World Health Organization

WORLD ECONOMIC FORUM

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From Burden to "Best Buys":
Reducing the Economic Impact of Non-Communicable Diseases in Low- and Middle-Income Countries

The content of this report stems from the work published in two separate reports, one led by the World Economic Forum and the Harvard School of Public Health, and the other developed by the World Health Organization:

The Global Economic Burden of Non-communicable Diseases – prepared by the World Economic Forum and the Harvard School of Public Health (2011). Available through: http://www.weforum.org/EconomicsOfNCD

Scaling up action against noncommunicable diseases: How much will it cost? – prepared by the World Health Organization (2011). Available through: http://www.who.int/nmh/publications

This report with the overview from these two recent papers does not represent an official position of the World Health Organization, the World Economic Forum or the Harvard School of Public Health. It is a tool to explore the views of interested parties on the subject matter. The authors alone are responsible for the views expressed in this overview and they do not necessarily represent the decisions, policy or views of the World Health Organization, the World Economic Forum or the Harvard School of Public Health. References to international partners are suggestions only and do not constitute or imply any endorsement whatsoever of this overview.

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Summary

There is growing awareness and concern about the large and escalating burden of chronic, non-communicable diseases (NCDs) not just from the public health perspective but also from the economic one. The social burdens associated with the four diseases that are the focus of the UN High-Level Meeting on NCDs – cardiovascular disease, diabetes, cancer and chronic respiratory diseases – include prolonged disability, diminished resources within families and reduced productivity, in addition to tremendous demands on health systems.

This report addresses current information gaps in our understanding of how to mitigate these challenges by highlighting recent findings about the social costs of NCDs and the resource needs for managing these conditions. Specifically, the report brings together findings from two new studies aimed at equipping decision-makers in government, civil society and the private sector with key economic insights needed to help reduce the growing burden of NCDs:

- A global analysis of the economic impact of NCDs by the World Economic Forum and the Harvard School of Public Health
- An analysis of the costs of scaling up a core intervention package in low- and middle-income countries by the World Health Organization

The economic consequences of NCDs are staggering. Under a "business as usual" scenario where intervention efforts remain static and rates of NCDs continue to increase as populations grow and age, cumulative economic losses to low- and middle-income countries (LMICs) from the four diseases are estimated to surpass US$ 7 trillion over the period 2011-2025 (an average of nearly US$ 500 billion per year). This yearly loss is equivalent to approximately 4% of these countries' current annual output. On a per-person basis, the annual losses amount to an average of US $25 in low-income countries, US$ 50 in lower middle-income countries and US$ 139 in upper middle-income countries.

By contrast, findings from the second study by the WHO indicate that the price tag for scaled-up implementation of a core set of NCD "best buy" intervention strategies is comparatively low. Population-based measures for reducing tobacco and harmful alcohol use, as well as unhealthy diet and physical inactivity, are estimated to cost US$ 2 billion per year for all LMICs – less than US$ 0.40 per person. Individual-based NCD "best buy" interventions – which range from counselling and drug therapy for cardiovascular disease to measures to prevent cervical cancer – bring the total annual cost to US$ 11.4 billion. On a per-person basis, the annual investment ranges from under US$ 1 in low-income countries to US$ 3 in upper middle-income countries.

In health terms, the return on this investment will be many millions of avoided premature deaths. In economic terms, the return will be many billions of dollars of additional output. For example, reducing the mortality rate for ischaemic heart disease and stroke by 10% would reduce economic losses in LMICs by an estimated US$ 25 billion per year, which is three times greater than the investment needed for the measures to achieve these benefits.

Policy-makers, members of civil society and business leaders all face the issue of how best to respond to the challenges posed by NCDs. This overview of two recent reports supplements existing knowledge by demonstrating not only the economic harm done by NCDs but also the costs and benefits related to addressing them.

The Economics of NCDs

Since 2009, a survey of business leaders from around the world carried out by the World Economic Forum identifies chronic disease as one of the leading threats to global economic growth[1]. Mortality and prolonged disability associated with NCDs have a sizeable economic impact on households, industries and societies, both via the consumption of health services and via losses in income, productivity and capital formation.

