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HEALTH ECONOMICS &
FINANCING PROGRAMME

**Economic and financial analysis
of scaling up child, newborn and maternal health**

Giulia Greco, Tim Powell-Jackson, Jo Borghi and
Anne Mills

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Abstract

Background Little attention has been paid to the question of how to finance the costs of scaling up MNCH care and the likely availability of funds.

Methods Past health expenditure (2000 – 2005) was analysed through the National Health Accounts of 57 high priority countries. We projected likely availability of funding for the period 2006 – 2015 under two scenarios (business as usual and public commitments). We estimated the financing gap by comparing the share of projected total health expenditure dedicated to MNCH with the WHO costing model for scaling MNCH interventions.

Findings The vast majority of countries spent less than 50 US\$ per person on health in the year 2005. Under the business as usual scenario, the financing gap for the period 2006-2015 for low income countries is more than US\$ 38.5 billion. Under the public commitments scenario, the gap for low income countries (excluding India) falls to just under US\$ 18.3 billion.

In lower middle and upper middle income countries the projected financing is estimated to meet costs under both scenarios.

Interpretation The volume of financing resources for the majority of low income countries will not be adequate to meet MDGs 4 and 5, even under optimistic assumptions. The financing sources required to “fill the gap” will depend on country context and needs. Additional funds need to be effectively targeted to MNCH services. Lower and upper middle income groups are likely to have sufficient funds. Their domestic policies for MNCH fund allocation will be paramount.

Acknowledgements

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1. Introduction

1.1 Background

There is considerable concern that maternal, newborn and child health (MNCH) has not received sufficient attention in recent years in global health strategies and resource allocation decisions. The fourth Millennium Development Goal demands a reduction of two-thirds in under five deaths between 1990 and 2015, and the fifth goal a reduction of three-quarters in maternal mortality. Child mortality rates have been falling in low income countries, but not fast enough to meet the 2015 target and neonatal mortality has to be addressed if further progress is to be made [1] [2]. The least progress has been made towards the maternal mortality goal. While many regions have seen modest reductions in the maternal mortality ratio, Sub-Saharan Africa represents the greatest challenge, with no signs of progress [3].

It is well recognised that increasing coverage of the most cost-effective interventions is key to achieving MDGs 4 and 5. Recent studies have estimated the costs of scaling-up maternal, newborn and child health care to achieve universal coverage of key interventions by 2015 [4, 5]. In addition, current resource flows to MNCH from donor agencies has also been estimated [6]. However, in order to assess how much more is required to achieve the scale-up, it is necessary to address the ‘financing gap’ – the difference between what is required to scale-up MNCH services and projected future expenditure.

1.2 Objectives

The objectives of the present study were twofold. First, past health expenditure trends were analysed and levels of total health expenditure projected over the period 2006-2015 according to two scenarios. Second, we estimated the financing gap between the cost of achieving MDGs 4 and 5 and the projected spending on maternal, newborn and child health.

2. Methods

2.1 List of countries

Expenditure and cost estimates were analysed for 60 priority child survival countries. These countries represent almost 500 million children – more than 75% of children under five in 2004 - and account for 94% of all deaths among children under five in the world [7]. The list of countries was based on two selection criteria. The first ensures countries are selected according to their total number of child deaths in the year 2003. All countries suffering at least 50,000 child deaths were included. The second was the under five mortality rate. Any country not already selected from the first list that has a rate of at least 90 under five deaths per thousand live births were chosen for our analysis. The second list ensures that countries with a small population but high child mortality rates (for example many Sub-Saharan African countries) are taken into consideration. The selection of countries, while not based on any maternal health criteria, does contain the majority of the countries in the greatest need with respect to maternal health¹.

The list of the 60 selected countries is provided in Annex 1. Due to the absence of reliable data for three of these countries (Zimbabwe, Iraq and Somalia), the analysis was conducted on 57 of the 60 countries.

2.2 Defining health expenditure

For the purpose of this study, the definitions and classification of general government expenditure and health expenditure were those used by the System of National Health Accounts, the internationally accepted methodology to track health resources within a country [8]. A description and definition of terms used are provided below.

¹ Of the 60 countries ranked with the highest maternal mortality ratio per 100 000 live births (according to WHO <http://www.who.int/whosis/whostat2006/en/index.html>), 10 are not included in the selection: Bhutan, Bolivia, Comoros, Eritrea, Guatemala, Laos, Lesotho, Namibia, Peru, Timor-Leste

Financing sources are entities that provide health funds, and financing agents are entities which manage the funds. They receive funds from financing sources and use them to pay for health services, products (e.g. pharmaceuticals), and activities [9]. Health expenditures are conventionally measured by the WHO in terms of financing agents but for projecting future expenditure, we define these at the level of financing source. Expenditures by financing agent are classified as follows:

General government expenditure (GGE) corresponds to the consolidated outlays of all levels of government; territorial authorities (Central/Federal Government, Provincial/Regional/State/District authorities, Municipal/ Local governments), social security institutions, and extra-budgetary funds, including capital outlays.

General government health expenditure (GGHE) is the sum of outlays on health paid for by taxes, social security contributions and external resources (avoiding double-counting the government transfers to social security and extra-budgetary funds).

Private health expenditure (PvtHE) comprises the outlays of insurers and third-party payers other than social security, mandated employer health services and other enterprise-provided health services, non-profit institutions and non-governmental organisations financed health care, private investments in medical care facilities and household out-of-pocket spending.

Externally funded health expenditures are loans and grants for medical care and medical goods provided by entities outside of the recipient country. Grants in-kind (capital equipment, pharmaceutical supplies and vaccines, technical assistance such as experts) should be estimated in terms of their monetary value.

2.3 Defining maternal, newborn and child health

Expenditures on child health were defined as expenditures on those activities whose primary purpose is to restore, improve, and maintain the health of children during a specified period of time and that are delivered directly to the child. Children are defined as those aged between 1 week and 5 years (under 5). Maternal and neonatal health expenditures were defined as expenditures on those activities whose primary function is to restore, improve, and sustain the

health of women and their newborn during pregnancy, childbirth, and the 7-day post partum period. Resources for single activity or interventions are not easy to track, as accounting systems of donor organisations are not often designed to identify expenditures on different activities within a project [6].

2.4 Sources of data

The principal sources of data for gross domestic product (GDP), inflation (consumer prices index – CPI) and exchange rates were the World Economic Outlook Database [10] and the International Financial Statistics [11]. Actual population and projections were taken from the UNPOP website [12].

The principal source of data on General Government Expenditure, and General Government Expenditure for Health, was the World Health Organisation’s National Health Accounts database[13]. WHO provide health expenditure data at the level of financing agent. Values provided by WHO and the IMF are in national currency units (millions). In order to standardize the findings across different countries and years, we converted nominal values into real data using 2004 as a base year. Subsequently, we converted values into US\$ at the exchange rate provided by the IMF. Therefore, the projected expenditures between 2006 and 2015 are presented in 2004 constant prices. The consumer price index for each country was used to generate real values thereby taking into account inflation.

The estimates of external resources to maternal, newborn, and child health were derived from various sets of data, including the DAC and CRS databases, provided by the Organisation for Economic Co-operation and Development (OECD). The databases capture the resource flows from bilateral donor agencies, multilateral development organisations, and global health initiatives. They include all 22 high-income donor countries and the European Union, represented in the Development Assistance Committee of the OECD, a forum for the major bilateral donors of ODA. Additionally, they include the World Bank, UNICEF, and the UN Population Fund (UNFPA) as multilateral development organisations; and more recently the Global Alliance for

Vaccines and Immunisation (GAVI) and the Global Fund to fight AIDS, Tuberculosis and Malaria (GFATM) as global health initiatives [6]. The methods we use to make projections account for resources coming from UNITAID and the Gates Foundation (channelled through GAVI only).

3. Data analysis

We constructed spreadsheet models to project likely trends of financial flows to MNCH over time. We adopted a highly simplified financing structure for each country, distinguishing between three sources of funding: government expenditure, private expenditure and external assistance. The projections are made annually, starting in 2006 and covering the period up to 2015.

The analysis consisted of the following steps:

- i) We analyzed the public and private composition of total and per capita health expenditure over the period 1998 – 2005 to explore recent trends in total expenditure for health.
- ii) We triangulated NHA data on external spending with estimates of donor disbursements to provide a comprehensive picture of financing to health in the high priority countries for the base year 2005.
- iii) We projected the three components of total health expenditure (public, private and external) from 2006 to 2015 under two different scenarios.
- iv) We estimated recent country spending on maternal, newborn and child health using methods of apportionment. The analysis was carried out on a country-by-country basis. However, the results are presented by income group using the World Bank classification of low, low middle and upper middle income and by region using the World Bank geographical classification. Given the high rates of economic growth of China and India, the results are presented both including and excluding these two countries.

3.1 Assumptions

There are inherent uncertainties in modelling future trends, and assumptions based on the available evidence must be made. We modelled health expenditure trends under two different scenarios, as defined below:

Business as usual – this scenario assumed that expenditure for MNCH would increase in line with current trends. General Government Health Expenditure projections were based on past trends from 1998 to 2004, assuming that growth in GGE for Health would be stable at an average of previous years. ODA projections were based on the past trends of ODA disbursements between the previous two years (2003 and 2004)

Public commitments – this scenario assumed that expenditure for MNCH would increase in line with public commitments. General Government Health Expenditure projections were based on the public announcement made by African Heads of State in the Abuja Declaration [14], that GGE for Health should grow to 15% of GGE by 2015. ODA projections were based on the announcements made at the G8 in 2005. These commitments, for the majority of countries, have been made only up to 2010. It was, therefore, assumed that ODA as a proportion of DAC country GDP would remain constant over the period 2011-2015 at the percentage announced, or it would grow up to 0.7% in 2015, whichever share is higher. It was not realistic to apply this assumption to the US and Japan as their commitments were lower. Their share is therefore projected to reach 0.3% in 2015. For further details, see annex 2.

