classification.

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# Global Laboratory Alliance for the Diagnosis of High Threat Pathogens (GLAD-HP)

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## Date Established

2017

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## Type (Official or Informal)

Informal.

Formalization planned but postponed due to COVID-19. But the formalized “WHO reference laboratories providing confirmatory testing for COVID-19” has been established with members of the GLAD-HP network. Now more than three years post COVID-19 pandemic lessons can be used to further establish the network.

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## Objectives

- Build a functional global diagnostic alliance based on WHO core values that can provide coordinated diagnostic outbreak response, assuring timely and accurate detection of emerging pathogens with epidemic potential.
- Establish collaboration, build capacity, develop guidance documents and create a platform to enable improved establishment of the aetiology of disease in outbreaks and towards rapid development, validation and implementation of accurate and accessible diagnostics for (re)emerging pathogens.
- Collaborate on cross-cutting diagnostic challenges across the disease-specific lab networks in order to avoid wasteful duplication and ensure effective engagements of relevant networks during disease X outbreaks. Cross-cutting issues to be addressed include: data and sample sharing, effective utilization of new diagnostic technology, platform for data sharing, quality assurance in outbreak settings, biosafety and biosecurity and rapid and safe transportation of infectious substances to reference laboratories.
- Empower member states to perform diagnostics for high threat and emerging pathogens by promoting development of and access to innovative technologies that assure safe and reliable diagnostic testing.

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## Terms of Reference

GLAD-HP provides guidance and sets standards for the detection of emerging pathogens with epidemic potential in alliance with existing networks and stakeholders. This umbrella function assures that cross-cutting issues are addressed and builds on WHO core values. GLAD-HP aims to lay the groundwork for a future of timely and accurate detection of high-threat pathogens, rapid development of diagnostics for novel pathogens, enabling containment of an outbreak at the earliest stage possible, and critical analyses of virus evolution and phylogenetic analyses.

To participate in the alliance, members will have to comply with a code of conduct, which is in development by the GLAD-HP secretariat, with input from consultations (internal and external) with the core GLAD-HP working group and other stakeholders.

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## Members

Diagnostic experts from established institutes with global representation working in public health, clinical, and research laboratories and in non-human (e.g. veterinary and food safety, wildlife) laboratories.

GLAD-HP members will include, but are not limited to, members of disease specific and other existing laboratory networks established by WHO. GLAD-HP will include representatives from WHO and non-WHO laboratory networks, United Nations Food and Agriculture Organization (FAO), office International des Epizooties (OIE), relevant NGOs and multilateral agencies.

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## 2023 Activity Summary

- Reference laboratories for confirmatory testing of SARS-CoV-2, the development, evaluation and sharing of SARS-CoV-2 diagnostic protocols, distribution of validated and high-quality diagnostics, rapid sharing of clinical samples and sequences, viruses and sequences and the validation and rapid development, manufacturing and shipment of SARS-CoV-2 molecular diagnostics. Continued support of the network to COVID-19 activities are ongoing.
- Members of the GLAD-HP network ongoing consultation to update [interim guidance for the laboratory testing for the monkeypox virus](#). Support the critical appraisal of available diagnostics and validation of the tests, in order for WHO to rapidly provide access to testing to Member States and network partners in need.
- With the lessons learned from the COVID pandemic the GLAD-HP alliance network is being updated to reflect the needs to assure that that WHO has an umbrella alliance that works with networks in and outside the organization to assure that laboratories around the globe can support the required work on preparedness and response for pathogens with epidemic and pandemic potential.

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# Emerging and Dangerous Pathogens Laboratory Network (EDPLN)

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## Date Established

2008

The establishment of the WHO Global Emerging and Dangerous Pathogens Laboratory Network (EDPLN) was the successful outcome of two informal WHO consultations. The first, held in Libreville, Gabon, in March 2008, focused on VHF laboratory responses in Africa, and the second, held at WHO-Geneva in February 2009, expanded the focus to EDP laboratory responses worldwide.

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## Type (Official or Informal)

Official. All EDPLN members are members of the Global Outbreak Alert and Response Network (GOARN). EDPLN is firmly coordinated with GOARN for laboratory preparedness and response.

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## Terms of Reference

The WHO Global Emerging and Dangerous Pathogens Laboratory Network (EDPLN) will:

- Focus on maintaining global public health security by ensuring coordinated mechanisms for detection, management, and prevention of disease outbreaks.
- Help Member States build national and regional laboratory capacity.
- Consist of a technical partnership between institutions and networks.
- Complement and strengthen existing networks and develop new ones to become a global network.
- Work to reduce the international spread of outbreaks by detection, management, and prevention of threats leading to a coordinated approach.
- Contribute to long-term outbreak preparedness and laboratory capacity building at national and regional levels.
- Constantly evaluate international efforts to minimize and contain outbreaks.

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## Members

EDPLN is a network of 23 high-security laboratories working on diagnostic and research related to emerging and dangerous pathogens. EDPLN is coordinated by the Viral Hemorrhagic Fever (VHF) team in the WHE programme.

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## Objectives

WHO EDPLN was established to assist WHO in:

- Enhancing the readiness and response of countries for timely laboratory detection and management of outbreaks of novel, emerging, and re-emerging pathogens
- Facilitating the transfer of safe and appropriate diagnostic technologies, practices, and training to laboratories in affected countries, as outlined in IHR (2005)
- EDPLN provides evidence-based strategies, tools, and practices for rapid detection and containment of outbreaks of novel, emerging, and dangerous pathogens to minimize their impact on public health, health systems, and economies of affected areas.

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## Activity Summary (routine)

- Provide real-time communication to ensure that outbreak information and laboratory investigation results are shared immediately to trigger, orient, and enhance outbreak control measures.

- Formalize a network of high-security laboratories that collaborate and share their knowledge, biological materials, and experimental research results in a real-time framework.
- Provide scientific and technical expertise so that effective and scalable laboratory capabilities are deployed when outbreaks occur and are made available to improve clinical care of patients, surveillance activities, and outbreak control operations.
- Promote the development of External Quality Assurance programs to evaluate laboratory diagnostic capacities at regional and global levels.
- Conduct ecological studies at the human-animal interface.
- Provide a high-quality laboratory field platform to support Research & Development (e.g., new Ebola vaccines and treatments) for dangerous pathogens with epidemic potential.
- Engage with partners in operational research to review or confirm prevention and control strategies (e.g., new mode of Ebola transmission, real-time gene sequencing analysis).
- Provide technology transfer and training so that Rapid Diagnostic Tests (RDTs) and Nucleic Acid Tests (NATs) are appropriately evaluated and that transfer of technology to regional networks and countries is implemented.
- Support international and regional workshops and trainings to ensure transfer of technology and know-how.
- Coordinate the production of reagents, and facilitate their distribution and pre-positioning.
- Provide a laboratory field operational platform for the appropriate assessment of point-of-care Ebola RDTs and NATs.
- Provide a forum for collaborative engagement to promote sharing of knowledge about emerging and dangerous pathogens, laboratory science and tools, and disease ecology.
- Establish a permanent EDPLN secretariat and forum for improving coordination of activities.
- Promote collaboration and/or partnership with other international and regional laboratory networks (e.g., AFR- EDPLN, European Emerging Viral Diseases-Expert Laboratory Network (EVD-LabNet) and European Virus Archive – GLOBAL (EVAg) networks, Laboratory Network of the GHSAG, Biobanking and BioMolecular Resources Research Infrastructure, European Research Infrastructure Consortium).
- Through the GOARN/EDPLN umbrella, support the development for minimum standards for mobile laboratory deployment.

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### 2022-23 Activity Summary

- **Network activities:** Several online meetings were organized in the margin of several GOARN meetings, and EDPLN secretariat attended the weekly GOARN meetings during outbreaks of Emerging and Dangerous pathogens followed by the VHF team.
- **Outbreak response :** Over 2022-2023 EDPLN work has focused mostly on supporting two Ebola virus disease outbreaks responses in the Democratic Republic of the Congo, one Sudan Virus Disease outbreak response in Uganda; three Marburg virus disease outbreak response in Guinea, Equatorial Guinea and Tanzania; seasonal Lassa Fever outbreaks in West Africa; seasonal Crimean-Congo Haemorrhagic Fever outbreaks in Afghanistan, Iraq, Mauritania, Turkey and Uganda; and several Rift Valley Fever outbreaks in Eastern Africa. Main activities included development of SOP and expert guidance documents as well as field support for establishing full genome sequencing capacities at country level, trainings and operations.
- **External Quality Assessment :** EDPLN worked closely with WHE Public Health Laboratory (PHL) team on implementing a Global External Quality Assessment (EQA) for VHF laboratory capacities targeting the VHF WHOCC and other VHF reference laboratories.
- **On research and development :** work has focused on the WHO R&D blueprint priority pathogens including filoviruses, Lassa fever, Crimean-Congo Haemorrhagic Fever, Nipah virus and Rift Valley Fever. EDPLN provided relevant expertise for supporting the development of R&D roadmaps and further advance clinical management of these diseases.

More information is available on the WHO website: [Emerging and Dangerous Pathogens Laboratory Network \(EDPLN\) \(who.int\)](https://www.who.int/emergencies/diseases/nipah-virus)

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# Emerging Diseases Clinical Assessment and Response Network (EDCARN)

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## Date Established

The Emerging Diseases Clinical Assessment and Response Network (EDCARN) comprises collaborating centres and individuals from governmental and nongovernmental organizations, academia, WHO and other stakeholders aimed at sharing information and experience to enhance clinical care and scientific understanding of emerging infectious diseases (EIDs). It started off informally with activities during the 2003 SARS outbreak; official activities since 2015.

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## Type (Official or Informal)

Official

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## Objectives

- Provide rapid clinical guidance and standards (when adequate materials not available) to manage EIDs during a response, for use by frontline healthcare workers (i.e., national staff, NGOs, EMTs, etc.).
- Provide experienced technical and operational experts to deploy during a response to lead health operations, case management, and/or IPC pillars.
- Develop clinical tools for management of EIDs during outbreaks and for preparedness—including training materials for national teams, facility and IPC checklists, HCW infections surveys, and PEP protocols.
- Develop GRADE-based clinical guidelines using WHO GRC standards for key diseases.
- Develop standardized, core clinical data sets to be collected during outbreaks of EIDs.
- Provide a platform for clinicians around the world to access information and expertise by facilitating a peer-to-peer knowledge-exchange arena.
- Develop key performance indicators to monitor quality during outbreak response

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## Terms of Reference

The WHO Global Emerging Diseases Clinical Assessment and Response Network (EDCARN) will:

- Support WHO's clinical management response in providing safe, scalable, evidence-based clinical care to patients in outbreaks and health emergencies.
- Working with Member States to build national and regional clinical management capabilities through:
  - increasing clinical operations capacity in health facilities (treatment centres) for emerging infection (infrastructure and human resources, clinical pathways, key performance indicators).
  - development and delivery of training materials, tools, and guidelines.
  - monitoring of unregistered and emergency use of promising therapeutics before clinical trials are established (through the MEURI framework).
  - identification and forecasting of medical and supply needs during surge conditions and health emergencies.
  - support for the development and monitoring of comprehensive survivor care programmes for high consequence infection (e.g. Ebola virus disease).
- Support the collection of standardized clinical data for characterizing the nature of emerging infections to improve patient management.

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## Members

Members are clinicians and other subject-matter experts involved in clinical management of and research in EIDs, from governmental and non-governmental organizations, academia, and other stakeholders. Currently, over 120 clinical experts from 65 countries across the six WHO regions actively collaborate in EDCARN.

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## Activity Summary (routine)

- **Network activities:** Several biweekly online meetings were organized during the COVID-19 pandemic, monthly meetings held during MPX PHEIC, and currently ad hoc meetings.
- **Outbreak response:**
  - **Marburg virus disease:** In February 2023, six EDCARN clinical experts were rapidly deployed to Equatorial Guinea to support the Ministry of Health in its response to the outbreak. EDCARN deployed a core team of clinical experts in infectious diseases, filovirus disease and critical care, pharmacy and health logistics to support the Ministry of Health in their response efforts. The EDCARN team also worked with the Ministry of Health to implement the use of investigational therapeutics (remdesivir) under the locally approved expanded access protocols under the MEURI ethical framework. Support was provided through training, set up treatment centres according to new design principles, set up referral pathway, and collection of standardized data using the WHO Clinical platform to describe more current clinical characterization of MVD.
  - **Cholera:** In January 2023, to support the Malawi Ministry of Health in their response efforts, EDCARN deployed a team of clinical experts to develop clinical capacities through training, set up referral pathways with operational partners and EMTs, collected standardized data using WHO Clinical platform to describe more current clinical characterization of cholera and understand rising case fatality ratios.
  - **Sudan Virus:** On 20 September 2022, Uganda declared an outbreak of Sudan virus disease (SVD) after a case of the virus was confirmed in the country's central Mubende District. The Uganda Ministry of Health, together with WHO and other partners, initiated response measures to control the outbreak and prevent further spread. EDCARN deployed a core team of clinical experts in infectious diseases, filovirus disease and critical care to support the Ministry of Health in their response efforts. The EDCARN team also worked with the Ministry of Health to implement the use of investigational therapeutics (monoclonal antibodies) under the locally approved expanded access protocols under the MEURI ethical framework. This important intervention enabled the team to prepare for clinical trials.
- **On research and development:** work has focused on the WHO R&D blueprint priority pathogens including filoviruses, Lassa fever, Crimean-Congo Haemorrhagic Fever, Nipah virus and Rift Valley Fever. EDPLN provided relevant expertise for supporting the development of R&D roadmaps and further advance clinical management of these diseases.
  - Developed the O2COV2 oxygen use and availability observational study protocol that has been implemented in 25 LMIC.
  - Developing an interventional research study on non-invasive respiratory support for acute hypoxemic respiratory failure from respiratory virus infections of pandemic, epidemic and outbreak potential.

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# Technical Advisory Group on the WHO Global Clinical Platform

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## Date established

2020

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## Type

Official (AG91)

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## Objectives

To maximise the relevance and utility of the WHO Global Clinical Platform through which member states, health facilities, and research organizations can support the clinical characterization of patients with emerging infections.

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## Terms of reference (refreshed July 2023)

- Providing WHO advise on strategy of clinical surveillance to inform collaborative surveillance and allow member states to better understand clinical characterization, management and operations of outbreaks to better respond, identify research priorities and conduct research studies.
- Providing advice on the deployment and development of the Global Clinical Platform, including how future platform use can facilitate and inform patient care, health systems implementation, and health policy.
- Supplying, filtering, and prioritising clinical questions and areas of investigation on which the platform should focus;
- Reviewing plans for data use, analysis, and interpretation within the platform, to ensure maximum relevance to global, regional and country-level readiness and response;
- Giving input into draft technical documents, reports and other documents arising from the work of the platform, within professional areas of expertise;
- Promoting the timely sharing of clinical information arising from the platform.

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## Members

(Open call for new members closes Aug 28, 2023):

Terms of reference support up to 24 members, with intentional representation of skills and professional knowledge from: healthcare professionals with interests in clinical monitoring and evaluation of emerging infectious disease; data scientists and IT experts with experience of health surveillance and multi-platform data aggregation and harmonization; health service users and advocates for the safe and effective use of anonymised patient data in improving healthcare, especially in the context of emerging infectious disease.

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## Activity summary

- Oversight of the Global Clinical Platform establishment during the COVID-19 pandemic (more than 1.1 million patients now included)

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# Global Outbreak Alert and Response Network (GOARN) Steering Committee

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## Date Established

2000

GOARN was established in 2000 as a WHO-coordinated network of institutions and stakeholders to improve disease event detection, international coordination and rapid response capacity and operations at local, regional and global levels -- ensuring rapid access to technical assistance and support of expert teams throughout the world who can deploy rapidly and work effectively in the field in a highly coordinated response.

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## Type (Official or Informal)

Official

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## Objectives

The SCOM has outlined plans to take forward the development and operations of the network --an initiative referred to as 'GOARN 2.0,' aligned with the major recommendations mentioned above. GOARN 2.0 involves expansion and increased involvement of partners in a range of activities, and possible engagement with new partners and stakeholders from public, private, and civil society.

The SCOM:

- Approves and monitors implementation of the Network's work plan
- Approves the terms of reference and monitors activities of Technical Working Groups and Standing Sub-Committees
- Approves the addition of new institutions/organizations/networks
- Advocates for the Network and represents the Network at key public health events

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## Terms of Reference

Governance of the network is provided by a Steering Committee (SCOM) comprised of one WHO representative and 20 members from GOARN partners. The SCOM meets every 6 months -- guiding and monitoring the development and operations of the network, approving the terms of reference and monitoring the activities of Technical Working Groups and Standing Sub-Committees; approving the addition of new institutions/organizations/networks to the Network; and advocating for the network and representing the network at key public health events.

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## Members

The GOARN Steering Committee is a representative selection of partner institutions of the Network that oversees the planning, implementation and evaluation of the Network's business and activities. The committee includes 21 member institutions. WHO is a permanent member of the committee, while the other 20 institutions are filled by rotation and agreed-upon selection processes. The Chair and Deputy Chair of the SCOM represent the committee.

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# Risk Communication Advisory Group (RCAG)

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## Date Established

Informally established since 2017.

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## Type (Official or Informal)

Informal. Plans for formalizing the group are being explored.

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## Objectives

- Support development of guidance on risk communication and community engagement for health emergencies.
- Provide expert advice to Member States on risk communication and community engagement as required under the International Health Regulations and the Pandemic Influenza Preparedness Framework.
- Provide surge support to WHO for high-level risk communication and community engagement in-country activities, including capacity building and emergency response.