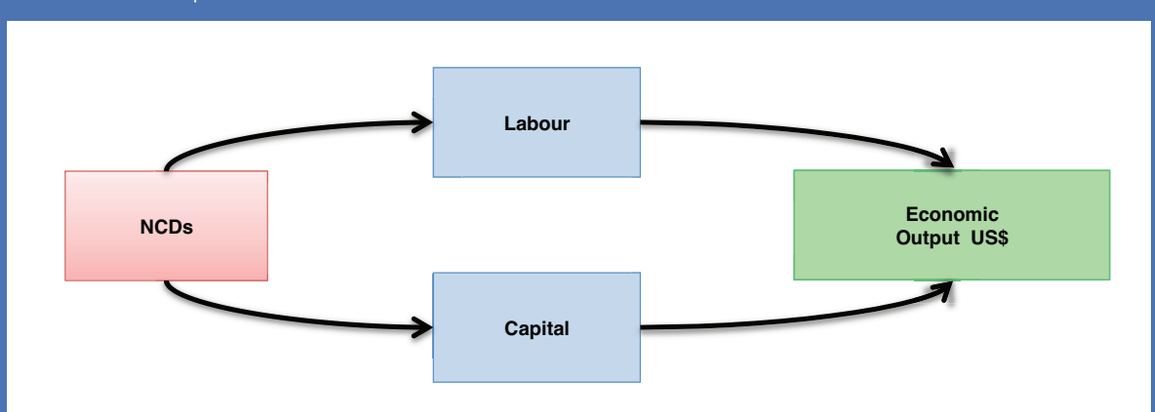
Specific intervention strategies can effectively tackle leading causes of NCDs and their underlying risk factors, as a growing body of evidence has demonstrated. These interventions include population level measures that encourage reduced consumption of tobacco, alcohol and salt; improved awareness of healthy life styles; increased excise taxes; and enhanced regulation. Individual-based interventions include the prevention and management of heart disease and strokes, as well as early detection and treatment of cancer. The combined cost of implementing these population- and individual-based measures, however, is not well established. This information gap has impeded the mobilization of necessary resources and planning at global and national levels.

This report attempts to fill current information gaps in our understanding of what specific impact NCDs might have on economic growth and what resources are needed to mitigate this impact. It brings together findings from two recently completed studies that can inform international policy dialogue, including the UN High-Level Meeting on NCDs. Their findings shed light on:

- Size of the problem – Economic analysis by the World Economic Forum and the Harvard School of Public Health identifies the sizeable economic burden of NCDs on societies.
- Possible solutions and their cost – Analysis by the World Health Organization (WHO) has identified a set of affordable, feasible and cost-effective intervention strategies (NCD "best buys"); its newly published study estimates a global price tag for implementing these measures.
- Potential benefits of taking action – Further analysis presented in this joint report by the WHO and the World Economic Forum indicates how LMICs could avert millions of deaths and reduce economic losses by billions of dollars over the next 15 years by making renewed efforts to tackle NCDs at the population and individual level.

Box 1: Estimating economic losses due to ill health: The WHO EPIC tool

The EPIC tool was developed by the World Health Organization to simulate the economic impact of diseases on aggregate economic output[2]. EPIC links the value of economic output to quantities of labour and capital inputs, as well as to technology. The EPIC model adjusts labour and capital inputs according to population health. Namely, labour is diminished by disability and death caused by NCDs. Capital is also reduced because costs of screening, treatment and care claim resources that would otherwise be available for public and private investment. The EPIC model predicts losses caused by different health conditions in terms of their effect on the value of economic output.



[1] World Economic Forum (2010). Global Risks 2009: A Global Risk Network Report.
[2] Abegunde, .D, Stanciole, A. "An estimation of the economic impact of chronic noncommunicable diseases in selected countries". WHO Working Paper Department of Chronic Diseases and Health Promotion (CHP), 2006.

