

Public Health Priorities: The US Centers for Disease Control and Prevention (part 3)

How do disease control organizations focus their priorities? How do they prepare for health emergencies, such as the COVID-19 epidemic?

This article is the third and final installment in the series on public health priorities. Part 1 looked at public health initiatives. Part 2 covered funding for disease control organizations around the world. This article concludes by taking a closer look at the budget history and funding priorities for the US Centers for Disease Control and Prevention (US CDC).

The US CDC

The US Centers for Disease Control and Prevention (US CDC) is the largest player in the disease control world. The US CDC's total annual budget for federal FY20 was \$7.9 billion, or 0.04% of the country's US \$21.7 trillion (T) GDP¹ and 0.2% of its US \$4.9T federal budget.² By comparison, the World Health Organization's 2019 budget was US \$2.2 B.

The US CDC's main priorities are:³

- Using data and analytics to respond to, and even predict, disease outbreaks
- Using its laboratories to solve health problems around the world
- Employing a public health workforce that is trusted around the world
- Quickly responding to outbreaks in the US and around the world
- Building a strong global health capacity and domestic preparedness

Has the US CDC's weak response to COVID-19 only been due to political impediments or did it also have been because of structural weaknesses caused by years of underfunding?

Figure 1 shows how in 2019, the American per capita spending on health care (\$11.072) was twice that of Finland, Denmark, Great Britain, France, and (more or less) Austria and approximately half again as much as Switzerland (\$7.732) and Germany (\$6.646).

Country	Per capita \$
USA	\$11.072
Switzerland	\$7.732
Germany	\$6.646
Austria	\$5.851
Denmark	\$5.568
Canada	\$5.418
France	\$5.376
Great Britain	\$4.653
Finland	\$4.578

source: OECD: Health spending
<https://data.oecd.org/healthres/health-spending.htm>

¹ US Bureau of Economic Analysis (BEA) <https://www.bea.gov/news/2020/gross-domestic-product-fourth-quarter-and-year-2019-second-estimate>

² By contrast, the Centers for Medicare and Medicaid Services (CMS), which funds health care for low-income people and those over 65, has a budget of \$828 B (17% of the federal budget, showing why lowering health care costs is critical), the Department of Defense has been allocated \$738 B (15%) and the Department of Education \$73 B (1.5% of the federal budget, though to be fair, education is not a federal responsibility in the United States).

³ CDC <https://www.cdc.gov/about/24-7/index.html>

To what extent is America’s huge rate of health expenditures due to:

- particular genetic or cultural factors in the country, versus
- insurance regulations, including lack of insurance, high co-payment amounts and underinsurance, versus
- underfunding of preventive health programs that could lower costs?

Splitting the US CDC Budget Pie

Looking at an organization’s budget reveals its programmatic priorities. The US CDC’s \$8 billion budget is broken into the following categories (see **Figure 2**):

Figure 2: CDC Budget by Category		
Funding category	FY20 US \$	FY20 %
Immunization and Respiratory Diseases	\$ 803 M	10%
HIV/AIDS, Viral Hepatitis, STI and TB Prevention	\$ 1.273 M	16%
Chronic Disease Prevention and Health Promotion	\$ 1.239 M	16%
Birth Defects, Developmental Disabilities, Disability and Health	\$ 161 M	2%
Environmental Health	\$ 214 M	3%
Injury Prevention and Control	\$ 677 M	9%
Public Health Scientific Services*	\$ 555 M	7%
Occupational Safety and Health	\$ 343 M	4%
Cross-Cutting Activities and Program Support*	\$ 358 M	5%
Building and Facilities	\$ 250 M	3%
Public Health Preparedness and Response*	\$ 850 M	11%
Global Health*	\$ 571 M	7%
Emerging and Zoonotic Infectious Diseases	\$ 622 M	8%
Total	\$ 7.919 M	100%

Source: CDC FY20 Operating Budget
**see Figure 3 for details*

The US CDC spends approximately 11% of its budget on infectious disease identification and response (including the portions of the Global Health and Cross-Cutting Activities that are relevant, see **Figure 3**) and 59% on “regular” diseases, such as NCDs, HIV, birth defects and injury prevention. Much of the funding for preparedness involves domestic preparations against biological, nuclear, epidemic and natural disaster health emergencies.

