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Subject: China's Interest in the Global Virome Project Presents an Opportunity for Global Health Cooperation

1. ~~(SBU)~~ **Summary and Comment:** The proposed Global Virome Project (GVP), an international non-governmental organization built on a decade-long prototype initiated by the U.S. Agency for International Development (USAID), seeks to address vulnerability from emerging diseases by creating a global database of viruses of animal origin and identifying those pathogens with greatest potential to jump to humans through sequencing their genomes, understanding the ecology involved in transmission, and assessing risk to humans. This knowledge could then be used to devise treatments and countermeasures. In the months leading up to the planned January 2018 launch of the Global Virome Project to codify this “proof of concept” into an international organization, China has expressed considerable interest in becoming a leader of this nascent global effort by contributing to collaborative academic papers, hosting symposia, participating in international activities, and by proposing its own associated China Virome Project. While the GVP will have to navigate complex issues concerning sharing of specimens and data across national borders, China’s interest in the Global Virome Project, represents a positive indication that health cooperation, safeguarding global health security, and advancing innovation in science remain priorities for China and presents new ground for potential U.S.-China collaboration. Absent U.S. government leadership in GVP agenda-setting, governance, and funding the Chinese government could likely take a leading position in this potentially path breaking endeavor undermining years of USG leadership and considerable investment in this critical field of public health.

2. ~~(SBU)~~ By continuing to work with other nations, including China, and playing a leading role

in the Global Virome Project, the United States would benefit from the advances in health science, intellectual property, and commerce that will come from it. U.S.-China collaboration on the Global Virome Project is an opportunity to lead innovation in science, collaborate with China, and potentially contribute to scientific breakthroughs. **End Summary and Comment.**

Health Security is a Global Agenda

3. ~~(SBU)~~ The Global Virome Project as proposed could be an important scientific contribution to the Global Health Security Agenda (GHSA). Launched in February 2014, the GHSA is a multi-sectoral effort aiming to accelerate implementation of the World Health Organization's International Health Regulations (IHR) in order to make the world safe and secure from infectious disease threats, whatever their source. Under the Global Health Security Agenda, the United States assists 31 countries and the Caribbean Community, including \$1 billion for 17 at-risk countries to strengthen global health security through a whole-of-government effort to prevent, detect, and respond to disease outbreaks at the local, subnational and national levels.

Pandemic Disease is a Global Threat

4. ~~(SBU)~~ A component to the overall Global Health Security Agenda is reducing the threat of pandemic disease, which is a widespread epidemic of naturally emerging deadly infectious pathogens. According to "The Global Virome Project," a collaborative paper written by several of the foremost experts on pandemic health issues, viruses of animal origin have caused significant outbreaks, such as SARS, influenza, MERS, Ebola, HIV, and Zika. Outbreaks such as these have had major economic and geopolitical impact and have threatened global security. There are an estimated 1.6 million such viruses worldwide. Scientists have estimated that only 1% of the potential viral threats have been identified and hundreds of thousands of unknown viruses in wildlife have the potential to infect people. However, less than 0.1% of all viruses with the potential to pose a threat to global health are estimated to have spilled over from animals to humans. With growing populations, reduced animal habitats and increasing international travel and trade, these types of emerging infectious diseases pose increasing risks of a global nature.

The Global Virome Project's Beginnings as a U.S. Investment

5. ~~(SBU)~~ GVP grew out of the PREDICT project of USAID, which has, over its seven year history, received \$130 million in U.S. funding and has thus far sampled over 56,000 wild animals and identified about 1000 new viruses. PREDICT hosts the GVP Secretariat at University of California-Davis. The GVP concept was validated at a gathering of international stakeholders in 2016, which included scientists and public health practitioners from the public and private sectors. Its first follow-up meeting was held in Beijing in early 2017, including a half-day session to initiate the associated China National Virome Project (CNVP). GVP expects to be incorporated as an international not-for-profit organization prior to its official launch, which is planned for January 30, 2018 in Thailand at the Prince Mahidol Awards Conference.

The Global Virome Project's Audacious Agenda

6. ~~(SBU)~~ The Global Virome Project is, by the project leadership's own admission, ambitious. Over the course of ten years and at an estimated cost of \$1 billion (\$100 million a year for ten years), the Global Virome Project aims to sample 63% of global mammalian diversity to find 71% of mammalian viromes. The projected costs cover sample collection and laboratory analysis, with phases including countries with the highest diversity of mammalian species. Phase One includes 10 countries and 1562 mammals, Phase Two, 16 countries and 970 mammals, Phase Three with 23 countries and 447 mammals. GVP also expects to collect samples from 740 waterfowl species.

