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US–China health exchange and collaboration following COVID-19

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Strong US–China collaboration on health and medicine is a crucial element of the global effort against COVID-19. We review the history of health collaboration and exchanges between the public and private sectors in the USA and China, including the long-lasting collaboration between governmental public health agencies of the two countries. Academic and scientific exchanges should be reinvigorated and the increasing valuable role of non-profit foundations acknowledged. The shared interests of the two countries and the magnitude of the pandemic necessitate both countries to collaborate and cooperate. We provide recommendations to the two governments and the global health community to control the ongoing COVID-19 pandemic and prepare for future threats.

Introduction

Over the past 4 years, trade, tariff, and other economic and security issues have created tensions between China and the USA. The relationship between these two countries has been exacerbated by the COVID-19 pandemic, including issues over original knowledge of the source of SARS-CoV-2, disagreements on transparency and data sharing, and increased public disputes between the two countries. In this Viewpoint, we argue for the viability of the US–China health exchange, highlight what has already been achieved through this collaboration, point to the urgency of such collaboration after turbulent years rife with distrust and disagreements, and outline key factors that will benefit both countries.

History of US–China health collaboration

The US–China relationship regarding health and medicine has fared better than the political interface. Since 1972, when President Richard Nixon visited China, scientific exchange and partnering efforts have flourished between the USA and China. In early 1980, a US government team of health leaders was formed to visit China, with the aim of promoting collaboration in public health and health services research.^{1,2} The team consisted of representatives from the US Centers for Disease Control and Prevention (CDC); directors from the National Institutes of Health (NIH); and Dr Julius Richmond, the then US Assistant Secretary for Health. In partnership with Chinese academicians and government leaders, a long-term taskforce, called The US–China Joint Committee for Cooperation in Medicine and Public Health—Public Health and Health Services Research Subject Area, was formed. This taskforce was co-chaired by John Bryant (1980–82), Jeffrey P Koplan (1982–92), and Prof Yang Ming-Ding (1980–1992) of Shanghai Medical University.

This taskforce promptly led to substantive collaboration between the USA and China, as documented in a supplementary issue of the *American Journal of Public Health* on public health in China, with each paper coauthored by Chinese and US scholars.³ Over the next four decades, ties flourished between US and Chinese health research

institutions. Hundreds of memoranda of understanding between educational institutions, health science centres, and hospitals have been established and there are many examples of substantive and sustained relationships between the two countries (table).⁴

There are many examples of productive health and medicine collaborations between the two governments. During the 1990s, the China–US Collaborative Project for Neural Tube Defect Prevention, a partnership between the US CDC and Chinese institutions, produced landmark findings on the efficacy of folic acid and contributed to the evidence base for mandatory folic acid fortification policies in the USA.^{9,17} In January, 2002, the Chinese Academy of Preventive Medicine was reorganised into the Chinese CDC, which was established as the main public health agency in China. The US CDC worked closely with the newly founded China CDC; the two sister agencies signed a memorandum of understanding and, until 2017, held annual director meetings to report on progress and exchange views on global health and collaborations. The US CDC helped China establish programmes, including the China Field Epidemiology Training Program and the Tuberculosis Prevention and Control Cooperation Project. These collaborations have played a crucial role in China's responses to emerging infectious diseases, such as SARS-CoV, avian influenza, and COVID-19, and are crucial to global health security. The national scientific funding agencies, the US NIH and the National Natural Science Foundation of China, have partnered to encourage collaborative biomedical research even as the bilateral relationship has soured.¹⁸

Since the Carter Administration pioneered the US–China student exchange, there are many Chinese students at every stage of academia in the USA; it is estimated that more than 350 000 Chinese students have studied in the USA since 2015.^{19,20} In 2018, there were 6182 Chinese students who received a doctoral degree in the USA.²⁰ Many students with biomedical training have returned to China, and other students have taken leadership roles, such as department chairs and deanships, in both the USA and China. Misuse of data, challenges to intellectual property, and frayed

