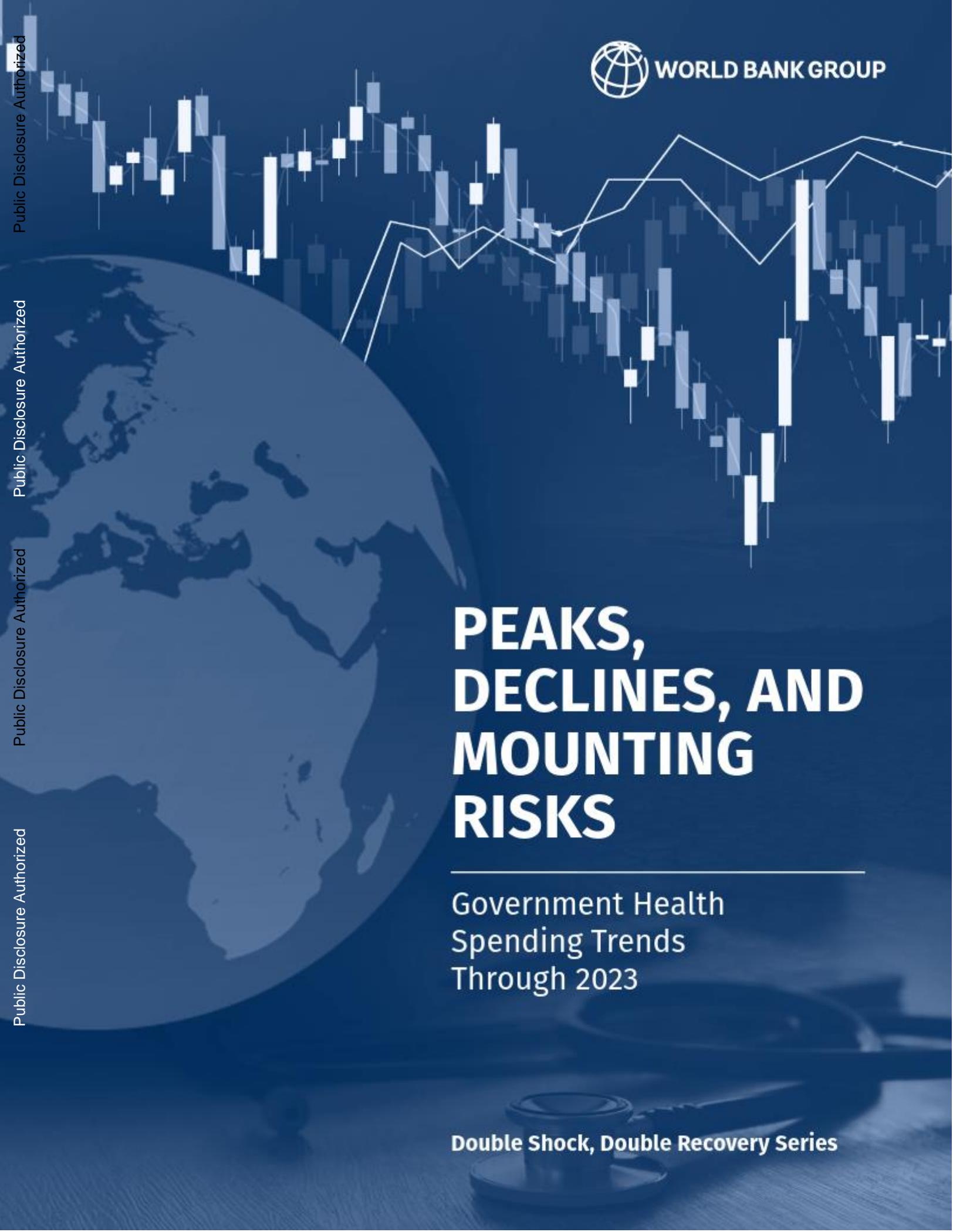


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# PEAKS, DECLINES, AND MOUNTING RISKS

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Government Health  
Spending Trends  
Through 2023

**Double Shock, Double Recovery Series**

**Government Health Spending Trends Through 2023:  
Peaks, Declines, and Mounting Risks**

**Double Shock, Double Recovery Paper Series**

**Christoph Kurowski, Martin Schmidt, Anurag Kumar, Julio Mieses, and Jacopo Gabani**

**November 2024**

## Health, Nutrition and Population Discussion Paper

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**Health, Nutrition and Population Discussion Paper**  
**Government Health Spending Trends through 2023:**  
**Peaks, Declines, and Mounting Risks**

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**Abstract**

This paper presents the most recent trends in government health spending (GHS) across 63 low- and lower-middle-income countries, offering critical insights as nations approach the decisive period for achieving the Sustainable Development Goals (SDGs). After the pandemic-induced surge, sustained declines in GHS per capita followed. While these declines might appear to be a logical consolidation, the resulting modest growth in GHS per capita and decreases in health's share of overall government spending between 2019 and 2023 pose significant challenges to the sustainability of government investment in health—compounded in many countries by contracting or stagnant government expenditure projected through 2029. These shifts cannot be ignored as countries need to restart progress toward Universal Health Coverage and other health-related SDGs after the COVID-19 setback, alongside building resilience to climate change and enhancing pandemic preparedness. Increasing the priority of health in spending is a key policy option, but it will not be sufficient on its own. Effective responses also require improving spending efficiency and addressing broader fiscal challenges. Without decisive action, many countries have little chance of achieving the health SDG.

**Keywords:** Government health spending, Universal Health Coverage, Sustainable Development Goals, health system resilience, pandemic preparedness

**Disclaimer:** The findings, interpretations, and conclusions expressed in the paper are entirely those of the authors, and do not represent the views of the World Bank, its Executive Directors, or the countries they represent.

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## ACRONYMS AND ABBREVIATIONS

CGHS	Central Government Health Spending
COVID-19	Coronavirus Disease 2019
DAH	Development Assistance for Health
GGE	General Government Expenditure
GHS	Government Health Spending
GNI	Gross National Income
HNP	Health, Nutrition, and Population Global Practice, World Bank
IMF	International Monetary Fund
LIC	Low-Income Country
LMIC	Lower Middle-Income Country
NHA	National Health Account
OECD	Organisation for Economic Co-operation and Development
SHA	System of Health Accounts
SHI	Social Health Insurance
SDGs	Sustainable Development Goals
WEO	World Economic Outlook
WHO	World Health Organization

## EXECUTIVE SUMMARY

This paper presents the most recent trends in government health spending (GHS) across 63 low- and lower middle-income countries (LICs and LMICs), covering nearly 90% of the population in these income groups. Using data through 2023, it updates the World Bank's previous Health Spending Review, *Strong Advance, Early Retreat*, and complements WHO's Global Health Expenditure Database, which operates on a two-year lag. The analysis examines GHS and its share of general government expenditure (GGE) from 2019 to 2023, with comparisons to pre-pandemic trends from 2015 to 2019—providing critical insights as countries enter the final phase for achieving the Sustainable Development Goals (SDGs).

### From peaks to sustained declines

In the years following the pandemic response, LICs and LMICs have, on average, experienced a steady decline in GHS per capita. While this may seem like a natural easing of the pandemic-induced spending surge, a closer examination reveals deeper concerns about the long-term trajectory of public investments in health. Rather than a temporary adjustment, these declines expose troubling trends in both GHS levels and the prioritization of health. What began as transient reduction has evolved into broader risks that affect both income groups and specific subsets of countries, eroding the spending momentum necessary for sustained progress toward the health SDGs.

### Mounting risks

These declines, compounded over several years, have resulted in only modest growth in GHS per capita across both income groups during the pandemic and recovery phases, standing in stark contrast to the sustained momentum seen pre-pandemic. This slower growth between 2019 and 2023 is largely due to a shrinking share of health within government budgets, as government expenditure expanded more quickly than health spending itself. This shift reverses the focus on health observed in pre-pandemic years, when governments steadily increased the health share of spending. The trends are especially pronounced in LICs, where GHS per capita remains often very low and heavily reliant on on-budget development assistance for health (DAH).

Beyond these general patterns, specific risks to the sustainability of GHS have intensified in 35 countries, representing over 2.5 billion people. In 32 of these nations, the share of government spending allocated to health has declined, while in 28, GHS per capita has dropped from 2019 to 2023. In 23 countries, risks are heightened further by IMF projections suggesting that general government expenditure (GGE) per capita will contract from 2023 to 2029. With overall government spending decreasing, policymakers will face tough choices across sectors to keep health a priority.

### Navigating difficult choices

As the final phase for achieving the SDGs approaches, current government health spending (GHS) remains far below the minimum annual per capita levels needed by 2030, estimated at around US\$80 in LICs and US\$100 in LMICs (in 2023-dollar values). These benchmarks cover only recurrent costs and assume efficient resource use, yet the recent modest growth in GHS per capita means that these minimum levels are increasingly out of reach without decisive policy action.

To counter these financing shortfalls, one critical option for governments is to increase the priority of health in spending decisions. Other domestic policies will also be crucial, including fiscal reforms to boost government revenues and measures to improve spending efficiency, such as eliminating ineffective subsidies and combating corruption.

## Time for a rethink

Trends in government health spending through 2023 suggest a precarious outlook for achieving global health goals. Without addressing the funding shortfalls, the consequences will be profound. Ministries of Health and other sector agencies will face rapidly increasing unmet health needs with inadequate, stagnant budgets, limiting their ability to strengthen health systems, improve population health, and enhance financial protection. Insufficient health investments will also undermine human capital development and weaken the foundation for long-term growth and revenue generation. Meanwhile, development partners risk seeing gains from past Development Assistance for Health (DAH) diminish and progress on global priorities, including pandemic prevention and preparedness, stall.

While the SDG era has been envisioned as a transformative decade for global health, recent government health spending trends now threaten to make this period one of limited gains for many countries. These trends call for a critical reassessment of financing strategies to achieve the health-related Sustainable Development Goals (SDGs) amid fiscal headwinds and multiplying development obstacles. The stakes extend beyond the health sector to include Ministries of Finance and development partners, who risk missing vital opportunities without collaboration to forge new paths. Encouragingly, the analyses also show that some countries are pursuing strategies to sustainably expand health investments, demonstrating that progress is possible.

## INTRODUCTION

Countries are entering a critical phase in achieving the health Sustainable Development Goals (SDGs), with Universal Health Coverage (UHC)—ensuring that all people have access to essential health services without financial hardship—at the core of these efforts. Only six years remain to meet these goals, yet global progress toward UHC has been slow, and the COVID-19 pandemic has caused significant setback (WHO and World Bank 2023). The current rate of progress is now estimated to be only a quarter of the pace necessary to achieve the health-related SDGs (WHO 2022).

