

Health expenditures and intervention packages: a global overview

Dépenses de santé et modules d'intervention: analyse mondiale

Comparative assessments of financial resources available to the health sector and the range of intervention options that can be purchased with these resources should be an integral part of health policy debate. The preparation of the World development report 1993: investing in health (WDR) by the World Bank stimulated the development of the first comparative assessments of national health expenditures and external assistance to the health sector. Four papers are presented here: the first reports in detail on the methods, materials and new results for assessing national health expenditures in all countries, while the second provides a detailed analysis of external assistance to the health sector over the last two decades. With the development of the Global Burden of Disease study and the expanding database on the cost-effectiveness of health interventions, information is now available to directly analyse the content of the health sector's activities. The third paper describes the basis for the packages of essential clinical and public health care proposed in the WDR. An alternative method of using information on burden and cost-effectiveness to identify packages of cost-effective health care, which also includes investments in improving the health system, is provided in the fourth paper.

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Il est souhaitable que la comparaison des ressources financières disponibles pour le secteur de santé et des diverses possibilités d'intervention susceptibles d'être achetées avec ces ressources fasse partie intégrante du débat sur les politiques de santé. La rédaction du Rapport sur le développement dans le monde 1993: investir dans la santé par la Banque mondiale a stimulé le développement des premières évaluations comparées des dépenses nationales de santé et de l'aide extérieure au secteur de santé. Quatre articles sont présentés ici; le premier rend compte en détail des matériels, des méthodes et des résultats nouveaux utilisés pour évaluer les dépenses nationales de santé dans tous les pays, tandis que le deuxième contient une analyse détaillée de l'aide extérieure au secteur de santé pendant les vingt dernières années. L'étude du poids de la morbidité dans le monde et l'extension des bases de données sur le rapport coût-efficacité des interventions sanitaires ont apporté des informations qui permettent d'analyser directement le contenu des activités du secteur de santé. Dans le troisième article sont indiqués les principes de base des modules de soins cliniques et de santé publique essentiels proposés dans le Rapport. Une autre méthode d'utilisation des données sur le poids de la morbidité et le rapport coût-efficacité pour identifier les modules de soins de santé à bon rapport coût-efficacité, qui tient compte également des fonds investis dans l'amélioration du système de santé, est indiquée dans le quatrième article.

National health expenditures: a global analysis

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As part of the background research to the World development report 1993: investing in health, an effort was made to estimate public, private and total expenditures on health for all countries of the world. Estimates could be found for public spending for most countries, but for private expenditure in many fewer countries. Regressions were used to predict the missing values of regional and global estimates. These econometric exercises were also used to relate expenditure to measures of health status. In 1990 the world spent an estimated US\$ 1.7 trillion (1.7×10^{12}) on health, or \$ 1.9 trillion (1.9×10^{12}) in dollars adjusted for higher purchasing power in poorer countries. This amount was about 60% public and 40% private in origin. However, as incomes rise, public health expenditure tends to displace private spending and to account for the increasing share of incomes devoted to health.

Interest in health expenditures is rising, both in poor countries facing the challenge of maintaining health services during global recession and structural adjustment, and in the richer countries trying to limit health expenditures that are growing faster than the GDP. Due to the lack of standardized estimates of national health expenditure with which to make meaningful international comparisons, the present study on national health expenditures was commissioned as a key preparatory step for the *World development report 1993: investing in health (1)*.

Past studies

Extensive reviews of both descriptive and analytical studies on national health expenditures in developing and industrialized countries have been prepared periodically (2–4). Four themes from past studies are important to put this work in context. First, information on health expenditure has evolved considerably in the past three decades in the industrialized countries but not in the developing countries. The earliest comprehensive international study, published by the International Labour Organisation (ILO) in 1959, compared medical payments under social insurance programmes with payments provided under voluntary insurance in the USA (5). Abel-Smith (6, 7) was the first to try to standardize cross-national data by defining the constituent components of health ser-

vices, listing the main sources of finance, and laying down a standard classification of expenditures which he applied to several industrialized countries. His efforts were followed by a series of comparative studies that led to the development of an annual database on OECD (Organisation for Economic Co-operation and Development) health expenditures, prepared using standard definitions and approaches (8–10).^a

The development of health expenditure data for the developing countries has been less successful. WHO, PAHO, USAID and the Sandoz Institute for Health and Socioeconomic Studies have attempted to improve information by promoting household surveys and publishing manuals for estimating national health expenditures (3, 11–13).^b Despite these efforts, most estimates of national health expenditure have come from *ad hoc* studies or development agency missions to countries, often conducted over a short period of time. Consequently, the unpublished literature from agencies such as the World Bank remains an important but difficult to obtain source of expenditure estimates for the developing countries. Regional reviews drawing largely on these sources have been prepared for Asia (14), Africa (15), and Latin America (16).