Table 1 summarises the key assumptions regarding projections of total health expenditure under each scenario. Additional assumptions that apply equally to both scenarios are described further below. In order to forecast real GDP, we applied country specific growth rates provided in the World Bank Global Economic Prospects up to the year 2008 [15]. For the years 2009 to 2015 we use real GDP projections based on regional growth rates provided by the same source (country specific projections are not available) [15]. We assumed annual real GDP growth for DAC countries to be in line with OECD projections in 2007, and 2 percent thereafter[16].

The share of government expenditure in real GDP over the period 2006-2015 was assumed to be constant and was based on the average between 2000-2005 [13]. Private spending was assumed to increase in line with real GDP growth.

Estimates of government and private health expenditure provided by WHO are measured in terms of financing agents, with public and private health expenditure each including a share of externally sourced health expenditure. For our purposes, we are interested in health expenditure at the level of financing source since our assumptions are specific to each of the three types of financing source. To derive public and private health expenditure at the level of financing source, we therefore need to subtract a share of external funds from the financing agents. Data from NHA exercises undertaken in 10 of the 60 priority countries² provided an indication of the proportion of externally financed health expenditure that is managed by public and by private entities at the level of financing agent. We assumed that 70% of external funds are allocated to government financing agents and 20% to private financing agents, the average from 1998. It is worth noting that the allocation only affects the composition of health expenditure, and it is not relevant for the forecasted availability of financial resources as a whole.

It was further assumed that the distribution of ODA across recipient countries and across sectors would remain the same as in year 2004.

Finally, assumptions were required to determine the maternal and child health proportion of total health expenditure. For external health expenditure we estimated that the proportion of total ODA spent on maternal, newborn and child health is 28%, using data from an analysis of donor spending on health [6]. For private and public health expenditure, the only data available are provided by NHA sub analyses of MNCH in four countries (Bangladesh 19%, Egypt 14%, Morocco 16% and Sri Lanka 11%), two of which are not in our selection of priority countries. We estimated the proportion as 15% of total health expenditure, based on the average of the available NHA sub analyses.

² The countries with NHAs that provide the public and private shares of allocation of externally financed health expenditure are Egypt (6% 94%), Kenya (36% 64%), Malawi (33% 67%), Niger (0% 100%), Rwanda (65% 35%), Tanzania (9% 91%), Uganda (55% 45%), Yemen (19% 81%), Zambia (25% 75%), Zimbabwe (24% 76%)

Table 1. Key assumptions for projecting total health expenditure

Variables	Scenario 1 Business as usual	Scenario 2 Public commitments	Source	
Annual real GDP growth rate of priority countries	Up to year 2008: country specific Years 2009 - 2015: regional		World Bank Global Economic Prospect [15]	
Annual real GDP growth rate of donor countries	2%		OECD – DAC [16]	
General Government Expenditure as % of GDP	Average 2000 – 2005		WHO [13] and IMF [10]	
General Government Expenditure for Health as % of General Government Expenditure	Average 2000 – 2005	Increases up to 15% in 2015	WHO [13]	Abuja Declaration [14]
Private Health Expenditure	Increases in line with GDP growth		Best guess	
External Health Expenditure distribution amongst public and private financing agents	70% for public agents 30% for private agents		Average based on available NHA reports [13] (see note 2)	
ODA as % of GDP	Average 2003 – 2004	In 2015, 0.7% of GDP or the % committed in 2010 (which ever higher) – except Japan and USA	OECD – DAC [16]	
Distribution of ODA across priority countries	Constant as 2004			
Distribution of ODA across purpose activities	Constant as 2004			
MNCH as % of General Government Expenditure for Health	15%		Average of available NHA reports [13] (Bangladesh, Egypt, Morocco and Sri Lanka)	
MNCH as % of Private Expenditure for Health	15%			
MNCH as % of External Expenditure for Health	28%		[6]	

3.2 Cost of scaling up maternal newborn and child health

In the financial gap analysis, the aim was to compare our projected spending on MNCH with the costs of scaling-up MNCH coverage. We used the cost estimates provided by WHO [4, 5]. Based on WHO clinical guidelines, the WHO costing model estimated additional maternal, child and newborn health care resource needs for the 60 priority countries, as *incremental* to current (2005) investments. Thus, expenditures required to maintain current coverage levels until 2015 were not included.

The analysis of the financing gap was carried out on an annual basis to show the yearly gap. In order that the projections of health expenditure be comparable with the WHO cost estimates, the difference between yearly expenditure and expenditure in 2004 was derived as additional yearly health expenditure.

The model for scaling up maternal and newborn health interventions estimated the costs for health care during pregnancy, childbirth, the newborn period, and postpartum period, including also family planning and counselling, abortion and post abortion care. Patient costs such as drugs, vaccines, lab tests and medical supplies were included along with programme costs, such as the investments needed to strengthen health system infrastructure and upgrade existing health centres to hospital standard, train existing human resources, manage and support service provision to ensure quality of care, and promote accessibility to and demand for MNCH care.

This costing exercise did not include increases in staff salaries and incentives to retain health workers in underserved areas. No new hospitals were assumed to be built; it was assumed that additional activities with increased care could be carried out by renovating and upgrading infrastructure capacity (e.g. upgrading health posts to health clinics, as well as upgrading health clinics to be able to perform comprehensive obstetric and neonatal emergency care). [4, 5].

The prices used to estimate costs were derived from public sector providers. The projections were made in constant US\$ (2004).

3.3 Sensitivity analysis

In addition to the two scenarios outlined above, we also performed a series of one-way sensitivity analyses around the most uncertain parameters. We considered the percentage impact on the financing gap (under business as usual) of a two percentage point change in GDP growth; of a five percentage point change in the share of total health expenditure going to MNCH (in line with the minimum and maximum values in the NHA reports); and a fifty percent increase in the costs of scaling up MNCH care share of total health expenditure going to MNCH (to account for salary increases and investments in new infrastructures for health care).

A best case and a worst case scenario were also estimated to give an idea of the extreme lower and upper limits likely to surround the baseline financing gap estimate. For the best case scenario, we considered the public commitments scenario, combined with a 2 percentage point increase in GDP growth, and a 5 percentage point increase in the share of total health expenditure going to MNCH. For the worst case scenario, we considered the business as usual scenario combined with a 2 percentage point reduction in per capita GDP growth, a 5 percentage point decrease in the share of total health expenditure going to MNCH and a 50% increase in costs.

4. Results

4.1 Past Trends in Total Health Expenditure (2000 – 2005)

We analysed past trends in health expenditure over the period 2000 - 2005, and its composition by public and private financing agents. Whilst there was a general increase in real total health expenditure during this period, there was considerable variation in the percentage change of government and private expenditure across countries (Figure 1). Twenty-one countries observed a decrease in total health expenditure. Decreases of over 50% over the period 2000-2005 were observed in DR Congo, Angola, Haiti and Guinea. Some countries like Burundi, Madagascar,

Brazil, Sierra Leone, Tanzania and Ethiopia experienced a net decrease in total health expenditure due to a drop in private sector expenditure, that was not compensated for by the relatively small increase in government expenditure.

As figure 2 illustrates, the vast majority of the priority countries spent less than 50 US\$ per person on health in the year 2005. Overall, more than half of total health expenditure in low income countries is managed by the private sector and the poorer the country, the larger the share of private health expenditure. In countries like Myanmar, India, Cote d'Ivoire and Togo more than 80% of health resources are managed by private entities, implying that out-of-pocket payment is the major source of spending for health. The public share of per capita health expenditure varies with income level. Health expenditure managed by public sector entities represents around 41% of per capita health expenditure in low income countries, 50% in lower middle income countries and 60% in upper middle income countries.

It is important to note that problems of data quality and consistency will affect the extent to which these trends depict the true situation.