Size of the Problem: Demonstrating the Economic Burden of NCDs

The economic burden study carried out by the World Economic Forum and the Harvard School of Public Health set out to assess economic losses associated with NCDs. The focus of analysis in this joint report is on LMICs, which account for 84% of the world's population and 83% of the non-communicable disease burden (as measured by DALYs (disability-adjusted life years)[3]. The WHO's EPIC tool is used to quantify losses in these countries, which it does by relating projected NCD mortality rates in a population to current and future economic output at the national level (see Box 1).

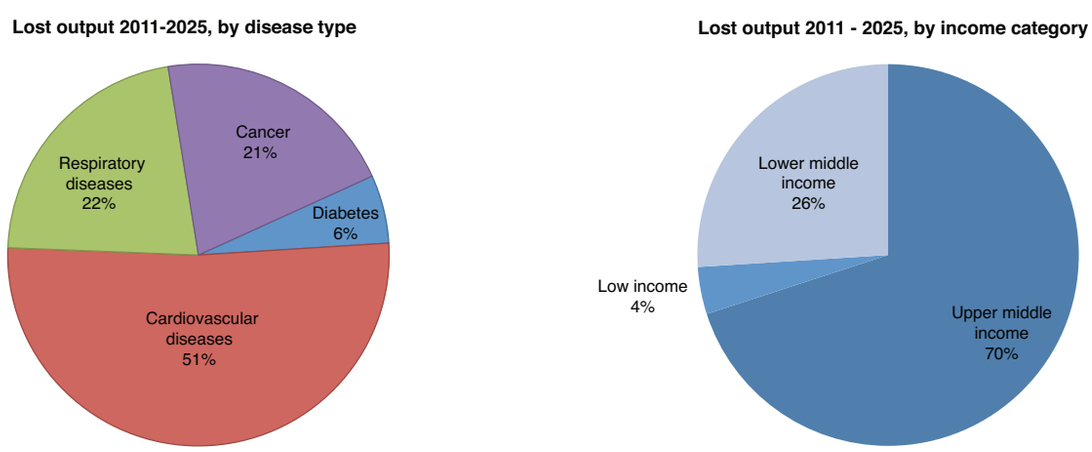
Over the period 2011-2025, the cumulative lost output in LMICs associated with the four NCD conditions that are the focus of the UN High-Level Meeting is projected to be more than US$ 7 trillion (Table 1; see also Figure 1 for a breakdown by disease type and by country income category). The total burden is lowest in the low-income countries, in part because the value of lost earnings in this group is low and in part because the total population of this country income group is much smaller than that of the middle-income countries (which include China and India). Figure 2 shows the cumulative output loss of all LMIC countries over the period 2011-2025.

Table 1: Economic Burden of NCDs, 2011-2025 (trillions of US$ in 2008)

Country income group	Diabetes	Cardiovascular diseases	Respiratory diseases	Cancer	Total
Upper middle	0.31	2.52	1.09	1.20	5.12
Lower middle	0.09	1.07	0.44	0.26	1.85
Low income	0.02	0.17	0.06	0.05	0.31
Total of low and middle	**0.42**	**3.76**	**1.59**	**1.51**	**7.28**

The annual loss of approximately US$ 500 billion amounts to roughly 4% of GDP for low- and middle-income countries in 2010. This sizable cost helps put public spending on health into perspective. In every income group, losses from NCDs are greater than public spending on health, assuming that inflation-adjusted levels of such spending remain at their 2009 levels for the period 2011-2025 (see Figure 3).[4,5]