Second, many cross-sectional studies have explored the determinants of national health expenditure, particularly in OECD countries (e.g. 17–31). Taken together, these studies show that income per capita explains most of the variance in health expenditure per capita; Newhouse (21), for example, found that 90% of the variance in OECD health expendi-

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^a Poullier J-P, Sandier S. *Cost containment in OECD countries*. Paper presented at the European Health Policy Forum, Paris, 25–26 February 1988.

^b Rice D. *Financing health services: a manual for developing countries*. Unpublished WHO document No. SHS/SPM/80.3, 1980.

ture was explained by GDP per capita. Some studies report that other variables such as reimbursement methods, institutional variables, and the inpatient/outpatient mix can explain some of the variance in health expenditure (23, 29, 32–35). Nevertheless, the strongest factor in nearly all studies, including those few which examined the developing countries (33, 36, 37), has been income per capita.

Most studies have also found that health expenditure has an income elasticity greater than one: for a 10 percent increase in income per capita, the health expenditure per capita increases more than 10 percent. Goods or services with an income elasticity greater than one are defined in economics to be a luxury. On this basis, Newhouse concluded that health expenditure in OECD countries must be purchasing *caring* (which is more of a luxury) than *curing* (which seems to be more of a necessity). However, others have taken issue with the empirical observation that health expenditure has an income elasticity greater than one and challenge the interpretation of health care as a luxury item (38).

Third, most studies at the household level in developed countries do not show a greater-than-one elasticity for health expenditure with respect to income. The discrepancy between the relations at the national level and at the household level has been attributed in Canada to non-price rationing, so that consumers buy less health care than they want and can afford (39). However, this would imply that high-income consumers are more rationed than those with lower incomes. A more plausible explanation is that large health care expenditures are financed primarily by insurance rather than by individuals, and insurance spending rises less rapidly with income.

Finally, few studies in either the OECD countries or the developing countries have examined public health expenditures and private health expenditures and their determinants separately. Musgrove's study (40), using household survey data from six Latin American countries, is a noteworthy exception. In these countries, private care had a higher income elasticity than public sector health expenditures, suggesting that private care is a luxury relative to public care and that consumption shifts from public to private, other things being equal, as household incomes rise. This may partly be attributed to differences in real or perceived quality which make private and public health care only imperfect substitutes. The finding that a higher income shifts expenditure to the private sector is not generally observed at the aggregate level, when countries outside Latin America are also studied.

The objectives of the present study are fourfold: (a) to assess existing information on national health expenditures and identify gaps in it; (b) to explore

the relation between national health expenditures and important social, economic and demographic variables using econometric analysis; (c) to estimate, using equations from (b), the level of national health expenditures in every country of the world for 1990; and (d) to analyse patterns of expenditure disaggregated by activity, type, and source of finance. The last objective is treated elsewhere (4); the other three are discussed here.

Definitions, methods and materials

The first objective, that of assessing what is known about health spending, required a consistent definition of expenditure and agreement on how to group spending by different agents and express its value in internationally comparable terms.

Defining and valuing health expenditure

To define health expenditure requires defining *health*, the set of health-promoting *activities*, and the subset of such activities to be included in the health *sector*. Many definitions of health have been proposed. WHO's Constitution defines health as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (41). Such a broad definition may be conceptually appealing, but it makes health almost equivalent to a utility or welfare and poses many practical measurement problems (42). A negative definition, such as the absence of dysfunction or death, is more practical and closer to what is involved in health *care*.

This raises the question of which expenditures on the various health-improving activities should be included as health sector expenditures. Programmes such as primary school education often contribute significantly to health, but these interventions also have objectives other than health status improvement. One could rank activities by the proportion of their intended outcome in terms of health improvement; for example, 100% of measles immunization benefits are expected to improve health, while perhaps only 20% of the benefits of indoor piped water supply contribute to health improvement. Where do we draw the line defining health expenditure?

For this study, the operational definition includes all expenditures incurred by the preventive and curative health services for individuals, and on population-based public health programmes, as well as some programmes with a direct impact on health status (e.g., family planning programmes, nutrition programmes, and health education but not other kinds of education). Programmes that only indirectly affect health, such as relief and food programmes, and environmental programmes related to water and sanitation, were excluded.

