The Cost of Pandemic Preparedness

An Examination of Costings and the Financial Requests in Support of the Pandemic Prevention, Preparedness and Response Agenda

A preliminary report by the Re-Evaluating the Pandemic Preparedness And REsponse agenda (REPPARE) research group at the University of Leeds.

May 2024

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Glossary

AHT	Accelerating Health Technologies (Group)
AMR	Anti-microbial resistance
CEPI	Coalition for Epidemic Preparedness Innovations
DALYs	Disability-adjusted life years
FIND	Foundation for Innovative New Diagnostics
G7	Group of Seven (governments)
G20	Group of Twenty (governments)
GDP	Gross domestic product
HIC	High income country
HIV/AIDS	Human immunodeficiency virus / Acquired Immunodeficiency Syndrome
HLIP	High-Level Independent Panel (of the G20)
IHRs	International Health Regulations
IHRWG	International Health Regulations Working Group
INB	Intergovernmental Negotiating Body (of WHO)
IPSN	International Pathogen Surveillance Network
LMIC	Low- and middle-income country
MERS	Middle East Respiratory Syndrome
MCP	Medical Countermeasures Platform
ODA	Official Development Assistance
PPR	Pandemic Preparedness and Response (often interchanged with PPPR)
PPPR	Pandemic Prevention, Preparedness and Response (often interchanged with PPR)

REPPARE	Re-Evaluating Pandemic Preparedness And Response (Project of the University of Leeds, UK)
SARS	Disease caused by Severe Acute Respiratory Virus -1
UHC	Universal Health Coverage
WHA	World Health Assembly
WHO	World Health Organization

Executive Summary

Background

International health institutions are emphasizing an urgency to prioritize prevention and response to pandemics.

The World Health Assembly will vote in May-June 2024 to accept two proposals to reform the role of the World Health Organization (WHO) regarding pandemics: The Pandemic Agreement and amendments to the International Health Regulations (IHRs), both of which will be legally binding on States. These proposed instruments are intended to help coordinate and complement other emerging pandemic preparedness initiatives, such as the World Bank's Pandemic Fund, the WHO International Pathogen Surveillance Network (IPSN), and a new Medical Countermeasures Platform (MCP), as well as coordinate national level preparedness.

Unprecedented financial requests are being proposed to support this agenda. These estimates range from US$31.1 billion a year, to US$171 billion over five years with unspecified annual commitments, to US$357 billion over ten years, with additional funds of US$10.3 to US$1.5 billion sought to implement One Health.

Problem

The estimated cost and financing requirements associated with the emerging pandemic preparedness agenda pose significant opportunity costs with the additional risk of redirecting scarce resources from global and national health priorities of greater burden. It is therefore vital that cost estimates are accurate and reliable, and provide adequate evidence to support the resource diversions that the pandemic preparedness agenda is proposing. Moreover, public health investments cannot be determined in isolation, but must also be weighed against competing health, social and economic priorities, since the recommended investments for pandemic preparedness carry broad implications for global health.

Objective

This report investigates the cost estimates and financing requirements underwriting the current pandemic prevention, preparedness, and response (PPPR) agenda. By doing so, the report seeks to better determine the degree to which proposed costs are substantiated by evidence and justified within the wider context of health financing.

Method

This report analyzes the data and evidentiary material cited within 4 key G20 (n=1), joint World Bank and WHO (n=1), and WHO Secretariat (n=2) documents used to support current policy

assumptions about pandemic preparedness costs and financing requirements. Our analysis also includes an examination of the primary resource used across the policy documents (McKinsey and Company) as well as secondary sources (n=10) cited in the policy documents to support their claims. Our analysis focused on the robustness of the cost estimations and whether the associated financial recommendations are justified as having an appropriate return on investment to support the current pandemic preparedness agenda.

Result

The report finds that there is a general lack of accurate cost estimations for current pandemic preparedness at both the domestic and international level due to poor monitoring, a lack of reporting, and inconsistent definitions about what constitutes pandemic preparedness.

That current cost estimates are based on a small evidence-base that is self-referential and under-scrutinized creating a circular evidence and citation base resulting in a false perception of rigor and counter-verification.

Claims for PPPR cost effectiveness and return on investment use problematic and crude baselines for comparison and fail to properly examine wider economic impacts and disease burdens, thus creating a false perception of value for money and investment returns.

There is a general lack of methodological standardization between the major costing and financing reports, which creates disparate estimate ranges. This complicates the reliability of the estimates underwriting current policy debates.

The estimates of required investment fail to consider significant associated opportunity costs, thus threatening to shift scarce resources from high impact investments on greater disease burdens with considerable resultant negative health outcomes.

The estimates are significant and would constitute anywhere from 25% to 55% of current global ODA spend for health, representing a disproportionate investment for an unknown future disease burden. This defies traditional practices in public health, which would weigh any benefit of pandemic prevention against other disease burdens and health financing needs.

Recommendations

There is a clear need to commission better global and country level baseline and preparedness cost estimations to accurately determine the scale and potential trade-offs of the pandemic preparedness financing required.

An appropriate determination of financial need must weigh these costs against other priorities in global health as well as country level disease burden needs.

Understanding relative disease burden and economic impacts is crucial for identifying the cost-benefit and return on investment of pandemic financing as well as how to best select interventions that promote overall public health outcomes.

Given the poor evidence and inadequate analysis underlying pandemic cost and financing requirements, it is prudent not to rush into new pandemic initiatives until underlying assumptions and wider claims of a return on investment receive proper assessment based on robust evidence, recognized need and risk, and overall benefit.

WHO Member States should support proportional pandemic preparedness efforts based on substantiated investment need, careful deliberation, and rational reflection. This does not currently appear to be in place.

1. Background

1.1. Financing the pandemic agenda

Since the recognition of SARS-CoV-2 in early 2020, the theme of pandemics has dominated international public health. Multilateral bodies including the Group of 20 (G20), Group of 7 (G7), United Nations (UN), European Union (EU), and World Bank have emphasized the importance of rethinking pandemic preparedness, prevention, and response (PPPR). The World Health Organization (WHO), being the health arm of the United Nations, has been the primary focus for coordinated policy. Supporters are seeking, and already receiving, substantial funding from international official development assistance (ODA) budgets for PPPR, whilst domestic research agendas and spending are being similarly directed.

These evolving priorities are having a major impact on global health financing. Although COVID-19 era ODA budgets saw an increase in overall dispersals for health since 2019, 63.9% of that increase was for the COVID-19 response with a further one billion dollars disbursed for infectious disease control. Contemporaneously, ODA for basic health care fell from US$3.4 billion in 2019 to US$2.3 billion in 2020, a drop of 34.5%, while that for nutrition declined by 10.1%. Although ODA for basic health rose again in 2022, it has not recovered to 2019 funding levels. In contrast, ODA for COVID-19 and infectious disease control saw increases of US$1 billion and US$500 million respectively in 2022. There is evidence that national budgets are also reallocating existing resources to PPPR, potentially increasing vulnerabilities for universal health coverage (UHC) and threatening to reverse previous positive health outcomes (Brown et al., 2022).[1,2]

The World Health Assembly (WHA),[3] the governing body of WHO, currently plans to consider two significant PPPR instruments in its May 2024 meeting, in response to this widespread interest in reform. These instruments are intended to bring substantial changes to the management of future pandemics and threats of pandemics, as well as other health emergencies.

The first instrument is a set proposed amendments to the International Health Regulations (IHR) with the intent of strengthening the role of WHO in declaring and directing responses to public health emergencies of international concern (PHEIC).[4,5] The aim of strengthening the

[1] https://www.oecd.org/dac/financing-sustainable-development/ODA-2022-summary.pdf
[2] https://www.brookings.edu/articles/global-health-financing-after-covid-19-and-the-new-pandemic-fund/
[3] https://www.who.int/about/accountability/governance/world-health-assembly
[4] https://apps.who.int/gb/wgihr/pdf_files/wgihr1/WGIHR_Compilation-en.pdf
[5] https://apps.who.int/gb/wgihr/pdf_files/wgihr8/WGIHR8_Proposed_Bureau_text-en.pdf

IHRs is to address perceived failures experienced during COVID-19 related to cooperation, policy alignment, and compliance. As in the current IHRs, WHO will recommend that countries undertake various measures when WHO declares a pandemic (or other) emergency, including many of the features associated with 'lockdowns' in the COVID-19 response. An extensive International Pathogen Surveillance Network (IPSN) will be developed at the global level, with corresponding surveillance systems within countries and monitored by WHO, while countries will additionally be expected to support WHO in information management and messaging.[6]

A second instrument, a new Pandemic Agreement (sometimes referred to as the 'pandemic treaty') is, like the IHR, intended to have force under international law,[7,8,9] This Agreement seeks to establish a new governance body (Conference of Parties – COP) with an extensive mandate to develop new PPPR requirements and regulations, funding mechanisms, and implementation mechanisms to support WHO in preparedness activities and response when a PHEIC is declared.[10] WHO will be funded to manage the transfer of pathogen samples and countries will be expected to provide WHO with significant quantities of goods related to pandemic response, cost-free and at-cost when an emergency is declared.

There have been wide ranging estimates regarding the cost of PPPR and how these costs can be financed. For example, the G20 High Level Independent Panel (HLIP) recommends global and country level investments of US$171 billion over five years with an unspecified amount annually thereafter. The World Bank estimates that an additional US$10.3 to US$11.5 billion will be required to boost One Health as a preventative complement to PPPR. An influential report written by McKinsey and Company estimated PPPR to cost anywhere from US$85 to US$130 billion over two years, with annual costs thereafter of US$20 to US$50 billion. The HLIP did not include several PPPR related activities within its original estimate, such as antimicrobial resistance (AMR), health emergency system strengthening, and only partially included manufacturing medical countermeasures. If these costs are also included, then PPPR costs reach over a quarter of a trillion dollars over the first five years with further investments required to maintain PPPR capacities year-on-year.

As a result, the financial requirements to support current proposals for PPPR are high in terms of prior spending on ODA for health. Currently, the PPPR agenda has seemingly settled on estimates provided by a joint 2022 WHO and World Bank report to the G20 titled *"Analysis of Pandemic Preparedness and Response (PPR) architecture, financing needs, gaps and mechanisms."*[11] The report estimates the need for approximately US$31.5 billion in total

[6] https://www.who.int/initiatives/international-pathogen-surveillance-network
[7] https://www.who.int/news-room/questions-and-answers/item/pandemic-prevention--preparedness-and-response-accord
[8] https://www.whitehouse.gov/briefing-room/statements-releases/2022/11/16/g20-bali-leaders-declaration/
[9] https://www.consilium.europa.eu/media/66739/g20-new-delhi-leaders-declaration.pdf
[10] https://inb.who.int/
[11] https://thedocs.worldbank.org/en/doc/5760109c4db174ff90a8dfa7d025644a-0290032022/original/G20-Gaps-in-PPR-Financing-Mechanisms-WHO-and-WB-pdf.pdf

annual funding for PPPR, including US$26.4 billion in annual PPPR investments by low-and middle-income countries (LMICs) and US$4.7 billion required in new ODA funding to shore-up international efforts. These estimates assume that 25% of existing ODA already covers international PPPR efforts and further assumes that LMICs will only require US$7 billion in extra ODA to fill national budget shortfalls. Thus, the total estimated ODA requirement for PPPR would be US$3.5 billion + US$7billion = US$10.5 billion.[12,13]

WHO, in its IHR amendments and proposed Pandemic Agreement, envisions increased regular financial contributions and potentially a mechanism for acquiring further 'surge' resources on request during a PHEIC. The World Bank has already established the Pandemic Fund to make further funds available for surveillance, diagnostics and related human resources, while both the IPSN and the MCP are being developed. Compared with approximately US$3.8 billion in current annual funding to WHO, and US$3 billion in total estimated funding globally for malaria, US$10.5 billion in ODA for PPPR would constitute a major increase and redirection in international public health funding.

Much of the justification for increased spending on PPPR, and the urgency with which it is being pushed forward, is based on claims from WHO, the World Bank, G20 and others of an increasing frequency and risk of disease outbreaks and potential pandemics. Indeed, as the HLIP states:

> *"…countering the existential threat of deadly and costly pandemics must be the human security issue of our times. There is every likelihood that the next pandemic will come within a decade…"*

These claims are assessed in a previous REPPARE report, which demonstrated, based on the databases and citations on which these agencies base their claims, that the urgency and risk is greatly overstated.[14] The main GIDEON database on which much analysis relies shows a decline in outbreak frequency and outbreak-related mortality over the decade pre-COVID-19.[15,16,17] This calls into question the financial scope and basis of current PPPR efforts, raising concerns about effective and efficient resource utilization, the risks of resource shifting, as well as the opportunity costs associated with this level of investment in PPPR.

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[12] https://thedocs.worldbank.org/en/doc/018ab1c6b6d8305933661168af757737-0290032022/original/PPR-FIF-WB-White-Paper.pdf
[13] https://pandemic-financing.org/report/foreword/
[14] http://essl.leeds.ac.uk/downloads/download/228/rational-policy-over-panic
[15] https://www.gideononline.com/
[16] https://www.biorxiv.org/content/10.1101/2020.04.20.049866v2
[17] https://royalsocietypublishing.org/doi/10.1098/rstb.2020.0535

1.2. Costs and Benefits

Any public health intervention must involve a balance of risk versus benefit. If restricted to physical disease, this is somewhat simpler to assess. Local travel restrictions have potential benefits in slowing the spread of a pathogen, with immediate physical risks limited to, perhaps, inability to seek care for another ailment. However, they may have huge economic, mental, and social consequences related to an inability to work, obtain education, socialize with family and friends, or attend important life events such as graduations, weddings and funerals.

Given the importance of these social determinants the WHO defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."[18] There is no hierarchy of importance implied between these aspects of health. The WHO definition is important when considering responses to outbreaks of infectious disease. Manifestations of infectious disease are predominantly physical, though sickness and death have obvious mental and social consequences. However, any response also has direct social and potentially mental health consequences. Quarantine, travel restrictions, workplace closures and restrictions on social activities are obvious examples.

These costs can be quantified in financial terms and in health, but both are difficult and highly dependent on methods used, which in turn can rely on the values placed on various aspects by those performing the calculations involved. Finance and health are also related, including through direct costs of interventions, indirect costs from government fiscal injections, through restrictions on income generation due to illness, and through financial costs placed on disability and death.

While mental and social wellbeing are particularly hard to quantify, several well accepted methods are used to estimate relative physical burdens imposed by disease. The simplest of these are case numbers and death counts. The former is poor beyond a very rough measure of spread of a pathogen in a community. Obviously, severity and duration are critical to the economic and social impact of a disease, as is long-term disability versus rapid and complete recovery.

Mortality alone can also give only a poor measure of overall impact, as death of a young child will foreshorten life far more than death of an elderly person. If most death from a disease occurs in old age and in those with comorbidities expected to shorten life, such as with COVID-19, recorded deaths may be high but the impact on average life expectancy will be small. Most would likely have died due to age and/or comorbidities within a few years if COVID-19 had

[18] https://apps.who.int/gb/bd/PDF/bd47/EN/constitution-en.pdf?ua=1

not occurred. In contrast, most deaths from malaria occur at an age less than 5 years, with perhaps 70 years of life lost per child. The death of a middle-aged woman, such as from HIV/AIDS or cervical cancer, may also leave orphan children and a reduced family income, exposing them in turn to higher health risks. Again, these considerations increase the wider economic impact of any disease and have therefore been factored into policies.

For example, to address discrepancies in age, measures involving life-years lost are commonly used.[19] Though not widely used for COVID-19, these are standard metrics used by WHO and other agencies are as relevant to outbreaks and pandemics as they are to endemic and non-communicable disease. Disability-adjusted life years (DALYs) combine life-years lost with measures of impact of illness (years of disability or lost healthy life years) on daily life, while quality-adjusted life years (QALYs) combine life-years gained by an intervention and the quality of life (lack of disability) during those years.[20,21]

Appropriate metrics of disease burden are vital to balancing costs and returns in investment in health policy, and of particular importance when broad-scale and high-cost interventions are being considered as in the case of PPPR. Besides considering direct costs, opportunity costs can arise from the reduction of resources available to address an alternate disease or health issue (*physical, mental and/or social*), or from economic costs that hinder the ability to reduce disease burdens more generally. Such economic costs will be most acute in lower income countries, where readily avoidable disease burdens tend to be higher.[22] Including such considerations in policy development is fundamental to good public health practice.

[19] https://www.who.int/data/gho/indicator-metadata-registry/imr-details/159
[20] https://www.who.int/data/gho/indicator-metadata-registry/imr-details/158
[21] https://onlinelibrary.wiley.com/doi/full/10.1111/j.1524-4733.2009.00515.x
[22] https://www.bis.org/publ/work910.htm

1.3. The imperative of reliable estimates

The opportunity costs of diverting US$10.5 billion to fill PPPR financing shortfalls while reallocating considerable resources from other national and regional health, economic or other priorities are likely to be significant. These sums are far larger than expenditure on other high-burden infectious diseases such as malaria[17] and tuberculosis,[18] and may divert further funding from such diseases to achieve PPPR priorities. For example, in 2017 the combined LMIC national spending on high burden diseases such as HIV/AIDS and malaria equalled US$25.3 billion,[19] just above the amount being asked from LMICs for more targeted efforts of PPPR. Moreover, in 2019 the total amount of ODA on PPPR was US$374 million,[20] whereas the current ODA financial ask looks to be 28 times that amount. Investment in nutrition and sanitation are also important health alternatives, particularly given the spin-offs in this case, which include improving population resilience to viral outbreaks as well as having broad positive benefits in reducing the burden of other diseases and improving economic health (and accordingly future healthcare).

It is therefore vital that cost estimates for PPPR are accurate and reliable, to provide adequate evidence to support the resource diversions that the PPPR agenda is proposing. In terms of public policy, particularly in health, the use of evidence-based policy is meant to be the gold standard, where policy decisions should be substantiated by rigorously established objective evidence and not based merely on ideology, dogma, common belief or loose guestimates. A goal of evidence-based policy is that it enables appropriate allocation of resources among competing health and economic priorities. In the case of PPPR, global health resources are already scarce and stretched. Thus, there is little doubt that decisions about how to finance pandemic preparedness will have significant implications for global and local economies, health systems, and wellbeing.

The REPPARE project is investigating the relative disease burden of outbreaks and competing disease priorities in a separate series of reports. This current report investigates the cost estimates and financing mechanisms underwriting the current PPPR agenda. By doing so, the report seeks to better determine to what degree the costs associated PPPR are substantiated and appropriate within wider global health financing.

2. Methodology

This report has four research aims:

To locate and outline the major cost estimates and financing considerations associated with the main policy documents involved with the Pandemic Prevention, Preparedness and Response policy agenda (PPPR).

To identify the evidence base used within these policy documents to support PPPR cost / gap analysis, particularly when used to justify financial needs.

To analyse the robustness of this evidence base and arguments used to justify PPPR cost / gap analysis, return on investment, and cost effectiveness.

To determine to what degree this evidence and cost justification support current PPPR assumptions and policy.

1) Key policy documents were identified through a series of online searches. These included: A) General searches of key intergovernmental organizations using combinations of search terms that included “PPPR cost estimates”, “needs / gap analysis”, “pandemic financing”, “pandemic investments”, “return on investment”, and “PPPR costing”; B) General searches of major institutional websites of the G7, G20, World Bank, World Health Organization and the United Nations; C) General Google searches and alert requests to help identify wider policy discussions, media foci, and institutional references associated with pandemic preparedness financing. The key selection criteria for inclusion of policy documents / reports in the analysis were that they: A) Explicitly gave pandemic costs and financing endorsements in support of policy recommendations; B) Were published after Covid-19, and; C) Were widely cited within the PPPR policy discourse.