Does it make more sense to spend more money on chronic diseases—such as diabetes and heart disease—and infectious diseases – such as HIV and other sexually transmitted diseases (STDs)? Where can the CDC get the biggest bang for its health care spending buck?

Figure 3: CDC Programs (*pandemic-related activities italicized*)

Global Health: Helping other countries increase their ability to prevent, detect and respond to health threats; includes immunization (against polio, measles, other), malaria and parasites, food and water, HIV and TB, *global health protection, epidemiology support, disease detection*

Public Health Scientific Services: statistics, surveillance, epidemiology, public health workforce

Cross-Cutting Activities: grants for preventive health, leadership and support, *infectious disease rapid response reserve fund*, other

Public Health Preparedness: education and communication for professionals and the public regarding public health emergencies, cooperative agreements

Cost Drivers

Part 2 of this series discussed a Return on Investment (ROI) for preventive services such as measles immunizations, by comparing the cost of preventive treatment with the health cost of treating people with the disease.

Another way to answer these policy questions analytically is to look at health care spending. If the major drivers of health costs can be better managed, then more funds will be available for other health (and non-health) services.

Chronic and mental health diseases cost US \$3.15 trillion in health care spending annually, but only 16% of the US CDC’s budget (\$1.2 B) is for chronic disease prevention.

Chronic Diseases

According to the US CDC, chronic and mental health conditions account for 90% of the \$3.5 trillion (T) in annual health care spending. Chronic diseases include heart disease, lung diseases, stroke, diabetes, kidney disease, as well as cancer and Alzheimer’s Diseases and Related Disorders (ADRD).⁴ To the extent chronic diseases are preventable, then money spent changing people’s behavior (including to stop smoking, eat healthier, exercise more, use sunscreen and drink less alcohol) will see a good return on investment (ROI). Yet only 16% of the US CDC’s budget in FY20 is for chronic disease prevention. See **Figure 4**.



Figure 4

Health spending on chronic diseases and mental health	CDC budget for NCD prevention
US \$3.15 trillion (90% of spending)	US \$1.2 billion (16% of budget)

HIV/AIDS & STDs

HIV/AIDS and STD prevention are another major category of funding for the US CDC, at \$1.3B or 16%. According to a 2016 study, the monthly medical cost for someone infected with HIV is \$1800 - \$4500⁵. If we assume half of the 1.14M people in the U.S.

with HIV in 2016⁶ receive those treatments, a back-of-the-envelope calculation shows an average annual cost of \$38K per person and \$21.9B in annual spending. This closely matches the Kaiser Family Fund calculation that FY19 spending for domestic HIV care and treatment was \$21.5B.⁷ (This roughly calculates to \$1,900 per person.) Thus, as **Figure 5** shows, CDC funding to prevent the spread of HIV is a mere 6% of the annual cost of treating people with HIV and AIDS.

How much money could the US save – as well as lives – if there was more money allocated for effective prevention? Whether for chronic diseases, HIV, immunizations, or birth defects. There won’t be complete prevention – people will still drink, drive drunk, smoke, have unprotected sex, and eat too many doughnuts. But if you were a policy maker, how would you split the pie?

⁴ US CDC <https://www.cdc.gov/chronicdisease/about/costs/index.htm>

⁵ Schackman, B. et al <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4359630/>

⁶ US CDC

https://www.cdc.gov/hiv/statistics/overview/atag glance.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fhiv%2Fstatistics%2Fbasics%2Fatag glance.html

⁷ Kaiser Family Foundation. <https://www.kff.org/hiv/aids/fact-sheet/u-s-federal-funding-for-hiv-aids-trends-over-time/>

Behavior changes are hard to influence

Spending on infrastructure, such as vans that make mammograms or disease testing and counseling available in underserved neighborhoods at low or no cost, has a more obvious ROI. But for some NCDs, such as asthma, obesity, diabetes and substance abuse, changes in lifestyle and medication adherence are critical to managing and even eliminating the disease.