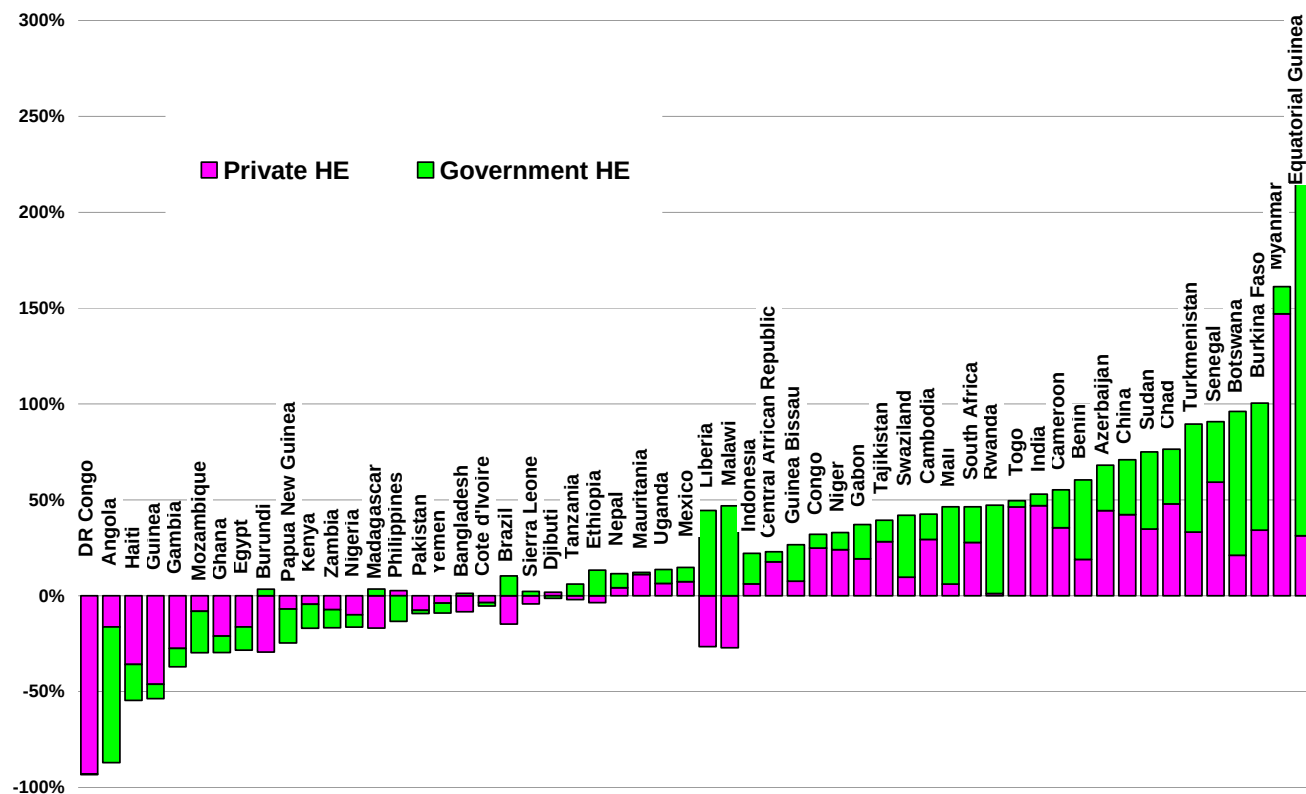


Figure 1. Percentage change in real government and private health expenditure over the period 2000 – 2005 (ranked by total health expenditure percentage change)

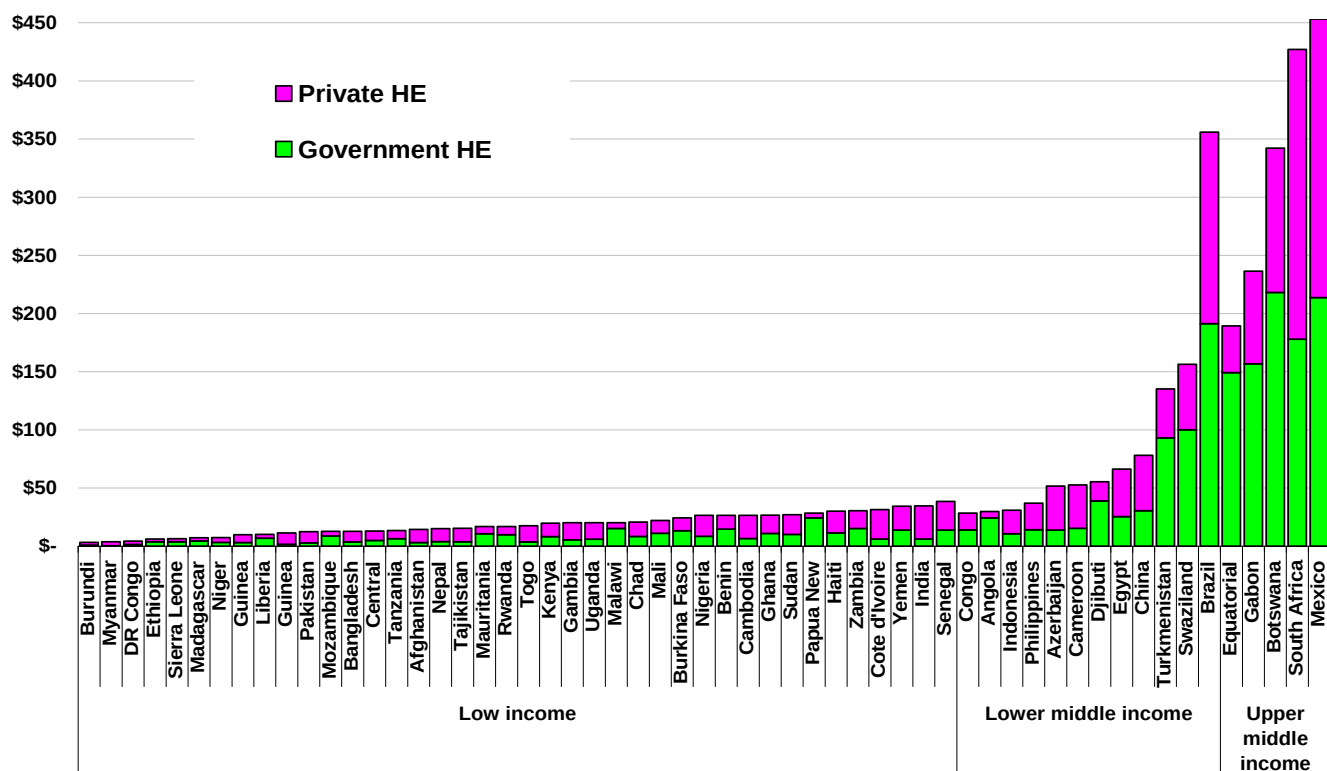


Figure 2. Real total Health Expenditure per capita in the year 2005 in US\$ (2004 prices) (ranked by income groups and by total health expenditure)

4.2 Health expenditure projection 2006 – 2015

Under the *business as usual* scenario, per capita total health expenditure in low income countries will grow from US\$ 27 in 2006 to US\$ 34 in 2015. Around 77 percent of this amount will come from private sources in 2015, and only US\$ 1 per person (4 % of total health expenditure) will come from external aid (see figure 3). For lower middle income countries, per capita total health expenditure will grow from US\$ 102 in 2006 to US\$ 146 in 2015. External aid accounts for less than 1 percent of the total. For upper middle income countries per capita total health expenditure will grow from US\$ 443 in 2006 to US\$ 510 in 2015 and its composition by source is similar to that of lower middle income countries (see figure 4).

Under the *public commitments* scenario, per capita total health expenditure in low income countries is projected to reach US\$ 59 per person in 2015. Public disbursement is estimated to grow to US\$ 30 per person (from 24 percent to 51 percent of the total), spending from private

sources is estimated to fall from 71 percent to 45 percent and external aid will increase to US\$ 3 per person (4 percent of total health expenditure) in 2015 (see figure 5).

Per capita total health expenditure for lower middle income and upper middle income countries is assumed to grow respectively to US\$ 179 and US\$ 573 in 2015. Private funds are estimated to decrease to around a half of total health spending; public and external spending will increase slightly (see figure 5).

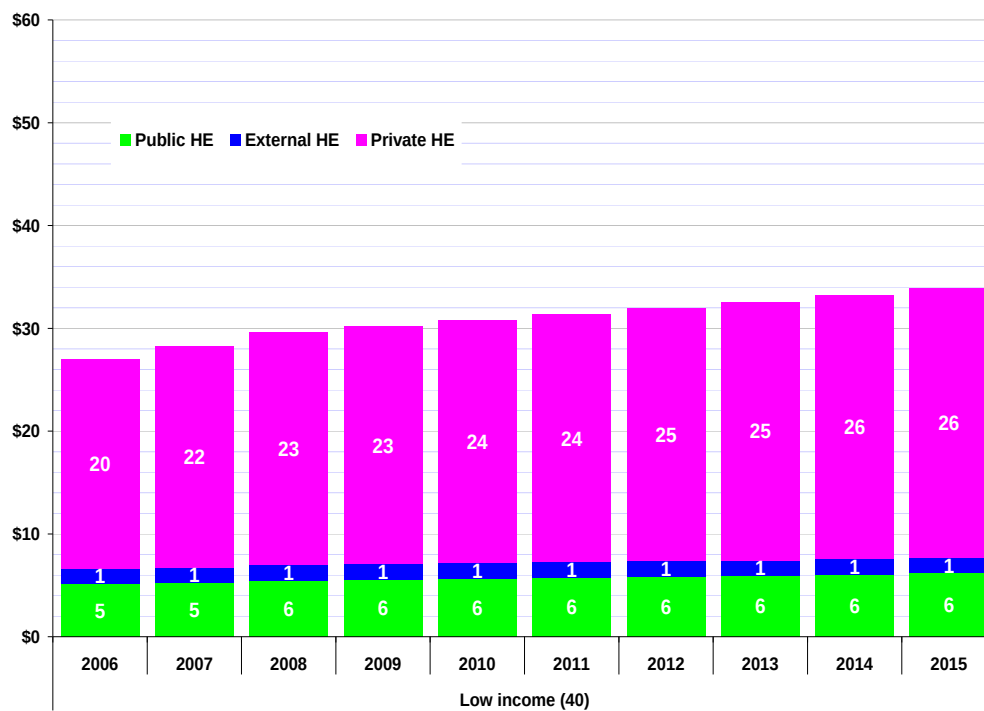


Figure 3. Real per capita Total Health Expenditure for low income countries under *business as usual*