2) This report analyzed the data and evidentiary material cited within 4 key G20 (n=1), joint World Bank and WHO (n=1), and WHO Secretariat (n=2) documents / reports used to support current policy assumptions about PPPR costs and financing requirements. These documents were selected because they represent the major post-Covid-19 PPPR policy initiatives where pandemic costs and funding gaps are explicitly reassessed in response to the emergence of SARs-CoV-2 as well as designed to explicitly provide evidentiary material for wider PPPR initiatives such as the Pandemic Agreement, the revised IHR, the Pandemic Fund, the IPSN, and the MCP. The policy documents and reports examined include:

- A Global Deal for a Pandemic Age: Report of the G20 High Level Independent Panel on Financing the Global Commons for Pandemic Preparedness and Response (June 2021).
- Analysis of Pandemic Preparedness and Response (PPR) Architecture, Financing Needs, Gaps and Mechanisms. World Health Organization and World Bank. *Prepared for the G20 Joint Finance & Health Task Force* (March 2022).
- WHO Secretariat *Health Emergency Preparedness and Response Financing Landscape Analysis. Prepared for the International Negotiating Body and International Health Regulation* Working Groups (November, 2023).
- WHO Secretariat Health Emergency Preparedness & Response Financing Mechanism Options. Prepared *for the International Negotiating Body and International Health Regulation* Working Groups (December, 2023).

The study included analysis of the main citation (n=1) directly referenced in the three policy documents for evidentiary support:

- Not the last pandemic: Investing now to reimagine public-health systems. McKinsey & Company (May 2021 and 2nd release 2022).

Additional third-level academic and non-academic references (n=10) found as secondary citations were also considered as part of the overall analysis in this report:

- Lorcan Clarke, Edith Patouillard, Andrew J. Mirelman, Zheng Jie Marc Ho, Tessa Tan-Torres Edejer, Nirmal Kandel. The costs of improving health emergency preparedness: A systematic review and analysis of multi-country studies, eClinicalMedicine, Volume 44 (2022): https://doi.org/10.1016/j.eclinm.2021.101269.
- Bernstein AS, Ando AW, Loch-Temzelides T, Vale MM, Li BV, Li H, Busch J, Chapman CA, Kinnaird M, Nowak K, Castro MC, Zambrana-Torrelio C, Ahumada JA, Xiao L, Roehrdanz P, Kaufman L, Hannah L, Daszak P, Pimm SL, Dobson AP. The costs and benefits of primary prevention of zoonotic pandemics. Sci Adv. 2022 Feb 4;8(5):eabl4183. https://doi.org/10.1126/sciadv.abl4183. Epub (2022) Feb 4. PMID: 35119921; PMCID: PMC8816336.
- Eaneff S, Boyce MR, Graeden E*, et al.* Financing global health security: estimating the costs of pandemic preparedness in Global Fund eligible countries. *BMJ Global Health (*2023);8**:**e008960.
- World Bank. Pandemic Preparedness Financing Status Update. 2019.
- Dobson AP, Pimm SL, Hannah L, Kaufman L, Ahumada JA, Ando AW, Bernstein A, Busch J, Daszak P, Engelmann J, Kinnaird MF, Li BV, Loch-Temzelides T, Lovejoy T, Nowak K, Roehrdanz PR, Vale MM. Ecology and economics for pandemic prevention. Science. (2020) Jul 24;369(6502):379-381. https://doi.org/10.1126/science.abc3189. PMID: 32703868.

- COVID-19: Let's Make it the Last Pandemic. Independent Panel for Pandemic Preparedness and Response (2021).
- Global Investments in Pandemic Preparedness and COVID-19: Development Assistance and Domestic Spending on Health Between 1990 and 2026. Institute for Health Metrics and Evaluation (2023).
- Indonesia Health Security Financing Assessment. World Bank (2022).
- Putting Pandemics Behind Us: Investing in One Health to Reduce Risks of Emerging Infectious Diseases. World Bank (2022).
- Crushing coronavirus uncertainty: The big 'unlock' for our economies. McKinsey and Company (2020)

The policy documents and articles were read by members of REPPARE (DB, JVA & GWB). Analysis of the documents proceeded in four stages: A) Identification and categorization of documented pandemic cost / gap assumptions, assessment and associated policy response; B) Exegesis of stated costs; C) Identification and mapping of cited evidence base, and; D) Descriptive analysis of reported cost justification and return on investment.

3) Analysis of the evidence base focused on determining: A) Level of evidence used; B) Main conclusions and recommendations; C) Research methodologies; D) Overall coherency of argument / approach. Critical analysis of the evidence base further focused on determining: A) Any misrepresentations of cited evidence; B) Methodological errors or shortcomings; C) Faulty research assumptions; D) Limitations and methodological confounders, and; E) Reliability of data.

4) Each policy document and its supporting evidentiary material was then analyzed individually to determine to what degree the evidence supports current PPPR financial asks and recommended policy. To make this determination, the evidence was first judged on its own merits in terms of whether it represents a robust cost assessment / return on investment, whether there is appropriate research coherency, as well as the overall convincingness of its conclusion. In case of the latter, this included weighing the evidentiary material against existing counter-evidence and public health data as well as reassessing the cost of PPPR against wider global health contexts and burdens.

3. World Health Organization Evidence base for Pandemic Prevention, Preparedness and Response

3.1. WHO Presentation to the INB and IHR Working Groups on Financing Pandemic Prevention, Preparedness and Response

In December 2021, at its second-ever special session, "the World Health Assembly (WHA) established an intergovernmental negotiating body (INB) to draft and negotiate a convention, agreement or other international instrument under the Constitution of the World Health Organization to strengthen pandemic prevention, preparedness and response".[23] The INB process first undertook negotiations centred on creating a Pandemic Treaty, which over the course of subsequent meetings was relabelled as the Pandemic Accord and then, from November 2023, the Pandemic Agreement. Although there are technical differences between conventions, framework agreements and treaties, they are all legal agreements made between countries that are binding.[24] The current draft of the Pandemic Agreement, as well as proposed amendments to the International Health Regulations (IHR), are under negotiation with final votes scheduled for the WHA in late May 2024, where the 194 WHA members will vote on the Agreement, with the additional two non-member particles to the IHR (Liechtenstein and the Holy See) also voting on the IHR amendments. The Agreement and IHR amendments are intended to be "compatible and mutually reinforcing".[25]

During the WHA in December 2021, Member States of the World Health Organization (WHO) requested that WHO convene the meetings of the INB and act as its Secretariat. This role includes facilitating the participation of other United Nations system bodies, non-state actors and other relevant stakeholders in the process to the extent decided by the 194 Member States forming part of the negotiations. As the WHO states:

> *"The WHO Secretariat's job is to support countries – its Member States – as they negotiate and agree on the new international accord. The WHO Secretariat does not determine the contents of any possible international accord".*[26]

[23] https://inb.who.int/home
[24] https://www.who.int/news-room/questions-and-answers/item/pandemic-prevention--preparedness-and-response-accord
[25] https://apps.who.int/gb/inb/pdf_files/inb9/A_inb9_3Rev1-en.pdf
[26] https://www.who.int/news-room/questions-and-answers/item/pandemic-prevention--preparedness-and-response-accord

Although the role of the WHO Secretariat is not to determine the final content of the Pandemic Agreement (that is for Member States), it does nevertheless play an instrumental role as the secretariat in determining what is discussed within the INB, by providing technical assistance to determine the scope of PPPR policy and corresponding programmes, as well as the dissemination of evidence to inform and support the INB and wider PPPR agenda. Moreover, WHO exercises the INB's main source of "convening power" with the responsibility to draft iterations of the Agreement as the INB progresses. As a result, WHO has considerable influence on how the INB functions, the information formally provided to Member States and other stakeholders for negotiation, and the degree to which external consultations are formally included.

At the Fifth meeting of the INB in April 2023, a series of intersessional subcommittees were created to informally discuss key Articles within the INB draft. This use of intersessional subcommittees was expanded in July 2023 and again in September 2023 to facilitate additional discussion on contentious issues. One such subcommittee was created for Article 19 and 20 of the Pandemic Agreement on PPPR financing, co-facilitated by Brazil (chair), Canada, South Africa and Malaysia (co-facilitators).

On 29th November 2023, the WHO Secretariat submitted a PowerPoint presentation titled *Health Emergency Preparedness and Response Financing Landscape Analysis* to the INB and IHR Working Groups following a request for "technical input". The slide deck is comprised of twenty-one slides that outline the scope of PPPR financing requirements, a needs and gap analysis, and mapping of existing financial flows.

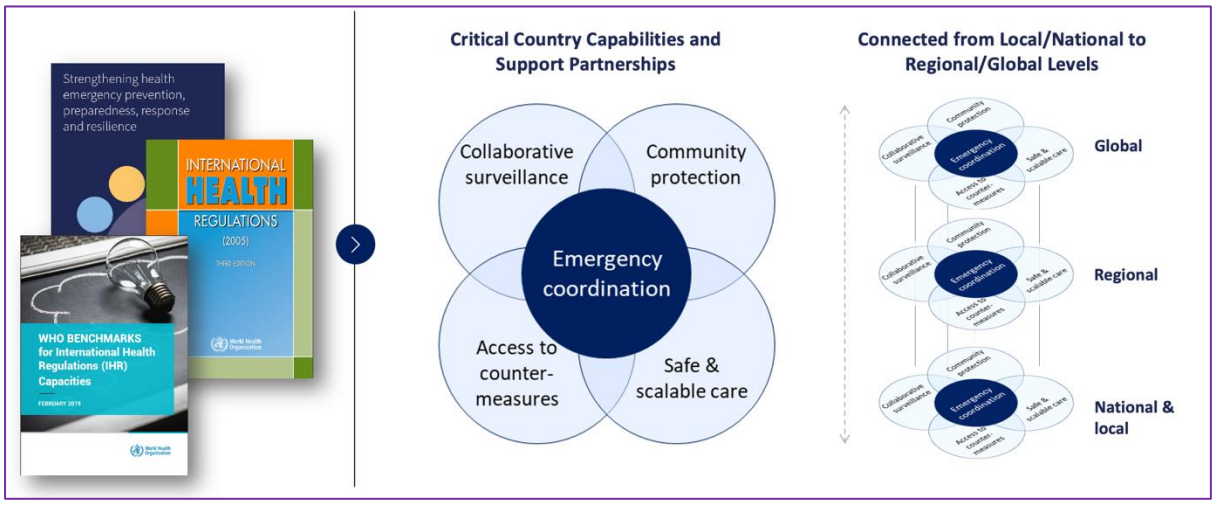
This presentation remains the primary reference for PPPR cost estimates and financial requirements within the INB and IHR process. It is also the key PPPR cost reference for Member States. These estimates have been adopted by the Group of Twenty (G20) and Group of Seven (G7) nations, the World Bank's Pandemic Fund, as well as the new International Pathogen Surveillance Network and the new WHO Medical Countermeasures Platform. They are also the estimates most widely referenced in other policy and academic debates.[27]

Though not explicitly acknowledged as its primary source, the WHO slide deck is largely based on the 2022 WHO and World Bank report for the G20 titled "*Analysis of Pandemic Preparedness and Response (PPR) architecture, financing needs, gaps and mechanisms."*[28] The overlap between the slide deck and the 2022 report is obvious, with exact usage of the headline estimates and graphics. In addition, an enquiry by REPPARE to WHO confirmed that the presentation slide deck was based primarily on the 2022 WHO and World Bank report.

[27] https://doi.org/10.1186/s12992-023-00999-6
[28] https://thedocs.worldbank.org/en/doc/5760109c4db174ff90a8dfa7d025644a-0290032022/original/G20-Gaps-in-PPR-Financing-Mechanisms-WHO-and-WB-pdf.pdf

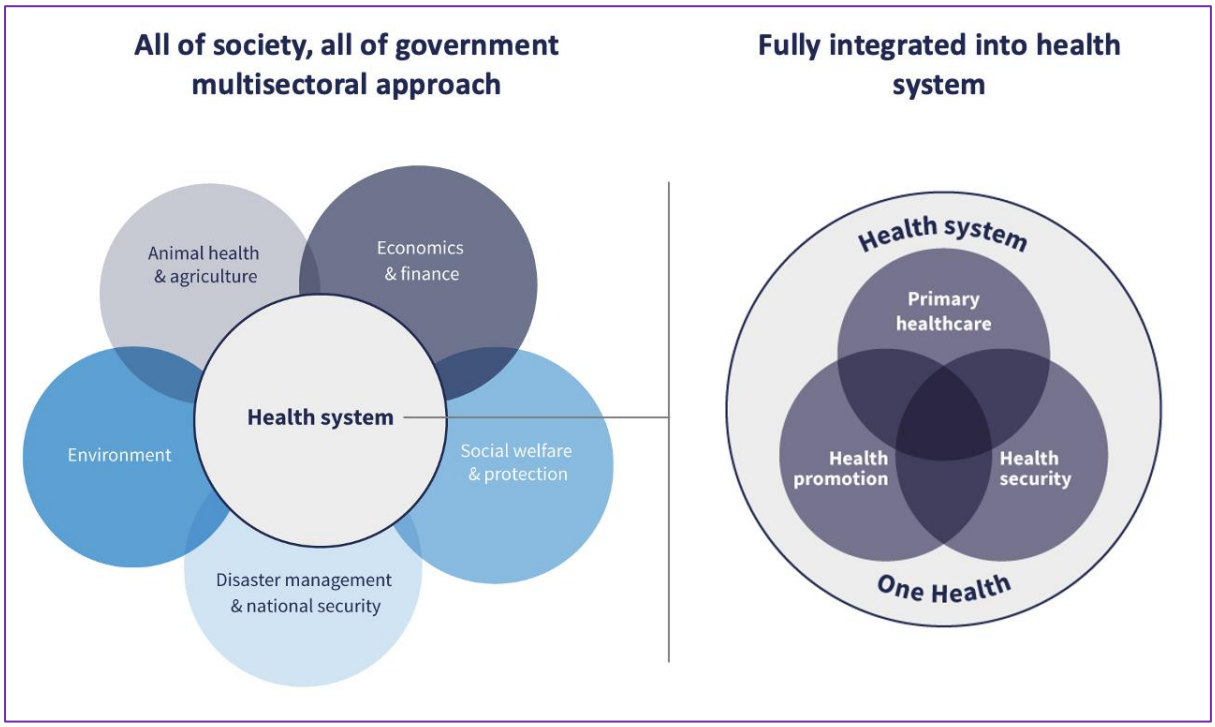
Consistent with the 2022 report, the WHO presentation states that the cost estimates and financing requirements within the slide deck cover five "critical capacities and support partnerships", which are derived from three related policy frameworks, and which apply at global, regional and local levels. A graphic to explain these capacity areas was included in the presentation (Figure 1):

Figure 1. Health Emergency Financing: Requires investments in core capabilities across a broad range of areas and institutions at local, national, regional and global level. Source: WHO Slide deck, p. 5.



Moreover, the cost estimates are stated to reflect an "all of society, all of government, multisectoral approach" as well as the full integration of PPPR capacities into "health systems" based on a One Health approach (Figure 2).

Figure 2. Health Emergency Financing: Requires investments across all sectors & fully integrated within health sector strategies and plans. Source: WHO slide deck, p. 4.



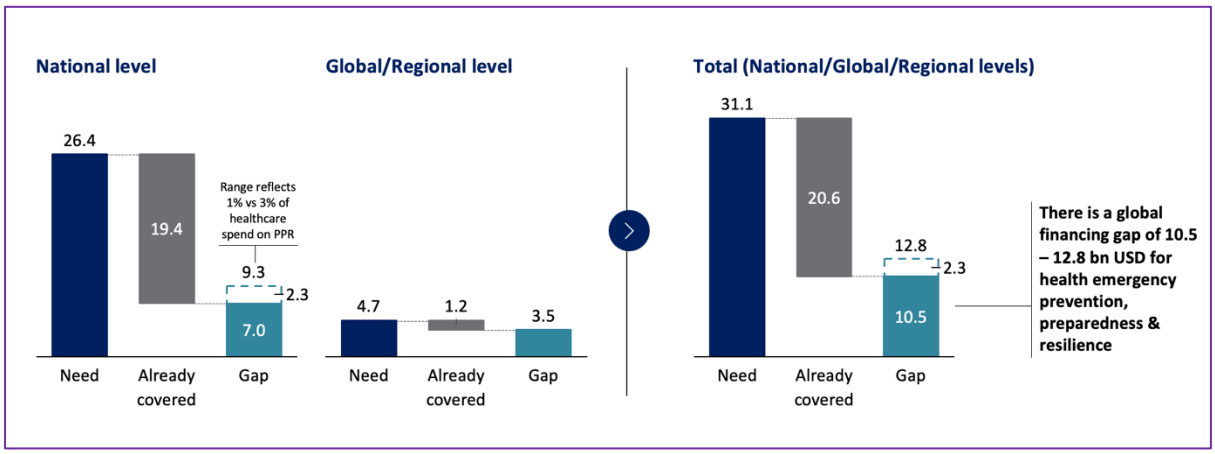
It is important to note that the presentation provides some different information to that presented in the 2022 report (as detailed in Section 4), in that Figure 2 suggests the inclusion of One Health within their cost calculation, whereas the 2022 report specifically excluded several One Health capacities since it prioritized certain capacities. Of note, a subsequent World Bank 2022 report *Putting Pandemics Behind Us* costed additional One Health measures on the basis that they were excluded from the joint WHO and World Bank estimates.[29] Moreover, the above presentation includes a footnote declaring that the estimates given for PPPR (Figure 3) were also derived from data provided from CEPI, FIND, Gavi, The Global Fund, UNICEF as well as its own 2022 WHO and World Bank report. However, the incorporation of data from these sources was not mentioned in the 2022 report, nor is it part of the report's methodology. Thus, it remains unclear what data was used from these additional organizations or how that data was synthesized within the slide deck presentation. Consequently, the information related in the slide deck to the INB and IHR Working Groups does not fully correspond to that contained in the report, although the final PPPR cost estimates are identical. On enquiry from REPPARE, WHO did not provide more detailed methodology. The absence of transparent methodology and the apparent convergence of

[29] https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099530010212241754/p17840200ca7ff098091b7014001a08952e

results despite differing inputs risks an impression that different working groups were working to justify pre-determined outcomes.

In line with the 2022 WHO and World Bank report, the WHO presentation to the Working Groups estimates the financial requirements to support PPPR to be approximately US$31.1 billion in total annual funding, including US$26.4 billion in annual PPPR investments by low- and middle-income countries (LMICs) and US$4.7 billion required in new Overseas Development Assistance (ODA) to fund additional international efforts. Based on the 2022 WHO and World Bank report, these estimates assume that 25% of international PPPR need is covered by existing ODA and that LMICs will only require US$7 billion in extra ODA to fill national budget shortfalls. Thus, the total estimated ODA requirement for PPPR is calculated as US$3.5 billion + US$7billion = US$10.5 billion (Figure 3).

Figure 3. World Bank & WHO analysis estimates financing gaps at both a national and global/regional level, with a total gap of 10.5bn USD. Source: WHO slide deck, p. 7.



As part of these estimates the WHO assumes that low-income countries (LICs) should be supported via ODA at 100% of their needs, while lower-middle-income countries would be supported up to 60% and upper-middle-income countries up to 20%. A footnote in the presentation justifies these assumptions as being "consistent" with the Financing Framework of the ACT-Accelerator, which was endorsed by Facilitation Council Financial Working Group (including representatives of Canada, France, Germany, Indonesia, Italy, Norway, South Africa, UK, USA). This corresponds to the assumptions used in the 2022 WHO and World Bank report.

