

Open Letter

Call for a Comprehensive Investigation of the Origin of SARS-CoV-2, if Possible with Chinese Government Participation

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On June 12, 2021, World Health Organization Director General Dr. Tedros Adhanom Ghebreyesus [stated](#) that the families of the many millions who have died from COVID-19 “deserve knowing what the origin of this virus is, so we can prevent it from happening again.”

In line with this critical aspiration, G7 leaders released a [joint statement](#) on the following day calling for “a timely, transparent, expert-led, and science-based WHO-convened Phase 2 COVID-19 Origins study including, as recommended by the experts’ report, in China.”

As scientists and science communicators who have called for a comprehensive investigation into pandemic origins in three open letters earlier this year ([#1](#), [#2](#) and [#3](#)), we welcome these statements and again call for a comprehensive scientific and forensic investigation into all plausible origin hypotheses with unrestricted access to all relevant records, samples, and personnel in China and, as appropriate, beyond.

All people and every nation, including China, have a direct interest in the origin of the pandemic being identified and our greatest vulnerabilities being addressed. It is therefore particularly unfortunate that no comprehensive investigation of all plausible origins has yet been carried out and that none is currently planned.

For reasons articulated in earlier letters, we believe that the WHO-convened joint-study process currently in place does not in its present form clear the bar of credibility due to grave structural shortcomings ([Annex A](#)).

Although the WHO-convened joint-study has been called by many a “WHO investigation,” it was neither led by the WHO nor intended to be an investigation. As Dr Tedros [recently clarified](#), “there is a misunderstanding. The [study] group came from different institutions and different countries, and they’re independent. There were only two WHO staff who joined them. They came up with their study.” The leader of this independent expert committee, Peter Ben Embarek, has also [repeatedly explained](#) that the joint study process was neither an investigation nor designed to be one.

Further, the Chinese government's well documented measures to hide records and prevent Chinese experts from sharing critical information and granular data make it very clear that the current process has no possibility, without significant changes, of fully and credibly investigating all plausible origin hypotheses.

Because failing to comprehensively investigate pandemic origins puts everyone and future generations at unnecessary risk, we call on world leaders to adopt a **two-track** approach for ensuring the fullest possible investigation of pandemic origins.

The **first track** is to invite China to fully cooperate with an improved WHO-convened investigation that is data-driven, independent, and meets essential conditions for a credible process. Such an investigation should:

- Be based on an explicit mandate to fully investigate all plausible origin hypotheses, including all plausible scenarios for both a zoonotic spillover (in the wild or at a farm or market) and a research-related incident. It is important to note that a research-related incident need not necessarily involve a non-natural virus, as multiple research-related accidental infection scenarios are compatible with a virus that was collected in the wild and not voluntarily genetically altered in a laboratory. These include researchers getting infected on a bat sampling field-trip, researchers becoming infected while working in one of the various Wuhan laboratories, and people outside laboratories becoming infected due to an accidental pathogen leak from faulty wastewater treatment, an air filter failure, or some other source of environmental contamination ([Annex B](#));
- Be led by a multidisciplinary team of international experts with the expertise domains necessary for an examination of both the zoonotic spillover and the research-related incident pathways, such as virology, epidemiology, zoology but also traditional forensics skills, laboratory audit experience, engineering skills, data acquisition and data analysis skills;
- Avoid any conflict of interest and undue bias within the experts team, which may be suggested by unsubstantiated statements and repeated dismissal of plausible non-zoonotic origins or by previous strong research partnership with parties of interest;
- Empower the experts team to carry out a full scientific and forensic investigation, which must include being given full access to all relevant records, samples, and personnel, upon request (anonymized if necessary) and being able to hold confidential interviews with Chinese experts without Chinese government oversight or control with the assistance of independent translators; and
- Share raw data with international experts for further studies, whenever possible, for constructive feedback and transparency.

Because these represent the most basic conditions under which any credible process can be carried out, the full acceptance of all of these terms by the Chinese government should be a necessary precondition for any next phase of the WHO-convened joint-study.

