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

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**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)

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)
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.

Source: SAGO TOR


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

Technical Elements

- Early investigations
- Human studies: epidemiology
- Human / Animal Interface studies
- Environmental / Ecological studies
- Genomics / Phylogenetics
- Biosafety / Biosecurity

SAGO
Scientific Advisory Group for the Origins of Novel Pathogens
Emergence of novel Pathogens
Stages of emergence, spillover and potential spillback through zoonotic spillover

Emergence in animals
Pathogen spillover from animals to humans
Emergence in humans
Human to human transmission/localized transmission
Epidemic
Pandemic

POSSIBILITY OF SPILLBACK
Transmission from humans to any susceptible animal (wild or domestic) through interspecies transmission or intermediate arthropod vectors.
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

World Health Organization
Emerging and Re-emerging diseases: Identifying Disease X:

Diseases with epidemic potential prioritized for research and development in emergency contexts by WHO

- 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”

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; EEV; 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)

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

https://www.who.int/activities/prioritizing-diseases-for-research-and-development-in-emergency-contexts
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)

<table>
<thead>
<tr>
<th>Date Published</th>
<th>Title of work</th>
<th>Status</th>
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<tbody>
<tr>
<td>22 December 2022</td>
<td>Recommendations to better understand the origins of and factors for the emergence and re-emergence of mpox</td>
<td>Complete</td>
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<tr>
<td>18 March 2023</td>
<td>SAGO statement on newly released SARS-CoV-2 metagenomics data from China CDC on GISAID</td>
<td>Complete</td>
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<tr>
<td>30 May 2023</td>
<td>Commentary in Nature – “<em>Why the world needs more transparency on the origins of novel pathogens</em>”</td>
<td>Complete</td>
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<tr>
<td>TBC</td>
<td>Global Framework</td>
<td>Presented to MS Anticipation publication date May 2024</td>
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<tr>
<td>TBC</td>
<td>Independent Assessment, Apply Global Framework work to Origins of SARS-CoV2</td>
<td>In Final Development (expected publication Summer 2024)</td>
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SAGO - Next steps

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
Thank you!