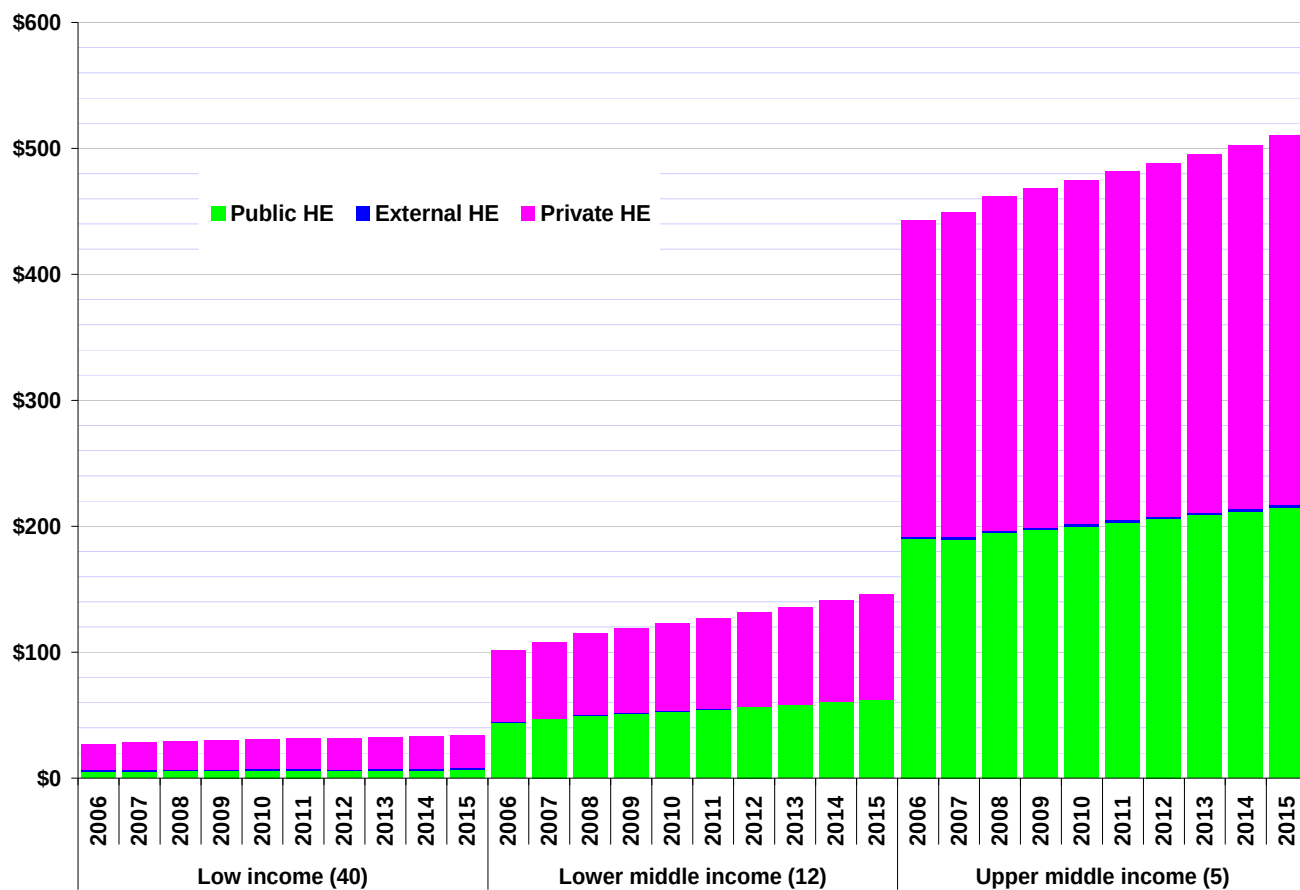


Figure 4 Real per capita Total Health Expenditure for all income groups under *business as usual* in US\$ (2004)

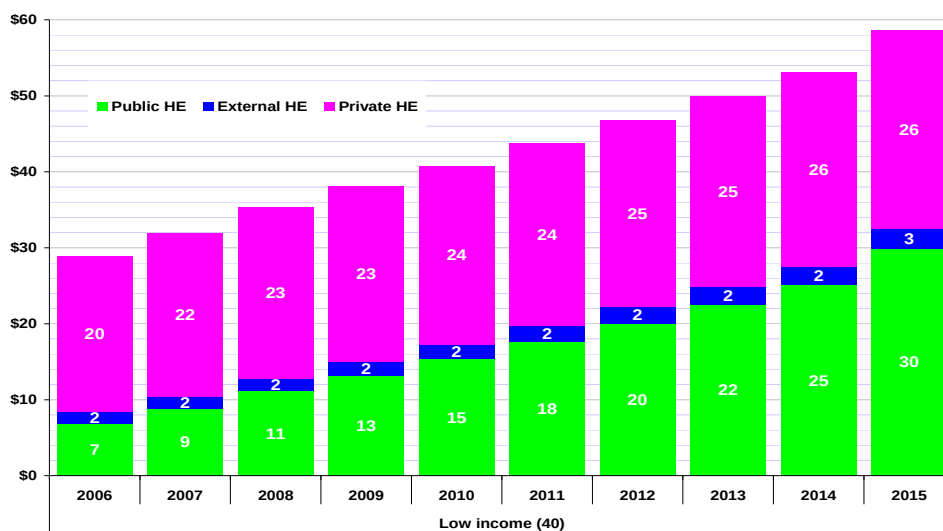


Figure 5. Real per capita Total Health Expenditure for low income countries under *public commitments scenario*

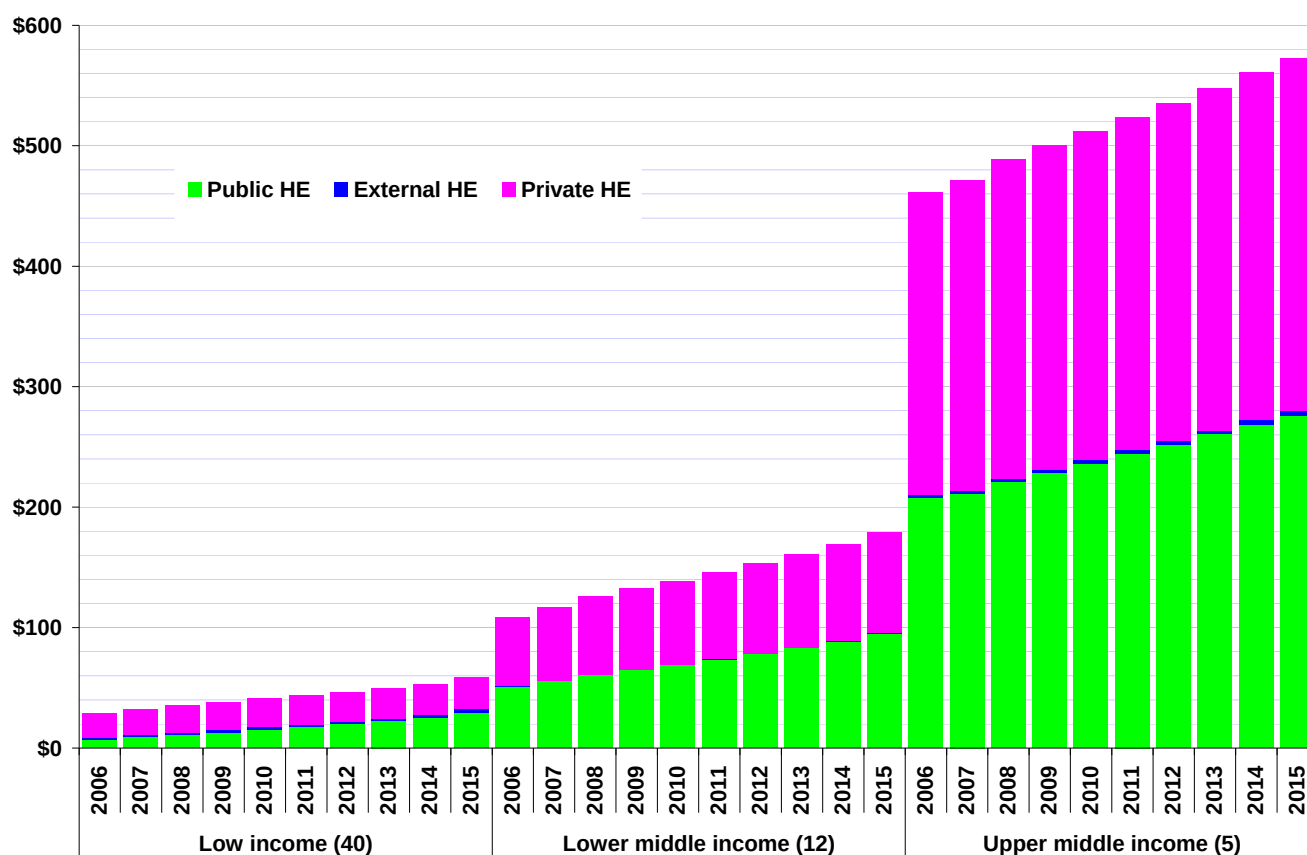


Figure 6. Real per capita Total Health Expenditure for all income groups under *public commitments scenario*

4.3 The financing gap

As stated above, the financing gap is derived by comparing estimated trends of additional incremental funding likely to be available over time with WHO's costing of additional incremental funding required annually up to 2015, with both increments assessed against the baseline of 2005. As illustrated in figures 7 and 8, the low income group has to bear the greatest amount of estimated financial requirements and enjoys the lowest total amount of projected financing.

Under the *business as usual* scenario (figure 7), the financing gap for the period 2006-2015 for low income countries is estimated to be more than US\$ 38.5 billion. The resources gap is calculated at US\$ 2 per person (US\$ 5 excluding India) in the year 2015. Under the *public*

commitments scenario (figure 8), the additional MNCH expenditure for low income countries is estimated to meet WHO costs. But the average masks a huge variation; excluding India from the analysis, there is a financing gap of just over US\$ 18.3 billion, or per capita US\$ 2 in the year 2015.

In lower middle and upper middle income countries the projected financing is estimated to meet costs under both scenarios.