Figure 5

US health spending for HIV/AIDS treatment

US \$21.5 billion
(est. US\$1900/person)

CDC spending on HIV/AIDS prevention

US \$1.3 billion
(16% of budget)

One challenge with disease prevention is how effective outreach efforts are in inducing positive behavior changes. To what extent will additional outreach services lead to increased adoption of healthy behaviors, such as diet changes, exercise, and medication adherence? Will triple or quadruple the amount of anti-smoking outreach lead two or three times as many people to stop smoking? Or will only a handful more people try to stop, making the additional funding not worthwhile?

In other words, when is it possible to improve outcomes via more spending for outreach?

Countermarketing against tobacco

Countermarketing campaigns have been found effective in motivating behavior change around tobacco use. The most famous countermarketer is the [truth campaign](#) in the United States, whose advertisements don't lecture or preach, but instead present factual evidence using sarcasm, anger, and other emotions to evoke a sense of fairness or outrage over injustice in teenagers and other relevant emotions in adults; teenagers perceive the ads as hip, as well as informative, and presenters are usually other teens. The truth campaigns have been successful in increasing the anti-tobacco beliefs of youth and increasing the intention of non-smoking kids to never smoke, with variations based on race/ethnicity⁸ as well as convincing smokers to quit, in particular people in lower socio-economic groups⁹.

The truth campaign tapped into teenage mistrust of authority via ads revealing how tobacco executives lied to and misled the public and the campaign continues to do so today with videos such as [animals against testing on humans](#) (get it?) and "the facts" (<https://www.thetruth.com/the-facts/>), including:

- Tobacco companies went into low-income neighborhoods in the 1950s to hand out free cigarettes, including to children as young as 7.
- The hydrogen cyanide found in rat poison is also in cigarettes.
- Vaping aerosol contains toxic chemicals such as formaldehyde.

Some notable advertisements include:

⁸ Cowell, A. et al. <https://jhu.pure.elsevier.com/en/publications/assessing-the-impact-of-the-national-truth-antismoking-campaign-o-3>

⁹ Bennett, M. et al.

https://www.researchgate.net/publication/317335315_Evidence_of_the_Impact_of_the_truth_FinishIt_Campaign

the tobacco industry lied and now they're forced to tell the truth

2006
A court finds that tobacco companies violated civil racketeering laws.

now they're **mandated** to run ads for a year **telling the truth** about:

- how they **manipulated** their products
- how they **lied** to the American public
- how they **obscured** the **deadly** and harmful effects of cigarettes

The tobacco companies spent 11 years fighting to keep the ads from seeing the light of day, but justice prevailed.

2017
The "corrective statements" from Altria, R.J. Reynolds Tobacco, Lorillard and Philip Morris USA are finally running in **print newspapers** and **network TV**.

"cigarette companies intentionally designed cigarettes with enough nicotine to create and sustain addiction."
 "All cigarettes cause cancer, lung disease, heart attacks, and premature death – lights, low tar, ultra lights, and naturals. There is no safe cigarette."
 "secondhand smoke causes lung cancer and coronary heart disease in adults who do not smoke."

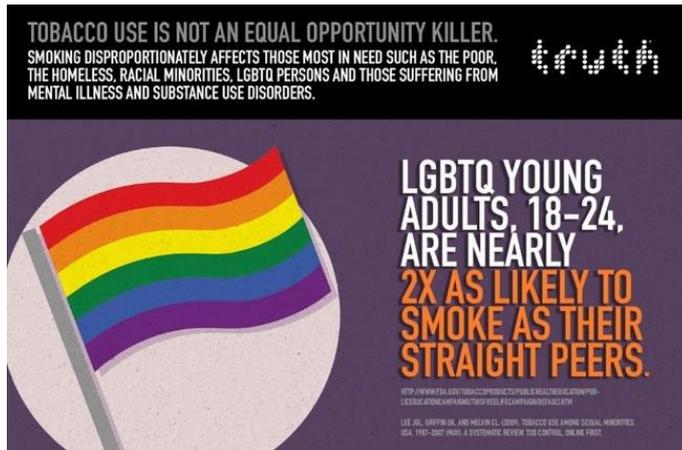
The tobacco companies want you to think that they've changed their ways, but the story's not over.

What's needed is corrective action, not just corrective statements.

