



One-Health Settings in China and Green Development

高福
(George F Gao)

2023-6-21



Global first Then Planetary

**17 UN SDG
Equity and Poverty**

联合国—可持续发展目标





全球化

Globalization?

特点：相互依赖

Interdependency



逆全球化

De-Globalization

Anti-Globalization

Counter-Globalization

Reverse Globalization

特点：不依赖（独立？自主？）

Independency



Problem-solving Strategy Politicized?

科学

Science

知识

Knowledge

常识

Common-sense



COVID-19 Pandemic

**The world
and China**



What we learnt from COVID-19 pandemic?

One world, One health

全球（化）



**What we learnt from
COVID-19 pandemic?**

包容 Tolerance

韧性 Resilience



Solidarity, solidarity, solidarity!

团结，团结，再团结！



Science and data-sharing

1918 Flu Pandemic

Vs

COVID-19

25-50 Million Vs <7 Million

Discovery of the virus

2nd Jan. 2020

Obtaining the RT-PCR results 3 hours after receiving the samples.

3rd Jan. 2020

Obtaining the full genome sequences of SARS-CoV-2

7th Jan. 2020

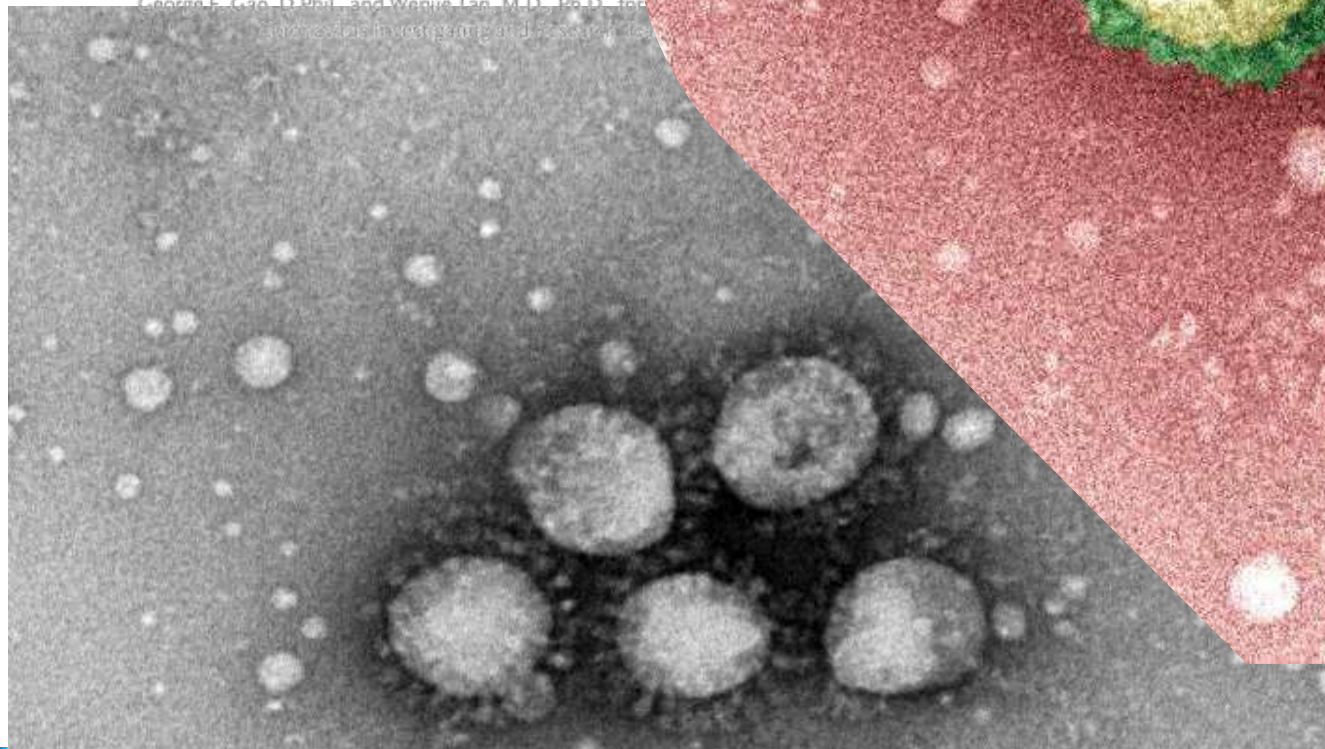
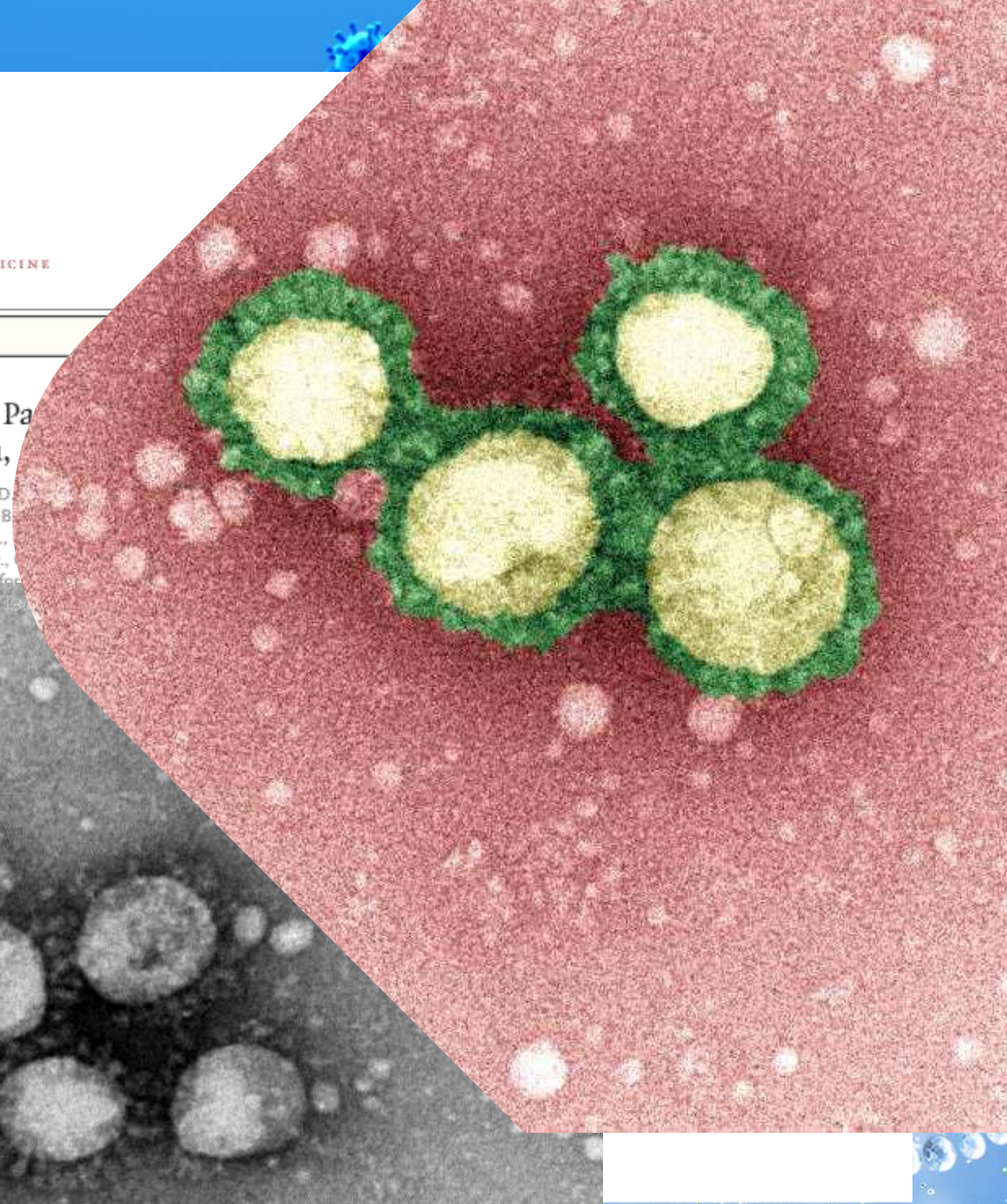
Isolation of SARS-CoV-2