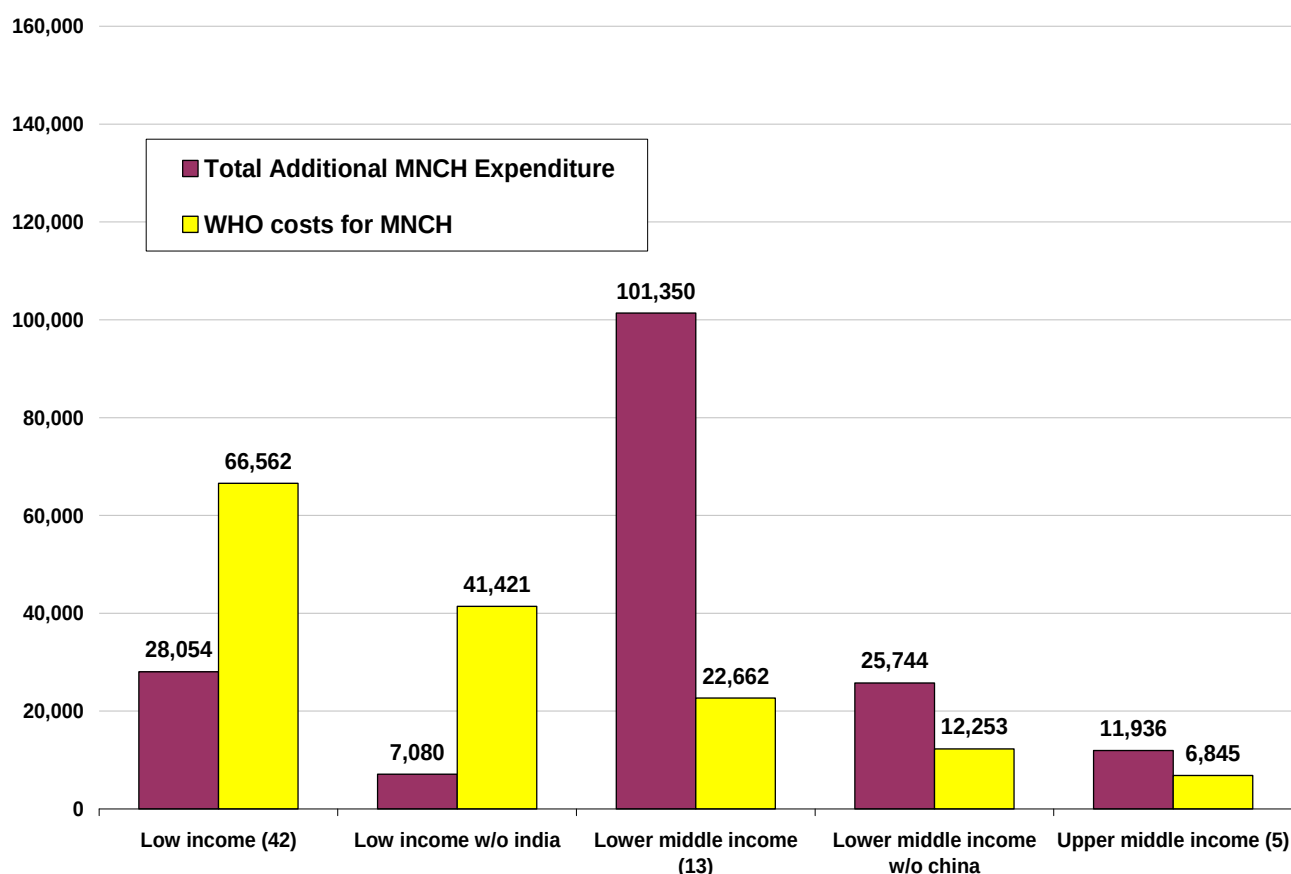


Figure 7. Comparison by income group of projected additional incremental MNC health expenditure and WHO costs of scaling up MNCH 2006 – 2015 under *business as usual* in million US\$ (2004)

Income group	Total additional MNCH expenditure	Gap	WHO costs for MNCH
Low income	28,054	-38,508	66,562
Low income w/o india	7,080	-34,341	41,421
Lower middle income	101,350	78,688	22,662
Lower middle income w/o china	25,744	13,491	12,253
Upper middle income	11,936	5,091	6,845

Table 2 the financing gap under *business as usual* in million US\$ (2004)

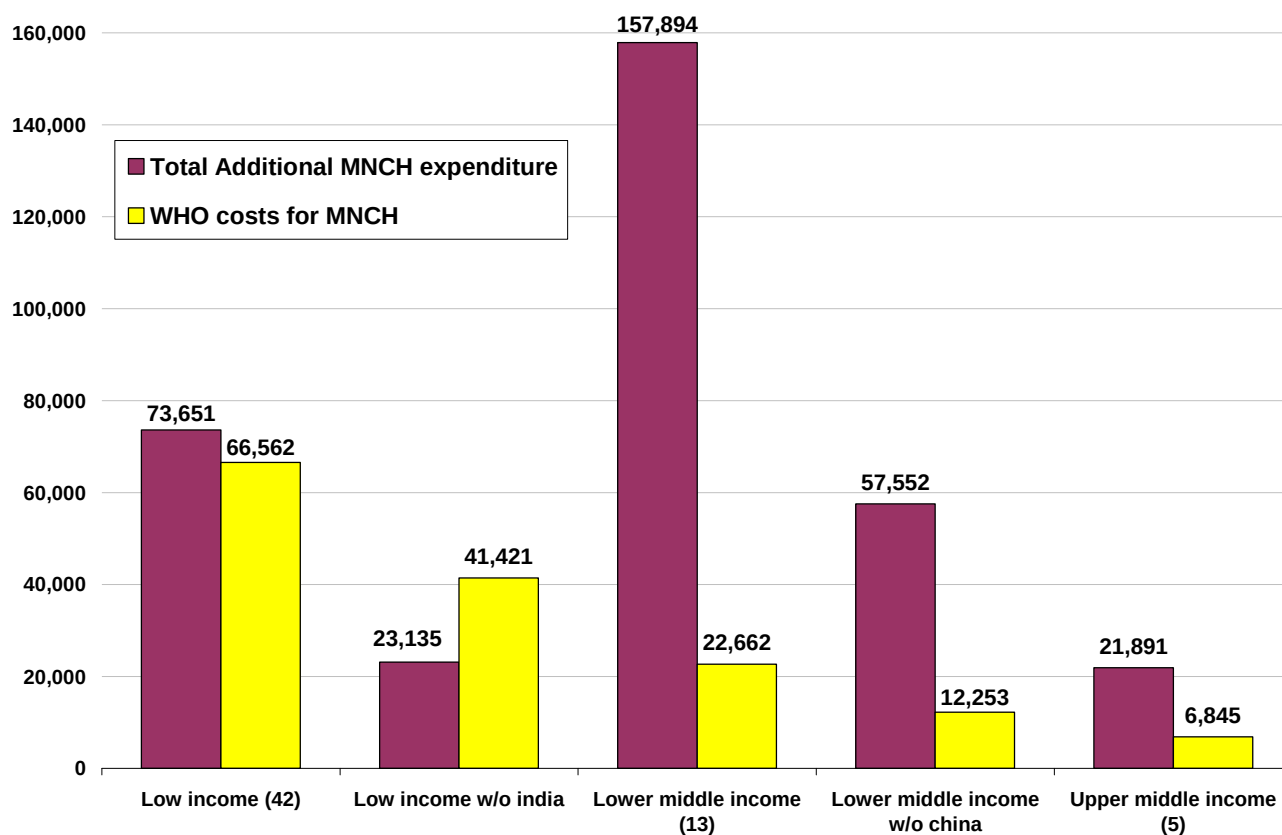


Figure 8. Comparison by income group of projected additional incremental MNC health expenditure and WHO costs of scaling up MNCH 2006 – 2015 under *public commitments* in million US\$ (2004)

Income group	Total additional MNCH expenditure	Gap	WHO costs for MNCH
Low income	73,651	7,089	66,562
Low income w/o india	23,135	-18,286	41,421
Lower middle income	157,894	135,232	22,662
Lower middle income w/o china	57,552	45,299	12,253
Upper middle income	21,891	15,045	6,845

Table 3 the financing gap under *public commitments* in million US\$ (2004)

On a yearly basis, the financing gap is forecast to increase each year for low income countries (when India is excluded) under both scenarios. Over time lower and upper middle income countries are increasingly able to meet the costs of MNCH, with total health expenditure exceeding costs by a growing amount.

We ran the analysis by regional grouping, and it is important to note that Sub-Saharan Africa countries are estimated to face a financial gap under both scenarios (figures 9 and 10). In the year 2015 it is estimated that under the business as usual scenario, Sub-Saharan African countries will need US\$ 4 per person in addition to available resources to cover the costs for that year. Under the public commitment scenario this group of countries will need US\$ 1 per person.

The other regions are estimated to meet their financial requirements under both scenarios.