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## Terms of Reference

- Provides expert advice to WHO in areas related to anthropology, community engagement, health communication, and risk communication for health emergencies
- Functions as a pool of experts on risk communication for the IHR Emergency Committee Roster as needed
- Functions as surge capacity deployment for high-level missions upon requests of Member States

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## Members

17 experts in areas of anthropology, community engagement, health communication and risk communication who are affiliated with academic institutions, NGOs (including MSF), and international organizations (including UNICEF and OIE)

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# Health Security Interface Technical Advisory Group (HSI-TAG)

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## Date Established

2019

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## Type (Official or Informal)

Official

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## Terms of References

Reflecting the evolving and emerging needs of the organization, the [Terms of Reference of the Health-Security Interface – Technical Advisory Group \(HSI-TAG\)](#) were revised and updated in March 2022. New members were appointed in later 2022 according to WHO rules and regulations.

The HSI-TAG will play a critical role in providing advice and recommendations to WHO and as a vehicle for information sharing among relevant actors, through the WHE programme, with the aim to advise WHO on inter-agency coordination, cooperation in this specific area and leadership in the UN system and among partner international organizations. The HSI-TAG will act as an advisory body to WHO in this field.

The HSI-TAG shall have the following functions:

- To identify gaps, vulnerabilities, challenges, and opportunities within the health-security interface;
- To provide WHO with the technical and scientific advice relevant to the health-security interface and the work of the Biosecurity and Health Security Protection (BSP) unit;
- To advise WHO on a platform for information sharing, with the WHO's international and other partners from health and security sectors.

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## Members

18 members (open call process conducted).

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## 2022-2023 Activity Summary

- Re-established HSI-TAG with 18 new members in 2022.
- Met twice in-person in October 2022 (inauguration meeting) and July 2023 (annual meeting), in Geneva, Switzerland.
- An output of the first meeting was the creation of the following Working Groups to support WHO's priority areas of work; Public Health Intelligence for Health-Security Interface, Concept note defining WHO's work on "Health-Security Interface", Information Risk/Digital Security, Deliberate Event/Dual Use Research of Concern (DURC)/Foresight, Chemical/Biological Deliberate Event Roster of Experts/training material, and Deliberate Event preparedness and response through IHR implementation.
- The meeting in July 2023 discussed 2024-2025 WHO priorities and country support. Recommendations are included in the meeting report, which can be found here: <https://www.who.int/publications/m/item/who-health-security-interface-technical-advisory-group-annual-meeting-report-2023>.
- One technical factsheet on Deliberate Event and two question & answers (Q&As) related to disinformation and cyber-attacks on health key infrastructure are currently (August 2023) under review for publishing on the WHO public website.
- Draft concept note defining WHO's work on "Health-Security Interface" is being reviewed.
- Contribution to conferences and meetings: PRET meeting, Geneva April 2023 - The eighth annual Multi-Stakeholder Forum on Science, Technology and Innovation for the SDGs (STI Forum), New York, May 2023.

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- Contribution to review WHO guidance/guidelines document including “The Global guidance framework for the responsible use of the life sciences”, Sept 2022, and Draft “Biosecurity guidance – Managing biological risks at all levels” (revised by the HSI-TAG members in July 2023).
  - Created and established an HSI-TAG WHO group webpage with more information about the activities of the HSI-TAG and its current members. Please find it here: [https://www.who.int/groups/health-security-interface-technical-advisory-group-\(HSI-TAG\)](https://www.who.int/groups/health-security-interface-technical-advisory-group-(HSI-TAG)).

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# Technical Advisory Group on Biosafety (TAG-B)

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## Date Established

Prior to 2000

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## Type (Official or Informal)

Official

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## Objectives

The TAG-B provides independent advice to the WHO including its strategic priorities and plans of action on specific topics relating to biosafety and biosecurity.

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## Terms of Reference

The TAG-B shall have the following functions:

- To provide, review and make recommendations to the WHO of the scientific, technical and strategic aspects of the WHO biosafety programme.
- To recommend priorities to the WHO (e.g. revision of documents, most important areas of biosafety and biosecurity to focus on).
- To advise the WHO on specific topics relating to biosafety and biosecurity.
- To advise the WHO on opportunities, international initiatives and partnerships appropriate to the WHO Biosafety programme.
- To review and makes recommendations to the WHO on biosafety and biosecurity guidance.

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## Members

16 members

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## Activity Summary

- Face-to-face meeting held in Geneva in September 2022, following the virtual conference in July 2022, and another meeting planned in September 2023
- Provided technical support for the development of the WHO biosecurity guidance document

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# Global Infection Prevention and Control Network (GIPC Network)

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## Date Established

2011

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## Type (Official or Informal)

Informal

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## Objectives

- To align expertise to effectively support development, dissemination and implementation of IPC recommendations, technical documents, campaign promotional messages and support the development and use of resources, and training materials and tools (including related to outbreaks).
- To contribute to the information/evidence for the WHO AMR surveillance programme of work and support the implementation of surveillance.
- To enhance global outbreak response through provision of technical advice and rapid development and dissemination of relevant recommendations/documents during emergency situations and provide evidence-based IPC recommendations to contain outbreaks as well as contributing to WHO Emerging Diseases Clinical Assessment and Response Network's (EDCARN) and/or Global Outbreak Alert and Response Network's (GOARN) calls to action in the event of a global health emergency.
- To contribute to defining the global health and research agenda for IPC including in the context of quality universal health coverage, as well as the most effective ways of working together to promote and implement them.

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## Terms of Reference

The Global Infection Prevention Control (GIPC) Network's aim is to enhance local, national (Member States) and international coordination and collaboration in the field of infection prevention and control (IPC) and to support WHO's and Member States' efforts on IPC, from preparedness to IPC systems and programmes' strengthening, outbreak prevention and control, as well as capacity building for surveillance.

[https://cdn.who.int/media/docs/default-source/integrated-health-services-\(ihs\)/gipc-network/gipcn-tor.pdf?sfvrsn=a9750377\\_3&ua=1](https://cdn.who.int/media/docs/default-source/integrated-health-services-(ihs)/gipc-network/gipcn-tor.pdf?sfvrsn=a9750377_3&ua=1)

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## Members

- Institutions, organizations, agencies and professional societies with demonstrated influence and experience in international IPC capacity building, particularly in low resource settings or in settings where IPC capacity is minimal.
- Agencies and organizations that provide emergency IPC in health care services in countries or regions experiencing (or have the potential to experience) communicable disease outbreaks amplified by the provision of care in health care settings
- Selected WHO Collaborating Centres.

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## Current Sub-Working Groups

- **IPC-Education and Training WG**
- **Infection Prevention and Control in Public Health Emergencies Working group (IPC-PHE-WG)**

### i. Objectives (IPC-PHE-WG )

- Support Member States' IPC public health emergencies response efforts through provision of:

- Timely advice within the context of emerging or re-emerging public health threats and events, supported by information and epidemiological data collection and analysis from health care and community settings
- Effectively support the development, peer review and dissemination of rapid advice guidance and relevant derivative products including training materials and community engagement materials
- Support response efforts through facilitating communication and collaboration across existing response networks including GOARN, EDCARN, Emergency Medical Teams (EMT), Global roster of IPC professionals, amongst others and within WHO
- Contribute to defining the immediate and longer-term IPC research priorities and implementation considerations within the context of new or re-emerging pathogens, to inform the development of research protocols

## ii. Terms of Reference (IPC-PHE-WG)

The terms of reference will be available at <https://www.who.int/teams/health-care-readiness/infection-prevention-and-control>

## iii. Member (IPC-PHE-WG)

Members represent the following agencies and institutions: WHO, WHO Collaborating Centre for Reference & Research on Antimicrobial Resistance and Healthcare Associated Infections (UK), MOH (Egypt), GOARN, UK Health Security Agency, IPAC (Canada), Nigeria CDC, UNICEF, Institute of Epidemiology, Disease Control & Research (Bangladesh), UK-Public Health Rapid Support Team, Asia Pacific Society of Infection Control, National Centre for Infectious Diseases Tan Tock Seng Hospital (Singapore), CDC (USA), Asia Pacific Society of Infection Control, Surgical Infection Society – Global Survey (USA), European Committee on Infection Control (Germany), The Global Fund, World Surgical Infection Society, Robert Koch Institute and Hong Kong University.

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## 2022-23 Activity Summary

### Overall Key Activities of GIPCN

- Participation in GIPC Network virtual consultations to provide input towards the Global IPC Strategy report (2022)
- Advocate for partner and staff participation in World Hand Hygiene Day activities and support dissemination of materials (2022 and 2023)
- Up to August 2023 there were seven meetings. The meetings focused on technical input for the development of the Global IPC report, Global IPC strategy, with accompanying global action plan and monitoring framework.
  - Provided input on global IPC strategy and provide member and WHO regional updates (February, March June and July 2022)
  - Provided member updates and input on the global strategy action plan and monitoring framework meeting (June 2023)
  - Participated in GIPC Network global strategy, action plan and monitoring framework development meetings with international external experts (August 2022, May 2023)
- GIPC Network members provided input on the development of the WHO IPC expert online roster (2022 and 2023)

### Key Activities of the Sub-working group (IPC-Education and Training WG)

- Up to August 2023, the GIPC Network Education and training working group held three meetings to contribute to the objectives outlined in the global strategy for infection prevention and control, to build knowledge in infection control and build a career pathway for infection prevention and control. The objectives and outcomes of the meetings included:

- 
- working group revamped and the revised the Terms of Reference and was validated by the members (August 2022);
  - recapped and outlined the education and training components required from the GSIPC for the accompanying global action plan, updated on regional activities and new products and discussed key features of required content of in-service and post-graduate IPC curricula (May 2023);
  - discussed May meeting and project priorities for 2023, reviewed key definitions and HCW education resources, and provided updates on regional activities and new products (July 2023).
- GIPC Network Education and Training WG reviewed and input updated education and training materials contributing to GIPC Network SharePoint site
  - GIPC Network Education and Training WG updated education and training current events on GIPC Network SharePoint site

### **Key Activities of the Sub-working group (IPC-PHE-WG)**

- This working group was established in August 2022; the Terms of Reference was discussed and validated by the members.
- Up to August 2023 there were six meetings. The subjects discussed in the meetings included the update on the Uganda SVD outbreak with focus on IPC activities and key IPC issues requiring rapid advice in the context of Uganda SVD outbreak (October 2022); to review proposed indicators enabling prioritization of IPC intervention support during cholera outbreaks, including minimal healthcare-associated infections surveillance and quality of care indicators.
- A prioritization exercise was performed to identify the research priorities regarding the IPC for Ebola Disease and Marburg Disease, which final report will available soon.
- A work plan was defined to be develop along the years 2023-2024 according to the objectives of the working group and are undergoing.

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# WASH in Public Health Emergencies Working Group

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## Date Established

7 April 2022

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## Type (Official or Informal)

Informal

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## Objectives

With the aim of strengthening WASH/IPC responses to Public Health Emergencies, and after a consultation process conducted as a follow up the launch meeting, the following objectives for the WASH in Public Health Emergencies Working Group have been proposed:

- Rapid advice on emerging risks and public health emergencies
- Technical and normative inputs
- Thematic discussions: global strategies and challenges
- Capacity building initiatives

The discussions held during the second meeting were featuring some of these objectives:

- Update on cholera as an example of “Rapid advice on emerging risks and public health emergencies”
- Discussion on Vector Control as an example of “Thematic discussions: global strategies and challenges”

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## Terms of Reference

The Terms of Reference for the WASH in Public Health Emergencies Working Group need to be refined and approved by the members.

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## Members

Members represent the following agencies and institutions: WHO, UNICEF, Global WASH Cluster, GTFCC, UNHCR, IFRC, ICRC, MSF, Save The Children, International Mercy Corps, OXFAM, Action Against Hunger, US CDC, Netherlands Red Cross, Health Care Without Harm, LSHTM, University of North Carolina, University of East Anglia, TUFTS University, USAID/BHA, ECHO, Swiss Cooperation, and FCDO.

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## 2022-23 Activity Summary

- A concept note was jointly developed by WHO and UNICEF in early 2022 to define the role of a WASH in Public Health Emergencies Working Group.
- The first WASH in Public Health Emergencies Working Group meeting was hold on 7 April 2022 with focus on defining potential areas of focus for the group.
- The second meeting was hold on 1 November 2022. It first included a global update about cholera outbreaks, done by Justine Haag, from the Global Task Force for Cholera Control and Monica Ramos, the Global WASH Cluster Coordinator. A presentation on Vector Control in Public Health Emergencies was then done by Claire Dorion and Corey LeClaire, from MSF.
- Additional work on Vector Control is now being conducted through a dedicated consultancy as a result of the WG discussion.
- The third meeting was delayed during the first semester of 2023 and will be organized in late September 2023.

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# Scientific Advisory Group for the Origins of Novel Pathogens (SAGO)

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## Date Established

November 2021

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## Type (Official or Informal)

Official

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## Objectives

The SAGO will advise the WHO Secretariat on technical and scientific considerations regarding emerging and re-emerging pathogens.

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## Terms of Reference

- To advise WHO on the development of a WHO global framework to define and guide studies into the origins of emerging and re-emerging pathogens of epidemic and pandemic potential;
- To advise WHO on prioritizing studies and field investigations into the origins of emerging and re-emerging pathogens of epidemic and pandemic potential, in accordance with the WHO global framework described in point (1) above;
- To provide information and views to assist the WHO Secretariat in the development of a detailed work plan of the SAGO;
- In the context of SARS-CoV-2 origins:
  - To provide the WHO Secretariat with an independent evaluation of all available scientific and technical findings from global studies on the origins of SARS-CoV-2;
  - To advise the WHO Secretariat regarding developing, monitoring and supporting the next series of studies into the origins of SARS-CoV-2, including rapid advice on WHO's operational plans to implement the next series of global studies into the origins of SARS-CoV-2, as outlined in the Joint WHO-China Global Study of Origins of SARS-CoV-2: China Part report published on 30 March 2021 and advise on additional studies as needed; and
- To provide additional advice and support to WHO, as requested by the WHO SAGO Secretariat, which may include participation in future WHO-international missions to study the origins of SARS-CoV-2 or other emerging pathogens.

[https://cdn.who.int/media/docs/default-source/scientific-advisory-group-on-the-origins-of-novel-pathogens/sago-tors-final-20-aug-21\\_-\(002\).pdf?sfvrsn=b3b54576\\_5](https://cdn.who.int/media/docs/default-source/scientific-advisory-group-on-the-origins-of-novel-pathogens/sago-tors-final-20-aug-21_-(002).pdf?sfvrsn=b3b54576_5)

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## Members

27 independent experts

[https://www.who.int/groups/scientific-advisory-group-on-the-origins-of-novel-pathogens-\(sago\)/about](https://www.who.int/groups/scientific-advisory-group-on-the-origins-of-novel-pathogens-(sago)/about)

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## 2021-2023 Activity Summary

- The SAGO has met monthly since its inception and will have had 19 meetings (two of which were in-person). They have produced their first report and are working towards publishing their Global Framework. Further reports by the SAGO will be provided as discussions continue.
- SAGO report: <https://www.who.int/publications/m/item/scientific-advisory-group-on-the-origins-of-novel-pathogens-report>

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# Technical Advisory Group (TAG) for Universal Health and Preparedness Review (UHPR)

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## Date Established

2021

Expected duration is two years from the first meeting in October 2021.

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## Type (Official or Informal)

Official

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## Objectives

To provide expert inputs on the technical content of the UHPR including draft processes for field piloting, and ensure that it is evidence-based, logical and appropriate to measure the status of health emergency preparedness in countries.

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## Terms of Reference

- Review the UHPR documents and provide recommendations to:

### Concept note

- Technical considerations
- The health emergency preparedness components
- The underlying logic model and theory of change
- The set of common indicators
- The methodology for measurement of preparedness status in countries.

### Pilot protocol

- Provide feedback and outcomes from the UHPR pilot phase and refine technical contents of documents to be presented at the 75th World Health Assembly in 2022.

[https://cdn.who.int/media/docs/default-source/health-security-preparedness/uhpr/open-call-uhpr.pdf?sfvrsn=74d7e998\\_16](https://cdn.who.int/media/docs/default-source/health-security-preparedness/uhpr/open-call-uhpr.pdf?sfvrsn=74d7e998_16)

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## Members

The UHPR TAG is composed of 21 experts with a range of technical knowledge, skills, and experience relevant to health emergency preparedness, including scientists, technical experts, healthcare professionals and policy makers with expertise in the following areas:

- Peer-review mechanisms at the multilateral level
- Universal Health Coverage (UHC), health systems and healthier populations and their contribution to preparedness o Pandemic preparedness and all-hazards risk management
- International Health Regulations (IHR) and health security
- Ethics, equity, human rights and gender in public health

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The TAG established smaller working groups of their members to work on specific issues:

- Sub-group 1: Governance and process
- Sub-group 2: Technical Indicators and metrics
- Sub-group 3: Interaction and relationship with other mechanisms

For details, please visit: <https://www.who.int/groups/technical-advisory-group-for-universal-health-and-preparedness-review>

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# Epidemic Intelligence from Open Sources Initiative Coordination Group (EIOS CG)

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## Date Established

2017

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## Type (Official or Informal)

Informal

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## Objectives

The EIOS initiative aims to mitigate and, ideally, prevent public health emergencies by connecting experts around the world and providing them with the best possible solutions to detect, contextualise, analyse, assess and share information for quick, evidence-based action.

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## Terms of Reference

The EIOS CG's role is to provide strategic recommendations to the EIOS Core Team (ECT) and advise on activities and priorities of the initiative on behalf of all stakeholders. The CG and its members are responsible for:

- Representing the epidemic intelligence community and championing the vision of the EIOS Initiative.
- Providing strategic and technical advice and input within the scope of the Initiative.
- Recommending approaches and sharing lessons learned as appropriate to ensure the ongoing success of the Initiative.
- Fostering collaboration and promoting the Initiative to grow the network of stakeholders and support the vision of the Initiative.
- Collaborating with WHO and other organisations as required to address and remove obstacles to the Initiative's successful development, implementation, adoption, use and evolution.
- Supporting the Initiative through active advocacy and galvanizing funding to ensure its long-term sustainability.
- Participating in epidemic intelligence activities within the Initiative, including communication through established networks and the identification of appropriate representatives to participate on and contribute through working groups as required.
- Participating in CG meetings
- Notifying the ECT as soon as is practical of any obstacles, issues or matters that arise that may impact the Initiative.
- Supporting the ECT in problem solving issues and obstacles that may arise, when and as requested by the ECT.
- Reviewing and providing feedback on CG meeting minutes and agendas as compiled and proposed by the ECT.

