

Perspective

COVID-19 and Underinvestment in the Public Health Infrastructure of the United States

NASON MAANI*[†] and SANDRO GALEA*

**Boston University School of Public Health; [†]London School of Hygiene and Tropical Medicine*

FOLLOWING ITS EMERGENCE IN CHINA IN DECEMBER 2019, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the causative agent of COVID-19, has spread globally, leading to more than 2 million confirmed cases (with the true prevalence of infection unknown but certainly much higher) and nearly 200,000 deaths.¹ In the early stages of the pandemic, cases were largely concentrated in the Wuhan province of China, and subsequently northern Italy, with the World Health Organization (WHO) labelling Europe as the epicenter of the pandemic as recently as March 13th.² However, as the pandemic progressed, the epicenter moved to the United States, with case numbers surpassing those in China by March 26th, and at the time of writing, standing at nearly four times the total confirmed cases of any other country.¹

It seems clear that the United States was not only ill-prepared and poorly positioned to deal with COVID-19,³ but also uniquely susceptible to the spread of this illness. The rapid increase in cases, the escalating pressures on hospitals, and the latest modelling estimates suggest that the United States will bear the brunt of COVID-19 related harm as compared to many other high-income nations. It is prudent that we ask why this might be the case, particularly considering the status of the United States as the world's wealthiest country. While the predominant focus of public debate has been on political decision-making as the pandemic unfolded, this narrative fails to acknowledge additional long-standing exacerbating features in the United States that laid the ground for greater spread and slower containment of SARS-CoV-2. As with any such event, assessing the precise causes is a complex issue, but there are two important trends that we consider central to the United States'

vulnerability to this pandemic: underinvestment in the public health infrastructure, which we discuss in this article, and underinvestment in the health of the US population, which we examine in a separate article.⁴

A comprehensive national public health structure is a system devoted to disease prevention and health promotion, incorporating a variety of local, state, and federal bodies that can promote the health of populations, surveil and predict emerging health threats, and retain the agility and capacity to respond when needed to events such as the current pandemic.

However, the US public health system historically has been characterized as fragmented in both organization and funding sources, so much so that it is hard to quantify, either in terms of funding level or capacity.⁵ It is generally accepted that local, county, and state public health capabilities vary widely across the United States,^{6,7} and that a persistent funding gap remains. Based on recent scholarship and expert opinion, there is a \$4.5 billion shortfall in funding to provide a minimum standard of foundational public health capabilities.⁸

Concern about the current pandemic, and the associated physical distancing measures being put in place around the country, has led to a growing awareness of the essential role of public health, and our underinvestment in this area. The third coronavirus stimulus bill recently signed by the President directs the Centers for Disease Control and Prevention (CDC) to provide \$4.3 billion to local, state and federal public health organizations to boost COVID-19 preparedness, prevention, and response efforts.⁸ These funds, while welcome, cannot replace or necessarily improve on long-standing gaps in policy, funding, coordination, and communication.

In this Perspective, we examine the nature and funding of the public health infrastructure in the United States in recent years.

Trends in Public Health Funding

Public health funding in the United States is provided by a variety of sources at the federal, state, and local levels. The variety of public health funding sources, funded programs, and definitions of what constitutes “public health” in terms of role and organization make ascertaining precise funding levels difficult.⁹ For example, state health authorities define public health spending differently than how the US Census Bureau defines state finance data. Some definitions may encompass

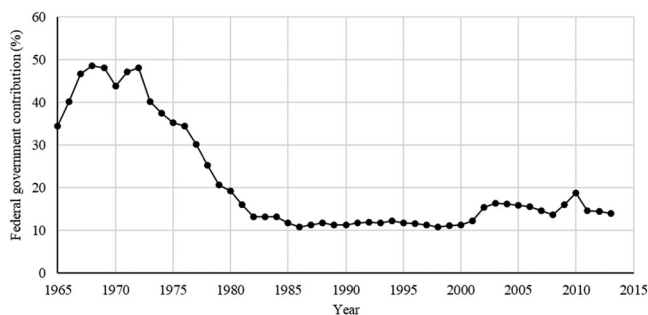
areas such as non-hospital based clinical care or behavioral health care, which do not meet the definition of public health services as commonly understood. There are, however, some broad trends that hold true regardless of definition.

State Public Health Departments Remain Chronically Underfunded

In 2003, a pivotal report by the Institute of Medicine (now the National Academy of Medicine) stated that “For governments to play their role within the public health system, policy makers must provide the political and financial support needed for strong and effective governmental public health agencies.”¹⁰

However, after a wave of funding increases in the wake of the September 11th terrorist attacks, local public health departments subsequently experienced staffing cuts in excess of 50,000 staff positions nationally.¹¹ This reflects both reduced spending in recent years by US states, but also a shift in where funds come from, with a much smaller proportion of public health spending now coming from the federal government (see Figure 1).