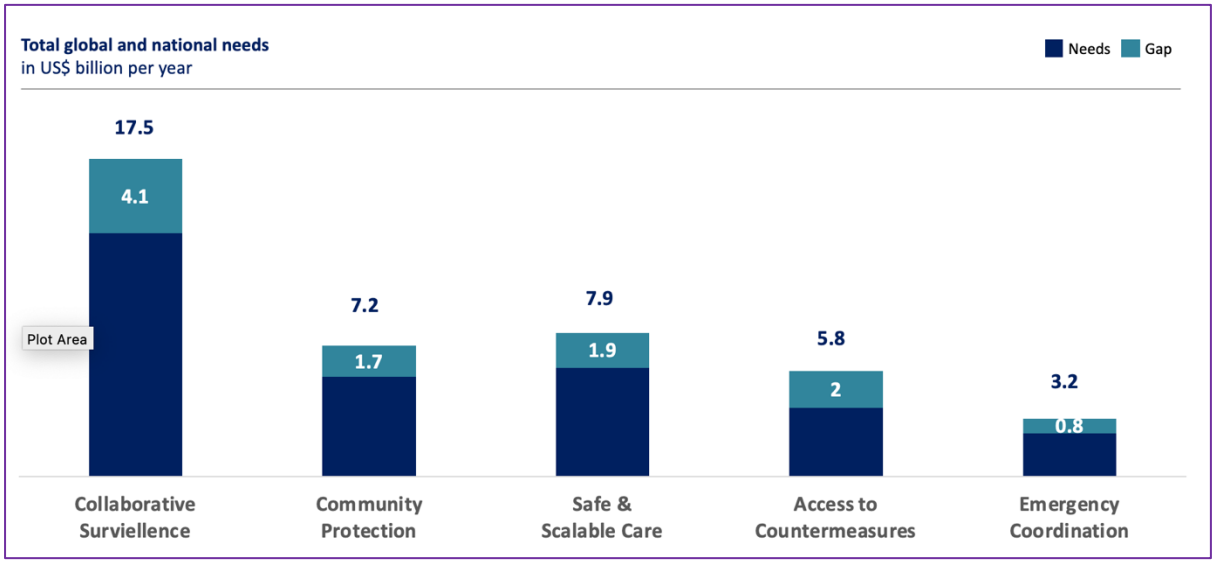
Figure 3 identifies an additional assumption that 3% of existing national health budgets are spent on PPPR activities yet also provides an estimate if a national spend assumption of 1% is used (perforated line). For the international gap, the WHO signals that the US$10.5 billion gap would be higher if broader health emergency and resilience shortfalls were to be included (perforated line).

As will be discussed in more detail when examining the 2022 WHO and World Bank report (Section 4), there are significant methodological limitations associated with how these assumptions were derived and their corresponding reliability. What is important here, however, is to merely note that estimating national and international level gaps is challenged by poor and incomplete data as well as inconsistent reporting mechanisms. For example, slide 18 of the WHO presentation slide deck conditions its estimates by stating that domestic spending on health emergency preparedness is "not routinely tracked", nor "is there a baseline of current spending levels". The report suggests that efforts to obtain reliable estimates are "confounded by the many definitions of preparedness and by the absence of associated budget lines in government accounting systems". Of the data that does exist, WHO states that the estimates were survey-based and thus "time consuming and costly to repeat".

This suggests that there is a need for more accurate and reliable cost estimates which, depending on the actual data, could significantly alter results. A more robust evidence base would include a more nuanced evaluation of country level investment in relation to contextual need, rather than generalized assumptions where countries are assumed to have relatively the same existing PPPR investments as well as financing gap needs.

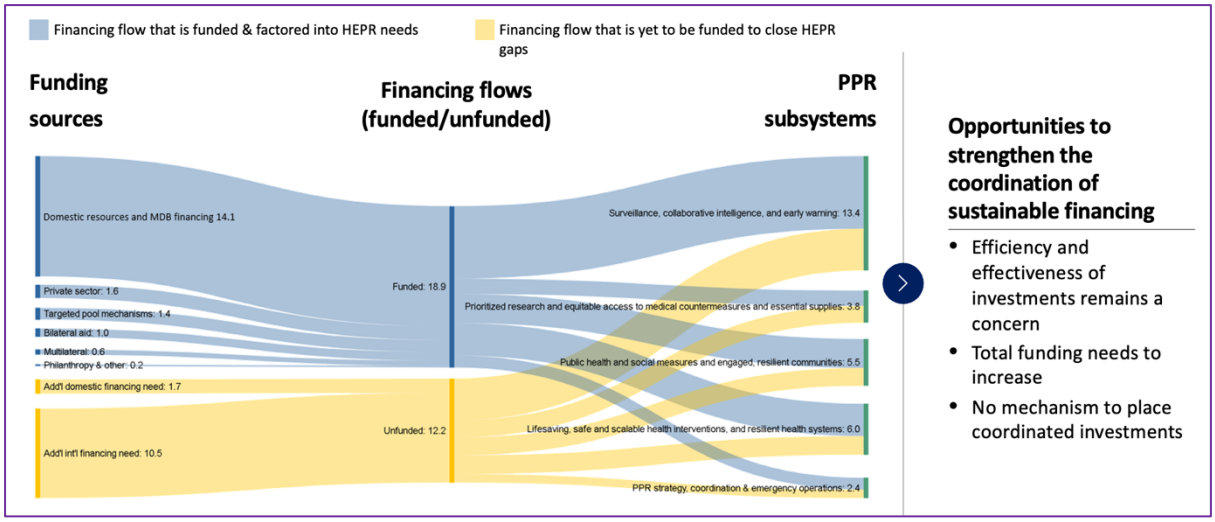
In terms of where these costs accrue, the WHO provides a graphic identifying specific gaps across the five capacities for PPPR (Figure 4).

Figure 4. Financing needs and gaps spread across all core capabilities. Source: WHO slide deck, p. 8.



Lastly, the WHO presentation argues that fragmentation is undermining international efforts for PPPR and that financial flows at this level are both insufficient and misaligned (Figure 5).

Figure 5. Existing financing mechanisms and flows follow different processes, fund different projects, and finance different components of the core capabilities. Source: WHO slide deck, p. 12.



The above graphic is notable for three reasons. First, the unfunded gap is estimated here as US$12.2 billion, which includes a new amount of US$1.7 billion for LMICs to "finance their share", which has been added to the US$10.5 billion required at the international level. This suggests that low income and lower middle income country capacity to absorb PPPR costs reduces to US$18.9 billion with international estimates rising to meet this shortfall (US$18.9 + US$12.2 = US$31.1 billion per year). This disparity has ranging implications, since US$1.7 billion is over a half-billion more than the amount of ODA spent on tuberculosis in 2023 (US$1.1 billion).[30] Small recalculations are therefore not benign, since they could represent PPPR mission creep increasing opportunity costs. Second, the new US$12.2 estimate given in Figure 5 does not correspond with Figure 3, where US$12.8 billion was shown as a hypothetical upper limit of the overall international funding gap. This disparity between slides is not explained by WHO. Yet, it does suggest that the estimates are meant to be approximate along a flexible range and that headline messages are being, to some extent, managed to reduce their negative impact (i.e. US$10.5 is easier to digest that US$12.8). Third, the right side of the graphic provides a clear steer from the WHO on what should be done to address the gap. Namely, there needs to be a significant increase in current PPPR funding and that this requires a new mechanism to better coordinate and align that funding (see Section 4.6) below for a more detailed discussion of current INB negotiations).

As detailed above, these financial and governance assumptions provided by the WHO Secretariat are guiding the negotiations within the INB and IHR working groups. They also inform general debates about PPPR globally. However, these assumptions and

[30] https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2023

recommendations are not inconsequential in terms of global health financing and represent significant opportunity costs and the potential for resources to be redirected away from diseases of greater burden. This concern manifests when compared to current trends in funding tuberculosis, where donor funding (US$1.1 billion) and domestic spend in LMICs reduced (for a total spend including ODA at US$5.8 billion a year).[31]

In addition, in 2022, global health received US$39.3 billion in ODA from governments and multilateral agencies.[32] This number had significantly increased from pre-pandemic ODA levels, although the increase is largely explained by increases in funding for COVID-19 which make up a fifth of total health ODA. Assuming that ODA for health remains constant at US US$39 billion, then US$10.5 billion would equate to over a quarter of all health-related ODA. If post-covid ODA for health returned to pre-COVID levels (approx. US$22 billion in 2018), then PPPR would constitute over half of all ODA global health spending.

[31] https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2023
[32] https://devinit.org/resources/aid-2022-key-facts-official-development-assistance-oda-aid/#:~:text=In%202022%2C%20DAC%2Dmember%20governments,and%20an%20all%2Dtime%20high

4. WHO and World Bank Report: Analysis of Pandemic Preparedness and Response (PPR) architecture, financing needs, gaps and mechanisms (2022)

4.1. The rising costs of pandemics

The 2022 WHO and World Bank report, "*Analysis of Pandemic Preparedness and Response (PPR) architecture, financing needs, gaps and mechanisms"* was produced at the request of the G20 Finance and Health Task Force ahead of the Bali G20 Leaders' Summit in November 2022. The report's remit was "to identify financing needs and gaps for Pandemic Preparedness and Response" and in turn outlines domestic, regional, and global cost estimates for PPPR together with available financing mechanisms and options. The report was based on an earlier 2020 report titled *"Assessment of Gaps in Pandemic Preparedness"* produced by the WHO and World Bank. In response to a request by REPPARE to obtain the 2020 report, WHO confirmed that the earlier report was a "work-in-progress" and was "replaced" in March 2022 by the 2022 report "*Analysis of Pandemic Preparedness and Response (PPR) architecture, financing needs, gaps and mechanisms"* and that it was this latter report that was presented to the G20 in Indonesia. In that same response WHO noted that the 2020 report is no longer publicly available.

The 2022 WHO and World Bank report estimated its costs based on five sub-systems that operate at national, regional and global levels:

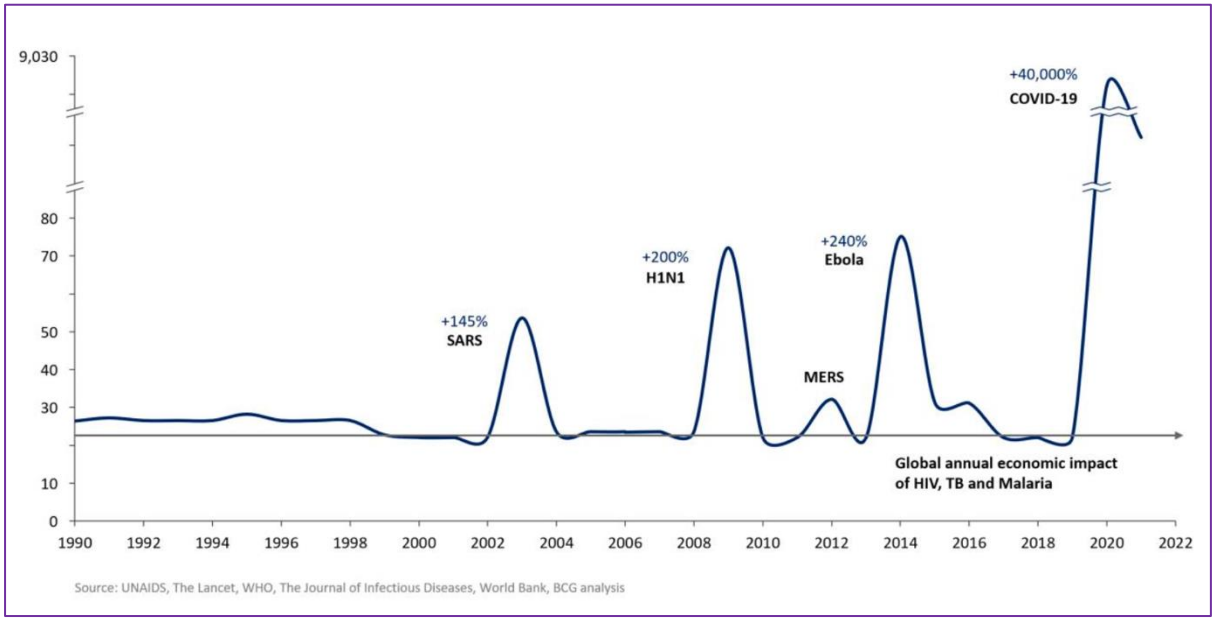
- Surveillance, collaborative intelligence, and early warning.
- Prioritized research and equitable access to countermeasures and essential supplies.
- Public health and social measures and engaged, resilient communities.
- Lifesaving, safe and scalable health interventions, and resilient health systems.
- PPR strategy, coordination, and emergency operations.

Financial requirements to support these five PPPR subsystems are estimated at US$31.1 billion annually, including US$26.4 billion in annual PPPR investments by low-and middle-income countries (LMICs) and US$4.7 billion required in ODA to fund additional international efforts. These estimates assume that 25% of ODA needs for international PPPR efforts are already covered by existing investments, leaving a financing gap of US$3.5 billion. It further assumes that LMICs will only require US$7 billion in extra ODA to fill national budget

shortfalls. Thus, the total estimated additional ODA requirement for PPPR is calculated as US$3.5 billion + US$7 billion = US$10.5 billion.

To justify this financial need the first section of the 2022 report begins with a graphic to argue the cost effectiveness associated with PPPR (Figure 6).

Figure 6. Economic impact of selected outbreaks over past 30 years (in US$billion). Source: WHO and World Bank report 2022.



As a visual this graph is striking. It suggests that the economic impact of the five listed outbreaks are magnitudes higher than the combined economic impact of HIV, tuberculosis, and malaria (which they estimate at an average of US$22 billion a year for the last 32 years). Moreover, the report argues an upward trajectory in terms of outbreak impacts over this period, which the report argues demonstrates that "the costs of the next pandemic are likely to exceed those of COVID-19" given that each outbreak has had greater impact than the last (WHO World Bank report, p. 4).

However, there are several problematic elements that render the graphic unconvincing. First, the report provides no methodology on how economic impact has been determined. What is provided in the report is a brief note that the data is based on "UNAIDS, The Lancet, WHO, The Journal of Infectious Diseases, World Bank and BCG analysis." Typical analysis of the economic effects of epidemics generally examines the economic costs deriving from disease-associated medical costs or forgone incomes as a result of the disease-related morbidity and mortality.

Global level analysis can also be expanded to include national or global measures of estimated lost economic output or gross domestic product (GDP) as well as the inclusion of fiscal costs incurred in response to an epidemic, such as government loans, guarantees, and

capital injections (the latter is often involved with economic analysis of COVID-19). More recently G-Cubed models have also been employed to factor wider and intersectional impacts associated with epidemics. Yet, given the evidence sources referred to within the report, G-Cubed methodologies are unlikely to have been used consistently by the listed evidentiary sources across the five diseases.

Without specification it is not possible to know whether the five diseases presented were appropriately compared using the same methodology or modes of analysis and whether wider factors of impact were incorporated in some or all cases. Given the high economic impact associated with COVID-19 in Figure 6, a reasonable assumption is that some measure of lost GDP and indirect impacts (stimulus packages to counter economic recession) were included. However, as will be outlined below, including these impacts is not unproblematic and can result in disproportionately high economic impact that may not be heuristically analogous with other diseases. Lastly, if traditional economic impact measures were used, then Figure 6 does not reflect the wider literature regarding the limited impacts of several of the diseases presented.

For example, in the case of SARS the disease did not present high private and nonprivate medical costs. Moreover, SARS cases were small in comparison to other major historical epidemics. Unlike HIV/AIDS, the duration of hospitalization of the infected patients is short, with more than 90 percent of the patients recovering in a relatively short period, thereby rendering the medical costs comparatively low. The SARS-related demographic or human capital consequences have been estimated to be insignificant. The fatality rate of the SARS coronavirus is high, but, with fewer than 800 deaths from SARS worldwide, the death toll is small compared with the 3 million who died of AIDS in 2003 (the SARS peak on Figure 6). Therefore, forgone incomes associated with morbidity and mortality from SARS must also be comparatively insignificant.[33]

Second, and relatedly, the estimated total annual economic impact of HIV, tuberculosis and malaria of approximately US$22 billion per year in Figure 6 is inconsistent with (far lower than) many other sources. For example, a study published in The Lancet estimated that the 1.4 million deaths from tuberculosis in 2018 resulted in US$580 billion in full income losses.[34] A KPMG report further estimates that during the period of 2000-2014, tuberculosis-related mortality caused US$616 billion in lost economic output.[35] A Lancet study on HIV argued that between 2000 and 2015, US$562.6 billion was spent on HIV/AIDS worldwide, which would equate to US$37.5 billion per year for HIV alone.[36]

[33] https://www.ncbi.nlm.nih.gov/books/NBK92473/
[34] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8415897/
[35] https://docs.wixstatic.com/ugd/309c93_bf9baa1398334a8aa1ff19cb083b129e.pdf?index=true
[36] https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)30698-6/fulltextfinds

These gaps raise important questions about the methodology used to calculate the economic impacts of the five outbreak diseases as well as HIV, tuberculosis, and malaria. This information is crucial when reflecting on PPPR policy, since various methods can produce wildly different outcomes, raising concerns about the reliability of the comparative baselines used in Figure 6. As just one illustration, a 2022 systematic review of the economic burden of malaria concluded that "there is no systematization of cost components of malaria and no comprehensive and comparable quantification of the economic burden of the disease to society and governments." This is because "studies vary by the type of cost components included, the estimation method, and the regional level of analysis."[37]

Third, Figure 6 estimates economic impacts, but does not include relative disease burden in terms of mortality, which in the case of three of the five outbreaks (SARS, MERS and West African Ebola outbreak), totals to less than 13,000 deaths,[38] while the H1N1 influenza outbreak had a far lower mortality than that expected from normal seasonal influenza (164,000 deaths; see Table 1 below, for an illustration of the relatively small impact of these and other outbreaks).[39] When compared to conservative estimates for HIV (over 600,000 per year),[40] tuberculosis (1.3 million per year),[41] and malaria (over 600,000 per year)[42] In view of trajectories of these diseases from 1990 to 2022, the combined number of deaths will be over 100 million with all three impacting children and, in the case of tuberculosis and HIV/AIDS, working-age adults. The long-term costs of supporting treatment for tuberculosis and HIV/AIDS case management, over far longer periods than the acute diseases presented in Figure 6, must also be taken into account.

Table 1. Assumptions and sources for analysis of mortality due to outbreaks listed in Annex D of the G20 HLIP Report. Source: Bell et al. (2024), Rational Policy Over Panic. Re-evaluating Pandemic Risk within the Global Pandemic Prevention, Preparedness and Response Agenda, REPPARE Report, University of Leeds, pp. 114-115.