For more detailed information, kindly visit the webpage: <https://www.who.int/initiatives/eios/eios-leadership-and-governance>

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## Members

The EIOS initiative is governed by a 12-member Coordination Group (CG) with representatives from various organisations. The current CG (2023) involves WHO, Centers for Disease Control and Prevention (CDC), Africa CDC, Nigeria CDC, FAO, Brazil Ministry of Health, European Commission, European CDC, Singapore Ministry of Health, WOA, RKI, and Iraq Ministry of Health.

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# One Health High-Level Expert Panel (OHHLEP)

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## Date Established

2020

OHHLEP was created jointly by FAO, UNEP, WHO and WOA. H.

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## Type (Official or Informal)

Official

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## Objectives

The One Health High-Level Expert Panel (“OHHLEP”) provides guidance to the four organizations on One Health-related matters that support improved cooperation among governments.

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## Terms of Reference

Currently under revision, should be approved by end July 2023.

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## Members

26 experts (Intention to recompose panel to best fulfil priorities of the Quadripartite. Not all 26 members will be reappointed. A new Call for Experts will be made once the ToR are approved).

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## 2022-2023 Activity Summary

- Published the One Health Theory of Change
- Under review design for a One Health Integrated Surveillance system
- Published Prevention of Zoonotic Spillover white paper
- Completion of Inventory of One Health Tools
- One Health Case Studies and Literature review of drivers of zoonotic spillover are still under development.
- Input into the INB, Pandemic Fund, and various other high-level discussions on One Health.

Details of 2022 deliverables can be found here: [https://cdn.who.int/media/docs/default-source/one-health/ohhlelep/ohhlelep-report-2022.pdf?sfvrsn=387c3b59\\_1&download=true](https://cdn.who.int/media/docs/default-source/one-health/ohhlelep/ohhlelep-report-2022.pdf?sfvrsn=387c3b59_1&download=true)

# Overview: A list of WHO Collaborating Centres relevant to Pandemic Preparedness

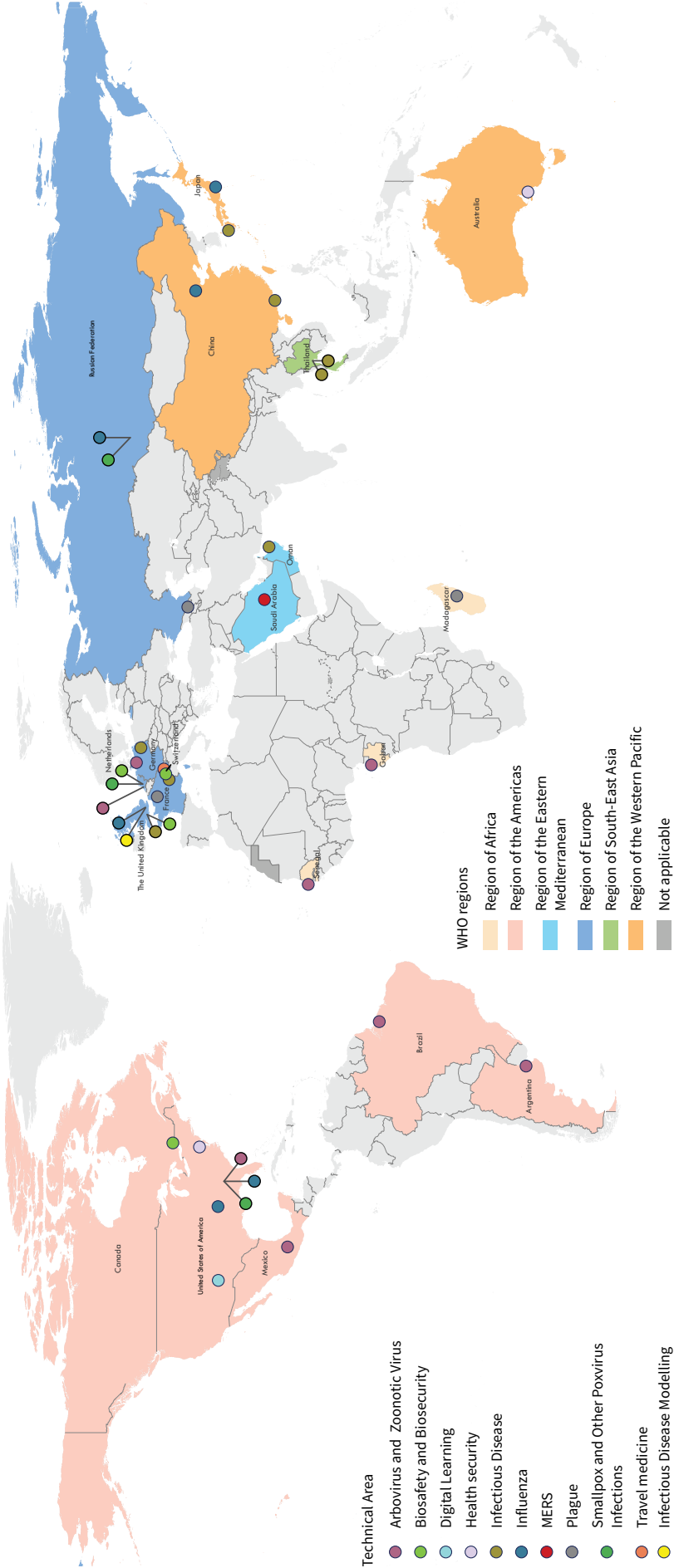
Technical Area	Title of WHO CC	Institution	Country
Influenza	WHO CC for Studies on the Ecology of Influenza in Animals	Department of Virology & Molecular Biology, St. Jude Children's Research Hospital, University of Tennessee	USA
Influenza	WHO CC for Reference and Research on Influenza	Influenza Virus Research Center, National Institute of Infectious Diseases	Japan
Influenza	WHO CC for Reference and Research on Influenza	Chinese National Influenza Center, National Institute for Viral Disease Control and Prevention, Chinese Center for Disease Control and Prevention (China CDC)	China
Influenza	WHO CC for Reference and Research on Influenza	Crick Worldwide Influenza Centre, The Francis Crick Institute	UK
Influenza	WHO CC for Studies on Influenza at the Animal-human Interface	Department of Zoonotic Infections and Influenza, Federal Budgetary Research Institution - State Research Center of Virology and Biotechnology "VECTOR", Rospotrebnadzor	Russian Federation
Influenza	WHO CC for Surveillance, Epidemiology & Control of Influenza	Influenza Division, National Center for Immunization and Other Respiratory Diseases, Centers for Disease Control and Prevention (CDC)	USA
MERS	WHO CC for Middle East Respiratory Syndrome (MERS)	Executive Department of Global Health, Public Health Authority of Saudi Arabia	Saudi Arabia
Arbovirus and Zoonotic Virus	WHO CC for Viral Hemorrhagic Fevers	Viral Special Pathogens Branch (VSPB), Division of High Consequence Pathogens and Pathology (DHCPP), National Center for Emerging Zoonotic Infectious Diseases (NCEZID), Centers for Disease Control and Prevention (CDC)	USA
Arbovirus and Zoonotic Virus	WHO CC for Reference and Research of Arbovirus and Hemorrhagic Fevers Virosis	Instituto Nacional de Enfermedades Virales Humanas "Dr Julio Maiztegui" (INEVH), Administración Nacional de Laboratorios e Institutos de Salud (ANLIS)	Argentina

Technical Area	Title of WHO CC	Institution	Country
Arbovirus and Zoonotic Virus	WHO CC for Arbovirus and Haemorrhagic Fever Reference and Research	Department of Virology, Bernhard Nocht-Institute for Tropical Medicine	Germany
Arbovirus and Zoonotic Virus	WHO CC for Arboviruses and Viral Haemorrhagic Fevers	Unité des Maladies Virales Emergentes, Centre International de Recherches Médicales de Franceville	Gabon
Arbovirus and Zoonotic Virus	WHO CC for Arbovirus and Haemorrhagic Fever Reference and Research	Department of Viroscience, Erasmus MC, Erasmus University Hospital Rotterdam	Netherland
Arbovirus and Zoonotic Virus	Centre collaborateur de l'OMS pour les Arbovirus et les Virus de Fièvres Hémorragique	Unité des Arbovirus et des Virus de Fièvres hémorragique, Institut Pasteur de Dakar	Senegal
Arbovirus and Zoonotic Virus	WHO CC for Emerging and Re-emerging Arboviruses and other Emerging Zoonotic Viruses	SAARB - Seção de Arbovirologia e Febres Hemorrágicas, Serviço Técnico-Científico Instituto Evandro Chagas, Ministério da Saúde	Brazil
Arbovirus and Zoonotic Virus	WHO CC for Arboviruses	Arboviruses and Hemorrhagic Viruses Laboratory, Department of Virology Instituto de Diagnóstico y Referencia Epidemiológicos (InDRE) “Dr. Manuel Martínez Báez”, Ministry of Health	Mexico
Plague	WHO CC for Reference & Research on Plague	Department of Epidemiology, Stavropol Research Antiplague Institute	Russian Federation
Plague	WHO CC on plague control and research	Unité de recherche Yersinia, Institut Pasteur	France
Plague	WHO CC on plague control and research	Unité peste, Institut Pasteur de Madagascar	Madagascar
Smallpox and Other Poxvirus Infections	WHO CC for Smallpox and Other Poxvirus Infections	Poxvirus Team, Poxvirus and Rabies Branch, Division of High-Consequence Pathogens and Pathology, National Center for Emerging and Zoonotic Infectious Diseases, Centers for Disease Control and Prevention (CDC)	USA
Smallpox and Other Poxvirus Infections	WHO CC for Orthopoxvirus Diagnosis and Repository for Variola Virus Strains and DNA	Department of Collection of Microorganism, Federal Budgetary Research Institution - State Research Center of Virology and Biotechnology "VECTOR", Rospotrebnadzor	Russian Federation

Technical Area	Title of WHO CC	Institution	Country
Smallpox and Other Poxvirus Infections	WHO CC for Smallpox Vaccine	Centre for Infectious Disease Control, Centre for Immunology of Infectious Diseases and Vaccines, National Institute for Public Health and the Environment (RIVM)	Netherland
Infectious Disease	WHO CC for Reference and Research on Tropical and Emerging Viral Diseases	Department of Virology, Institute for Tropical Medicine, Nagasaki University	Japan
Infectious Disease	WHO CC for Research and Training on Viral Zoonoses	Department of Medicine, Neurovirology Division, Faculty of Medicine, Chulalongkorn University	Thailand
Infectious Disease	WHO CC for Virus Reference & Research (Special Pathogens)	Virology and Pathogenesis Group; Rare and Imported Pathogens Laboratory, UK Health Security Agency	UK
Infectious Disease	WHO CC for epidemic and pandemic diseases	Division of Infectious Diseases, University Hospital of Geneva	Switzerland
Infectious Disease	WHO CC for Emerging and Re-Emerging Infectious Diseases	Central Public Health Laboratories, Ministry of Health	Oman
Infectious Disease	WHO CC for Diagnostic Reference, Training and Investigation of Emerging Infectious Diseases	Armed Forces Research Institute of Medical Sciences (AFRIMS)	Thailand
Infectious Disease	WHO CC for Infectious Disease Epidemiology and Control	School of Public Health, The University of Hong Kong	China
Infectious Disease	WHO CC for Emerging Infections and Biological Threats	Zentrum für Biologische Gefahren und Spezielle Pathogene/Centre for Biological Threats and Special Pathogens (ZBS), Robert Koch Institute	Germany
Infectious Disease Modelling	WHO CC for Infectious Disease Modelling	The MRC Centre for Global Infectious Disease Analysis, Imperial College London	UK
Biosafety and Biosecurity	WHO Collaborating Centre for Laboratory Preparedness and Response for High Threat Pathogens and Biorisk	Centre for Infectious Diseases Research, Diagnostics and Laboratory Surveillance, National Institute for Public Health and the Environment (RIVM)	Netherland
Biosafety and Biosecurity	WHO CC for Applied Biosafety and Training	Biosafety, Air and Water Microbiology Group; Novel and Dangerous Pathogens Training, UK Health Security Agency	UK

<b>Technical Area</b>	<b>Title of WHO CC</b>	<b>Institution</b>	<b>Country</b>
Biosafety and Biosecurity	WHO CC for Biosafety and Biosecurity	Centre for Biosecurity, Health Security Infrastructure Branch, Public Health Agency of Canada	Canada
Biosafety and Biosecurity	WHO CC for Biosafety and Biosecurity	Biosafety Centre, Institute for Infectious Diseases, The University of Bern	Switzerland
Health Security	WHO CC for Mass Gatherings and Global Health Security	Disaster Research Centre, Flinders University	Australia
Health Security	WHO CC for Global Health Security	Center for Health Security, Bloomberg School of Public Health, Johns Hopkins University	USA
Travel medicine	WHO CC for Travellers' Health	Epidemiology, Biostatistics and Prevention Institute (EBPI), Department of Public Health, Travel Medicine and Infectious Diseases, University of Zurich	Switzerland
Digital Learning	WHO CC for Digital Learning in Health Emergencies	The ECHO Institute, University of New Mexico Health Sciences Center	USA

# WHO Collaborating Centres for Epidemic and Pandemic Preparedness and Response (as of October 2023)



The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization  
Map Production: WHO Health Emergencies Programme  
Map Date: 26 October 2023



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# WHO Collaborating Centre for Studies on the Ecology of Influenza in Animals

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## Name of Institution

Department of Virology & Molecular Biology, St. Jude Children's Research Hospital

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## Location

Tennessee, USA

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## Terms of Reference for Collaboration with WHO

- As requested by WHO and under its leadership, provide technical support to WHO in its work related to Pandemic Influenza Preparedness. This work will be conducted in alignment with the TORs as specified in ANNEX 5 of the PiP Framework ([http://www.who.int/influenza/resources/pip\\_framework/en/index.html](http://www.who.int/influenza/resources/pip_framework/en/index.html)) as relating to WHO Collaborating Centres for Influenza Terms of Reference Related to Work with Pandemic Influenza Preparedness.
- Upon WHO's request, support WHO by maintaining functioning laboratory infrastructure and surge capacity to receive influenza viruses and samples from all hosts of interest to public health for rapid and full characterization."
- In agreement with WHO, conduct risk assessment of influenza viruses using animal models including ferrets and avian hosts.
- Upon WHO's request, serve as GISRS point of contact with veterinary sector laboratories on issues of interest to public health.
- Upon WHO's request and under its leadership, support WHO in its pandemic preparedness efforts in collecting data on influenza viruses to inform WHO on the production and distribution of candidate vaccine viruses and/or reference viruses.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- Contributed to twice yearly WHO Influenza Vaccine Consultations meetings with a specific input on zoonotic viruses. The activities involved in this included collection of biologic samples or viruses from collaborators from within and outside, including those in the veterinary sector, of the Global Influenza Surveillance and Response System (GISRS). Viruses isolated or detected were characterized genetically and antigenically with these data feeding into decision-making for zoonotic influenza candidate vaccine virus development.
- CC members participated in WHO-coordinated risk assessments of circulating animal influenza viruses using the Tool for Influenza Pandemic Risk Assessment (TIPRA). This involves provision of data, virus profile review and virus scoring.
- A lot of the CC focus over this period has been on the clade 2.3.4.4b A(H5) viruses which have been responsible for the explosive spread of highly pathogenic avian influenza since mid-2021. The CC has characterized a number of viruses in mammalian models as detailed in TORs. We have also collected and provided data to WHO on antiviral susceptibilities and other public health-related information. The collected data were also used by CC members in the context of GISRS PCR and antiviral working groups.

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# WHO Collaborating Centre for Reference and Research on Influenza

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## Name of Institution

Influenza Virus Research Center, National Institute of Infectious Diseases

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## Location

Tokyo, Japan

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## Terms of Reference for Collaboration with WHO

- Under WHO's leadership, to support WHO in carrying out surveillance of influenza viruses.
- By request of WHO, to monitor anti-influenza drug resistant viruses.
- To conduct collaborative research under WHO's leadership for the improvement and development of PCR - based diagnosis for influenza viruses.
- By request of WHO, to produce and supply reagents for surveillance on influenza viruses.
- By request of WHO, to provide technical assistance to laboratories of the WHO Global Influenza Surveillance and Response System (GISRS).
- Under guidance of WHO, to support WHO in its activities in relation to the Pandemic Influenza Preparedness Framework (PIP-FW).

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- Implemented antigenic and genetic analyses for isolates from Japan, Taiwan and neighbouring countries, such as Lao PDR, Myanmar, Nepal, Mongolia. The data were shared in the WHO vaccine composition meeting to make WHO recommendation for vaccine composition.
- Conducted monitoring of anti-influenza drug-resistant viruses by genetic and/or phenotypic analyses for isolates from Taiwan and the countries described above. The data were shared with WHO.
- Evaluated the current primers and probes to detect recently circulating seasonal and H5N1 highly pathogenic avian influenza viruses. We recognized that we did not need to update these materials.
- Provided reference antigens and their corresponding ferret antisera for differentiation of type/subtype/lineage of seasonal influenza virus isolates with Taiwan and NICs in neighbouring countries.
- Carried out EQA trial work to detect SARS-CoV-2 by real-time RT-PCR for 18 institutes, including some NICs, of Vietnam, Cambodia, or Lao PDR. We also conducted a training course on SARS-CoV-2 genome analysis using next-generation sequencing for the staff of the National Center for Laboratory and Epidemiology (NIC-Lao PDR), the Institut Pasteur, and the Mahosot Hospital of the Lao PDR.
- Analysed A(H5N1) highly pathogenic avian influenza viruses isolated from poultry, wild birds and a mammal in Japan. Whole genome sequencing and antigenic analysis of these viruses were conducted. The data were shared in the WHO vaccine composition meeting for proposing candidate vaccine viruses.