Accelerating progress is particularly challenging in low- and lower middle-income countries. Many of these countries face diverse disease burdens, including maternal and child mortality, major epidemics such as HIV/AIDS, tuberculosis, and malaria, as well as the growing impact of non-communicable diseases, injuries, and environmental threats. Strengthening pandemic preparedness and building climate-resilient health systems also remain critical to safeguarding future gains.

Government health expenditure is central to achieving these goals. It sets the limits of what countries can achieve in providing their populations with essential health services and financial protection. As the primary source of prepaid funding for health systems, GHE enables individuals—especially those less well-off—to access necessary health services without facing financial distress. It is also critical for maintaining public health functions and fostering health system resilience, thereby making it a central consideration in fiscal planning.

Multiple expert bodies have suggested minimum spending levels to meet global health goals, and when these estimates are disaggregated and adjusted to reflect only the government health expenditure component<sup>1</sup>, they consistently point to, in terms of current 2023-dollar values, about US\$80 per person on health in low-income countries (LICs) and at least US\$100 in lower middle-income countries (Commission on Macroeconomics and Health, 2001; HLTF, 2009; McIntyre, Meheus, & Røttingen, 2017; Stenberg et al., 2017; Jamison et al., 2024). These estimates reflect only recurrent spending, excluding the capital investments required to expand service delivery infrastructure and reach the entire population, and assume that resources are spent efficiently. Yet, in 2019, government health expenditure was far below these thresholds, averaging, again in 2023-dollar values, US\$12 in LICs and US\$80 in LMICs, with spending growth over the previous two decades insufficient to even approach the minimum levels needed by 2030, especially in LICs.

### Purpose

Against this backdrop, this paper provides critical insights into the most recent trends in Government Health Spending (GHS) across LICs and LMICs, offering data up to 2023. It draws on over 3,000 budget reports, combining initial and supplemental allocations with final expenditures to construct country-specific estimates. This often involves compiling data from multiple ministries, departments, and agencies—information that countries typically do not have available before producing comprehensive updates of their national health accounts.

GHS, as defined in this paper, includes current spending of national and subnational government ministries, including health<sup>2</sup>, on-budget development assistance for health (DAH), and general fund transfers to Social Health Insurance (SHI) schemes. Unlike the 2011 System of Health Accounts (SHA) framework, this definition excludes SHI contributions from employers and employees because SHI

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<sup>1</sup> As defined in the system of health accounts (OECD 2011).

<sup>2</sup> Dependent on the country, other ministries may include defense, labor or social protection.

institutions typically do not report source and spending data in a timely manner. This exclusion sets GHS apart from the broader definition of government health expenditure under the SHA classification, focusing on spending that can be tracked more promptly.

The analysis centers on two core indicators—government per capita health spending and its share of overall government expenditure—both critical measures of a government’s commitment to invest in health. The paper highlights overarching trends across countries and income groups, while also shedding light on country-specific variations.

The aim of this study is to ensure that data is accessible within months after the end of a calendar year, providing decision-makers with timely information to adjust health investments as needed. Given this emphasis on timely availability, the study does not cover non-government health spending, such as off-budget expenditures and out-of-pocket payments, since these data are typically produced with a significant lag. For the same reasons, it does not analyze the composition of expenditures or the impact of spending levels on UHC progress. However, to support more in-depth analysis, the corresponding government reports and data used in this paper are available for further research through the [Government Health Budgets and Spending Database](#) and the associated [Health Budgets Repository](#).

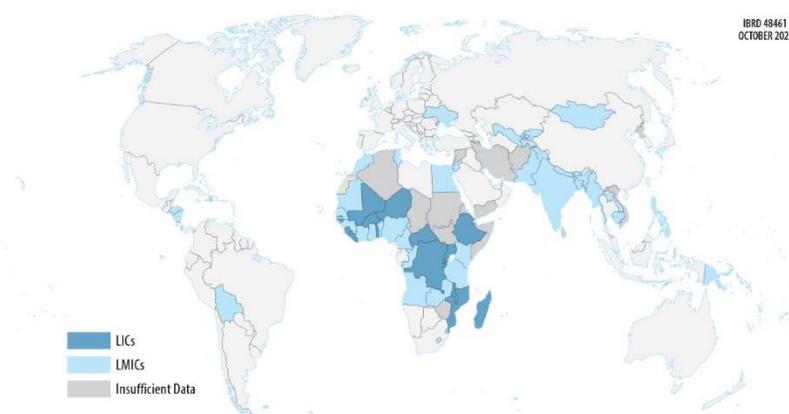
### Timeframe and coverage

The analysis focuses on the pandemic response and recovery period from 2019 to 2023, with comparisons to pre-pandemic years (2015–2019) to provide additional context to understand the trends. Together with the simultaneously published Health Spending Outlook (Kurowski et al. 2024), this paper offers a comprehensive overview of GHS trends from 2015 to 2029, covering nearly the entire SDG era.

The study covers 63 of the 80 LICs and LMICs, encompassing 87 percent of the population in these income groups (Map 1). It includes countries from all World Bank regions, with a significant focus on sub-Saharan Africa, where all the included LICs and over half of the countries in the analysis are located. The scope also extends to nine small island developing states (SIDS)—all LMICs—and 21 nations facing fragile or conflict-affected situations.

The study excluded 17 countries due to data challenges. In some cases, budget documents had not been published, particularly in conflict-affected settings, while in others, inconsistencies in data series could not be reconciled, often due to hyperinflation and other forms of macroeconomic volatility.

### Map 1. Study countries (63) by income group



Source: World Bank country classification by income level, 2022

Note: “No data” indicates LICs and LMICs where GHS data are unavailable for one or more years between 2019 and 2023. See Annex 1, Table A1.3, for a list of the study’s 63 countries by income group.

## Methods

This study builds on the methods used in the earlier Health Spending Review, *Strong Advance, Early Retreat*, with three major modifications (Kurowski et al. 2023). First, GHS has been introduced as the core indicator, replacing the previous focus on central government health spending (CGHS), which excluded subnational government spending from local government revenues (Annex 1).

Second, the timeline has been extended to include data through 2023, providing timely insights into most recent trends during the pandemic and recovery years (2019–2023). Additionally, extending the timeline back to 2015 allowed for a more comprehensive comparison with pre-pandemic trends (2015–2019), whereas the earlier report limited comparisons to 2019 data. Government figures from 2019 to 2022 have also been updated where available.<sup>3</sup>

Third, robustness checks have been enhanced to assess the reliability of the GHS estimates (Annex 2). The introduction of data series on health spending from subnational governments reduced the uncertainty surrounding GHS figures. At the same time, checks on errors from statistical modeling of missing expenditure data and the impact of missing data from social health insurance contributions have been strengthened, demonstrating that trends across income groups hold despite data limitations.

## Notes to the reader

Following this introduction, the report moves into an exploration of the most recent trends in GHS per capita spending LICs and LMICs. Followed by an analysis of the health share within general government expenditure. The final section presents key conclusions.

The findings section is intentionally concise, allowing readers to quickly grasp the main trends and shifts. Whether scrolling through the text or navigating through maps, tables, or figures, readers can easily explore data. The figures have been designed to clearly highlight individual country performances, making it simple to identify both overarching patterns and country-specific details at a glance.

Finally, readers should bear in mind that unless stated otherwise, all dollar values in the paper are expressed in constant 2023 US\$. This ensures that the analysis accounts for inflation, providing a clearer view of real changes in spending over time.

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<sup>3</sup> Revisions include the replacement of allocations with expenditure data, or updates of previously published expenditure data.

## TRENDS IN GOVERNMENT SPENDING ON HEALTH

This section presents the most recent trends in government health spending (GHS) in 63 out of 80 low- and lower middle-income countries (LICs and LMICs) (Table 1). Combined, these countries are home to close to 3.4 billion people, representing nearly 90 percent of the population living in LICs and LMICs.

**Table 1: Average real GNI per capita (US\$ 2023) and total population (millions) by income group, 63 countries, 2023.**

Income group	N	GNI pc	Population
LICs	17	736	471
LMICs	46	2,577	2,916
<b>Total</b>	<b>63</b>	<b>2,072</b>	<b>3,387</b>

*Source:* Authors' calculations using Government Health Budgets and Spending Database.

*Note:* The income group averages reflect the simple average of real GNI per capita (in constant US\$ 2023) for all countries in that income group (as per the 2022 World Bank country classifications by income level).

The analysis examines GHS per capita and its share of overall government expenditure. It highlights average trends for across all study countries as well as for both income groups, while also emphasizing individual country variations.

This study focuses on the pandemic and recovery phase from 2019 to 2023, providing essential insights for shaping health financing strategies. Additionally, comparisons with pre-pandemic years from 2015 to 2019 provide important context for understanding these trends and their implications for health outcomes.

### Trends in government per capita health spending: From peaks to sustained declines

In 2023, average real GHS per capita continued its decline from the peaks observed during the pandemic response phase (Table 2). In LICs, spending surged in 2020 but fell back to near pre-pandemic levels of approximately US\$ 10.0 in 2023. Similarly, in LMICs, spending dropped from the peak reached in 2021, reverting close to 2019 levels of around US\$55.

**Table 2: Average real GHS per capita (constant US\$ 2023) by income group, 63 countries, 2019-2023.**

Income Group	2019	2020	2021	2022	2023
LICs	10.1	13.1	11.7	11.0	10.2
LMICs	54.5	61.0	64.1	60.0	57.6

*Source:* Authors' calculations using Government Health Budgets and Spending Database.

*Note:* The income group averages reflect the simple average of real GHS per capita (in constant US\$ 2023) for all countries in that income group (as per the 2022 World Bank country classifications by income level).

### Modest growth trajectories

The recent, prolonged decline in GHS led to modest growth rates in spending over the pandemic and recovery period. From 2019 to 2023, the average real annual growth rate of GHS per capita was just 0.4 percent in LICs and slightly higher at 0.9 percent LMICs.

These modest growth rates sharply contrast with the pre-pandemic period. Between 2015 and 2019, average real annual growth of GHS per capita was 4.2 percent in LICs and 2.4 percent in LMICs (Table 3).

**Table 3: Average annual growth rate of real GHS per capita (percent) by income group, 56 countries, 2015-2019 and 2019-2023.**

Income Group	2015-2019	2019-2023
LICs	4.2	1.2
LMICs	2.4	1.2
All countries	2.8	1.2

Source: Authors' calculations using Government Health Budgets and Spending Database.