Outbreak (HLIP Annex D)	Mortality	Notes	Source for mortality estimate
2019 SARS-CoV-2	…	Discussed separately in a previous REPPARE report, pp. 48-49.	
2018 Lassa	114	Nigeria	https://www.who.int/emergencies/disease-outbreak-news/item/20-april-2018-lassa-fever-nigeria-en

[37] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9533489/
[38] https://essl.leeds.ac.uk/downloads/download/228/rational-policy-over-panic
[39] https://apps.who.int/iris/bitstream/handle/10665/329438/9789241516839-eng.pdf?ua=1
[40] https://www.unaids.org/en/resources/fact-sheet
[41] https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2023
[42] https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2022

2017 Zika	362	Assumed to be 2016-2017 outbreak.	https://www.nejm.org/doi/pdf/10.1056/NEJMoa2101195
2017 Ebola	3	DRC	https://www.cdc.gov/vhf/ebola/outbreaks/drc/2017-may.html
(2018 Ebola)	33	DRC (Bikoro)	https://www.cdc.gov/vhf/ebola/outbreaks/drc/2018-may.html
(2018-2020)	2287	DRC (n Kivu, Ituri, S Kivu).	https://www.who.int/emergencies/disease-outbreak-news/item/2020-DON284
2014 Chikungunya	0	Location of 2014 outbreak unclear. Mortality is low, but may occur among the elderly.	
2014 Ebola	11,325	West Africa outbreak.	https://www.who.int/emergencies/situations/ebola-outbreak-2014-2016-West-Africa
2012 MERS	858	Global	https://www.who.int/health-topics/middle-east-respiratory-syndrome-coronavirus-mers#tab=tab_1
2010 Cholera	9,792	Haiti (2010-2019)	https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON415
2009 H1N1 Influenza	164,000	Median of WHO estimate 123,000-203,000.	https://apps.who.int/iris/bitstream/handle/10665/329438/9789241516839-eng.pdf?ua=1
2004 H5N1 Influenza	32	Southeast Asia	https://www.ncbi.nlm.nih.gov/books/NBK22148/
2003 SARS-CoV-1	774	Global	https://www.who.int/publications/m/item/summary-of-probable-sars-cases-with-onset-of-illness-from-1-november-2002-to-31-july-2003
2001 Enterovirus 71	26	Taiwan	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9188855/
2001 Nipah	45	Bangladesh	https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON490

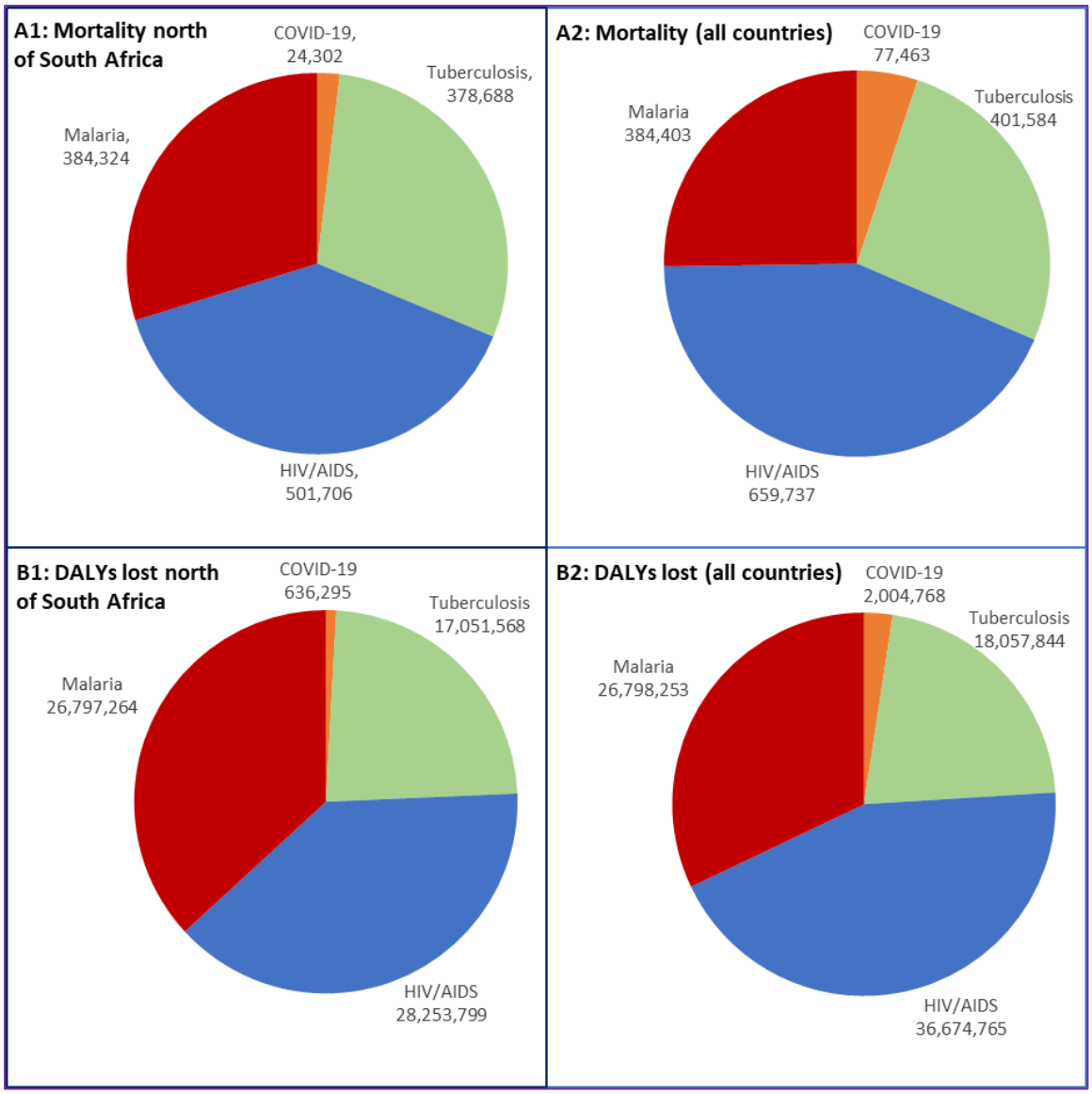
Including COVID-19, the mortality total from all five diseases listed in Figure 6 rises to just over 7.2 million.[43] Although this is not insignificant, it is a much smaller mortality burden than that of HIV/AIDS, tuberculosis and malaria over the same period (at approximately 120 million deaths). In addition, wider tools for estimating disease burden such as disability-adjusted life years lost (DALYs) would provide a very different picture, since COVID-19 mortality was largely restricted to those aged over 75 years,[44] whereas malaria largely kills children under the age of five.[45] As the graphic on sub-Saharan Africa in Figure 7 illustrates, when calculated in terms of DALYS, reported COVID-19 cases represented a very low burden compared to HIV, tuberculosis and malaria in this population.[46] However, the recent Global Burden of Disease

[43] https://data.who.int/dashboards/covid19/deaths
[44] https://covid.cdc.gov/covid-data-tracker/#demographics
[45] https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2022
[46] https://www.ajtmh.org/view/journals/tpmd/105/6/article-p1510.xml

study estimates COVID-19 to be responsible for around 75% of total pandemic-era excess mortality and to be the leading cause of DALYs lost in most countries in sub-Saharan Africa. This illustrates a large degree of uncertainty with respect to the real burden of COVID-19 as compared to the effects of mitigation measures and other disease burden.[47]

Figure 7. Comparison of baseline mortality and disease burdens (DALYs lost) predicted for the 12 months of 2020 for malaria, tuberculosis and HIV/AIDS (pre-lockdown impact), and up to 31 March 2021 for COVID-19, in sub-Saharan Africa.

A1 Mortality for sub-Saharan countries north of South Africa and Lesotho. A2: Mortality for all sub-Saharan countries. B1 DALYs lost for sub-Saharan countries north of South Africa and Lesotho. B2: DALYs lost for all sub-Saharan countries. Source: https://www.ajtmh.org/view/journals/tpmd/105/6/article-p1510.xml



[47] https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(24)00367-2/fulltext

This has implications in terms of opportunity costs, since the estimated ODA for PPPR to avoid another "covid-like" outbreak is US$10.5 billion, which represents over 25% of 2022 ODA total spend on all global health programmes, whereas tuberculosis would receive just over 3% of ODA despite its higher disease burden in terms of DALYs.

Fourth, as suggested above, it is not clear which factors were considered within the economic cost estimates, particularly in relation to COVID-19. If lost global GDP or government fiscal injections were factored for COVID-19 (or any of the diseases), then the Figure 6 fails to disaggregate the direct cost of SARS-CoV-2 (hospitalization, treatments, lost wages due to illness) from the economic costs resulting from specific policy responses with high economic impact, such as lockdowns and travel bans. This complicates the key message that should be taken from Figure 6, since there are an increasing number of studies questioning the effectiveness of COVID-19 policy responses which constituted the greatest economic impact associated with the pandemic.[48] This issue is acknowledged in the recent Global Burden of Disease study estimating the excess mortality over the COVID-19 years, including both SARS-C0V-2 deaths and those that rose primarily from the various impacts of the public health response.[49]Furthermore, given that COVID-19 largely affected the elderly and sick, depending on how economic impact is calculated, the economic impact would be less for COVID-19 than HIV, tuberculosis and malaria. COVID-19 particularly targets those already dependent on support, whilst the three endemic diseases are concentrated in younger people. HIV and tuberculosis mortality removes productive people from the economy, whilst malaria child deaths impact future growth. This creates a situation where Figure 6 is arguably comparing apples with oranges in the case of COVID-19, since wide-ranging lockdowns and trillion-dollar stimulus packages are not associated with HIV, tuberculosis and malaria, while age and underlying fitness also plays a major role in how we should understand both economic impact and life years lost.

Together, these four concerns raise an important issue regarding the entire hypothesis on which the requests for pandemic funding rely. The rising costs per pandemic illustrated in Figure 6 are likely to reflect more the choice of response than an increasing disease burden. As a global public health body, WHO has a responsibility, and mandate, to assess this carefully and advise PPPR policy on the basis of evidence. Was the cost of the 2003 SARS outbreak, which killed approximately 800 people, the equivalent to 6 hours of tuberculosis deaths, a proportionate response? Or, as discussed above, the COVID-19 response? Making such a determination requires the careful weighting of evidence.

Pandemic preparedness involves not only the potential for control of human movement and behaviour and mass vaccination, but the potential for managing expectations, fear and panic in such a way as to minimize harm. There were no major acute pandemics killing more than

[48] https://onlinelibrary.wiley.com/doi/10.1002/cesm.12055
[49] https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(24)00367-2/fulltext

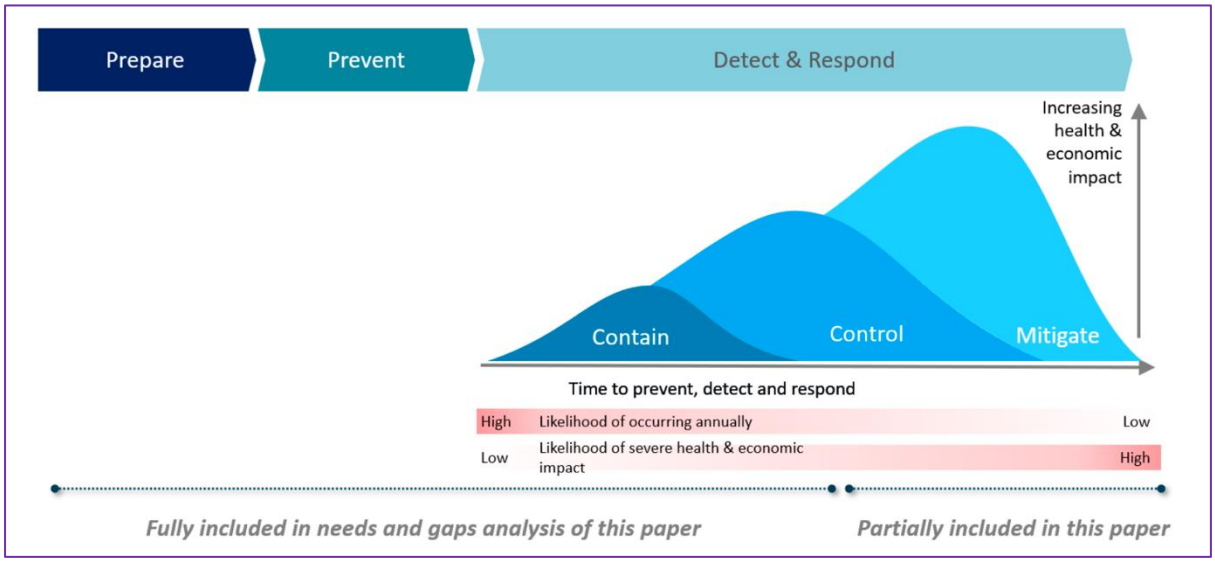
1.1 million people in the century between the Spanish Flu and COVID-19. An increase in surveillance and detection is increasing the opportunity to detect potential pathogens.[50] If this steady improvement in detection technologies translated into an increasingly costly and more frequent response, divorced from a comprehensive assessment of the actual impact and costs of this response, then we risk permanently hobbling economic growth and healthcare over a mirage.

[50] https://essl.leeds.ac.uk/downloads/download/228/rational-policy-over-panic

4.2. Return on Investment

The 2022 WHO and World Bank report argues that an increased frequency of pandemics and their associated high economic impacts provide justification for increased PPPR investments, based on clear substantial return on such investments. To illustrate this point, the report provides a graphic on the mitigating effect of PPPR on the economic impacts associated with outbreaks (Figure 8).

Figure 8. Continuum of outbreak, epidemics and pandemics: from prepare and prevent to detect and respond. Source: WHO and World Bank 2022 report.



There are three key aspects in Figure 8. First, the report assumes that prevention and preparedness efforts will be sufficiently effective in reducing the number of outbreaks and in controlling (indeed, in halting) spread. The graphic attempts to articulate the cost saving concept of "an ounce of prevention is worth a pound of cure". Although this is a well proven principle in public health in relation to preventative health and medicine, this is problematic as aerosolized viruses can travel vast distances quickly, and even with an intensive global surveillance network it is likely that initial spread will be considerable prior to detection. Such a surveillance network may then have been funded in vain, meaning with no or minimal return. Even if detected early, interventions will often have limited impact. As an example, there is strong evidence that non-pharmaceutical interventions (NPIs) had very little impact on the spread and virus-related impact of COVID-19.[51] Only a small number of well-positioned countries (e.g. Australia and New Zealand) managed to postpone large outbreaks throughout 2020 with a strict border and quarantine regimes but ultimately could not prevent the virus

[51] https://brownstone.org/articles/the-who-and-pandemic-response-should-evidence-matter/

from infecting their populations. Even in the short run, the effect of stricter NPI on Covid-19 mortality has been shown to be small.[52] The Nordic countries have had very low excess mortality during the pandemic despite some of the least stringent mitigation policies.[53]

Specifically, it is not clear whether pinpointed investments in the PPPR "five buckets" including an increased focus on infectious pathogen surveillance and vaccine R&D will have a similar preventative system and population effect in terms of return on investment. Ioannidis et al. (2023) show that countries that suffered substantial excess mortality during the COVID-19 pandemic are characterised by higher socioeconomic vulnerability indexes.[54] The proposed PPPR investments do not aim at alleviating poverty, but indeed may worsen it by redistributing of funds. Further, the report specifies that control and response costs are only partially included in their PPPR cost estimate of US$31.1 billion per year. This suggests that pathogen-specific surge financing and indirect mitigation costs such as non-pharmaceutical social measures will require additional and unspecified financial commitments.

The 2022 WHO and World Bank report goes further, claiming that:

> *"Calculating the potential return on investment in a PPR architecture capable of preventing and effectively responding to such pandemic threats is complex, but a team from Imperial College London has built a scenario model based on epidemiological and economic data to project the deaths and short-term GDP loss associated with future pandemics. To account for the fact that future threats might look and act differently from SARS-CoV-2, their scenarios included three other potential respiratory pathogens: Spanish flu-like, SARS-like, and a Swine flu-like event. They then modelled various outbreak mitigation strategies (unmitigated, full lockdown, and reactive closures) for each type of pathogen across four G20 countries (USA, UK, China, India). The Imperial team concluded that PPR is a highly cost-effective investment for protecting both health and economic well-being. Depending on country level baseline health spending and mitigation strategies, deaths averted average between 40 and 124 per 100 000 population. In financial terms, taking the US as an example, the model estimates that for every dollar invested in PPR, countries can expect a health gain to the value of US$1703 and an expected economic gain to the value of US$1102. This is a return several orders of magnitude greater than traditional population-level health interventions such as seasonal influenza vaccination or lead paint control"* (WHO & World Bank report, p. 18).

There are several problems with the model that these claims are derived from. Notably, according to a presentation at the Center for Global Development by two of the involved researchers, Patrick Doohan and Katharina Hauck, the modellers assume a pandemic every

[52] https://iea.org.uk/publications/did-lockdowns-work-the-verdict-on-covid-restrictions/
[53] https://onlinelibrary.wiley.com/doi/full/10.1111/ecaf.12611
[54] https://www.pnas.org/doi/abs/10.1073/pnas.2309557120

10 years, with the four mentioned diseases weighed equally.[55] This effectively assumes that both a COVID-19 like event and a Spanish Flu-like event happen every 40 years Meanwhile, Marani et al (2021), quoted in the World Bank Report Putting Pandemics Behind Us, suggest on the basis of historical frequency a mean recurrence time of 129 years for a COVID-19-like event and 879 years for a Spanish Flu-like event respectively.[56] While such modelling is itself highly uncertain, the gap of over a century between the Spanish Flu and COVID-19 raises questions regarding return on investment. Meanwhile, Swine Flu and SARS have caused only moderate costs. SARS killed just 774 people,[57] which would suggest a small return on investment for a surveillance and readiness system that may require years of maintenance in order to respond. Swine Flu, at 164,000 deaths, killed less than a third of the number who die annually from seasonal influenza.[58]

The model presented by Doohan and Hauck assumes that one year into a pandemic, a vaccine will be available that ends transmission, and the degree of preparedness determines the speed of vaccine administration. Thus, deaths are averted through an assumed effective vaccination. The mentioned ROI estimates are based on scenarios of unmitigated pandemics, but other calculations estimate even higher economic GDP losses under a reactive closure strategy. None of these assumptions are based on historical examples. Spanish Flu, SARS, and Swine Flu did not trigger lockdowns, nor were they ended by vaccination. For COVID-19, vaccines were indeed rolled out over a year into the pandemic and have received wide acclaim for their role in improving clinical outcomes of SARS-CoV-2 infections. However, vaccine-induced immunity has been proven to wane quickly,[59] and most crucially they did not stop transmission from vaccinated individuals, and thereby could not alone have averted or halted a pandemic. This is not specific to COVID-19 but expected from injectable vaccination for most respiratory viruses.[60]

All in all, the return on investment estimated in the Imperial College model rests on a largely inflated frequency of disease emergence and an efficacy not seen with current vaccines for respiratory viruses. The ROI calculation further assumes that proposed investments are fit to achieve this scenario. In turn, this raises the importance of a thorough examination of the assumptions and inputs on which the model relies. These are not presented in the WHO and World Bank Report.

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[55] https://www.cgdev.org/event/what-return-investment-pandemic-preparedness
[56] https://www.pnas.org/doi/10.1073/pnas.2105482118
[57] https://www.who.int/publications/m/item/summary-of-probable-sars-cases-with-onset-of-illness-from-1-november-2002-to-31-july-2003
[58] https://apps.who.int/iris/bitstream/handle/10665/329438/9789241516839-eng.pdf?ua=1
[59] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8816388/
[60] https://www.cell.com/cell-host-microbe/fulltext/S1931-3128(22)00572-8

4.3. Country Level Costs and Gaps

In estimating national level costs, the 2022 WHO and World Bank report utilized the International Health Regulations' (IHRs) 18 technical areas (also known as benchmarks), which were categorized into the five essential sub-systems (see above). The 2022 report relied on four main sources of data for estimating national level costs; IHR State Party Self-Assessment Annual Reports (SPAR), Joint External Evaluations (JEEs), National Action Plans for Health Security (NAPHS), and a systematic review of ten key studies on financial needs for PPPR.

The 2022 report acknowledges that not all countries had data available for analysis and that the different evaluation tools used to identify PPPR baselines differed "in scope, methods, and assumptions, and hence offer a range of estimates" (WHO & World Bank report, p. 9). To compensate, extrapolations were used from a selected number of case countries (not including HICs) as well as the findings from the Clarke et al. systematic review to identify baseline costs and estimates. Three assumptions were made from the analysis:

> *"The estimated needs per capita per year to achieve benchmark levels ranges from less than US$1 for studies focused on a narrow set of capacities, to a range of US$3 to US$5 for studies that considered capacities across the full spectrum of prevention, detection, and response.*
>
> *In the short term, per capita needs are higher in LICs and lower middle income countries than higher-income countries given lower baseline capacities and associated needs for frontloaded capital investments."*
>
> *Estimates include One Health, "but vary in scope", while "AMR [antimicrobial resistance] is often excluded entirely, and the scope of zoonotic prevention and detection activities is inconsistent"* (WHO and World Bank report, p. 9).

Based on several undisclosed "adjustments", the country level cost estimates across the five capacity areas were as shown in Table 2.

Table 2. National level financing requirements of the PPR architecture by income group (in US$billion). Source: 2022 WHO and World Bank report, p. 10).