	Collaboration	Sector
Government		
Public health system	The US CDC has worked together closely with Chinese public health leadership for over 35 years to strengthen an effective and responsive public health system in China and has improved institutions at the national, provincial, and municipal levels ⁵	Public health
Outbreak investigation and reporting	The China CDC Weekly, a scientific journal modelled after the US CDC Morbidity and Mortality Weekly Report, is a collaborative effort between the Chinese CDC and the US CDC; the journal started in 2019, reporting on outbreaks in China in English ⁶	Public health
USA–China global disease detection Cooperative Agreements	From 2004 to 2014, the CNIC and the US CDC developed cooperative agreements to build capacity in influenza surveillance in China; ⁵ the initiative led to a network of 411 laboratories and 556 sentinel hospitals (as of 2009) and Weekly Influenza Reports, in both Chinese and English, shared among key stakeholders and published on the CNIC website	Public Health
Africa CDC	The Africa CDC has benefited from USA–China collaborative efforts to build public health capacity in sub-Saharan Africa; ⁷ USA and China collaborated with the African Union and its member states to launch the Africa CDC, providing support for infrastructure and capacity building of the Africa CDC and associated five Regional Collaboration Centers	Global health
Combating Ebola in west Africa	USA and China collaborated successfully in laboratory capacity, logistics, and drug development to combat Ebola ⁸	Global health
The US–China collaborative project for neural tube defect prevention	A partnership between US CDC and Chinese institutions to generate high-quality evidence for folic acid fortification, leading to policy changes in the USA ⁹	Biomedical science
Human Genome Project	A collaborative efforts between 20 scientific centres in six countries (China, France, Germany, Japan, the UK, and the USA) to sequence the human genome ¹⁰	Biomedical science
Academia		
China Tobacco Control Partnership	Strong and effective tobacco control programmes of the partnership, in collaboration with the Emory Global Health Institute, Gates Foundation, and ThinkTank Research Center for Health Development (a Chinese NGO) in 22 cities in China, have resulted in marked reductions in smoking in public places ¹¹	Public health
Yale University	Dating back to 1835 when Yale graduate Peter Parker opened the first US-style hospital in China, Yale University has maintained a collaborative relationship with Chinese institutions, particularly the Central South University, whose medical graduates are eligible to be licensed in China and Connecticut, USA ¹²	Medical education
Harvard China Health Partnership	This partnership provides a platform for faculty across Harvard University to advance scholarships in China, particularly China's health systems ¹³	Health systems
Non-profit foundations and think tanks		
China Medical Board	Founded in 1914 with endowments from the Rockefeller Foundation, CMB strives to advance health, equity, and the quality of care in China and southeast Asia; key focuses of CMB include health policy and systems sciences and health professional education ¹⁴	Medical education; health systems
Resolve to Save Lives	A global non-profit initiative of Vital Strategies founded by a former director of the US CDC, Dr Thomas Frieden, Resolve to Save Lives, works with Chinese institutions to prevent deaths from cardiovascular disease through hypertension control and sodium reduction policies ¹⁵	Chronic disease prevention
Bill & Melinda Gates Foundation	This NGO has an office in Beijing, working with Chinese partners to develop innovative low-cost vaccines and vaccine refrigeration equipment for low-income settings, low-cost interventions to reduce risks of HIV infection in Africa ¹⁶	Global health
CDC=Centers for Disease Control and Prevention. CMB=China Medical Board. CNIC=Chinese National Influenza Center. NGO=non-governmental organisation.		
Table: Accomplishments of previous US–China health and medicine collaborations		

partner relationships have occurred.²¹ However, these unfortunate events have been few by comparison with the tens of thousands of trainees, faculty exchanges, and successful research collaborations in biomedical and public health. Yale University (CT, USA) and Harvard University (MA, USA) are two of the many US educational institutions that have long-lasting collaborations with Chinese counterparts on topics related to health and medicine.^{12,13}

