

# All for Health, Health for All

Investment case 2025–2028



Methods Report



World Health  
Organization

## Table of Contents

1.	Background and purpose .....	2
1.1	Aim and scope: .....	2
2.	Methodological approach: .....	2
2.1	Key methodological decisions .....	3
2.1.1	Data sources .....	3
2.1.2	Contribution approach to health benefits .....	3
2.1.3	Defining the counterfactual .....	4
2.1.4	Discounting .....	4
2.2	Data Identification .....	4
2.3	Data extraction and analysis .....	5
2.3.1	Alignment of counterfactuals .....	6
2.3.2	Strategies to Mitigate Overlap in Lives Saved Across Studies .....	9
3.	Climate change modelling .....	10
3.1	Definition of intervention packages .....	10
3.3	Analysis .....	10
3.3.1	Global scale-up models .....	10
3.3.2	Models of health impact .....	11
3.4	Results .....	12
4.	Health emergencies preparedness and response estimates .....	13
4.1	Current number of deaths .....	13
4.2	Projections .....	14
5	Results .....	14
5.1	Lives saved estimates .....	14
5.2	Regional and country breakdowns of lives saved .....	15
5.3	Conversion to economic benefits and validation of ROI .....	15
6	Comparison to other investment cases .....	17
7.	References .....	20
	Annex 1: full list of identified studies .....	22

## 1. Background and purpose

WHO's first Investment Round (IR) begins in May 2024 at the 77<sup>th</sup> World Health Assembly. The IR provides donors with a unique opportunity to support WHO, with predictable, flexible, resilient financing to respond to and keep pace with the world's escalating health challenges, across all levels of the Organization – headquarters, regional and country levels. Sustainable funding enables WHO to remain focused on global health priorities, to remain agile in responding to shifting health threats, to plan for the longer term, and to ensure the Organization's integrity, impartiality, and independence.

The Investment Round is closely linked to the development of the 14<sup>th</sup> General Programme of Work covering the period from 2025-2028, budget projections, and the associated results framework is supported by the development of an Investment Case for the 4-year period of GPW14. The investment case and budget requirements are tied to the outputs and outcomes proposed in GPW14, that clearly articulate what WHO will do and how it will drive measurable impact at the country level, working in collaboration with other global health actors.

The investment case will also make an economic case for investment in WHO. The Investment Case will be across three workstreams:

1. *Develop a compelling narrative to articulate the unique added value of WHO*
2. *Quantify the lives saved by achieving the targets in the GPW14 Results frameworks and aligned with the rest of the ecosystem*
3. *Produce thematic deep dives to demonstrate impact on key themes*

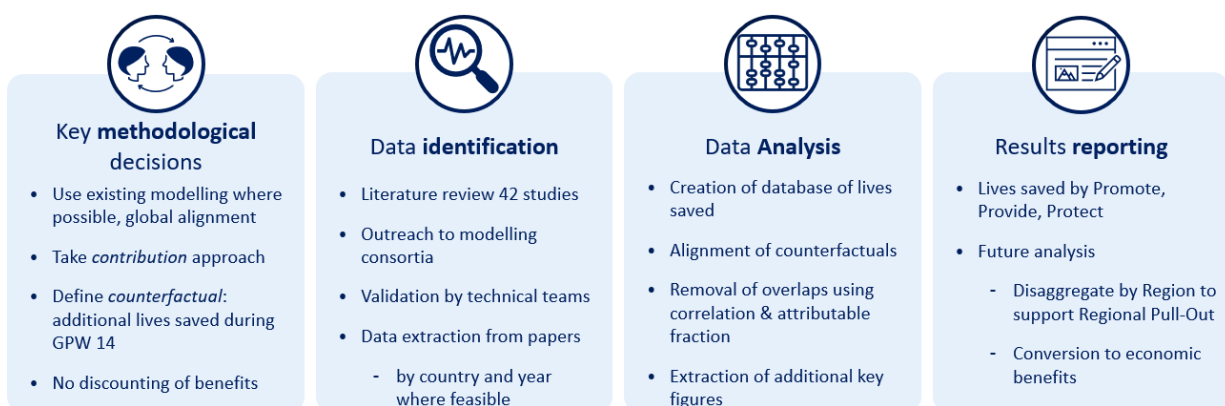
This document outlines the methodology for the quantitative analysis on lives saved which underpins the Investment Case.

### 1.1 Aim and scope:

The overall aim of the quantitative analysis is to analyze the impact of investment in the whole of the WHO General Programme of Work, taking a contribution approach to health outcomes. The analytics will be based on specific activities related to WHO's outputs, specifying where and by when certain outputs and outcomes will be achieved.

## 2. Methodological approach:

The aim of the analysis is to quantify WHO's contribution to lives saved during the GPW14 period, if targets related to outcome indicators are achieved. Figure 1 provides a high-level summary of the modelling approach, with further detail on each step provided in the following sections.



**Figure 1:** Overarching methodological approach to WHO Investment Case

## 2.1 Key methodological decisions

### 2.1.1 Data sources

The impact of WHO's work in GPW14 has been quantified building on existing global modelling efforts and investment cases to estimate the lives saved resulting from WHO's activities, along with the economic benefits. Where health benefits are non-quantifiable, narratives outlining how WHO effects change are included. Deep dives into focus topics highlight WHO's activities and showcase the contribution of leadership, WHO global public health goods, and technical support to achieving measurable impact in countries.

To develop the lives saved calculation in the most efficient way possible, existing modelling efforts and global investment cases were used as the basis for the analysis. Where there was no existing data, new modelling studies were commissioned.

### 2.1.2 Contribution approach to health benefits

The contribution approach and the attribution approach are two distinct methodologies employed in impact modelling, each offering unique insights into the effectiveness of interventions. The contribution approach focuses on assessing the overall impact of a program or intervention, acknowledging the collective efforts of various stakeholders and external factors that contribute to the observed outcomes. It emphasizes the holistic understanding of impact, recognizing the interconnectedness of multiple factors at play. In contrast, the attribution approach seeks to isolate the specific contribution of a particular intervention or actor to the observed outcomes, aiming to attribute causality directly to the intervention itself.

As GPW14 strongly acknowledges the role of partnerships, and the entire global health architecture to deliver impact, the decision was taken to focus on a contribution approach. As such, modelling studies were considered if they modelled the implementation of WHO's guidance, regardless of the payer or the role of different agencies and national governments in implementation.

### 2.1.3 Defining the counterfactual

In impact modelling, a counterfactual refers to a hypothetical scenario used as a basis for comparison to assess the impact of an intervention or program. Essentially, it represents what would have happened in the absence of the intervention being evaluated. The counterfactual provides a benchmark against which the observed outcomes of the intervention are measured. By comparing the modelled outcomes to those that would have occurred without the intervention, we can estimate the expected impact of scaling up health interventions.

For the WHO investment case, the intent was to model the impact of WHO's GPW 14 targets being met, that is to estimate how many additional lives can be saved over the GPW14 period, compared to no GPW14. The counterfactual is therefore defined as the number of deaths occurring in business-as-usual projections, versus scaling up interventions over the 4-year period.

There are many ways to define the counterfactual: for example, the use of a null (no intervention) is often employed when developing investment cases to allow maximization of the health impact associated with scale up. This was not the option chosen for this analysis due to the framing of the Investment Case, which is to as closely as possible show the additional health impact of implementing GPW14.

### 2.1.4 Discounting

Discounting is used in health economics primarily to account for the time value of money and to compare costs and benefits that occur at different points in time. As there is no intent to define a cost-effectiveness or cost-benefit ratio in this analysis, no discounting has been employed.