PPR framework subsystems	Estimated national-level priority needs (US$ billion)			
	LIC	LMIC	UMIC	Total
1) *Surveillance, collaborative intelligence and early warning*	1.3	6.2	4.7	12.2
2) *Prioritized research and equitable access to medical countermeasures and essential supplies*	0.2	1.0	0.8	2.0
3) *Public health and social measures and engaged, resilient communities*	0.5	2.5	1.8	4.8
4) *Lifesaving, safe and scalable health interventions and resilient health systems*	0.5	2.8	2.1	5.4
5) *PPR strategy, coordination and emergency operations*	0.2	1.0	0.8	2.0
Total	**2.7**	**13.5**	**10.2**	**26.4**

In order to identify the gap between baseline and need, the 2022 WHO and World Bank report posits that "data limitations make the estimation of PPR financing at national level challenging" (WHO & World Bank 2022, p. 11). As a result, the report relies on a sample of *National Health Accounts* and a McKinsey & Company report *"Not the last pandemic: Investing now to reimagine public-health systems"* in which a range of 1% and 3% of total domestic health expenditure is estimated to have been spent for health emergency preparedness (Table 3).[61]

Table 3. National health and PPR spending estimates. Source: WHO and World Bank 2022 report, p. 10.

Income group	Dom. govt. exp. on health (US$ per capita)	Domestic PPR spending per capita in US$	
		1% of dom. health exp.	3% of dom. health exp.
Low income	10.2	0.1	0.3
Lower middle income	35.4	0.4	1.1
Upper middle income	296.8	3.0	8.9
High income	3486.4	34.9	104.6

[61] https://www.mckinsey.com/industries/public-sector/our-insights/not-the-last-pandemic-investing-now-to-reimagine-public-health-systems

Based on the assumption that LICs will require 100% ODA support, lower middle income countries 60% support and upper middle income countries 20% support for PPPR gap needs, the 2022 report provides the following table of domestic level PPPR estimates (Table 4):

Table 4. International financing gap for national needs assuming 1% or 3% domestic spend on PPR and differentiated support by income group. Source: WHO and World Bank 2022 report, p. 13.

PPR framework subsystems	Estimated national-level priority needs (US$ billion)	Minimum priority gaps assuming 1% spend on PPR[9] (US$ billion)	Minimum priority gaps assuming 3% spend on PPR[8] (US$ billion)
1) *Surveillance, collaborative intelligence and early warning*	12.2	4.3	3.2
2) *Prioritized research and equitable access to medical countermeasures and essential supplies*	2.0	0.7	0.5
3) *Public health and social measures and engaged, resilient communities*	4.8	1.7	1.2
4) *Lifesaving, safe and scalable health interventions and resilient health systems*	5.4	1.9	1.4
5) *PPR strategy, coordination and emergency operations*	2.0	0.7	0.5
Total	**26.4**	**9.3**	**7.0**

Determining the reliability of these estimates is difficult since they are based on several assumptions, each of which pose their own challenges. For example, the WHO and World Bank acknowledge that there is insufficient data to make accurate baseline estimates of current domestic level spending in health emergency preparedness. Accordingly, the report is based entirely on extrapolations from selected cases and assumptive models. Second, the 1% to 3% assumption used to determine PPPR gaps look to have been based on a small number of case countries, and there is no clear methodological explanation of which countries were used, nor how this range was determined. Moreover, the range was also influenced by calculations based on ten studies examined in the Clarke et al. systematic review and although there was a fair level of overlap between the studies reviewed in terms of upper and lower percentage range, different methodologies meant that comparisons were inexact while outliers were discounted (see below). Third, the country needs assumptions based on income-level gaps are extremely rough. Other than country income-level, these strip out all domestic context, health burdens, and existing capacities from the equation. For example, the report recognises in a footnote that certain "outlier" countries were identified in its case sample, where over 5% of domestic spending was allocated to health emergency

preparedness. However, these countries were discounted because "the 1-3% range [was used] as this is consistent with a review by McKinsey & Company" (WHO & World Bank report, p. 11). These methodological decisions will impact the results. Lastly, the 2022 report recognises the need for better accounting to track, determine, and analyse PPPR requirements. The lack of reliable evidence was so manifest that the report dedicates an entire full-page shadow box titled "embedding the monitoring of domestic spending on health security and prevention preparedness and response within wider statistical frameworks measuring health expenditure" to address this information shortfall in the future. Yet, by doing so, the report subtly recognises that without better data and reporting it is not possible to get an accurate analysis of PPPR need.

Consequently, it is difficult to assess the reliability of the domestic estimates. It could very well be the case that the estimates reflect existing investment and remaining need, and that the study made the best of the data and techniques available to them. And, importantly, the final domestic investment estimates do, to various degrees, reflect the results from a number of other studies. Yet, given the considerable cost of PPPR for LMICs (US$26.4 billion annually) as well as the opportunity costs of diverting this level of funding, it is essential to have reliable estimates to guide policy. Moreover, given that the claims for urgency to respond to pandemic risk have been shown to be inflated,[62] there is time to conduct a more systematic review of country level need and existing spending baselines, and to develop more contextually sensitive investments. Generating a review of this type would require the creation of agreed reporting and accounting guidelines with an additional 24 months to properly conduct the study of WHO member states. Doing so will better assure that PPPR costings are accurate, contextualised, and proportional to relative disease burdens.

[62] https://essl.leeds.ac.uk/downloads/download/228/rational-policy-over-panic

4.4. International Costs and Gaps

The 2022 WHO and World Bank report estimates the total financial requirements to support PPPR, within the scope covered in the report, to be approximately US$31.1 billion. This includes the US$26.4 billion in annual PPPR investments by LMICs discussed above and US$4.7 billion required in ODA to fund additional international efforts. In determining the final international estimates, the report assumed that:

> *"Existing institutions and funding mechanisms have the capacity to contribute approximately 25% of the need based on current trends, leaving an estimated potential annual international funding gap of US$3.5 billion"* (WHO & World Bank report, p. 15).

Moreover, the report assumes that LMICs will only require US$7 billion in extra ODA to fill national budget shortfalls (this number assumes current national spend at 3% of health budget). Thus, the total estimated ODA requirement for PPPR is calculated as US$3.5 billion + US$7 billion = US$10.5 billion (Table 4). Thus, total global need becomes a US$26.4 billion national level investment with US$10.5 billion in new international ODA (Table 6).

Table 5. Global needs and international funding gaps assuming 25% contribution from existing institutions and funding mechanisms based on current trends. Source: WHO & World Bank report, p. 16).

PPR framework buckets	Estimated global level priority needs (US$ billion)	Minimum global level priority gaps (US$ billion)
1) *Surveillance, collaborative intelligence and early warning*	1.2	0.9
2) *Prioritized research and equitable access to medical countermeasures and essential supplies*	1.8	1.3
3) *Public health and social measures and engaged, resilient communities*	0.7	0.5
4) *Lifesaving, safe and scalable health interventions and resilient health systems*	0.6	0.5
5) *PPR strategy, coordination & emergency operations*	0.4	0.3
Total	**4.7**	**3.5**

Table 6. Overall PPR needs and gaps. Source: WHO & World Bank report, p. 16.

PPR framework buckets	Estimated PPR financing needs (US$ billion)	Minimum priority PPR financing gaps[11] (US$ billion)
1) *Surveillance, collaborative intelligence and early warning*	13.3	4.1
2) *Prioritized research and equitable access to medical countermeasures and essential supplies*	3.7	1.8
3) *Public health and social measures and engaged, resilient communities*	5.5	1.8
4) *Lifesaving, safe and scalable health interventions and resilient health systems*	6.1	1.9
5) *PPR strategy, coordination and emergency operations*	2.5	0.9
Total	**31.1**	**10.5**

There are several issues involved with these estimations. First, the 2022 report explicitly states that the international estimates are based on an underdeveloped body of research and that the numbers presented in the report should not be understood as precise. Accordingly, the report suggests that it is therefore necessary to conduct "more precise estimations of need and gaps" as well as what "subsystem" requirements need to be prioritized (WHO & World Bank report, p. 15).

Second, the 2022 report assumes that "existing institutions and funding mechanisms have the capacity to contribute approximately 25% of the need based on current trends", rendering an annual international funding gap of US$3.5 billion (WHO & World Bank report, p. 15). However, it is unclear whether "existing institutions" such as The Global Fund, CEPI and Gavi have this capacity, since there have been significant shortfalls in recent replenishments and these institutions are thus unable to meet their own targets.[63] This suggests that either more money must be funnelled into these institutions for PPPR activities or current financing levels will need to shift from other health initiatives to PPPR. Either way this reflects a significant opportunity cost as well as significant potential for overall negative impacts on global population health as scarce financing moves from endemic diseases such as HIV, tuberculosis and malaria to an unknown future pandemic threat.

One explanation for this potential oversight is that "current trends" include the unprecedented rise in ODA for health during the COVID-19 pandemic from US$22.2 billion in

[63] https://www.devex.com/news/sponsored/cepi-hopeful-despite-underwhelming-replenishment-102862; https://www.devex.com/news/sponsored/global-fund-replenishment-pledges-expectations-and-what-s-at-stake-103372; https://www.reuters.com/world/pandemic-fund-vastly-oversubscribed-more-money-needed-world-bank-2023-03-07/

2019 to US$29.2 billion in 2020 and US$34.0 billion in 2021. However, when analysed, 63.9% of the increase in 2020 was for COVID-19 with another US$1 billion earmarked for infectious disease control. This trend continued in 2022, with COVID-19 accounting for an additional US$1 billion and infectious disease control accounting for an additional US$500 million of the increase (2022 ODA for health US$39.2 billion). As a result, the assumption of 25% existing capacity seemingly assumes that COVID-19 era ODA for health will continue, that COVID-19 financing will shift to PPPR, and that replenishment commitments will return to 2021 levels. What COVID proves is that resources can be mobilized if necessary. Nevertheless, this does not demonstrate that these resources will continue at this level, nor that doing so is the most effective, efficient, and equitable use of resources in relation to global disease burden and risk.[64]

Third, the 2022 WHO and World Bank report claims that country-level need is US$26.4 billion, of which US$16.2 billion or 61.3% would fall on LICs and lower middle-income countries, with upper middle-income countries able to cover most of their PPPR costs themselves. Moreover, the report assumes that international financing sources currently cover, and will cover, 100% of LIC, 60% of lower middle-income countries and 20% of upper middle income countries costs, reducing the country-level annual gap to US$7 billion. Yet, this assumption is doubtful. Again, like the international estimates, the 2022 report assumes that US$14.1 billion in funding is already available via domestic and MDB financing, and that lower middle-income countries currently invest 3% of health spending on PPPR. However, as acknowledged in the report, there is currently no widely accepted measurement of domestic spending on PPPR. As a result, the 3% assumption could be an overestimation. Again, the implication is that PPPR will require significantly higher investments from lower middle-income countries than are presented in the 2022 WHO and World Bank report, thus threatening to redirect limited resources while further extending potential opportunity costs.

[64] https://essl.leeds.ac.uk/downloads/download/228/rational-policy-over-panic

4.5. The Creation of a Circular Evidence-base to Justify PPPR Costs

As stated in the 2022 WHO and World Bank report:

> *"the total annual financing need for the future PPR system is estimated at US$31.1 billion, consistent with the estimate of the G20 High-Level Independent Panel."*

As discussed in greater detail in Section 5 below, the G20 HLIP report similarly states that:

> *"The estimates provided are primarily based on two studies: the WHO's report to the G20 'Assessment of Gaps in Pandemic Preparedness' in 2020, and McKinsey & Company's report 'Not the last pandemic: Investing now to reimagine public-health systems'. While a number of studies have attempted to measure pandemic PPR investment needs, recent estimates converge to a range which is higher than pre-COVID estimates, and point to a need to significantly scale up current financing. The Panel had chosen to use data from the WHO and McKinsey studies as they were the most recent and systematic estimates of needs at the global and country levels"* (HLIP, p. 82).

One potential problem is that these two reports create a circular logic and evidence-base, where the 2022 report and HLIP report cite one another as being key sources of evidence and verification. The clear explanation for this circularity is that the HLIP relied heavily upon the earlier 2021 WHO and World Bank '*Assessment of Gaps in Pandemic Preparedness*' report for its cost estimations, while the revised 2022 WHO and World Bank report then regurgitated the HLIP estimations based on its 2021 report to support the reliability of their PPPR estimations. Sourcing from each other, they are presenting and cross-referencing the same conclusions across the reports and thereby creating a false perception of a wider evidence-base that has been properly counter-verified through independent studies. In reality, the HLIP report merely used baseline estimates from the WHO that were then presented again by the WHO and World Bank in the second iteration of their report.

In addition, both the HLIP and 2022 WHO and World Bank reports used the 2021 McKinsey & Company publication "Not the last pandemic: Investing now to reimagine public-health systems" as a primary evidence-base and based many of their assumptions on this document. As stated in the WHO and World Bank 2022 report, it:

> *"leverages the in-depth costing work that was done for the G20 High-Level Independent Panel report "Financing the Global Commons for PPR", published in June 2021, as well as the McKinsey & Company publication "Not the last pandemic: Investing now to reimagine public-health systems" from May 2021, to provide estimates of needs and gaps for the five PPR subsystems outlined above"* (WHO & World Bank report, p. 10).

Consequently, the estimates presented for PPPR are based primarily on just three cross-referenced and cross-verified reports. Although cross-referencing is not in and of itself a problem, in this case the circular chain might be interpreted as reinforcing a form of “enclave thinking” where the exact same people are consulted and conclusions reiterated under an illusion of wider and largely independent analysis. In practice this also risks generating a condition of “congeniality bias” that limits rigour and objectivity.

4.6. A new Coordinating Mechanism for PPPR under the Pandemic Agreement

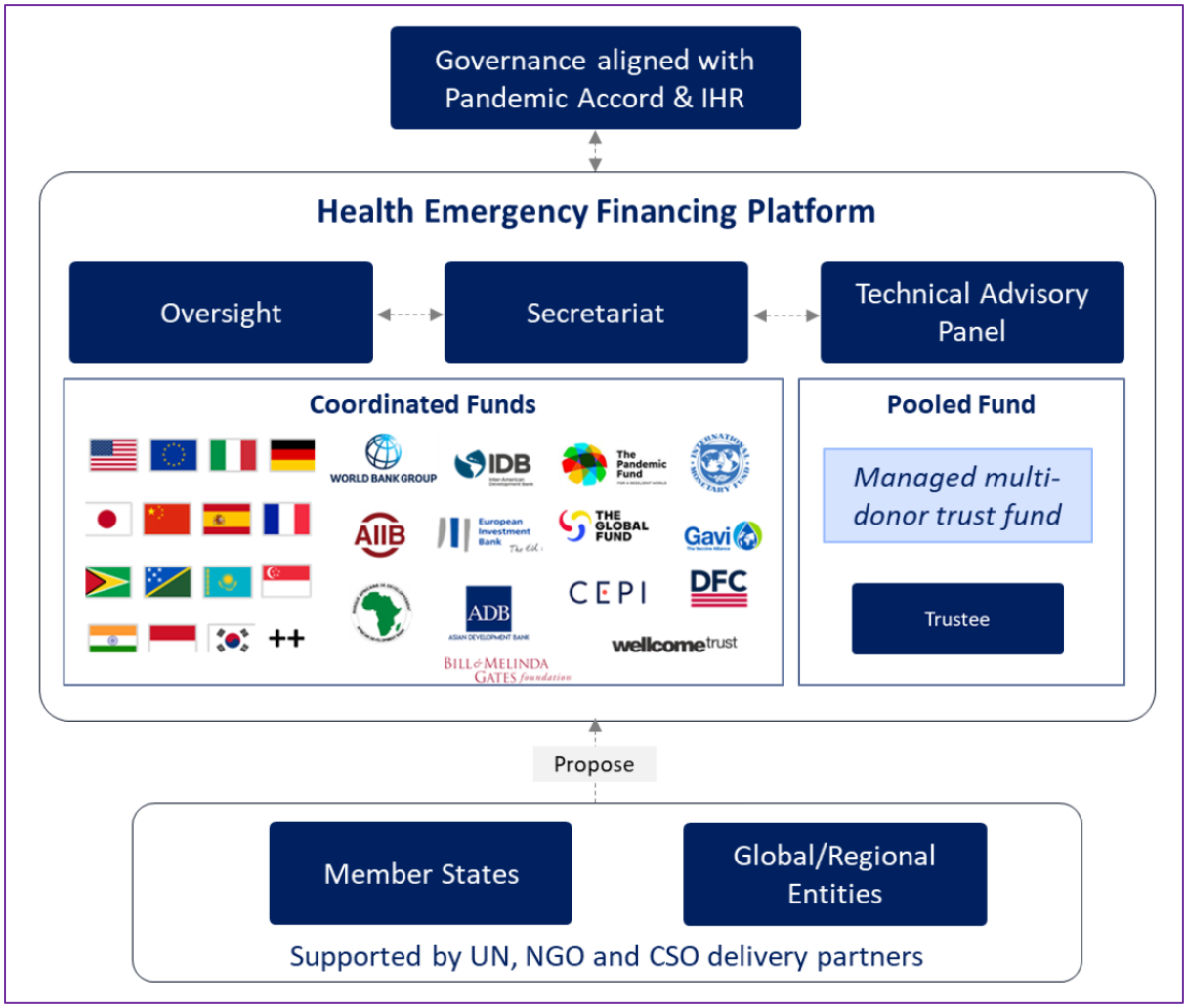
The final section of the 2022 WHO and World Bank report outlines several scenarios regarding how PPPR financing shortfall can be addressed. These include the use of multilateral development banks (MDBs) for low interest and concessional loans for country level and global common goods for PPPR, the better use of pooled funds for specific capacities, and the use of innovative financing. The report, much like the G20 HLIP report, stresses the need for institutional enhancement in global governance capacities to help mobilize, coordinate and better account for PPPR funding. The 2022 report outlines three options that could operate exclusively or in a combined fashion (WHO & World Bank report, p. 24):

> *"1) Selectively augment the resources of existing institutions/mechanisms to support PPR*
>
> *2) Establish a new, dedicated stream of additional, catalytic international financing for PPR, that can be channelled through existing institutions (e.g., a pooled fund)*
>
> *3) Establish a new PPR financing agency with the necessary fiduciary capacity and legal, administrative, and technical expertise"* (WHO & World Bank report, p. 24).

As discussed above, the 2022 report was a revised version of the 2021 report '*Assessment of Gaps in Pandemic Preparedness*'. As a result, the 2022 report was being finalised prior to the full launch and first round of funding from the new World Bank Pandemic Fund and before negotiations on the Pandemic Agreement had settled on Article 20 and its commitment to create a "Coordination Mechanism" to fund the Agreement as well as larger PPPR activities.

That said, the 2022 report remains the basis for PPPR costs and financing discussions within the Pandemic Agreement's International Negotiating Body (See Section 3 above). Moreover, the INB Article 20 Subcommittee have now adopted the WHO Secretariat's recommendation for a new "Coordination Mechanism". In a presentation given to the INB and IHR Working Groups in December 2023, the WHO presented four options for how the mechanism could be designed, and the INB quickly settled on Option Four, which was presented as an amalgamation of Options 1 through 3 (Figure 9).

Figure 9. Establish coordinated financing platform (combines options 1, 2 & 3). Source: Health Emergency Preparedness & Response Financing Mechanism Options - WHO Secretariat requested technical input to INB & WG IHR Geneva, 12 December 2023.