#TobaccoRacketeers

truth initiative
INSPIRING TOBACCO-FREE LIVES

truthinitiative.org /truthinitiative @truthinitiative



Community Health Workers

Another effective approach to encouraging compliance with treatment guidelines and adoption of healthier behaviors involves Community Health Workers (CHWs), who usually come from the communities they serve. CHWs visit people in their homes to educate them about their diseases and conditions and link the patients to necessary and affordable support services, such as gym memberships at community centers, that will help the patients adopt healthy behaviors. Such one-on-one conversations, tailored to the education level, healthy literacy level, and personal needs and lifestyle of patients, are time consuming—thus not cheap—yet effective, as one study of over 100 countries found, when programs included key features such as supportive supervision and continuous education.¹⁰ Another study found CHWs to be cost-effective in multiple countries in reducing malaria, promoting breastfeeding, decreasing infant mortality and managing asthma.¹¹ The [WHO](http://www.who.int) developed guidelines for best practices for CHWs, including appropriate training that combines theory and practice, competency-based certification, reasonable salary, providing sufficient supplies for CHWs to distribute and integrating CHWs into the primary health care team.

CHW programs need to be targeted to where they will be most effective, including program design and population and disease targeted. One study found CHWs effective for mammography screening outcomes but not for clinical- and self- breast examinations.¹²

The financial ROI should be considered along with medical outcomes. For example, for a pediatric asthma program I was involved in, we determined that it was not cost effective to provide CHW home visits and support materials such as vacuum cleaners or air conditioners to all children with asthma. Even limiting the program to children whose asthma was not well controlled (based on their Asthma Control Test (ACT) scores) would not provide a positive financial ROI. The program needed to focus on patients who had visited the hospital in the past year, either through an emergency room visit or hospital stay. By targeting those children whose health care costs were high, we determined the CHWs could both produce an

¹⁰ Scott, K. et al. <https://human-resources-health.biomedcentral.com/articles/10.1186/s12960-018-0304-x>,

¹¹ Nkonki, L. et al. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5331680/>

¹² Viswanathan, M. et al. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4781407/>

improved quality of life for young patients as well as provide a net savings in health care expenditures for the public health insurance agency funding the program.

In order to tackle non-communicable diseases such as diabetes and heart disease, health care stakeholders need to find effective ways of persuading patients to change their behaviors and lifestyles. Medical treatment alone will not be sufficient in improving outcomes for certain chronic diseases.

History of CDC Funding

Is the US CDC underfunded?

Figure 6 shows the US CDC budgets for FY10, FY15 and FY20. All values are in FY2020 dollars.¹³ Total FY20 funding is 4% less than FY10 funding and annual funding is roughly double the \$4.74B the US CDC requested for FY2000.

Changes or similarities in program priorities throughout the decade can be seen in the graph. For example, HIV funding (dark blue) has remained rather constant (\$1.2M+) and chronic disease prevention (green) has also averaged \$1.2M over time. On the other hand, funding for Emerging Diseases (dark orange) has doubled in the past decade. Yet public health preparedness funds (middle orange) are about half of what they were a decade ago. Among the “other” category, the major reason for the drop and then growth in funding over the decade is because monies for injury prevention grew from \$148 M in FY10 to \$677 M in FY20.¹⁴

Although the total budgets for FY10 and FY20 are not so different, funding gaps and program shortages are chronic. A few examples:

- In 2016, to combat the spread of the virus [Zika](#), which is particularly dangerous to pregnant women and their fetuses, the US CDC re-allocated \$44 M intended for local health departments for emergencies such as hurricanes and the flu. The funds were transferred after Congress refused to allocate \$1.9 B in emergency funding as requested by President Obama. While the funding transfer enabled the CDC to respond to Zika, at the same time it weakened local health departments.
- The US CDC’s Division of Oral Health (FY20 budget of \$19.5 M) provides competitive grants to states for oral health prevention, including for surveillance infrastructure, water fluoridation and medical-dental integration. In 2018 only 20 out of 45 states that applied for funding received it, while 20 states have never been funded at all.
- During the 2019 measles outbreaks that occurred around the country (see Part 2 of this series), Washington state health secretary Dr. John Wiesman testified in front of the U.S. Senate health committee to demand additional funding to prevent disease outbreaks. He complained the CDC’s Section 317 immunization program was underfunded at \$616 M in FY20, “especially in light of the anti-vaccine movement” that led to pockets of unvaccinated children.¹⁵

The program also responds to increases in Hepatitis A, sexually transmitted diseases, and the flu.