## 2.2 Data Identification

We conducted a literature review with the aim of identifying return on investment and/or cost-effectiveness modelling studies conducted by WHO (or based on initiatives or goals proposed by WHO) for the domains prioritized by GPW14.

Investment case studies were first identified in the WHO's publication repository using the keywords "investment", "cost" or "investing". Subsequently, we matched each of the studies to a WHO strategic objective (e.g. "More climate-resilient health systems are addressing climate risks and impacts") to map out all the objectives covered by at least one study. For objectives that were not covered by the initial search, we conducted a targeted search in the WHO IRIS Repository using keywords related to the objectives (e.g. "climate risk"). Additionally, to identify studies not stored in either repository, the same keywords, along with "WHO", were used to search for eligible studies on Google Scholar. Due to the vast number of search results, we only reviewed the first three pages of publications. At this stage, we were flexible, also admitting epidemiological analysis conducted at a global level, even if they did not present economic data.

Among all the papers retrieved, we identified 42 WHO reports, predominantly comprising return-on-investment (ROI), cost-benefit, or cost-effectiveness analyses (see Appendix 1 for more information). For these 42 reports, we extracted information including: general setting (publication name, authors, study

type, year of publication, countries or regions involved, period of analysis) along with information on the methodological approach conducted (type of epidemiological data used, type of costs considered, health benefits included, economic benefits included, and any other modelling assumptions of importance). The database containing all this information is available in case modelling groups require specific information about previous methodological approaches or assumptions made in previous modelling studies.

From this literature review, we identified gaps in the modelling of health outcomes associated with Climate Change and Health Emergencies Preparedness and new modelling was commissioned.

## 2.3 Data extraction and analysis

Consequently, we proceeded with the extraction of health impact data, including the number of lives saved, health-adjusted life years saved, or disability-adjusted life years (DALYs) averted per year, regionally or globally when data was not disaggregated by region, and by disease group, risk factor, or intervention. For this extraction, we exclusively considered studies with a global or regional scope and projections (or target goals) up to 2030, all of which were published within the last 5 years. This approach aimed to prioritize more recent estimates.

In cases where studies have only reported aggregated health benefits for an analysis period (e.g., 2020-2030), without disaggregating by year, a simple average was conducted to obtain an estimated value of the expected annual health benefit. Also, in cases where two or more reports provided information on the same intervention, priority was given to the one with a broader scope or that reported a greater number of lives saved. However, some reports present aggregated information involving a combination of different interventions, many of which may also be evaluated in other reports (see Strategies to Mitigate Overlap in Lives Saved Across Studies).

Table 1 presents the main sources identified and considered along with the name of the disease category or risk factor for which they provided data. In addition, Appendix 2 shows detailed information on how the numbers of lives saved were obtained and the assumptions made for each study report.

**Table 1.** Main study reports identified and considered for each disease category or risk factor.

Disease or Risk factor	Source
Hepatitis	"Additional resource needs for viral hepatitis elimination through universal health coverage: projections in 67 low-income and middle-income countries, 2016-30" (1)
HIV, STI	HIV Heatmap (2)
Tuberculosis	"One Million Lives Saved Per Year: A Cost–Benefit Analysis of the Global Plan to End Tuberculosis, 2023–2030 and Beyond" (3)
Malaria	WHO internal data.
Maternal health	"Improving maternal and newborn health and survival and reducing stillbirth" Progress report 2023 (4)
Child health	"UNIGME 2023" (5)

Vaccines	“Estimating the health impact of vaccination against ten pathogens in 98 low-income and middle-income countries from 2000 to 2030: a modelling study”. VIMC Data Visualisation Tool (6) “Modeling the impact of vaccination for the immunization Agenda 2030: Deaths averted due to vaccination against 14 pathogens in 194 countries from 2021 to 2030” (7)
Hypertension	“Global report on hypertension: the race against a silent killer “ (8)
Tobacco	Combined figure from two sources: “It’s time to invest in cessation: the global investment case for tobacco cessation” (9) Disaggregated data from “Saving lives, spending less: the case for investing in noncommunicable diseases” (10)
Alcohol	Disaggregated data from “Saving lives, spending less: the case for investing in noncommunicable diseases” (10)
Physical Activity	
Dietary interventions	
Diabetes intervention	Disaggregated data from “Saving lives, spending less: the case for investing in noncommunicable diseases” (10)
Cancer	"WHO REPORT ON CANCER" 2020 (11)
Road Safety	"Saving lives through road safety risk factor interventions: global and national estimates" (12)
AMR	WHO internal data.
Climate Change	WHO internal data. See section below “Climate change modelling”
Health Emergencies Preparedness and Response	WHO internal data. See section below “Health Emergencies Preparedness and Response estimates”

### 2.3.1 Alignment of counterfactuals

In many of the publications identified, the base case scenario did not align with our defined counterfactual. In the majority of cases, however, a “no change” trajectory was available. This was used to adjust the numbers of lives saved over 2025-2028 to align with the appropriate definitions.

**Table 2.** Data extraction and calculation for each disease area

Disease or Risk factor	Source	Main assumptions on how the total number of lives saved were obtained
Tobacco	Combined figure from two sources: "It's time to invest in cessation: the global investment case for tobacco cessation" Disaggregated data from "Saving lives, spending less: the case for investing in noncommunicable diseases"	Combined data from smoking cessation study report and disaggregated data from NCD study report for tobacco-related deaths by year.
Alcohol	"Saving lives, spending less: the case for investing in noncommunicable diseases"	Combined disaggregated data for all three risk factors by year.
Physical Activity		
Dietary interventions		
Diabetes intervention	Disaggregated data from "Saving lives, spending less: the case for investing in noncommunicable diseases"	Based on fractions of diabetes-attributable CVD and sex proportions of CVD incidences from The Global Cardiovascular Risk Consortium 2023, we assumed 12.1% of CVD lives saved were attributable to diabetes.
Road Safety	"Saving lives through road safety risk factor interventions: global and national estimates"	A constant rate of mortality reduction was assumed, lives saved adjusted for the period of analysis from the total lives saved.
HIV, STI	HIV Heatmap	Calculated from the difference between the projected baseline (assuming the same trend as observed for 2020-2022) for 2025 and the target of deaths from HIV, STI and Hepatitis-related causes in 2025.
Tuberculosis	"One Million Lives Saved Per Year: A Cost–Benefit Analysis of the Global Plan to End Tuberculosis, 2023–2030 and Beyond"	Obtained from Figure 2: the difference between projected tuberculosis deaths under baseline and Global Plan scenarios (with vaccine).
Malaria	WHO Global Malaria Programme	Data provided by WHO Global Malaria Programme comparing current mortality with projected mortality in 2028 if on-track to meet GTS targets
Child health	"UNIGME 2023"	Derived from projected mortality averted if countries realise SDG. A constant rate of mortality reduction was assumed, lives saved adjusted for the period of analysis from the total lives saved.
Maternal health	"Improving maternal and newborn health and survival and reducing stillbirth" Progress report 2023	A constant rate of mortality reduction was assumed, lives saved adjusted for the period of analysis from the total lives saved.
Vaccines	"Modeling the impact of vaccination for the immunization Agenda 2030: Deaths averted due to vaccination against 14 pathogens in 194 countries from 2021 to 2030" (7)	Data from Annex 5 comparing scale up to current coverage rates. Vaccines included: Hib, Japanese Encephalitis, Measles, Meningitis A, PCV, Rota, Rubella, Yellow Fever.