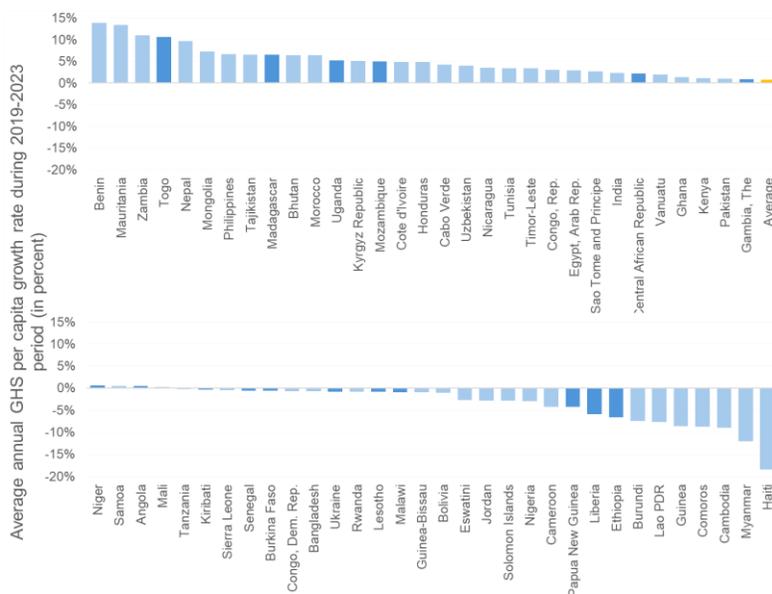
Note: Sample limited to 56 countries with data for both periods (2015-2019 and 2019-2023). The averages reflect the simple average of the compounded annual growth rate of real GHS per capita for all countries in that income group (as per the 2022 World Bank country classifications by income level).

countries represent a population of one billion people. In Myanmar and Haiti, the decline was particularly severe, with negative annual growth rates exceeding 10 percent.

#### Countries with growing GHS per capita

In contrast, 35 countries saw an expansion of GHS per capita with a notable concentration of LMICs. For this group of countries, average annual real growth of GHS per capita was approximately 4.7 percent, amounting to more than 20 percent over the pandemic response and recovery phase. Several sub-Saharan African countries, including Benin, Mauritania, Togo, and Zambia witnessed average annual growth rates in the double digits.

**Figure 1: Average annual real growth rate of GHS per capita (percent), 63 countries, 2019-2023.**



Source: Authors' calculations using Government Health Budgets and Spending Database.

Note: The annual growth rate refers to the compounded annual growth rate.

## Trends in the Health Share of Government Spending: Again, from peaks to sustained declines

In 2023, the share of government spending allocated to health also continued its decline from the pandemic peak (Table 4). In LICs, this decrease was significant, beginning in 2021, with levels dropping to 5.6 percent. In LMICs, the decline started a year later and was less severe with the GHS-to-GGE ratio falling to 6.3 percent in 2023. The reductions resulted from negative growth in GHS per capita compared to generally stagnant or modest growth in general government expenditure (GGE) per capita in most years since 2021 (Figure 2).

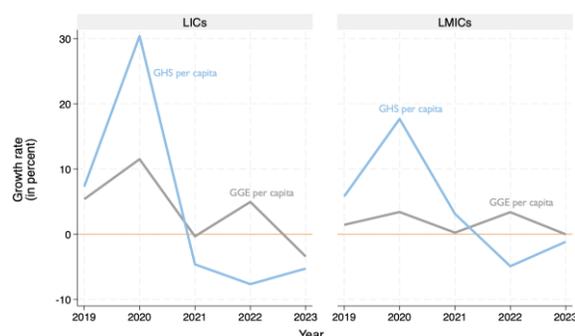
**Table 4: Average GHS-to-GGE ratio (percent) by income group, 63 countries, 2019–2023.**

Income Group	2019	2020	2021	2022	2023
LICs	6.2	7.1	6.5	5.8	5.6
LMICs	6.5	7.3	7.3	6.7	6.5
All countries	6.4	7.2	7.1	6.4	6.3

*Source:* Authors' calculations using Government Health Budgets and Spending Database for GHS; IMF WEO (April 2024) for GGE.

*Note:* The averages reflect the simple average of GHS-to-GGE ratio for all countries in that income group (as per the 2022 World Bank country classifications by income level).

**Figure 2: Average annual real growth rates of GHS per capita and GGE per capita (percent) by income group, 63 countries, 2019-2023.**



*Source:* Authors' calculations using Government Health Budgets and Spending Database for GHS; IMF WEO (April 2024) for GGE.

## Negative growth trajectories

Throughout the pandemic response and recovery period, the sustained decline in the GHS-to-GGE ratio outweighed the initial surge. By 2023, the ratio had fallen below the 2019 level (Table 4), and the average annual growth rate had turned negative (Table 5).

The decline in the share of health spending resulted from GHS growth lagging GGE growth. However, GHS per capita growth remained positive, driven by the overall increase in government spending, even though the proportion allocated to health decreased.

In LICs, the decline was more pronounced, with GHS growth falling significantly short of GGE growth, and the GHS-to-GGE ratio dropping well below the 2019 level. In LMICs, GHS growth aligned more closely with GGE growth, leading to small annual increases in the GHS-to-GGE ratio over the four-year period, with the ratio remaining just above the 2019 level.

**Table 5: Average annual real growth rate of GHS per capita and GGE per capita (percent) and change in GHS-to-GGE ratio (percentage points) by income group, 63 countries, 2019-2023.**

Income Group	GHS pc growth (%)	GGE pc growth (%)	GHS/GGE growth (pp)
LICs	0.4	2.5	- 0.14
LMICs	1.0	1.3	0.02
All countries	0.8	1.6	- 0.03

*Source:* Authors' calculations using Government Health Budgets and Spending Database for GHS; IMF WEO (April 2024) for GGE.

*Note:* The averages in columns 1 and 2 reflect the simple average of the compounded annual growth rate of real GHS and GGE per capita respectively, for all countries in that income group (as per the 2022 World Bank country classifications by income level). The averages in column 3 reflect the simple average of annual percentage point change in the GHS/GGE ratio for all countries in that income group.

These trends represent a clear departure from the pre-pandemic era (Table 6). Between 2015 and 2019, average GHS growth rates surpassed GGE growth rates by considerable margins, and the GHS-to-GGE ratio had notably increased in both LICs and LMICs.

**Table 6: Average annual real growth rate of GHS per capita and GGE per capita (percent), and GHS-to-GGE (percentage points) by income group, 56 countries, 2015-2019 and 2019-2023.**

Income Group	2015-2019			2019-2023		
	GHS pc growth (%)	GGE pc growth (%)	GHS/GGE growth (pp)	GHS pc growth (%)	GGE pc growth (%)	GHS/GGE growth (pp)
LICs	4.2	2.3	0.09	1.2	2.1	- 0.06
LMICs	2.4	0.7	0.07	1.2	1.1	0.04
All countries	2.8	1.1	0.07	1.2	1.4	0.02

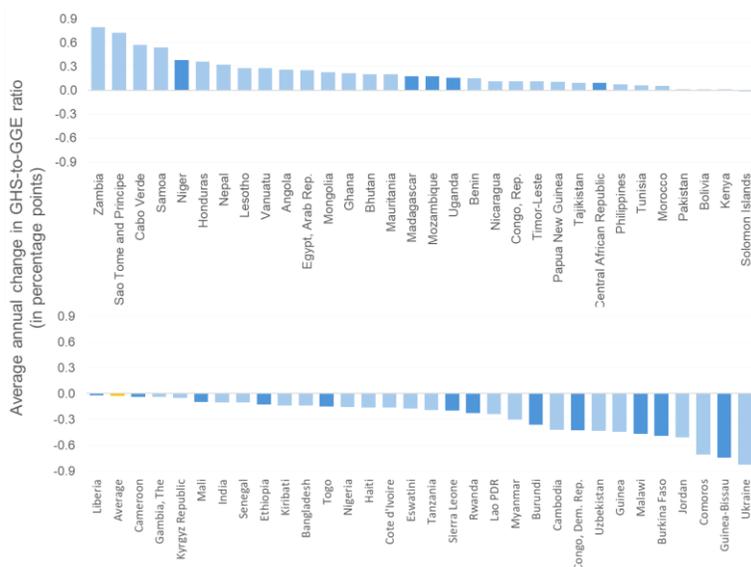
*Source:* Authors' calculations using Government Health Budgets and Spending Database for GHS; IMF WEO (April 2024) for GGE.

*Note:* Sample limited to 56 countries with data for both periods (2015-2019 and 2019-2023). The averages in columns 1, 2, 4 and 5 reflect the simple average of the compounded annual growth rate of real GHS and GGE per capita respectively, for all countries in that income group (as per the 2022 World Bank country classifications by income level). The averages in columns 3 and 6 reflect the simple average of annual percentage point change in the GHS/GGE ratio for all countries in that income group.

### Country-specific trends for the GHS-to-GGE ratio: Diverging priorities

Among all study countries, the GHS-to-GGE ratio exhibited considerable variation, with annual average changes ranging from a decline of 0.8 percentage points to an increase of 0.8 percentage points (Figure 3). At the two extremes, the changes in the average annual growth rates accumulated to more than three percentage points over the four-year period.