Although the need for a Coordinating Mechanism to finance PPPR has been agreed by most parties negotiating the Pandemic Agreement, there remains considerable contestation. As of March 29, 2024, negotiating parties of the INB have not detailed who will host the mechanism, what set of instruments will be used to mobilize funds, nor what governance processes will be put in place. Although the World Bank's Pandemic Fund is favoured by donor countries because it is seen to reduce institutional fragmentation and has existing capacity to manage complex financing arrangements, LMICs have strongly resisted the use of the Pandemic Fund, with alternative proposals for the mechanism to be hosted by the WHO or by a new PPPR institution similar in design to the Global Fund.[65]

[65] https://healthpolicy-watch.news/who-will-finance-countries-pandemic-response/

These INB (and IHR working group) negotiating processes are ongoing and indeterminant. What is crucial to reflect upon here is that the PPPR financing landscape operates within an environment of scarce resource allocations where various interests are competing for limited financing. This mean that PPPR will most likely require trade-offs with other existing funding commitments. Moreover, the process in which key decisions are being made has been accelerated to meet a World Health Assembly deadline of May 2024, where major decisions regarding the amendments to the International Health Regulations (IHRs) and the Pandemic Agreement will be made. What this has created is an environment where many principles in public health, such as weighing of overall costs versus benefits, have been relegated to a secondary position to geopolitics, organizational competition, and interest promotion. Given the high costs associated with PPPR this threatens to undermine global public health, but also to produce pandemic preparedness policies that actually reduce health security.

5. The G20 Evidence Base for PPPR Cost Estimates

5.1. The G20 Bali Leaders Declaration, 15-16 November 2022.

The G20 met in Indonesia in November 2022 and expressed support for initiatives of WHO, the World Bank and partners to strengthen financial support for PPPR.[66] Prior to the meeting, the G20 convened the G20 High Level Independent Panel on Financing the Global Commons for Pandemic Preparedness and Response' (HLIP) with the specific mandate to "propose how finance can be organized, systematically and sustainably, to reduce the world's vulnerability to future pandemics."[67] The HLIP commissioned two reports to help evidence its decision-making on PPPR costing and financing. The first report, A Global Deal for our Pandemic Age', was published in June 2021.[68] The second report was commissioned from WHO and the World Bank as a gap analysis and preparation white paper on PPPR estimated costs, titled 'Analysis of Pandemic Preparedness and Response (PPR) architecture, financing needs, gaps and mechanisms' (March 2022).[69]

Whereas the HLIP focused on mobilizing financing, the WHO and World Bank report focused on identifying country, regional and global level gaps in PPPR and to estimate the cost of responding to those gaps. The HLIP had three independent co-chairs, multiple project leads from different organizations, and used external consultations to inform their conclusions. Both G20 reports were produced in under five months and relied heavily on existing reports and academic literature on pandemic risk and estimated gap costs.

The official G20 Bali Leaders Declaration,[70] released by the United States Government, devotes Paragraphs 19-24 to support the initiatives behind the PPPR and health emergencies agenda.[71] The Declaration states G20 backing for the WHO Intergovernmental Negotiating Body (INB) process to develop a "legally binding instrument" to strengthen PPPR,[72] and the work of the Working Group on amendments to the International Health Regulations (WGIHR).[73]

The G20 2022 Gap Analysis Report was examined above, whereas we now turn to the G20 HLIP report.

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[66] https://www.whitehouse.gov/briefing-room/statements-releases/2022/11/16/g20-bali-leaders-declaration/
[67] https://pandemic-financing.org/report/foreword/
[68] https://pandemic-financing.org/wp-content/uploads/2021/07/G20-HLIP-Report.pdf
[69] https://thedocs.worldbank.org/en/doc/5760109c4db174ff90a8dfa7d025644a-0290032022/original/G20-Gaps-in-PPR-Financing-Mechanisms-WHO-and-WB-pdf.pdf
[70] https://www.whitehouse.gov/briefing-room/statements-releases/2022/11/16/g20-bali-leaders-declaration/
[71] Ibid.
[72] https://inb.who.int/
[73] https://www.who.int/health-topics/international-health-regulations#tab=tab_1

5.2. G20 High Level Independent Panel (HLIP) PPPR Cost Estimates

In June 2021 the G20 HLIP published a report 'A Global Deal for our Pandemic Age'. As outlined in the section on "Investing in Global Public Goods: To Save Immense Costs", the report states that:

> *"We can only avoid future pandemics if we invest substantially more than we have been willing to spend in the past, and which the world is now paying for many times over in dealing with COVID-19's damage"* (HLIP, p. 6).

At the domestic level, the HLIP report states that:

> *"Countries must step up domestic investments in the core capacities needed to prevent and contain future pandemics, in accordance with the International Health Regulations… Low- and middle-income countries will need to add about 1% of GDP to public spending on health over the next five years"* (HLIP, p. 6).

In a table included in Annex H of the report (Table 7), the HLIP estimates this 1% investment number to be approximately US$93 billion over five years or US$18 billion per year, with unspecified annual investments thereafter. A key feature of this cost is that US$77 billion of the estimate is to be invested by LMICs (Table 9). In terms of existing budgetary spend this represents a major financial requirement imposed on low resource settings, one that is arguably disproportionate in relation to local need and existing disease burdens within those settings.

Table 7. Additional Public Funding for Prevention and Preparedness over 5 Years (US$billion). Source: HLIP Report, p. 80.

Category	Total	International Financing	National Budgets
Robust surveillance & detection networks	74	26	49
Building resilience in health systems	63	19	44
Supply capacity for medical countermeasures	34	34	-
Total	**171**	**78**	**93**
Average Annual Investment	**34**	**16**	**18**

At the international level, the HLIP claims that:

> *"Governments must collectively commit to increasing international financing for pandemic prevention and preparedness by at least US$75 billion over the next five*

> *years, or US$15 billion each year, with sustained investments in subsequent years*" (HLIP, p. 6).[74]

The HLIP report argues that this is the "absolute minimum" in new investments required for effective pandemic prevention and preparedness yet notes that several further investments will be required outside of the HLIP estimates. For example, the report does not include estimates for response (HLIP p. 80).

Moreover, the HLIP report also excludes costs required for containing antimicrobial resistance (AMR), which the HLIP suggests would require an additional US$9 billion annually (HLIP report, p. 6).[75] As noted by the HLIP, AMR containment efforts were excluded because they have benefits beyond pandemic PPPR and operate through non-pandemic related programs such as behavioural policies to promote the "more rational use of antimicrobials in health and agriculture" (HLIP report, p. 28). The HLIP report also states that it excluded full estimates for implementing One Health, since like AMR, it proved difficult to provide comprehensive and up-to-date estimates (HLIP, p. 28 and 84).

Also excluded from the HLIP report are costs associated with building health system resilience. These costs were excluded because they are only indirectly related to the global public good for PPPR approach taken by the Panel (HLIP report, p. 84). That said, the HLIP provides a rough estimate of what a commitment to system resilience, including Universal Health Coverage (UHC), would require. Here, the HLIP estimates that an additional US$555 billion would be required over five years, including US$89 billion in international financing.

The HLIP further warns that their estimates are:

> *"Based on conservative assumptions on the scale of vaccine manufacturing capacity required in advance of a pandemic. Larger public investments to enable enhanced manufacturing capacity will indeed yield much higher returns" (HLIP, p. 6).*

As a result, the HLIP states that the scale of research and development, as well as manufacturing of medical countermeasures, had not been fully estimated in the annual US$15 billion investment case for increased international financing. That said, the HLIP does cite an Accelerating Health Technologies (AHT) Group estimate for incentivising supply capacity, where the AHT group estimated that "production capacity and supply chain inputs for vaccines alone require US$60 billion in public funding to enable the capacity to be installed over a period of years, and about US$2 billion per year thereafter to maintain this capacity". The findings of the AHT were not cited from written evidence but were attributed in a footnote to inputs from G20 HLIP and AHT member Michael Kremer (HLIP, p. 29).

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[74] These numbers are rounded down from those presented in Table 1, which presents them as US$78 and US$16 billion.
[75] https://documents1.worldbank.org/curated/en/323311493396993758/pdf/final-report.pdf

These substantial investments associated with the HLIP report are unprecedented in global health financing. The international and country level investments when combined equate to roughly US$171 billion over five years or US$34 billion per year for five years (HLIP, p. 80). When compared to the approximately US$3.8 billion given annually to WHO,[76] and the US$3.1 billion funding estimated to target malaria globally,[77] this US$15 billion per year in Overseas Development Assistance for PPPR would constitute a major increase and potential redirection in international public health funding.

Table 8. Additional Public Funding for Prevention and Preparedness over 5 Years

Domestic
$93b for PPPR (surveillance/detection, resilient health systems, medical countermeasures)
International
$78b for PPPR (surveillance/detection, resilient health systems, medical countermeasures)
Unspecified
$9b (containing antimicrobial resistance) + $26b (additional costs for incentivizing vaccine supply capacity not included above)
TOTAL: $206b ($41b p.a.)

[76] https://open.who.int/2022-23/contributors/contributor
[77] https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2022

5.3. Return on Investment

The HLIP states that its recommended core investments of US$171billion over five years is both a "scientific and moral imperative" which the HLIP argues is due to the increased frequency and severity of zoonosis spillover events. A recent REPPARE report found assumptions to be poorly supported by evidence. Specifically, the HLIP did not consider advancements in detection[78]. In consideration of their claims of increased risk and associated cost of pandemics, the HLIP argues with a substantial expected return on investment:

> *"They will materially reduce the risk of events whose costs to government budgets alone are 700 times as large as the additional international investments per year that we propose, and 300 times as large as the total additional investments if we also take into account the domestic spending necessary. The full damage of another major pandemic, with its toll on lives and livelihoods, will be vastly larger" (HLIP, p. 6).*

The HLIP gives no evidence nor explanation for how these multipliers were determined, nor how the risk reductions were calculated. The most likely explanation can be derived from a statement on Page 19 of the report, where an IMF estimate of "over US$10 trillion" is given for total COVID-19 fiscal costs up to March 2021.[79] Assuming that this estimate was used as a baseline cost of a pandemic outbreak, the equation below can help explain how returns of x700 for international and x300 could be derived, namely:

US$15 billion Int'l investment x 700 = US$10.5 trillion

US$34 billion Int'l and domestic investment x 300 = US$10.2 trillion

Given that the HLIP report tends to round their estimates up or down, then both the x700 and x300 multipliers for return on investment correspond approximately to the IMF US$10 trillion estimated fiscal cost of COVID-19 as of March 2021.

In making these claims, the panel posits several assumptions about both its cost estimates and return on investment. The HLIP argues that "the world is now paying several times over dealing with COVID-19 damage", which signals that investments now will reduce future "damage" as experienced from COVID-19. It is undoubtedly true that COVID-19 event equates to trillions of dollars in fiscal damage, which includes lost GDP, national stimulus packages, social protection measures, pharmaceutical subsidies, health response and rebuilding activities.

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[78] http://essl.leeds.ac.uk/downloads/download/228/rational-policy-over-panic
[79] https://www.imf.org/en/Publications/FM/Issues/2021/03/29/fiscal-monitor-april-2021

Yet, the stated return on investment requires scrutiny:

First, the HLIP report assumes that there will be another COVID-19-like pandemic in the near future (5 to 20 years). This is highly unlikely given that pandemics have been historically rare.[80] For example, an article cited in the World Bank report "Putting Pandemics Behind Us",[81] which the HLIP used as evidence of increased pandemic risk, estimated an average recurrence time of a COVID-19-like pandemic to be 129 years.[82] The last deadlier pandemic occurred at a time when antibiotics were not yet available (Spanish Flu), and the same publication estimates an outbreak of this magnitude may occur every 292 or 877 years. It is inherently difficult to plan or estimate returns on investment in such large time frames or with such low incidence, due to changing contexts.

Second, the HLIP return on investment calculation above seemingly assumes that pandemic preparedness investments can mitigate the full fiscal cost of any COVID-like pandemic threat (at least for the first year of the pandemic). This rests on a further assumption that recommended prevention and preparedness efforts can both largely prevent and then largely control emerging infectious diseases (EIDs) successfully, without incurring significant additional fiscal obligations. In addition, the calculation does not factor the costs of mitigation and response beyond its list of preparedness activities, while in the case of COVID-19 (the HLIP pandemic comparator) it was the response policies that incurred the largest costs (projected to be a cumulative economic contraction of US$22 trillion by 2025).[83] It is also important to note that the IMF estimate of over US$10 trillion for March 2021 did not include government loans, guarantees, and capital injections.[84] Again, these were significant costs associated with COVID-19 and are estimated by the IMF to have been over US$6 trillion as of March 2021.[85] Yet, as will be argued in detail below, these costs could be attributed to questionable COVID-19 policy responses (lockdowns, travel bans) and not directly attributed to the emergence of SARs-CoV-2. As a result, the multipliers of x700 and x300 are not a "conservative" estimate for return on investment as suggested by the HLIP report, but highly optimistic in that the HLIP assumes that prevention and preparedness policies will be effective in reducing overall fiscal risk.

Third, if the pandemic risk assessments underwriting the HLIP report are inaccurate or inflated, as suggested by a recent REPPARE report,[86] then the HLIP return on investment fails to appreciate the opportunity costs of investing US$171 billion over five years (with unspecified annual maintenance) on pandemic prevention and preparedness. Opportunity

[80] http://essl.leeds.ac.uk/downloads/download/228/rational-policy-over-panic
[81] https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099530010212241754/p17840200ca7ff098091b7014001a08952e
[82] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8536331/
[83] https://blogs.imf.org/2021/01/26/a-race-between-vaccines-and-the-virus-as-recoveries-diverge/
[84] https://www.imf.org/en/Publications/FM/Issues/2021/03/29/fiscal-monitor-april-2021
[85] https://www.imf.org/en/Publications/FM/Issues/2021/03/29/fiscal-monitor-april-2021
[86] http://essl.leeds.ac.uk/downloads/download/228/rational-policy-over-panic

costs represent reductions in resources available to address an alternate disease or health issue (physical, mental and/or social) and usually signal economic costs that diminish the ability to reduce disease burdens more generally. Again, it is important to note that economic costs will be most acute in low resource countries, where readily avoidable disease burdens tend to be higher. Cost diversion from sectors such as education and economic development incur additional and longer-term health costs. As a result, this raises important questions about the costs of pandemic preparedness when measured against other metrics of disease burden, which traditionally has been an important policy calculation to promote good public health practice.

On Page 30 of the HLIP report the panel hedges its return-on-investment claims, suggesting that "even if we assume the investments in prevention and preparedness only reduce the probability of a pandemic by 50%, and reduce the cost of any resulting pandemic by 50% — hence saving 75% of the costs of a COVID-19-scale pandemic — the cost savings to government budgets are 8 to 18 times the cumulative additional investments over the next 10 to 20 years, in present value terms" (HLIP, p. 30).

Given earlier calculations regarding a return on investment of US$10.5 trillion, which we assume is based on COVID-19 IMF fiscal expenditure data as a comparator, the Panel's assumption here is that the additional investments, even if they only reduced EIDs by 50%, with a corresponding 50% reduction in mitigation costs, would still result in US$7.8 trillion cost saving to government fiscal budgets. Again, the HLIP report gives no evidence to support whether this level of prevention is reliable, nor does it justify why preparedness investments will reasonably provide the further cost reductions proposed. It is further unlikely that measures that may reduce the probability of any EID outbreaks by 50% reduce the probability of pandemics to the same extent, as early suppression is more likely to work for less transmissible EIDs, and pathogens with rapid spread are most difficult to control.

Nevertheless, the assumption that investment in preparedness will be sufficient in "reducing COVID-19-like damage" (HLIP p.6) by an additional 50% raises an important consideration when determining to what degree damage was a direct result of SARS-CoV-2 and to what degree costs should be attributed to the negative effects resulting from certain policies employed in the public health response. In other words, the HLIP makes no attempt to detangle what are direct costs related to the virus (e.g. emergency surge capacities and therapeutics) from self-inflicted costs resulting from policies that arguably resulted in unnecessary "damage" (e.g. school closures and lost economic performance due to lockdowns). For example, the UK government implemented a "dine out to help out" scheme in August 2020 to encourage people to return to restaurants and support the hospitality industry, covering 50% of each bill. The logic was that lockdowns had severely harmed the hospitality industry and thus it required stimulus to recover (US$1.1 billion was spent on

scheme).[87] Yet, what is difficult to establish is whether the cost of "dine out to help out" is best attributed to "damage" resulting from COVID-19 or to "damage" caused by potentially ineffective non-pharmaceutical interventions (NPIs). This damage also had concerning effects on equity. In representative surveys carried out in 31 LMICs, two thirds of the population reported decreases in income during lockdowns, with vulnerable populations affected disproportionally.[88] Meanwhile, workers in overcrowded living conditions could practically not engage in social distancing, voiding any potential epidemiological benefits of workplace closures. A study from Bogota found that "low-income areas with higher population density, informality and overcrowding reacted less to mobility restrictions".[89] There is currently a limited evidence-base from which to give exact determinations in terms of impact attribution. Yet, the complexity of attributing pandemic cost does confound how we should interpret claims made within the HLIP report as well as how much credence to afford them.

[87] https://researchbriefings.files.parliament.uk/documents/CBP-8978/CBP-8978.pdf
[88] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8823956/
[89] https://www.undp.org/latin-america/publications/unequal-response-mobility-restrictions-evidence-covid-19-lockdown-city-bogota

5.4. ANNEX H: Estimated Financing Needs for Global Public Goods for Pandemic Prevention and Preparedness

Annex H of the HLIP report provides the methodology for estimating pandemic prevention and preparedness costs as well as the sources of evidence used to support these estimates. In the "Explanatory Notes", the HLIP panel states that its estimates relate strictly to a "global common goods approach" which excluded several other PPPR categories in its calculations (discussed above). The selection of the three categories for cost estimation were drawn from the Global Preparedness Monitoring Board (GPMB), who provided the list of key capacities and function requirements to be costed (available in Annex G of the HLIP report). The three general categories include capacities associated with: (1) robust surveillance and detection networks; (2) building resilience in health systems; and (3) supply chains for medical countermeasures.

In estimating the costs associated with these three capacity areas the HLIP panel further recognised important inputs from the Centre for Global Health Science and Security at Georgetown University, Talus Analytics, the G-Finder survey *Landscape of Emerging Infectious Disease Research and Development*, and the Coalition for Epidemic Preparedness Innovations (CEPI). The HLIP report states that the Panel "modified certain estimates following our consultations with industry experts" and "triangulated" cost data from CEPI and country level data from the University of Georgetown (HLIP, p. 81). However, no specific methodological details are provided about how these evidence sources were used, what exact data was drawn from these sources, nor how the data was analysed and synthesised when calculating the HLIP's final cost estimates.

The HLIP report breaks down its estimated costs according to each recommended GPMB capacity area as well as by country income status (Table 9).

Table 9. Additional Public Funding for Prevention and Preparedness over 5 Years (US$ billion) (Breakdown by Global- and Country-Level). Source: HLIP Report, p. 80.

Category	Total	Global Level Capacities	Country-level Global Public Goods				
			HIC	MIC		LIC	
				International Financing	National Budgets	International Financing	National Budgets
Robust surveillance & detection networks	74	5	11	11	36	10	1
Building resilience in health systems	63	-	4	9	39	10	1
Supply capacity for medical countermeasures[60]	34	34	-	-	-	-	-
Total	**171**	**39**	**15**	**20**	**75**	**20**	**2**
Average Annual Investment	**34**	**8**	**3**	**4**	**15**	**4**	**0.4**

The HLIP report states that the "primary" data sources for these final cost estimates came from two studies: 1) A WHO report for the G20 titled "*Assessment of Gaps in Pandemic Preparedness*" (2020), and 2) a McKinsey & Company report titled "*Not the last pandemic: Investing now to reimagine public-health systems*" (2020 & reprinted in May 2021).[90] The HLIP states that the data from these reports was preferred because they "were the most recent and systematic estimates of needs at the global and country levels" (HLIP, p. 82).

