

Public Health Priorities: Funding for Disease Control (part 2)

Disease management is suddenly a household topic due to COVID-19. But what are the normal priorities of the World Health Organization (WHO) and other disease control organizations?

Part 1 of this series talked about what public health is. This article discusses public health priorities from a policy perspective. How are funds for disease prevention and control spent? Should we reprioritize funding due to COVID-19?

The article focuses on disease control and prevention organizations around the world: the WHO, the US Centers for Disease Prevention and Control (US CDC), the European CDC (ECDC), the Indian National CDC (NCDC) and the Africa Centres for Disease Control and Prevention (Africa CDC) (see **sidebar** for details).

The **World Health Organization** (WHO) works to promote health, improve the health of vulnerable populations, promote universal health coverage and protect a billion people from health emergencies. Founded 7 April 1948 (now World Health Day).

The **European Center for Disease Prevention and Control** (ECDC) focuses on infectious diseases with surveillance, epidemic response, and public health preparedness. Established 2005 by EU.

The **U.S. Centers for Disease Control and Prevention** (US CDC) works to protect Americans from health, safety and security threats, including chronic, acute, and preventable diseases as well as health threats from human error, deliberate attack and global disease threats. It also promotes public health. Founded 1946 to fight malaria.

Africa Centres for Disease Control and Prevention (Africa CDC) strengthens the capacity and capability of Africa's public health institutions as well as partnerships to detect and respond quickly and effectively to disease threats and outbreaks, based on data-driven interventions and programs. Founded 2016 after Ebola outbreak.

National Centre for Disease Control (NCDC) was established as the Central Malaria Bureau in India in 1909. It is now a national center of excellence for control of communicable diseases.

Pan American Health Organization (PAHO) works with countries in North, Central, and South America to fight communicable and non-communicable diseases, improve health systems, and respond during emergencies and disasters.

A distinction should be made between organizations that:

- provide regular health care services (such as health systems);
- promote public health initiatives (such as public health associations); and
- have a mandate for disease control and prevention, for which they may engage in research and policy development or act in a convening/facilitation role (such as the WHO).

The distinction may blur for organizations that engage in activities in more than one of these areas.

Other key public health players include federal governments, city and regional public health agencies, national and regional public health associations (such as the European Public Health Association (EUPHA)), and non-profit organizations focused on disease prevention, but they are not the focus of this article.

Public Health priorities

The focus of public health organizations can be categorized into five themes:

- **Chronic and non-communicable diseases (NCD)**, such as diabetes, obesity, and asthma, as well as mental health and substance abuse issues; cancer also falls into this category.
- **“Common” infectious diseases**, such as tuberculosis (TB), the flu, sexually transmitted diseases (STDs) and polio
- **Emerging infectious diseases**, including HIV in the 1980s and 1990s and SARS, H1N1, Ebola, and now COVID-19. Included in this category are **One Health** efforts, which bring together animal and human disease specialists who track zoonotic diseases, such as rabies and brucellosis, that can jump between animals and humans.
- **Environmentally-caused diseases**, such as dysentery, cholera and other waterborne diseases; respiratory diseases caused by air pollution; and even poverty-related diseases such as asthma caused by rodents and cockroaches prevalent in some low-income housing
- **Other topics**, such as maternal health, birth defects, child mortality, developmental disabilities, and injuries

Priorities of Disease Control Organizations

Disease control and prevention organizations may have started with a narrow focus, such as malaria, but their missions have broadened to include non-communicable diseases, emergency outbreaks, common infectious diseases, environmentally-caused conditions and other health issues. Identifying and responding to epidemics is only one part of their work. See **Figure 1**.

Figure 1: Priorities of Disease Control and Prevention Organizations

Type	Issue	WHO	US CDC	Euro CDC	Africa CDC	Indian NCDC	PAHO
NCDs	Chronic diseases and NCD prevention; health promotion	X	X		X	X	X
NCDs	Alcohol, substance abuse	X					X
NCDs	Tobacco	X	X			X	X
NCDs	Mental health	X					X
Infectious	Immunizations	X	X	X	X		X
Infectious	HIV/AIDS, STDs, hepatitis	X	X	X	X	X	X
Infectious	Tuberculosis (TB)	X	X	X	X		X
Infectious	Communicable diseases	X	X	X	X		X
Infectious, Environment	Hospital safety, antibiotic resistance	X	X	X	X	X	X
Emerging infectious	Identification of emerging infectious diseases	X	X	X	X	X	X
Emerging infectious	Animal health, One Health	X	X	X	X	X	X
Environment	Air, water pollution	X				X	X
Environment, Other	Natural disasters	X		X			X
Environment	Climate change	X		X		X	X
Environment	Food and water-borne diseases	X	X	X	X		X
Other	Birth defects, developmental disabilities		X				

