

# Update on SAGO's work: WHO Global Framework for investigating the origins of novel pathogens

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on behalf of all SAGO Members and WHO Secretariat

**SAGO**

Scientific  
Advisory Group  
for the Origins  
of Novel Pathogens



SAGO, an advisory group to WHO



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

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**SAGO was formed in the context of the continued threat of the emergence or re-emergence of pathogens with epidemic and pandemic potential.**

## The Need

- A global framework to study future emerging and re-emerging pathogens, including
  - Comprehensive and coordinated studies
  - A holistic approach to study the emergence of high threat zoonotic pathogens including the animal human interface, environmental safety, biosafety and biosecurity
  - An established framework for studying emerging pathogens where and when they emerge

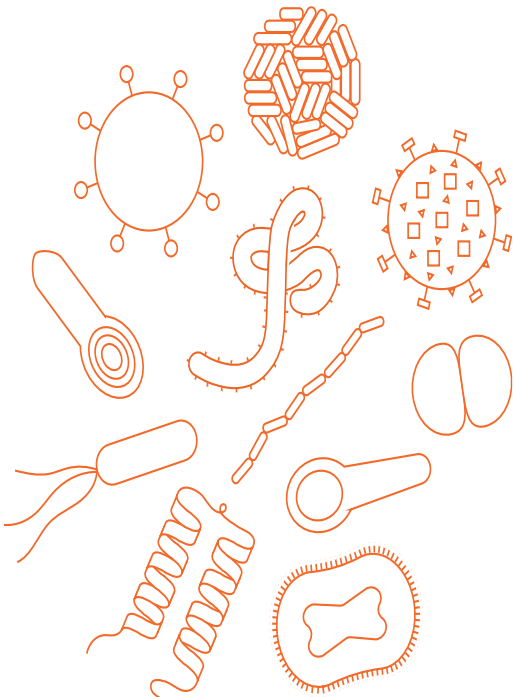
## Addressing a gap

- A scientific advisory group to advise WHO on technical and scientific considerations regarding origins of emerging and re-emerging pathogens

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

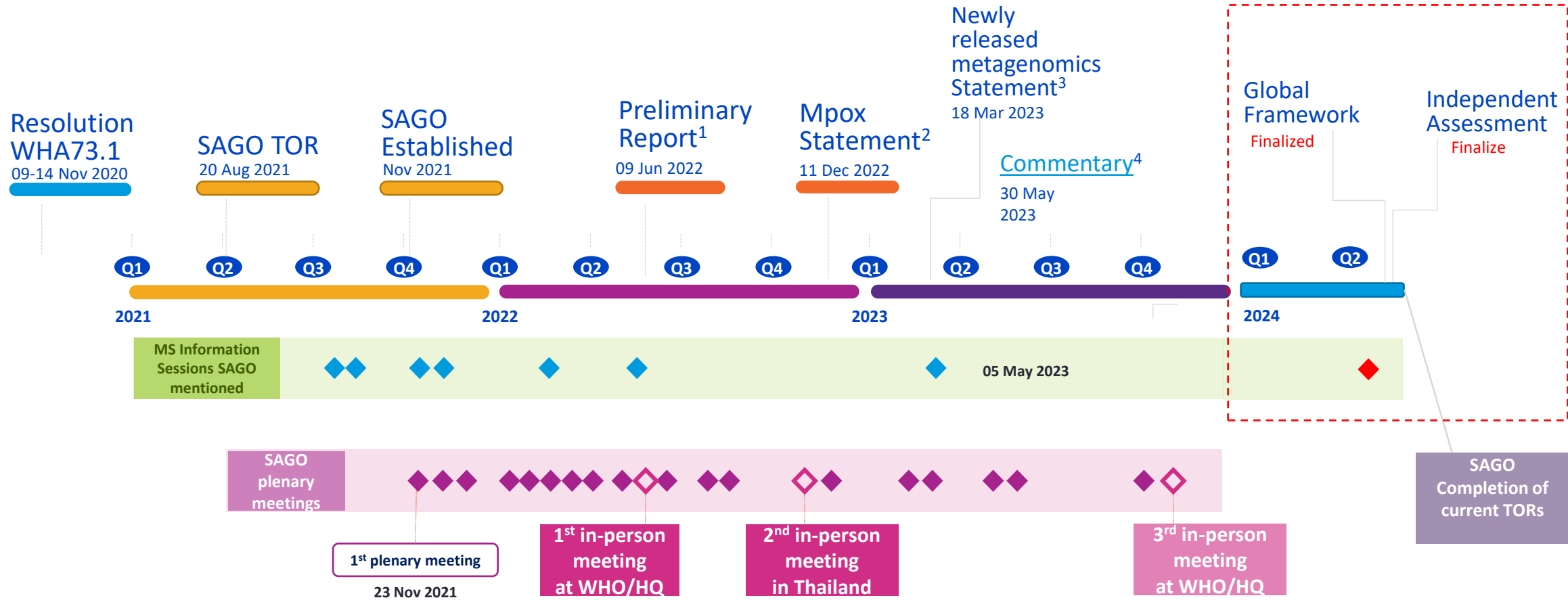
# SAGO Terms of Reference (2021)