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# WHO Collaborating Centre for Reference and Research on Influenza

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## Name of Institution

Chinese National Influenza Center, National Institute for Viral Disease Control and Prevention, Chinese Center for Disease Control and Prevention (China CDC)

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## Location

Beijing, China

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## Terms of Reference for Collaboration with WHO

- Under the coordination of WHO, to strengthen capacity to select and develop candidate vaccine viruses and make them timely available for vaccine development and production
- In support to WHO, to promote efforts on pandemic preparation and response, and providing findings and technical inputs.
- Under the guidance of WHO, to Share surveillance data with WHO and WHO Global Influenza Surveillance and Response System (GISRS) for both seasonal and novel influenza viruses.
- Upon WHO's request, to assist in the influenza surveillance strengthening in WHO Member States
- In support to WHO, to promote basic scientific research on influenza to support disease control and prevention
- Under WHO's leadership, contribute to the implementation of the WHO Pandemic influenza Preparedness (PIP) Framework, respecting rules set out by the PIP Framework for sharing of influenza viruses and access to vaccines and other benefits (<http://www.who.int/influenza/pip/en/Framework>) and to work under the Terms of Reference related to the work with Pandemic Influenza Preparedness biological materials as described in Annex 5 of the PIP Framework Document.

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# WHO Collaborating Centre for Reference and Research on Influenza

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## Name of Institution

Crick Worldwide Influenza Centre, The Francis Crick Institute

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## Location

London, UK

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## Terms of Reference for Collaboration with WHO

- In support of WHO, obtain, fully characterize & preserve representative influenza viruses from outbreaks in different parts of the world.
- At WHO's request, to provide guidance and advise as and when appropriate on the viruses that should be included in influenza vaccines.
- Upon request by WHO, collect & distribute virologic and epidemiological information about the prevalence of influenza in different parts of the world and to develop and distribute reference viruses.
- At the request of WHO and in line with its norms and standards, provide training as and when appropriate to experts from WHO National Influenza Centres and other GISRS laboratories in specialized techniques.
- To conduct research related to the properties of influenza viruses and reference activities as prioritized by the WHO Research Agenda for influenza.
- Under the leadership of WHO, receive, handle and distribute influenza viruses of pandemic potential according to the rules set out by the WHO Pandemic Influenza Preparedness (PIP) Framework for sharing of influenza viruses and access to vaccines and benefits (<http://www.who.int/influenza/pip/en/Framework>) to meet the goals of the PIP Framework and to work under the Terms of Reference related to the work with Pandemic Influenza Preparedness biological materials as described in Annex 5 of the PIP Framework Document.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- Technical support in the form of training NICs in virus isolation, characterisation, and sequencing.
- Participation in several Advisory Groups such as GISRS, PIP, Advisory Group on the Composition of Influenza Vaccines, AVWG, PCRWG, TAG-CO-VAG (antigenic subgroup) and STAG-IH
- Collaboration with WOA/FAO for the One Health approach, responding to zoonotic outbreaks.
- Support for WHO global influenza surveillance, risk assessment and recommendations for influenza vaccines to be prepared for pandemic preparedness purposes and for the preparation of pandemic vaccines.
  - In this period, to date receipt of five zoonotic samples, sequencing, and characterisation of these reported to VCM in zoonotic report.
  - Provision of control material for NICs to confirm they are able to detect zoonotic infections.

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# WHO Collaborating Centre for Studies on Influenza at the Animal-human Interface

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## Name of Institution

Department of Zoonotic Infections and Influenza, Federal Budgetary Research Institution - State Research Center of Virology and Biotechnology “VECTOR”, Rospotrebnadzor

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## Location

Koltsovo, Russian Federation

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## Terms of Reference for Collaboration with WHO

- Under WHO’s leadership, to maintain constant readiness and strengthen capacity for rapid and full characterization of influenza viruses isolated from the human and animal interface.
- In support to WHO, to maintain national & international virological surveillance for influenza at the animal-human interface and contribute data to WHO for pre-pandemic influenza vaccine virus selection.
- Upon WHO’s request, to evaluate quantitatively the transmissibility of avian influenza viruses in mammalian species, and conduct risk assessments via animal studies including ferrets and mathematical modelling and rapid share results to the WHO Tool for Influenza Pandemic Risk Assessment (TIPRA) process.
- Under WHO’s leadership, contribute to the implementation of the WHO Pandemic Influenza Preparedness (PIP) Framework, respecting rules set out by the PIP Framework for sharing of influenza viruses and access to vaccines and other benefits (<http://www.who.int/influenza/pip/en/Framework>) and to work under the Terms of Reference related to the work with Pandemic Influenza Preparedness biological materials as described in Annex 5 of the PIP Framework Document.
- Provide technical support to WHO Global Influenza Surveillance and Response System as requested by WHO.

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# WHO Collaborating Centre for Surveillance, Epidemiology & Control of Influenza

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## Name of Institution

Influenza Division, National Center for Immunization and Other Respiratory Diseases, Centers for Disease Control and Prevention (CDC)

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## Location

Atlanta, USA

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## Terms of Reference for Collaboration with WHO

- In support to WHO, to maintain national & international virologic and disease surveillance for both seasonal and novel influenza and conduct thorough virus characterization and epidemiologic investigations.
- In support to WHO, to evaluate the impact and burden of disease for influenza.
- Upon WHO's request, to conduct risk assessment studies for influenza viruses.
- In support to WHO, to evaluate the effectiveness of current seasonal influenza vaccines and develop new types of vaccines for protection against influenza.
- In support to WHO, to evaluate the effectiveness of and monitor the susceptibility of influenza viruses to antiviral drugs.
- To provide technical assistance and capacity building, including laboratory and epidemiologic training, to strengthen the WHO Global Influenza Surveillance and Response System (GISRS) as requested by WHO.
- Upon WHO's request, to produce, and supply epidemic and pandemic vaccine reference strains, diagnostic reagents, virologic and immunologic tests to WHO GISRS and other institutions as agreed by WHO for the characterization and control of influenza.
- Under WHO's leadership, contribute to the implementation of the WHO Pandemic Influenza Preparedness (PIP) Framework, respecting rules set out by the PIP Framework for sharing of influenza viruses and access to vaccines and other benefits (<http://www.who.int/influenza/pip/en/Framework>) and to work under the Terms of Reference related to the work with Pandemic Influenza Preparedness biological materials as described in Annex 5 of the PIP Framework Document.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

### Activity 1. Conducted comprehensive epidemiologic and virologic studies.

- US surveillance systems tested 4,501,395 specimens for influenza A/B viruses; 414,469 (9%) were positive. International samples from WHO-NICs and other partners included: 3,013 specimens from 55 countries.
- CDC analyzed ~600 human serum samples collected pre- and post- influenza vaccination for their reactivity with viruses' representative of vaccine components and circulating lineages.
- Comprehensive data packages for the WHO consultation meetings were developed for Influenza Vaccines Composition meetings for Southern Hemisphere 2023 and Northern Hemisphere 2023-24.

### Activity 2. In support to WHO, to evaluate the impact and burden of disease for influenza.

- Used surveillance data in the U.S. to summarize disease burden and averted burden estimates from the 2021-22 season and monitor influenza activity and disease burden prospectively across all age groups weekly during the 2022-23 season. Used data from COVID-19 to test refinements to disease

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burden estimation methods to advance estimates for influenza in the future (<https://publichealth.jmir.org/2022/6/e34296/> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8730676/pdf/main.pdf>)

- Continued to work with WHO-GIP on global influenza hospitalization estimates. Helped facilitate the WHO Workshop on global influenza-associated hospitalization estimates comparison in Atlanta (Dec 2022).
- Working with scientists in Asia, Africa, Europe, and Latin America to estimate disease and economic burden associated with pandemic and epidemic/endemic influenza based on surveillance and multi-country cohort data. CDC, PAHO, and other partners published respiratory virus burden findings among children <2 years in Panama and El Salvador (<https://doi.org/10.1016/j.lana.2022.100304>).

### **Activity 3. Risk assessment studies for influenza viruses.**

- Received international zoonotic samples from WHO-NICs, MOHs, FAO, and OIE to investigate and/or monitor animal influenza viruses. Genetic characterization of was performed for 1765 specimens obtained from animals or humans infected with zoonotic influenza A viruses.
- Continue to provide input to the development of the WHO Tool for Influenza Pandemic Risk Assessment (TIPRA) and participated in all scoring activities related to TIPRA.
- Provided comprehensive epidemiologic and virus characterization information packages on zoonotic influenza viruses for the WHO consultation meetings on Influenza Vaccines Composition for Southern Hemisphere 2023 (September 2022) and Northern Hemisphere 2023-24 (February 2023).

### **Activity 4. In support to WHO, to evaluate the effectiveness of influenza vaccines and new vaccine strategy.**

- Coordinated multiple studies of epidemic/endemic influenza vaccine effectiveness (VE) against medically attended, laboratory-confirmed influenza in the U.S. Presented results to the U.S. AACIP and 2023 WHO VCM.
- Final estimates for the 2021-22 season were published in Dec 2022 (<https://doi.org/10.1093/cid/ciac941>), additionally VE against hospitalized illness was also published (<https://doi.org/10.1093/cid/ciac869>).
- Interim US 2022-23 VE estimates were published in early 2023 from multiple CDC-supported studies. (<https://doi.org/10.1016/j.ijid.2023.05.015>). Interim estimates of 2022 influenza burden and VE against hospitalization were published by the Chilean MoH, PAHO and CDC (<http://dx.doi.org/10.15585/mmwr.mm7143a1>).
- Conducted one NITAG training, one vaccine safety training and participated in a sub-regional meeting on strengthening seasonal influenza vaccination programs and policies.

### **Activity 5. In support to WHO, to evaluate the effectiveness of and monitor the susceptibility of influenza viruses to antiviral drugs**

- Analyzed virus susceptibility to NA and PA inhibitors using genetic-based analysis supplemented with phenotypic testing.
- Reports and data packages were prepared and delivered on multiple periodic bases and ad hoc, as requested for publications such as WHO GISRS, CDC FluView, state public health laboratories and others. Data was included in VCM data packages for September 2022 and February 2023.

### **Activity 6. Provide technical assistance and capacity building, including laboratory and epidemiologic training, to strengthen the WHO GISRS as requested by WHO.**

- Provided technical assistance, training, and reagents to WHO, including training and supplies for virus identification and genetic sequencing.
- Supported all WHO regional offices and HQ with funding and technical assistance for regional reporting networks and seconded two staff to WHO HQ.
- Provided bilateral financial and technical support to > 50 countries to enhance participation in WHO GISRS, including participating in meetings on operationalizing the GISRS+ framework and conducting regular laboratory and surveillance assessment. The results of capacity assessments are used at the country and global level to design trainings and workshops that address gaps.

- In partnership with WHO, CDC conducted 11 laboratory and 13 surveillance assessments; 2 surveillance costing tool pilots; 8 regional laboratory trainings on PCR testing and virus isolation, 4 regional next generation sequencing, biosafety, and equipment maintenance; and 7 regional and 2 country-level trainings
- CDC experts participated in several WHO regional NIC meetings and provided technical consultations to NICs on various topics.

**Activity 7. Produce and supply epidemic and pandemic vaccine reference strains, diagnostic reagents, virologic and immunologic tests for members of the WHO GISRS and other institutions as agreed by WHO**

- WHO CC through the International Reagent Resource (IRR) program provided the following:
  - 4,290 rRT-PCR kits (2,145,000 tests) for Flu-SC-2 Multiplex to 108 countries.
  - 202 rRT-PCR kits (202,000 tests) for Influenza A/B Typing to 59 countries.
  - 369 rRT-PCR kits (369,000 tests) for Influenza A subtyping to 100 countries.
  - 359 rRT-PCR kits (359,000 tests) for Influenza B lineage testing to 91 countries.
  - 309 rRT-PCR kits (309,000 tests) for detection of human and non-human (HPAI H5 and Eurasian H7) influenza viruses to 98 countries.
  - 128 “WHO” Influenza Reagent Kits for subtyping influenza viruses to 65 laboratories in 55 countries.
- 6,100 other influenza reagents to 305 laboratories in 113 countries. Distributed reagents to academic laboratories, vaccine manufacturers and/or public health partners

**Activity 8. Under WHO’s leadership, adhere to TORs specified in the ANNEX 5 of the PIP Framework**

- Characterized 18 novel influenza A viruses including domestic and international swine-origin and HPAI viruses. Published 11 genome sequences.
- Studies led to the recommendations to develop pre-pandemic CVVs for new two new A(H5) clade 2.3.4.4b and one A(H3N8) CVV.
- Developed and/or developing pre-pandemic CVVs using reverse genetics for a clade 2.3. 4.4b virus, an A/American Wigeon/South Carolina/22-000345-001/2021-like CVV
- Developed ferret antisera against 20 zoonotic viruses for antigenic characterization and distribution to research, public health and veterinary health laboratories.
- Facilitated and utilized the IVTM to track shipments of PIP-BM sent and/or received by CDC.
- Shipped a total of 62 PIP-BM CVVs to 10 different manufacturers, public health laboratories, industry or academic institutions.
- Conducted serological studies to understand human immunity to novel influenza viruses and investigate risk of animal to human transmission.

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# WHO Collaborating Centre for Middle East Respiratory Syndrome (MERS)

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## Name of Institution

Executive Department of Global Health, Public Health Authority of Saudi Arabia

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## Location

Riyadh, Kingdom of Saudi Arabia (KSA)

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## Terms of Reference for Collaboration with WHO

- To support WHO in generation and dissemination of evidence-based MERS-COV clinical and epidemiological information
- To support WHO's work in developing and strengthening strategies for MERS preparedness and surveillance systems
- Upon request of WHO, act as a reference center for capacity building for response and control of MERS clusters and outbreaks

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

### Activity 1. Support and participate in research studies on MERS including the planning, conducting, monitoring and evaluation of research

- Mobilized Expert Researchers group including seven researchers from different local entities with expertise in MERS research.
- Supported scoping review through technical revision of final manuscript. Reference is made to EMRO's mission to KSA in Sep 2022. The scoping review on MERS-related research was conducted to identify remaining knowledge gaps by WHO team and the Expert Researchers group. The first draft was finalized by the end of Feb 2023 and presented in EMARIS in Mar 2023.
- Reviewed research protocols: reviewed the different questionnaires for the anthropological studies that were finalized by HQ in 2018.

### Activity 2. Support WHO for the dissemination of up-to-date knowledge and best practices on MERS to global community through different forums

- Engaged in the Eastern Mediterranean Acute Respiratory Infection Surveillance (EMARIS) conducted by WHO RO in March 2023, the PHA team/CC contributed in the below:
  - Participated in the technical working group for the workshop under the title of “One Health Approach & Middle East Respiratory Syndrome (MERS) surveillance, preparedness and response” and during day 2 of the conference presented KSA's experience in joint multi-sectoral MERS case exposure investigations, genomics/lab and data sharing with IHR/WHO as well as provided a presentation on MERS CC mandate to the workshop participants
  - Provided an oral presentation in day 3 under the title “KSA experience for prevention and control of MERS: Progress and challenges”
- Ongoing technical and coordination support to WHO for the Global meeting on MERS (to be held in Riyadh, 27- 29 Nov 2023).

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### **Activity 3. Support WHO in development and introduction of MERS guidelines for effective and efficient MERS surveillance systems**

- Draft guidelines were developed by MERS CC and as per agreement with WHO on later stages, decision was to transform them into practical/field guide, case studies and policy briefs to be incorporated into the global MERS guidelines that are under revision
- Reviewed the updated WHO protocols for MERS-CoV investigations and surveillance, to be published under the WHO Unity Studies

### **Activity 4. Support the development of MERS surveillance strategies including introduction of new evidence-based surveillance tools**

- **MERS Dashboard to create a data collection tool with validation rules on data items**
  - MERS Dashboard will be developed to share the national MERS database in a common KSA-WHO. MERS Dashboard SharePoint to be accessed and updated by KSA team.
  - Suggested MERS Dashboard variables were sent by WHO and reviewed and agreed by PHA team. (Requesting the permission from MOH for data sharing).

### **Activity 5. Support building capacity to respond to MERS outbreaks through training and/or support for international outbreak investigations**

- Developed training materials on outbreak response (PHRRTs) for MERS (pending finalization and sharing with WHO)
- Technical revision for the WHO MERS-CoV module online course that includes 5 courses with 11 modules each tackling a specific area related to MERS (detection and reporting cases, prevention and control of outbreaks, research and development, RCCE)

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# WHO Collaborating Centre for Viral Hemorrhagic Fevers

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## Name of Institution

Viral Special Pathogens Branch (VSPB), Division of High Consequence Pathogens and Pathology (DHCPP), National Center for Emerging Zoonotic Infectious Diseases (NCEZID), Centers for Disease Control and Prevention (CDC)

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## Location

Atlanta, USA

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## Terms of Reference for Collaboration with WHO

- To support WHO in its function of alert and response to outbreaks of Emerging and Dangerous Pathogens of international importance, including outbreaks of Viral Haemorrhagic Fevers and novel and emerging infectious diseases.
- Support WHO in the early diagnosis, rapid identification and characterization of high-risk pathogens specimens submitted through WHO using reference laboratory techniques.
- During response operations to outbreaks of Viral Haemorrhagic Fevers and Emerging and Dangerous Pathogens coordinated by WHO, to provide onsite laboratory diagnostic support.
- In the framework of Viral Haemorrhagic Fevers and Emerging and Dangerous Pathogens outbreaks, prevention and control operations carried out under the responsibility of WHO, provide assistance to WHO by offering expert opinion, staff or equipment when possible.
- To inform WHO of any epidemiological or laboratory finding that would be in conjunction with a risk of transmission of a severe disease of international concern : Viral Haemorrhagic Fevers and novel and emerging infectious diseases.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

### Activity 1: Support WHO in its function of early detection of VHF outbreaks

VSPB continues to support WHO through technical support, consultations and deployments of epidemiologists, laboratory and management and operation staff, providing at times a mobile laboratory to support testing capabilities. Some highlights below:

#### Uganda:

- Sudan virus outbreak response; October 2022 – January 2023
- RVF and CCHF: During this same period, we support the detection of multiple outbreaks of RVF and CCHF in Uganda.
- Next-Generation Sequencing: With UVRI and colleagues from WHO -Uganda office, supported training of 20 laboratory scientists from across Uganda on the methods for generating and analysis of next generation sequencing from suspect Sudan virus samples.