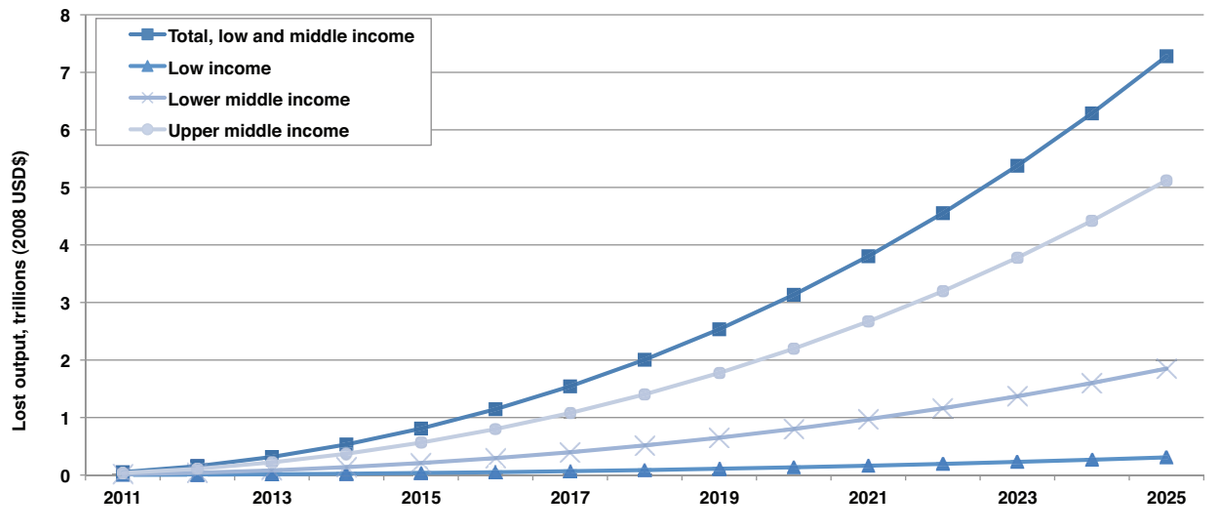
Figure 1: Breakdowns of NCD cost for all LMICs, by disease and income level



Source: Based on The Global Economic Burden of Non-communicable Diseases – Prepared by the World Economic Forum and the Harvard School of Public Health (2011)

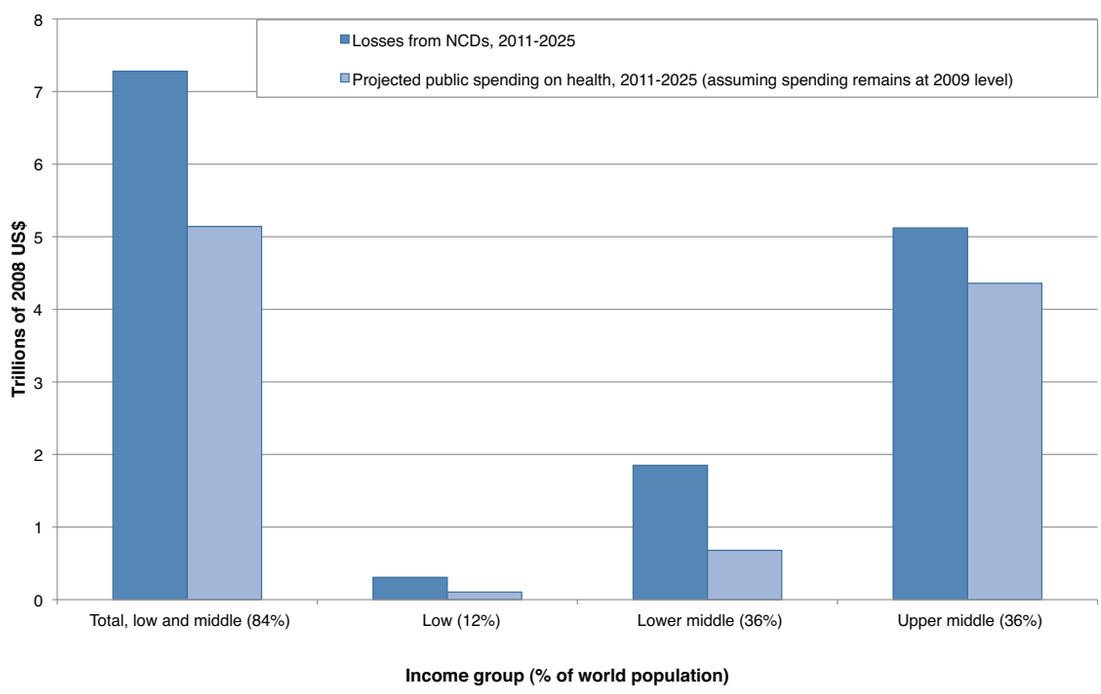
[3] The study used the 2011 World Bank classifications distinguishing lower income and middle- income countries. Middle-income countries are further subdivided into lower middle and upper middle, and categorization depends on a country's gross national income per capita. The present report refers to low, lower middle-income and upper middle-income countries collectively as LMICs.
For the income category of countries, please see: siteresources.worldbank.org/DATASTATISTICS/Resources/CLASS.XLS. For example, China is currently classified as an upper middle-income country and India as a lower middle-income country.
[4] World Development Indicators. 2010. Washington DC: World Bank.
[5] The full report prepared by the World Economic Forum and the Harvard School of Public Health covers similar ground to this joint Forum-WHO report, except that it focuses on 2010-2030, includes mental health conditions as an NCD, implements two methodologies in addition to EPIC for estimating the economic burden of NCDs (Cost of Illness and Value of a Statistical Life), and provides results for high-income countries as well.