**Figure 3: Average annual change in GHS-to-GGE ratio (percentage points), 63 countries, 2019-2023.**



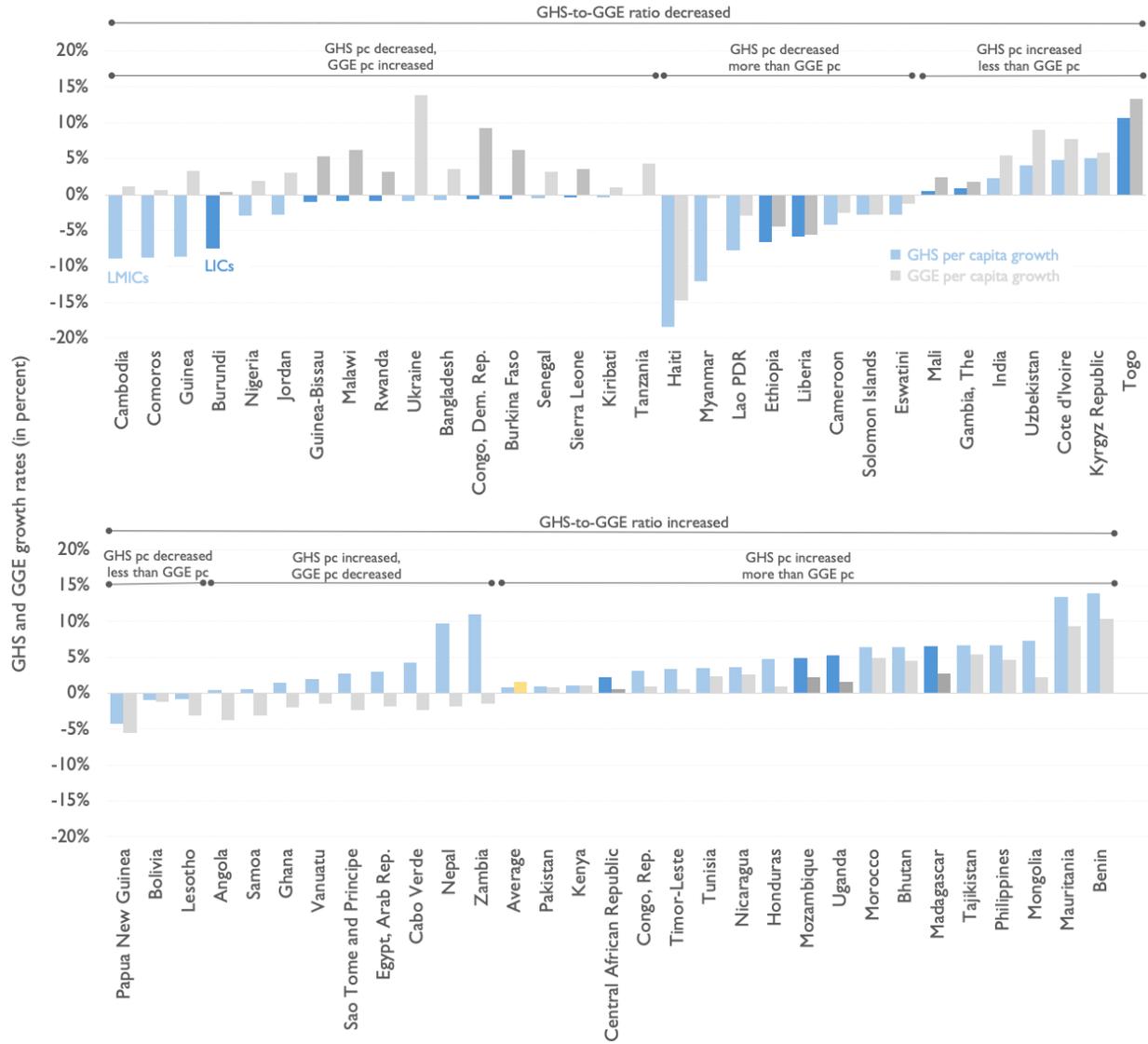
Source: Authors' calculations using Government Health Budgets and Spending Database for GHS; IMF WEO (April 2024) for GGE.

### Countries with decreasing GHS-to-GGE ratios

More than half of the countries experienced a decline in the GHS-to-GGE ratio between 2019 and 2023, with a notable concentration of LICs (Figure 3). In the 32 countries, GHS lagged GGE growth by an average of 5.0 percentage points (Figure 4). The GHS-to-GGE ratio decreased by 0.27 percentage points annually, totaling more than one percentage point over the four-year period. Collectively, the 32 countries represent a population of 2.5 billion people.

In this subset of countries, the largest group (17) saw a reduction in GHS despite an increase in GGE. In these countries, the average decline in GHS growth was substantial, and the difference between the two growth rates large - on average 6.9 percentage points. In four countries – Cambodia, Guinea, Myanmar, and Ukraine – annual average GHS growth lagged GGE growth by more than 10 percentage points (Figure 4). Unlike the other countries with stagnant GGE, Ukraine exhibited significant growth in GGE.

**Figure 4: Average annual real growth rates of GHS per capita vs. GGE per capita (percent), 63 countries, 2019-2023.**



Source: Authors' calculations using Government Health Budgets and Spending Database for GHS; IMF WEO (April 2024) for GGE. Note: The averages reflect the simple average of the compounded annual growth rate of real GHS and GGE per capita for all countries in that income group (as per the 2022 World Bank country classifications by income level).

### *Countries with increasing GHS-to-GGE ratios*

Nearly half of the study countries saw an increase in the GHS-to-GGE ratio, including a disproportionately higher number of LMICs. In these 31 countries, GHS growth exceeded GGE growth by an average of 3.5 percentage points. The annual average increase in the GHS-to-GGE ratio was 0.23 percentage points, leading to a cumulative rise in the ratio of close to one percentage point over the four-year period.

In this group, most countries (18) experienced growth in both GHS and GGE, though the differences in growth rates were generally modest. The exceptions are Nepal and Zambia, where GHS growth surpassed GGE growth by more than 10 percentage points. Notably, ten countries saw GHS growth despite a contraction of GGE, with GHS growing on average by 6.2 percentage points faster than GGE. However, three countries (Bolivia, Lesotho, and Papua New Guinea) saw both negative GHS and GGE growth, with the share of GHS in GGE remaining positive, as the declines in GGE outpaced those in GHS.

### **Risks to Health Spending Sustainability**

Amid diverse trajectories in both government health spending (GHS) per capita and the GHS-to-general government expenditure (GGE) ratio, a subset of countries faces negative trends that pose significant risks to the sustainability of government health spending.

Between 2019 and 2023, a total of 32 countries experienced a reduction in the GHS-to-GGE ratio. Four out of five of these countries also experienced a contraction in GHS per capita. In addition, three countries saw GHS per capita contract more slowly than GGE per capita, resulting in only a marginal positive trend in health prioritization (Table 7).

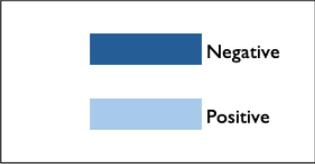
This group of 35 countries represents a population of over 2.5 billion people and includes a notable concentration of fragile and conflict-affected countries.<sup>4</sup> In these nations, any future increase in government per capita spending on health will depend on an increased prioritization of health within government budgets, a favorable fiscal environment—whether achieved through increased revenues or enhanced borrowing capacity—higher levels of development assistance for health, or any combination thereof.

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<sup>4</sup> Robustness checks indicate that only one country, Bolivia, would not qualify as a higher-risk country if revenue from obligatory social health insurance (SHI) contributions—which constitute an unusually high share of total health revenue for a lower middle-income country—substantially increased between 2019 and 2023. However, obligatory SHI contributions generally follow trends in general government revenue, which decreased in Bolivia during the same period.

**Table 7: Risks to the sustainability of GHS-to-GGE and GHS per capita, 63 countries, 2019-2023.**

Higher risk				Lower risk			
Country	Income Group	GHS/GGE growth	GHS pc growth	Country	Income Group	GHS/GGE growth	GHS pc growth
Burkina Faso	LICs	Negative	Negative	Central African Republic	LICs	Positive	Positive
Burundi	LICs	Negative	Negative	Madagascar	LICs	Positive	Positive
Congo, Dem. Rep.	LICs	Negative	Negative	Mozambique	LICs	Positive	Positive
Ethiopia	LICs	Negative	Negative	Niger	LICs	Positive	Positive
Guinea-Bissau	LICs	Negative	Negative	Uganda	LICs	Positive	Positive
Liberia	LICs	Negative	Negative	Angola	LMICs	Positive	Positive
Malawi	LICs	Negative	Negative	Benin	LMICs	Positive	Positive
Rwanda	LICs	Negative	Negative	Bhutan	LMICs	Positive	Positive
Sierra Leone	LICs	Negative	Negative	Cabo Verde	LMICs	Positive	Positive
Bangladesh	LMICs	Negative	Negative	Congo, Rep.	LMICs	Positive	Positive
Cambodia	LMICs	Negative	Negative	Egypt, Arab Rep.	LMICs	Positive	Positive
Cameroon	LMICs	Negative	Negative	Ghana	LMICs	Positive	Positive
Comoros	LMICs	Negative	Negative	Honduras	LMICs	Positive	Positive
Eswatini	LMICs	Negative	Negative	Kenya	LMICs	Positive	Positive
Guinea	LMICs	Negative	Negative	Mauritania	LMICs	Positive	Positive
Haiti	LMICs	Negative	Negative	Mongolia	LMICs	Positive	Positive
Jordan	LMICs	Negative	Negative	Morocco	LMICs	Positive	Positive
Kiribati	LMICs	Negative	Negative	Nepal	LMICs	Positive	Positive
Lao PDR	LMICs	Negative	Negative	Nicaragua	LMICs	Positive	Positive
Myanmar	LMICs	Negative	Negative	Pakistan	LMICs	Positive	Positive
Nigeria	LMICs	Negative	Negative	Philippines	LMICs	Positive	Positive
Senegal	LMICs	Negative	Negative	Samoa	LMICs	Positive	Positive
Solomon Islands	LMICs	Negative	Negative	Sao Tome and Principe	LMICs	Positive	Positive
Tanzania	LMICs	Negative	Negative	Tajikistan	LMICs	Positive	Positive
Ukraine	LMICs	Negative	Negative	Timor-Leste	LMICs	Positive	Positive
Gambia, The	LICs	Negative	Positive	Tunisia	LMICs	Positive	Positive
Mali	LICs	Negative	Positive	Vanuatu	LMICs	Positive	Positive
Togo	LICs	Negative	Positive	Zambia	LMICs	Positive	Positive
Kyrgyz Republic	LMICs	Negative	Positive				
Uzbekistan	LMICs	Negative	Positive				
Cote d'Ivoire	LMICs	Negative	Positive				
India	LMICs	Negative	Positive				
Bolivia	LMICs	Positive	Negative				
Lesotho	LMICs	Positive	Negative				
Papua New Guinea	LMICs	Positive	Negative				



Source: Authors' calculations using Government Health Budgets and Spending Database for GHS; IMF WEO (April 2024) for GGE.

## CONCLUSIONS

This paper presents most recent trends in government health spending (GHS) across 63 low- and lower middle-income countries (LICs and LMICs), covering close to 90 percent of the population in these income groups. It offers critical insights as nations approach the decisive period leading to the Sustainable Development Goals (SDGs). Incorporating data through 2023, the paper updates the earlier World Bank Health Spending Review, *Health Financing in a Time of Global Shocks: Strong Advance, Early Retreat* (Kurowski et al. 2023), and complements WHO's Global Health Expenditure Database, which operates with a two-year lag.

The paper highlights significant shifts and emerging issues that are expected to shape the sustainability of health spending in the years ahead. The analysis focuses on GHS and its share of total government expenditure (GGE) from 2019 to 2023, while comparing these trends to the pre-pandemic period from 2015 to 2019.