**Oman:** VSPB is supporting WHO by providing CCHF training workshop on surveillance and CCHF diagnostics (covering PCR, NGS and serology). This training will be attended by two laboratorians from 6 EMRO countries (Sep 2023).

**Democratic Republic of Congo:** VSPB continues to support DRC with funding and technical consultations for timely detection of new VHF cases and monitoring of relapses in survivors:

- VSPB provided IgM and IgG reagents and training to 3 INRB laboratorians so that INRB will be able to perform retrospective and prospective serological testing for possible EBO cases.

- Support for the investigation of suspect VHF Case Cluster in Equateur (Ingende); August 2023
- Support for the investigation of suspect VHF Case in Haut Uele; August 2023. The INRB staff used the molecular diagnostic assays provided to screen samples received from the case cluster. Of the 1 sample that was received, it tested positive for Plasmodium/P. falciparum, 1 sample was negative for all pathogens and one sample was negative for EBO but could not be tested on the other platforms.

**South Sudan:** Support for the investigation of suspect cluster of suspect VHF cases; July 2023.

**Equatorial Guinea:** Marburg Virus outbreak response in Ebebiyin and Bata; February 2023 – May 2023

- Initially established a field laboratory for the detection of Marburg virus in Ebebiyin using the Biofire (bioMerieux) platform and Warrior Panel assays.
- Trained 2 laboratory staff from the Baney Laboratory (Malabo) on the use of a field Biosafety Cabinet (Biobubble) for inactivation of samples for molecular diagnostics.

**Bangladesh:** Support for the investigation of Nipah cases; December 2022 – April 2023

- Provided serological (IgM and IgG) reagents for the detection of Nipah virus from samples collected from suspect cases in Bangladesh; this year had the highest number of confirmed cases of Nipah virus in Bangladesh in the last 6 years.

**PAHO /Argentina and Bolivia:**

- Provided remote technical assistance to Bolivia concerning Chapare virus and hantavirus cases laboratory detection with molecular techniques. Revision of RT-qPCR results and feedback provided to colleagues from CENETROP.
- Provided training on New World Arenaviruses and Hantaviruses; Argentina, June 2023

**Activity 2: In support of WHO, provide technical input/guidance for the development of WHO recommendations, fact sheets and guidance documents in the context of outbreaks.**

**VHF Technical and Reference Materials:**

**General updates:**

- CDC continues to update our VHF page at [Viral hemorrhagic fevers \(VHFs\) | CDC](#)
- The following pages were developed and updated over the past 12 months, with multiple guidelines, technical documents, and health education materials related to VHFs
  - [Ebola disease](#)
  - [Marburg virus disease](#)
  - [VHF guidelines for healthcare providers](#)
  - [Crimean-Congo hemorrhagic fever](#)
  - [Rift Valley fever](#)
  - [Nipah Virus \(NiV\) | CDC](#)

**WHO R&D Blueprint Meeting for Nipah – London, UK July/August 2023:**

- Attended and participated in the World Health Organization, the Center for Infectious Disease Research and Policy at the University of Minnesota, and Wellcome Trust organized 1.5 day R&D roadmap taskforce meetings on Nipah; Dr. Montgomery served as the moderator and discussant for the diagnostics session

**Uganda-Sudan Outbreak:**

- CDC epidemiologists provided in country response support to Uganda MOH and WHO for multiple VHF outbreaks occurring during this time period. Support included technical guidance, recommendations, fact sheets and guidance documents in the context of the Sudan virus outbreak for contact tracing, case investigation, clinical diagnosis, and developed health education and training for community, health care providers, MOH technical staff and international staff.

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### **Georgia – CCHF focused:**

- Providing ongoing epidemiological and technical support for increase in CCHF cases.
- Provided guidance on conducting serosurvey and assisted in analysis and interpretation of the results.
- Working on developing predictive risk models for identification of locations where incident human cases may be more likely to occur and assist with targeted surveillance and validations.

### **Equatorial Guinea – Marburg Outbreak:**

- CDC epidemiologists and laboratory staff provided in country response support to Equatorial Guinea MOH and WHO. Support included technical support, guidance, recommendations, fact sheets and guidance documents in the context of the Marburg outbreak for contact tracing, case investigation, clinical diagnosis, and developed health education and training for community, health care providers, MOH technical staff and international staff.

### **Tanzania – Marburg Outbreak:**

- CDC epidemiologists provided in country response support to Equatorial Guinea MOH and WHO for multiple VHF outbreaks occurring during this time period. Support included technical support and guidance for contact tracing, case investigation, clinical diagnosis, and developed health education and training for community, health care providers, MOH technical staff and international staff.

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# WHO Collaborating Centre for Reference and Research of Arbovirus and Hemorrhagic Fevers Virosis

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## Name of Institution

Instituto Nacional de Enfermedades Virales Humanas “Dr Julio Maiztegui” (INEVH), Administración Nacional de Laboratorios e Institutos de Salud (ANLIS)

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## Location

Buenos Aires, Argentina

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## Terms of Reference for Collaboration with WHO

- To support WHO in its function of alert and response to outbreaks of Emerging and Dangerous Pathogens of international importance, including outbreaks of Arboviruses, Viral Haemorrhagic Fevers and novel and emerging infectious diseases.
- Support WHO in the early diagnosis, rapid identification and characterization of high risk pathogens specimens submitted through WHO, keeping the results confidential, if so required.
- During response operations to outbreaks of Emerging and Dangerous Pathogens coordinated by WHO, to provide onsite laboratory diagnostic support.
- Provide technical support to the national laboratories involved in epidemiological and laboratory investigations during Emerging Infectious Diseases outbreak responses.
- To inform WHO of any epidemiological or laboratory finding that would be in conjunction with a risk of transmission of a severe disease of international concern : Arboviruses, Viral Haemorrhagic Fevers and novel and emerging infectious diseases.

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# WHO Collaborating Centre for Arbovirus and Haemorrhagic Fever Reference and Research

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## Name of Institution

Department of Virology, Bernhard Nocht-Institute for Tropical Medicine

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## Location

Hamburg, Germany

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## Terms of Reference for Collaboration with WHO

- To support WHO in its function of alert and response to outbreaks of Emerging and Dangerous Pathogens of international importance, including outbreaks of Arboviruses, Viral Haemorrhagic Fevers and novel and emerging infectious diseases.
- To support WHO in the early diagnosis, rapid identification and characterization of high risk pathogens specimens submitted through WHO, keeping the results confidential, if so required.
- To inform WHO of any epidemiological or laboratory finding that would be in conjunction with a risk of transmission of a severe disease of international concern : Arboviruses, Viral Haemorrhagic Fevers and novel and emerging infectious diseases.

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# WHO Collaborating Centre for Arboviruses and Viral Haemorrhagic Fevers

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## Name of Institution

Unité des Maladies Virales Emergentes, Centre International de Recherches Médicales de Franceville

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## Location

FRANCEVILLE, Gabon

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## Terms of Reference for Collaboration with WHO

- To support WHO in its function of alert and response to outbreaks of Emerging and Dangerous Pathogens of international importance, including outbreaks of Arboviruses, Viral Haemorrhagic Fevers and novel and emerging infectious diseases.
- Support WHO in the early diagnosis, identification, and characterization of viral infections due to Arboviruses and viral hemorrhagic fever viruses and new emerging viruses, using reference techniques: molecular biology, serology and virus isolation.
- During response operations to outbreaks of Emerging and Dangerous Pathogens coordinated by WHO, to provide onsite laboratory diagnostic support.
- In the framework of Emerging and Dangerous Pathogens, Arboviruses or viral haemorrhagic fevers outbreak responses carried out under the responsibility of WHO, provide assistance to WHO by offering expert opinion, staff or equipment when possible.
- To inform WHO of any epidemiological or laboratory finding that would be in conjunction with a risk of transmission of a severe disease of international concern: Arboviruses, Viral Haemorrhagic Fevers and novel and emerging infectious diseases.

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# WHO Collaborating Centre for Arbovirus and Haemorrhagic Fever Reference and Research

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## Name of Institution

Department of Viroscience, Erasmus MC, Erasmus University Hospital Rotterdam

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## Location

Rotterdam, Netherland

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## Terms of Reference for Collaboration with WHO

- To support WHO in its function of alert and response to outbreaks of Emerging and Dangerous Pathogens of international importance, including outbreaks of Arboviruses, Viral Haemorrhagic Fevers and novel and emerging infectious diseases at the human - animal interface.
- To support WHO in the early diagnosis, rapid identification and characterization of high risk pathogens specimens submitted through WHO, keeping the results confidential, if so required in agreement with IHR.
- To inform WHO of any epidemiological or laboratory finding that would be in conjunction with a risk of transmission of a severe disease of international concern : Arboviruses, Viral Haemorrhagic Fevers and novel and emerging infectious diseases.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- The Department of Viroscience of the Erasmus MC is an international centre of excellence for multidisciplinary, basic, translational and clinical research of viruses and infections at the molecular, patient and population level. The CC is headed by prof. Dr Marion Koopmans.
- The CC provides advice in several advisory groups, including the WHO R&D Blueprint Scientific Advisory Group, One Health High-Level Expert Panel, TAG-VE, the GLAP HP network, and the Lancet Commission on Arboviral Diseases. Moreover, the department is national reference laboratory for Influenza, Corona, arbo- and haemorrhagic fever viruses, and coordinator or partner of several European laboratory networks, such as VEO, DURABLE, ECRAID, AURORAE, EVD-LabNet, the US NIH centre of excellence network etc.
- We have supported and participated in a wide range of activities of various emerging- and arboviruses from surveillance (West Nile and Usutu virus, SARS-CoV-2), diagnostic testing/sequencing (mpox, SARS-CoV-2), test development and evaluations (mpox, HFV, SARS-CoV-2, flu), knowledge sharing (yellow fever virus, SARS-CoV-2, nipah virus, laboratory preparedness), trainings (sequencing), expert opinions (yellow fever virus, mpox, SARS-CoV-2) to outbreak response (mpox, acute hepatitis of unknown origin) and others. Support was provided during the pandemic at request of multiple countries setting up diagnostics and/ or sequencing (Qatar, Kuwait, Morocco, Luxemburg, Republic of Georgia, Armenia, Afghanistan, Latvia, Lithuania, Kenya, Spain, Poland), and to WHO for literature review to support the TAG VE. Support was also provided to HQ during the severe acute hepatitis of unknown origin in children outbreak, both on epidemiology and diagnostics (metagenomics). The Erasmus MC is also involved in key collaborations on the interactions between climate change- and other human-driven causes of disease spread and emergence.

## Listed key activities

### Mpox related activities:

- Molecular diagnostics and characterization:

- Involved in early response to the outbreak by readily available diagnostic test. Responsible for molecular diagnostics of suspected cases nationally.
- Developed WGS for mpox and supported external partners by providing sequencing services.
- Serological diagnostics and characterization:
  - Development of a suit of assays that allows discriminating serological profiles from mpox infection and vaccinia vaccination. Employed these assays for (inter)national serosurveillance, epidemiological and modelling studies.

#### **Severe acute hepatitis of unknown origin in children outbreak:**

- GOARN deployment of staff to support WHO HQ with signal verification and epidemiological analyses
- Offered support for metagenomic analyses of specimens obtained from suspected cases both in countries with no WGS capacity and nationally.

#### **West Nile and Usutu virus related activities**

- Ongoing WNV surveillance in both humans and animals, member of national response team.
- Coordinator of Europe wide genomic analyses of WNV.
- Several international collaborations to assess the relation between climate change and vector borne diseases (South Africa, Nigeria, Senegal, Sudan, Brazil, Dutch Caribbean, Vietnam).

#### **SARS-CoV-2 related activities:**

- Support of TAG-VE and TAG-CO-VAC WHO advisory groups that monitor SARS-CoV-2 genetic changes and vaccine updates, respectively.
- Participation in the WHO China mission
- Antigenic mapping and characterization of human sera for the WHO immune escape assessment
- Vaccination studies in risk groups and healthy populations
- Contributions to laboratory preparedness by multiple validations studies (including influenza).
- Studies on SARS COV 2 in mink, and support for studies in Poland

#### **Viral Haemorrhagic Fever related activities:**

- Prepared fact sheet of Nipah virus disease upon request from ECDC. Continuous lookout for improving our laboratory preparedness for VHF by developing new assays (in-house pan-Arenavirus PCR, pan-VHF PCR) and implementation in regular diagnostics of test for key targets (Nipah virus PCR).
- Tested/sequenced samples for Nipah virus for collaborators from Bangladesh.

#### **EYE laboratory working group related activities:**

- Comprehensive support of the working group activities from providing samples (YF PRNT international EQA), to critical appraisal of multiple guidelines and manuals (laboratory algorithm, laboratory manual, use of yellow fever assays and reviewed several independent evaluations) and research activities all aiming to improve YF diagnostics in the future.
- Research project in collaboration with IP Dakar aiming to develop serological method to distinguish naturally infected people from vaccinated.
- Preparing a review on YF diagnostics in urine.

#### **Other relevant activities:**

- Supporting WHO laboratory preparedness project by contribution and attending at the Task Force for emerging and re-emerging pathogens third meeting (Izmir, Türkiye, 23-24 May 2023)
- Participation in IHR emergency committee meetings for SARS COV 2.
- Advisor to the EU president von der Leyen on SARS COV 2 (Prof. Koopmans)

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# WHO Collaborating Centre for Arboviruses and Viral Haemorrhagic Fevers (Centre collaborateur de l’OMS pour les Arbovirus et les Virus de Fièvres Hémorragique)

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## Name of Institution

Unité des Arbovirus et des Virus de Fièvres hémorragique, Institut Pasteur de Dakar

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## Location

Dakar, Senegal

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## Terms of Reference for Collaboration with WHO

- To support WHO’s activities on detection and genomic surveillance of epidemic prone diseases, emerging and dangerous pathogens.
- To support WHO efforts for response operations to outbreaks including of emerging and dangerous pathogens.
- Upon WHO’s request, to strengthen capacities of national laboratories by providing training on diagnosis of viral and bacterial pathogens including emerging and dangerous pathogens, information sharing, scientific and technical expert advice and document development.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- **National and Regional Reference Yellow fever**

Yellow fever virus was confirmed in using RT-PCR, IgM ELISA and PRNT. RT-PCR positive cases (6) have been detected in CAE (1), CAF (2) and CIV, CNG and GUI (1 case in each country). Yellow fever IgM/PRNT confirmed cases (275) in many countries.

- **Viral hemorrhagic fever suspected cases**

Received 96 samples for viral hemorrhagic diagnostic. The samples were sent by SEN (82), Cape Verde (1), GHA (3), CIV (1), GAM (1), Equatorial Guinea (8). Marburg cases (1) in GHA and 1 in Equatorial Guinea and Crimean-Congo hemorrhagic fever cases (7 in SEN and 1 in CIV) have been detected.

- **Viral Syndromic Sentinel Surveillance system in Senegal (4S)**

In Senegal, sentinel surveillance focused on influenza, led by the Institut Pasteur Dakar (IPD), was implemented since 2012 in collaboration with the national Ministry of Health (MoH). A total of 2443 samples were collected from suspected arbovirus and viral hemorrhagic fever patients and tested with serological and molecular biology diagnostic tools for Chikungunya virus (ChikV), Dengue virus (DenV), Rift valley fever virus (RVFV), Crimean Congo Hemorrhagic fever virus (CCHFV), Zika virus (ZIKV), Yellow fever virus (YFV) and West Nile virus (WNV). These samples were collected in different sentinel sites in Senegal.

- **Outbreak investigations and support to MoH and WHO**

- i. Outbreak investigations in Senegal**

Involved in several arbovirus and hemorrhagic fever virus outbreak investigations in different regions in Senegal to support the MOH.

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## ii. Marburg outbreaks in Equatorial Guinea and Ghana

- **In Ghana**, on July 8, 2022, blood samples from two people taken in the Ashanti region (south) suggested the Marburg virus and the samples had been sent to WHO CC at the Pasteur Institute in Dakar (IDP) for confirmation. RT-PCR test specific to Marburg virus has been conducted and allowed to confirm the infection.
- In **Equatorial Guinea**, on February 7, 2023, an alert from the MoH in the district of Kie Ntem province in Equatorial Guinea, reported several patients presenting symptoms suggestive to hemorrhagic fever, as well as a mortality cluster of 9 deaths. Eight blood samples were collected from additional contacts and sent to the regional WHO collaborative center for arboviruses and hemorrhagic fever viruses at IPD. One out of all the samples came positive to MARV by molecular assay. Phylogenetic analysis showed that the detected MARV groups with strains isolated from fruit bats *Rousettus aegyptiacus* in Sierra-Leone in 2017 (98.45% nt identity) and 2018 (97.41% nt identity). A WHO deployment of two IPD experts was organized between May 11, 2023 – May 26, 2023 to ensure the capacity building of the team in the Baney Laboratory (Malabo) for MARV and other Hemorrhagic Fever Viruses.

## iii. Monkeypox surveillance in Africa

Between May 27, 2022 and February 17, 2023, we received and analyzed 39 Monkeypox suspected case samples from Gambia (1), Kenya (1), Guinea (3), Benin (6), Mauritania (6) and Senegal (22). Three samples from Benin were RT-PCR positive and sequenced with a capture-based hybrid approach using a panel of probes including specific Monkeypox virus targets. Genomes with coverages between 97.5 and 98.09% were obtained. The analyses showed that the strains grouped with the Nigeria 2020 strains.