Figure 2: Cumulative NCD loss, beginning in 2011



Source: Based on The Global Economic Burden of Non-communicable Diseases – Prepared by the World Economic Forum and the Harvard School of Public Health (2011)

Figure 3: Comparing losses from 4 NCD conditions to public health spending, 2011-2025



Source: Based on The Global Economic Burden of Non-communicable Diseases – Prepared by the World Economic Forum and the Harvard School of Public Health (2011)

Possible Solutions and Their Cost: Estimating a Global Price Tag for NCD "Best Buys"

Many interventions for prevention and control of NCDs exist. Even in the wealthiest countries, however, choices have to be made about which of these interventions are prioritized for implementation because resources for health are finite – and in most countries very limited. A number of criteria enter into such decisions, including the current and projected burden of disease, cost-effectiveness, fairness and feasibility of implementing interventions, and political considerations.

In preparation for the UN High-Level Meeting, the WHO has identified a set of evidence-based "best buy" interventions that are not only highly cost-effective but also feasible and appropriate to implement within the constraints of the local LMIC health systems (see Table 2)[6]. Of course, many other interventions exist to reduce chronic disease at the population or individual level that, while not meeting all "best buy" criteria, may still contribute to a comprehensive public health response to the challenge of NCDs[7,8]. The WHO has developed a costing tool to enable countries to add or substitute interventions according to national needs or priorities.

Table 2: "Best Buy" Interventions

Risk factor / disease	Interventions
Tobacco use	• Tax increases • Smoke-free indoor workplaces and public places • Health information and warnings • Bans on tobacco advertising, promotion and sponsorship
Harmful alcohol use	• Tax increases • Restricted access to retailed alcohol • Bans on alcohol advertising
Unhealthy diet and physical inactivity	• Reduced salt intake in food • Replacement of trans fat with polyunsaturated fat • Public awareness through mass media on diet and physical activity
Cardiovascular disease (CVD) and diabetes	• Counselling and multi-drug therapy for people with a high risk of developing heart attacks and strokes (including those with established CVD) • Treatment of heart attacks with aspirin
Cancer	• Hepatitis B immunization to prevent liver cancer (already scaled up) • Screening and treatment of pre-cancerous lesions to prevent cervical cancer

[6] Scaling up action against noncommunicable diseases: How much will it cost? 2011. Geneva, Switzerland: World Health Organization.
[7] Global strategy on diet, physical activity and health. 2004. Geneva, Switzerland: World Health Organization.
[8] Global strategy to reduce the harmful use of alcohol. 2010. Geneva, Switzerland: World Health Organization.

The identified set of strategies form a basis for analysing costs of scaled-up implementation in the LMICs through 2025 (see Box 2)[9].