**A scientific advisory group to advise WHO on technical and scientific considerations regarding origins of emerging and re-emerging pathogens:**



1. 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
2. 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;
3. In the context of **SARS-CoV-2 origins**:
  - a. To provide an **independent evaluation** of available **scientific and technical findings** from global studies on the **origins of SARS-CoV-2**;
  - b. To advise the WHO Secretariat regarding **developing, monitoring and supporting the next series of studies** into the origins of SARS-CoV-2
4. To provide additional advice and support to WHO, as requested by the WHO Secretariat, which may include participation in future WHO-international missions to study the origins of SARS-CoV-2 or for other emerging pathogens.

# SAGO Timeline (as of March 2024)



1. Scientific Advisory Group for the Origins of Novel Pathogens. Preliminary Report for the Scientific Advisory Group for the Origins of Novel Pathogens (SAGO). Geneva, Switzerland: World Health Organization; 2022 (<https://www.who.int/publications/m/item/scientific-advisory-group-on-the-origins-of-novel-pathogens-report>).
2. Scientific Advisory Group for the Origins of Novel Pathogens. Recommendations to better understand the origins of and factors for the emergence and re-emergence of mpox. Geneva, Switzerland: World Health Organization; 2022 (<https://www.who.int/publications/m/item/recommendations-to-better-understand-the-origins-of-and-factors-for-the-emergence-and-reemergence-of-mpox>).
3. Scientific Advisory Group for the Origins of Novel Pathogens. SAGO statement on newly released SARS-CoV-2 metagenomics data from China CDC on GISAID. Geneva, Switzerland: World Health Organization; 2023 (<https://www.who.int/news/item/18-03-2023-sago-statement-on-newly-released-sars-cov-2-metagenomics-data-from-china-cdc-on-gisaid>).
4. Venter M. Why the world needs more transparency on the origins of novel pathogens. Nature. 2023;618:27-9.

# WHO Global Framework for investigating emerging and re-emerging diseases

- **Rationale**

- Prior to SAGO - lack of a unified and structured approach to standardize origins investigations globally
- Global framework to study origins of emerging and re-emerging pathogens using a One Health approach

- **Significance of the Framework**



Improve the understanding of the pathogen's origins.



Improve the global preparedness and response to emerging pathogens of similar origin



Improve the speed, quality, consistency, coordination, and comprehensiveness of investigations

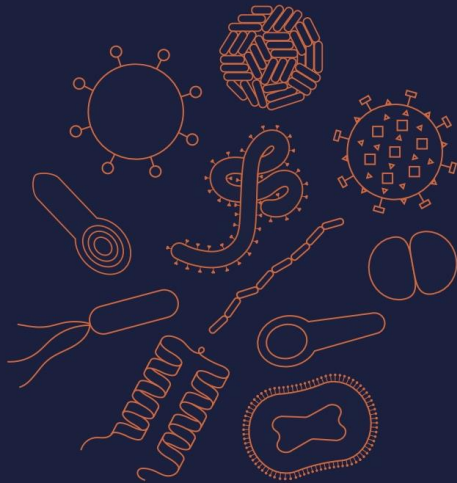


Foreground the commitment of international health regulations (IHR)



Consider the diverse specializations and expertise via a participatory and integrative approach

WHO Global Framework to define and guide studies into the origins of emerging and re-emerging pathogens of epidemic and pandemic potential