To prevent a situation where the negotiation and planning process is drawn out over many months or even years, a firm deadline of two months following the articulation of these terms should be set for their acceptance by Chinese authorities and for the commencement of a full investigation on the ground in China. It is our sincere hope that, for the good of humanity, the Chinese government will join such a comprehensive and science-based investigation process as a full partner.

Should Chinese authorities not allow this type of comprehensive investigation within this time frame, however, it would then be clear that a **second track** would need to be established, under which groups of nations, coordinating around some other organization or mechanism, should set up an alternative science-based and data-driven investigation.

Although the decision of how to best mandate and coordinate such an investigation should be left to interested governments and partners, possible entities might include the OECD, G7, the Quad, or other structures and institutions.

While this type of alternate investigation, by unfortunate necessity carried out without the full participation of the Chinese government, would suffer from a lack of access to many important records, samples, and personnel inside China, a great deal of highly relevant information could still be gathered without the participation of Chinese authorities.

In fact, many governmental and individual investigators around the world have already gathered and begun analysing significant amounts of relevant data. A well organized and concerted effort, free of interference and drawing on all available information sources and involving a large pool of experts, could well end-up providing unambiguous evidence supporting one particular origin hypothesis or another.

An investigation carried out without the assistance of Chinese authorities should include:

- Careful testing and analysis of hospital samples and environmental samples from various countries to better understand the initial emergence and the early spread of SARS-CoV-2 around the world;
- A thorough evaluation of the farm-animal and wild-life trades from South-East Asia to China, and within China, and their potential roles in the pandemic;
- A detailed analysis of all the known coronaviruses related to SARS-CoV-2 to reconstruct the evolutionary history of SARS-CoV-2 (its geography and its phylogenetic relationships);
- A systematic quantitative evaluation of the key features of SARS-CoV-2 in order to clarify statements about its origin;
- A broad semi-quantitative assessment of the current weights of evidence in favor of each possible scenario in order to foster a rational debate and help drive further research efforts on key points;
- A systematic search for documents and missing information about key virus sequences, including:
 - The main WIV database of pathogens, samples and isolates that was taken offline in Sep. 2019 and never reinstated, and the other databases managed by the WIV which were taken offline;
 - Materials from NCBI GenBank sequence database, including the emails exchanged regarding the submission of the first genome sequence of SARS-CoV-2 (MN908947.1) by Zhang et al and made accessible on Genbank on [12th Jan 2020](#);
 - Materials from the GISAID database, including the virus sequence and metadata associated with accession number EPI_ISL_402122, which is no longer available at GISAID and which likely corresponds to an early COVID-19 patient;
- The acquisition and review, in accordance with the joint statements in favor of a full and transparent investigation by the [United States](#) and the [European Commission](#), of relevant communications, documents and data from the following parties:
 - North-American partners of the WIV:
 - EcoHealth Alliance, in particular studies in Asia of [pangolins](#) trade and of [bats](#).

- United States Agency for International Development (USAID), particularly with regard to their work in [China](#) under the projects “[PREDICT](#)” and “[PREDICT-2](#)”, and [sampling collection](#) in Asia;
- National Institutes of Health, especially regarding projects [1R01AI110964-01](#) and [2R01AI110964-06](#) entitled “Understanding the Risk of Bat Coronavirus Emergence”;
- o European partners of the WIV:
 - European Commission, in particular the documents related to funds allocated to WIV within the framework of [Horizon 2020](#) and [EVA-G](#), including those reserved until the period of 2023, the correspondence with the WIV, plus the WIV interim report which was [mentioned](#) by the European Commission;
 - French research institutions (Inserm, Institut Pasteur, Fondation Mérieux), regarding the documentation related to their [cooperation](#) established in 2014 with the WIV, and also the funds that were allocated to the WIV since;
- The inspection of documents (submitted manuscripts, submitted sequences, cover letters, reviewers’ comments, authors’ replies) associated with the peer review process of the key scientific articles listed in [Annex C](#), which may recover additional data and relevant information;
- The creation of a secure whistleblower program allowing for the safe sharing of information from within China and abroad;
- The examination of the forensic evidence collected by intelligence agencies and Open Source Intelligence specialists, including a detailed mapping out of key research teams, their stated objectives, their work at the time of the outbreak, their means, and an evaluation of the safety conditions within their laboratories, and any events of interest within or around these laboratories.