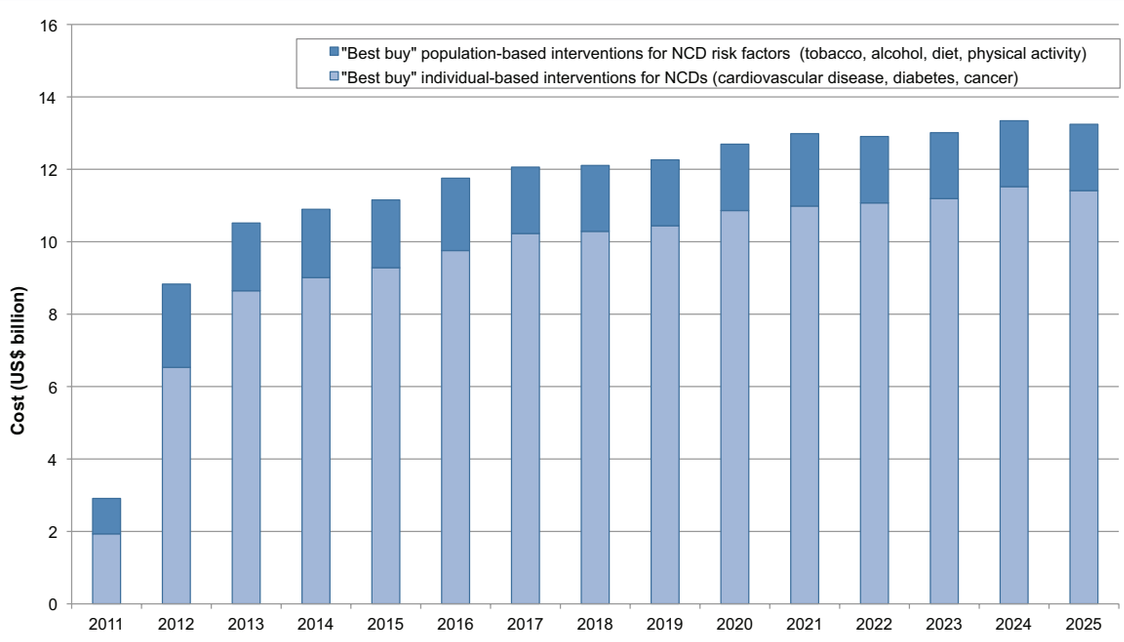
Box 2: Estimating the cost of scaling up chronic disease interventions

- Analysis was performed on a group of 42 low- and middle-income countries (with populations in excess of 20 million) that account for 90% of the non-communicable disease burden in developing regions of the world. Upward adjustments were made from this set to derive estimates for all low- and middle-income countries.
- The period of scaling-up was set at 2011-2025 to achieve desired levels of treatment coverage (80%). Full implementation of population-based strategies would occur more rapidly (after approximately five-six years).
- Key data sources included UN Population Division statistics, the WHO Global Burden of Disease and risk factor surveillance estimates, international treatment guidelines and cost databases.

The total cost of implementing the full set of "best buy" interventions across all LMICs over this period is estimated to be US$ 170 billion, at an average of US$ 11.4 billion per year (Figure 4). This amounts to an annual per capita investment of under US$ 1 in low-income countries, US$ 1.50 in lower middle-income and US$ 3 in upper middle-income countries. When considered in terms of overall health spending, these costs constitute only a tiny portion of total health spending – 4% in low-income countries, 2% in lower middle-income countries and less than 1% in upper middle-income countries.

As shown in Figure 4, population-based measures that address tobacco and harmful alcohol use, as well as unhealthy diet and physical inactivity, account for a very small fraction of the total price tag (US$ 2 billion per year – less than US$ 0.40 per person).[10]

Figure 4: Total cost of scaling up NCD "best buy" interventions in low- and middle-income countries



Source: Scaling up action against noncommunicable diseases: How much will it cost? – Prepared by the World Health Organization (2011)