7. ~~(SBU)~~ GVP's core principles include embracing an international scope while fostering local ownership, promoting equitable access to data and benefits, instilling transparency, building national capabilities for prevention, detection, and response for emerging viral threats, and encouraging global ownership through an international alliance. If successful, this initiative will provide a wealth of publicly accessible unbiased data, which should enable innovative research on the mechanisms and ecology of disease transmission, and informatics focusing on virus families as opposed to individual viruses. Such research could accelerate the development of new diagnostics, vaccine technologies, and risk mitigation strategies against whole families of emerging viral diseases.

Like all Risky Endeavors Failure is a Possibility

8. ~~(SBU)~~ GVP looks to the Human Genome Project as a model, in which a comprehensive, ambitious approach led to the development of new technologies and a vast data resource now available to all. Unlike the Human Genome Project, GVP is by design not 'owned' by an institution or specific country, because of its international sampling scope. Its infrastructure will also be distributed globally. Thus GVP faces significant challenges as it transitions from a start-up to an independently operating foundation: Who will own the samples that are collected from many countries? Where will they be analyzed? Will all GVP data be freely available to the public? GVP expects to grapple with these legal and ethical issues very early, but it will take time for policies to be proposed and approved by the many countries that will be either allowing sample collection or storing specimens and data.

GVP Enjoys Strong Chinese Government Support in Principle and in Kind

9. ~~(SBU)~~ The Chinese government has shown strong interest in the Global Virome Project and is not shy about expressing interest in funding projects where Chinese scientists will take a lead. The new Director of China Center for Disease Control and Prevention (China CDC), Dr. George Gao, a distinguished virologist, told EmbOfs that the Global Virome Project is a priority project that China CDC must push hard on to get stakeholders involved and organize funding. He stated that China's involvement in this project is a good follow-up to the August 21 World Health Organization dialogue meeting at which Health and Human Services Secretary Price and US Ambassador Branstad where both sides agreed on the need for increased U.S.-China collaboration against growing health threats at the intersection of animal and human health. In February 2017, Gao led a symposium proposing a China virome project, however the specific details of how the two will integrate was left undefined.

10. ~~(SBU)~~ The Beijing Genomics Institute (BGI), now based in Shenzhen, made a blanket offer to conduct 30% of the sequencing for GVP, but did not provide details on how that sequencing would take place or where the subsequent data would be housed. Its current leader, Yang Huanming, was instrumental in China's involvement in the Human Genome Project in the 1990s, and is a proponent of sharing data. BGI's commitment (as opposed to Yang's commitment) to GVP's values of open, free access to data has not yet been officially stated however. [Note: The BGI group has enjoyed significant funding from the Chinese government. BGI Genomics became a publically-traded company in July 2017.]

11. ~~(SBU)~~ The GVP expects to raise its \$1 billion ten-year budget from a variety of sources, both public and private. Roughly \$5 million per year will cover operations of the non-governmental organization, to include working groups, sample and data standardization and management, and technical assistance to participating country field operations. However, specifics on funding commitments have not been publicly announced.

Both the U.S. and China Strongly Support GVP-related Collaborative Research

12. ~~(SBU)~~ Beyond creating the database of viral sequences which carries the \$1 billion price tag, GVP recognizes the importance of research on the mechanisms and ecology of infectious disease transmission. This type of research already enjoys strong support in both China and the United States, and scientists are increasingly collaborating with each other.

13. ~~(SBU)~~ Shi Zhengli, a senior scientist at the Wuhan Institute of Virology, Chinese Academy of Sciences (CAS) who studied mechanisms of transmission of SARS between species, stated that CAS has already allocated funding for GVP-related research. Wang Zhengwu, Department of International Affairs at CAS, stated that CAS is working on a process and mechanism to support Chinese scientists with backing from the Ministry of Sciences and Technology and The National Natural Science Foundation of China (NSFC) for Global Virome Project type research. He noted that CAS encourages Chinese scientists to take part in or lead international research projects and that CAS has a budget for seed funding to incubate research projects, workshops, and collaboration that can be used for the Global Virome Project. Significant USG support for GVP-related research already exists, including the Ecology and Evolution of Infectious Diseases (EEID) program, which is jointly supported by NIH, USDA, and NSF, is actively seeking collaboration in China, and plans to host a joint workshop supported by NSFC and CAS in early 2017.

Global Virome Project Provides China a Platform for International Collaboration

14. ~~(SBU)~~ It is encouraging that China, along with other countries, is ready to take what started as a U.S.-led initiative and proof of concept to a global scale. The GVP still awaits a commitment of funding for its viral sampling and processing infrastructure. It is likely that the Chinese government will engage both with funding and with in-kind support, which will likely give China a large voice in GVP governance and data-sharing policies. While U.S.-based NGOs and academics are likely to provide some leadership for the GVP, it will be important for the USG to remain engaged in significant ways with the GVP, to ensure that U.S. interests are adequately reflected in this effort, which will facilitate the development of countermeasures

against future threats (pandemic preparedness), and enable rapid detection of viral threats and increase the capacity to handle them.