While the Chinese government must be offered every opportunity to join a comprehensive investigation into pandemic origins, it should not be afforded a veto over whether or not the rest of the world carries out the fullest possible investigation.

The two-track process proposed here encourages China to participate in a comprehensive, science-based, and data-driven investigation should it wish to do so, as other countries have done before both with zoonotic outbreaks and laboratory-related accidents.

In the unfortunate case the Chinese government chooses not to join this process, however, a thorough investigation into the origins of SARS-CoV-2 is still possible, has a realistic chance of success, and must be pursued for the common good.

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Annex A: Shortcomings of the WHO-China joint-study process

The main shortcomings of the joint-study process and its resulting Phase 1 report include:

- The World Health Assembly mandate called for a joint study of “the zoonotic origin of the virus” rather than a comprehensive investigation into all plausible origins, setting the stage for a process predominantly focused around examining the natural origins hypotheses with extremely little effort expended on a research-related accident;
- The Terms of Reference (ToRs) for that essential process were negotiated behind closed doors between China and the WHO, without known input from member states other than China, and were only rendered public months after they were finalized;
- The ToRs granted the Chinese government an effective veto over who could participate in the international expert committee;
- The selection process for the international expert committee [was not transparent](#);
- Several members of the international committee had significant conflicts of interest;
- No provisions were made ensuring international experts had access to all relevant records, data, and personnel;
- The raw data was not provided to the international expert committee, including upon request;
- No provisions were made allowing Chinese experts the opportunity to provide confidential input to international experts without fear of retribution by Chinese government authorities;
- A mere 2 paragraphs in the 120 pages of the main body of the Phase-1 report were dedicated to a possible research-related origin;
- The likelihood of each scenario was decided by a show of hands in front of Chinese government officials;
- Multiple inconsistencies have been noticed in Annex D7 of the report and were listed in [the Supplement of our letter #2](#).

Annex B: The three accidental infection scenarios

The laboratory-related accident hypothesis includes three **scenarios of accidental infection** which were detailed in the [Annex A of our letter #3](#):

1. A researcher or assistant getting infected on a bat sampling site and bringing the infection back to Wuhan.
2. A researcher, student or employee getting infected in one of the various Wuhan laboratories known to be working on Bat Coronaviruses, typically at level P2 or P3 (a Laboratory Acquired Infection - LAI). Examples of previous LAIs include:
 - Hantavirus outbreak at a College in Yunnan (China) in 2003, associated with laboratory rats and lax safety practices ([paper by Shi Zhengli et al](#))
 - [SARS LAIs](#) in a Singapore P3 and a Taiwan P4 in 2003, fully investigated by the WHO.
 - Several [SARS LAIs](#) at the top P3 in China in 2004, with a limited investigation from which the WHO eventually dropped out.
 - [Brucellosis LAI](#) in Harbin (China) in 2011 due to lax safety practices.
3. Someone outside of a laboratory getting infected due to an escaped pathogen, without anybody in the laboratory itself being infected - for instance due to bad wastewater treatment or to an air filter failure (a Laboratory Escape without LAI).
Examples:
 - Respiratory anthrax accident in Sverdlovsk (ex USSR) [in 1979](#), covered up for many years.
 - Foot and Mouth outbreak in Britain [in 2007](#)
 - Brucellosis outbreak in Lanzhou in China in [Nov 2019](#)

For the various **scenarios about the virus** (natural vs. product of research), see [Annex B of our letter #3](#).

Annex C: Scientific papers of interest

Here is a list of articles for which documents associated with the peer review process may help retrieve additional data and information, for instance in relation to early sequences of SARS-CoV-2 and to related viruses:

- [Andersen et al. 2020](#),
- [Calisher et al. 2020](#),
- [Hong Zhou et al. 2020](#),
- [Lam et al. 2020](#),
- [Latinne et al. 2020](#),
- [Li et al. 2020](#),
- [Liu et al. 2019](#),
- [Xiao et al. 2020](#)
- [Xiao et al. 2021](#),
- [Zhang et al. 2020](#),
- [Zhang & Holmes 2020](#),
- [Zhou et al. 2020](#)