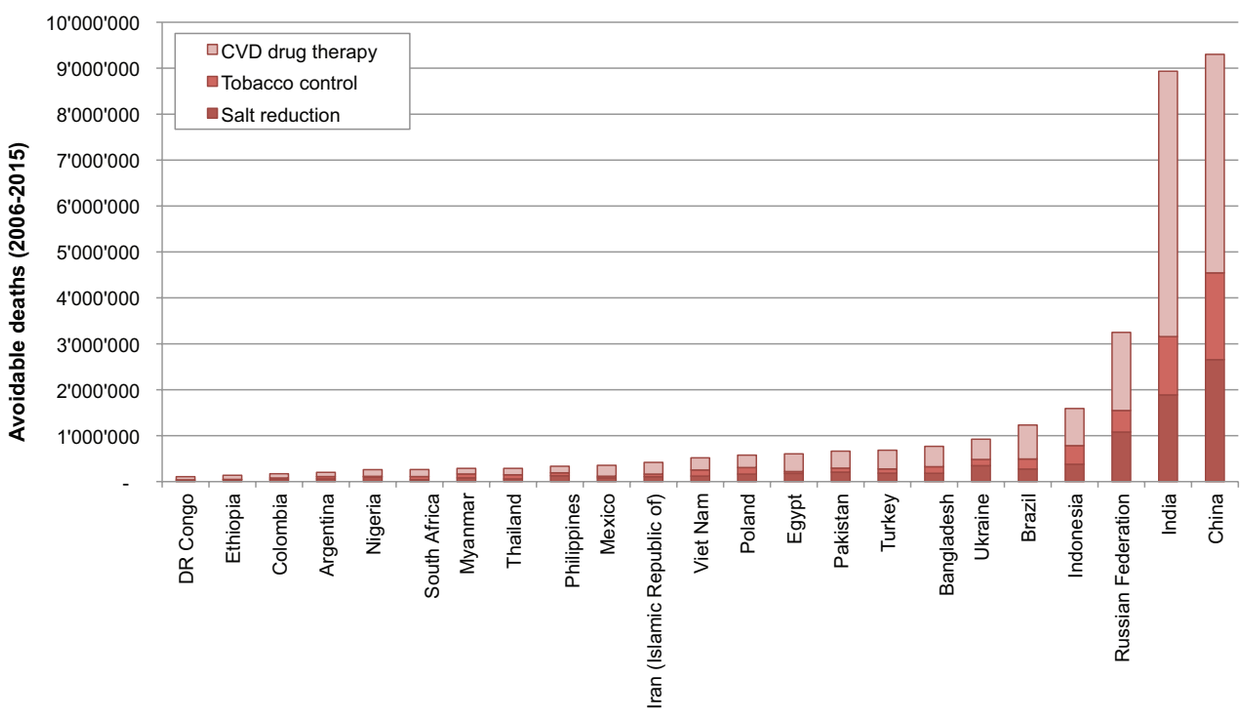
[9] Scaling up action against noncommunicable diseases: How much will it cost? 2011. Geneva, Switzerland: World Health Organization.
[10] Lower costs in the first year of scale-up reflect current screening and treatment coverage levels (<10%).

Potential Benefits of Taking Action: Combined Conclusions

What can be expected in return for these proposed investments? In health terms, the primary benefit is a reduction in premature mortality due to NCDs. Previous studies have found that implementing a specific set of NCD "best buys" in 23 large LMICs could prevent 30 million premature deaths from 2006-2015 or an average of 3 million per year (Figure 5)[11, 12].

Total deaths in LMICs due to the four NCDs that are the focus of the UN High Level Meeting amounted to 23.7 million in 2004[13], which indicates that at least 10-15% of premature deaths could be successfully averted through the scaled-up implementation of a core intervention package (i.e., 3 million out of 23.7 million).

Figure 5: Avoidable deaths from a scaled-up chronic disease intervention package in 23 low- and middle-income countries (2006-2015)



Source: Scaling up action against noncommunicable diseases: How much will it cost? – Prepared by the World Health Organization (2011)

[10] Lower costs in the first year of scale-up reflect current screening and treatment coverage levels (<10%).
[11] Asaria, P., Chisholm, D., Mathers, C. et al. "Chronic disease prevention: health effects and financial costs of strategies to reduce salt intake and control tobacco use" in Lancet, 2007, 370: 2044-2053.
[12] Lim, S., Gaziano, T., Gakidou E. et al. "Prevention of cardiovascular disease in high-risk individuals in low-income and middle-income countries: health effects and costs" in Lancet, 2007, 370: 1954-1962.
[13] The Global Burden of Disease. 2004. Update 2008. Geneva, Switzerland: World Health Organization.