THE NEW ENGLAND JOURNAL of MEDICINE

BRIEF REPORT

A Novel Coronavirus from Patients with Pneumonia in China, 2019

Na Zhu, Ph.D., Dingyu Zhang, M.D., Wenling Wang, Ph.D., Bo Yang, M.S., Jingdong Song, Ph.D., Xiang Zhao, Ph.D., Bo Weifeng Shi, Ph.D., Roujian Lu, M.D., Peihua Niu, Ph.D., Xuejun Ma, Ph.D., Dayan Wang, Ph.D., Wenbo Xu, M.D., George F. Gao, D.Phil., and Wenjie Tan, M.D., Ph.D., for the Chinese Coronavirus Investigation and Research Team



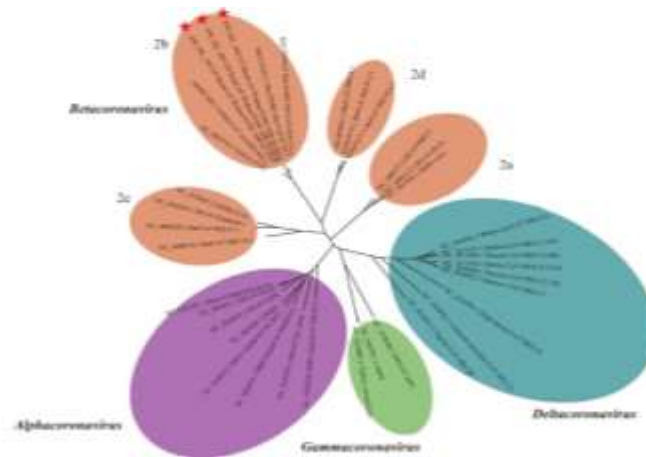
Genome sequences data release and Global sharing

In 10th Jan. 2020, China CDC released the SARS-CoV-2 genome sequence in GISAID.

