

Commentary

A Strong Public Health System: Essential for Health and Economic Progress

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Public health has been defined as “*the science and art of preventing disease, prolonging life, and promoting health through the organized efforts and informed choices of society, organizations, public and private communities, and individuals*” (1).

Public health, and not medical care, has been responsible for most of the health gains in the world during the past century. Public health initiatives such as clean water and sanitation, vaccination, tobacco control, motor vehicle and workplace safety, and improved nutrition led to 80% of the gain in U.S. life expectancy in the 20th century (2). Globally, public health accomplishments such as smallpox (3) and polio eradication (4), and immunization (5) have saved millions of lives.

The U.S. CDC, created in 1946, has become an epicenter of public health knowledge and practice (6–7). China CDC is a much younger organization, created in 2002. The following year, the SARS outbreak killed 774 people worldwide, including 349 in China. In response, China’s government made substantial investments to strengthen China CDC (8). I was privileged to serve as director of the U.S. CDC from 2009–2017, and have seen firsthand, through visits and regular communication, how dedicated China CDC leadership and staff are.

The most effective public health units at local, city, state/provincial, national, and global levels have at least 5 key components (7,9). These include:

Sufficient funding. The U.S. CDC’s annual budget is more than U.S. \$12 billion (10), which is nearly U.S. \$40 per person.

Sufficient number and quality of staff to detect, investigate, stop, and prevent health threats, including robust laboratory and disease investigation capacity. The U.S. CDC has approximately 14,000 regular full-time staff and another 10,000 contract staff focused on all aspects of health promotion and disease prevention, from infectious diseases and environmental health to noncommunicable diseases and injuries (Table 1). In virtually any area of health, some of the world’s top experts are working at the U.S. CDC. In addition, in

the United States, state, city, and local public health agencies employ more than 200,000 additional people. Furthermore, the U.S. CDC is able to pay top health experts competitive salaries above the standard government pay scale (11).

Close connections with other public health and health care entities. The U.S. CDC sends billions of dollars a year – 60% of its budget – to state and city health departments to assist with specific programs. These are in the form of “cooperative agreements” and include specific requirements for the local area and commitments of the U.S. CDC. U.S. CDC also sends 1,000 staff to embed with state, city, and local health departments for periods of 2 years or more. These local agencies have a wide range of capacities, some on par or superior to those at U.S. CDC, and others which need extensive technical and financial support. The essential importance of the U.S. CDC has been not just providing reference and technical leadership, but also upgrading skills and capacities of state and local public health, where competence can determine whether an emerging health threat is found and stopped rapidly.

Technical independence in the context of political support. The U.S. CDC is a federal agency just two steps removed from the President, with considerable latitude to act independently. CDC’s technical expertise is respected both within and outside of government, both in the U.S. and globally. As U.S. CDC director, I briefed President Barack Obama on critical health issues. This direct access to the highest level of government gives U.S. CDC authority and ensures that public health is prioritized at a national level.

Effective communication. The U.S. CDC communicates frequently and effectively with the public, doctors, the media, and policy-makers. It produces the *MMWR*, a weekly epidemiological digest widely respected as a definitive resource worldwide. In times of crisis, it follows the risk communication principle: “Be first, be right, be credible”.

China has a history of excellent public health

TABLE 1. Number and proportion of United States Centers for Disease Control and Prevention staffing in different public health areas.

Unit	Staff	Percentage
National Center for Emerging and Zoonotic Infectious Diseases	1,296	11%
Center for Global Health	1,263	11%
National Center for HIV, Viral Hepatitis, Sexually Transmitted Diseases, and Tuberculosis Prevention	1,204	10%
National Institute for Occupational Safety and Health	1,073	9%
National Center for Chronic Disease Prevention and Health Promotion	828	7%
National Center for Environmental Health/Agency for Toxic Substances and Disease Registry	701	6%
National Center for Immunization and Respiratory Diseases	683	6%
Center for Preparedness and Response	485	4%
National Center for Injury Prevention and Control	407	4%
National Center for Birth Defects and Developmental Disabilities	202	2%
Scientific services including the National Center for Health Statistics	1,336	12%
Cross-cutting including support to states, tribes, localities, and territories	1,993	17%
Total	11,471	

Note: Includes authorized full-time equivalent positions but does not include approximately 10,000 individuals for whom the unit-wise breakdown is not available. These include contractors, fellows, locally employed staff in global offices, and other categories. <https://www.cdc.gov/budget/documents/fy2021/FY-2021-CDC-congressional-justification.pdf> and <https://www.cdc.gov/budget/documents/fy2021/FY-2021-ATSDR-congressional-justification.pdf>.

practice. The country has reduced maternal and infant mortality rates and improved life expectancy over the past half century (12). There has been great progress controlling and even eliminating many formerly endemic infectious diseases (13). China faces new challenges with the emergence of new infectious diseases such as COVID-19, increasing antimicrobial resistance worldwide, and the increase in noncommunicable diseases, driven in part by high smoking rates among men, high sodium consumption, and air pollution (14). The Healthy China 2030 policy established a plan to achieve the UN Sustainable Development Goals (SDGs) and address these important health issues (15).