### From Peaks to Sustained Declines

In the years following the pandemic response, LICs and LMICs have, on average, experienced a steady decline in GHS per capita. While this may seem like a natural easing of the pandemic-induced spending surge, a closer examination reveals deeper concerns about the long-term trajectory of public investments in health. Rather than a temporary adjustment, these declines expose troubling trends in both GHS levels and the prioritization of health. What began as transient reduction has evolved into broader risks that affect both income groups and specific subsets of countries, eroding the spending momentum necessary for sustained progress toward the health SDGs.

### Mounting risks

These declines, compounded over several years, have resulted in only modest growth in GHS per capita across both income groups during the pandemic and recovery phases. These growth rates stand in stark contrast to the more rapid growth seen in the pre-pandemic period, when GHS per capita experienced sustained momentum.

The modest growth is largely due to a shrinking share of health in overall government budgets, as government expenditure envelopes expanded faster than health spending itself. This shift in prioritization reverses the focus on health that characterized the pre-pandemic years, when governments steadily increased the health share of their spending. The recent trends are pronounced in LICs, where GHS per capita is already very low and spending often relies heavily on on-budget development assistance for health (DAH).

Beyond these general patterns, specific threats to the financial sustainability of GHS have intensified in 35 countries representing a population of over 2.5 billion people. In 32 of these nations, the share of government spending allocated to health has declined, while in 28 countries, GHS per capita has contracted. In 23 of these countries, risks are further heightened by IMF projections suggesting that general government expenditure (GGE) per capita will contract between 2023 and 2029 (Kurowski et al. 2024). As overall government spending decreases, policymakers will face tough choices across sectors to maintain health as a priority.

### Facing severe funding shortfalls

As the final phase to achieve the SDGs approaches, spending levels remain far below the minimum annual per capita government health spending needed by 2030. These benchmarks, estimated at around US\$80

in LICs and US\$100 in LMICs (in 2023-dollar values), only cover recurrent costs and assume efficient resource use. The recent modest growth in GHE per capita means that these minimum spending levels are increasingly out of reach for many countries without decisive policy action.

### **Navigating difficult choices**

To address these financing shortfalls, one critical option for governments—especially where health represents a relatively small share of government budgets—is to increase the priority given to health in spending decisions. However, this is especially difficult when overall budget envelopes are shrinking or stagnant, particularly now, as development priorities are multiplying and placing growing demands on governments across sectors (Kurowski et al. 2021a). Further exploration is necessary to better understand effective strategies and approaches that countries can adopt in this evolving context.

Increasing the share of health in government spending is only one approach to raise health spending for faster progress toward broader coverage with essential health services and financial protection. A range of complementary domestic policies will also play an important role. Some policies fall under the remit of Ministries of Finance and monetary authorities rather than Ministries of Health. These include fiscal reforms to enhance government revenue, alongside fiscal and monetary measures to manage public debt, control inflation and stimulate growth.

Other policies have an economy wide scope and require the active involvement of all government sectors, including health. These strategies build on spending reviews to identify measures that improve spending efficiency, such as eliminating ineffective subsidies and combating corruption (Kurowski et al. 2020). For guidance with these measures, countries can draw on an extensive body of publications detailing successful experiences (Barroy et al. 2018; Mathauer et al. 2019; World Bank 2019; Jowett et al. 2020; Mathauer et al. 2020; Kurowski et al. 2021a; Barroy, Blecher, and Lakin 2022).

### **Time for a rethink**

Trends in government health spending through 2023 suggest a precarious outlook for achieving global health goals. Recent modest growth in government health spending suggests that the necessary per capita amounts to meet the Sustainable Development Goals (SDGs) by 2030 remain out of reach. Even with the higher spending observed during the first two decades of the century, most LICs and LMICs struggled to make adequate progress toward these levels (World Bank 2019; WHO 2022).

If these funding shortfalls are not addressed, the consequences will be profound, impacting all stakeholders. Ministries of Health and other sector agencies will be tasked with addressing large and rapidly increasing unmet health needs with inadequate and stagnant budgets, severely impeding their ability to strengthen health systems, improve population health, and enhance financial protection. Insufficient health investments will undermine human capital development and as highlighted by the G20 Ministers of Finance, erode the foundation for long-term growth and revenue generation (World Bank 2019). Meanwhile, development partners will eventually see gains from past Development Assistance for Health (DAH) diminish and progress on global priorities, including pandemic prevention and preparedness, stall.

The SDG era has been envisioned as a transformative period for global health—a time of accelerated progress and bold achievements. However, pandemic setbacks and mounting financing challenges have introduced new realities that, if unaddressed, will redefine this era as one of limited gains and unmet promises. A critical reassessment of financing approaches to achieve health-related SDGs is now essential, with careful consideration of today's macro-fiscal headwinds and multiplying development challenges. The stakes are high, not only for those in the health sector but also for Ministries of Finance and

development partners, who risk missing vital opportunities unless they collaborate to forge new paths forward. Encouragingly, the analyses also demonstrate that even amid these pressing challenges, some countries are already pursuing strategies to sustainably expand health investments, showing that progress is possible.

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## ANNEX 1: DATA

This annex describes the data collection framework, compares it to the System of Health Accounts (SHA) 2011 (OECD/Eurostat/WHO 2017) and the World Health Organization’s (WHO) Global Health Expenditure Database (GHED) (WHO 2023a), and provides additional details on the data collection and sample.

### DATA FRAMEWORK AND ALIGNMENT WITH SHA

#### Government health spending (GHS)

The study draws on over 3,000 budget and expenditure documents from government sources, primarily Ministry of Finance websites. It systematically extracts and organizes quantitative financial data on health spending from government revenues, ensuring consistency and comparability across countries while avoiding double-counting (Figure A1.1). The data comprises two main components: (1) Government Health Spending (GHS) at both central and sub-national levels, funded through government revenues such as taxes and on-budget development assistance, and (2) spending from compulsory Social Health Insurance (SHI) contributions.

In line with international reporting standards like the System of Health Accounts 2011, the analysis focuses on current health expenditures, excluding capital expenditures where possible. GHS covers expenditures on goods and services, administrative overhead, earmarked health transfers to subnational governments, and transfers to social health insurance schemes at both central and subnational levels. While GHS is predominantly used in the report, it is important to note that Government Health Expenditure (GHE) includes both GHS and spending from compulsory SHI contributions.

**Figure A1. 1. Framework for Data Collection of Health Spending Indicators**

<b>GHS</b>			
<b>Central GHS</b>		<b>Subnational GHS</b>	<b>SHI</b>
<b>Spending from Ministry of Health</b>	Health spending from other ministries	Health spending from unconditional central government transfers	Spending from compulsory SHI contributions
	Transfers for health to subnational governments		
	Transfers to SHI	Health spending from subnational revenues	

Source: Authors’ illustration.

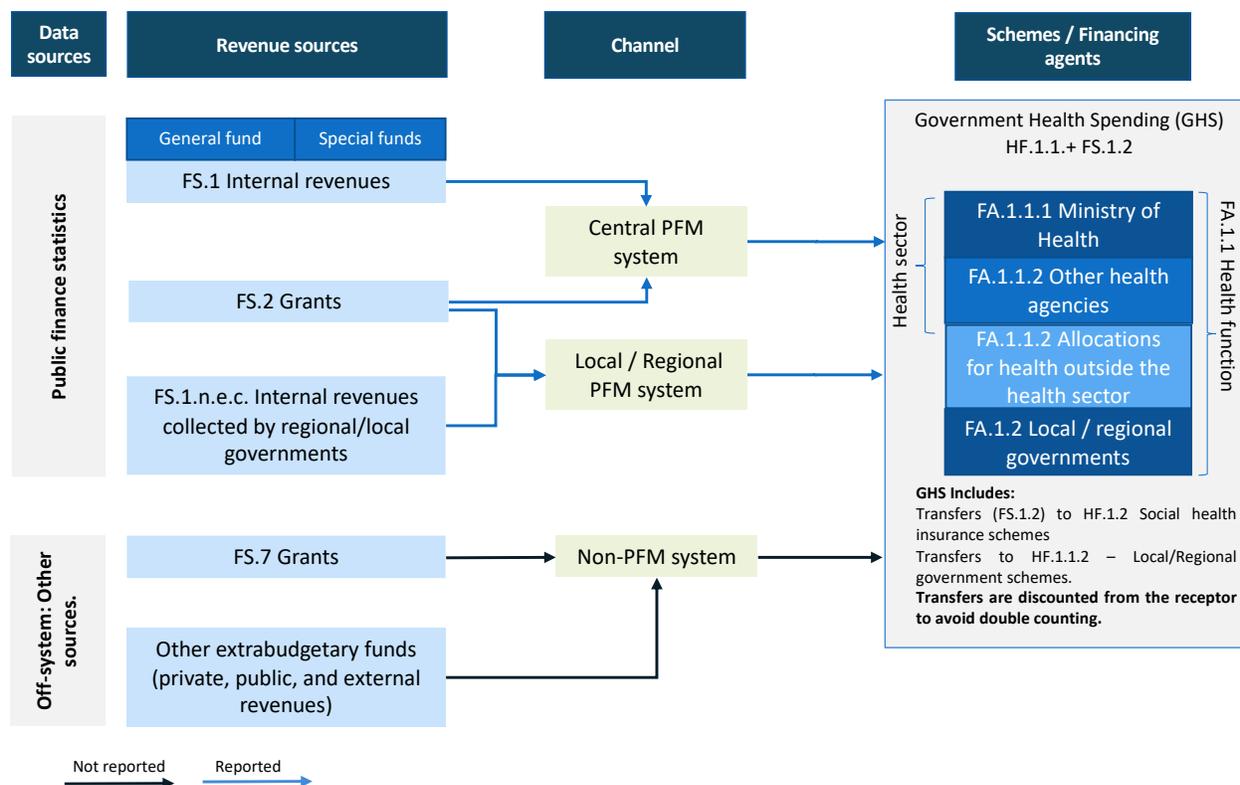
Conditional transfers to subnational governments and SHI transfers are recorded as central government expenditures. To prevent double-counting, subnational government health spending includes only expenditures funded by unconditional central government transfers and the subnational governments’ own revenues. GHS is the aggregate of health spending by both central and subnational governments.

Spending from SHI contributions excludes any central or subnational government transfers intended to cover deficits or subsidize enrollees. It also omits voluntary prepayments and other minor income sources, such as utility revenues, reinsurance compensation, and dividends from financial assets.

## Alignment with SHA 2011

GHS is aligned with the SHA 2011 classification of revenues, schemes, and financing agents (Figure A1.2). Specifically, GHS corresponds to the sum of FS.1 and FS.2 categories in the SHA classification of revenue sources. However, it includes only on-budget allocations and expenditures. Off-budget items, such as external financing managed through public financial management systems but not recorded in the official budget, are excluded from the analysis.