Type	Issue	WHO	US CDC	Euro CDC	Africa CDC	Indian NCDC	PAHO
Other	Maternal & child health, child mortality	X	X				X
Other	Injuries, occupational health, accidents	X	X			X	X
Other	Health equity for underserved communities	X		X			X

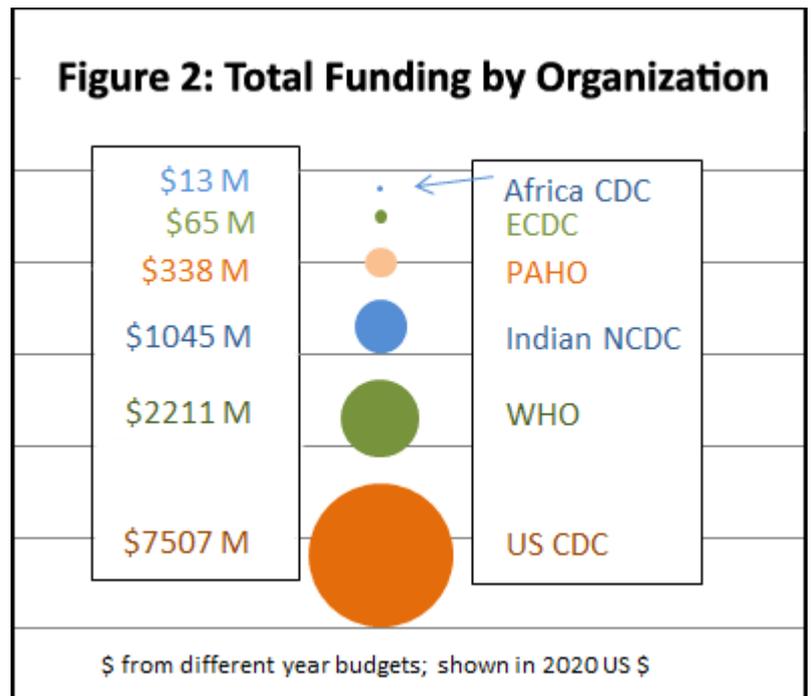
A Look at Budgets

Budgets show the priorities of an organization as well as its funders, such as government agencies.

The US CDC is the largest disease control organization in the world, with an annual budget of US \$7.5 B.¹ **Figure 2** shows how the US CDC’s budget dwarfs the other organizations.

The WHO comes next in size, with an annual budget of \$2.2 (based on a 2-year budget of \$4.4 B). The WHO’s budget in 2018-2019 was only 29% of US CDC’s budget.

The Indian National CDC has a budget of over \$1 M, followed by PAHO with \$676 M. The European CDC has a budget one-tenth the size (\$65 M), while the Africa CDC started with a budget of \$7 M and 20 staff, though its 2020 budget is \$13 M, or one-fifth of the ECDC’s.



The Policy Question

How should global disease control funds be spent?

The WHO reported 57 million (57 M) deaths worldwide in 2016. The top causes, representing 54% of all deaths, were: heart disease, stroke, pulmonary disease, diabetes, lung cancer, Alzheimer’s, tuberculosis, diarrheal diseases, and road injuries.²

Should these figures guide priorities? What about during the COVID-19 pandemic? Some might argue that the entire budget of the WHO and other organizations should be turned over to COVID-19 health care services and vaccine development.

¹ Unless otherwise specified, all budget figures are in 2020 US dollars, adjusted using the U.S. Bureau of Labor Statistics Inflation Calculator, comparing January values for years in question

² WHO. <https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death>

On the other hand, what about less common issues, such as preventing birth defects? Or less well-known issues, such as improving water sanitation so people do not get cholera (which can kill a healthy adult within hours), diarrhea or typhoid? Increasing vaccinations for measles, mumps and rubella (MMR) to prevent future illnesses and health care costs as well as enable people to work and earn an income? Identifying effective treatments for Alzheimer’s to improve quality of life for millions in their older years?

One way to answer the question of how the funding pie should be split is to look at the disease burden – how many people have a disease – and the costs associated with treatment for that disease. How much money will preventing a disease save in later health care costs?³

Of course, in addition to looking at financial data, decision-makers also need to talk to experts who can provide a fuller picture of what programs are effective, scalable, appropriate for certain populations, urgently needed, and provide social justice to underserved communities. In other words, policy decisions need to be about more than just numbers.

Return on Investment (ROI)

Health care organizations calculate a Return on Investment (ROI) for preventive measures, to determine their efficacy and worthiness for funding.