According to the [Association of State and Territorial Health Officials](#), the U.S. spends \$27 B a year to

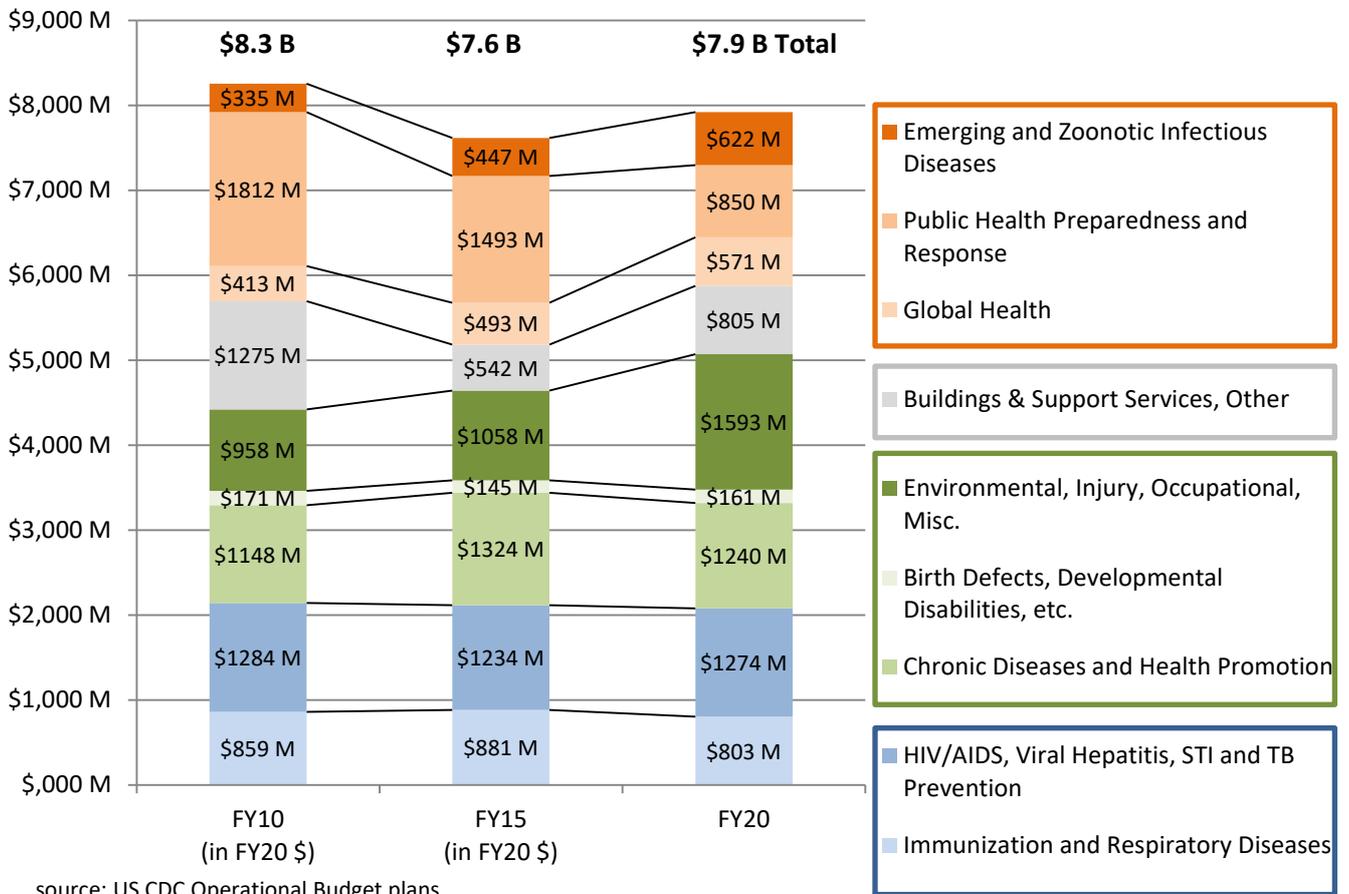
¹³ 2020 dollars calculated using Bureau of Labor Statistics CPI inflation calculator, Jan 2020:Jan 2010 and Jan 2015 https://www.bls.gov/data/inflation_calculator.htm