**Figure A1. 2. Relationship between GHS and SHA 2011 Classifications**



Source: Authors' illustration.

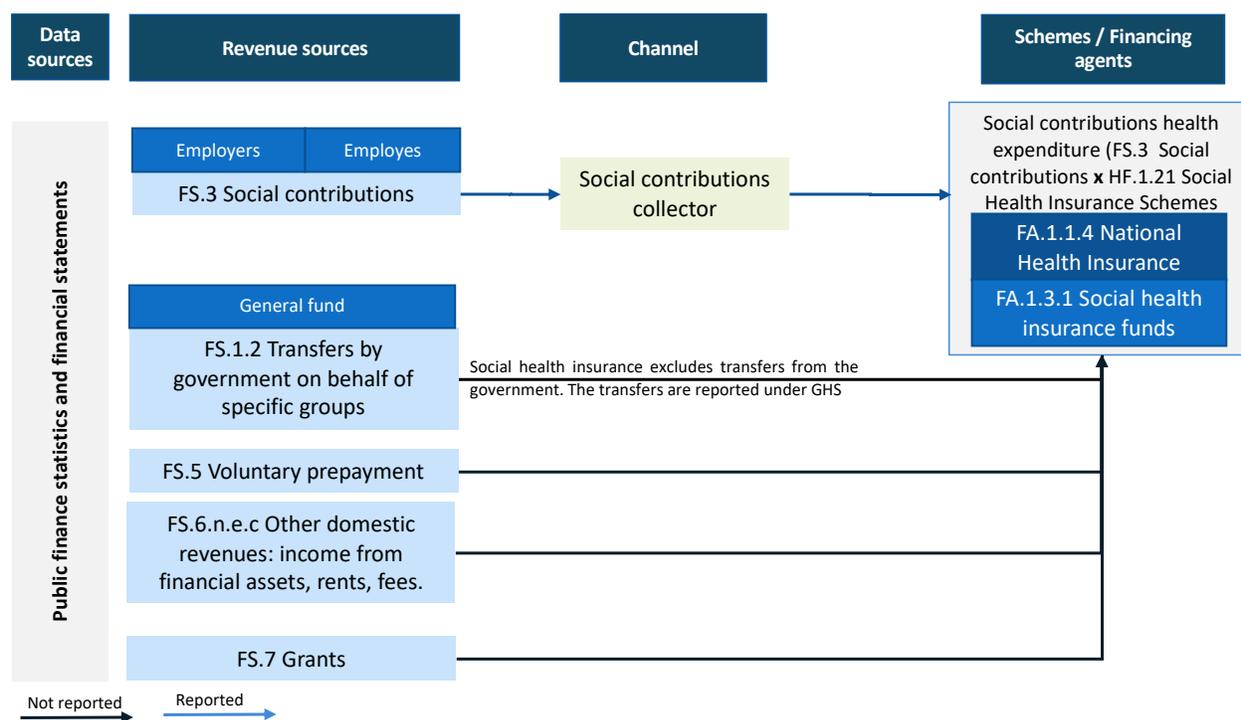
Government spending from compulsory SHI contributions corresponds to the FS.3 category in the SHA classification of revenue sources (Figure A1.3). As noted earlier, this excludes any transfers to SHI schemes from central or subnational governments.

## DATA

### Government health spending

To determine GHS in 26 LICs and 54 LMICs, the study collected allocated budgets, the latest revised and executed budgets. Executed budgets reflect actual spending reported by governments and are referred to as “spending” or “expenditures” in the report. Budget allocations are used to estimate GHS when executed budgets are unavailable.

**Figure A1. 3. Relationship between Spending from Compulsory SHI Contribution and SHA 2011 Classifications**



Source: Authors' illustration

GHS was constructed using three different methods (Table A1.1): (1) summing recurrent health-related expenditure items, (2) utilizing total government health expenditure as reported, and (3) summing recurrent or total expenditure items and subtracting inter-budgetary transfers. The scope of these methods varies based on the level of aggregation and budget classifications. The three scopes are: (1) the health function, classified under the Classification of Functions of Government (COFOG), which includes all health-related allocations from both health and non-health sector agencies; (2) the health sector, encompassing budgets from health sector agencies; and (3) the Ministry of Health, used as a proxy when functional classifications are unavailable or no other health agencies are represented in the budget.

When capital expenditure could not be separated, GHS was constructed using total expenditure. Inter-budgetary transfers between the central and subnational governments were generally excluded to prevent double counting.

GHS data or the allocations used to estimate GHS for the years 2015–2023 were, at times, unavailable (Table A1.2). The analysis focuses on the 17 LICs and 46 LMICs for which GHS data between 2019 and 2023 were either available or could be estimated (Table A1.3). GHS had to be estimated for 12 countries in 2022 and 38 countries in 2023 (Annex 2)

Budget documents for 19 out of the 63 countries do not include information on subnational GHS. However, health account data indicate that only six of these 19 countries have subnational health spending that accounts for more than 10 percent of total government health spending. Additionally, this figure includes subnational spending funded by central government transfers, which is already captured in central GHS.

**Table A1. 1. Methods and scope used to construct GHS**

<b>Method:</b>	<b>Scope</b>	<b>Example</b>
Sum of recurrent expenditure items	Central Government - Health function	El Salvador (2019) <i>Wages: \$201,610,382</i> <i>Goods and services: \$56,805,025</i> <i>Other current transfers: \$348,628,965</i> <i>Other current expenses: \$3,461,650</i> <i>Special contributions budget (current transfers to special units): \$45,303,289</i> <b><u>Current health budget:</u></b> <b><u>\$655,809,311</u></b>
Total government health expenditure	Central Government - Health function	Indonesia (2021) <i>Total central health budget: Rp 130,668.9 billion</i> <i>Total regional and village-level health budgets: Rp 39,054.7 billion</i> <b><u>Total health budget (including conditional transfers to the subnational level):</u></b> Rp 169,723.7 billion
	Central Government - Ministry of Health	Zambia (2019) <b><u>Total MoH budget:</u></b> ZK 7,519,930,916 According to the 2016 National Health Accounts 2016, the MoH accounts for 95.3 percent of central government schemes spending.
Sum of recurrent or total expenditure items minus inter-budgetary transfers	General Government – Health function	India (2021) <b><u>General Government Health Spending</u></b> 254,064 crore Recurrent health spending from State Governments: 224,711 crore Minus transfers to subnational governments by the MOH: 49,299 crore: Plus MOH expenditure: 78,652 crore

**Table A1. 2. Data availability for GHS, by year**

Year	GHS		
	Initial Allocations	Revised Allocations	Spending
2015	64	38	58
2016	64	41	63
2017	69	43	65
2018	71	45	68
2019	75	54	72
2020	77	61	72
2021	76	59	70
2022	73	53	54
2023	72	27	26

**Table A1. 3. List of 63 Countries Included in the Analysis**

LICs	LMICs		
Burkina Faso	Angola	Jordan	Senegal
Burundi	Bangladesh	Kenya	Solomon Islands
Central African Republic	Benin	Kiribati	Tajikistan
Congo, Dem. Rep.	Bhutan	Kyrgyz Republic	Tanzania
Ethiopia	Bolivia	Lao PDR	Timor-Leste
Gambia, The	Cabo Verde	Lesotho	Tunisia
Guinea-Bissau	Cambodia	Mauritania	Ukraine
Liberia	Cameroon	Mongolia	Uzbekistan
Madagascar	Comoros	Morocco	Vanuatu
Malawi	Congo, Rep.	Myanmar	Zambia
Mali	Cote d'Ivoire	Nepal	
Mozambique	Egypt, Arab Rep.	Nicaragua	
Niger	Eswatini	Nigeria	
Rwanda	Ghana	Pakistan	
Sierra Leone	Guinea	Papua New Guinea	
Togo	Haiti	Philippines	
Uganda	Honduras	Samoa	
	India	Sao Tome and Principe	

## Health spending from social health insurance contributions

Out of the 63 countries in the sample, 38 countries possess SHI schemes based on information from the WHO 2019 Global Health Expenditure Database (GHED). For 22 of these countries information on health spending from SHI contributions is unavailable. However, only in six of the 22 countries<sup>5</sup> is the share of health spending from SHI contributions in domestic government health spending<sup>6</sup> larger than 10 percent.

**Table A1. 4. Methods and source document structure used to construct health spending from SHI contributions**

SHI Indicator	Source Document Structure	Approach
<b>Allocated SHI contributions</b>	SHI budget reports allocations for contributory scheme.	Reported amount taken as is; no adjustments made.
	SHI budget with capital component included.	Reported amount adjusted: infrastructure and equipment removed from SHI budget allocations for contributory scheme.
<b>Actual SHI contributions</b>	SHI financial statements report income from contributory schemes.	Reported amount taken as is; no adjustments made.
	SHI financial statements have no disaggregation.	Transfers from government subtracted from total SHI income.
	SHI budget of income and expenditure.	Total SHI income equals expected expenditure when income is greater than expenditure (to exclude potential reserves).
<b>Spending from SHI contributions</b>	SHI financial statement/NHA reports/SHI annual reports report contributory SHI spending.	Reported amount taken as is; no adjustments made.
	SHI financial statement reports on spending including capital component, disaggregated.	Reported amount adjusted: infrastructure and equipment removed from SHI budget spending for contributory scheme.
	SHI financial statement reports on spending including pensions and other social insurance benefits, disaggregated.	Reported amount adjusted: pensions and other social insurance benefits removed from SHI budget spending for contributory scheme.
	SHI financial statements do not disaggregate transfers and contributory components.	Reported income from contribution multiplied by overall SHI execution rate.

<sup>5</sup> The six countries are Benin, Côte d'Ivoire, Egypt, Haiti, Nigeria, and Togo.

<sup>6</sup> The share is calculated using the formula  $FS.3/(FS.1+FS.3)$  from 2019 GHED data.

To determine health spending from social health insurance contributions, the study collected data on allocated SHI contributions, actual SHI contributions, and spending from SHI contributions. When executed budget data were unavailable, allocated and actual SHI contributions were used to estimate SHI health spending. Various methods were employed to construct these values, depending on the structure of the source documents (Table A1.4). In some countries, no distinction is made between spending from SHI contributions and spending from government transfers. In such cases, to avoid double counting, government transfers for subsidized enrollees were subtracted from the total executed amount, as they are already accounted for in GHS.

### **General government expenditures**

Data on general government expenditures (GGE) are obtained from the IMF World Economic Outlook, April 2024 (International Monetary Fund 2024). This indicator includes total expenses, covering both current and capital expenditures, as well as the net acquisition of nonfinancial assets. General government encompasses central, subnational, and social security funds. GGE also accounts for a portion of debt servicing, specifically interest payments on domestic and external borrowings.