CHINA CDC WEEKLY

CCDCweekly

中国疾病预防控制中心周报



GISAID About us EpiFlu™ Features Events Collaborators

In Focus

China releases genetic sequence of newly discovered coronavirus from Wuhan

The Chinese Center for Disease Control and Prevention, the Chinese Academy of Science and the Chinese Academy of Medical Science released through the GISAID initiative the genome sequence of a newly discovered coronavirus. The virus was identified during an outbreak in the city of Wuhan, where patients were suffering from respiratory illnesses such as pneumonia since late December 2019.

The genome sequence of this betacoronavirus is crucial to develop specific diagnostic tests and to identify potential intervention options.

[read more and access the data](#)

Courtesy: NVDC, China CDC

新型冠状病毒国家科技资源服务系统

TABLE 1. Basic information for the first virus of 2019-nCoV.

Code	Description	Accession
CHNC2019-00001	CHNC2019-00001	CHNC2019-00001
Name in Chinese	2019-nCoV	
Name in English	2019-nCoV	
Taxonomy	newly discovered coronavirus	
Source of the Specimen	clinical patient	
Source of Collection	Wuhan, Hubei Province, China	
Isolation Date	Jan 8, 2020	
Host Level	BSL-3	
Contact info	china@china-cdc.org.cn	

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信息流行病学? ? ?

流言、谣言、假信息

Infodemic

Infodemiology

Inforus

Perspectives

Infodemiology: The Science Studying Infodemic and Inforus

George F. Gao^{1,2,3,#}



After three years of great effort, we are now facing a new challenge from the coronavirus disease 2019 (COVID-19) pandemic in China. From strict lockdown in Wuhan City (1–2), Hubei Province, to dynamic zero-COVID and subsequent precision prevention and control, the control strategies have been a good example with great achievements for preparedness and emergency response in modern settings of public health. While there are always arguments, it is clear that life-saving and time-winning processes have made essential materials available for the new challenge, with more vaccines and inhibitors/drugs available for use by now. In the past, discussions about a strategy switch raised concerns about China's response capacity and even led to rumors or mis/disinformation, which challenged the resilience and tolerance of society. China was able to explore the zero-COVID strategy because it has a

January 2020, rumors and mis/disinformation filled social media, causing serious panic around the world. Dr. Anthony Fauci, a world-renowned infectious disease expert and long-term director of National Institute of Allergy and Infectious Diseases (NIAID), National Institutes of Health (NIH), USA, was attacked and someone on social media even threatened to kill his two daughters. Emails of my conversation with Dr. Fauci were revealed under the US law. Bill Gates was also blamed on social media for supporting grants for infectious diseases research, claiming he supported the creation of the SARS-CoV-2 virus, the causative agent of COVID-19. Our publications from China CDC, including the identification and isolation of the SARS-CoV-2 (then called hCoV-19) and the determination of the epidemiological parameters, were published in both *the Lancet* and *The New England Journal of Medicine*. It is hard to believe that scientific



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George F Gao: Head of China CDC Signals a more global outlook



Profile

George F Gao: head of China CDC signals a more global outlook

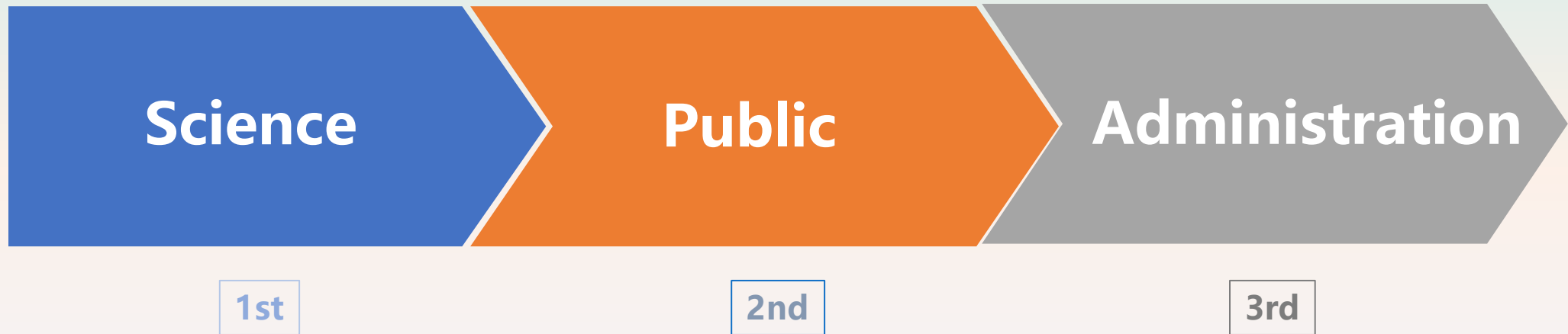


Had the state bureaucracy been allowed to determine the career path of George F Gao (Gao Fu), the current Director-General of the Chinese Center for Disease Control and Prevention (China CDC) might now have been working not as one of his country's leading scientists but as a vet practising in Shanxi province near the border with Inner Mongolia. This was where Gao was born in 1961. In the China of that era, personal choice in education was not a priority; Gao was allocated a place to study veterinary medicine at Shanxi Agricultural University. He had other ideas. "I never ever wanted to become a vet", he says. So having finished his course he moved to Beijing Agricultural University to do a masters degree. He stayed on as a teaching assistant

in the rural wild, and even the most dangerous place in Africa during the outbreak of Ebola." The interspecies transmission of pathogens has long been one of Gao's principal interests.