The WHO estimates an ROI of US \$1.40 for every dollar spent on universal health coverage, \$8.30 for every dollar spent on protection from health emergencies and \$1.50-\$121 for every dollar spent on making populations healthier.⁴

What does that mean? It means for every dollar spent, there is a savings in reduced health care costs greater than the dollar spent. If a program costs \$100 and saves \$100 in health care spending then it breaks even. **Therefore the ROI needs to be >\$1 for the program to have a positive ROI.**



Figure 3

CHW program costs	Health care savings
<ul style="list-style-type: none"> ▪ CHW salary \$200K ▪ Manager salary \$70K ▪ Supplies \$5K ▪ Admin/overhead \$40K 	<ul style="list-style-type: none"> ▪ Reduced medication \$20K ▪ Fewer doctor visits \$40K ▪ Less ER usage \$100K ▪ Less inpatient stays \$470K
Total: \$315K	Total: \$630K
ROI: \$630 / \$315 = \$2 ROI for every \$1 spent on program	

Sample ROI

Let’s imagine a program⁵ where community health workers (CHWs) visit people at home to help them manage chronic diseases such as diabetes and heart disease. The program costs (see **Figure 3**) include the CHW salaries, time for both travel to client homes and the visit itself, plus any supplies they hand out. There are also administrative costs, including the CHWs’ supervisor and building and facility costs. In this sample program, let’s say the total program costs are \$315,000 (\$315 K).

ROI must be >\$1 to have a positive financial return

³ My analysis does not include the actuarial cost of loss of life.

⁴ WHO. Proposed programme budget 2020–2021. (2019)

⁵ In this example, numbers are fictitious; through the rest of the article, numbers are real

Now let's assume these home visits mean people are eating a more appropriate, low-salt or low-fat diet and exercising more. Some people will no longer need to be on medication for heart disease or diabetes. Others will need to visit their doctors less often and a few will not need to go to the hospital due to a heart attack or other disease-related emergency. Let's say these prevented costs add up to \$630K.

If you divide the savings (\$630 K) by the program costs (\$315 K), then the return on investment is \$2 for every \$1 spent on the program. From an ROI perspective, this program is worthwhile to run.

On the other hand, if the total health care costs prevented due to the program were only \$200 K, then the program would have a negative ROI: \$200 K divided by \$315 K = \$0.63. That means a savings of only \$0.63 cents for every dollar spent.

Policy questions about ROIs

Financial returns on investments can be far trickier to calculate than my simple example shows. The factors and assumptions used to calculate an ROI can be debated.

However, the concept of using ROIs to select health care programs elicits policy issues:

Should there be a minimum ROI threshold to justify health care programs? Can individual cases or conditions be exempted from an ROI requirement, such as conditions affecting children, programs for vulnerable groups who may have not had equitable access to health care services or treatment for specific diseases? What about programs that improve quality of life but do not save money?

Three real-world examples illustrate the challenges of identifying what diseases or health conditions to prioritize: measles, polio and COVID-19.

Example #1: Measles

Measles is a highly contagious but usually non-fatal disease, with outbreaks both in developed and low-and-middle-income (LMIC) countries.

Measles is easily preventable through vaccination of children at 12-14 months and then again at 4-6 years. The cost of measles vaccines range from US \$0.38 per dose (or <\$1 for both doses) for a program in Afghanistan run by GAVI, the Vaccine Alliance and UNICEF⁶ to US \$2.17 (or \$4 for both doses) for public health agencies purchasing doses through the US CDC or \$7.87 (or \$16 for both doses) for a private physician in America purchasing directly from the pharmaceutical company⁷. Prevention is thus not only feasible but cheap. The measles, mumps and rubella (MMR) vaccine is part of the of immunization schedule for infants in most developed countries.

By comparison, the total cost of measles is not as cheap. Costs can be broken down into three categories:

- **Cost of health care:** For measles cases without complications, home care and over the counter (non-prescription) medication is sufficient. However, costs are not always so low:⁸
 - 1 in 10 children with measles get ear infections, which may necessitate at a minimum a visit to the doctor

⁶ GAVI. <https://www.gavi.org/news/media-room/measles-vaccine-campaign-launched-afghanistan>

⁷ US CDC. CDC Vaccine Price List. Updated 1 June 2020.