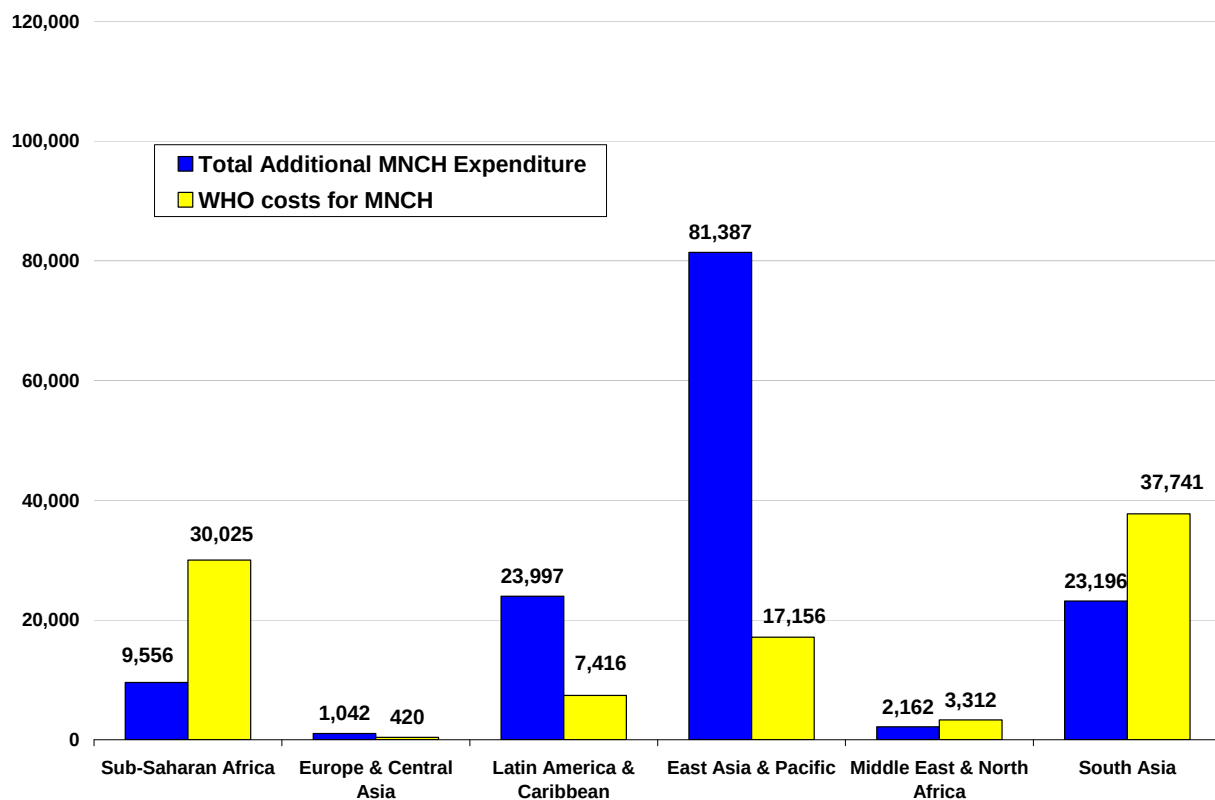


Figure 9. Comparison by region of projected additional incremental MNC health expenditure and WHO costs of scaling up MNCH 2006 – 2015 under *business as usual* in million US\$ (2004)

World Bank regions	Total additional MNCH expenditure	Gap	WHO costs for MNCH
Sub-Saharan Africa	9,556	-20,469	30,025
Europe & Central Asia	1,042	622	420
Latin America & Caribbean	23,997	16,582	7,416
East Asia & Pacific	81,387	64,231	17,156
Middle East & North Africa	2,162	-1,150	3,312
South Asia	23,196	-14,545	37,741

Table 4 the financing gap under business as usual in million US\$ (2004)

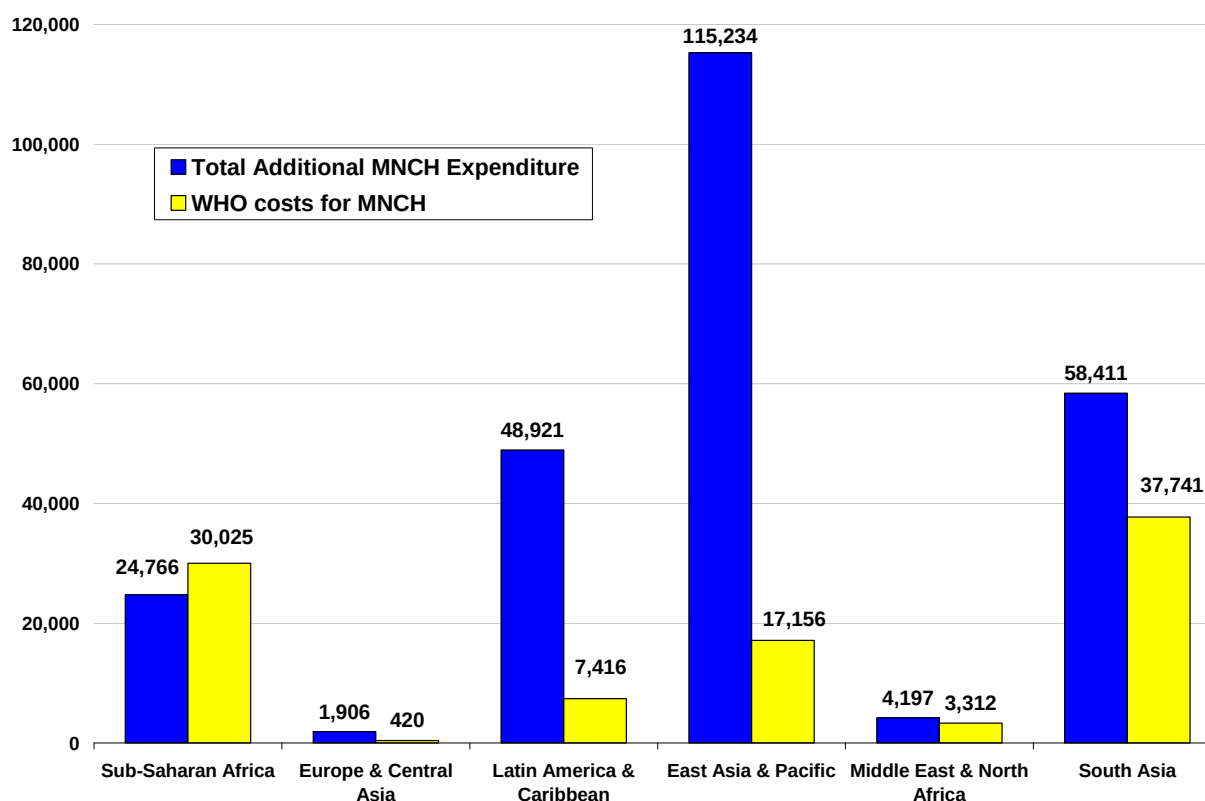


Figure 10. Comparison by region of projected additional incremental MNC health expenditure and WHO costs of scaling up MNCH 2006 – 2015 under *public commitments* in million US\$ (2004)

World Bank regions	Total additional MNCH expenditure	Gap	WHO costs for MNCH
Sub-Saharan Africa	24,766	-5,260	30,025
Europe & Central Asia	1,906	1,486	420
Latin America & Caribbean	48,921	41,505	7,416
East Asia & Pacific	115,234	98,078	17,156
Middle East & North Africa	4,197	886	3,312
South Asia	58,411	20,670	37,741

Table 5 the financing gap under *public commitments* in million US\$ (2004)

Figures 11 and 12 show the composition of projected total health expenditure for each country in the year 2015 under both scenarios. The share of external aid varies greatly amongst the countries; in general it is observed that under the *public commitment* scenario the share of private health expenditure is clearly reduced compared to the *business as usual* scenario, as a result of a greater share of public and external expenditure for health.

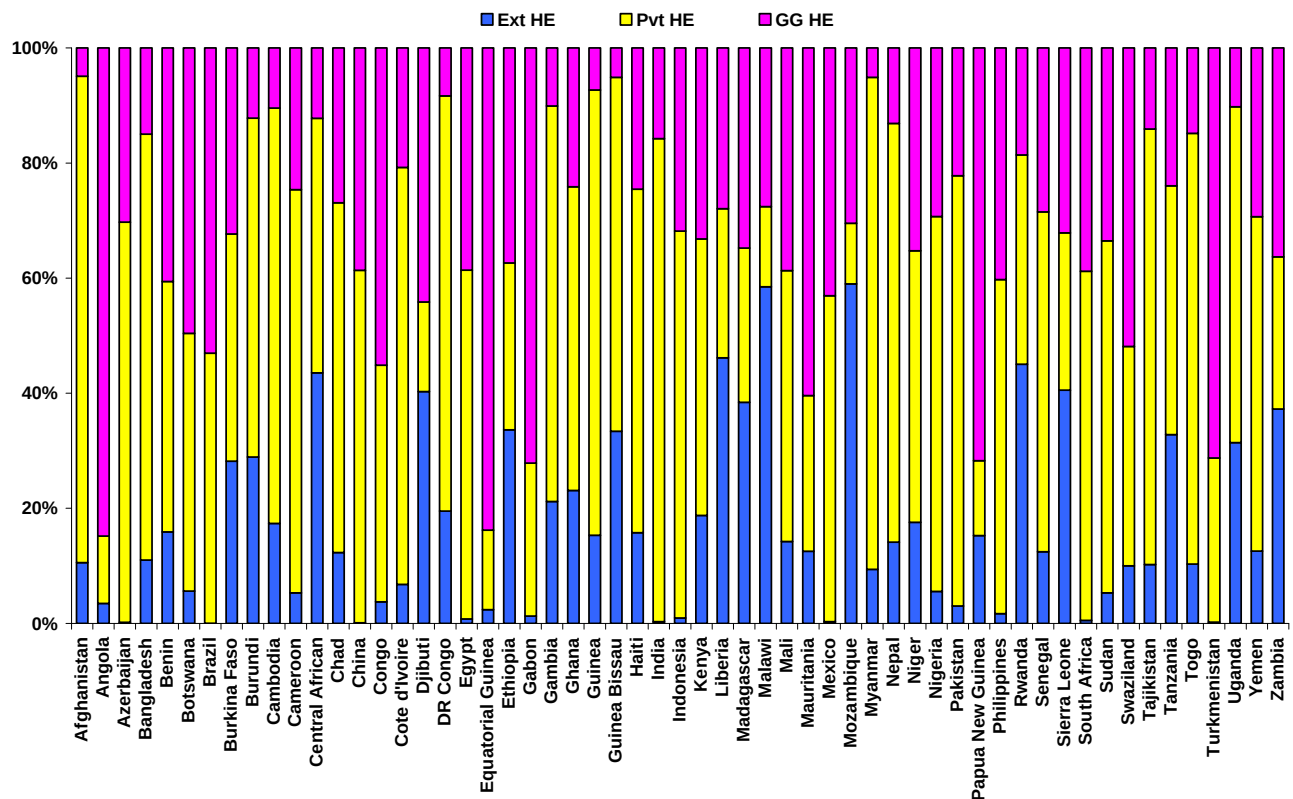


Figure 11. Projected sources of Total health Expenditure in 2015 under *business as usual*