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resource management, or water quality could help determine areas where U.S. technical assistance is needed in China's overall water management system. The Fellow's activities could inform and advance the missions of EPA, Army Corps of Engineers, NOAA, or EPA.

6. (U) Topic 4: Haff Disease: Haff disease is unexplained rhabdomyolysis that occurs after eating cooked seafood, resulting in severe illness or death. From June 27 to August 24, 2016, 1,347 cases were reported in nine provinces in Central China. The epidemiology and clinical characteristics of Haff Disease are well known, but an Embassy Science Fellow with expertise in aquatic microbiology or toxicology is needed to help determine the etiology and provide marine and/or environmental laboratory assistance. The Fellow, based at the Chinese CDC, would first work with the epidemiological team, then go into the field with Chinese marine biologists to investigate and collect samples, and hopefully raise Haff Disease's profile with the Chinese science community. The Fellow would help strengthen collaboration between U.S. CDC, China CDC, and provincial CDCs.

7. (U) Topic 5: Tobacco Control: China is the largest tobacco producer in the world, and lung cancer is the top cause of death in the country. The National Cancer Institute (NCI) has supported translational research examining tobacco use and control, which has helped limit the uptake of smoking and mitigate the impact of smokers on their friends and families. With the advent of Nicotine Replacement Therapy (NRT), now available on the Chinese market, an Embassy Science Fellow would work with experts in the national tobacco control program at the Chinese Centers for Disease Control and Prevention, design targeted pilots to offer cessation programs using NRT, and target life events such as heart attack, birth, or surgery as opportunities to quit smoking. The Fellow should be familiar with global health issues, methods, and practice.

8. (U) Topic 6: Curcumin Nutritional Trial: Curcumin is the main ingredient in curry spice and research has found it is effective as an anti-inflammatory agent and in mitigating the growth of cancer, including stomach and colon cancer. However, to date, no large-scale clinical trial has looked at the anti-cancer properties of curcumin. An Embassy Science Fellow with expertise in cancer research and global health issues would work with clinical trial and cancer epidemiologists and experts in the NCI, Chinese CDC, and Shougong Hospital, in western Beijing, to help design and help launch a curcumin nutritional trial.

9. (U) Topic 7: Global Virome Project/Ecology and Evolution of Infectious

Diseases: Human population growth and changes in land use have accelerated the emergence of new infectious diseases — many of which emerge in Asia, threatening global health security. An Embassy Science Fellow with expertise in microbiology, ecology, genomics, and big data systems could visit related research institutes and funding agencies in China to map the landscape of research and infrastructure in this area, which spans forestry, agriculture, aquatic/marine science, and human health. The Fellow would participate in discussions with Chinese funding agencies as they develop a comprehensive national and global approach to preventing future pandemics. One active and growing platform is the Global Virome Project (GVP), a global partnership to detect and characterize virtually all of the planet's unknown viral zoonotic pathogens for the purpose of developing proactive solutions and preparedness measures. Possible products would be joint U.S.-China workshop(s) and a comprehensive report that will facilitate broad U.S. Government engagement in this area. This fellow's activities would advance the interests of CDC, USAID, NSF, and NIH.

10. (U) Topic 8: Waste Management: China's waste management practices have not kept pace with its increasing volume and ever-changing content of waste. China also processes most of the world's discarded electronic products and components. If China does not radically and efficiently adapt its recycling and targeted waste disposal technologies, the entire world will soon face catastrophic environmental consequences, including exhaustion/multiplication of landfills, run off into rivers and oceans, unhealthy waste disposal alternatives, such as burning, and waste of potential energy resources. The United States and China currently have a marine litter sister city program, and an Embassy Science Fellow with expertise in environmental sciences, waste management, or engineering could explore current Chinese waste management practices and replicate the sister city relationship. This project is relevant to EPA, and potentially other U.S. agencies, and would be a useful technical exchange for U.S. companies that have developed waste disposal technologies.

11. (U) Topic 9: Earth System Science: China is making significant investments in the Earth system sciences, both in expertise and infrastructure, which provides potential opportunities for collaboration. An Embassy Science Fellow with a background in Earth system sciences could explore opportunities for increased bilateral cooperation in the fields of Earth observations (in-situ and/or remote sensed), data and infrastructure sharing, numerical modeling, and service applications. The Fellow's focus could be on ocean, land, and the atmosphere, data and modeling, and the use of Earth system information to improve climate resilience. The fellow's activities would inform and advance the missions of