Non-profit foundations have played an instrumental role in US–China health exchange and collaboration. For over 100 years, the China Medical Board has collaborated with medical universities and schools of public health and nursing in China to train health-care professionals,

provide incentives for doctors to stay in areas of need, and develop capacities in global health, health policy, and health system sciences in China.^{14,22} The Bill & Melinda Gates Foundation has funded initiatives in China directly and through other agencies, including the Emory Global Health Institute (GA, USA) and Resolve to Save Lives (NY, USA),^{11,15,16} to promote health in China and harness the manufacturing capability in China to develop innovative and low-cost means to benefit people in need elsewhere.

To benefit the health of people in both countries, we need to maintain and support our productive, mutually beneficial medical and scientific exchanges and collaborations in every sector of the two societies.

Challenges and opportunities in US–China health collaboration

Challenges to the US–China health collaboration exist, including deeply rooted political and economic differences, acute stresses related to the COVID-19 pandemic, and other global concerns such as mental health disorders, non-communicable diseases, ageing, urbanisation, and climate change. The political and economic differences need to be acknowledged and might require a long-term solution involving continuing dialogues between US and Chinese health leaders.

Over the past 4 years, even before COVID-19, steps have been taken by both countries that hinder bonds of scientific inquiry, friendship, and productivity.^{2,23} The US CDC China Office has had a substantial reduction of its staff, compromising collaborative efforts.² The past 4 years have been stressful for Chinese scholars in the USA, particularly those who have close collaborations with Chinese institutions because of increasing scrutiny, often by law enforcement, funding agencies, and employers.²³ The intensity of these stresses has increased because of the COVID-19 pandemic. The tension has been initiated and has intensified more at the higher political levels (ie, senior elected and appointed officials in health and diplomatic sectors) than at the scientific or technical levels (ie, scientists and researchers).

As the ongoing COVID-19 pandemic continues to disrupt livelihoods, international travel will be compromised for the near future and there will be less face-to-face interactions. Collaboration will continue virtually, with the eventual return to common practice of in-person travel and face-to-face meetings. Anticipation of one or more effective and safe vaccines can be promising but not assured. Strong US and Chinese collaboration in vaccine development and distribution would benefit both countries and the world.

There are also many inherent long-term societal and health challenges for both nations, alluding to collaborative opportunities in health and medicine. These challenges include: urban health as China experiences dramatic urban growth and develops its megacities, ageing populations in both countries with expanded demands for medical and social services for older adults, environmental degradation, climate change, energy needs and approaches, policy and economic issues in which health has a major stake, and non-communicable diseases and their risk factors (eg, including tobacco use, smoking, diet or overnutrition, salt intake, fat intake, physical activity, diabetes, heart disease and stroke, mental health and substance abuse, arthritis and mobility and injuries).

Besides the ongoing COVID-19 pandemic, long-running global health challenges include fragile health systems in the low-income and middle-income countries that can be overwhelmed by an emerging infectious disease or chronic diseases. The USA and China can complement each other in their global health aid and engagement

despite differences in objectives, approaches, and where they succeed and fail. The USA has extensive experience in evaluating health aid programmes and can offer lessons learned. China could operate with more security and efficiency in particular geopolitical settings that are out of reach for the USA. China could also complement the US prowess in technology and management with its strengths in manpower and logistics, as shown by the US–China collaboration in controlling Ebola. The USA also has a much larger global health workforce and more global health academic programmes, supporting the scale of operation of the US global health engagement. By comparison with the USA, China has fewer and less extensive global health programmes. Global health science and knowledge will be enriched from a bi-directional exchange between the USA and China.²⁴

The immediate future, following COVID-19, will be challenging. However, we have so much to learn from and offer to each other that our biomedical and public health ties must be maintained and strengthened. It makes sense for US and Chinese scientists to work together on elements of the pandemic response and best practices for future pandemics.