¹⁴ Values in real dollars

¹⁵ State of Washington Department of Public Health. “United States Senate Committee on Health, Education, Labor, and Pensions “*Vaccines Save Lives: What is Driving Preventable Disease Outbreak*”.

provide medical treatment for four diseases that can be prevented by immunizations: influenza, pertussis (whooping cough), pneumonia and shingles. Doubling the Section 317 program to \$1.2 B would help bend the curve on these health costs for these diseases.

Figure 6: CDC Budget History



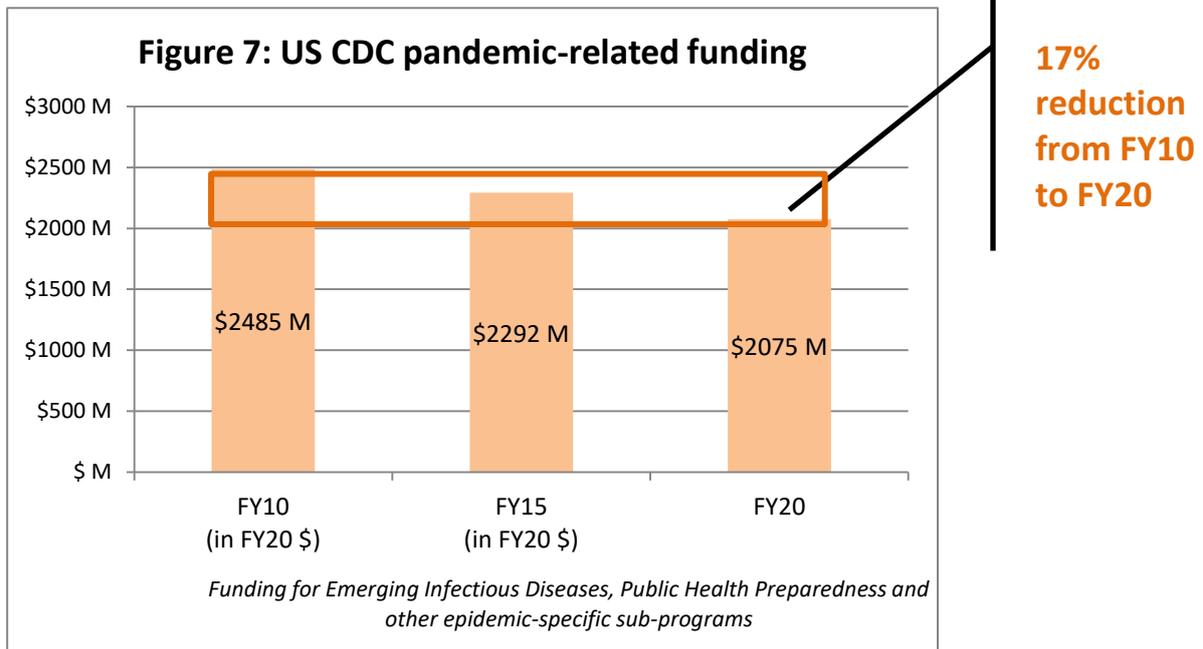
For FY21, which begins October 2020, the presidentially-proposed budget is \$7 B, almost a billion less than the FY20 budget of \$7.9 B. Although the budget for HIV/AIDS, TB and sexually transmitted diseases would increase by 22%, injury prevention by 8% and immunizations by 3%, all other categories would face cuts, many of them severe: funding for chronic diseases would drop 34%, environmental health by 15%, occupational safety by 45%, and the “other” category by a total of 30%.

As Parts 1 and 2 of this series have shown, investing in health promotion and disease prevention activities both improves quality of life and saves health care costs.