<https://www.cdc.gov/vaccines/programs/vfc/awardees/vaccine-management/price-list/index.html>

⁸ US CDC. [https://www.cdc.gov/measles/symptoms/complications.html?](https://www.cdc.gov/measles/symptoms/complications.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fmeasles%2Fabout%2Fcomplications.html)

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- 1 in 10 people have diarrhea, which can lead to dehydration and thus hospitalization
- 1 out of 20 children get pneumonia, the most common cause of death from measles in young children
- **Household economic burden (non-healthcare):** If a parent needs to take unpaid sick days to care for the child, the household suffers economically. Other family members are also likely to get the measles, adding to the household's burden. In addition, 1 - 3 out of 1.000 people with measles die even with medical care and 1 out of every 1.000 people with measles have brain swelling, which could lead to brain damage. Any deaths or disabilities caused by measles place a further economic burden on the household (in addition to the emotional cost).
- **Controlling an outbreak:** The majority of costs associated with measles come from contact tracing by public health officials to determine from whom the patient caught the measles and who else both people came into contact with. During the 2019 measles outbreak in the state of Washington on the Pacific coast, 64 cases were expected to cost a total of \$1 M in additional department of health staff costs, or almost \$15.600 per case. The 2018 MMR vaccination rate in Washington State was 90.8%, according to the US CDC, too low for herd immunity to be effective (see **sidebar**).^{9,10}

Herd immunity

Herd immunity occurs when sufficient people are immune to an infectious disease because they either have had the disease or because they have been vaccinated against the disease. Although sick people will spread germs, only a few additional people will get sick and further spread the disease. Herd immunity is a way to protect people who cannot be vaccinated, such as infants and people with auto-immune diseases. However, herd immunity *isn't* a promise of protection; rather, it is a way to reduce the probability of the disease spreading.

Studies have shown varied rates of immunization required for herd immunity to work, from 93% to 96% for common infectious diseases, based on the disease. This explains why the vaccination rate of <91% was insufficient to prevent the measles outbreak in Washington State.

In one county in New York State in 2019, 80% of the people who had measles had had no MMR vaccination and 6% had only 1 MMR shot (while 12% had an unknown vaccination status).

Measles ROI

In the Netherlands, a measles outbreak in 2013-2014 had 2.700 cases, with an average cost of US \$1.739 per case. 380 patients (14%) had complications, including hospitalizations. One child died and one patient with encephalitis spent 8 months in a rehabilitation clinic. The total cost for direct health care was US \$1.3 M, or a mean of \$465/case, while an additional \$136/case was estimated for productivity losses. See **Figure 4**, detailing the direct health care costs. The study concluded that outbreak management represented 54% of total costs, medical costs were 27% of total costs, while vaccinations were 11% and productivity loss was 8% of total costs.¹¹

Type of cost	Total # patients	Unit cost (US \$)	Avg health care utilization	Total cost (US \$)
Physician consultation				
Uncomplicated measles, # visits	2.320	\$ 37,35	0.2	\$ 17.330
Uncomplicated measles, # phone calls	2.320	\$ 18,07	0.1	\$ 4.192
Hospitalizations	181	\$ 37,35	1.0	\$ 6.760

⁹ US CDC. Seither et al. "Vaccination Coverage with Selected Vaccines and Exemption Rates Among Children in Kindergarten — United States, 2018–19 School Year." (2019) https://www.cdc.gov/mmwr/volumes/68/wr/mm6841e1.htm?s_cid=mm6841e1_w

¹⁰ U.S. National Institutes of Health (NIH). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6906342/>

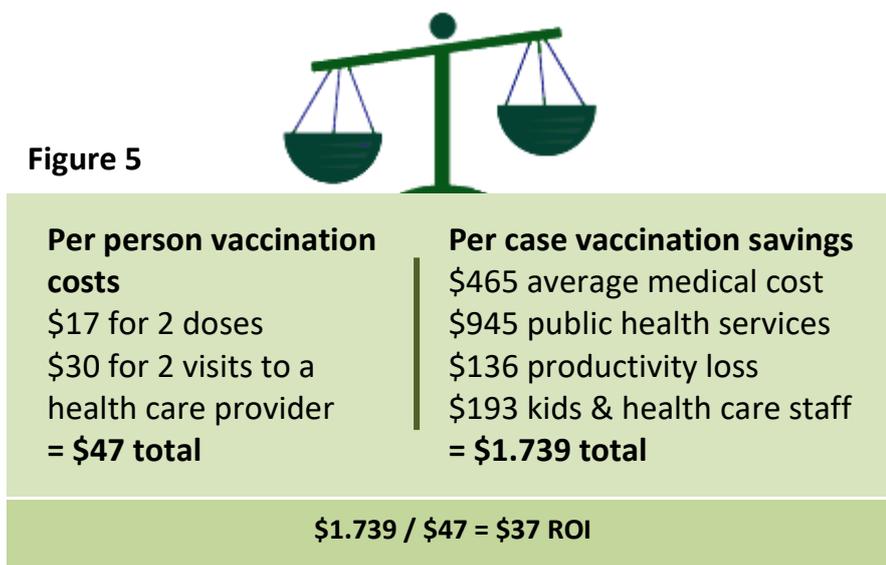
¹¹ Suijkerbuijk, A. et al. *Emerging Infectious Diseases*. "Economic Costs of Measles Outbreak in the Netherlands, 2013–2014." (2015)