Recommendations for US–China health collaboration following COVID-19

The health and medicine collaborations between the USA and China have been fruitful. We refer to the USA and China, but in reality, it is global because every nation is relevant as long as COVID-19 is circulating. Although elimination of transmission in one country is excellent for that individual nation, it must prepare for the reintroduction of the virus and its rapid propagation. There is great value in addressing the pandemic in partnerships, collegially, sharing information, being transparent, improving communications in accuracy and timeliness. The collaboration must be maintained and nurtured to support our common interests and address health challenges and threats.

In the era of the COVID-19 pandemic there are heightened political tensions. We hope the Biden administration can help resolve our political and economic differences. There are many areas of real or potential conflict. However, health and medicine are areas where we have shown we can work together productively for mutual benefits because we live in an interconnected world.²⁵ Collaborations and exchanges will be more important than ever following COVID-19. We need to learn together and appreciate our similarities and differences. We are intellectually enhanced and socially challenged by both and hereby offer three immediate recommendations.

First, to control and rebuild from the COVID-19 pandemic and prepare for future outbreaks and pandemics, we need to restore partnership and collaboration on health and medicine between US and Chinese government agencies that has been hampered by

politics.^{26–28} The collaboration could be between the US and Chinese CDCs,²⁹ the US Food and Drug Administration and the China Drug Administration, the US Agency for International Development and the China International Development Cooperation Agency,³⁰ and the Chinese Academy of Medical Sciences and NIH. We welcome the announcement from the Biden Administration that the USA will not withdraw from WHO and will participate in the COVID-19 Vaccine Global Access (COVAX) facility, providing an opportunity where the USA can collaborate with WHO and China to provide funds for countries that do not have ample financial resources.³¹ The two countries should go beyond the COVAX initiative to increase access to COVID-19 vaccines in low-income and middle-income countries.³² For example, with the country's successful history of mass testing, China could team up with the USA to assist African countries in testing and screening of COVID-19. The USA and China should work with WHO and other nations to expand the Yellow Card (also referred to as a vaccine passport, which documents an individual's vaccination history) vaccination record to address needs generated by the COVID-19 pandemic.

Second, to enable the collaboration and exchange between the academic and scientific communities that has been hindered by politics and the COVID-19 pandemic. Scholarly exchanges continue to exist amid the tensions and the pandemic; however, the momentum could be dampened if the set course continues.^{33,34} Collaboration and exchange in health and medicine between academic institutions should be encouraged rather than held back. Previous missteps, such as the discontinuation of the Fulbright Program in China, should be reversed. Both sides should invest in earnest efforts to improve bilateral exchanges in science and cultural perspectives.

Finally, the business case for US–China collaboration on health and medicine is evident. The USA and China should collaborate in investing in innovations for health, expanding market access for pharmaceuticals and providing regulatory control for synthetic opioids, which has benefits to both the USA and China.²⁷ There are ample opportunities for the private sector, including businesses and non-profit organisations, to work with the governments in both countries to improve US–China collaboration on health and medicine.

Contributors

All authors contributed equally to the conception and writing of the manuscript. All authors have approved the final version of this Viewpoint.

Declaration of interests

LL served as the founding Director-General of the Chinese Center for Disease Control and Prevention (2002–04) and Vice President of the Chinese Academy of Medical Sciences (2004–16). KW served as the third President of the Chinese Academy of Preventive Medicine (1996–2000). JPK was Director of the US Centers for Disease Control and Prevention (1998–2002), the Founding Director of the Emory Global Health Institute

(2006–13), and is the co-founder of the International Association of National Public Health Institutes (since 2006). JPK was part of the first US government team of health leaders that visited China and co-chaired the long-term taskforce called the US–China Joint Committee for Cooperation in Medicine and Public Health—Public Health and Health Services Research Subject Area. ZC declares no competing interests.

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