## ANNEX 2: ADDRESSING DATA LIMITATIONS

The study compiled data on government health spending (GHS) and health spending from social health insurance (SHI) contributions from more than 3000 budget reports. However, in some instances, GHS data were incomplete, with gaps in later years for specific countries or missing subnational components. Additionally, data on health spending from SHI contributions were often unavailable. This annex details the methodology used to estimate GHS from budget allocations, and presents a statistical model to assess the impact of data limitations on trends across income groups. The modeling demonstrates that these trends remain robust, even when accounting for statistical uncertainty due to data limitations.

### DATA LIMITATIONS

The GHS data of the 63 LICs and LMICs in the sample face the following key limitations for the years 2019 to 2023:

1. Actual GHS data (executed budget) are not available for 12 countries in 2022, and for 38 countries in 2023; only data on health budget allocations are available.
2. Data on subnational GHS are unavailable in budget documents for 19 of the 63 countries. In six of these countries<sup>7</sup>, health account data suggest that the omitted subnational spending is significant – defined as exceeding ten percent of GHS.
3. Data on allocations and expenditures from SHI contributions are missing in 22 of the 38 countries with SHI schemes. The WHO 2019 Global Health Expenditure Database (GHED) suggests that in six of these countries<sup>8</sup>, the missing SHI spending is larger than ten percent of GHS. Additionally, in the 16 countries that do have data, spending details are not available for some years.

Therefore, the study faced could not sum the different components to calculate government health spending and total government health expenditure (GHE) for each country  $c$  and year  $t$ :

$$GHS_{ct} = \text{central } GHS_{ct} + \text{subnational } GHS_{ct}$$
$$GHE_{ct} = GHS_{ct} + \text{spending from SHI contributions}_{ct}$$

To address these data limitations, the study estimates missing spending data using budget allocations or statistically models potential deviations from an established baseline. Components requiring estimation are treated as random variables, each with statistical distributions and confidence intervals. For example, when all components must be estimated for a specific year in a given country, the below equations are used:

$$\widehat{GHS}_{ct} = \text{central } \widehat{GHS}_{ct} + \text{subnational } \widehat{GHE}_{ct}$$
$$\widehat{GHE}_{ct} = \widehat{GHS}_{ct} + \text{spending from } \widehat{SHI} \text{ contributions}_{ct}$$

The following sections outline the approaches used to address the three key data limitations.

### ADDRESSING MISSING GHS DATA IN 2022 and 2023

Missing GHS data are estimated using initial or revised budget allocations, based on the historical relationship between health spending and allocations. When available, these allocations are used to estimate missing health spending. The study employs a linear panel regression model with country and

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<sup>7</sup> The 6 countries are Bolivia, Cambodia, Democratic Republic of Congo, Malawi, Philippines, and Rwanda.

<sup>8</sup> The six countries are Benin, Côte d'Ivoire, Egypt, Haiti, Nigeria, and Togo.

year fixed effects, a method well-suited given the sample size<sup>9</sup>. This approach is similar to those used in OECD countries to estimate missing health spending data for prior or current years.

In particular, the study regresses real per capita GHS (in constant US\$) on real per capita allocations (in constant US\$) using a panel regression with a log-log specification<sup>10</sup>. Time fixed effects ( $T_t$ ) are included to account for shocks, such as the COVID-19 pandemic, affecting all countries at the same time. Country fixed effects ( $C_c$ ) are included to control for country-specific, time-invariant, confounding factors, such as chronic budget under-execution. The statistical model has the following form

$$\log GHS \text{ per capita}_{ct} = a + b \cdot \log GHS \text{ allocation}_{ct} + C_c + T_t + \varepsilon_{ct}$$

$$\varepsilon_{ct} \sim N(0, \sigma_\varepsilon) \text{ i. i. d}$$

**Table A2.1. Fixed-Effects Regression of Log of Government Health Expenditures on the Log of Government Initial Allocations and Revised Allocations for Health**

Dependent variable → Independent variables ↓	Log GHS Expenditures	Log GHS Expenditures
Log Initial Budget Allocations	0.565*** (0.0585)	
Log Revised Budget Allocations		0.757*** (0.039)
2016	0.033 (0.025)	-0.012 (0.023)
2017	0.044* (0.024)	0.028 (0.022)
2018	0.043* (0.024)	0.028 (0.021)
2019	0.063** (0.025)	0.004 (0.023)
2020	0.183*** (0.029)	0.048* (0.026)
2021	0.158*** (0.034)	0.038 (0.029)
2022	0.074** (0.032)	0.019 (0.028)
2023	0.057 (0.041)	-0.003 (0.032)
Constant	1.958*** (0.264)	1.102*** (0.177)
Observations	622	441
Adjusted R <sup>2</sup>	0.987	0.993

Source: Authors' calculations.

Note: Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Country fixed effects are omitted.

<sup>9</sup> When using data from all years 2015-2023 across 84 countries for which data was collected (18 LICs, 51 LMICs, and 15 IDA UMICs), there are 631 spending-initial allocation pairs and 447 spending-revised allocation pairs.

<sup>10</sup> Other methods and specifications, such as estimation via budget execution rates, interaction terms, and alternative linear regression models, were explored in the previous Global Health Spending Review report (Kurowski et al., 2023b). This method produced the smallest prediction error based on five-fold cross-validation.

The regression results show a strong linear correlation, with an R<sup>2</sup> of 0.99 for both, initial allocations and for revised allocations (Table A2.1). To generate predictions for GHS per capita, the outputs of the log-log regression model is exponentiated:

$$GHS \widehat{per\ capita}_{ct} = \exp(\log GHS \widehat{per\ capita}_{ct})$$

Whenever possible, revised allocations are used in place of initial allocations. The following conditions are applied, to ensure that estimated GHS per capita is meaningful:

1. At least one expenditure-allocation pair is available from non-COVID years (2015–2019 or 2023).
2. At least two expenditure-allocation pairs are available from COVID years (2020–2022).

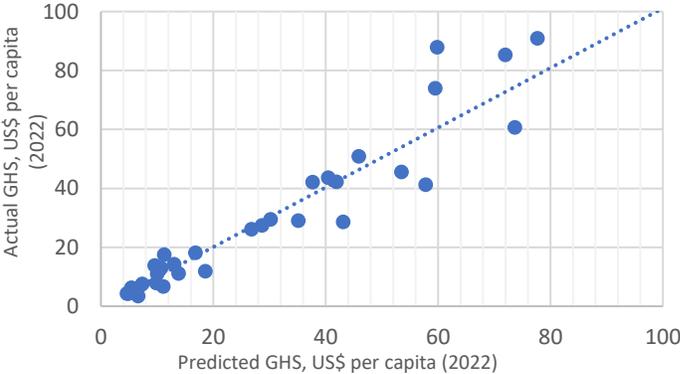
If these conditions are met and GHS budget allocations are available, the missing country-year GHS per capita is estimated. This applies to 12 countries in 2022 and 38 countries in 2023.

Predicted (i.e., estimated) values can simply be compared with the available actual values to assess the accuracy of the estimated GHS per capita. For predictions based on initial allocations, the mean absolute difference between predicted and actual values across 51 countries with available spending data in 2022 is 14.1 percent, and 10.4 percent for 25 countries with data in 2023. For predictions based on revised allocations, the mean absolute difference is 9.4 percent in 2022 and 6.0 percent in 2023. These numbers are in line with the methodologically more reliable cross-validation results from the previous report (Kurowski et al. 2023): a mean absolute difference of 18.4 percent for predictions based on initial allocations and 14.0 percent for predictions based on revised allocations.

A similar assessment is possible between the predicted GHS values from the previous and the now-available actual GHS values. The earlier report (Kurowski et al. 2023) estimated GHS per capita in 2022 for 36 countries where GHS data was unavailable at the time. With the now-available budget documents, it is possible to compare those estimates with the actual GHS values in 2022. The comparison is instructive as both reports used the same panel regression method.

Predicted and actual GHS expenditures show a strong linear correlation, with a coefficient of 0.98 (Figure A2.1), confirming the method's reliability. The average per capita GHS is \$41.9 for predicted values and \$42.3 for actual values. The difference between the actual and predicted GHS means is approximately 1 percent and not statistically significant. Across all country-year observations, the mean absolute difference is 18.2 percent of the actual value.

**Figure A2.2. Comparison of Actual Data with Predicted Data**



Source: Authors’ calculations using predicted GHS data from the previous edition (2023) of the report (Kurowski et al. 2023) and actual GHS data from the now-available budget documents (in 2024).

## ADDRESSING MISSING SUBNATIONAL GHS DATA

Missing subnational GHS data in 18 countries cannot be estimated from allocation data, as these are also unavailable. However, recent health account data provide subnational shares of government health spending for 2019, offering a baseline for estimating the missing subnational spending. An analysis of subnational GHS trends in seven countries, where central and subnational GHS are clearly delineated, indicates the expected range of changes after 2019.

To operationalize this approach the study takes two steps:

1. Use the subnational share around 2019 to calculate subnational GHS in 2019:

$$\text{subnational } GHE_{c2019} = \frac{\text{subnational share}_{2019}}{1 - \text{subnational share}_{2019}} \cdot \text{central } GHS_{2019}$$

2. Estimate missing post-2019 subnational GHS by applying a plausible range of relative deviations to the 2019 baseline. The small sample of seven diverse countries suggests a standard deviation of plus or minus 10 percent. Therefore:

$$\widehat{\text{subnational } GHE}_{ct} = \text{subnational } GHE_{c2019} + \text{subnational } GHE_{c2019} \cdot \varepsilon_{ct}$$

$$\varepsilon_{ct} \sim N(0,0.1) \text{ i. i. d.}^{11}$$

The procedure provides an approximate estimate of the missing subnational component in 2019 and the resulting uncertainty in later years. Ultimately, the adjustments are minimal, and in most of the 18 countries with missing subnational GHS, the missing subnational component represents less than 10 percent of GHS.

## ADDRESSING MISSING HEALTH SPENDING FROM SHI CONTRIBUTIONS

Missing health spending from SHI contributions for the 38 countries with SHI schemes can be estimated from either allocated or actual SHI contributions and their historical relationship with health spending. The study applies the same linear panel regression model used for estimating missing GHS data. This method enables the estimation of per capita health spending from SHI contributions for one additional country in 2022 and six in 2023. With these estimates, data for health spending from SHI contributions are available for 12 countries in 2022 and 10 countries in 2023.