Figure 1. Federal Government Share of Total Public Health Expenditures^a

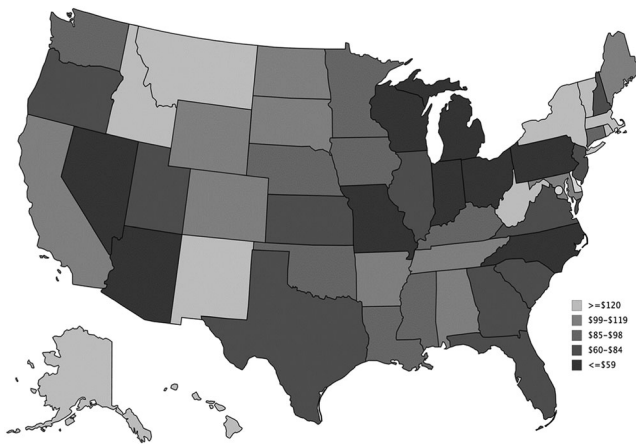


^aBased on supplementary data from Himmelstein and Woolhandler 2016.¹²

The reliance on a range of state and local funding sources in lieu of federal contributions has led to a patchwork of public health funding levels per capita across the country (Figure 2). Reflecting this variety, associated service provision varies widely.¹³

Such public health funding discrepancies affect coordination and preparedness for dealing with countrywide health challenges. Beyond this, however, a failure to provide a sufficient minimum level of public health services can also lead to unnecessary increases in health care utilization, the cost of which greatly exceeds investment in prevention.⁹ For example, higher levels of investment in public health at the state level

Figure 2. Per Capita State and Federal Expenditures (CDC and HRSA) on Public Health, 2019^a



^a Adapted from United Hospital Fund.¹⁴ Based on data from Trust for America's Health; US Department of Health and Human Services; and US Census Bureau, Annual Estimates of the Resident Population, April 1, 2010 to July 1, 2018.

Abbreviations: CDC, Centers for Disease Control and Prevention; HRSA, Health Resources and Services Administration.

have been shown to reduce Medicare utilization,¹⁵ providing particular improvement in areas with higher poverty levels, perhaps reflecting the level of preventable harms responsive to public health initiatives.¹⁶

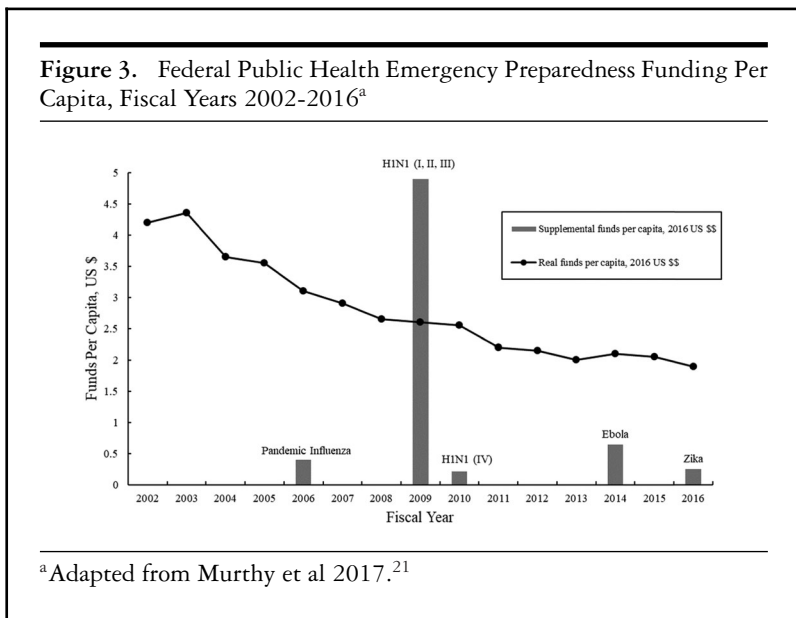
*Public Health Funding at the Federal Level
Has Faced Cuts in Favor of Health Care
Provision*

More broadly, the United States has made long-term strategic commitments to ensure appropriate hospital infrastructure, as well as relatively stable levels of investment in biomedical research funding, to support future health care treatments and innovation. By contrast, public health structures in the United States have not been supported by consistent or predictable federal financial support.¹⁷

Instead, public health funding has been cut to cover rising health care and other costs, despite constituting a small (around 2-3%) of total government health spending. While the Affordable Care Act included a renewed focus on prevention, with a planned \$15 billion increase in public health funding under the Prevention and Public Health Fund, a 2012 law cut this funding by \$6.25 billion, using the funds instead to forestall Medicare physician fee cuts.¹⁸ Sequestration, which cut federal spending across the board beginning in 2013, included a 5% cut to the overall CDC budget, a \$160 million budget reduction for local, county, and state public health assistance, \$25 million less for global infectious disease programs (including the Strategic National Stockpile), and \$13 million less for emerging infectious diseases.¹⁹ Most recently, the Tax Cuts and Jobs Act (signed into law in December 2017) cut an additional \$750 million from the Prevention and Public Health Fund, using it instead to cover the costs of the Children's Health Insurance Program.²⁰