Figure 4: Estimated direct health care costs during measles outbreak, the Netherlands, 2013–2014

Type of cost	Total # patients	Unit cost (US \$)	Avg health care utilization	Total cost (US \$)
Other complicated measles	199	\$ 37,35	2.0	\$ 14.865
Treatment for pneumonia in general practice	75	\$ 16,02	1.0	\$ 1.202
Length of hospitalization				
General ward	174	\$ 600	4.6	\$ 480.240
Intensive care unit	7	\$ 2.866	13.1	\$ 262.812
Rehabilitation	1	\$ 447	245	\$ 109.515
Serologic test results	993	\$ 21,37	1.0	\$ 21.220
DNA/RNA amplification	1342	\$ 251,55	1.0	\$337.580
Total				\$ 1.255.718
Cost per case	2.700			\$ 465

Source: Suijkerbuijk, A. et al. *Emerging Infectious Diseases*. "Economic Costs of Measles Outbreak in the Netherlands, 2013–2014." (2015)

When weighing the costs against the benefits (see **Figure 5**), the ROI is \$37 for every \$1 spent on vaccination.



A study in *Health Affairs* about the ROI for vaccinations in 94 low and middle income countries (LMIC) showed a return of \$16 in costs for averted illnesses for every dollar invested in vaccinations and a \$44 return when quality of life and lifespan were included (see **Figure 6**). Measles had the highest ROI, 58 times the cost of investment.¹²

¹² Ozawa, S. et al. *Health Affairs*. "Return On Investment From Childhood Immunization In Low- And Middle-Income Countries, 2011–20". (2016) <https://www.healthaffairs.org/doi/full/10.1377/hlthaff.2015.1086>

Figure 6: Estimated Return On Investment (ROI), Economic Benefits, And Costs Of Immunization Programs

Return on investment (net benefits divided by costs)	
Cost of illness only	16.11
Broader economic benefits	43.83
Economic benefits	
Cost of illness only	\$586 billion
Broader economic benefits	\$1.53 trillion
Cost of immunization programs	\$34 billion

Source: Ozawa, S. et al. Return On Investment From Childhood Immunization In Low- And Middle-Income Countries, 2011–20

Given these numbers, does it make sense for a disease control organization to focus on increasing vaccination rates, including paying for outreach staff to work with communities or families that have not been vaccinated or are resistant to vaccination?

Or should funds be spent on COVID-19 and the consequences of insufficient vaccination rates be a problem for later?

Example #2: WHO Budget Breakdown

The World Health Organization's priorities can be seen in its 2018-2019 budget, which breaks down as follows (see **Figure 7**):

Figure 7: WHO Budget 2018-2019

Category	Amount (2 year budget)	% of budget
Communicable Diseases	\$805.400.000	18%
Noncommunicable Diseases	\$351.400.000	8%
Promoting health through the life course	\$384.300.000	9%
Health Systems (universal health coverage)	\$589.500.000	13%
Corporate services/enabling functions	\$715.500.000	16%
Polio	\$902.800.000	20%
WHO Health Emergencies Programme	\$554.200.000	13%
Special programmes	\$118.400.000	3%
Total	4.421.500.000	100%

source: WHO Program Budget 2018-2019

In addition, the WHO expects to raise funds as needed for health emergencies, such as due to natural disasters or disease outbreaks.

Do these priorities make sense from a policy perspective? The table shows that 18% of the budget is spent on infectious diseases such as sexually transmitted diseases (STDs), influenza, childhood vaccinations, and other communicable diseases. A total of 13% is budgeted for health systems, that is, efforts promoting universal health coverage. The emergencies program is also 13% of the budget, while polio takes up the largest portion of the pie, at 20%.

Let's look at polio from a policy framework. Should the WHO be spending 20% of its budget on polio eradication?

Poliomyelitis (polio) is a highly infectious disease that is found mostly in children. When the virus spreads from the intestine to the nervous system, it can cause paralysis; 1 in 200 infections leads to paralysis, of which 5% - 10% die when their breathing muscles become paralyzed.¹³ As recently as 1988, polio was endemic in 125 countries, with 1,000 children paralyzed a day. Thanks to worldwide vaccination efforts, polio remains endemic in only three countries: Afghanistan, Pakistan and Nigeria, though it remains a very high risk in Chad, Somalia and South Sudan and a high risk in the Congo, Ethiopia and Sudan, according to GAVI The Vaccine Alliance.¹⁴ Polio is one of the 17 infectious diseases for which GAVI funds immunization programs; GAVI has committed \$200 M for polio vaccination efforts in 2019-2020. There is no cure for polio, only prevention through vaccinations.