In 2011 he moved from the Institute of Microbiology to China CDC, first as its Deputy and, since 2017, overall Director-General. Created in 2002, China CDC grew out of the Chinese Academy of Preventive Medicine, a body with a limited research focus. Gao helped to change that. "And I've moved from basic research, though not completely, into more public health oriented research", he says. "I now combine my virology and immunology with more practical field work." Besides interspecies transmission, his research ranges from virus entry and release to structure-based drug design.

Three steps for Public Emergency Control



Science *Truth* *Administration* *Pragmatic*

THE LANCET



Global pandemic perspectives: public health, mental health, and lessons for the future

Matshidiso Moeti, George F Gao, Helen Herrman

The COVID-19 pandemic: the world's wake-up call to invest in equity and preparedness for sustainable development

Science-based, public-involved, and swift administration strategy for future pandemic preparedness

An unprecedented COVID-19 pandemic has reminded us that emerging pathogens are a great challenge to human beings. Yet with modern scientific progress, we have achieved a great deal for the control of such a devastating disease after the 1918 influenza pandemic a century ago. We are facing more unknown diseases in the future³ and learning from the COVID-19 pandemic will help us to protect our society and the Earth. We have identified three steps for handling public health emergencies. First, keep

Why and How have we got here

--Pandemic?

--Climate change

--Human behaviour

MERS-CoV life cycle to infect humans



Bat



Humans

NEWS&ANALYSIS



EMERGING INFECTIOUS DISEASES

**Link to MERS Virus Underscores
Bats' Puzzling Threat**

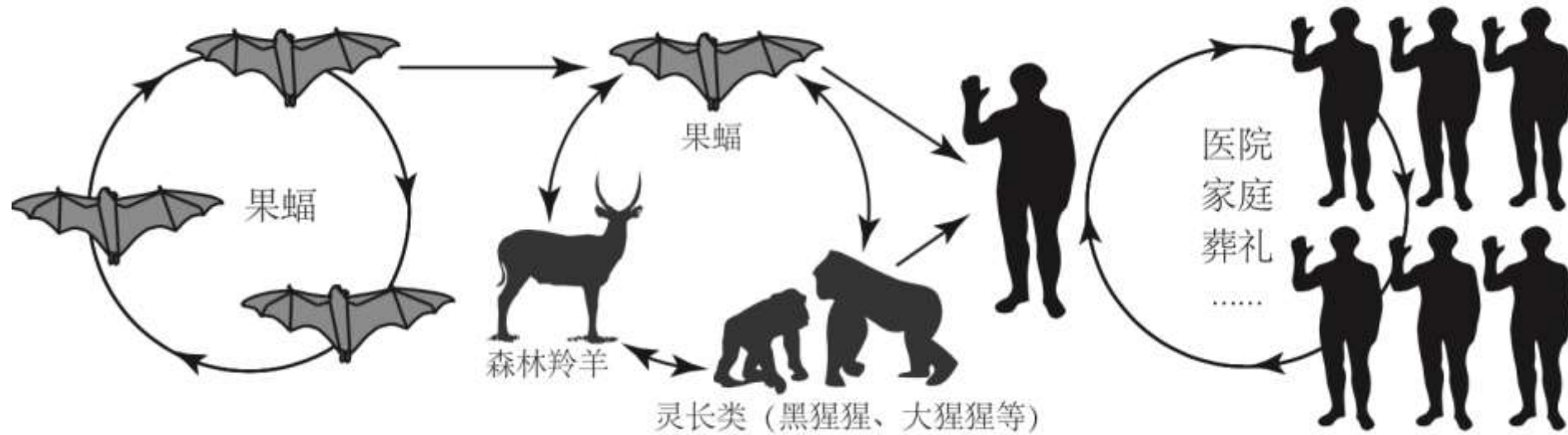


EMERGING DISEASES

**Researchers Scramble to Understand
Camel Connection to MERS**

Ecology of Ebola:

Bat>mammals>human



Natural
Hosts/Reservoir
Hosts

Intermediate
Hosts

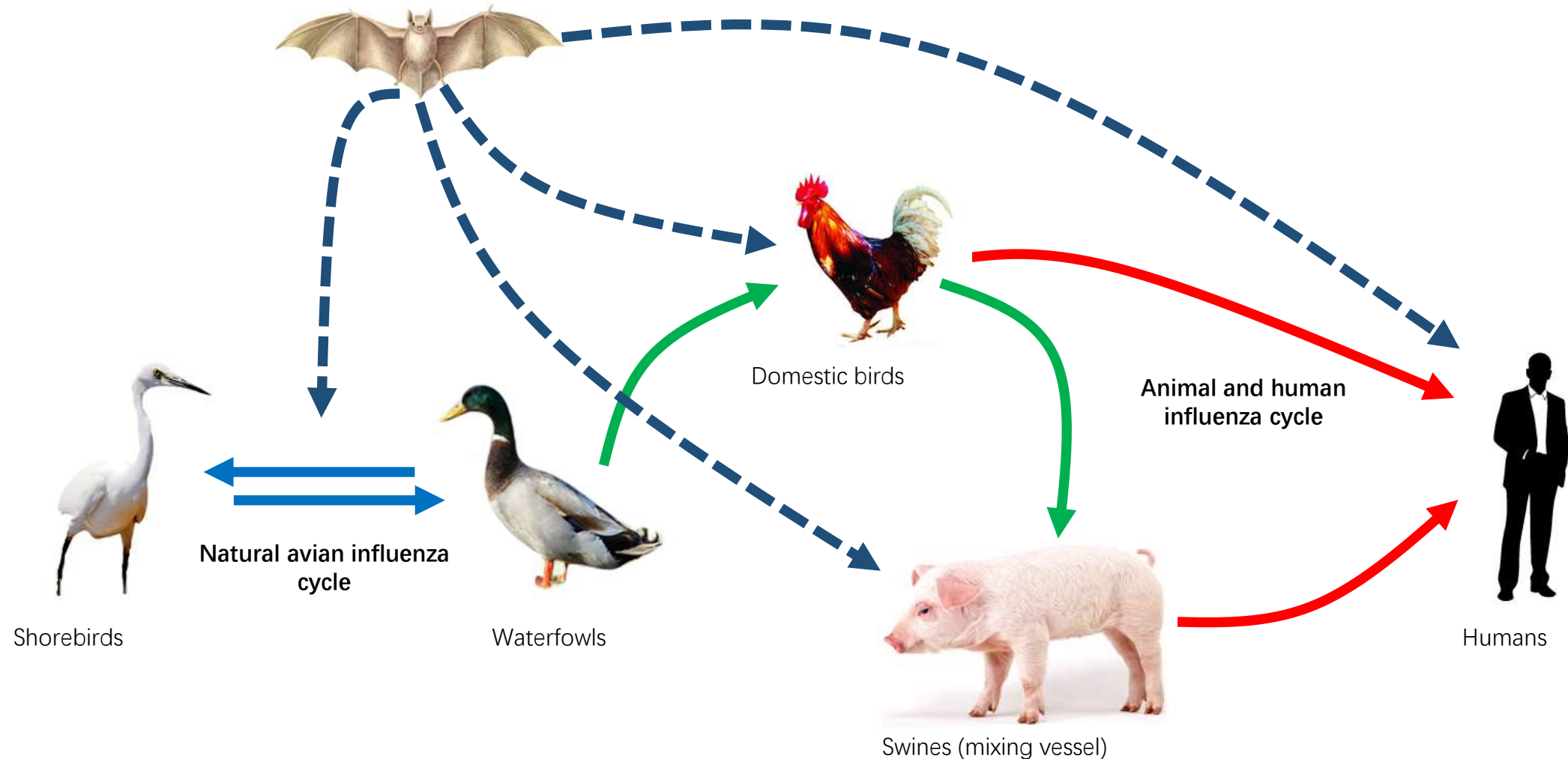
Human
Infections

Human-to-
human
transmission

NEWS&ANALYSIS



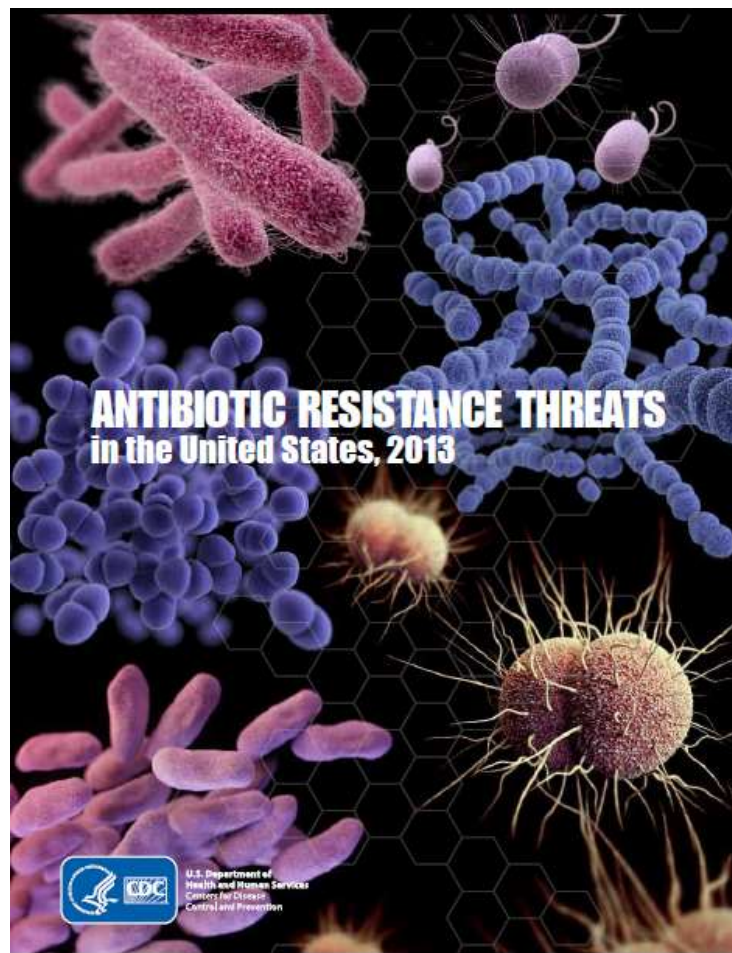
Interspecies transmission is the result of change in virus host tropism