- **Arboviruses and viral hemorrhagic fever surveillance programme**

To monitor the emergence of arboviruses and detect any viral emergence, considering the ecological context, an entomo-virological surveillance program has been set up to assess the circulation of viruses in vectors (virus isolation). Focusing on viral isolation on cell culture, the mosquito analyses did not show the presence of any arbovirus of medical interest. However, we found mosquito pools positive for *Mesonivirus*.

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# WHO Collaborating Centre for Emerging and Re-emerging Arboviruses and other Emerging Zoonotic Viruses

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## Name of Institution

SAARB - Seção de Arbovirologia e Febres Hemorrágicas,  
Serviço Técnico-Científico Instituto Evandro Chagas, Ministério da Saúde

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## Location

Ananindeua, Brazil

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## Terms of Reference for Collaboration with WHO

- At PAHO/WHO's request the proposed institution will provide laboratory reference services including diagnostic, validation of protocols, evaluation of diagnostic kits, production of antisera, antigens and related diagnostic reagents for arboviruses and other emerging zoonotic viruses diagnosis.
- At PAHO/WHO's request the proposed institution will support PAHO/WHO during emergency response, by providing technical input and guidance during epidemics and pandemics.
- At PAHO/WHO's request the proposed institution will assist PAHO/WHO in developing materials including guidance documents, fact sheets for arboviruses of public health importance, diagnostic protocols, biosafety procedures, and risk assessment protocols
- At PAHO/WHO's request the proposed institution will support PAHO/WHO by training virologists, medical entomologists and epidemiologists in arbovirus and other zoonotic viruses laboratory diagnostics and surveillance procedures.

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# WHO Collaborating Centre for Arboviruses

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## Name of Institution

Arboviruses and Hemorrhagic Viruses Laboratory, Department of Virology Instituto de Diagnóstico y Referencia Epidemiológicos (InDRE) “Dr. Manuel Martínez Báez”, Ministry of Health

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## Location

Mexico City, Mexico

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## Terms of Reference for Collaboration with WHO

- To support PAHO/WHO in developing and maintaining a repository of sera samples and arboviruses' strains for regional and global reference services
- At PAHO/WHO's request the proposed institution will train virologists, medical entomologists and epidemiologists in laboratory diagnostic and surveillance procedures for arbovirus.
- At PAHO/WHO's request the proposed institution will provide technical input for the development of laboratory surveillance and quality assurance recommendations for arboviruses.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- Consulting and implementation of the quality management systems for arbovirus surveillance.
- Advice and implementation of genomic surveillance of arboviruses.
- Advice and implementation of strategies for the evaluation of commercial kits for the molecular and serological surveillance of arboviruses
- Implementation of multiplex molecular methodologies for surveillance of neurotropic arboviruses (Alpha virus – WEEV, EEEV, VEEV).
- Implementation of “dual” real-time RT-PCR to increase the sensitivity of DENV typing
- Advice for the implementation of entomovirological surveillance of arboviruses.
- Preparation and review of documents (guides, manuals) to strengthen laboratory surveillance of arboviruses
- Provide training at InDRE facilities, derived from the existing infrastructure and the certification of personnel to carry out training.

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# WHO Collaborating Centre for Reference & Research on Plague

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## Name of Institution

Department of Epidemiology, Stavropol Research Antiplague Institute

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## Location

Stavropol, Russian Federation

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## Terms of Reference for Collaboration with WHO

- Supporting WHO with a technical expertise for the strains identification et sensitivity to antibiotics, as well as epidemiological surveillance, investigation and control of outbreaks
- At the request of WHO, to map and monitor the natural plague foci and propose options to improve methods of forecast foci activity and estimate of epidemic risk

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- The institution provides expertise in all aspects of the plague event investigation, namely epidemiology, entomology and biology. For this last one, the institution advises the affected country on the best practices for collecting and shipping the clinical specimens, and under WHO request processes them in its facilities. The institution shares the results in due time with the affected country and WHO.
- A model has been developed for the temporal forecasting of epizootic activity of natural plague foci in the Caucasus.
- Methods are being developed for using MaxEnt spatial models to increase the efficiency of surveying natural plague foci.
- A new mathematical spatial model is being developed to search for plague epizootics and the impact of climate change on plague foci in the Caucasus using artificial intelligence.

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# WHO Collaborating Centre on Plague Control and Research

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## Name of Institution

Unité de Recherche *Yersinia* - Département de Microbiologie, Institut Pasteur

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## Location

Paris, France

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## Terms of Reference for Collaboration with WHO

- Support WHO's epidemiological surveillance, investigation, and control of plague outbreaks through provision of technical expertise for *Yersinia pestis* strain identification and sensitivity to antibiotics testing.
- Support WHO's preparedness efforts for outbreak control through local capacity building on *Yersinia pestis* strain characterization.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- Participation to the organization of the International Course 'Plague: Laboratory Diagnosis & Surveillance', held in Madagascar in July 2022, supported by WHO and by the Pasteur International Network.
- Critical revision of the WHO Manual for plague surveillance, diagnosis, prevention, and control.
- Supply of *Yersinia pestis* diagnostic tools/reagents and technical advice to laboratories in Algeria, Democratic Republic of Congo, Indonesia and Zambia.
- Confirmation of plague diagnosis by PCR on DNA extracted from Rapid Diagnosis Tests (RDT) from Democratic Republic of Congo.

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# WHO Collaborating Centre on Plague Control and Research

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## Name of Institution

unité peste, Institut Pasteur de Madagascar

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## Location

Antananarivo, Madagascar

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## Terms of Reference for Collaboration with WHO

- Supporting WHO with a technical expertise for the strains identification et sensitivity to antibiotics, as well as epidemiological surveillance, investigation and control of outbreaks
- To inform WHO's work towards the elaboration and review of technical guidelines
- Upon WHO's request and as appropriate, to provide rapid diagnostic tests to countries in need

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

### Preparedness:

- Conducted international courses on plague
  - Laboratory diagnosis and surveillance (July 11-16, 2022): 18 health staffs from 10 countries (Algeria, Democratic Republic of Congo, Indonesia, Iran, Kenya, Madagascar, Tanzania, United States of America, Vietnam and Zambia) acquired knowledge on plague diagnosis and surveillance. Information sharing was done through 12 conferences on the themes -plague situation, plague agent, diagnostic and treatment, early detection and monitoring, prevention and control, animal surveillance, and bio risk management etc.
- Provided support to the revision of WHO guidelines for plague by hosting and organizing a meeting (outcome: WHO Plague manual 2023)
- Developed effective rodent management in Madagascar. A national stakeholder workshop was held in April 2023 in Antananarivo and achieved outcomes such as such as recommendations for policy, implementation and communications, with the long-term objective of improving health and well-being outcomes for communities.
- Development of research with focus on “Plague Emergence, Maintenance & Spread” and trial on Plague treatment and PoC.

### Emergency responses:

- Regional level: Assisted the Democratic Republic of Congo (DRC) during plague outbreak. Provided RDT (N=300) and discussed implementation of laboratory tests for plague diagnosis at the Reference Lab.
- Country level: Investigation of Pneumonic plague outbreaks, Reservoirs and vectors surveillance, Cases confirmation, ATB surveillance, analysis of plague situation regarding situation report (weekly and yearly), technical report (investigation & surveillance) and related advice for control measures delivered to MoH.

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# WHO Collaborating Centre for Smallpox and Other Poxvirus Infections

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## Name of Institution

Poxvirus Team, Poxvirus and Rabies Branch, Division of High-Consequence Pathogens and Pathology, National Center for Emerging and Zoonotic Infectious Diseases, Centers for Disease Control and Prevention (CDC)

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## Location

Atlanta, USA

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## Terms of Reference for Collaboration with WHO

- To assist WHO in implementing the resolutions of the World Health Assembly regarding 1) the study, maintenance or destruction of all variola virus strains and related materials held at CDC, and 2) implementation of biennial WHO biosafety and biosecurity inspections of the variola virus repository and research laboratory
- To formally register with WHO all variola virus strains held at CDC and recombinant plasmids containing variola virus DNA sequences produced in the laboratory and notify WHO of provision by CDC of plasmids to other entities, per current recommendations
- To cooperate with WHO in implementing the smallpox research agenda and making the results of research using live variola virus available to the international community in a timely manner
- To provide WHO with requested technical expertise to facilitate poxvirus research globally and support countries and laboratory networks, in collaboration with WHO, to ensure timely diagnosis of suspected orthopoxvirus cases

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- The WHO CC continues to maintain the variola virus stocks according to the WHA resolutions, which includes maintaining under the highest biosafety and biosecurity measures. This includes maintaining a BSL4 laboratory for any work with live variola virus which is conducted by a small number of highly trained staff with appropriate clearance.
- There were no requests for short variola virus DNA fragments during the 2022-2023 reporting period. However, CDC did provide guidance to multiple researchers working with plasmids containing short synthetic reads of variola virus DNA sequence within the WHO limits on the amount of variola virus genome that may be used as plasmid control material. This included providing this information to a request through the Federal DSAT program as well as providing the requestor with information on WHO contract information. CDC continues to maintain stocks of variola virus DNA within the secure/approved laboratory.
- **Smallpox research agenda overview:**
  - i. **Diagnostics overview:** Over the past year we have worked on a collaboration with an academic partner to develop a CRISPR based LAMP POC assay. CDC has contributed to necessary studies to support one of the FDA cleared diagnostic PCR tests. CDC has also done additional studies with a commercial orthopoxvirus PCR kit available internationally. CDC has tested multiple commercially-available positive control materials to inform both domestic and international partners in need of orthopoxvirus control material.
  - ii. **Medical countermeasures (vaccines and therapeutics):** CDC continues to work with different monoclonal antibody cocktails that are in development. CDC has also screened variola and MPXV isolates that have changes in F13L (the target of TPOXX) to ensure the isolates remain sensitive to

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drug treatment. CDC continues to work on a study in the DRC looking at efficacy of the vaccine JYNNEOS to protect healthcare workers from MPXV infection within endemic areas and evaluated vaccine effectiveness of JYNNEOS in the United States during the ongoing mpox outbreak. CDC staff serve on WHO's SAGE working group for orthopoxviruses and support WHO with their work by sharing systematic review data and unpublished data that facilitate vaccine policy for mpox.

- CDC continues to maintain orthopoxvirus reference strains and diagnostic capability to support global orthopoxvirus research and laboratory network. This includes propagation of orthopoxvirus activities as needed. During 2022, CDC deposited an MPXV isolate (from the current 2022 outbreak) with BEI resources where it is maintained for public access as researchers need. CDC has been providing significant material (MPXV isolates and orthopoxvirus DNA) to requesting organizations for those labs to use for diagnostic development purposes.
  - i. Over the past year we have sequenced approximately 2200 orthopoxvirus isolates.
  - ii. For any variola virus or MPXV specimens for which sequencing results have identified F13L mutations (F13L is the target of TPOXX), CDC performs in vitro TPOXX resistance testing.
  - iii. CDC continues to collaborate within mpox endemic countries (Cameroon, DRC, and Nigeria) on efforts to expand capacity for laboratory diagnostics, surveillance, outbreak response, research and One Health capacity for mpox. CDC provided technical assistance to WHO's OpenWHO Mpox modules – virtual training modules on mpox designed for use by individuals in endemic mpox settings.

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# WHO Collaborating Centre for Orthopoxvirus Diagnosis and Repository for Variola Virus Strains and DNA

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## Name of Institution

Department of Collection of Microorganisms, Federal Budgetary Research Institution - State Research Center of Virology and Biotechnology "VECTOR", Rospotrebnadzor (Federal Service for Surveillance on Consumer Rights Protection and Human Well-being)

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## Location

Koltsovo, Russian Federation

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## Terms of Reference for Collaboration with WHO

- To cooperate with WHO in implementing the resolutions of the World Health Assembly regarding 1) the studying, maintenance or destruction of all remaining variola virus strains and related materials held at VECTOR, 2) conservation of variola virus DNA in a biologically safe form, and 3) implementation of biennial WHO biosafety and biosecurity inspections of the variola virus repository and research laboratory.
- To register with WHO all variola virus strains held at VECTOR and recombinant plasmids containing variola virus DNA sequences produced in the laboratory, notify WHO of provision by VECTOR of plasmids to other entities, and provide an annual inventory in a format agreed by WHO & VECTOR.
- To work with WHO in developing and implementing the smallpox research agenda and making the results of research using live variola virus available to the international community in a timely manner.
- To support WHO work towards the development of state-of-the-art methods of rapid diagnosis of smallpox and other orthopoxvirus infections.
- To support WHO work towards the development & assessment of new generation vaccines & drugs against orthopoxviruses, including the development of experimental models for their evaluation, as needed.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- As part of research on the development of state-of-the-art methods for rapid diagnosis of smallpox and other orthopoxviral infections, a stand-alone point-of-care immunochemistry kit for rapid detection of orthopoxviruses has been developed.
- Development of a fourth-generation cell-derived vaccine, with reduced reactogenicity, has been accomplished. This vaccine has been licensed by the Russian Federation Ministry of Health for use in the prevention of smallpox and other orthopoxvirus infections.
- In association with the Novosibirsk Institute of Organic Chemistry SB RAS, as part of research to develop a pipeline of effective drugs against smallpox and other orthopoxvirus infections, a new drug has been developed with high activity against orthopoxviruses. This drug, NIOCH-14, has been approved by the Russian Federation Ministry of Health for treatment of infections caused by variola virus, mpox virus, and cowpox virus.
- Based on the results of the above research and development efforts, research articles have been published in Russian and international journals, and a number of patents have been secured in the Russian Federation.

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# WHO Collaborating Centre for Smallpox Vaccine

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## Name of Institution

Centre for Infectious Disease Control, Centre for Immunology of Infectious Diseases and Vaccines, National Institute for Public Health and the Environment (RIVM)

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## Location

Bilthoven, Netherland

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## Terms of Reference for Collaboration with WHO

- Upon WHO's request, to hold vaccinia seed virus and its reference materials required for the production and the potency testing of smallpox vaccine and to make these materials available, at the request of WHO, in case of a smallpox re-emergence.
- To support WHO's work in response to Smallpox outbreaks, build and maintain the capacity of personnel able to safely carry out potency testing of smallpox vaccine and hold the vaccinia seed virus and reference materials.
- To house a smallpox vaccine information database in which information on smallpox vaccine is collected & stored and available for sharing at the request of WHO
- To support WHO, by having an actualised PCR test available that can distinguish between species of orthopox viruses and to be able to execute these tests on diagnostics samples referred by WHO.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- The 5-yearly potency test for the vaccine test has been completed in 2022 and the report has been sent and accepted by WHO.
- Personnel has been trained and a new location for testing has been used and assigned permanently for this use.
- The vaccine information database has been provided to WHO and will be update twice per year.
- The PCR test is available for orthopoxvirus generic, and for mpox specific, and has been used during the outbreak of MPOX in 2022. Many samples from patients in the Netherlands were tested and also samples from the Caribbean Netherlands, Malta, Kosovo, Bosnia and Poland. As it is part of our laboratory accreditation, the review process for this test will be biannual.

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# WHO Collaborating Centre for Reference and Research on Tropical and Emerging Viral Diseases

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## Name of Institution

Department of Virology, Institute for Tropical Medicine, Nagasaki University

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## Location

Nagasaki, Japan

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## Terms of Reference for Collaboration with WHO

- To participate in collaborative studies, under WHO's leadership, we are conducting epidemiological and virological studies/surveillance/activities in tropical and emerging viruses as follows 1. sero-epidemiology, 2. Virological studies and molecular epidemiology of tropical and emerging viruses in Asia-Pacific Region and other regions.
- To participate in collaborative research, under WHO's leadership, our laboratory is developing/evaluating vaccines and antivirals against tropical and emerging viruses. The target infectious diseases include Dengue fever, Zika fever, Japanese encephalitis, Chikungunya, West Nile fever, Severe Fever with Thrombocytopenia Syndrome, Nipah virus infection, Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-COV-2) infection, and other related arboviruses of regional concern infection.
- To participate in collaborative research, under WHO's leadership, for the development and evaluation of rapid diagnostic test for the detection of tropical and emerging viruses and provide support to WHO to ensure quality of diagnostic testing.
- To support WHO to build and strengthen capacity for laboratory diagnosis of tropical and emerging viruses.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- **Revealing the impact of arbovirus and emerging virus infections in Vietnam, Myanmar, Nepal, and other Asian and African countries.**
- (Joshi, et al. Trop Med Health, 2023, 10:51(1); Pandey, et al. Lancet Reg Health West Pac. 2023, 38:100851; Ngwe Tun, et al. Microbes and Infection, 2023, 105129; Pandey, et al. Trans R Soc Trop Med Hyg. 2023, 117(6); Rimal, et al. Viruses : 2023, 15(2):507; Pandey et al. Lancet Infect Dis. 2023, 23(1); Ngwe Tun, et al. J Nat Med : 2022: 76(2); Nomoto, et al. J Infect Chemother, 2022, 28(1); Takemura, et al. Trop Med Health., 2022, 50(1):3; Ashizawa, et al. viruses : 2022,14(2):279; Arima, et al. J Physiol Anthropol. 2022, 41(1):12; Mya Nwe, et al. Pathogens, 2022,11(5):558; Pandey, et al. Life(Basel), 2022,12(7):1087, Ernest, et al. Trop Med Int Health. 2022, 27(8); Nakada, et al. Viruses, 2022, 14(8):1807; Phu Ly, et al. Can J Infect Dis Med Microbiol. 2023, 2635383.)
- **Research activities and developing antivirals/vaccines against arboviruses and emerging virus infections in Japan, Vietnam, Myanmar, and other Asian countries.**
- (Luvai, et al. Ticks Tick Borne Dis: 2022,13(1):101860; Ngwe Tun, et al. Trop Med Health. 2022, 50(1):8; Ngwe Tun, et al. Arch Virol. 2022, 67(7).)
- **Research activities and developing antivirals/vaccines for SARS-CoV-2 infection in Japan, Vietnam, Nepal, and other Asian countries.**
- (Pandey, et al. BMJ, 2022:377; Abe, et al. Microorganisms, 2022, 10(1):9; Ngwe Tun, et al. J Nat Med. 2022, 76(2); Zhuang, et al. Front Psychol. 2022,12:795219; Akagi, et al. J Infect Dis. 2022,75(2); Ngwe Tun,

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et al. *Trop Med Health*. 2022, 20(1):30; Tanaka, et al. *J Clin Med*. 2022, 1(18):5444; Pandey, et al. *Epidemiol Infect*. 2022, 150:e196.)