If polio were allowed to spread, then the WHO estimates 200,000 new cases could arise worldwide annually, which could result in 1,000 children paralyzed per year. Of course, the disease would spread mainly through countries that do not immunize against polio, i.e., more likely in the developing world.

What is the cost of polio prevention? What is the cost of polio treatment?

This type of analysis is known as looking at the opportunity cost: What is lost by taking a certain action? What will be lost by not doing that action? Also, how much money will be saved if polio is eradicated worldwide?

An article in the Journal of Infectious Diseases compares the cost of vaccination versus treatment (see **Figure 8**). While the cost of providing either of the two preventive vaccines is cents or a few dollars, the cost of treating someone with polio ranges from \$700 in low-income countries to \$750,000 in high-income countries. Even assuming that polio outbreaks would occur only in low-income countries and also that the WHO's predictions are too high so that only 100,000 people a year got polio, with a cost of \$700/case for treatment x 100,000 new cases a year, the total health care costs would be a minimum of \$700 M. This is 1.5 times the WHO's \$450 M annual budget for polio, or an ROI of \$1,56.

Figure 8: Cost of Polio¹⁵	
Cost Category	Cost
Prevention costs	
Vaccine dose cost per person	\$0.15 - \$3.15
Routine delivery cost per person	\$1.30 - \$2.46
Total prevention	\$1.45 - \$5.61
Treatment cost per person with polio acute flaccid paralysis	
Low income	\$700
Lower to middle income	\$7000
Upper to middle income	\$70 000
High income	\$750 000

¹³ WHO. <https://www.who.int/news-room/fact-sheets/detail/poliomyelitis>

¹⁴ GAVI. [GAVI'S Engagement In Polio Eradication](#). (2018)

¹⁵ Zimmerman, M. et al. [The Journal of Infectious Diseases](https://academic.oup.com/jid/article/221/4/561/5576004). "Projection of Costs of Polio Eradication Compared to Permanent Control " (2020) <https://academic.oup.com/jid/article/221/4/561/5576004>

What else could the WHO do with \$450 M a year?

Figure 9 looks at ROIs for polio vaccinations versus other health issues. Returns on investment for many programs are often long-term, as healthier populations continue to need less medical care. Access to care also reduces costs because people can seek treatment at an earlier stage in their illness – compare the cost of getting a cavity filled by a dentist versus needing a tooth pulled in the emergency room due to lack of access to a dentist.

Figure 9: Health Program ROIs		
Program	ROI	Impact
Polio vaccinations	\$1.56	Paralysis in 1 of 200 infected children prevented
Universal health coverage*	\$1.40	24.4 M lives saved
Making populations healthier*	\$1.50-\$121	3.8 M lives saved
Protection from health emergencies*	\$8.30	1.5 M lives saved
Water, sanitation and hygiene (WASH)**	\$4.30	800.000 lives saved, including 300.000 children under 5
Vaccination in LMIC***	\$16 for just cost of vaccine & supply system \$44 including economic & social benefits	Varies based on type of vaccine; WHO estimates 1.5 M lives could be saved
<p>*WHO. Proposed programme budget 2020–2021. **WHO. https://www.who.int/water_sanitation_health/monitoring/economics/en/ ***Johns Hopkins School of Public Health. https://www.jhsph.edu/departments/international-health/news/vaccine-return-on-investment-health-affairs.html</p>		

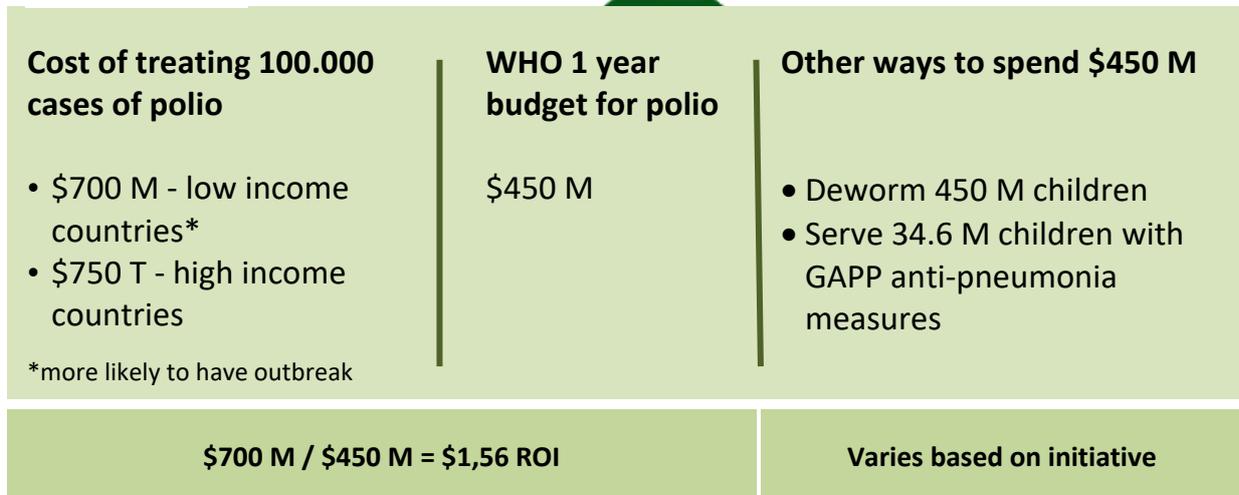
Two of the many other options for the WHO (see **Figure 10**) to spend \$450 M on are:

- School-based deworming for intestinal worms (soil-transmitted helminths and schistosomiasis) that grow in the stomach and intestines; the worms drain nutrients from food and cause anemia and malnourishment, as well as stunting and mental impacts. Treatment is a single dose of medicine that costs around US \$1.00, including staff time, and is usually distributed in school-wide vaccinations.
- Cover 5.5% of the costs of the WHO's Global Action Plan for Prevention and Control of Pneumonia (GAPP), that also includes measures to reduce diarrhea; interventions include vaccination and injection supplies, antibiotics and other supplies for pneumonia management, and promotion of breastfeeding. The 2015 estimated cost, for 68 countries that represent 98% of pneumonia deaths in children under 5, was \$8B, with a per-child cost of \$13.¹⁶

¹⁶ WHO and UNICEF. Global Action Plan for Prevention and Control of Pneumonia (GAPP). (2009) https://www.who.int/maternal_child_adolescent/documents/fch_cah_nch_09_04/en/



Figure 10



Funding for epidemics

How much funding is available for the identification and containment of zoonotic and other emerging infectious diseases? I calculated the rough amount of funding available at each organization for identifying and managing epidemics. I tried to take a liberal view, including all funding in categories that might be relevant during an infectious disease epidemic, even if only part of those funds are typically used for disease monitoring and response. See **Figure 11** for a list of budget categories included as pandemic funding for this article.

According to my calculations, the WHO spends approximately 13% of its budget on pandemic funding while the US CDC spends 27% and PAHO spends 31% of their respective budgets on pandemic surveillance and response. The ECDC, whose mission is to combat infectious diseases, spends only 10% of its budget on pandemic-related activities. Because the Africa CDC was founded in response to Ebola with the mission of identifying emerging infectious diseases, I have included its entire budget as epidemic-related.

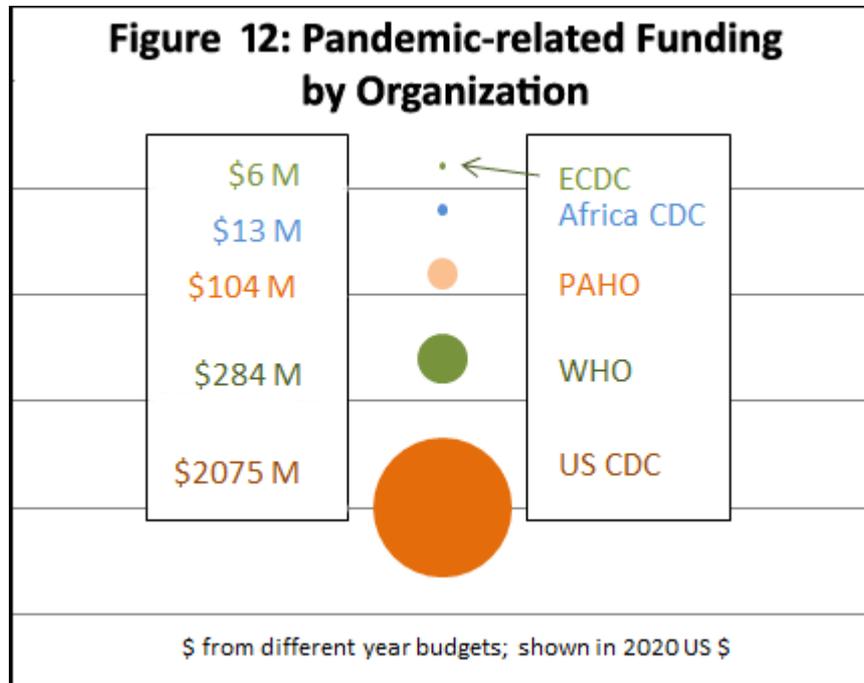
Figure 11: Funding categories included as “pandemic funds”