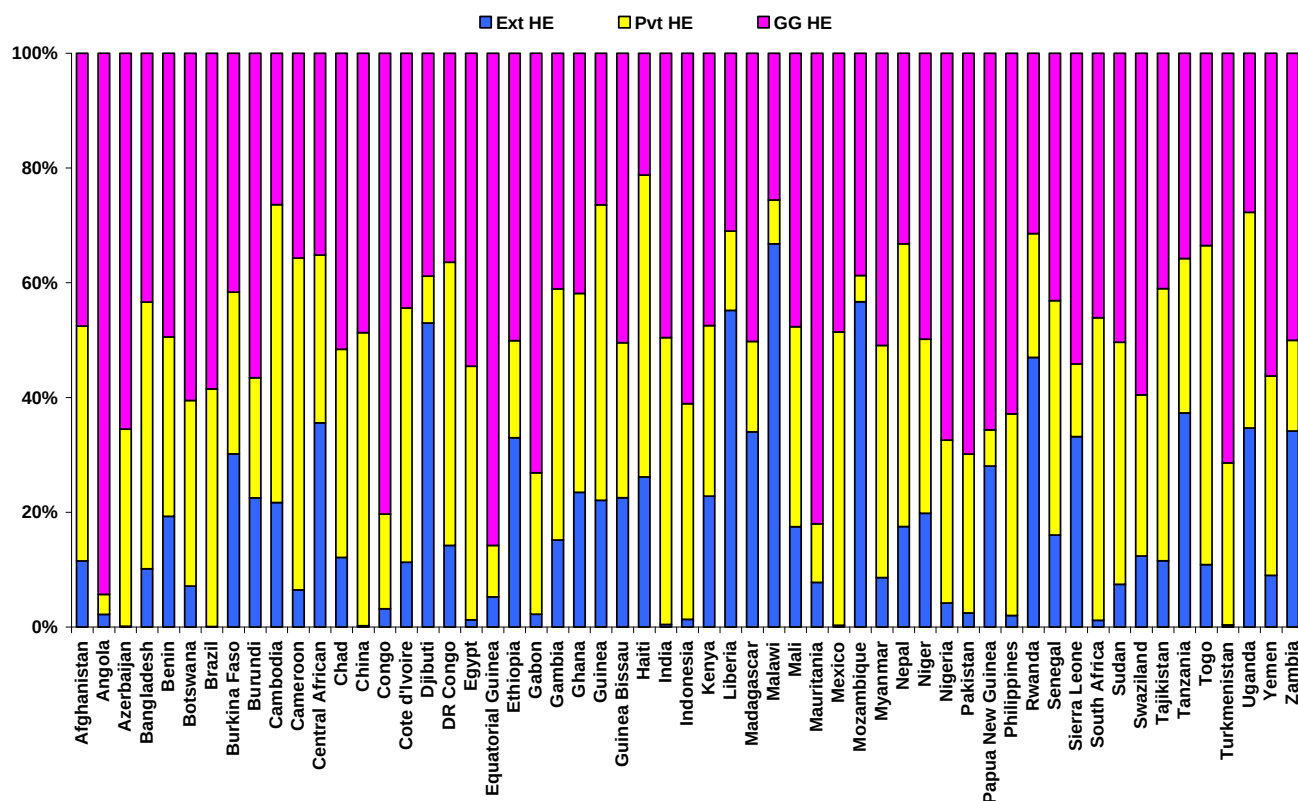


Figure 12. Projected sources of Total health Expenditure in 2015 under *public commitments*

4.4 Sensitivity analysis

A one-way sensitivity analysis was used to explore the implications of uncertainty of assumptions.

Changing annual GDP growth by 2 percentage points resulted in a 76 percent change in the financing gap. A variation of 5 percentage points in the share of maternal, neonatal and child health resulted in a 103 percent change in the financial gap. When costs increased by 50 percent, this widened the gap by 93 percent (table 2).

Table 6. Sensitivity analysis: percentage change in financial gap in response to change in uncertain parameters

variable	% change	impact on gap
annual GDP growth for priority countries	+/- 2 percentage points	-/+ 76 %
MNCH as % of THE	+/- 5 percentage points	-/+ 103 %
WHO costs	+ 50%	+ 93 %

Table 3 presents the best and worst case results compared to the base line gap estimates (*business as usual*). It is worth noticing that under the worst case assumptions, the average of all countries experiences a financial gap. In particular, low income countries have a gap of more than 80 billion US\$ (more than double that derived with base line assumptions). Under the best case assumptions, there is still a financial gap for the low income countries when India is not included, of around US\$ 7.4 billion. The other income groups no longer face a gap.

Table 7. Best and worst case analysis: impact on financial gap results

<i>million US\$</i>	Worst case	Base line	Best case
All countries	- 49,691	+ 45,271	+ 302,224
Low income	- 80,993	- 38,508	+ 44,551
Low income w/o India	- 57,275	- 34,341	- 7,438
Lower middle income	+ 33,603	+ 78,688	+ 225,088
Lower middle income w/o China	- 1,197	+ 13,491	+ 79,655
Upper middle	- 2,300	+ 5,091	+ 32,585

5. Discussion

5.1 Main results

Across the countries included in this analysis, there are differences in the likelihood that countries will have the financial resources to advance towards MDGs 4 and 5. In some countries it seems likely that adequate financial resources can be mobilized; in many countries the cost is far beyond domestic affordability. Even if a combination of public and private financing seems likely to fill the financing gap, reliance on private financing brings with it concerns of equity, so additional public and external funds might be required even in this set of countries.

In order to meet public commitments, general government expenditure for health in the low income countries would need to increase more than four fold by 2015 compared to spending levels in 2006; external funds would need to almost double.

From the study it emerges that under the *business as usual* scenario, the financing gap for the period 2006-2015 for low income countries is more than US\$ 38.5 billion. Under the *public commitments* scenario, the gap for low income countries (excluding India) falls to just under US\$ 18.3 billion.

The financing gap increases each year for low income countries under both scenarios. Over time lower and upper middle income countries are increasingly able to meet the costs of MNCH, with total health expenditure exceeding costs by a growing amount under both scenarios.

Even if donor and priority countries fulfil their commitments to increase external aid to developing countries, Sub Saharan African countries will still lack adequate financial resources to scale up maternal, newborn and child health interventions. We estimate that US\$ 1 per capita additional to committed resources would be required in 2015 to extend coverage of life-saving interventions for mothers and children in these countries. If total health expenditure increases in

line with past trends, the financing gap is estimated to be more than US\$ 4 per person. This gap can be taken to illustrate the relative neglect of MNCH in recent donor funding policies [17].

The analysis highlights the great importance of the allocation of domestic and external resources to MNCH and, for external finance, across countries. To the extent that countries and donors can focus their financial allocations on MNCH, this will reduce the financing gap (if at the expense of other health areas). Similarly the gap will be reduced in the poorest countries if donors are able to target funds on the most needy country populations.

5.2 Limitations

Main limitations are generated by data availability and quality. We had to make critical assumptions such as the share of MNCH on the average of very limited data sources; in fact only four countries have produced NHAs that provide this figure, and two are not considered priority countries for our study. Furthermore, we had to drop three countries (Somalia, Iraq and Zimbabwe) in our study due to lack of data and very unstable economic conditions (highly volatile exchange rate, extraordinary inflation rates).

Results were very sensitive to estimates of cost of scaling-up MNCH. We were reliant on the WHO estimates, but these are likely to be underestimates as they do not include the costs of increased staff salaries or building new health infrastructure. Furthermore, the cost estimates were based on cost-effectiveness data which assume efficiency in the delivery of services. This assumption may not apply in many low income settings.

It is important to bear in mind the large extent of uncertainty around the results as shown by best and worst case estimates.

It was not possible to present results by country due to agreement with WHO over use of estimated cost data. Presentation by income group could mask inter country differences

(particularly in the middle lower income group). But country specific data are likely to be of very variable quality.

Finally, this estimate should not be seen as absolute or worldwide. Other exercises would give different results depending upon the time frame considered, the data available and the assumptions made. The results presented here should therefore be interpreted in the light of the purpose of the analysis and in comparison with other analyses of forecasted expenditure. Action at country level will need to be driven by analyses tailored to country circumstances.

5.3 Conclusions

The main implication of this analysis is that the volume of financing resources in low-income countries, in particular in the Sub-Saharan African region, will not be adequate to meet MDGs 4 and 5. This group of countries is estimated to face a financing gap even under the more optimistic scenario; it bears the greatest amount of estimated financial requirements and enjoys the lowest amount of projected financing. Low income countries are likely to need complementary funding over and above that already committed in order to scale up provision of essential maternal, neonatal and child health care.

The specific financing source(s) required to “fill the gap” will depend on the context and needs of each country and a combination of domestic and external resources is likely to be needed. Any additional aid would need to be effectively targeted towards MNCH services.

From the analysis it emerges that many of the priority countries – in particular the lower middle and upper middle income groups - are estimated to have sufficient funds for progressing towards MDGs 4 and 5. These countries’ own domestic policies for allocating funding and improving health system performance is therefore paramount.

Donor countries should better target their effort to the countries that enjoy the least amount of resources, such as the majority of sub-Saharan African countries with low income. Moreover, strong coordination within the current aid architecture is critical for improving aid effectiveness

and for ensuring a predictable and uninterrupted flow of funding. Furthermore, development and strengthening of health systems is needed, because interventions cannot be delivered at scale and in the long term without a well functioning structure [18].