AMR

2013年在美国：

- 每年有**200万**人发生耐药菌感染，
- 由耐药菌感染直接导致**2.3万人**死亡。
- 每年增加**200亿**美元的医疗支出，
- 因社会生产力丧失造成的损失达**350亿**美元。



预计2050 年：

- 全球每年因耐药菌感染死亡达**1000万**人；
- 经济负担**100万亿**美元。

One world one health



The background is a solid blue color with various medical and scientific motifs. In the top left, there is a stylized illustration of a virus particle with a blue core and red spikes, and a white, spiky spherical object. In the top right, there are more virus particles. In the center, there is a horizontal band with a blurred image of medical syringes and vials. In the bottom right, there is a molecular structure diagram with white spheres and connecting lines.

Environmental health practice in China

厕所革命



习近平近日作出重要指示强调
坚持不懈推进“厕所革命”
努力补齐影响群众生活品质短

新华社北京11月27日电 中共中央总书记、国家主席、中央军委主席习近平近日就推进“厕所革命”工作作出重要指示。他强调，厕所问题，同水、电、气一样，是群众最关心、最直接、最现实的问题，要下决心解决好农村厕所问题，努力补齐影响群众生活品质短板。

2015年4月，习近平总书记就推进“厕所革命”作出重要指示，强调“厕所革命”是提升农村人居环境的突破口，是改善农村人居环境、建设美丽宜居乡村的必由之路。党的十八大以来，全国农村“厕所革命”作为重点工程，受到党中央的高度重视，成为农村人居环境整治的重要内容。