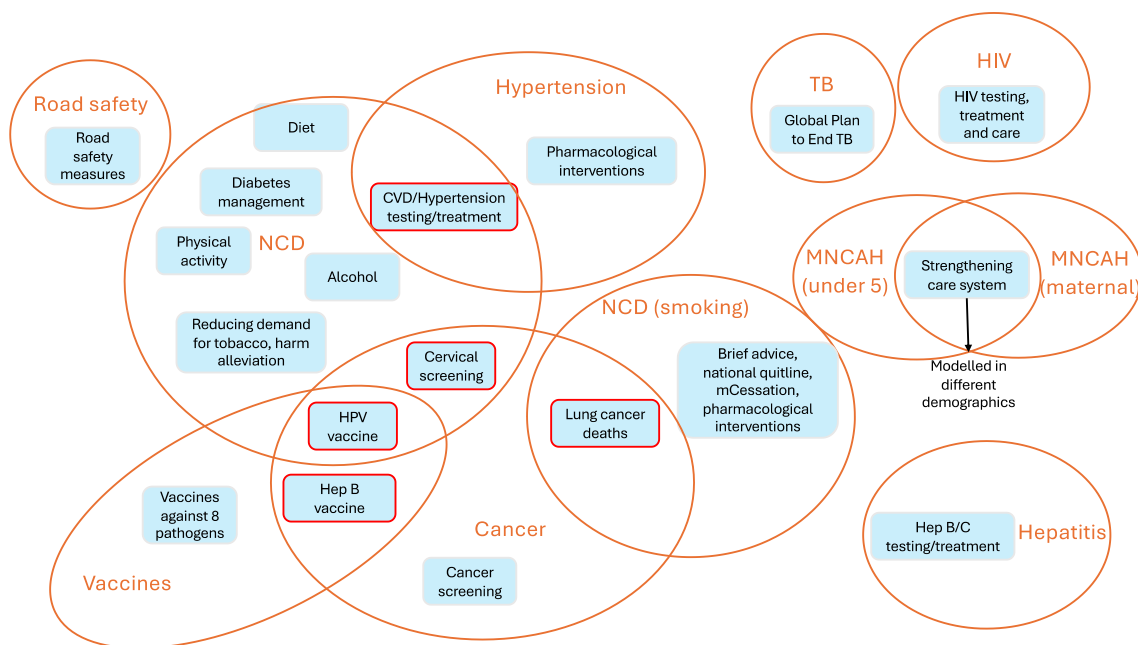


Hypertension	"Global report on hypertension: the race against a silent killer"	Lives saved under aspirational scenario modelled: "Hypertension control accelerates to rates of improvement that are faster than observed historically in high-performing countries"
Cancer	"WHO REPORT ON CANCER" 2020	A constant rate of mortality reduction was assumed, lives saved adjusted for the period of analysis from the total lives saved.
AMR	WHO internal data	A constant rate of mortality reduction was assumed, lives saved adjusted for the period of analysis from the total lives saved.
Climate Change	WHO internal data. See section above "Climate change modelling"	See section below "Climate change modelling"
Health Emergencies Preparedness and Response	WHO internal data. See section above "Health Emergencies Preparedness and Response estimates"	See section below "Health Emergencies Preparedness and Response estimates"

### 2.3.2 Strategies to Mitigate Overlap in Lives Saved Across Studies

To prevent double-counting health benefits in subsequent steps, a mapping of possible overlaps of interventions or involved risk factors across the reports was conducted. Figure 2 illustrates the potential overlaps found across the reports.

**Figure 2.** Potential overlap between interventions evaluated across different reports.



Note: Boxes highlighted with a red border represent potential overlap.

To eliminate overlap in the lives saved modelled by the studies on hypertension management, cancer (lung cancer and cervical cancer screening), and vaccination (see the boxes highlighted with a red border in Figure 1), disaggregated data were used, and relevant assumptions were made.

**Hypertension Management:** To minimise overlap between lives saved reported by the NCD study report (9) and the hypertension study report (7), we excluded cardiovascular-disease (CVD) attributable lives saved due to blood pressure control from the NCD study report (9). To achieve this, we isolated deaths related to diabetes from the CVD-attributable lives saved in the NCD study report (9) and excluded the remaining CVD lives saved (which were assumed to be due to hypertension management interventions). This was done based on the fraction of diabetes-attributable CVD cases (15.2% for women and 10.2% for men) and the sex proportions of CVD incidences (37.3% for women and 62.7% for men) from The Global Cardiovascular Risk Consortium 2023<sup>1</sup>. Consequently, we assumed 12.1% of CVD deaths are attributable to diabetes.

<sup>1</sup> The Global Cardiovascular Risk Consortium. Global Effect of Modifiable Risk Factors on Cardiovascular Disease and Mortality. New England Journal of Medicine [Internet]. 2023 Oct 5 [cited 2024 May 17];389(14):1273–85. Available from: <https://www.nejm.org/doi/full/10.1056/NEJMoa2206916>

Lung Cancer: To minimise overlap in the lives saved reported in the smoking cessation study report (8) and the cancer interventions study report (10), we deducted lung cancer-attributable lives saved, assuming that 18.3% of the total lives saved by cancer interventions would pertain to lung cancer.

Cervical Cancer Screening: To minimise overlap in the lives saved reported by the NCD study report (9) and the cancer interventions study report (10), lives saved by cervical cancer screening as part of the NCD study report (9) were not included.

Vaccines: To minimise overlap in the lives saved reported in the vaccination intervention study report (6), NCD study report (9) and the cancer interventions study report (10), lives saved by HPV vaccines and Hep B vaccines were only considered as part of the cancer interventions study report (10).

### 3. Climate change modelling

Health impact analyses of five intervention packages for the Climate Change and Health Stream of the 3rd WHO Global Investment Case.

#### 3.1 Definition of intervention packages

The numbers of lives saved were estimated from the global scale-ups of five intervention packages:

1. Establishment and operation of a heat-health warning system (HHWS), as per World Meteorological Organization/WHO guidance (13)
2. Electrification of primary healthcare facilities through decentralized solar systems coupled with batteries systems and provision of essential life-saving power-dependent medical devices (14)
3. Water, sanitation and hygiene (WASH) (improved drinking water, basic sanitation and handwashing promotion) for climate change adaptation (15)
4. Cleaner household energy sources (100% clean household energy), transitioning from more polluting stoves and fuels to clean technologies and fuels, as per WHO guidelines (16)
5. Fiscal policies to efficiently price fossil fuels through fossil fuel subsidy phase-out combined with fossil fuel taxation (to the rate of goods and services or value-added tax) (17, 18)

#### 3.3 Analysis

##### 3.3.1 Global scale-up models

Global scale-up with a HHWS was modelled for 57 countries without a HHWS at the base year (2023), assigned using the country's latest WHO survey data point (19, 20), with immediate intervention scale-up to 100% coverage in 2024 and retaining 100% coverage for the period 2025-2075. The comparator was the coverage with a HHWS in the base year, as per latest WHO survey data point (19, 20).

##### *Electrification of primary healthcare facilities*

The numbers of primary healthcare facilities for electrification were modelled using World Bank estimates of investment needs (14) and WHO data on the proportion of all healthcare facilities that are primary healthcare facilities. Global scale-up with electrification through decentralized solar systems and batteries systems combined with essential life-saving power-dependent medical devices was modelled for 30,000 facilities in 63 countries without such electrification in the base year (2023), with immediate intervention scale-up to 100% coverage in 2024 and retaining 100% coverage over the period

2025-2050. The comparator was primary healthcare facilities' coverage with electrification in the base year, as per WHO estimates (see above).

#### *Water, sanitation and hygiene for climate change adaptation*

Global scale-up with WASH for climate change adaptation was modelled linearly for 183 countries over the period 2024-2030 from coverage in base year (2023), projected from WHO/UNICEF estimates (21), to reach 100% coverage in 2030 and retaining 100% coverage for the period 2031-2075. The comparator was the coverage with climate-resilient WASH in the base year, as per WHO projections (see above).