When no spending or allocation data are available, a baseline approach similar to that used for missing subnational GHS is applied. The difference is that SHI shares for all countries are available until 2021 from WHO's GHED database, and the sample of 11 countries with observable SHI spending trends before 2023<sup>12</sup> is slightly larger. This approach is implemented in two steps:

1. Use the WHO GHED's SHI share of domestic government spending in 2021 to calculate missing SHI spending between 2019 and 2021:

$$\text{spending from SHI contributions}_{ct} = \text{SHI share}_{ct} \cdot \text{GHS}_{ct} \text{ if } t \in [2019, 2021]$$

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<sup>11</sup> An alternative model where the mean value of the error term increases annually by 2 percent made little difference and the results are not presented here. The annual increase roughly matches the average increase observed in the seven-country sample.

<sup>12</sup> The 11 countries are Bolivia, Cabo Verde, Ghana, Honduras, Kyrgyz Republic, Mali, Mongolia, Morocco, Nicaragua, Philippines, and Tanzania.

2. Estimate missing post-2021 health spending from SHI contributions by applying a plausible range of relative deviations to the 2021 baseline. The small sample of eleven diverse countries suggests again a standard deviation of plus or minus 10 percent. Therefore:

$$\widehat{\text{spending from SHI contributions}}_{ct} = \text{spending from SHI contributions}_{c2021} + \text{spending from SHI contributions}_{c2021} \cdot \varepsilon_{ct} \text{ if } t \geq 2021$$

$$\varepsilon_{ct} \sim N(0,0.1) \text{ i. i. d.}^{13}$$

With SHI shares of government health expenditure (GHE) ranging from less than 1 percent in Cameroon to 47.2 percent in Tunisia, the absolute difference between GHS per capita and GHE per capita can be substantial. However, comparing trends of GHE per capita without health spending from SHI contributions with total GHE per capita, using WHO's GHED database, shows that across the 38 countries with SHI schemes in the sample, the direction and relative changes remained closely aligned in all years. Modest but notable deviations occurred only in countries with significant SHI shares. Close alignment exists also between GHS and GHE for the 12 countries where health spending from SHI contributions is known or could be estimated.

#### ROBUSTNESS OF AVERAGE GHS PER CAPITA TRENDS ACROSS INCOME GROUPS

Missing data on GHS, its subnational components, and health spending from SHI contributions could challenge the picture that emerges from actual GHS per capita numbers and GHS shares. To evaluate the impact of these data limitations on trends across income groups, statistical modeling is employed. Trends without the estimated subnational GHS components and SHI contributions are compared to trends where these missing components are incorporated. Additionally, the uncertainty resulting from the inference of missing data is quantified using the standard deviations of the estimated random variables. The analysis demonstrates that trends across income groups remain robust, even when accounting for these data limitations.

Estimated GHS per capita carries statistical uncertainty when GHS per capita is estimated from allocations or when the subnational component is missing. The same applies to missing health spending from SHI contributions:

$$\widehat{GHS \text{ per capita}}_{ct} = \text{central } \widehat{GHS \text{ per capita}}_{ct} + \text{subnational } \widehat{GHE \text{ per capita}}_{ct}$$

$$\widehat{GHE \text{ per capita}}_{ct} = \text{central } \widehat{GHS \text{ per capita}}_{ct} + \text{subnational } \widehat{GHE \text{ per capita}}_{ct} + \text{spending from SHI contributions per capita}_{ct}$$

Assuming independence of the different random variables, the combined mean for an income group (e.g., LICs) is calculated as the average of the individual country values, while the combined standard deviation for the income group's mean equals the square root of the average of the sum of individual countries' squared standard deviations<sup>14</sup>. Although the assumption of independence is strong, it offers a

<sup>13</sup> An alternative model, where the mean value of the error term increases annually by 2.5 percent, made little difference and is not presented here. This annual increase roughly matches the average increase observed in the seven-country sample.

<sup>14</sup> We remind the reader that the standard deviation of a GHS observation for a country-year where we have data is zero. The standard deviation for a single estimated value of GHS for a country-year is measured using the options `stdp` when using the `predict` command in Stata.

reasonable foundation for an initial estimation of uncertainty in the estimates. The following illustrates these formulas with the LICs' average and standard deviation:

$$\overline{GHS\ per\ capita}_{LICs} = \frac{1}{n_{LICs}} \cdot \sum_{i=1}^{n_{LICs}} GHS\ per\ capita_{ct}$$

$$SD_{LICs} = \frac{1}{\sqrt{n_{LICs}}} \cdot \sqrt{\sum_{i=1}^{n_{LICs}} SD_{ct}^2}$$

Similar formulas apply to GHS shares. Income-group-specific averages for per capita levels and shares can now be calculated under the following conditions

- Missing GHS per capita levels and GHS shares are estimated from allocations, but missing subnational components and health spending from SHI contributions are disregarded (Table A2.4).
- Missing GHS per capita levels, GHS shares, and their subnational components are estimated, while health spending from SHI contributions is disregarded (Table A2.5).
- GHE per capita levels and GHE shares are estimated (Table A2.6).

**Table A2. 2. Income group means and standard deviations for GHS per capita (without estimated missing subnational components)**

Income group	Year	N	Level Mean	Level SD	Share Mean	Share SD
All countries	2019	63	42.5	0	6.4	0
All countries	2020	63	48.1	0	7.2	0
All countries	2021	63	49.9	0	7.1	0
All countries	2022	63	46.7	0.1	6.4	0
All countries	2023	63	44.8	0.1	6.3	0
LICs	2019	17	10.1	0	6.2	0
LICs	2020	17	13.1	0	7.1	0
LICs	2021	17	11.7	0	6.5	0
LICs	2022	17	11	0.1	5.8	0.1
LICs	2023	17	10.2	0.2	5.6	0.1
LMICs	2019	46	54.5	0	6.4	0
LMICs	2020	46	61	0	7.2	0
LMICs	2021	46	64.1	0	7.3	0
LMICs	2022	46	59.9	0.1	6.7	0
LMICs	2023	46	57.6	0.1	6.5	0

**Table A2. 3. Income group means and standard deviations for GHS per capita (with estimated missing subnational components)**

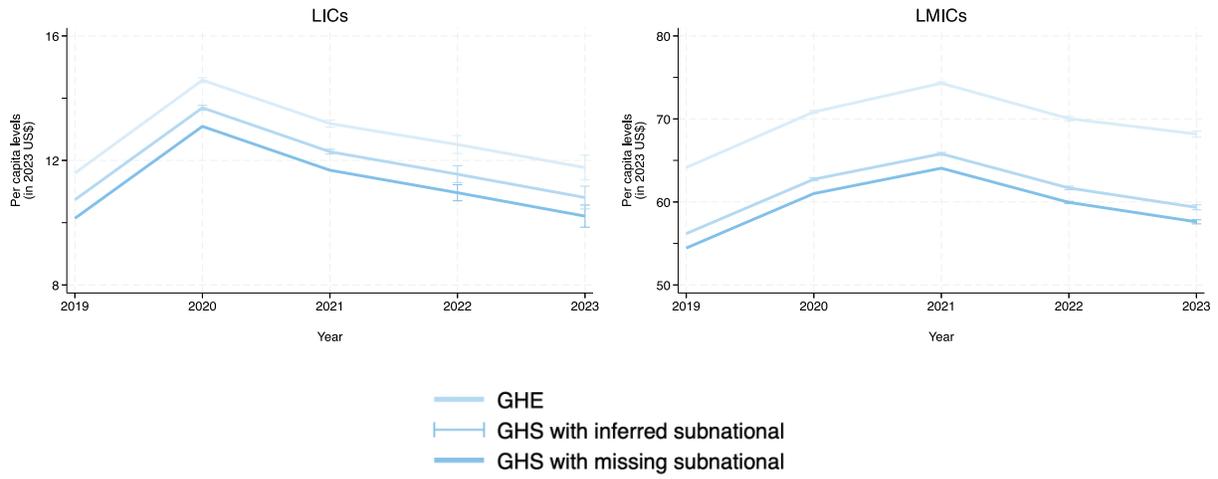
Income group	Year	N	Level Mean	Level SD	Share Mean	Share SD
All countries	2019	63	43.9	0.1	6.7	0
All countries	2020	63	49.5	0.1	7.4	0
All countries	2021	63	51.4	0.1	7.4	0
All countries	2022	63	48.2	0.1	6.7	0
All countries	2023	63	46.2	0.1	6.5	0
LICs	2019	17	10.7	0	6.6	0
LICs	2020	17	13.7	0	7.5	0
LICs	2021	17	12.3	0	6.9	0
LICs	2022	17	11.6	0.1	6.1	0.1
LICs	2023	17	10.8	0.2	5.9	0.1
LMICs	2019	46	56.2	0.1	6.7	0
LMICs	2020	46	62.7	0.1	7.4	0
LMICs	2021	46	65.8	0.1	7.5	0
LMICs	2022	46	61.7	0.1	6.9	0
LMICs	2023	46	59.3	0.2	6.8	0

**Table A2. 4. Income group means and standard deviations for GHE per capita (with estimated missing health spending from SHI contributions)**

Income group	Year	N	Level Mean	Level SD	Share Mean	Share SD
All countries	2019	63	50	0.1	7.4	0
All countries	2020	63	55.7	0.1	8.2	0
All countries	2021	63	57.8	0.1	8.1	0
All countries	2022	63	54.5	0.1	7.4	0
All countries	2023	63	53	0.1	7.3	0
LICs	2019	17	11.6	0	7	0
LICs	2020	17	14.6	0	7.8	0
LICs	2021	17	13.2	0.1	7.2	0
LICs	2022	17	12.5	0.1	6.5	0.1
LICs	2023	17	11.8	0.2	6.3	0.1
LMICs	2019	46	64.1	0.1	7.6	0
LMICs	2020	46	70.8	0.1	8.3	0
LMICs	2021	46	74.3	0.1	8.4	0
LMICs	2022	46	70	0.1	7.8	0
LMICs	2023	46	68.2	0.2	7.7	0

Including the missing subnational components does not substantially change the average per capita levels, while incorporating the missing SHI components increases per capita levels by around 10 percent in LICs and approximately 15 percent in LMICs. This effect is also reflected in health shares. Including these missing components shifts both average per capita levels and shares upward but does not change the overall income group trends (Figures A2.3 and A2.4). The uncertainty in income group means, represented by standard deviations that translate into confidence intervals, is higher in LICs than in LMICs, partly due to the larger number of countries in LICs. Uncertainty also increases in later years because more data points are estimated.

**Figure A2.3. Average health spending per capita levels for LICs and LMICs, 63 countries**



**Figure A2.4. Average health shares of government spending for LICs and LMICs, 63 countries**