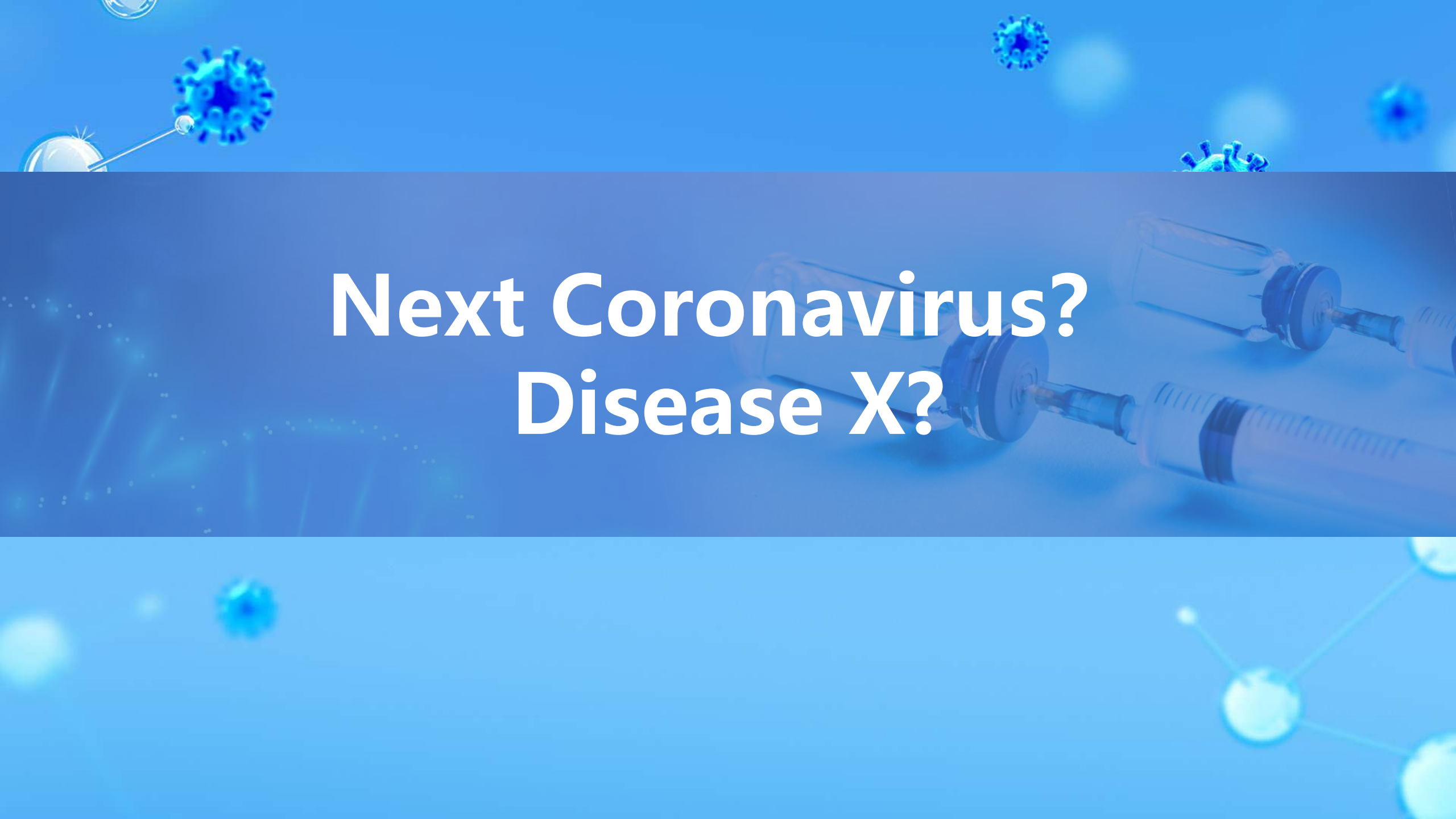
新农村建设
要来场“厕所革命”
让农村群众
用上卫生的厕所



改造后的农村卫生厕所



河北中部的连茅圈



Next Coronavirus? Disease X?

It is likely not a matter of if, but when

Trends in Microbiology

CellPress

Review

Epidemiology, Genetic Recombination, and Pathogenesis of Coronaviruses

Shuo Su,^{1,*} Gary Wong,^{2,3,4} Weifeng Shi,⁵ Jun Liu,^{4,6}
Alexander C.K. Lai,⁷ Jiyong Zhou,¹ Wenjun Liu,^{3,4}
Yuhai Bi,^{2,3,4,*} and **George F. Gao**^{2,3,4,6,8,9,*}