#### *Cleaner household energy sources*

Using the WHO Benefits of Action to Reduce Household Air Pollution Tool (22), global scale-up with 100% clean household energy was modelled linearly for 129 countries over the period 2024-2030 from coverage in the base year (2023) to reach 100% coverage in 2030 and retaining 100% coverage for the period 2031-2054. The comparator was continued use of the household energy sources used in the base year (22).

#### *Fiscal policies to efficiently price fossil fuels*

Based on International Monetary Fund (IMF) estimates (17, 18), global scale-up with fossil fuel subsidy phase-out and fossil fuel taxation to the efficient price was modelled linearly for 168 countries over the period 2024-2034 from coverage in the base year (2023), assigned using the baseline coverage from Black 2023 (17, 18), to reach 100% coverage in 2034 and retaining 100% coverage for the period 2035-2043. The comparator was the coverage with fossil fuel subsidies and taxes in the base year (2023), as per Black 2023 (17, 18).

### 3.3.2 Models of health impact

#### *Heat-health warning system*

The number of lives saved from the above described global scale-up with a HHWS was modelled using estimates of the intervention effect of a HHWS on all-cause mortality among children (0-5 years) (23) and among outdoor workers (23), UN population projections for children (0-5 years) (24), Lancet Countdown on health and climate change population projections for outdoor workers (25), and WHO projections of the number of heatwave days where the maximum daytime temperature exceeds the 90<sup>th</sup> percentile for that time of the year based on a baseline period of 1961-1990 (RCP 85 emission scenario) (20).

#### *Electrification of primary healthcare facilities*

Using The Lives Saved Tool (26), the number of lives saved from the above described global scale-up for 30,000 primary healthcare facilities with electrification through decentralized solar systems, batteries systems and provision of essential life-saving power-dependent medical devices was modelled using estimates of the intervention effect of oxygen delivery, antenatal check-ups and childhood vaccinations on mortality from pneumonia (27-30).

#### *Water, sanitation and hygiene for climate change adaptation*

Using The Lives Saved Tool (26), the number of lives saved from the above described global intervention scale-up was modelled using estimates of the intervention effect of WASH on mortality from diarrhoea (31) and pneumonia (32) and UN projections of populations (24) and of urbanization (33).

#### *Cleaner household energy sources*

Using the WHO Benefits of Action to Reduce Household Air Pollution Tool (22), the number of lives saved from the above described global scale-up with 100% clean household energy sources was modelled.

#### *Fiscal policies to efficiently price fossil fuels*

Based on IMF estimates (17, 18), the number of lives saved from the above described global scale-up with fossil fuel subsidy phase-out and taxation to ensure efficient pricing was modelled using the IMF estimates of lives saved from air pollution averted by these interventions reported in Black 2023 (17, 18).

### 3.4 Results

Table 3 presents the estimated numbers of lives saved by intervention package and for all intervention packages combined. Global scale-up of the five intervention packages combined is estimated to save 1.9 million lives per year (Table 3) and 7.6 million lives over the 4-year investment period of 2024-2027.

**Table 3.** Number of lives saved by intervention package and for all five intervention packages combined over the respective study period and on average per year

Intervention package (study period, study years)	Number of lives saved	
	Over study period	Per year
Heat-health warning system (52 years, 2024-2075)	5,112,344	98,314
Electrification of primary healthcare facilities (27 years, 2024-2050)	7,844,498	290,537
WASH for climate change adaptation (52 years, 2024-2075)	8,988,922	172,864
Cleaner household energy sources (31 years, 2024-2054)	4,125,944	133,095
Fiscal policies to efficiently price fossil fuels (20 years, 2024-2043)	24,046,880	1,202,344
<b>Total</b>	<b>-</b>	<b>1,897,154</b>

## 4. Health emergencies preparedness and response estimates

### 4.1 Current number of deaths

A literature review and a search through published documents provided the estimated number of deaths per year by threat category. The threat categories include high-threat epidemic prone diseases (cholera, meningitis, yellow fever, Ebola, measles, and polio), neglected tropical diseases (NTDs) (chikungunya and dengue), climate-related disasters, humanitarian crises, and three types of pandemic threats (COVID-like pandemic threats, other higher probability/moderate severity pandemic threats, and low probability/high severity pandemic threats). The sources for these global estimates include publicly available data from WHO, PAHO, IHME, CDC, OCHA, UNDDR Our World in Data, and peer-reviewed publications (Table 4). The total number of deaths per year from health emergencies was estimated to be approximately 3.2 million across all threat categories representing annualized probability adjusted figures (i.e., based on the likelihood of such emergencies occurring each year). This includes the deaths directly attributable to infectious hazards but does not include estimated excess mortality; for climate-related disasters and humanitarian crises the figures do not include mortality directly caused by the events but do include the deaths that result from a disruption to health services (i.e., deaths indirectly caused by the events).

**Table 4:** Data sources underpinning health emergencies impact model

Estimated frequency of future pandemic events and associated mortality estimates	Nita K. Madhav, Ben Oppenheim, Nicole Stephenson, Rinette Badker, Dean T. Jamison, Cathine Lam, and Amanda Meadows. 2023. "Estimated Future Mortality from Pathogens of Epidemic and Pandemic Potential." CGD Working Paper 665. Washington, DC: Center for Global Development. <a href="https://www.cgdev.org/publication/estimated-future-mortality-pathogens-epidemic-and-pandemic-potential">https://www.cgdev.org/publication/estimated-future-mortality-pathogens-epidemic-and-pandemic-potential</a>
Cholera frequency	<a href="#">Cholera (who.int)</a>
Cholera Mortality	WHO GHE
Ebola frequency	Annualised outbreak counts from <a href="https://www.cdc.gov/vhf/ebola/history/chronology.html">https://www.cdc.gov/vhf/ebola/history/chronology.html</a> Accessed 23 May 2024
Ebola mortality	IHME global burden of disease
Measles frequency	Dimala CA, Kadia BM, Nji MAM, Bechem NN. Factors associated with measles resurgence in the United States in the post-elimination era. Sci Rep. 2021 Jan 8;11(1):51. doi: 10.1038/s41598-020-80214-3. PMID: 33420153; PMCID: PMC7794463.
Measles mortality	<a href="#">Measles (who.int)</a>
Meningitis frequency	WHO
Meningitis mortality	WHO GHE
Yellow fever frequency	WHO reporting
Yellow fever mortality	IHME global burden of disease

Climate related incidents	United Nations Office for Disaster Risk Reduction. 2022 Global natural disaster assessment report. Online report accessed 23 May 2024 <a href="https://www.preventionweb.net/publication/2022-global-natural-disaster-assessment-report">https://www.preventionweb.net/publication/2022-global-natural-disaster-assessment-report</a>
Climate related mortality	IHME global burden of disease
Humanitarian crises	Jawad, M., Hone, T., Vamos, E.P. et al. Estimating indirect mortality impacts of armed conflict in civilian populations: panel regression analyses of 193 countries, 1990–2017. BMC Med 18, 266 (2020). <a href="https://doi.org/10.1186/s12916-020-01708-5">https://doi.org/10.1186/s12916-020-01708-5</a>