In macroeconomic terms, the key benefits derived from these health improvements include the restored or continued ability of individuals to lead flourishing lives and to participate actively in the workplace. For example, a 10% reduction in the mortality rate due to ischaemic heart disease and stroke would reduce economic losses in LMICs by an estimated US$ 377 billion over the period 2011-2025 – an average of US$ 25 billion per year. This sum is approximately three times the yearly cost of scaling up "best buy" interventions for cardiovascular disease (see Table 3).

Table 3: Cost and Benefits of Scaling Up "Best Buy" Interventions for Cardiovascular Disease, 2011-2025 (US$ billions)

Cardiovascular disease (ischaemic heart disease and stroke)	Cumulative figure for 2011-2025 (US$ billions)	Average annual figure for 2011-2025 (US$ billions)
Cost of "best buy" interventions (scaled-up response)	120	8
Projected economic benefit (10% reduction in CVD mortality)	377	25

Realizing these benefits will require firm commitments of resources and capabilities, not only by governments but also by civil society, development agencies, the private sector and academia. Governments and international organizations can provide leadership, establish necessary frameworks, create infrastructure and create health policies. Academia can contribute scientific insights and expertise. NGOs and civil society can raise the profile of NCDs and support implementation and action on the ground. The private sector can leverage core business skills, networks and funds to access target populations and offer innovative products and solutions.

Collaboration among these partners will allow societies to capitalize on individual strengths and realize benefits beyond the reach of any single entity to ensure that communities have the necessary resources to manage the growing burden of NCDs.

Annex

This joint summary report was prepared by Professor David E. Bloom (Harvard School of Public Health), Dr Dan Chisholm (World Health Organization) and Dr Eva Jané-Llopis (World Economic Forum). Klaus Prettner, Adam Stein and Andrea Feigl (Harvard School of Public Health) also made substantial contributions to it.

The report by the World Economic Forum and the Harvard School of Public Health (HSPH) on the economic impact of NCDs was carried out by a team led by Professor David E. Bloom (Clarence James Gamble Professor of Economics and Demography, Harvard School of Public Health), Ms Elizabeth Cafiero (Department of Global Health and Population, Harvard School of Public Health) and Dr Eva Jané-Llopis (Head, Chronic Disease and Well-Being, World Economic Forum). The team included Ms Shafika Abrahams-Gessel (Harvard Global Health Institute), Ms Lakshmi Reddy Bloom (Data for Decisions), Ms Sana Fathima (University of Oxford), Ms Andrea Feigl (Department of Global Health and Population, HSPH), Professor Tom Gaziano (Center for Health Decision Science, HSPH), Mr Ali Hamandi (Department of Global Health and Population, HSPH), Dr Mona Mowafi (HSPH), Mr Danny O'Farrell (Department of Global Health and Population, HSPH), Mr Emre Ozaltin (Department of Global Health and Population, HSPH), Mr Ankur Pandya (Center for Health Decision Science, HSPH), Dr Klaus Prettner (Center for Population and Development Studies, HSPH), Mr Larry Rosenberg (Department of Global Health and Population, HSPH), Mr Ben Seligman (Stanford University), Mr Adam Stein (Department of Global Health and Population, HSPH), Ms Cara Weinstein (Center for Health Decision Science, HSPH) and Mr Jonathan Weiss (Yale School of Public Health).

The analysis and report by the World Health Organization on the costs of scaling up a core intervention package in low- and middle-income countries was prepared by Dr Dan Chisholm (Department of Health Systems Financing), Dr Dele Abegunde (Department of Essential Medicines and Pharmaceutical Policies) and Dr Shanthi Mendis (Coordinator, Chronic Disease Prevention and Management, Department of Chronic Disease and Health Promotion). The study was overseen by Dr Ala Alwan (Assistant Director General, Noncommunicable Diseases and Mental Health), Dr David Evans (Director, Department of Health Systems Financing) and Dr Tessa Tan Torres Edejer (Coordinator, Department of Health Systems Financing).

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