Scientific Advisory Group on the Origins of Novel Pathogens (SAGO)

Update to Member States
9 June 2022

Dr Maria Van Kerkhove, Unit Head of Emerging Diseases and Zoonoses, COVID-19 Technical Lead
Professor Marietjie Venter, University of Pretoria, SAGO Chair
Dr Jean Claude Manuguerra, Institut Pasteur, SAGO Co-chair

Health Emergencies Programme, World Health Organization
Scientific Advisory Group on Novel Origins (SAGO)

The SAGO was formed in view 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 or re-emerge

Addressing a gap

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

The Scientific Advisory Group for the Origins of Novel Pathogens (SAGO)
Meetings and Organization of the SAGO

- First meeting November 2021
- 10 plenary SAGO meetings held to date
- 27 members with significant and diverse expertise
- Chair and Vice-Chair
- 2 observers
- 6 sub-working groups were formed and are meeting regularly
  - Human, epidemiology
  - Animal/Human Interface,
  - Environment/Ecological,
  - Early Investigation/Anthropology,
  - Biosafety/Biosecurity, and
  - Genomics/Phylogenetics

Current Main Areas of Focus

Provide recommendations to establish a Global Framework for studying the origins of emerging and re-emerging pathogens.

1. Review available evidence on the emergence of SARS-CoV-2 and provide recommendations for studies urgently needed.

2. Provide preliminary recommendations to study the emergence of SARS-CoV-2 VOCs.
SAGO first plenary meeting

Plenary Meeting 1
30 November 2021

Chinese Scientists presented

Plenary Meeting 2
9 December 2021

Plenary Meeting 3
9 December 2021

Chinese Scientists presented

SAGO chair sent letter #1 to WHO to request studies from China

Plenary Meeting 4
14 January 2022

DG sent letter #3 to China

Plenary Meeting 5
19 January 2022

Plenary Meeting 6
31 January 2022

Plenary Meeting 7
14 February 2022

DG sent letter #4 to China

Plenary Meeting 8
14 February 2022

Plenary Meeting 9
8 April 2022

SAGO sent its first report to WHO

Plenary Meeting 10
10 March 2022

Planned in-person plenary meeting

Ongoing work

SAGO working groups (20 meetings)
January-March 2022
Terms of Reference of the SAGO

In its capacity as an advisory body to WHO, the SAGO will follow the terms of reference as initially outlined and shall have the following functions:

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 all 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
SAGO – First preliminary report to WHO

- Background on the formation and meetings of the SAGO
- Overview of the scientific discussions that SAGO members have had in plenary and technical working group meetings
- Initial recommendations for the development of a global framework to study emerging and re-emerging pathogens of pandemic potential
- Applying the global framework elements to develop preliminary recommendations for the studies that are needed to advance our understanding of the emergence of SARS-CoV-2 and its variants of concern
- Review of available findings to date with comment that there are key pieces of data that are not yet available for a complete understanding of how the COVID-19 pandemic began.
The SAGO is reliant on available information and published evidence.

The SAGO notes there are still gaps in existing evidence and available information needed to assess how SARS-CoV-2 could have spilled over into the human population.

Several links point to the wet markets in Wuhan where several susceptible animal species were sold but no SARS-CoV-2 positive animal samples were identified during sampling.

The SAGO was not provided with any new findings or access to information regarding laboratory activities with coronaviruses including SARS-CoV-2-related viruses or the laboratory’s approach to implementation and improvement of laboratory biosafety and biosecurity.

The SAGO has not evaluated any raw data

The SAGO has lacked access to the persons working at animal markets, source farms and labs and those conducting relevant studies. Consequently, there remain unanswered questions.
Currently, the SAGO is not able to make any conclusions about the origins of the COVID-19 pandemic as key information is not yet available from recommended studies.

Currently available epidemiological and sequencing data suggest ancestral strains of SARS-CoV-2 originate from a zoonotic source.

- The closest genetically related viruses are beta coronaviruses, identified in Rhinolophus bats in China and Laos.
- Neither the virus progenitors nor the natural/intermediate hosts or spill-over event to humans has been identified.

The SAGO was presented with updates from invited Chinese scientists on molecular epidemiology studies, Wuhan blood bank serosurvey study results, animal and environmental studies and cold-chain transmission of SARS-CoV-2 in the Huanan market.

There are still some outstanding results from the recommended studies that the SAGO believe need to be conducted and that are outlined in the report.

The SAGO will remain open to all scientific evidence that becomes available in the future to allow for comprehensive testing of all reasonable hypotheses.
Next steps

- Define and develop the Workplan for SAGO for 2022/2023
- To continue to meet in plenary and as working groups to attain the objectives set out in their TORs
  - Continue development of the global framework (expected output third or early fourth quarter 2022)
  - Advancing the studies needed into the origins of SARS-CoV-2 that are outlined in the SAGO report
  - Applying the global framework to emerging and re-emerging pathogens origin investigations (e.g., SARS-CoV-2 VOC, monkeypox)
- Plan for series of virtual meetings (June 2022 and monthly) and in-person meetings (TBD November 2022)
- Define next SAGO outputs (e.g., reports to WHO, papers for peer-review, presentations with other TAGs/SAGs).
Recommended studies for SARS-CoV-2 in the report for scientists to prioritize

**Epidemiology recommendations**

- Morbidity surveillance, pharmacy purchase; mass gathering events; Mortality surveillance
- Identification of early cases and role of the Huanan market in early cases
- Case-searching (<December 2019, serological evidence & severe acute respiratory infection surveillance; wastewater)
- Laboratory testing - Cross reference confirmation by external labs

**Molecular epidemiology recommendations:** Link animal/human database; ACE-2 binding domain evolution; furin binding site, continued evolution

**Animal and environment recommendation**

- Pathway of emergence from wildlife and/or intermediate hosts to humans; susceptible species, origin of animals at markets
- Food/cold chain hypotheses; environmental contamination

**Introduction of SARS-CoV-2 to the human population through a breach in biosafety or biosecurity measures:**

- Breach in biocontainment, occupational hazards for labworkers or field investigations

**Origins of SARS-CoV-2 variants of concern:** under surveillance populations; immunosuppressed host; new animal reservoirs
The SAGO at its first in-person meeting in June 2022

- 27 Members with significant and diverse expertise
- Chair and vice-chair
- 2 Observers  FAO/OIE
The SAGO experts met in person for the first time on 1-2 June 2022 for their 10th plenary meeting.

Experts joined in person, and others virtually (21 in person, 6 virtual, 1 apologies).

Discussed the release of the SAGO report and planned for its dissemination.

Further advanced the plans for establishment of the global framework on the origins of emerging and re-emerging pathogens.

Reviewed updated studies on SARS-CoV-2 and advanced towards the application of the global framework towards the origins of SARS-CoV-2.

Discussed the application of the global framework to the emerging monkeypox outbreak.

**Outputs**

- Clear steps for the development of a workplan for the SAGO for 2022/2023
- Advancement in the work outlined in their TORs

More information at: https://www.who.int/groups/scientific-advisory-group-on-the-origins-of-novel-pathogens-(sago)