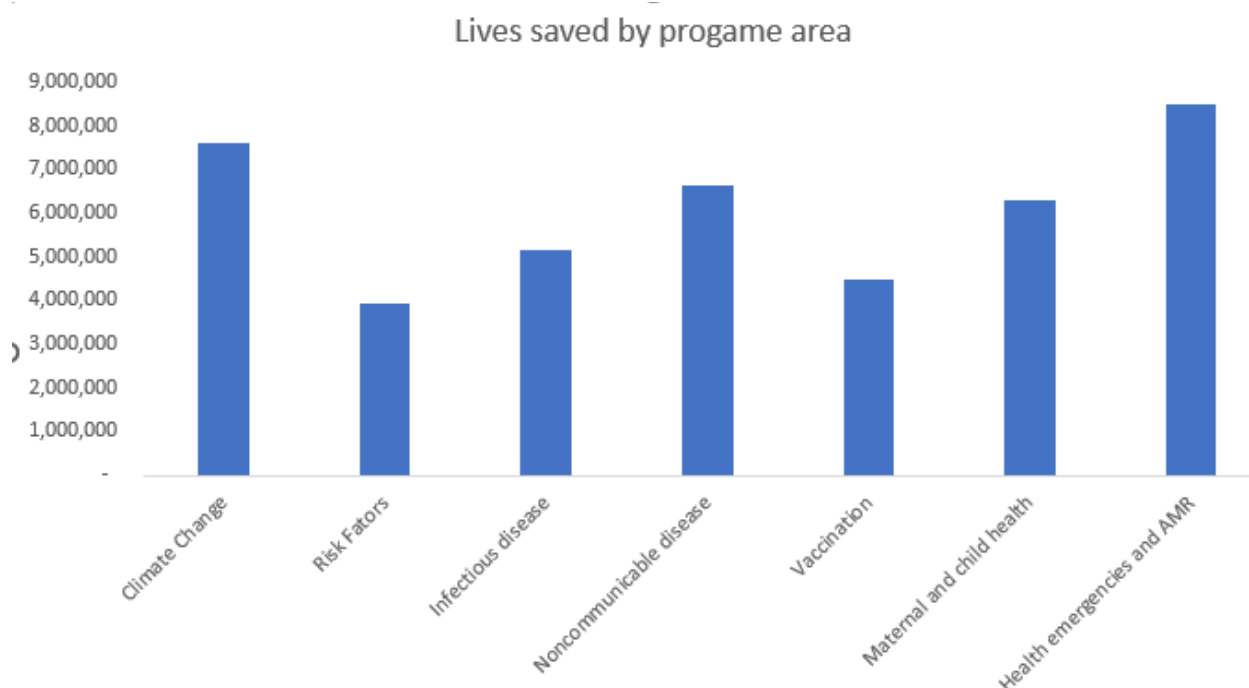
## 4.2 Projections

Projections were carried out to estimate the number of deaths that will be averted related to health emergencies due to the actions of WHO, Member States, and partners during the four-year period of GPW14. Countries are facing more frequent, more complex, and longer lasting health emergencies due to overlapping and interacting factors including climate change, geopolitical conflict and insecurity, weakened health systems in the wake of COVID-19, and new infectious disease outbreaks. Data and evidence indicate that health emergencies are increasing year-on-year in number, scale, and intensity. This increasing trend is expected to continue and result in more deaths which is why an estimated 10% increase per year in the number of deaths is one of the assumptions underlying the projections. Furthermore, it is estimated that increased investment in WHO during GPW14 will enable WHO, Member States, and partners to meet these challenges and further reduce mortality by 50%. This is an ambitious target but reflects not only what can be done, but what needs to be done. These assumptions and projections result in an ambition to save approximately 8 million lives through enhanced, coordinated, and equitable health emergency preparedness, prevention, and response during the four-year period of GPW14.

## 5 Results

### 5.1 Lives saved estimates

The baseline estimate of lives saved during GPW14 is 42,300,000 broken down across programme areas as shown in figure 3.



**Figure 3.** Summary lives saved estimates by programme area

Sensitivity analysis was included for two specific areas where progress has a high likelihood of backsliding if efforts of partners discontinue, namely HIV and Immunization, therefore a null counterfactual was considered. The resulting estimate is 48 million and 51 million lives saved respectively.

As the WHO investment case is a communication document, and the estimates produced are uncertain, a pragmatic decision to round down to 40 million lives saved was taken.

## 5.2 Regional and country breakdowns of lives saved

Disaggregated data on lives saved by WHO region or country was accessible for only four of the included study reports: hypertension (disaggregated by country), vaccination (disaggregated by country), HIV (disaggregated by region), and road safety (disaggregated by country). These four study reports involved not only low- and middle-income countries but also high-income countries. However, for the remaining study reports, disaggregated information on lives saved by country or region could not be obtained.

## 5.3 Conversion to economic benefits and validation of ROI

With the aim of estimating the economic burden associated with deaths prevented thanks to the GPW14 initiative, the methodological approach based on the value of statistical life (VSL) was employed. This approach quantifies the economic value of preventing fatalities by assessing the monetary worth individuals assign to reducing their risk of death. By utilizing this methodology, we estimated the economic impact of the GPW14 initiative in terms of the value attributed to the lives saved through its implementation. Given the lack of information on specific countries or regions for all estimated deaths



prevented in this study, the calculation of a global average VSL was conducted. For this purpose, calculations were carried out based on the article published by Robinson et al. titled "Valuing Mortality Risk Reductions in Global Benefit-Cost Analysis,"<sup>2</sup> using the following formula:

$$VSL \text{ target} = VSL \text{ base} * \left( \frac{Income \text{ target}}{Income \text{ base}} \right)^{elasticity}$$

where:

- VSL "target" represents the global average VSL.
- VSL "base" represents a reference VSL, already calculated for a country. In this case, the VSL calculated for the United States has been used, estimated to be 160 times the gross national income (GNI) per capita, based on Robinson et al.
- Income "target" represents the average global GNI per capita.
- Income "base" represents the GNI per capita for the benchmark country (United States).
- Elasticity: a value of elasticity greater than one implies that the ratio of VSL to GNI per capita is smaller in lower-income populations than in higher-income populations.

Income (GNI per capita) data was taken from The World Bank's official website (current US\$ using Atlas methods, as of 2022). These values were US\$ 5 680 for Low and Middle income countries, US\$ 12,871 for the global average and US\$ 76,770 for the United States values.

Based on Robinson et al, the elasticity value in the equation should be 1.6. Based on expert opinion (personal communication, Lisa Robinson) it was decided to use a range of values between 1 and 1.4, due to the lower income per capita worldwide compared to the United States. Therefore, a value of 1.2 was used for the base case, while reporting a potential minimum and maximum VSL value using elasticity values of 1.6 and 1 respectively.

Applying these values to the formula, a figure of US\$ 1.4 million was obtained with a range between US\$ 1.0 million and US\$ 2.1 million, using the GNI per capita reported by The World Bank for the year 2022. Using the LMIC average GNI, the range was US\$ 0.19-0.8 million. To estimate these values for the analysis period 2025-2028, we applied GNI per capita growth factors (annual %), using an average of the last 5 years. The final values are shown in table 5 below.

**Table 5.** Global estimates of the value of statistical life, reported in millions (US\$) for the analysis (2025-2028).