Public Health Funding Tends to be Reactionary

As with federal public health funding, there has been a downward trend for preparedness and disease surveillance in particular, with periodic injections of supplemental funds made for particular infectious diseases, but only after they emerged as serious threats to population health (see Figure 3),²¹ mirroring the response to the current coronavirus pandemic. It is self-evident that the unpredictable and reactionary nature of these



funds does not allow for the stable building of a robust public health infrastructure or workforce that can engage in health protection and promotion in ways that reduce health care utilization and improve quality of life, while also being ready to respond to urgent demands, such as the current pandemic.

Underinvestment in Public Health Structures

Beyond specific funding decreases in recent years, there are also deep-rooted structural deficits in the US public health system that have been the subject of scholarship and improvement efforts over the past decade.^{22,23} Such work has unquestionably led to improvements in recognized minimum standards, and a clearer vision of what public health services in the United States should be able to provide. However, due to the complex nature of the US system, it is still unclear how much foundational public services might cost,²³ and as a consequence, how large the shortfall in current funding may actually be.

A recent article examining historical US public health spending at local, state, and federal levels summarized the outstanding challenges inherent in the complexity of the current system.⁹ First, public health is internally siloed owing to the nature of its funding structures, with specific tranches of funding from a variety of sources contributing to specific areas of focus, reducing flexibility and adaptability. This is compounded by the variety of actors involved in the public health system. Second, the relationship between largely privately funded health care and largely publicly funded public health work has been historically difficult to coordinate, reflecting the complexity and variability of the organizations involved. Third, the United States lacks a coherent system for governmental funding of public health, reflecting the independent development over time of different aspects of the public health system, and the persistent lack of meaningful intergovernmental planning to address this deficit.

These systemic problems are further compounded by a lack of political will in recent years to address them. For example, the current federal administration has signaled the desire for a reduced CDC budget in recent years, although this has not yet materialized due to a lack of support in the US House of Representatives. A 2018 Presidential Federal Budget Request included a 17% reduction in CDC funding,²⁴ and reductions in US funding of global health programs by around 25%.²⁵

Implications

In spite of recent efforts by researchers and public health leaders to build and design a better, more equitable US public health system, persistent underinvestment, a lack of political will, a focus on reactionary interventions instead of strategic capacity building, and a general focus on health care provision over prevention, all continue to prevent the United States from having a public health system at local, county, state, and federal levels with a consistent standard of surveillance capacity, coordination, and adaptability.

This has likely hampered the country's ability to track, prepare for, and respond to COVID-19 as it spreads, and cannot be overcome with short-term funding increases. While it is important to acknowledge the herculean efforts of public health authorities across the United States at this challenging time, it is also important to note the structural

reasons that may have exacerbated the current crisis and hindered their efforts. Reactionary funding in response to COVID-19, although welcome, would represent only the latest in a series of such measures that fail to acknowledge the need to build a robust, equitable public health infrastructure across the nation with continuing support from the federal government, akin to federal planning for other aspects of health.

A Post-COVID Public Health System

An ongoing body of research^{7,10,22,23,26,27} has highlighted the need for meaningful improvements in US public health infrastructure and capacity. In light of the challenge posed by COVID-19, it seems more important than ever that federal and state planning be informed by the adage that prevention is better than the cure. COVID-19 has re-emphasized that public health funding is a matter of economic security and cost-effectiveness as well as population health, for communities, states, nations, and the international community. An important first step could involve a sustained, bipartisan federal commitment on the practical need for a centrally coordinated, well-connected, and accountable public health infrastructure, as a firm foundation on which to rebuild the future economic security, health, and well-being of the United States and its citizens.

References

1. Johns Hopkins Coronavirus Resource Center. Coronavirus COVID-19 global cases by the Center for Systems Science and Engineering. <https://coronavirus.jhu.edu/map.html>. Published 2020. Accessed April 20, 2020.
2. Coronavirus: Europe now epicentre of the pandemic, says WHO. *BBC News*. <https://www.bbc.com/news/world-europe-51876784>. Published March 13, 2020. Accessed April 21, 2020.
3. Dyer O. Covid-19: US testing ramps up as early response draws harsh criticism. *BMJ*. 2020;368:m1167.
4. Maani N, Galea S. COVID-19 and Underinvestment in the Health of the US Population. *Milbank Q*. 2020. <https://doi.org/10.1111/1468-0009.12462>.