Sustainable progress towards scaling up MNCH interventions will demand a willingness of both donors and priority countries to mobilize and then effectively channel resources to directly impact maternal, neonatal and under-five health care. Donor countries are required to act in accordance with their commitments and to coordinate their efforts for providing adequate and effective technical assistance, and priority countries need to be dedicated to improve and strengthen health systems and to better manage, plan and allocate domestic resources.

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Annex 1

Country	World Bank region	World Bank income
Afghanistan	South Asia	Low income
Angola	Sub-Saharan Africa	Lower middle income
Azerbaijan	Europe & Central Asia	Lower middle income
Bangladesh	South Asia	Low income
Benin	Sub-Saharan Africa	Low income
Botswana	Sub-Saharan Africa	Upper middle income
Brazil	Latin America & Caribbean	Lower middle income
Burkina Faso	Sub-Saharan Africa	Low income
Burundi	Sub-Saharan Africa	Low income
Cambodia	East Asia & Pacific	Low income
Cameroon	Sub-Saharan Africa	Lower middle income
Central African Republic	Sub-Saharan Africa	Low income
Chad	Sub-Saharan Africa	Low income
China	East Asia & Pacific	Lower middle income
Congo	Sub-Saharan Africa	Lower middle income
Côte d'Ivoire	Sub-Saharan Africa	Low income
Djibouti	Middle East & North Africa	Lower middle income
Democratic Republic of the Congo	Sub-Saharan Africa	Low income
Egypt	Middle East & North Africa	Lower middle income
Equatorial Guinea	Sub-Saharan Africa	Upper middle income
Ethiopia	Sub-Saharan Africa	Low income
Gabon	Sub-Saharan Africa	Upper middle income
Gambia	Sub-Saharan Africa	Low income
Ghana	Sub-Saharan Africa	Low income
Guinea	Sub-Saharan Africa	Low income
Guinea-Bissau	Sub-Saharan Africa	Low income

Haiti	Latin America & Caribbean	Low income
India	South Asia	Low income
Indonesia	East Asia & Pacific	Lower middle income
Iraq	Middle East & North Africa	Lower middle income
Kenya	Sub-Saharan Africa	Low income
Liberia	Sub-Saharan Africa	Low income
Madagascar	Sub-Saharan Africa	Low income
Malawi	Sub-Saharan Africa	Low income
Mali	Sub-Saharan Africa	Low income
Mauritania	Sub-Saharan Africa	Low income
Mexico	Latin America & Caribbean	Upper middle income
Mozambique	Sub-Saharan Africa	Low income
Myanmar	East Asia & Pacific	Low income
Nepal	South Asia	Low income
Niger	Sub-Saharan Africa	Low income
Nigeria	Sub-Saharan Africa	Low income
Pakistan	South Asia	Low income
Papua New Guinea	East Asia & Pacific	Low income
Philippines	East Asia & Pacific	Lower middle income
Rwanda	Sub-Saharan Africa	Low income
Senegal	Sub-Saharan Africa	Low income
Sierra Leone	Sub-Saharan Africa	Low income
Somalia	Sub-Saharan Africa	Low income
South Africa	Sub-Saharan Africa	Upper middle income
Sudan	Sub-Saharan Africa	Low income
Swaziland	Sub-Saharan Africa	Lower middle income
Tajikistan	Europe & Central Asia	Low income
Tanzania	Sub-Saharan Africa	Low income
Togo	Sub-Saharan Africa	Low income
Turkmenistan	Europe & Central Asia	Lower middle income

Uganda	Sub-Saharan Africa	Low income
Yemen	Middle East & North Africa	Low income
Zambia	Sub-Saharan Africa	Low income
Zimbabwe	Sub-Saharan Africa	Low income

Annex 2

OECD-DAC Secretariat Simulation of DAC Members' Net ODA Volumes in 2006 and 2010 In constant 2004 US\$ million

The data below are not forecasts, but Secretariat projections based on public announcements by member countries of the OECD's Development Assistance Committee (DAC). The key figures from such announcements are shown as "Assumptions". To calculate net ODA and ODA/GNI ratios requires projections for GNI for 2006 and 2010. For 2006 the projections of real growth for each country are taken from the *OECD Economic Outlook* No. 77 (May 2005) Annex Table 1. For the period 2006-10, real annual GNI growth of 2% is assumed for all countries. While calculations have been discussed at technical level with national authorities, the **DAC Secretariat is responsible for the methodology and the final published results.**

14 November 2005

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Country	2004		Assumptions	2006				2010			
	Net ODA	ODA/GNI		Net ODA	ODA/GNI	Real change in ODA compared with 2004		Net ODA	ODA/GNI	Real change in ODA compared with 2004	
						(\$ m)	Per cent			(\$ m)	Per cent
Austria	678	0.23%	0.33% in 2006 and 0.51% in 2010	1 000	0.33%	322	48%	1 673	0.51%	995	147%
Belgium ¹	1 463	0.41%	0.7% in 2010	1 815	0.49%	351	24%	2 807	0.70%	1 344	92%
Denmark	2 037	0.85%	Minimum 0.8%	2 037	0.81%	0	0%	2 185	0.80%	148	7%
Finland ^{1 2}	655	0.35%	0.44% in 2007 and 0.7% in 2010	797	0.41%	141	22%	1 475	0.70%	820	125%
France ¹	8 473	0.41%	0.5% in 2007 and 0.7% in 2012	9 983	0.47%	1 510	18%	14 110	0.61%	5 638	67%
Germany	7 534	0.28%	0.33% in 2006 and 0.51% in 2010	9 271	0.33%	1 737	23%	15 509	0.51%	7 975	106%
Greece	465	0.23%	0.33% in 2006 and 0.51% in 2010	715	0.33%	251	54%	1 196	0.51%	732	158%
Ireland	607	0.39%	0.5% in 2007 and 0.7% in 2012	765	0.44%	158	26%	1 121	0.60%	514	85%
Italy	2 462	0.15%	0.33% in 2006 and 0.51% in 2010	5 537	0.33%	3 075	125%	9 262	0.51%	6 801	276%
Luxembourg ¹	236	0.83%	1% in 2009	272	0.90%	36	15%	328	1.00%	93	39%
Netherlands	4 204	0.73%	Minimum 0.8% ⁶	4 801	0.82%	598	14%	5 070	0.80%	867	21%
Portugal ³	1 031	0.63%	0.33% in 2006 and 0.51% in 2010	558	0.33%	- 474	-46%	933	0.51%	- 98	-10%
Spain ^{1 2}	2 437	0.24%	0.5% in 2008 and 0.7% in 2012	3 569	0.33%	1 132	46%	6 925	0.59%	4 488	184%
Sweden	2 722	0.78%	1% in 2006	3 719	1.00%	997	37%	4 025	1.00%	1 303	48%
United Kingdom ^{1 2}	7 883	0.36%	0.47% in 2007-08 and 0.7% in 2013	9 602	0.42%	1 719	22%	14 600	0.59%	6 717	85%
EU Members, Total	42 886	0.35%		54 440	0.43%	11 554	27%	81 221	0.59%	38 335	89%
Australia	1 460	0.25%	0.36% in 2010	1 768	0.28%	308	21%	2 460	0.36%	1 000	68%
Canada ⁴	2 599	0.27%	See footnote 4	2 897	0.28%	297	11%	3 648	0.33%	1 049	40%
Japan ⁵	8 906	0.19%	See footnote 5	9 906	0.20%	1 000	11%	11 906	0.22%	3 000	34%
New Zealand	212	0.23%	0.27% in 2005-06 and 0.28% in 2007-08	258	0.27%	46	22%	289	0.28%	77	36%
Norway	2 199	0.87%	1% over 2006-09	2 657	1.00%	458	21%	2 876	1.00%	677	31%
Switzerland ⁶	1 545	0.41%	See footnote 6	1 596	0.41%	51	3%	1 728	0.41%	182	12%
United States ⁷	19 705	0.17%	See footnote 7	24 000	0.19%	4 295	22%	24 000	0.18%	4 295	22%
DAC Members, Total	79 512	0.26%		97 520	0.30%	18 008	23%	128 128	0.36%	48 616	61%

¹ ODA/GNI ratios interpolated between 2004 and year target scheduled to be attained.

² Finland aim to achieve 0.7% by 2010 'subject to economic circumstances'; Spain aim for a minimum of 0.5% by 2008, with the intention then to aim for 0.7% by 2012; the UK has announced a timetable to reach 0.7% by 2013.

³ Portugal's ODA in 2004 was above trend due to an exceptional debt relief operation for Angola.

⁴ Canada intends to double its 2001 International Assistance Envelope (IAE) level by 2010 in nominal terms. The ODA portion estimated here, supplied by the Canadian authorities, includes adjustments for inflation (approximately 2 per cent per annum) and for ODA expenditures outside the IAE.

⁵ Japan intends to increase its ODA volume by \$10 billion in aggregate over the next five years (2005 - 2009) compared to its net ODA in 2004. The Secretariat's estimate assumes \$1 billion extra in 2006 and \$3 billion extra in 2010.

⁶ Switzerland's ODA will increase by 8% in nominal terms from 2005 to 2008. A new goal will be determined for the following years. The Secretariat's estimate assumes maintenance of 0.41% of GNI in 2006 and 2010.

⁷ Secretariat estimate based on 2004 ODA plus \$5 billion per annum to cover the Gleneagles G8 commitments on increased aid to Africa, Millennium Challenge Account, and initiatives on HIV/AIDS, malaria and humanitarian aid.

⁸ The Netherlands' ODA in 2004 was below its target as India repaid all its outstanding Dutch aid loans. The Netherlands intends to maintain its target of 0.8% of GNI, on average, over the period 2004-07.