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



## Technical Elements



Early investigations



Human studies: epidemiology



Human / Animal Interface studies



Environmental / Ecological studies



Genomics / Phylogenetics



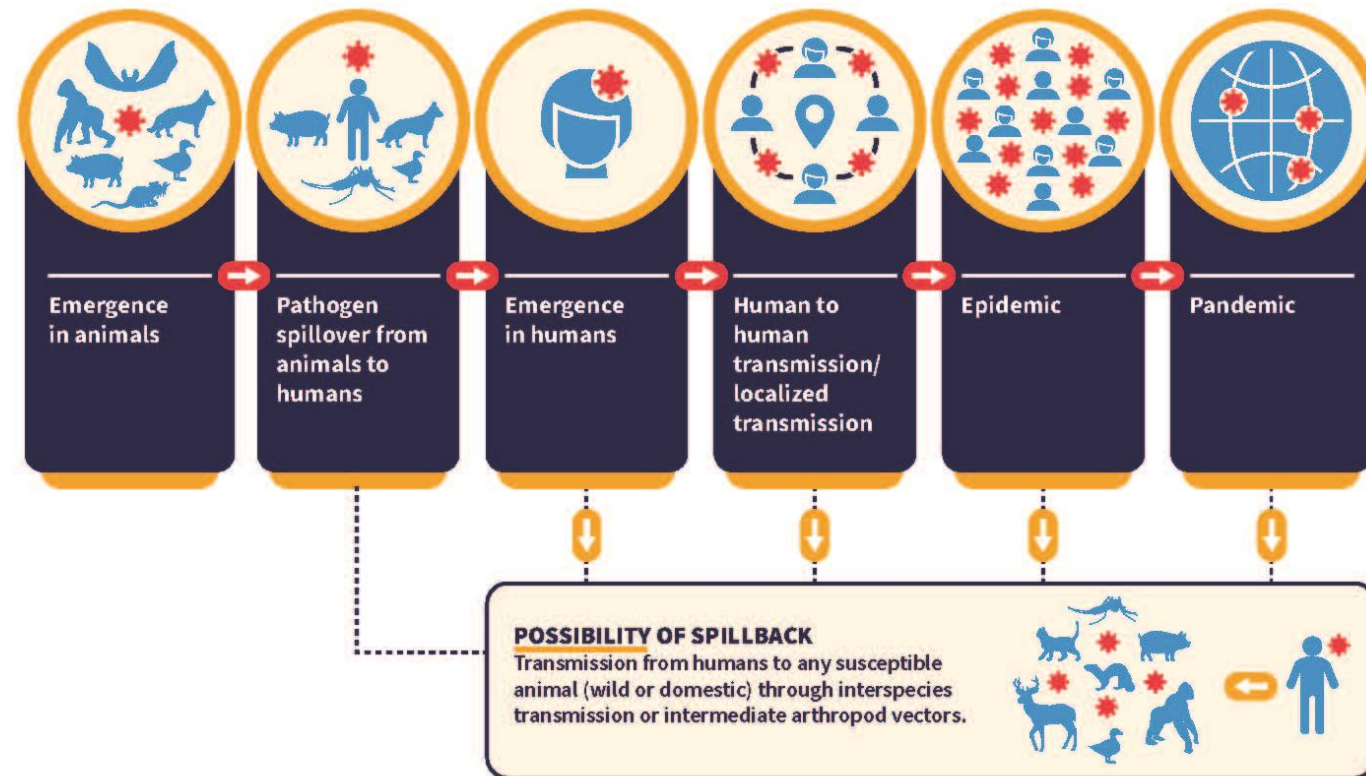
Biosafety / Biosecurity

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# Emergence of novel Pathogens

## Stages of emergence, spillover and potential spillback through zoonotic spillover



# Implementing the WHO Global Framework

## Technical Elements



Early investigations



Human studies: epidemiology



Human / Animal Interface studies



Environmental / Ecological studies



Genomics / Phylogenetics



Biosafety / Biosecurity

## Country Capacities and Systems

Multi-disciplinary team (national/international)  
Outbreak investigation; Epi Data collection, sample collection, transport & storage

Human disease surveillance systems, epidemiology capacity; diagnostic testing

Animal surveillance systems, epidemiology capacity

Environmental surveillance system, wastewater, vectors; laboratory capacity

Access to laboratories with advanced gene sequencing expertise

Biosafety & biosecurity governance, oversight

## Alignment with IHR

Multidisciplinary, cross cutting teams  
research/development

Surveillance and response systems

One Health approach: detection of zoonoses and foodborne diseases

Laboratory capacity, diagnostics, biosafety



# Emerging and Re-emerging diseases: Identifying Disease X:

Diseases with epidemic potential prioritized for research and development in emergency contexts by WHO<sup>[1]</sup>

- COVID-19
- Crimean-Congo haemorrhagic fever
- Ebola virus disease and Marburg virus disease
- Lassa fever
- Middle East respiratory syndrome coronavirus (MERS-CoV) and severe acute respiratory syndrome (SARS)
- Nipah and henipaviral diseases
- Rift Valley fever
- Zika
- **“Disease X”**

Being updated currently - as part of R&D blueprint for priority pathogens

Global Framework: Pathogens of concern (non-exhaustive)

- **Viral Haemorrhagic Fevers** with animal hosts
  - E.g. Filoviruses (Ebola, Marburg); Arenaviruses (Lassa Fever; Lujo; South American haemorrhagic Fevers) etc
- **Arboviruses** (viruses with arthropod vectors)
  - Flaviviruses (e.g. WNV; Zika; JEV etc)
  - Alphaviruses (e.g. CHIKV; EEEV; VEE etc)
  - Bunyavirales: (CCHF; RVF etc)
- **Pox viruses**
  - Smallpox; M-pox etc
- **Paramyxoviruses**
  - Henipa viruses (Nipah, Hendra)
- **Influenza A**
  - Zoonotic: Swine; Avian or novel Influenza viruses
- **Coronaviruses:** SARS-CoV-1 ; SARS-CoV-2; MERS-CoV
- **Bacterial pathogens of concern:**
  - Emerging and re-emerging zoonotic bacteria or drug-resistant bacteria (eg anthrax; plague; cholera etc)

[1] <https://www.who.int/activities/prioritizing-diseases-for-research-and-development-in-emergency-contexts>

# Investigating the Origins of Emerging and Re-Emerging Pathogens

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Investigating a pathogen's origins requires a dynamic, non-linear approach where findings are shared rapidly and transparently to guide the next steps.