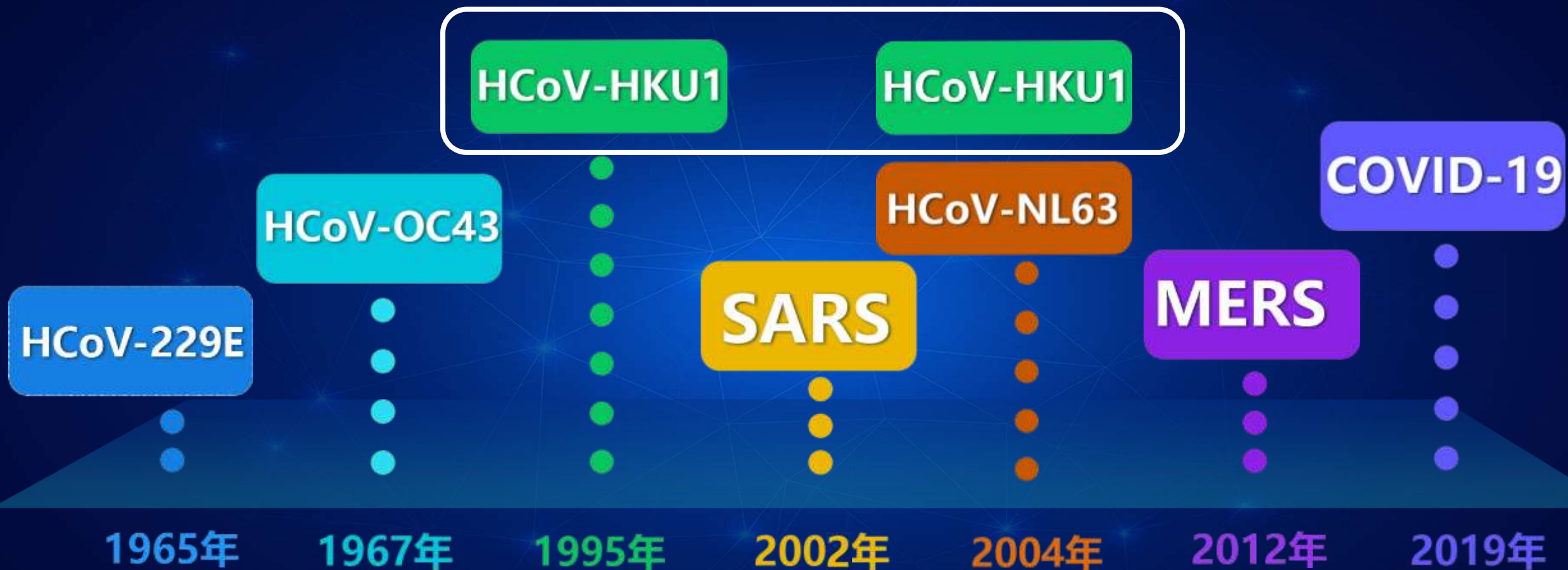
Concluding Remarks

The result from a high frequency of recombination events in CoVs is the generation of novel viruses with a high genetic diversity, with unpredictable changes in virulence during human infections. With multiple species of CoVs circulating in the wild amongst different animal species that may constantly interact with one another, it is likely not a matter of if, but when, the next recombinant CoV will emerge and cause another outbreak in the human population. As such, some crucial future areas of investigation include: (i) the prevalence of HCoVs already circulating within the animal population, (ii) the commonality of coronavirus recombination in animals, (iii) animals which may potentially serve as mixing vessels for the generation of novel recombinant CoVs, and (iv) a surveillance network to monitor and predict the potential emergence of a highly virulent, recombinant CoV from animals (see Outstanding Questions). Furthermore, lessons from the SARS-CoV and MERS-CoV outbreaks must be urgently learned in advance to effectively prepare for the next CoV outbreak.

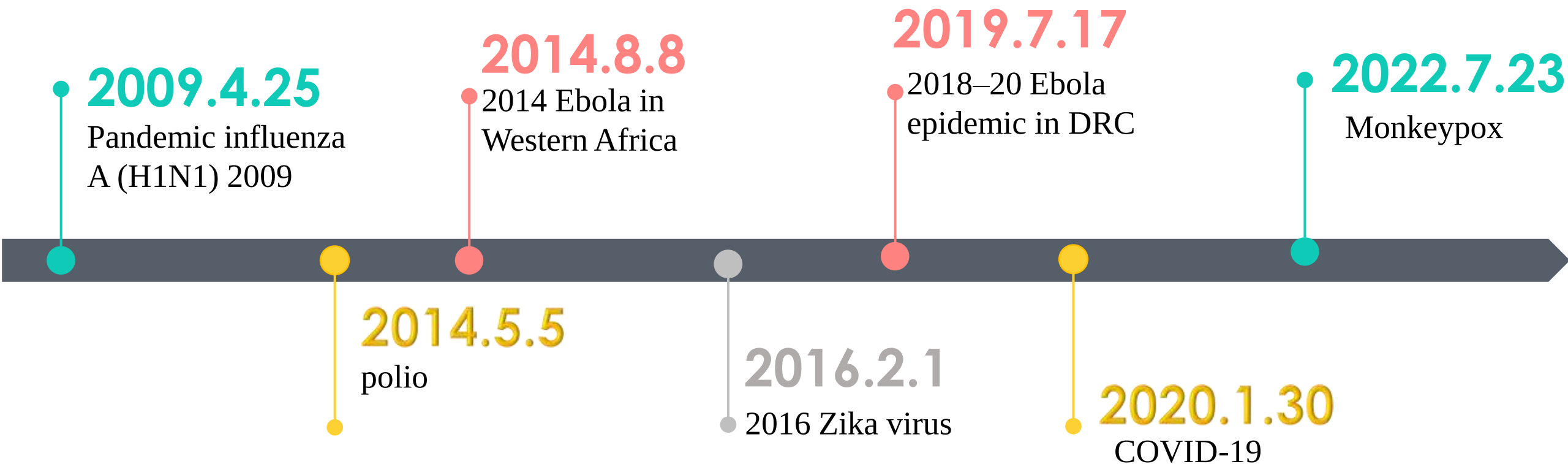
..., it is likely not a matter of if, but when, the next recombinant CoV will emerge and cause another outbreak in the human population.

Trends in Microbiology
2016 June
Vol. 24, No 6: 490-502

7 human-infecting coronaviruses, 2 new



Timeline of PHEICs in this century





Future: Green Developments

Neo-Pollutants

废弃口罩对生物体和生态环境造成危害

海洋塑胶污染致海洋动物**死亡**

动物误食**致死**

海洋生物被口罩耳带缠绕而**死亡**

.....





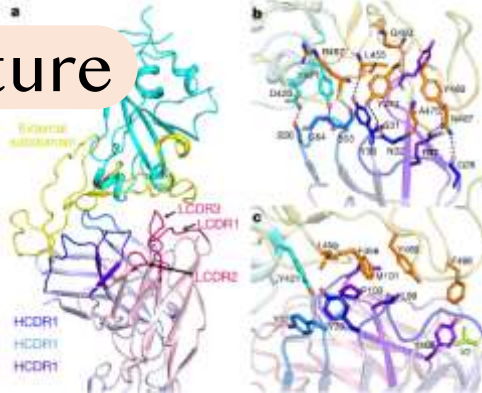
**Global health must go
global !**

Globalization?

Interdependency

Good Collaboration: China-USA, my own experience

Nature



君实



EUA in USA and Europe



Global cooperation

**1 Climate change
and green earth**

**2 Global health
and disease control**



谢谢！

高福