5. Hyde JK, Shortell SM. The structure and organization of local and state public health agencies in the U.S.: a systematic review. *Am J Prev Med.* 2012;42(5 Suppl 1):S29-41.
6. Trust for America's Health. The impact of chronic underfunding on America's public health system: trends, risks, and recommendations, 2019. <https://www.tfah.org/report-details/2019-funding-report/>. Published April 2019. Accessed April 21, 2020.
7. DeSalvo K, Parekh A, Hoagland GW, et al. Developing a financing system to support public health infrastructure. *Am J Public Health.* 2019;109(10):1358-1361.
8. Coronavirus Aid, Relief and Economic Security (CARES) Act, H. R. 748 (2020).
9. Leider JP, Resnick B, Bishai D, Scutchfield FD. How much do we spend? Creating historical estimates of public health expenditures in the United States at the federal, state, and local levels. *Annu Rev Public Health.* 2018;39:471-487.
10. Institute of Medicine Committee on Assuring the Health of the Public in the 21st Century. *The Future of the Public's Health in the 21st Century*. Washington, DC: National Academies Press; 2003.
11. National Association of County and City Health Officials. The forces of change in America's local public health system. <http://nacchoprofilestudy.org/wp-content/uploads/2018/12/2018-Forces-of-Change-Main-Report.pdf> Published 2018. Accessed April 21, 2020.
12. Himmelstein DU, Woolhandler S. Public health's falling share of US health spending. *Am J Public Health.* 2016;106(1):56-57.
13. Mays GP, Smith SA. Geographic variation in public health spending: correlates and consequences. *Health Serv Res.* 2009;44(5 Pt 2):1796-1817.
14. United Health Foundation. America's Health Rankings - National Public Health Funding. https://www.americashealthrankings.org/explore/annual/measure/PH_funding/state/ALL Published 2019. Accessed April 13, 2020.
15. Mays GP, Mamaril CB. Public health spending and Medicare resource use: a longitudinal analysis of US communities. *Health Serv Res.* 2017;52 Suppl 2(Suppl 2):2357-2377.
16. Danaei G, Rimm EB, Oza S, Kulkarni SC, Murray CJL, Ezzati M. The promise of prevention: the effects of four preventable risk factors on national life expectancy and life expectancy disparities by race and county in the United States. *PLoS medicine.* 2010;7(3):e1000248-e1000248.

17. Institute of Medicine Committee on Public Health Strategies to Improve Health. *For the Public's Health: Investing in a Healthier Future*. Washington, DC: National Academies Press; 2012.
18. Merlis M. Medicare Payments to Physicians (Updated). Health Affairs Health Policy Brief. <https://www.healthaffairs.org/doi/10.1377/hpb20120228.395943/full/>. Published February 28, 2012. Accessed April 21, 2020.
19. McDonough J. The sequestration cuts that are harming health care. *Harvard Business Review*. October 24, 2013. <https://hbr.org/2013/10/the-sequestration-cuts-that-are-harming-health-care>. Accessed April 21, 2020.
20. An Act to provide for reconciliation pursuant to titles II and V of the concurrent resolution on the budget for fiscal year 2018, HR1 (2017).
21. Murthy BP, Molinari N-AM, LeBlanc TT, Vagi SJ, Avchen RN. Progress in public health emergency preparedness—United States, 2001–2016. *Am J Public Health*. 2017;107(S2):S180-S185.
22. Bekemeier B, Marlowe J, Squires LS, Tebaldi J, Park S. Perceived need versus current spending: gaps in providing foundational public health services in communities. *J Public Health Manag Pract*. 2018;24(3):271-280.
23. Resnick BA, Fisher JS, Colrick IP, Leider JP. The foundational public health services as a framework for estimating spending. *Am J Prev Med*. 2017;53(5):646-651.
24. Collier R. Massive cuts to science and medicine in Trump budget. *CMAJ*. 2017;189(23):E812-E813.
25. Kates J, Sadat N, Wexler A, Dieleman, J. What US budget cuts to global health could mean for future funding. *Health Affairs Blog*. July 26, 2017. <https://www.healthaffairs.org/doi/10.1377/hblog20170726.061209/full/>. Accessed April 21, 2020.
26. Mamaril CBC, Mays GP, Branham DK, Bekemeier B, Marlowe J, Timsina L. Estimating the cost of providing foundational public health services. *Health Serv Res*. 2018;53(Suppl 1):2803-2820.
27. National Research Council, Institute of Medicine. *U.S. Health in International Perspective: Shorter Lives, Poorer Health*. Washington, DC: National Academies Press; 2013.

Address Correspondence To: Sandro Galea, MD, DrPH, School of Public Health, Boston University, 715 Albany St, Talbot 301, Boston, MA 02118 (email: sgalea@bu.edu).