Importantly the WHO 2020 report is no longer publicly available, which prohibits examination by REPPARE. In a request to the WHO for access to the 2020 WHO report REPPARE were told that the original report was a "work-in-progress" and that it has been "incorporated and replaced" in March 2022 by a final WHO and World Bank report titled "Analysis of Pandemic Preparedness and Response (PPR) architecture, financing needs, gaps and mechanisms".[91] Furthermore, it was stated that this latter 2022 report was presented to the G20 in Indonesia. Given the importance of both the McKinsey & Company and 2022 WHO and World Bank report (analysed above), they will be examined in detail separately (see Section 6 of this REPPARE report for the McKinsey report).

The HLIP report presents the overall cost estimates from these reports in two tables (Tables 10 and 11). The costs are broken down by capacity category and country income status. Cost figures on the right-side are associated with the McKinsey report while the figures on the left-side are the estimates provided by the WHO.

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[90] https://www.mckinsey.com/industries/public-sector/our-insights/notthelast-pandemic-investing-now-to-reimagine-public-health-systems#/

[91] https://thedocs.worldbank.org/en/doc/5760109c4db174ff90a8dfa7d025644a-0290032022/original/G20-Gaps-in-PPR-Financing-Mechanisms-WHO-and-WB-pdf.pdf

Table 10. Additional Public Funding for Prevention and Preparedness over 5 Years (US$billion). Source HLIP Report, p. 85.

Category	Total	International Financing	National Budgets
Robust surveillance & detection networks	53/94	20/35	33/59
Building resilience in health systems	60/66	19/18	41/48
Supply capacity for medical countermeasures	19/34	19/34	-
of which R&D	8/13	-	-
of which manufacturing	11/20	-	-
Total	**131/194**	**58/87**	**74/107**
Average Annual Investment	**26/39**	**12/17**	**15/21**

Table 11. Additional Public Funding for Prevention and Preparedness over 5 Years (US billion) (Breakdown by Global- and Country-Level). Source: HLIP Report, p. 85.

Category	Total	Global Level Capacities	Country-level Global Public Goods				
			HIC	MIC		LIC	
				International Financing	National Budgets	International Financing	National Budgets
Robust surveillance & detection networks	53/94	5/5	5/15	8/18	27/43	7/11	1/2
Building resilience in health systems	60/66	-	6/1	10/8	33/45	8/10	1/1
Supply capacity for medical countermeasures	19/34	19/34	-	-	-	-	-
of which R&D	8/13	-	-	-	-	-	-
of which manufacturing	11/20	-	-	-	-	-	-
Total	**131/194**	**24/39**	**11/16**	**19/26**	**60/88**	**15/22**	**2/3**
Average Annual Investment	**26/39**	**5/8**	**2/3**	**4/5**	**12/18**	**3/4**	**0/1**

Methodological differences between the two reports can help explain why the WHO estimates are lower than those provided by McKinsey and Company, further explained in Section 6 of this report. The HLIP provides little explanation on how the Panel's estimates synthesised cost data from the two reports and how additional consultations amended the estimates. Instead, Annex H merely outlines why there was a need to increase frontloaded investment figures (due to historical underinvestment) and explains why some costings were excluded from the two reports (i.e. removed McKinsey AMR estimates and WHO HIC estimates). Moreover, Annex H provides several assumptions regarding the need for increased ODA as part of the HLIP international estimate, relying on WHO assumptions that LMIC country ODA will be based on income status (i.e. low-income countries need 88% cost support versus middle

income countries who require 24% cost support). Consequently, without a more robust description of the Panel's methodology, a full understanding of how the final HLIP estimate of US$171 billion over five years was calculated is not possible. Deciphering the basis for the estimates therefore requires a thorough examination of the 2022 WHO and McKinsey & CO reports (see Section 3 above and Section 6 below respectively).

Intuitively, the HLIP estimates occupy an obvious middle position between the two reports at a total estimate of US$171 billion, although it is not an exact average of the two (i.e. US$162.5 billion). Moreover, the HLIP agrees with WHO's estimate that current national level investments are at 3% of GDP, although they reach different conclusions on how that percentage translates into total investment. This suggests a general alignment between the HLIP and the two reports (although see Conclusion for why this is likely due to "congeniality bias"). In addition, it signals that the HLIP report was not meant to provide an exact estimation of pandemic prevention and preparedness cost, but to provide a more general assessment of financing needs for ongoing G20 deliberations. This interpretation is supported by the fact that the HLIP report tends to round numbers up and down without concern for whether the numbers are consistently presented across the report, especially between the figures in the tables and what is highlighted in the report itself.

5.5. HLIP Financing and Governance Recommendations

Based on an assumption of high pandemic risk and further assumptions of meaningful returns on investment, the HLIP recommends financing this investment by increasing "pre-agreed" and "equitable" financial commitments from both advanced and developing countries. This includes: 1) An increase in assessed contributions from one-quarter to two-thirds of the WHO budget (approx. shift of US$1 billion); 2) Creating agreements for PPPR global common goods to become a core mandate of all global financial institutions with reliable replenishment; 3) Exploring new innovative financing incentives to shore-up existing PPPR gaps; 4) Mobilizing US$10 billion of ODA per year via the establishment of a new global fund (titled in the HLIP as Global Health Threats Fund); 5) That multilateral coordination should be enhanced with private and philanthropic sectors to meet financing shortfalls, and; 5) that US$5 billion of ODA per year would go directly to the WHO and other existing global institutions (HLIP, pp. 25-28).

The investments recommended by the HLIP target four gaps identified in the HLIP (p. 32-44):

1. Globally networked surveillance and research: to prevent and detect emerging infectious diseases.

2. Resilient national systems: to strengthen a critical foundation for global pandemic preparedness and response.

3. Supply of medical countermeasures and tools: to radically shorten the response time to a pandemic and deliver equitable global access.

4. Global governance: to ensure the system is tightly coordinated, properly funded and with clear accountability for outcomes.

In summary, the HLIP report recommends a major shift in global health policy and the level of investment required for pandemic prevention and preparedness. For example, an annual investment of US$15 billion a year for international preparedness efforts is substantial and greatly overshadows investments made towards other high burden infectious diseases. International funding for malaria in 2021 was US$3.5 billion of a target of US$7.3 billion (with a trend of decreasing investment from 2019),[92] while global funding for Tuberculosis was US$921 million in 2020, which constituted 3.2% of overall Overseas Development Assistance for health (ODA).[93] In relative terms, the HLIP recommended US$15 billion for pandemic preparedness would consume over half of the entire 2020 ODA amount spent on global

[92] https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2022/questions-and-answers
[93] https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2022/featured-topics/international-funding

health and population programmes (US$29 billion).[94] In 2022, ODA for global health rose to US$39.2 billion (with a fifth of that earmarked for covid-19).[95] In relative terms, the HLIP recommended US$15 billion for PPPR would constitute %38.3 of the entire global health ODA. Assuming that 2022 covid-19 ODA is shifted into PPPR (US$8.5 billion), without new financing to meet the PPPR gaps, then ODA would return back to near 2020 levels (US$30.7 billion), where the HLIP recommended US$15 billion would again make-up almost %50 of global health ODA.

In this context, investments in the range of US$15 billion in ODA over five years for pandemic preparedness has the potential to cause substantial redirections of ODA away from other programmes, while threatening to exacerbate current trends of "donor fatigue" and reduced donor commitments. Furthermore, an overall investment of US$171 billion over five years (with additional maintenance thereafter) represents an opportunity cost at both the national and international level in terms of the effect that that investment (or a portion of that investment) could have if directed toward endemic diseases of high burden and/or to other persistent global health challenges. This is particularly germane for LMICs, who already struggle to respond to existing disease burdens due to resource constraints. Redirecting financing away from everyday health toward investments for an unknown future pandemic risk will have immediate and profound effects on health delivery and outcomes. These effects may not be justifiable. As a result, PPPR cannot be "costed" in isolation, but must be factored in balance with other risks and benefits to produce pandemic policies that are proportional and a net gain for global population health.

[94] https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2022/featured-topics/international-funding
[95] https://devinit.org/resources/aid-2022-key-facts-official-development-assistance-oda-aid/#:~:text=In%202022%2C%20DAC%2Dmember%20governments,and%20an%20all%2Dtime%20high

6. McKinsey & Company "*Not the last pandemic: Investing now to reimagine public-health systems*" (2020 and 2021 revision) Contributing to the HLIP and 2022 WHO and World Bank Report

In July 2020 McKinsey & Co published a report titled "Not the last pandemic: Investing now to reimagine public-health systems", which was revised in May 2021 and republished under the same title. The authors aimed to make "an economic case for investments in infectious-disease surveillance and preparedness" since "the returns from smart investments in preparedness and response are likely to be large multiples of their costs" (McKinsey & CO, p. 2).

The 2021 McKinsey report was cited by the WHO and World Bank, and the G20 High Level Independent Panel (HLIP), as one of two primary sources for their analysis of pandemic prevention, preparedness and response cost and financing estimates (see above). As a result, this report has played an outsized role in influencing current PPPR strategies and policy debates, particularly regarding justification for the WHO and World Bank estimates for US$31.1 billion annual investment in PPPR.

6.1. PPPR Return on Investment

The McKinsey report begins by mirroring a conclusion of *The Independent Panel for Pandemic Preparedness and Response* (IPPPR),[96] which argued that COVID-19 was "the 21st century's 'Chernobyl moment' and making clear that if investment doesn't occur now, we will condemn the world to successive catastrophes" (McKinsey & Co, p. 2). To press the case for investment further, the McKinsey report suggests that COVID-19 was a "test run for a pandemic that arrives soon, with even more serious consequences". The report posits a hypothetical pandemic threat scenario, asking the reader to "imagine a disease that transmits as readily as COVID-19 but kills 25 percent of those infected and disproportionately harms children" (McKinsey & Co, p. 2).

A scenario of this magnitude would indeed pose a serious threat to human health, since it would clearly result in a high burden of disease across several measures (excess mortality, DALYs and QALYs) as well as resulting in major economic impacts. Nevertheless, the rationale and justification for the appropriateness of using such a hypothetical as a practical heuristic is not provided and the aim of the hypothetical might be best described as an attempt to shock governments away from "atrophy" and from cycles of "panic and neglect" (McKinsey & Co, p. 2).

However, as argued elsewhere,[97] there are reasons to advance a more measured analysis of zoonosis risk, which according to the evidence relied upon by the WHO and World Bank, estimated that the likelihood for another (and less dangerous) "COVID-like" event occurring is 129 years. Moreover, it is debatable whether there is historical precedence to support the hypothetical used by the McKinsey report. Other than perhaps measles and smallpox, which were deadly due to being rapidly introduced into immunologically naïve populations, it is difficult to locate a specific pathogen that had these attributes. Although there might be bacterial candidates worthy of historical consideration as a comparative scenario, the risks from these would now be greatly reduced due to the introduction of antibiotics and modern sanitation. As a result, it is seemingly more appropriate to argue from a position of general prudence. Namely, that it is prudent to prepare for future outbreaks and to develop effective PPPR mechanisms to mitigate risk, since outbreaks will occur and will have health effects. Yet, it is also prudent to design measures that proportionately reflect known empirical risks and advances in health and technology, and that are cognate of a fuller range of costs and benefits associated with PPPR policy.

Nevertheless, relying on their escalated risk profile for pandemics, the McKinsey report estimates that:

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[96] https://theindependentpanel.org/wp-content/uploads/2021/05/COVID-19-Make-it-the-Last-Pandemic_final.pdf
[97] https://essl.leeds.ac.uk/downloads/download/228/rational-policy-over-panic

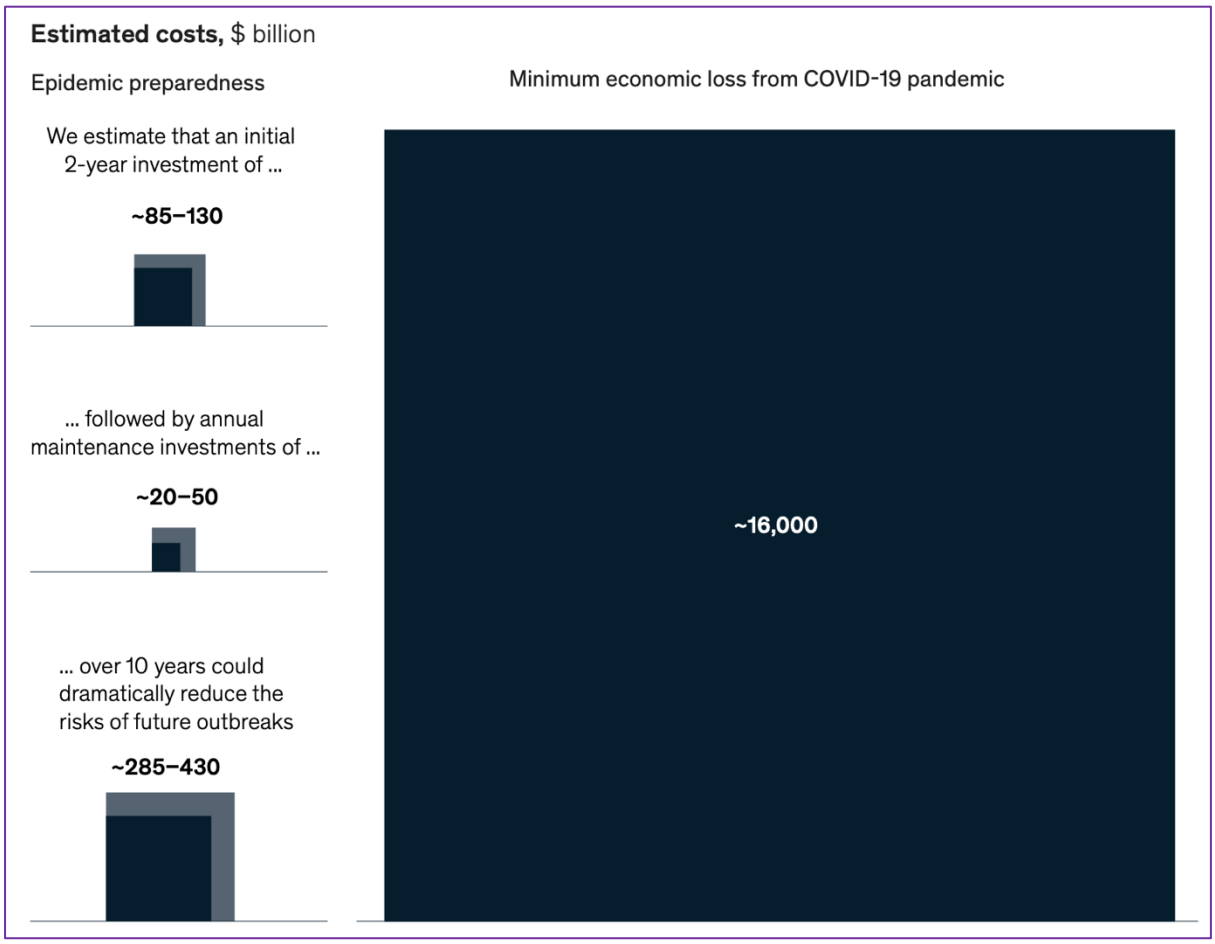
> *"spending approximately $85 billion to $130 billion over the next two years and approximately $20 billion to $50 billion annually after that could substantially reduce the likelihood of future pandemics… This equates to an average of about $5 per person per year for the world's population"* (McKinsey, p. 2).

Moreover, McKinsey estimate that:

> *"Approximately 27 percent of this spend would take place at the global and regional levels, and about 73 percent would take place at the country level (8 percent in high-income countries and 65 percent in middle- and low- income countries)"* (McKinsey, p. 3).

To support this investment as providing a significant return on investment the McKinsey report provides a visual (Figure 10).

Figure 10. Assuming a COVID-19-scale epidemic is a 50-year event, the return on preparedness investment is clear, even if it only partly mitigates the damage. Source: McKinsey, p. 3).



The return of investment is based on an assigned economic impact of COVID-19 at US$16 trillion dollars, which McKinsey took from a previous report titled *"Crushing coronavirus uncertainty: The big 'unlock' for our economies"* published in May 2020.[98] Assuming the economic impact to be correct as of May 2020, the report seeks to demonstrate in visual form the comparative size of the economic investments in PPPR relative to economic impacts over a fifty year period (with the assumption that a Covid-like event occurs every 50 years). What is evident in the visual is that the investments are minimal when compared to the overall economic impact of COVID-19, delivering a message that investments now would be minuscule when compared to what another COVID-like pandemic will cost (i.e. compared to the return in costs averted).

However, a closer examination of this visual raises several issues that render McKinsey's argument underwhelming.

First, the visual assumes that another COVID-19 event will occur, and if it does occur, it will take place within the next 50 years. The report provides no evidence to substantiate the use of this outbreak frequency while also foregoing existing evidence in a paper quoted by the World Bank that suggested a far longer time horizon of 129 years for another "COVID-19-like" event,[99,100] reflecting the absence of such events for a century after the 1918-19 Spanish Flu. Second, the visual assumes that the recommended investments in PPPR would eliminate the full cost of the economic impact of COVID-19 (US$16 trillion) and a similar "COVID-like" pandemic. Similar to fallacious assumptions in the 2022 WHO and World Bank report, as well as the HLIP report, the McKinsey report makes no attempt to untangle what are direct economic impacts related to the virus (e.g. emergency surge capacities and therapeutics) from self-inflicted indirect costs resulting from policies that arguably resulted in unnecessary economic impacts (e.g. lost income, supply line interruptions, travel bans, etc.). For example, over a third of households in LMICs reported they stopped working during the pandemic due to lockdowns, with higher rates in countries with stricter policies.[101] Meanwhile, evidence for the effectiveness of non-pharmaceutical interventions remains meagre.[102] As a result, it is not clear that the US$16 trillion economic impact can necessarily be attributed only to the emergence of SARs-CoV-2. This confounder is supported by emerging evidence which suggest that the largest economic impacts from COVID-19 were due to questionable policy responses. Third, as argued elsewhere,[103] COVID-19 is seemingly a historical outlier in terms of recorded non-influenza outbreaks over the last one hundred years and their associated disease

[98] https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/crushing-coronavirus-uncertainty-the-big-unlock-for-our-economies
[99] https://www.pnas.org/doi/10.1073/pnas.2105482118
[100] https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099530010212241754/p17840200ca7ff098091b7014001a08952e
[101] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8823956/
[102] https://onlinelibrary.wiley.com/doi/10.1002/cesm.12055
[103] https://essl.leeds.ac.uk/downloads/download/228/rational-policy-over-panic

burdens. If this assessment is correct, then it renders the McKinsey visual a worst-case scenario and thus a potentially inappropriate primary case example upon which to base significant PPPR investment.[104,105] Lastly, if COVID-19 is not of natural origin, but the result of a lab escape, as an increasing evidence base argues, then it is not clear whether PPPR measures and associated costs as currently formulated would prevent such a threat from occurring again. If the alternative origin story is plausible or representative of any future risk, then current PPPR costing is based on an impoverished threat assessment and should include greater emphasis on laboratory and research standards in order to prevent similar human-made accidents.