- US CDC:** Emerging and Zoonotic Infectious Diseases; portions of Global Health, Public Health Preparedness and Response, and other
- WHO:** WHO Health Emergencies Programme; does not include additional fundraising for specific emergencies
- ECDC:** Surveillance and epidemic intelligence; Preparedness and response
- PAHO:** Risk factors for communicable diseases; Elimination of communicable diseases; Data, information, knowledge, and evidence; Health emergencies preparedness and risk reduction; Epidemic and pandemic prevention and control; Health Emergencies Detection and Response; Outbreak and crisis response
- Africa CDC:** Entire budget included due to CDC’s founding to combat emerging infectious diseases
- NCDC:** Not included; one category, Coordination of Prevention and control of Zoonotic Diseases, is relevant but reflects only a tiny portion of the budget; additional funding is likely included in the general line items.

I was only able to identify 0.2% of the NCDC’s funding as being specifically targeted for epidemics, but the main, non-detailed line items in the budget likely also include services to identify and combat emerging infectious diseases; I was therefore not able to calculate the actual percentage of funding the NCDC spends on emerging infectious diseases.

However, less important than the percentage of funds is the actual dollar value – even if the ECDC spent its entire budget preparing for and preventing pandemics, it would still only be contributing \$65 M to the effort.

Figure 12 shows the relative amounts of pandemic-related budget activities for each of the target organizations: The ECDC spends only approximately \$6 M—less than the Africa CDC. PAHO spends over \$200 M, the WHO spends \$568 M, while the US CDC spends \$2.000 M – almost as much as the entire budget for the WHO for one year. The Indian NCDC likely contributes another large sum, given its \$1 B budget.



Example 3: COVID-19 ROI

What is the ROI for spending on COVID-19? It’s obviously much too early to know total costs, including the enormous economic toll in addition to the health care costs. An effective vaccine has not yet been developed and disseminated. However, some estimates can be done using current caseload data.

COVID-19 currently has a mortality rate of around 7% among infected people. That means without quarantine measures to reduce the spread, the death toll could theoretically be 540 M out of our 7.8 B world population—or almost ten times the annual worldwide death rate of 60 M. With countermeasures, the actual death toll will obviously be much lower. Currently it is 472.000 out of 9.1 M cases of COVID-19 (5,2%), or .006% of the 7.8 B people on the planet.¹⁷

Mortality rates are usually given as a percentage of 100.000 people, making COVID-19’s mortality rate 6,1%, i.e., 6 out of 100.000 people in the world.

By comparison:

- Unsafe water, sanitation and hygiene infrastructure (WASH) annually kills:

¹⁷ COVID-19 figures as of 23.6.2020

- 46 out of every 100.000 people in Africa;
 - 15 out of 100.000 in southeast Asia; and
 - 11 out of 100.000 in the eastern Mediterranean.¹⁸
- The mortality rate for non-communicable diseases is:¹⁹
 - over 900 in Sierra Leone and the Ivory Coast
 - around 800 or more in Guinea, Togo, Egypt and Yemen
 - around 700 in Uzbekistan and the Ukraine

 - over 500 in Zambia, Zimbabwe, Timor-Leste
 - around 400 for the US, Ecuador and Germany
 - 300 - 350 for Switzerland, France and Greece

Funding for Disease Control and Prevention

We are now experiencing a scary, bewildering crisis, the likes of which we have not faced since the Spanish flu epidemic a century ago. Funds must certainly be diverted to reduce how many people die and prevent economies from collapsing. But what makes the most sense?

If we don't focus on funding for a vaccine for COVID-19, we could have a worldwide economic meltdown and more deaths in the next couple of years.

But if we ignore other health issues (for now), we will have more short-term deaths that could have been prevented (such as from cholera and malaria) as well as longer-term illness, disability and deaths due to chronic, long-term diseases whose impact could have been reduced through health outreach and treatment measures.

How do we weigh future health costs against current urgent needs? There are no easy answers.

Part 3 of this series will provide a more in-depth view of the US CDC's policy decisions and funding history, as a way of showing trends in policy decision making.

¹⁸ WHO. Mortality rate attributed to exposure to unsafe WASH services.

[https://www.who.int/data/gho/data/indicators/indicator-details/GHO/mortality-rate-attributed-to-exposure-to-unsafe-wash-services-\(per-100-000-population\)-\(sdg-3-9-2\)](https://www.who.int/data/gho/data/indicators/indicator-details/GHO/mortality-rate-attributed-to-exposure-to-unsafe-wash-services-(per-100-000-population)-(sdg-3-9-2))

¹⁹ WHO. Total NCD Mortality. <https://www.who.int/data/gho/data/themes/topics/indicator-groups/indicator-group-details/GHO/total-ncd-mortality>