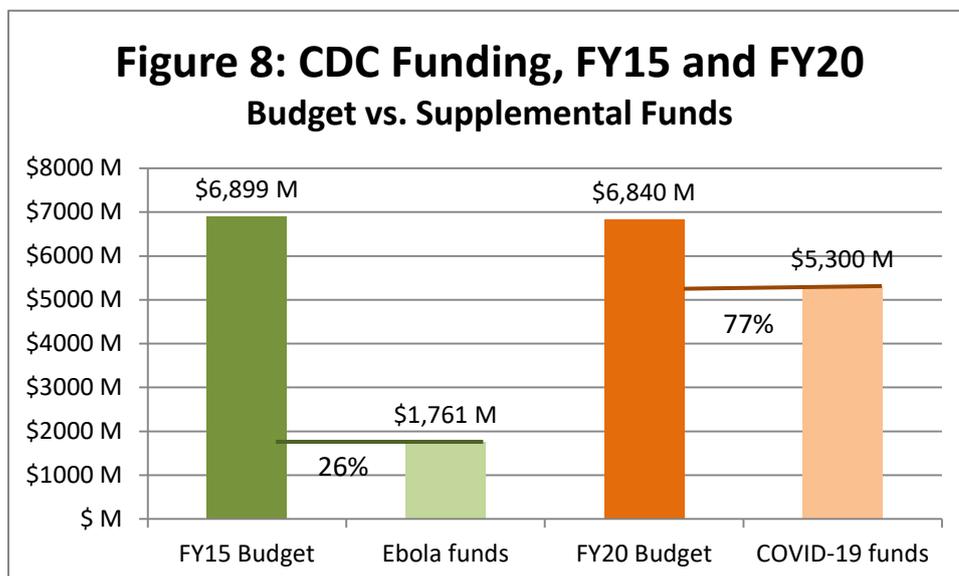
What about epidemics?

The topic on everyone’s mind is how well-equipped the US CDC is to handle emerging infectious diseases such as SARS, H1N1, and COVID-19.

The funding categories relevant to epidemics—or pandemics—are shown in orange in **Figure 6**: emerging infectious diseases and public health preparedness and response (which was aggressively funded after 9/11). The Global Health program has a component for emerging infectious diseases but is mostly concerned with immunizations and other health issues that are non-communicable. Funding for emerging infectious diseases has doubled—from 4% to 8% of the budget. Meanwhile, public health preparedness funds have decreased from 22% of the FY10 budget to 11% in the current FY20 budget. Looking at the pandemic-related funds throughout the US CDC’s budget, total funding for pandemic-related efforts has decreased 17% from \$2.5B in FY10 to \$2.1B in FY20 (see **Figure 7**).



A pertinent case study comes from FY2015, when Ebola emerged as a global threat. The US CDC was allocated an additional \$1.8B, equivalent to approximately a quarter of its annual budget, to fight Ebola (see **Figure 8**).



In 2020, funds have already been, and likely will continue to be, diverted to fight our current Coronavirus pandemic. A bill was passed in early March 2020 providing \$7.8B in emergency funds to combat COVID-19, with \$2.2B allocated directly to the CDC for disease surveillance and infection control and another \$3.1B allocated for vaccine research, use of technologies and development of manufacturing. Altogether, these funds represent 77% of the US CDC's regular budget for the year.

Policy decisions are tough

COVID-19 currently has a mortality rate of around 7%. But without quarantines to reduce the spread, the total potential impact worldwide could be 540 M deaths in our 7.8 B world population—or ten times the annual worldwide death rate of 60 M reported by the WHO.

What is the “right” amount of funding to spend on identifying, preventing, and responding to infectious disease epidemics? By contrast, how much money “should” be spent preventing chronic, long-term diseases that bring long-term health costs?

Public health has a long history of harnessing improvements in knowledge, technology, medicine and infrastructure and laws, to improve the health of the general population. The question we face now is how much money and effort should be spent on a single disease, deadly though it is, and how much should remain on the long-term efforts to reduce chronic disease, improve mental health, decrease infant mortality, prevent dehydration and cholera in children, improve treatment of Alzheimer's Disease and make the world a safer—and thus healthier—place?

All efforts worldwide are being mobilized to contain the worst impacts of the COVID-19—to the detriment of other health programs, which will cause future repercussions in terms of lives lost and health care costs that could have been avoided.

There are no easy answers. Hopefully these articles have provided some insights into the complexities of policy decisions about prioritizing funding for diverse health care programs.