- **Construction of BSL-4 facility has been completed in the Nagasaki University and research activities upon highly pathogenic viruses.**
- (Misu, et al. *Front Microbiol*. 2023, 14:1137086; Takamatsu, et al. *J. Virol*. 2022, 96(17); Fujita-Fujiharu, et al. *Nat. Commun*.2022,13(1),1191; Shimojima, et al. *Viruses*, 2022, 14(8):1665.)

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# WHO Collaborating Centre for Research and Training on Viral Zoonoses

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## Name of Institution

Department of Medicine, Neurovirology Division, Faculty of Medicine, Chulalongkorn University

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## Location

Bangkok, Thailand

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## Terms of Reference for Collaboration with WHO

- As requested by WHO and under its leadership, provide technical support to Member States in referral services for conducting investigation of viral zoonoses.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

### Rabies campaign and therapeutics against next pandemics

- International Neurovirology meeting (New York, October 2022) - Innovation on rabies prophylaxis and therapeutics
- WHO/OIE meeting on rabies (Paris, December 2022) - Leap towards plausible prophylactics and therapeutics.
- Publication: Efficiency comparative approach of plant-produced monoclonal antibodies against rabies virus infection. *Vaccines* 2023, 11, 1377
- Public awareness on rabies and dog and cat population control 2023 through media and public meeting with special emphasis on Sterilization using intra-testicular injection by Zn gluconate
- Rabies Therapeutics in vitro and in vivo model using Favipiravir-CBD-BoxA (WHO CC Chulalongkorn/WHO CC QSMI/Faculty of Medicine, Chulalongkorn); Using peptide compound broad spectrum against enveloped viruses (WHO CC Chulalongkorn/WHO CC QSMI/Nanyang Institute, Singapore)
- Design and production of plant based monoclonal antibodies against Ebola Nipah EV71 rabies and other RNA viruses (Baiya Phytopharm, Chulalongkorn University, WHO CC QSMI, WHO CC Chulalongkorn)
- Plan step of use in humans of peptide compound against RNA viruses with Nanyang Institute.
- International Dengue meeting, 6th Asia Dengue summit (Bangkok, June 2023).

### Paradigm shift in EID management

- Terminate all activities of wildlife surveillance to collect novel viruses
- Strategic development of advanced rapid diagnostic platform in diseased humans and animals including pathogen X discovery
  - Multiplex polymerase chain reaction (PCR) for screening several viruses in one reaction
  - Family PCR for detection of multiple viruses in the same family at the same time
  - Set up detection of Monkey pox in human and animal specimens
  - Single-Primer Amplification; SISPA for identifying pathogen X (under development)

### Neuroinfectious diagnosis and management

- Oral presentation “Country experiences as academic institution, how to link research to patient care” in WHO Regional workshop (May 2023) to develop TOR of the Regional Reference Laboratory network and Diagnostic advisory group for pathogens of epidemic and pandemic potential (New Delhi, May 2023)
- Laboratory diagnosis for Prion disease.

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# WHO Collaborating Centre for Virus Reference & Research (Special Pathogens)

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## Name of Institution

Virology and Pathogenesis Group; Rare and Imported Pathogens Laboratory, UK Health Security Agency

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## Location

Salisbury, UK

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## Terms of Reference for Collaboration with WHO

- To support WHO in its function of alert and response to outbreaks of Emerging and Dangerous Pathogens of international importance, including outbreaks of Arboviruses, hantaviruses, arenaviruses and haemorrhagic fever viruses, Poxviruses, Rickettsiae and hazard group 3 bacteria (including but not limited to Bacillus anthracis, Francisella tularensis, Yersinia pestis & other BT agents and related bacterial and viral zoonoses in hazard groups 2-4).
- Support WHO in the early diagnosis, rapid identification and characterization of high risk pathogens specimens submitted through WHO, keeping the results confidential, if so required.
- To inform WHO of any epidemiological or laboratory finding that would be in conjunction with a risk of transmission of a severe disease of international concern : Arboviruses, hantaviruses, arenaviruses and haemorrhagic fever viruses, Poxviruses, Rickettsiae and hazard group 3 bacteria (including but not limited to Bacillus anthracis, Francisella tularensis, Yersinia pestis & other BT agents and related bacterial and viral zoonoses in hazard groups 2-4) - and novel and emerging infectious diseases.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

### WHO-funded project: HARMONY 1

- HARMONY 1 is a study to investigate whether the outputs of different tests for antibodies to SARS-CoV-2 could be harmonised to give answers as Binding Antibody Units (BAU), the binding assay equivalent to the neutralising antibody international units (IU) which are the base calibration in the international standard NIBSC 20/136. The study was managed through the Rare & Imported Pathogens Laboratory (RIPL) in conjunction with WHO and the National Institute of Biological Standards & Control (NIBSC).
- The work centred on the major commercial assays covering the largest populations, involving 14 manufacturers and a total of 22 tests covering different configuration and targets.
- The results demonstrated that assay based on the same antigen (Receptor Binding domain, S1, whole spike etc) and looking for the same things (IgG, total antibody) could be harmonised quite accurately allowing similar assay from different manufacturers or studies to be compared in vaccine efficacy and other studies.
- Results of the study were presented internationally at the Frederick National Laboratory for Cancer Research Clinical and Translational Serology Task Force (CTTF) focus group meeting (June 2022), the WHO Solidarity weekly meeting on COVID serology, and European Society for Clinical Virology annual workshop (Sep 2022). The journal paper was submitted in Dec 2022.

### WHO-funded project HARMONY 2

- HARMONY 2 was initially intended to evaluate open platform COVID antibody assays for use in low to middle income countries, but the changing incidence of COVID and its rapid evolution, together with

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the poor interest from relevant companies changed the direction of this study to examine pseudo-neutralisation assays.

- For this work, manufacturers were again given a definitive protocol, and a panel for sera to evaluate, comparing their results against the neutralising antibody levels in each sample measured by neutralising antibody tests calibrated against the international standard. Of 15 companies identified, 10 took part in the final study and analysis of the results is on-going.
- An initial report was submitted to WHO on 31 August 2023.

### **CCHF Research & Development Roadmap**

- The CCHF Roadmap originated in 2018 as a project co-led by Public Health England (now UKHSA) and WHO; however, the project was suspended in 2020 owing to COVID.
- Wellcome Trust agreed to fund UKHSA for the completion of the Roadmap in October 2022. The Taskforce was reconvened and enlarged with more representatives from African and Asian countries, supplemented by experts on anti-tick vaccines as a new approach to disease control.
- The BSA - Baseline Situation Analysis - is being updated and the Roadmap includes a section on cross-cutting themes and research needed around pathogenesis and surveillance.
- The focus is on research topics that could be deliverable in a relatively short time, and which would make a practical difference in disease management and control, subject to funding. A stakeholders meeting has been agreed for June 2024.

### **CCHFV diagnostic and training support to:**

- **Tanzania:** Worked with the Kilimanjaro Clinical Research Institute in Tanzania to support local CCHF assay capability by supplying specialist training, assay methodology and control reagents to establish a laboratory reference assay. Training in country
- **Turkey:** RT-PCR assay & ELISOPT training provided to Sivas University hospital.
- **Kazakhstan:** Laboratory diagnosis and CCHFV sequencing using MinION. Training in Almaty.

### **Mammarenavirus support and training:**

- **Lassa fever diagnostic and training support to Abakaliki Nigeria:** RT-PCR training on the Altona test kit was provided to several colleagues from Abakaliki to UKHSA-Porton.
- **New World Mammarenavirus isolation and identification:** Collaboration with Fioruz, Rio de Janeiro to isolate and characterise two new species of mammarenavirus (XAPV & APOV)

### **Kyasanur Forest Disease Virus diagnostics and collaboration:**

- **India - Kyasanur Forest:** training and support on discriminatory RT-PCR diagnosis between KFDV and AHFV to Manipal Institute of Virology, India. Resulting in a new RT-PCT test kit.

### **Supply of virus reference control reagents to Japan:**

- **Provision of HG4 virus reagents to supply the Japanese BSL4 laboratory in Tokyo:** Several strains of CCHFV and Lassa fever virus were provided to the National Institutes of Infectious Disease (Murayama branch).

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# WHO Collaborating Centre for epidemic and pandemic diseases

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## Name of Institution

Division of Infectious Diseases, University Hospital of Geneva

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## Location

Geneva, Switzerland

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## Terms of Reference for Collaboration with WHO

- As requested by WHO, provide technical input to WHO on its activities related to clinical management, interventions and other response activities for the control of disease outbreaks, epidemics, and pandemics.
- Under WHO's leadership, provide technical input to WHO in its activities that may support the development of guiding documents, their dissemination and implementation on priority emerging infectious diseases as defined by WHO, including new emerging diseases.
- Support WHO by technically contributing to its work through the provision of reference materials on diagnostics, quality control and evaluation to strengthen preparedness and readiness for epidemic and pandemic-prone diseases.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- Opening ceremony of the WHO Collaborating Centre for epidemic and pandemic diseases at the University Hospital of Geneva on June 7, 2023.
- Deployment of a clinical expert to Equatorial Guinea to serve as case management lead for Marburg virus outbreak under WHO coordination.
- Provision of a SARS-CoV-2 new variant isolate (XBB1.5) to WHO BioHub.
- Participation in the WHO CoviNet (lab network) as expert laboratory for characterizing new variants.
- Validation of Mpox rapid diagnostic test in collaboration with the organization Finddx.

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# WHO Collaborating Centre for Emerging and Re-Emerging Infectious Diseases

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## Name of Institution

Central Public Health Laboratories, Ministry of Health, the Sultanate of Oman

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## Location

Muscat, Oman

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## Terms of Reference for Collaboration with WHO

- To support WHO in its function of response to outbreaks of high threat pathogens, including outbreaks of Arboviruses, Viral Haemorrhagic Fevers and novel and emerging infectious diseases, with special emphasis on diagnostics and laboratory support.
- Support WHO in capacity building on laboratory diagnostics for emerging and re-emerging diseases
- Under WHO's leadership, to provide technical assistance and laboratory capacity building to strengthen & expand the EMR influenza and other emerging respiratory diseases laboratory networks

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

Several collaborative activities were conducted in 2022 and 2023, all geared towards enhancing the national and regional capacities that support response and preparedness for emerging and re-emerging infections:

- Influenza SARS CoV Multiplex PCR Test training, practical wet lab (29th May–2nd June 2022) in collaboration with CDC/APHL US
- SARS CoV 2 Genomic Analysis Training Course (4th–8th July 2022) in collaboration with UK Health Authority Agency, NVAP, EMRO
- Public Health Laboratory Twinning for Infectious Disease Diagnostic and Genomic Surveillance with support of CDC Oman office (22nd Aug–16th Sep 2022)
- Regional Laboratory Training Workshop on Measles and Rubella Molecular Survey, Wet Lab, CPHL (16th–24th Oct 2022)
- Training for National Influenza Laboratories on Influenza and SARS Cov 2 genetic sequencing to support the integration of SARS CoV 2 and Influenza sentinel surveillance. Conducted by EMRO/ CDC/ CPHL (7th–10th Nov 2022)
- Training for National Influenza Laboratories on Influenza and SARS Cov 2 genetic sequencing. Training for National Influenza Laboratories on Influenza and SARS Cov 2 genetic sequencing. Conducted by EMRO/CDC/CPHL
- Regional Training for the Oxford Nanopore MINion Technology for direct detection of Polio Virus, wet lab, CPHL. Conducted by EMRO/ BISC/ Campridge Univ. (4th Dec–15th Dec 2022)
- Virtual WGS Training for PulseNet Middle East. (26 Sep–31st Oct 2022)
- Advance Malaria Microscopic training. EMR & CPHL. (8th–12th Jan 2023)
- Train the Trainer- Covid Sequencing -NGS. UK Health Security Agency (22nd–26th Jan 2023)
- National Antimicrobial Susceptibility Testing WS (29–31 May 2023)
- National Biosafety training (8–10 Jan 2023)
- Sub-regional One Health training for national reference laboratories of VHF priority countries on advanced laboratory diagnosis of CCHF and RVF viruses in Muscat (17–28 Sep 2023)

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# WHO Collaborating Centre for Diagnostic Reference, Training and Investigation of Emerging Infectious Diseases

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## Name of Institution

Armed Forces Research Institute of Medical Sciences (AFRIMS)

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## Location

Bangkok, Thailand

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## Terms of Reference for Collaboration with WHO

- Upon request from WHO, provide assistance to WHO to support Member States in outbreak investigation, disease detection and response activities (including laboratory diagnostics)
- To assist WHO for the dissemination of findings of emerging and re-emerging disease research and laboratory diagnostics for the benefit of regional health security
- To support WHO's efforts to improve diagnostic capacity, prevention and strengthen capacities in Member States

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- Conducted surveillance for emerging antimicrobial-resistant bacteria and shared our findings with regional and national health authorities, supporting informed decision-making.
- Disseminated findings regarding vector and vector-borne pathogen distribution and abundance in Thailand, enhancing regional health security.
- Strengthened the capacity of Armed Forces Philippines to conduct surveillance for vectors of dengue and malaria.
- Facilitated training and capacity building in Laboratory Biosafety/Biosecurity and Occupational Health for 400 healthcare workers at the Victoriano Luna Medical Center of the Armed Forces of the Philippines, Quezon City, Metro Manila, Philippines
- Strengthened diagnostic capacity for HIV and emerging infectious diseases, including providing technical support for quality assurance and certification under the Department of Health.
- Performed testing for SARS-CoV-2 to assist the Ministry of Public Health in Thailand, the Philippines and other collaborating sites to improve public health response through detection of variants and spread of disease.
- Disseminated findings of emerging disease research including influenza and respiratory viruses as well as febrile and vector-borne illnesses including dengue, chikungunya and Zika, enhancing regional health security.
- Ongoing GEIS-funded zoonotic disease surveillance of Eurasian avian-like H1N1 swine influenza and Severe Fever Thrombocytopenia in Thailand in collaboration with the RTA; AFRIMS VET MED provides lab support

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# WHO Collaborating Centre for Infectious Disease Epidemiology and Control

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## Name of Institution

School of Public Health, The University of Hong Kong

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## Location

Hong Kong, China

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## Terms of Reference for Collaboration with WHO

- In collaboration with WHO, strengthen capacity and response for infection prevention and control.
- In collaboration with WHO, strengthen capacity, prevention and response for Antimicrobial Resistance (AMR).
- In collaboration with WHO, strengthen capacity, prevention and response to outbreaks of emerging and re-emerging pathogens.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- Our WHOCC has actively taken part in international / local conferences and shared expertise on infection prevention and control related to COVID-19. In particular, our WHOCC has participated in the WHO expert meeting on the global strategy for infection prevention and control in August 2022. Prof Cowling is a member of the Through-the-air transmission (TTAT) Technical Consultation Group. Locally, our WHOCC has provided an educational update to 3 private hospitals in Hong Kong for the topic of “Understanding laboratory testing of COVID-19 and the impact of actual infection on the results” in April 2022.
- Our WHOCC is a member of the WHOAMRCC and GLASS networks. We participated in the GLASS meetings held in February 2022 and March 2023. We committed in further updating the Diagnostic Stewardship Manual and training tools once GLASS 2.0 finalizes. We will also conduct further Webinars on this topic and can develop further training package for Diagnostic Stewardship. Our WHOCC is heavily involved in the regional training of AMR surveillance. In particular, Prof Seto was invited by the 18th Shanghai International Hospital Infection Control Forum (SIFIC) to speak for the topic of “Diagnostic Stewardship for AMR control”. Our WHOCC has agreed to contribute to the WHO Academy Initiative. We will take part in Diagnostic Stewardship of the “Foundation of implementing AMR and AMC surveillance” Module.
- Members of our WHO CC published 89 papers under the affiliation of the WHO CC, The University of Hong Kong (reference list available on request).
- Prof Ben Cowling was awarded a WHO project entitled “Non-pharmaceutical public health measures for mitigating the risk and impact of epidemic and pandemic influenza” for the period from June 2022 to November 2022 to work with WHO to update the NPIs guidance for influenza to provide countries with the best evidence to better respond to future influenza epidemics and pandemics.

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# WHO Collaborating Centre for Emerging Infections and Biological Threats

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## Name of Institution

Zentrum für Biologische Gefahren und Spezielle Pathogene/Centre for Biological Threats and Special Pathogens (ZBS), Robert Koch Institute

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## Location

Berlin, Germany

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## Terms of Reference for Collaboration with WHO

- Support WHO in its function to prepare for high-threat / high-impact pathogen outbreaks in the area of laboratory diagnosis, surveillance and epidemiology, epidemic forecasting, infection prevention and control (IPC), and clinical management through training and other activities.
- Assist WHO by providing expertise in event investigation and outbreak response in the areas of laboratory diagnosis, epidemiology, modeling, IPC and clinical management, including development of standardized procedures and applied research.
- Support WHO with the implementation of the International Health Regulations (IHR) 2005 regarding preparedness for hazards of biological and unknown cause.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

The WHO Collaborating Center for Emerging Infections and Biological Threats works across three Departments at the Robert Koch Institute, namely the Centre for Biological Threats and Special Pathogens (ZBS), the Dept. for Infectious Disease Epidemiology as well as the Centre for International Health Protection (ZIG). Key activities under the 2022-23 collaboration were:

- **Diagnosis and characterization of bacterial and viral pathogens, as well as detection of biological toxins:**
  - Conduct of annual EQAs on highly pathogenic bacteria with about 30 laboratories in Europe.
    - The EU-funded project “European program for the establishment of validated procedures for the detection and identification of biological toxins (EuroBioTox, <https://www.eurobiotox.eu>), continued its work on quality assurance measures for biological toxin detection within EU and beyond, integrating 63 institutions within 23 countries (including laboratories, industrial partners and end users from the health, food and security sectors is established).
    - The External Quality Assurance program for Electron Microscopy of Virus Diagnostics (EQA-EMV) completed one run, and prepared another run which was shipped in June 2023. Six blinded samples, including SARS-CoV-2, orthopoxviruses and influenza, were sent out to over 80 participants in more than 30 countries worldwide with an 81% response rate.
    - The “EMERGE Laboratory Network” has further been strengthened in the framework of the EU funded Joint Action (JA) SHARP (April 2019 – September 2023), including about 40 European diagnostic laboratories
- **Clinical expertise, operational and technical support to WHO on clinical management and treatment of patients with high-impact pathogens upon request by WHO**
  - RKI’s permanent working group, STAKOB, collaborates with WHO’s Emerging Disease Clinical Assessment and Response Network (EDCARN) to offer clinical and laboratory insights, expert

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opinions, and deployment of clinical experts for outbreak response. Clinicians from STAKOB participate in WHO COVID-19 guideline development, Cochrane reviews, and training initiatives. RKI's contribution enhances WHO's clinical response capacity for high-impact pathogens such as Marburg Virus Disease and Crimean-Congo Hemorrhagic Fever.