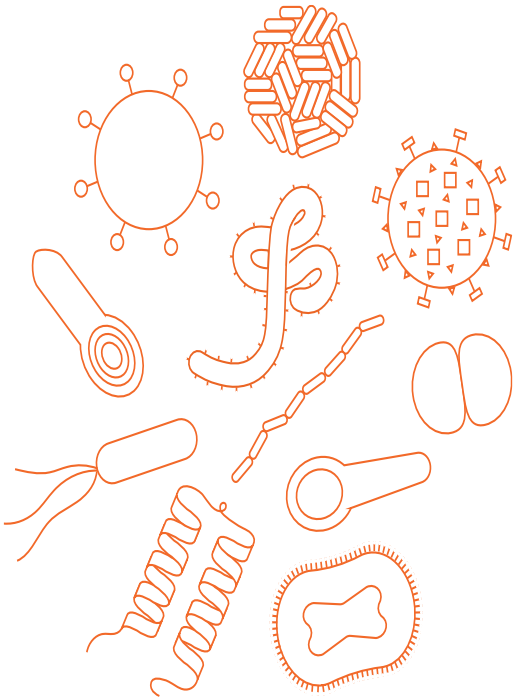
This process:

- Guides immediate responses: crucial for implementing measures to halt further transmission and prevent new spillover events.
- Facilitates adaptive studies: accelerates and refines ongoing and future investigations, allowing research to adapt swiftly to new information.
- Promotes transparency: Sharing results with the international community fosters transparency and facilitates international collaboration.
- The framework encourages results are shared as they are finalized, not waiting for a final report.

# SAGO Outputs (2021-2024)

Date Published	Title of work	Status
9 June 2022	Preliminary Report for the Scientific Advisory Group for the Origins of Novel Pathogens (SAGO)	Complete
22 December 2022	Recommendations to better understand the origins of and factors for the emergence and re-emergence of mpox	Complete
18 March 2023	SAGO statement on newly released SARS-CoV-2 metagenomics data from China CDC on GISAID	Complete
30 May 2023	Commentary in Nature – <i>“Why the world needs more transparency on the origins of novel pathogens”</i>	Complete
TBC	Global Framework	Presented to MS Anticipation publication date May 2024
TBC	Independent Assessment, Apply Global Frame work to Origins of SARSCOV2	In Final Development (expected publication Summer 2024)

1. Publish the Global Framework (WHO website)
2. Publication of the Independent assessment of the origins of SARS-CoV-2
3. End of term for current SAGO members
4. Revise terms of reference and launch call for new members
5. Ongoing direct involvement and oversight in future events - promoting, implementing and building on the Global Framework



Setting the agenda in research

## Comment



Researchers catch bats emerging from a cave in Thailand to test them for coronaviruses.

## Why the world needs more transparency on the origins of novel pathogens

Marietje Venter on behalf of the WHO Scientific Advisory Group for the Origins of Novel Pathogens

Collaboration and openness are essential to minimize the risks of future pandemics, says the World Health Organization's scientific advisory group, SAGO.

**O**n 5 May, the director-general of the World Health Organization (WHO), Tedros Adhanom Ghebreyesus, declared that COVID-19 is no longer a public-health emergency of international concern. This signalled the end of the acute phase of a pandemic that has caused almost 7 million confirmed deaths worldwide. But more than three years after COVID-19 was declared a pandemic, where the coronavirus SARS-CoV-2 came from, and how it first came to infect humans, remains unclear.

Understanding the origins of novel pathogens that could result in major outbreaks, epidemics or pandemics is essential to prepare for the next emerging disease. In

recognition of this, the WHO established the Scientific Advisory Group for the Origins of Novel Pathogens (SAGO) in 2021. The 27 members of our group, from 27 countries, include specialists in epidemiology, virology, human and animal infectious diseases, ecology, genomics, and biosafety and biosecurity.

Since SAGO was established, we have evaluated what new data are available to aid investigation of the origin of SARS-CoV-2, met with scientists from around the world and made recommendations about the kinds of data and studies that still need to be collected or pursued. Another key task has been to develop the WHO Global Framework to define and guide studies into the origins of any emerging

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**Thank you!**