Epidemic prevention and control requires both hard work and deep expertise. Infectious disease cases need to be detected, investigated, treated, and monitored, with contacts traced and checked and epidemiological trends analyzed to identify prevention strategies. Every country needs capacity to prevent, detect, and effectively respond to disease outbreaks – and the larger the country, the more resources are needed.

China has made extraordinary efforts to understand and contain COVID-19. China's public health system became much stronger after SARS. Those of us working in global public health hope that, just as SARS led China to step up the function and investment in China CDC, the current effort will trigger another exponential leap in public health capacity in China.

Compared with the strongest public health systems in the world, China has great strengths, including community mobilization. In other areas, China's public health system has the potential to increase its contributions to China's growth and development. This will not only better protect the health of the Chinese people, but also have a ripple effect regionally and throughout the world.

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References

- Winslow CEA. The untilled fields of public health. *Science* 1920;51(1306):23 – 33. <http://dx.doi.org/10.1126/science.51.1306.23>.
- Centers for Disease Control and Prevention. Ten great public health achievements – United States, 1900-1999. *MMWR Morb Mortal Wkly Rep* 1999;48(12): 241-3. <https://www.ncbi.nlm.nih.gov/pubmed/10220250>.
- Foege WH. House on fire: the fight to eradicate smallpox. Berkeley, CA: University of California Press. 2011. <http://find.nlm.nih.gov/search/showDocDetails?docId=-2736031528544668653&dataSource=ucs09&query=House%20on%20Fire>. [2020-02-14].
- Greene SA, Ahmed J, Datta SD, Burns CC, Quddus A, Vertefeuille JF, et al. Progress toward polio eradication — Worldwide, January

- 2017–March 2019. *MMWR Morb Mortal Wkly Rep* 2019;68(20): 458 – 62. <http://dx.doi.org/10.15585/mmwr.mm6820a3>.
5. Ozawa S, Clark S, Portnoy A, Grewal S, Stack ML, Sinha A, et al. Estimated economic impact of vaccinations in 73 low- and middle-income countries, 2001-2020. *Bull World Health Organ* 2017; 95(9):629 – 38. <http://dx.doi.org/10.2471/BLT.16.178475>.
 6. NPHI case study: Profile of creation and growth. United States: Centers for Disease Control and Prevention (CDC). Atlanta: The International Association of Public Health Institutes (IANPHI). 2007. http://ianphi.org/_includes/documents/IANPHI_Case_USA-web1.pdf. [2020-02-14].
 7. Frieden TR, Koplan JP. Stronger national public health institutes for global health. *Lancet* 2010;376(9754):1721 – 2. [http://dx.doi.org/10.1016/S0140-6736\(10\)62007-7](http://dx.doi.org/10.1016/S0140-6736(10)62007-7).
 8. China CDC celebrates a decade of progress. Atlanta: The International Association of Public Health Institutes (IANPHI). 2012.<http://ianphi.org/news/2012/ChinaCDCcelebrates.html>. [2020-02-14].
 9. Meda N, Dabis F, Desenclos JC, Crespin X, Delfraissy JF. Network for strong, national, public health institutes in West Africa. *Lancet* 2016;387(10034):2196 – 7. [http://dx.doi.org/10.1016/S0140-6736\(16\)30015-0](http://dx.doi.org/10.1016/S0140-6736(16)30015-0).
 10. Centers for Disease Control and Prevention: FY 2021 President's Budget. Atlanta: Centers for Disease Control and Prevention. <https://www.cdc.gov/budget/documents/fy2021/FY-2021-CDC-Budget-Detail.pdf>. [2020-02-10].
 11. HHS Personnel Instruction 42-1: Appointment of 42 U.S.C. § 209(f) Special Consultants. Washington: U.S. Department of Health & Human Services. 2015. <https://www.hhs.gov/about/agencies/asa/ohr/hr-library/title-42/index.html>. [2020-02-14].
 12. Wang L, Wang ZH, Ma QL, Fang GX, Yang JX. The development and reform of public health in China from 1949 to 2019. *Global Health* 2019;15(1):45. <http://dx.doi.org/10.1186/s12992-019-0486-6>.
 13. Chen S, Guo L, Wang Z, Mao WH, Ge YF, Ying XH, et al. Current situation and progress toward the 2030 health-related Sustainable Development Goals in China: a systematic analysis. *PLoS Med* 2019;16(11):e1002975. <http://dx.doi.org/10.1371/journal.pmed.1002975>.
 14. The Lancet Public Health. Public health in China: achievements and future challenges. *Lancet Public Health* 2018;3(10):e456. [http://dx.doi.org/10.1016/S2468-2667\(18\)30187-7](http://dx.doi.org/10.1016/S2468-2667(18)30187-7).
 15. Chen PJ, Li FZ, Harmer P. Healthy China 2030: moving from blueprint to action with a new focus on public health. *Lancet Public Health* 2019;4(9):e447. [http://dx.doi.org/10.1016/S2468-2667\(19\)30160-4](http://dx.doi.org/10.1016/S2468-2667(19)30160-4).