- **Provision of expertise in outbreak response in the field**
  - The RKI's involvement includes supporting the EMT Technical Working Group (TWG) on Highly Infectious Diseases, which aims to develop Minimum Standards and Recommendations for Emergency Medical Teams (EMTs) responding to outbreaks of highly infectious diseases. The RKI contributed by reviewing guidelines, coordinating TWG meetings, consulting with WHO experts and partners, and drafting the final document. This engagement enhances the preparedness and effectiveness of EMTs in addressing outbreaks of highly infectious diseases.
- **Development of training modules to support activities related to surveillance, preparedness and response to infectious diseases**
  - The RKI has been collaborating extensively with the World Health Organization (WHO) in various regions and countries to develop training modules for surveillance, preparedness, and response to infectious diseases.
- **Assessment, review, implementation and strengthening of IHR core capacities regarding surveillance, preparedness and response to infectious diseases including capacities at the human-animal interface**
  - Joint External Evaluations (JEEs): RKI experts have contributed to numerous JEEs since 2016, assessing IHR core capacity implementation and leading technical areas. JEEs help identify needs and priorities for enhancing outbreak and health emergency preparedness in countries.
    - Namibia Stakeholder Workshop (2022): RKI collaborated with the Namibian Ministry of Health and Social Services to convene a stakeholder meeting focused on strengthening IHR core capacities. This workshop facilitated connections among Namibian, German, and international stakeholders in public and One Health, leading to planned joint activities and capacity-building efforts.
    - IHR Summer School (2022) aimed at enhancing IHR core capacities, particularly in preparedness and response operations. The program engaged senior officials from African countries, providing an interactive platform for exchanging experiences and knowledge related to IHR implementation and communication with WHO.

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# WHO Collaborating Centre for Infectious Disease Modelling

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## Name of Institution

The MRC Centre for Global Infectious Disease Analysis, Imperial College London

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## Location

London, UK

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## Terms of Reference for Collaboration with WHO

- Upon request of WHO provide rapid analysis of urgent infectious disease problems, notably outbreaks and events of international concern.
- Upon request of WHO provide technical assistance to WHO infectious disease programs including coordination of expertise in modelling and contribute to WHO information products
- Upon request of WHO, contribute to capacity building in modelling in accordance with WHO needs and planning.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

The Centre continued to provide modelling outputs and technical advice on COVID-19 activities across multiple WHO departments and regions. For example:

- Generation of estimates of vaccine impact and booster prioritization strategies were provided to inform the updated prioritization and guidelines made by WHO-SAGE.
- Joint epidemiological-economical modelling was applied to support Indonesia in estimating the societal value of SARS-CoV-2 booster vaccination strategies.
- New research was initiated to estimate the costs of pandemics to support longer-term aims to assess the return-on-investment of pandemic preparedness.
- Staff supported the TAG-VE group monitoring the emergence and spread of SARS-CoV-2 variants.

Centre staff additionally supported WHO departments in response to other health emergencies:

- Working closely with the WHO EURO regional office, a model of mpox transmission was developed to support WHO decision-making regarding PHEIC status and provided insights into future vaccination needs.
- New research was initiated and is ongoing to determine the optimal stockpile size for the Ervebo vaccine against Ebola across a range of reactive and preventative vaccination strategies.
- Estimates of excess deaths in Somalia were provided for a WHO/UNICEF report on the impact of drought in Africa.

Alongside these activities, Centre staff provided support across a wide range of endemic disease programs.

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# WHO Collaborating Centre for Laboratory Preparedness and Response for High Threat Pathogens and Biorisk

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## Name of Institution

Centre for Infectious Diseases Research, Diagnostics and Laboratory Surveillance, National Institute for Public Health and the Environment (RIVM)

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## Location

Bilthoven, Netherland

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## Terms of Reference for Collaboration with WHO

- To provide technical support to WHO in the field of laboratory system strengthening
- To provide technical support in developing laboratory preparedness and response activities for high threat pathogens in conjunction with WHO
- To support WHO in the International Health Regulations (IHR) implementation through the establishment of Biosafety and Biosecurity Requirements and Biorisk management
- To support WHO in sharing expertise and lessons learned with relevant stakeholders

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- Alignment of WHO country assessment tool to the new WHO laboratory safety manual; assessment of human and veterinary labs in three Balkan countries; summary report on all assessments in Southeast and Eastern Europe and Central Asia in 2019-2022; identification of gaps and needs for adequate laboratory preparedness, readiness and response for diagnosis, emerging events of public health concern; translation of assessment outcome to action plan for capacity and capability building.
- Mapping of diagnostic capabilities in laboratories in Southeast and Eastern Europe and Central Asia; Assessment of access to External Quality Assurance exercises and development of roadmap for improvement of access and pathogen coverage.
- Development of a new and complete manual to guide Laboratory Preparedness for Health Emergencies.
- Assistance and execution in different phases of the GOARN/ RRML simulation exercise, including a) set up of minimum operational standards b) support of TTX on pre-deployment phases of the RRML life cycle to initiate the exercise and prepare for the subsequent field exercises; c) contribution to field exercise by supporting development and execution, including delivery of EQA panel.
- Assistance to WHO-Euro in preparation and execution of the Lab Taskforce meeting in Antalya, Turkey in 2022 and the meeting in Izmir, Turkey in 2023.
- Development sustainability assessment tool for WHO lab assessment tool.
- Organisation of several BSL-3 courses for delegates from Southeast and Eastern Europe; organisation of One Health workshop to establish One Health approach in lab diagnostics for WHO Balkan hub countries; NGS training for Eastern European country; organisation of training for orthohantavirus diagnosis including Biorisk management for WHO Balkan hub countries; organisation of training on EQA design, development and analysis for delegation of Eastern European country.
- Development of an eLearning tool on basic biosafety in line with the 4th edition of the WHO biosafety manual.

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# WHO Collaborating Centre for Applied Biosafety and Training

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## Name of Institution

Biosafety, Air and Water Microbiology Group; Novel and Dangerous Pathogens Training, UK Health Security Agency

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## Location

Salisbury, UK

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## Terms of Reference for Collaboration with WHO

- Provide technical expertise, advice, knowledge and support on the effectiveness of laboratory biosafety systems, as requested by WHO, to support the global development of sustainable laboratory facilities.
- Support WHO for the development of WHO biosafety and biosecurity guidance and standards
- Develop and deliver biosafety and biosecurity training for WHO

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# WHO Collaborating Centre for Biosafety and Biosecurity

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## Name of Institution

Centre for Biosecurity, Health Security Infrastructure Branch, Public Health Agency of Canada

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## Location

Ottawa, Canada

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## Terms of Reference for Collaboration with WHO

- Upon request by WHO, provide technical expertise and input on biosafety and biosecurity
- Support WHO to build the evidence on biosafety and biosecurity through applied research
- Promote the adoption and implementation of WHO's biosafety and biosecurity best practices, tools and methodologies
- Assist WHO in building capacity in countries through training on evidence-based biosafety and biosecurity

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

Through the WHO Collaborating Centre (CC) for Biosafety and Biosecurity, the Public Health Agency of Canada (PHAC) provided technical expertise, knowledge, support, and coordination to the WHO through the following activities:

- Promoting the Analytical Approach e-learning tool, which the WHO can use to discuss how to effectively address National Action Plan recommendations
- Providing feedback on the development of the draft WHO Biosecurity Guidance document
- Presenting the Laboratory Incident Notification Canada (LINC) program, which monitors laboratory incidents in Canada, at international fora with the aim of supporting other countries interested in developing similar programs

PHAC has shared biosafety/biosecurity materials relevant to the WHO, which could serve as sources for WHO product development and tools for other countries (e.g., Canadian Biosafety Guideline, Scientific Research Policy for Human Pathogens and Toxins, etc.). Additionally, through the WHO CC, PHAC supported the WHO in developing the *Global guidance framework for the responsible use of the life sciences: mitigating biorisks and governing dual-use research*, which was published in Sept 2022. PHAC continues to provide support and advice on issues related to dual-use research of concern and is progressing in the development of biosafety and biosecurity resources for kindergarten to grade 12 students. PHAC also actively supports global polio eradication through domestic and international engagement.

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# WHO Collaborating Centre for Biosafety and Biosecurity

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## Name of Institution

Biosafety Centre, Institute for Infectious Diseases, The University of Bern

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## Location

Bern, Switzerland

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## Terms of Reference for Collaboration with WHO

- To provide technical support to WHO's capacity building and training on biosafety and biosecurity
- To support WHO's efforts in disseminating knowledge on biosafety and biosecurity and provide technical input to WHO that may inform the development of guidance documents for the development, management and operation of biosafety laboratories
- To inform WHO's technical work towards the establishment of a global consensus and coordinated assessment system for biosafety and biosecurity

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

New CC designated from 25 August 2023 with no activities undertaken thus far.

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# WHO Collaborating Centre for Mass Gatherings and Global Health Security

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## Name of Institution

Disaster Research Centre, Flinders University

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## Location

Adelaide, Australia

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## Terms of Reference for Collaboration with WHO

- Support WHO in carrying out research translation and inform WHO's work on mass gatherings, emergencies, high visibility/high consequence events and health protection preparedness
- Upon WHO's request, develop and apply scientific knowledge as well as provide operational, clinical, epidemiological and event management support on mass gathering and global health security
- Upon WHO's request, assist capacity building and inform WHO's work by identifying best scientific evidence, shared experiences, key publications, guidelines in mass gathering and global health security
- Assist WHO by identifying suitable evidence and providing advice to inform WHO on the identification, prevention and response to mis/dis information and infodemics, concerning actual and perceived threats to global health security
- Under WHO's leadership, support global health security activities and capacity building for bio and health security planning, and inform WHO's work in assisting Member States in complying with the International Health Regulations and reducing global threat especially in relation to the deliberate use of biological agents.

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## sHighlights – List of key activities and outcomes under the 2022-23 collaboration

- Ongoing support and critique for the development of suitable risk assessment frameworks for mass gathering (public) health including COVID-19 specific assessment, and “all-hazards” assessment.
- Participation in WHO led mass gathering forum at the World Congress on Disaster and Emergency Medicine (Ireland) and the 5th International Congress on Mass Gathering Medicine (October 2023) in Riyadh.
- Networking support and orientation to Event Health Services for WHO leadership (Etape Morzine – France) including discussion of global standards for event health and extant science.
- Assistance to HSI-TAG in completion of the current strategic workplan and especially concerning the definition and special characteristics of health intelligence for deliberate events.
- Participation in the HSI-TAG meetings (July 2023, October 2022) including the WHO Information Risk Workshop with cross-sectoral partners.

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# WHO Collaborating Centre for Global Health Security

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## Name of Institution

Center for Health Security, Bloomberg School of Public Health, Johns Hopkins University

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## Location

Baltimore, USA

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## Terms of Reference for Collaboration with WHO

- To provide research and analysis at request of WHO on detection, preparedness, and response to natural and deliberate events and other threats to global health security.
- To support WHO in assessing possible impact of ongoing developments in science and technology on global health security.
- To assist WHO in evaluation of human health risks associated with deliberate events and other threats to global health security and develop appropriate policies and practices to strengthen health security.
- To support WHO's continued efforts towards increasing national capacities in Member States with their IHR commitments through the development of tools and relevant reports.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- JHCHS (Johns Hopkins Center for Health Security) co-developed the Assessment Toolkit for National Capacity to Respond to Deliberate Biological and Chemical Events to support Member States in strengthening their national capacities to prepare for, detect and respond to deliberate events.
- JHCHS reviewed and provided expert comments to other WHO guidance and tools for deliberate event preparedness and response including the Biosecurity Guidance: Managing Biosecurity at All Levels.
- JHCHS supported the development of the Global Guidance Framework for the Responsible Use of the Life Sciences: Mitigating Biorisks and Governing Dual-Use Research through providing technical expertise and input during the drafting and socialising stages.
- JHCHS led to the development of various mass gathering COVID-19 and All Hazard risk assessments and decision tools for Member States and event organizers, including CBRN and other human health risks.
- JHCHS collaborated with the infodemic management team to raise awareness on infodemic management strategies and best practices. The team also participated in a joint call for papers to contribute to the evidenced based field of best practices for infodemic management.
- JHCHS supported the Preparedness and Resilience for Emerging Threats (PRET) initiative by documenting and analyzing lessons from the COVID-19 pandemic to improve country readiness for future infectious disease emergencies.
- JHCHS colleagues have participated in numerous advisory groups, expert groups and other forums to facilitate informational exchanges around preparedness and response for natural, accidental and deliberate events as well as the developments in science and technology.
- JHCHS supported other WHO teams including the Global Influenza Programme and Smallpox Secretariat to design and build decision tools to aid Member States in estimated their national burden of seasonal influenza and a modeling tool to estimate the vaccines and drugs that might be needed in an Orthopoxvirus emergency.

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# WHO Collaborating Centre for Travellers' Health

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## Name of Institution

Epidemiology, Biostatistics and Prevention Institute (EBPI), Department of Public Health, Travel Medicine and Infectious Diseases, University of Zurich

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## Location

Zurich, Switzerland

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## Terms of Reference for Collaboration with WHO

- To undertake epidemiological monitoring / surveillance of travellers' health and illness, particularly relating to infections acquired during travel, in close collaboration upon WHO's request.
- To provide evidence synthesis and evaluation of interventions in the area of travel health to assist WHO in the development of guidance and information products in response to the needs of countries and relevant stakeholders as indicated by WHO
- To support WHO by strengthening capacities and disseminating information related to travel health.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

- Ongoing collaboration with WHO in the surveillance of travel related infections. Prof. Schlagenhauf and her team, with WHO collaboration, have developed an App called "ITIT" (Infection Tracking in Travellers) where travellers input data themselves on illness symptoms experienced during travel. These data together with passive data from the App, including geolocation and environmental data, provide the basis for early alerts that may indicate clusters of illness or emerging infections. This is an important contribution to pandemic preparedness. So far in 2023, we have recruited up to 1000 users of the App who are sentinels for infection throughout the globe. We have presented our findings at conferences in Europe (in Basel 2023) and published our paper with the results of the pilot study. *Travel Med Infect Dis.* 2023 Mar-Apr;52:102526. doi: 10.1016/j.tmaid.2022.102526.
- The Zürich WHO CC is very active in network surveillance of travellers' illness. Prof. Schlagenhauf is the GeoSentinel Site Director and Network Director of EuroTravNet. Both these networks have a goal of monitoring illness in travellers. GeoSentinel is a global network whereas EuroTravNet focuses on infections presenting in Europe post travel. Prof. Schlagenhauf organises monthly network meetings to exchange information on trends in travel-related illness and shares "alerts" from EuroTravNet with WHO epidemic intelligence. Regular publications reflect changes and trends in travel related illness such as COVID-19 impact on EuroTravNet infectious diseases sentinel surveillance in Europe.
- The Zürich WHO CC supports WHO activities in Guideline Development Groups – in 2023 -Syndromic screening for epidemic prone diseases of travellers via ground crossings
- This WHO CC collaborates in evaluating travel medicine interventions and also produces systematic reviews of travel-related illness with pandemic potential such as Travel-related respiratory symptoms and infections in travellers (2000-2022): a systematic review and meta-analysis.
- Participation in WHO review groups such as the Editorial Peer Review Group of the WHO Green Book "International Travel and Health"

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# WHO Collaborating Centre for Digital Learning in Health Emergencies

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## Name of Institution

The ECHO Institute, University of New Mexico Health Sciences Center

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## Location

Albuquerque, New Mexico, United States

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## Terms of Reference for Collaboration with WHO

- At WHO's request, collaborate with the organization to support the design and implementation of digital learning activities.
- Provide technical input to WHO to support the design and implementation of digital learning activities for enhanced emergency preparedness and response.
- Provide technical assistance and training to WHO to increase WHO's capacity to design and implement digital learning opportunities.
- Provide virtual technical assistance and support to increase WHO's capacity to design and implement digital learning opportunities utilizing the ECHO case- based virtual community of practice learning model and in alignment with WHO's rules and policies.
- Provide technical assistance to WHO for the design and implementation of the future Global Health Emergency Workforce (GHEW) digital learning to increase capacity and professionalization of the GHEW workforce. At the request of WHO, support design and implementation of digital learning activities to increase capacity and professionalization of the future GHEW.
- Provide technical assistance to WHO for the monitoring and evaluation of digital learning activities and collaborate to support the promotion and dissemination of digital learning lessons learned and best practices.

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## Highlights – List of key activities and outcomes under the 2022-23 collaboration

New CC designated in September 2023 with no activities undertaken thus far.



Notes

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**World Health  
Organization**

**EPIDEMIC  
& PANDEMIC  
PREPAREDNESS  
& PREVENTION**

**HEALTH  
EMERGENCIES**  
programme