



**World Health
Organization**

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

**Update to Member States
9 June 2022**

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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

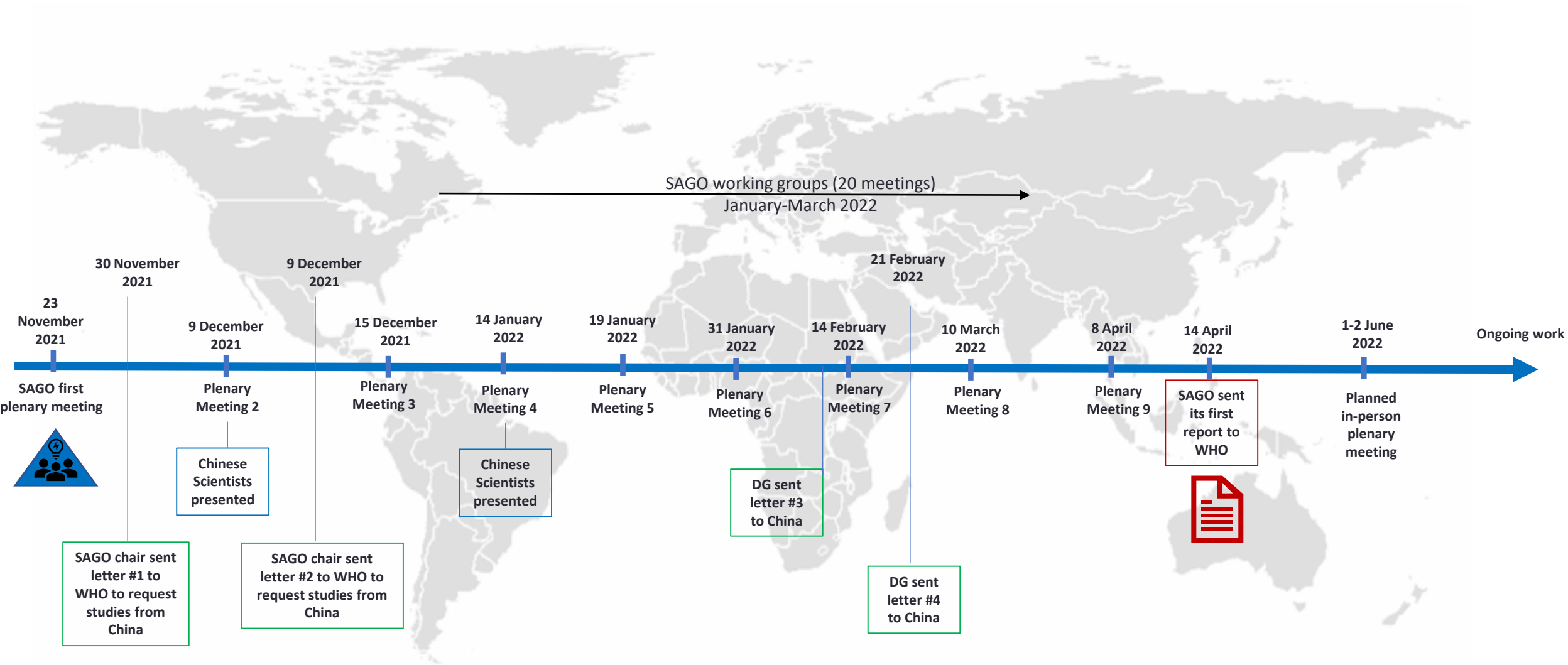
The Scientific Advisory Group for the Origins of Novel Pathogens (SAGO)

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  Food and Agriculture Organization of the United Nations  WORLD ORGANISATION FOR ANIMAL HEALTH
- 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

- 1 Provide recommendations to establish a **Global Framework** for studying the origins of emerging and re-emerging pathogens.
- 2 Review available evidence on the **emergence of SARS-CoV-2** and provide recommendations for studies urgently needed.
- 3 Provide preliminary recommendations to study the **emergence of SARS-CoV-2 VOCs**.



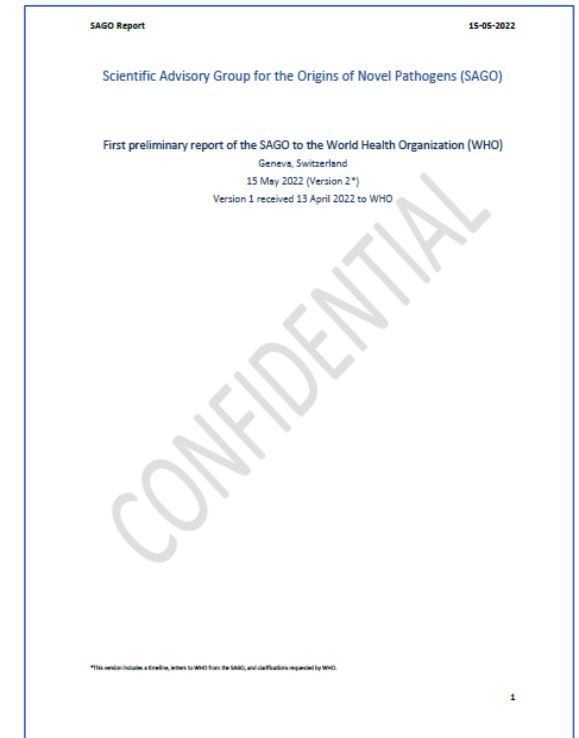
Terms of Reference of the SAGO

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.

SAGO – First preliminary report to WHO

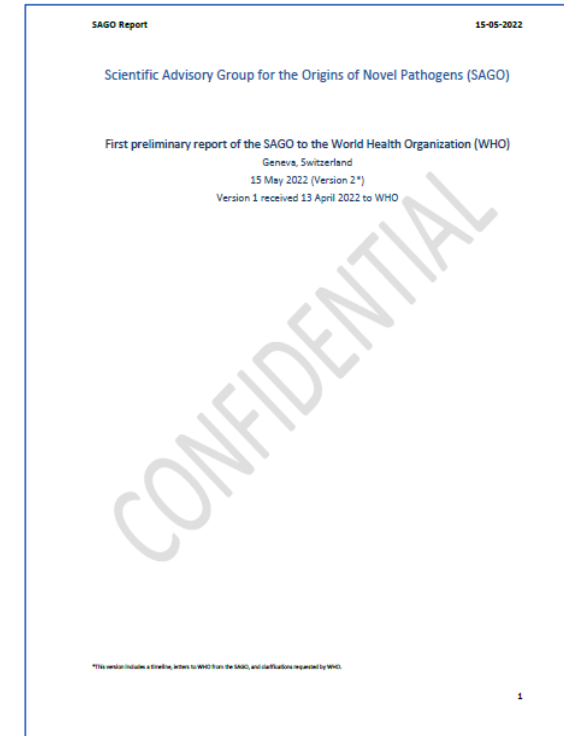
- Background on the formation and meetings of the SAGO
- Overview of the scientific discussions that SAGO members have had in plenary and technical working group meetings
- Initial recommendations for the development of a global framework to study emerging and re-emerging pathogens of pandemic potential
- 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.



Submitted to WHO 19 May 2022

SAGO – First preliminary report to WHO - limitations

- **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.



SAGO – Key preliminary findings on the origins of SARS-CoV-2

- 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).

SAGO – First preliminary report to WHO

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

SAGO – First in-person plenary meeting in Geneva, Switzerland

- 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