	<b>2022 values</b> (US\$ million)	<b>2025 projection</b> (US\$ million)	<b>2026 projection</b> (US\$ million)	<b>2027 projection</b> (US\$ million)	<b>2028 projection</b> (US\$ million)
<b>Global VSL</b>					
Minimum range	1.01	1.05	1.07	1.08	1.10
Base case	1.44	1.51	1.53	1.55	1.57
Maximum range	2.06	2.15	2.18	2.22	2.25
<b>LMIC VSL</b>					
	<b>2022 values</b> (US\$ million)	<b>2025 projection</b> (US\$ million)	<b>2026 projection</b> (US\$ million)	<b>2027 projection</b> (US\$ million)	<b>2028 projection</b> (US\$ million)

<sup>2</sup> Robinson LA, Hammitt JK, O’Keeffe L. Valuing Mortality Risk Reductions in Global Benefit-Cost Analysis. *Journal of Benefit-Cost Analysis*. 2019;10(S1):15-50. doi:10.1017/bca.2018.26

Minimum range	0.19	0.19	0.19	0.2	0.2
Base case	0.54	0.55	0.56	0.57	0.58
Maximum range	0.9	0.93	0.95	0.96	0.98

These values were used to recalibrate the return on investment of WHO, taking the following approach based on the previous WHO investment Case:

1. The lower value of lives saved (42,300) was converted to a welfare benefit using the lower VSL value
  - a. This gives a value of US\$ 8 350 billion
2. The average achievement rate and lower end attribution rate of benefit from the 2<sup>nd</sup> WHO investment case were applied to this value
  - a. This gives a value of US\$ 466 billion
3. This value was divided by the WHO operating budget across 2 biennia – US\$ 13.45 billion - , inclusive of the WHE response budget which would be required to achieve the full benefits attributed to emergency preparedness and response

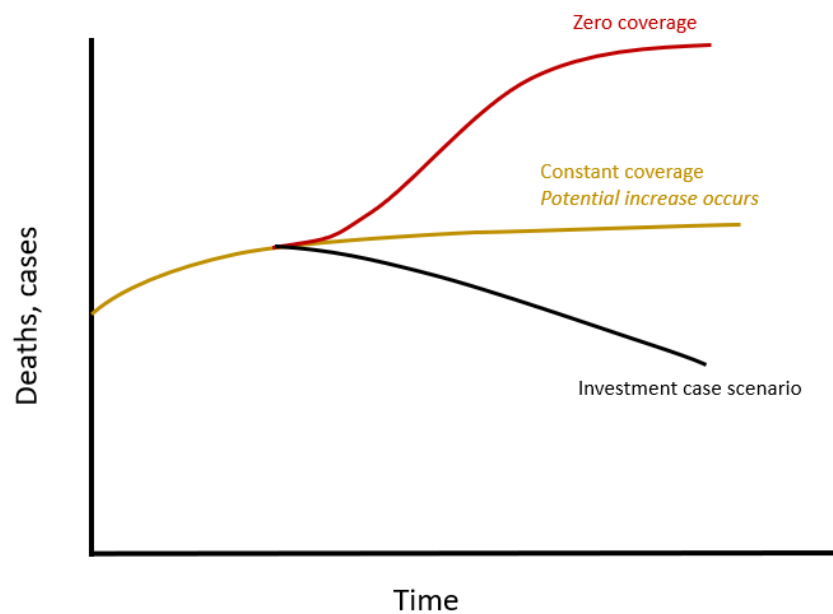
The resulting base-case estimate is US\$ 35 for every \$1 invested in WHO, in line with the second WHO investment case. It was expected that this value would be maintained, as the 4 year period of GPW14 is a sub-set of the 2021-2030 time period included in the previous investment case.

## 6 Comparison to other investment cases

The WHO estimate focuses on the lives that will be saved from the effective and efficient use of additional investments to scale up life-saving interventions from pre-2025 levels to reach the global targets. As they are forward-looking, these estimates do not include the benefits accrued over the last 20 years of investment across a range of sectors that have contributed to huge numbers of cases averted and lives saved from malaria, TB, HIV, and vaccine preventable illnesses amongst others. All reasonable efforts were made to align with the models and targets used in investment cases produced by other agencies. However, different investment cases pose different questions, and use different counterfactuals. Thus, resulting numbers may differ. This section of the document aims to explain the alignment across the investment cases.

In 2022, the impact from economic and social development, coupled with the combined actions of Member States and Ministries of Health, WHO and partners like the Global Fund, in tackling the three diseases contributed to an estimated 5.6 million lives saved. If current efforts and investments were to backslide, these gains would be reversed and the additional gains estimated in the WHO analysis would not be achieved.

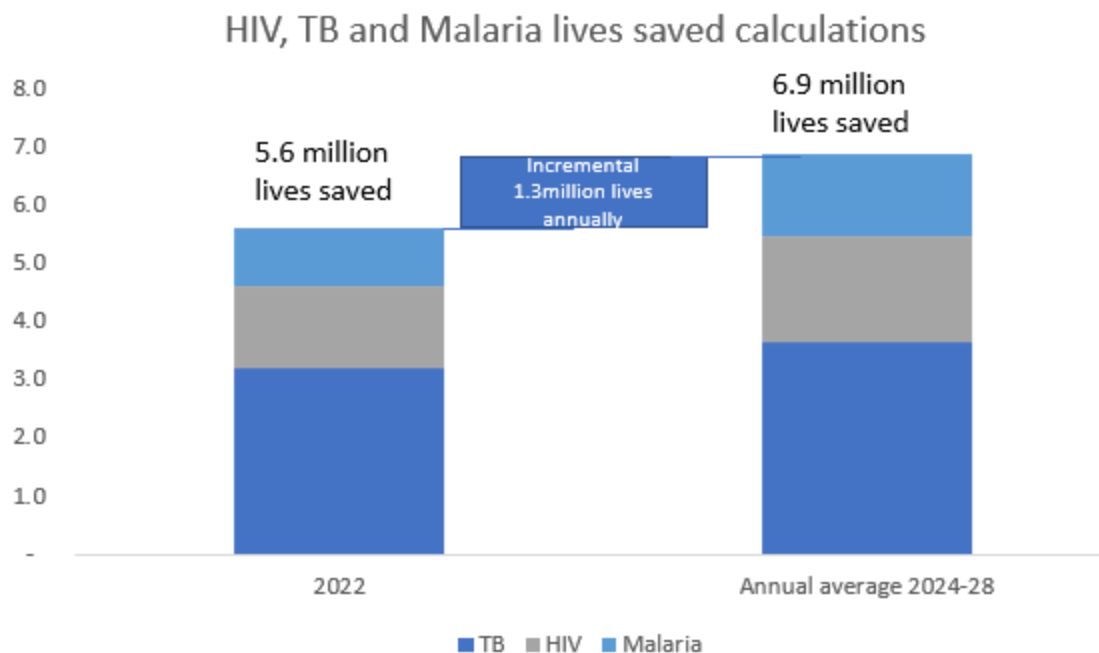
The numbers of total lives saved are presented in the Global Fund investment case, and are calculated using a counterfactual of zero coverage, i.e. what would theoretically happen if the Global Fund, and related partners, ceased to exist. This is represented by the comparison between the red line (zero coverage scenario) and the black line (investment case scenario) in figure 4. The assumption is that existing costs would not be absorbed into national budgets, and progress made in reducing disease burden since 2020 would backslide.



**Figure 4:** schematic of counterfactuals in different investment cases

WHO's investment case asks the complementary question "compared to status quo, how many additional lives can be saved by WHO, Member States and partners over the next 4 years by progressing toward global targets?". This is represented by the difference between the brown line (constant coverage scenario) and Investment Case scenario in figure 4.

The resulting estimates are that approximately 5.6 million lives are currently saved each year, and this will increase to approximately 6.9 lives saved on average each year between 2025-28. Within the WHO investment case, only this incremental increase of 1.3 million lives per year, or 5 million lives over the GPW period, is reported (Figure 5).