[104] https://www.bmj.com/content/382/bmj.p1556
[105] https://www.dni.gov/files/ODNI/documents/assessments/Unclassified-Summary-of-Assessment-on-COVID-19-Origins.pdf

6.2. PPPR Costings

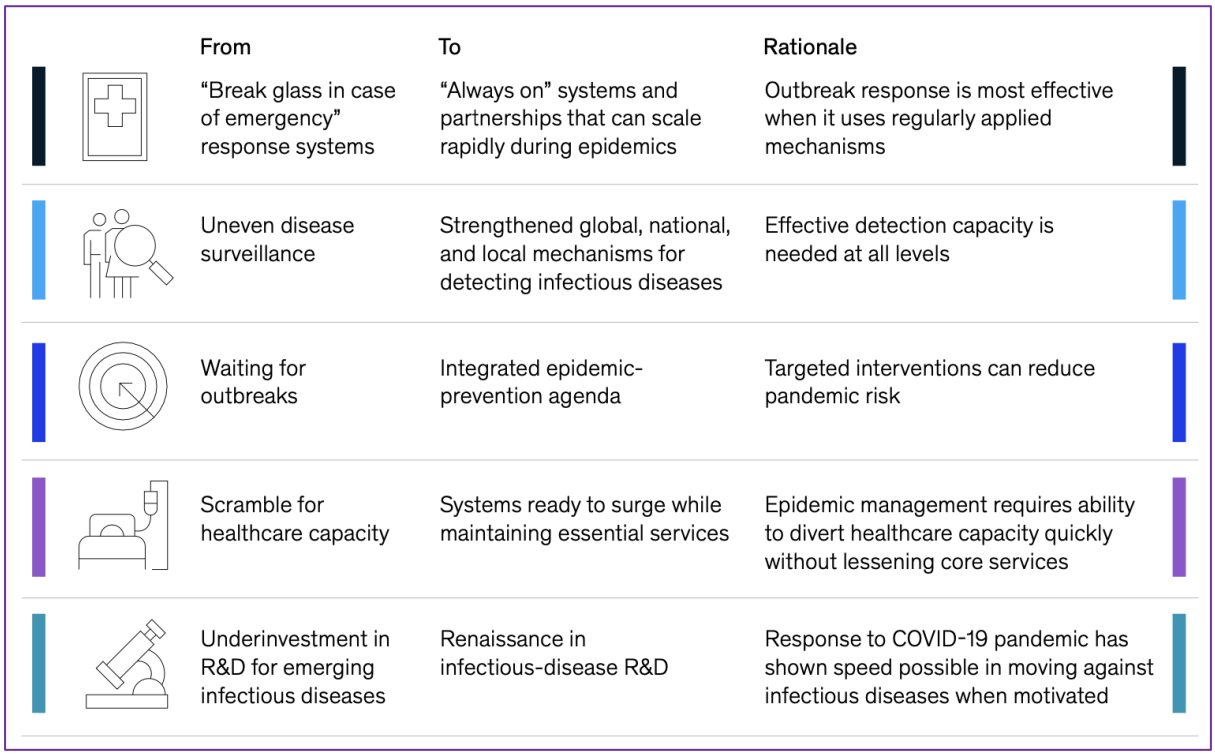
The McKinsey and Company report prefaces its costing estimates with a disclaimer, claiming that the report provides only "high-level estimates with wide error bars" (McKinsey & Co, p. 3). The report continues by stating that its estimates do not cover the full range of health system strengthening necessary for emergency preparedness nor does it include the full range of AMR or One Health provisions. In addition, the McKinsey report does not provide the full details of its costing analysis, instead making a partial data set and its methodological assumptions available for download at McKinsey.com (a downloadable two-page Appendix in the form of a spreadsheet).[106]

The McKinsey report estimates the PPPR costs across five areas (Figure 11). These include:

- building "always on" response systems;
- strengthening mechanisms for detecting infectious diseases;
- integrating efforts to prevent outbreaks;
- developing healthcare systems that can handle surges while maintaining the provision of essential services, and;
- accelerating R&D for diagnostics, therapeutics, and vaccines (McKinsey & Co, p. 4).

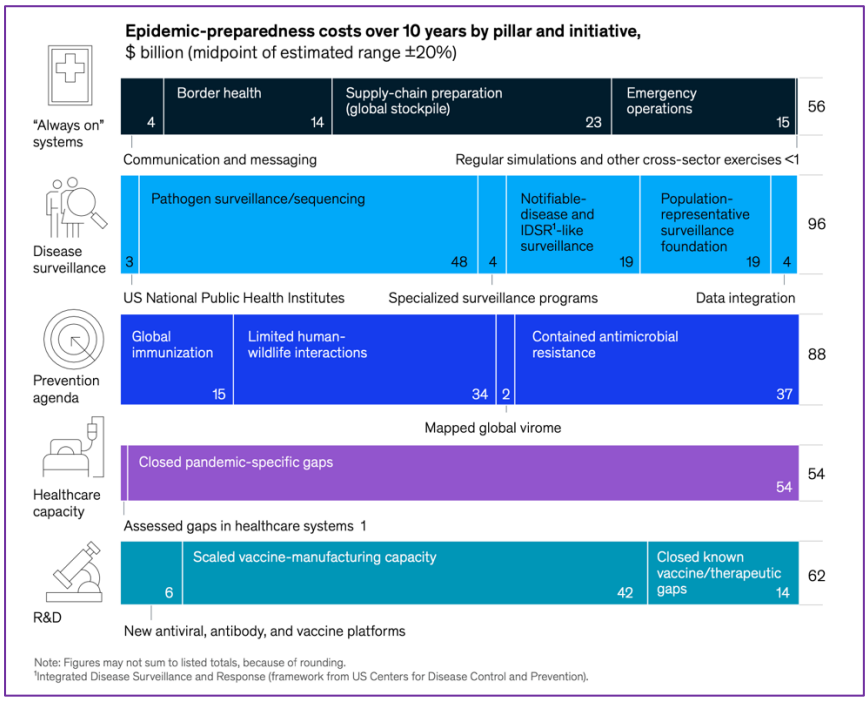
[106] https://www.mckinsey.com/~/media/mckinsey/industries/public%20and%20social%20sector/our%20insights/not%20the%20last%20pandemic%20investing%20now%20to%20reimagine%20public%20health%20systems/may%202021%20update/appendix-not-the-last-pandemic-may-31-2021.pdf?shouldIndex=false

Figure 11. Five shifts in healthcare systems can help reduce the chance of future pandemics. Source: McKinsey & Co., p. 4).



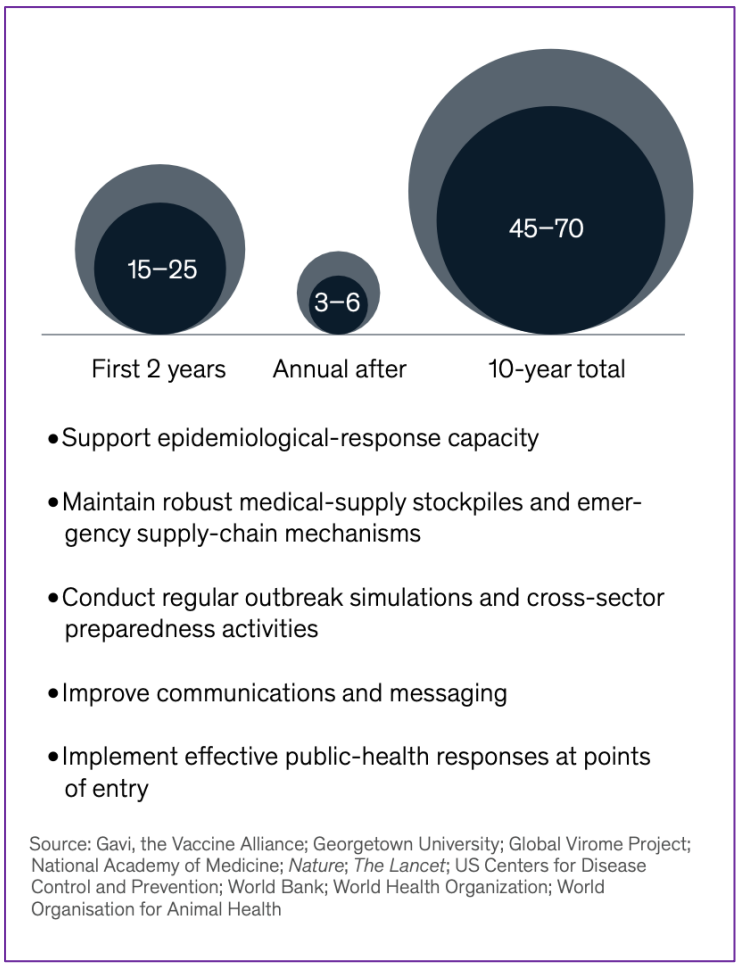
Unlike previous headline estimates that included a PPPR cost range of US$285 and US$ 430 billion over ten years, the report settles on a simple average between the two, suggesting that the "five pillars of preparedness can be achieved at a total cost of US$ 357 billion over 10 years" (equates to roughly US$35.7 billion a year with frontloaded investment, although this breakdown was not given in the McKinsey report).

Figure 12. Five pillars of preparedness can be built for $357 billion, in our estimate. Source: McKinsey & Co., p 5.



The McKinsey report is separated into five sections, each presenting the costs for each pillar in a series of individual graphics. These graphics show the initial two-year investment, subsequent annual investments, and then total investment for each pillar over ten years. Below each graphic, a list of capacities to be supported is provided. Each graphic supplies a list of sources used to determine the cost estimates, although details about what data, exact location of that data, and how cost estimates were analysed and calculated individually or across the cited sources is not given (see Figure 13 as an indicative example). That said, some further details about sources and data used are summarized in the downloadable Appendix (see above).

Figure 13. Building "always on" epidemic management systems means they are ready as soon as outbreaks start. Summary of estimated epidemic-preparedness initiatives and investments, US$ billion. Source. McKinsey & Co., p. 6.



It is difficult to determine the accuracy of the estimates provided in the McKinsey and Company report. This is largely due to two factors. First, the sources given for each pillar are merely a list of organizations from which information was gathered for assessment, including Gavi, The Lancet, Georgetown University, WHO, and the World Organization for Animal Health (Figure 13). When cross referenced with details provided in the report's Appendix, only basic summaries are provided for the cost assumptions used and from the source organization. As a result, it is difficult to fully pinpoint how cost estimations were assessed by McKinsey without more specific details on the data used, and how that data was combined and analysed. Second, without analysis of the direct (but unspecified) sources used in the McKinsey report, it is not possible to assess the reliability and accuracy of the evaluations made by the individual organizations cited in the Appendix spreadsheet. Although academic sources are assumed to have been peer reviewed and scrutinized, this may not be true of the material provided by organizations. Consequently, the report rests upon an assumption that the cost estimates from various sources are methodologically robust and methodologically

compatible in a way that allows reliable comparisons across the pillars and sub-capacities within the McKinsey report.

However, assuming that the McKinsey estimates are correct, the report still fails to situate its estimates in relation to other global health priorities and financing. As demonstrated with the WHO, World Bank, and HLIP estimates (Sections 3.1, 4.3, 4.4, 5.2, and 5.4), the McKinsey report does not factor the opportunity costs involved with channelling US$35.7 billion a year into PPPR. As the McKinsey report argues, 27% of the US$35.7 billion a year would be at global and regional levels, which suggests that annual ODA for PPPR would be US$9.6 billion, while middle- and low-income countries would be required to invest 65% of the total amount, suggesting annual investments of US$23.2 billion. When compared to total ODA spend for global health in 2022 (US$39.2 billion), the annual ODA for PPPR recommended by McKinsey would constitute nearly 25% of total spend (US$24.49 billion). If ODA returns to 2020 levels, then US$9.6 billion a year would account for nearly a third of all global health spend.

Moreover, the McKinsey report does not contextualize its cost estimates relative to known global disease burdens. Instead, the report measures the appropriateness of its PPPR investment recommendations against the economic impacts of COVID-19 (as of May 2020) and via a hypothetical pathogen with a drastically higher disease burden than SARS-CoV-2. Although hypotheticals can be useful heuristics for policy and planning, they should also reflect known empirical realities and historical trends. In this light, the "value for money" argument presented by McKinsey looks unconvincing, since international funding for malaria in 2021 was US$3.5 billion of a target of US$7.3 billion (with a trend of decreasing investment from 2019),[107] while global funding for Tuberculosis was US$921 million in 2020, which constituted 3.2% of overall ODA for health.[108] The problem, however, is that both malaria and tuberculosis combined kill roughly 2 million people per year (conservative estimates). When extrapolated over ten years (as done with the McKinsey costings), it is expected that approximately 20 million will die from these two diseases (assuming levels remain stagnate), many of which are children. Given that official deaths from COVID-19 were roughly over 7 million people over four years (mostly the aged), the relative investment in PPPR for an unknown future risk looks misplaced.

In this context, investments in the range of US$9.8 billion in ODA a year for pandemic preparedness has the potential to cause substantial redirection of scarce resources away from other programmes, while threatening to exacerbate current trends of "donor fatigue" and reduced donor commitments to endemic diseases such as malaria. Furthermore, US$23.2 billion a year from already low-resource countries represents a significant opportunity cost in terms of the effect that investment (or a portion of that investment) could

[107] https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2022/questions-and-answers
[108] https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2022/featured-topics/international-funding

have if directed toward endemic diseases of high burden and other local health challenges. Redirecting financing away from everyday health toward investments for an unknown future pandemic risk will have immediate and profound effects on health delivery and outcomes. These effects may not be justifiable. As a result, as has been suggested of other key PPPR estimates by the WHO, World Bank and G20 in the REPPARE report, PPPR should not be "costed" in isolation, but must be factored in relation to other risks and benefits to produce pandemic policies that are proportional and a net gain for global population health.

7. What is the true cost of pandemic prevention, preparedness and response?

At the end of May 2024, the World Health Assembly will vote on whether to adopt two new legally binding World Health Organization (WHO) instruments: the Pandemic Agreement and the amended International Health Regulations (IHRs). These policies have been designed to coordinate and compliment other emerging pandemic preparedness initiatives, such as the World Bank's Pandemic Fund, the WHO International Pathogen Surveillance Network, and the Medical Countermeasures Platform, as well as coordinate national level preparedness.

To support this emerging agenda the WHO, World Bank and Group of 20 (G20) commissioned two reports to estimate the costs of pandemic prevention, preparedness, and response (PPPR) and to examine associated financing requirements, returns on investment, and funding modalities. This REPPARE report reviewed these documents as well as supplemental material provided by the WHO Secretariat in support of the International Negotiating Body (INB) for the Pandemic Agreement and International Health Regulation Working Group (IHRWG). Our examination aimed to better determine the degree to which the estimates are substantiated by evidence and are justified within the wider context of health financing. As part of this effort, we further analyzed the data and evidentiary material cited from a primary resource used across the two policy documents (McKinsey and Company) as well as the secondary sources (n=10) cited by the WHO / World Bank and HLIP. Our analysis focused on the robustness of the cost estimations and whether the associated financial recommendations are justified as having appropriate returns on investment in support of the current pandemic preparedness agenda.

The research identified four crosscutting concerns arising from this analysis.

7.1. PPPR estimates lack reliability

The reliability of PPPR estimates is weak since there is a general lack of accurate cost estimations for current pandemic preparedness at both the domestic and international level due to poor monitoring, a lack of reporting, and inconsistent definitions about what constitutes pandemic preparedness. To compensate for this lack of evidence, the PPPR documents overly relied on a small sample of case studies, the same shortlist of academic studies, the use of significant extrapolations from poor datasets, and the use of loose estimates provided by McKinsey and Company.

One consequence of this limited evidence base is that the primary cost estimates used by the WHO, World Bank, the International Negotiation Body, the International Health Regulations Working Group and G20 are based on just three reports which are self-referential and under-scrutinized, creating a circular evidence and citation base. As outlined in the previous sections, the HLIP relied upon the 2021 WHO and World Bank report and the report from McKinsey & Company to calculate their PPPR financing estimates. The 2021 WHO and World Bank report relied on the very same McKinsey estimates. Yet, in an obscured act of circular logic, the 2022 WHO and World Bank updated report then also cited the HLIP report for validation of their cost estimates, which were in fact, largely based on estimates from the WHO and World Bank's original 2021 report. As discussed in Section 4.5, this circular justification creates a false perception of scientific rigor and counter-verification. More worryingly it results in potential "congeniality bias", which is demonstrated by the fact that when distilled to an annual estimate for PPPR, all three reports coalesce around a surprisingly similar PPPR price tag of US$31.1 billion to US$35.7 billion (US$31.1 billion; WHO/World Bank - US$34.2 billion; HLIP - US$35.7 billion; McKinsey). Usually, such a low margin between independent studies would suggest a high level of reliability in the estimates provided. However, in this case, given the incestuous nature of the sources used and the limited methodologies outlined, reliability and accuracy are undermined. As a result, there is a clear need for more robust PPPR baseline estimates as well as projected costs to fill identified gaps.

7.2. Unconvincing justification for PPPR value for money

Claims made about PPPR value for money and return on investment are highly unconvincing. The investment models applied to justify PPPR used problematic, crude, or unexplained baselines for comparison while failing to properly examine wider impacts on economies and other disease burdens. For example, the documents uniformly assumed that PPPR measures could prevent 100% of the economic impact associated with an outbreak (although the HLIP did hedge its bet by later suggesting that it might be only 75%). This is highly doubtful, since preventing and containing zoonosis is extremely challenging and even minor outbreaks will produce some impact. Moreover, and more concerningly, the models used COVID-19 as their comparative baseline yet failed to disaggregate direct impacts resulting from the emergence of SARS-CoV-2 (hospitalizations, treatments, lost incomes due to illness) from indirect impacts resulting from society-wide policy responses that generated negative economic impacts (lockdowns, travel bans, fiscal injections, stimulus packages, etc). Given that the largest costs of COVID-19 are associated with social response measures such as lockdowns, the reports create a false impression of value for money and strong return on investment. An alternative argument is that greater value for money would result from an appropriate and thoroughgoing review of the response measures used during COVID-19 to properly determine their efficacy and costs versus benefit.

While return on investment is commonly used within the private sector, its use in public health is more challenging since monetising benefits is not straightforward and there are a variety of non-fiscal benefits that can be included. The goal of return on investment is to translate the benefits of an investment into a single quantitative measure expressed in monetary terms, so its “value” can be directly compared with its cost. However, in the case of the PPPR documents reviewed, these challenges were further compounded by long time horizons and the failure to acknowledge that contextual conditions will inevitably change, such as shifting global health burdens and new technological advancements.

7.3. An unprecedented cost threatening to absorb global health financing

Even if the estimates for PPPR are correct, they represent a significant alteration in global health policy and would constitute anywhere from 25% to 55% of current ODA spend for health. This represents a disproportionate investment for an unknown future disease burden. In terms of public policy, this defies traditional practices in public health, which would weigh any benefit of pandemic prevention against other disease burdens and health financing needs.

7.4. The PPPR estimates pose unrecognised opportunity costs with the potential for net harm

The estimates provided by the documents analysed failed to consider the significant opportunity costs associated with the unprecedented investments being suggested by the WHO, World Bank and HLIP. Opportunity costs are important to any public health policy, since the estimated cost and financing requirements for PPPR pose the risk of redirecting scarce resources from global and national health priorities of greater burden. It is therefore vital that cost estimates are accurate and reliable. Moreover, any investment cannot be determined in isolation, but must also be weighed against competing health, social and economic priorities, since the recommended investments for pandemic preparedness carry broad implications for societal health. These reflections were not considered within the documents we reviewed, thus suggesting that no serious effort has been made to weigh PPPR against other known global public health concerns.

7.5. Recommendations

There is a clear need to commission better global and country level baseline and preparedness cost estimations to accurately determine the scale and potential trade-offs of the pandemic preparedness financing required. In doing so, a wider range of case country examples and primary data collection regarding current PPPR spend is required to better identify exact gaps as well as to capture contextual variation and need. Furthermore, better evaluation of current regional and global level PPPR activities and costs is necessary, since overlapping programmes and institutions pose problems of double-counting and the entanglement of financial flows.

Moreover, an appropriate determination of financial need must weigh these costs against other priorities in global health as well as country level disease burden needs.

Understanding relative disease burden and economic impacts is crucial for identifying the cost-benefit and return on investment of pandemic financing as well as how to best select interventions that promote overall public health outcomes. Failing to take these wider issues into account will result in overly expensive PPPR policies that deliver limited public health benefit.

Given the poor evidence underlying pandemic cost and financing requirements, it is prudent not to rush into new pandemic initiatives until underlying assumptions and wider claims of a return on investment receive proper assessment based on robust evidence, recognized need and risk, and overall benefit.

WHO Member States should support proportional pandemic preparedness efforts based on substantiated investment need, careful deliberation, and rational reflection.