**Figure 5:** summary of total vs incremental lives saved using different counterfactuals

The Gavi investment case, and publications from the Vaccine Impact Modelling Consortium and the Immunization Agenda 2030 report total lives saved based on year of vaccine given. To align these estimates with others in the WHO investment case, the comparison point was adjusted to the current vaccination coverage rates, and the lives saved from scaling up to projected 2028 values was calculated. These data were drawn from Annex 5 of “Modeling the impact of vaccination for the immunization Agenda 2030: Deaths averted due to vaccination against 14 pathogens in 194 countries from 2021 to 2030” (7). The same modelling groups, therefore same models and assumptions were used, and the same target levels of coverage as per Gavi 5.0 investment case. Lives saved due to vaccination are calculated using a year of vaccination approach, meaning that the lives saved in future years due to vaccinations given in 2025-2028 are captured (unlike estimates for lives saved from HIV, TB and malaria, where lives saved estimates only include those that occur in this time interval). This method was adopted on the recommendation of an external advisory group, based on the long term nature of the impact of vaccines.

The resulting estimate is that 4.5 million additional lives will be saved over the period 2025-28. This is the incremental of the 13 million lives saved from all vaccination programmes (excluding TB, Hepatitis and HPV, per earlier explanation on overlaps) due to improved coverage.

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## Annex 1: full list of identified studies

Publication name	Reference	Study Type	Year	Country/ies or Region	Period of analysis	Priority
Hidden depths: the global investment case for drowning prevention	<a href="https://www.who.int/publications/i/item/9789240077720">https://www.who.int/publications/i/item/9789240077720</a>	Return of investment analysis	2023	50 LMIC	2020-2050	Protect Health
An investment case for new tuberculosis vaccines	<a href="https://www.who.int/publications/i/item/9789240064690">https://www.who.int/publications/i/item/9789240064690</a>	Return of investment analysis	2022	105 low- and middle-income countries,	2025–2050	Provide Health
It's time to invest in cessation: the global investment case for tobacco cessation	<a href="https://www.who.int/publications/i/item/9789240039285">https://www.who.int/publications/i/item/9789240039285</a>	Return of investment analysis	2021	124 middle-income countries and low-income countries	2021-2030	Promote Health
Investment case for eliminating mother-to-child transmission of syphilis	<a href="https://www.who.int/publications/i/item/9789241504348">https://www.who.int/publications/i/item/9789241504348</a>	Health impact and cost-effectiveness analysis (CEA)	2012	12 intensified support countries	by 2015	Promote Health
Global costs and benefits of drinking-water supply and sanitation interventions to reach the MDG target and universal coverage	<a href="https://www.who.int/publications/i/item/WHO-HSE-WSH-12.01">https://www.who.int/publications/i/item/WHO-HSE-WSH-12.01</a>	Cost–benefit analysis	2012	136 low- and middle-income countries	2010-2015	Promote Health
The bill China cannot afford : health, economic and social costs of China's tobacco epidemic	<a href="https://www.who.int/publications/i/item/9789290617907">https://www.who.int/publications/i/item/9789290617907</a>	Health impact modeling	2012	China	2010-2015	Promote Health
Economic and health effects of increasing coverage of low cost household drinking-water supply and sanitation interventions to countries off-track to meet MDG target 10	<a href="https://www.who.int/publications/i/item/WHO-SDE-WSH-07.05">https://www.who.int/publications/i/item/WHO-SDE-WSH-07.05</a>	Return of investment analysis	2007	6 non-OECD developing world regions	2007-2015	Promote Health
Evaluation of the costs and benefits of household energy and health interventions at global and regional levels	<a href="https://www.who.int/publications/i/item/9789241594790">https://www.who.int/publications/i/item/9789241594790</a>	Cost–benefit analysis	2006	11 developing and middle-income subregions of the WHO.	2005-2015	Promote Health
Constraints to Scaling Up the Health Millennium Development Goals: Costing and Financial Gap Analysis	<a href="https://www.who.int/publications/i/item/WHO-HSS-HSF-2010.02">https://www.who.int/publications/i/item/WHO-HSS-HSF-2010.02</a>	Costing and financial gap analysis	2010	49 low-income countries	2009–2015	Provide Health

Health-care investments for the urban populations, Bangladesh and India	<a href="https://iris.who.int/handle/10665/330391">https://iris.who.int/handle/10665/330391</a>	Cost–benefit analysis	2020	Bangladesh and India	2020-2030	Protect Health
Cost-effectiveness of TB control in the Russian Federation	<a href="https://www.who.int/publications/i/item/WHO-HTM-TB-2005.357">https://www.who.int/publications/i/item/WHO-HTM-TB-2005.357</a>	Cost-effectiveness analysis	2005	Russian Federation	not mentioned	Provide Health
Saving lives, spending less: the case for investing in noncommunicable diseases	<a href="https://www.who.int/publications/i/item/9789240041059">https://www.who.int/publications/i/item/9789240041059</a> and <a href="https://www.who.int/publications/i/item/9789240041233">https://www.who.int/publications/i/item/9789240041233</a>	Cost–benefit analysis	2021	76 low- and lower-middle income countries	2021-2030	Provide Health
WHO report on cancer: setting priorities, investing wisely and providing care for all	<a href="https://www.who.int/publications/i/item/9789240001299">https://www.who.int/publications/i/item/9789240001299</a>	Return of investment analysis	2020	LMICs	by 2030	Provide Health
Health, financial, and education gains of investing in preventive chemotherapy for schistosomiasis, soil-transmitted helminthiasis, and lymphatic filariasis in Madagascar: A modeling study	<a href="https://www.who.int/publications/i/item/pntd-0007002">https://www.who.int/publications/i/item/pntd-0007002</a>	Cost-effectiveness analysis	2018	Madagascar	not mentioned	Promote Health
The Investment Case for Noncommunicable Disease Prevention and Control in Mongolia	<a href="https://iris.who.int/bitstream/handle/10665/259627/WHO-NMH-NMA-17.55-eng.pdf?sequence=1">https://iris.who.int/bitstream/handle/10665/259627/WHO-NMH-NMA-17.55-eng.pdf?sequence=1</a>	Return of investment analysis	2017	Mongolia	15 year time frame	Promote Health
The Case for Investment in Prevention and Control of Noncommunicable Diseases in Jamaica: Evaluating the Return on Investment of Selected Tobacco, Alcohol, Diabetes, and Cardiovascular Disease Interventions	<a href="https://iris.paho.org/bitstream/handle/10665.2/49693/9789275120545_eng.pdf?sequence=5&amp;isAllowed=y">https://iris.paho.org/bitstream/handle/10665.2/49693/9789275120545_eng.pdf?sequence=5&amp;isAllowed=y</a>	Return on investment analysis	2018	Jamaica	2017-2032	Promote Health
The Case for Investment in Prevention and Control of Noncommunicable Diseases and Mental Disorders in Suriname	<a href="https://iris.paho.org/bitstream/handle/10665.2/58116/9789275127636_eng.pdf?sequence=1&amp;isAllowed=y">https://iris.paho.org/bitstream/handle/10665.2/58116/9789275127636_eng.pdf?sequence=1&amp;isAllowed=y</a>	Return on investment analysis	2023	Suriname	2021-2036	Promote Health
Prevention and control of noncommunicable diseases in Kazakhstan: the case for investment	<a href="https://iris.who.int/handle/10665/346422">https://iris.who.int/handle/10665/346422</a>	Return on investment analysis	2019	Kazakhstan	at 5 and 15 years	Promote Health
Prevention and control of noncommunicable diseases in Armenia: the case for investment	<a href="https://iris.who.int/handle/10665/346420">https://iris.who.int/handle/10665/346420</a>	Return on investment analysis	2019	Armenia	at 5 and 15 years	Promote Health
Prevention and control of noncommunicable diseases in Turkey: the case for investment	<a href="https://iris.who.int/handle/10665/345584">https://iris.who.int/handle/10665/345584</a>	Return on investment analysis	2018	Turkey	at 5 and 15 years	Promote Health



Prevention and control of noncommunicable diseases in Belarus: the case for investment	<a href="https://iris.who.int/handle/10665/343979">https://iris.who.int/handle/10665/343979</a>	Return on investment analysis	2018	Belarus	at 5 and 15 years	Promote Health
Prevention and control of noncommunicable diseases in Uzbekistan: the case for investment	<a href="https://iris.who.int/handle/10665/362354">https://iris.who.int/handle/10665/362354</a>	Return on investment analysis	2018	Uzbekistan	at 5 and 15 years	Promote Health
Prevention and control of noncommunicable diseases in Kyrgyzstan: the case for investment	<a href="https://iris.who.int/handle/10665/351407">https://iris.who.int/handle/10665/351407</a>	Return on investment analysis	2017	Kyrgyzstan	at 5 and 15 years	Promote Health
Cost-effectiveness of strategies to prevent road traffic injuries in eastern sub-Saharan Africa and Southeast Asia: new results from WHO-CHOICE	<a href="https://link.springer.com/article/10.1186/s12962-018-0161-4">https://link.springer.com/article/10.1186/s12962-018-0161-4</a>	Cost-effectiveness analysis	2018	Sub-Saharan Africa and Southeast Asia	2010-2110	Promote Health
Cost effectiveness of strategies to combat road traffic injuries in sub-Saharan Africa and South East Asia: mathematical modelling study	<a href="https://www.bmj.com/content/344/bmj.e612.full">https://www.bmj.com/content/344/bmj.e612.full</a>	Cost-effectiveness analysis	2012	Sub-Saharan Africa and Southeast Asia	10 year period	Promote Health
Additional resource needs for viral hepatitis elimination through universal health coverage: projections in 67 low-income and middle-income countries, 2016-30	<a href="https://pubmed.ncbi.nlm.nih.gov/31353061/">https://pubmed.ncbi.nlm.nih.gov/31353061/</a>	Cost-effectiveness analysis	2020	67 LMICs	2016 to 2030 time horizon	Provide Health
Identifying Actions for Scaling up long- acting reversible contraceptives	<a href="https://iris.who.int/bitstream/handle/10665/259992/9789290618218_eng.pdf?sequence=1&amp;isAllowed=y">https://iris.who.int/bitstream/handle/10665/259992/9789290618218_eng.pdf?sequence=1&amp;isAllowed=y</a>	Cost-effectiveness analysis	2017	Cambodia	(2016–2020)	Provide Health
Return On Investment From Immunization Against 10 Pathogens In 94 Low- And Middle-Income Countries, 2011–30	<a href="https://www.healthaffairs.org/doi/10.1377/hlthaff.2020.00103?url_ver=Z39.88-2003&amp;rft_id=ori%3Arid%3Acr%3Apubmed%3A31353061">https://www.healthaffairs.org/doi/10.1377/hlthaff.2020.00103?url_ver=Z39.88-2003&amp;rft_id=ori%3Arid%3Acr%3Apubmed%3A31353061</a>	Return on investment analysis	2020	94 LMICs	2011-2030	Provide Health
Global return on investment and cost-effectiveness of WHO's HEAR interventions for hearing loss: a modelling study	<a href="https://www.sciencedirect.com/science/article/pii/S2214109X21004472">https://www.sciencedirect.com/science/article/pii/S2214109X21004472</a>	Return on investment analysis and cost-effectiveness	2022	172 countries	2020-2030	Provide Health
Investment case, seventh replenishment 2022	<a href="https://www.theglobalfund.org/en/seventh-replenishment/fight-for-what-counts/">https://www.theglobalfund.org/en/seventh-replenishment/fight-for-what-counts/</a>	Return on investment analysis	2022	HIV: 24 countries TB: 78 Global Fund-eligible countries Malaria- 60 Global Fund-eligible countries	2021-2026	Provide Health

Global Fund Investment Case, Fifth Replenishment 2017-2019	<a href="https://cerf.un.org/sites/default/files/resources/Global%20Fund%20Investment%20Case%202017-20192.pdf">https://cerf.un.org/sites/default/files/resources/Global%20Fund%20Investment%20Case%202017-20192.pdf</a>	Investment case	2015	Global	2017-2019	Provide Health
Step up the fight investment case, sixth replenishment 2019	<a href="https://www.afmeurope.org/wp-content/uploads/2019/02/549931_Global-Fund-Investment-Case-2020-2022-Soft-Copy.pdf">https://www.afmeurope.org/wp-content/uploads/2019/02/549931_Global-Fund-Investment-Case-2020-2022-Soft-Copy.pdf</a>	Return on investment analysis	2019	HIV:56 countries in Fast Track	2017-2030	Provide Health
Economic Returns to Investment in AIDS Treatment in Low and Middle Income Countries	<a href="https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0025310">https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0025310</a>	Return on investment analysis	2011	98 countries	2011-2020	Provide Health
Estimating the health impact of vaccination against ten pathogens in 98 low-income and middle-income countries from 2000 to 2030: a modelling study	<a href="https://www.thelancet.com/journals/lanct/article/PIIS0140-6736(20)32657-X/fulltext">https://www.thelancet.com/journals/lanct/article/PIIS0140-6736(20)32657-X/fulltext</a>	Epidemiological Analysis	2021	98 LMICs	2000-2019-2030	Provide Health
An Investment Case for Ending Neglected Tropical Diseases	<a href="https://www.ncbi.nlm.nih.gov/books/NBK525199/">https://www.ncbi.nlm.nih.gov/books/NBK525199/</a>	Return on investment + cost-effectiveness analysis	2017	Global	2011 - 2030	Provide Health
Global report on hypertension: the race against a silent killer	<a href="https://www.who.int/publications/i/item/9789240081062">https://www.who.int/publications/i/item/9789240081062</a>	Cost-benefit analysis	2023	Global	2023 - 2050	
One Million Lives Saved Per Year: A Cost-Benefit Analysis of the Global Plan to End Tuberculosis, 2023-2030 and Beyond	<a href="https://www.cambridge.org/core/journals/journal-of-benefit-cost-analysis/article/one-million-lives-saved-per-year-a-costbenefit-analysis-of-the-global-plan-to-end-tuberculosis-20232030-and-beyond/A74F0D10F1017092A250EB604ED39B1B">https://www.cambridge.org/core/journals/journal-of-benefit-cost-analysis/article/one-million-lives-saved-per-year-a-costbenefit-analysis-of-the-global-plan-to-end-tuberculosis-20232030-and-beyond/A74F0D10F1017092A250EB604ED39B1B</a>	Return of investment analysis	2023	Global	2023-2050	Provide Health
Saving lives through road safety risk factor interventions: global and national estimates	<a href="https://www.thelancet.com/journals/lanct/article/PIIS0140-6736(22)00918-7/abstract#articleInformation">https://www.thelancet.com/journals/lanct/article/PIIS0140-6736(22)00918-7/abstract#articleInformation</a>	Epidemiological Analysis	2022	Global	unknown	Promote Health
HIV - Global Health sector strategies 2022 - 2030	<a href="https://heatmap.hivci.org/">https://heatmap.hivci.org/</a>	Epidemiological Analysis	2022	Global	2022-2030	Provide Health
Levels & Trends in Child Mortality	<a href="https://childmortality.org/">https://childmortality.org/</a>	Epidemiological Analysis	2023	Global	2023-2030	Protect Health

Improving maternal and newborn health and survival and reducing stillbirth	<a href="https://iris.who.int/bitstream/handle/10665/367617/9789240073678-eng.pdf?sequence=1">https://iris.who.int/bitstream/handle/10665/367617/9789240073678-eng.pdf?sequence=1</a>	Epidemiological Analysis	2023	Global	2022-2030	Provide Health
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