We hoped to estimate health expenditure according to who pays for it and also who provides it. Categorizing health expenditure according to both financing and provision of services by the government, parastatal agencies (i.e., social security and social insurance programmes of the government), and the private sector defines a 3×3 matrix (Table 1). Typically, data were available for the total financing provided by each of the three subsectors. The breakdown of government financing for services provided by the government itself, by parastatal agencies and by the private sector was also often available. However, data were rarely found for the other cells in the matrix. The study was therefore restricted to the financing of health services by the various sectors. This focus is consistent with the approach of the U.S. Health Care Financing Administration (HCFA) (29), and facilitates comparisons of health expenditures in the OECD countries.

While estimates for individual countries are the main objective of the study, for some purposes countries have been grouped, as in the *World development report 1993*, into eight regions: Established Market Economies (EME), Formerly Socialist Economies of Europe (FSE), Middle Eastern Crescent (MEC), India (IND), China (CHN), Other Asia and Islands (OAI), Latin America and the Caribbean (LAC), and Sub-Saharan Africa (SSA). The first two groups together are referred to as "demographically developed" since they have largely completed the transition to low fertility and mortality levels.

The base year for the study is 1990. For countries with estimates prior to 1990 but not for 1990, we assumed that spending on health as a share of GDP was the same in 1990 as in the year of the most recent estimate. Estimates of the 1990 expenditure in local currency have been converted into US dollars (US\$) using the 1990 official exchange rates. The results were also calculated in "International dollars" (I\$) using purchasing-power parity (PPP) ratios from the World Bank's modification of the United Nations international comparisons project (43). Purchasing-power parity ratios calculated specifically for the

health sector would be preferable to those based on total GDP, but as these are available for so few countries (4) the GDP PPPs were used for all countries. In the calculation of expenditures in international dollars, external assistance (primarily paid in US dollars or other hard currency) was assumed to fund only tradable goods, so it was not corrected for purchasing-power parity.

Domestic expenditures for each country are classified as government, parastatal, or private sector spending. Total health expenditure comprises these expenditures and external assistance. Government health expenditure is what has been spent on health by the government at various administrative levels or by institutions wholly controlled by the government. Parastatal expenditures consist of the health components of social security and social insurance programmes, and the expenditures on health of other parastatal agencies. Public expenditures are defined as the sum of government and parastatal expenditures, to permit comparisons with the OECD countries where expenditures on health-related social insurance and social security programmes are not distinguished from government expenditure. Private sector health expenditure refers to spending by all nongovernmental entities, including individuals, households, private corporations and non-profit organizations. Private expenditures are the sum of private institutional and individual expenditures (including both direct or incidental costs and purchase of insurance by institutions and individuals or households).

Data sources, coverage and limitations

Substantial effort was invested in obtaining data on government, parastatal and private health expenditure directly from governments, supplemented with reports and data from WHO, the World Bank, the International Labour Organisation, regional development banks, and the United Nations Statistics Division as well as the published literature. The collection includes material from nearly 1000 different reports, articles and budgets, much of which is not published.

Information on government health expenditures was available for 138 countries. These expenditures were for the years from 1977 to 1990, with the majority (119 countries) having data for the period 1986-90. Information for the 24 OECD countries for 1990 was obtained from the HCFA national health accounts. Data on government health expenditures from 43 other countries came from national budgets. Information for another 45 countries was taken from an IMF yearbook (44). Data for 21 countries not covered by these sources were obtained through the World Bank health and public sector studies. Finally, data for five countries came from *ad hoc* studies.

Table 1: Availability of health data, financing vs. provision

	Financing			Total health
	Government	Parastatal	Private	
Provision				
Government	X			
Parastatal				
Private	X			
Total health	X	X	X	X

Information on parastatal spending was available from 111 countries for the period from 1983 to 1990; 1988 was the latest year for which there was comprehensive information for most countries. Data on social security in 100 countries were obtained from ILO studies, and for eleven countries from the World Bank and *ad hoc* studies.

Even using multiple sources, reasonable data on private sector spending were available for only 73 countries for the period 1974 to 1990. Information came from household surveys (some conducted by the ILO), national accounts, as well as World Bank, HCFA and *ad hoc* studies. Unfortunately, even when these assessments were based on surveys—either institutional or at the household level—many estimates were suspect. Household surveys, although widely acknowledged to provide the most reliable assessment of private spending on health, often exhibited systematic sampling and non-sampling bias. For some household consumption surveys, total household expenditure, expanded to all households in the country, exceeded estimated private consumption in the national accounts data for the same year, which made the estimated private household expenditure on health for the country unrealistically high. For example, in a household survey in the Republic of Korea in 1990, calculated private health spending was 11–12% of GDP. Even more strikingly, a survey in Fiji in 1977 gives a figure for private health spending that exceeds GDP.

For several reasons, including non-representative sampling, many household surveys in developing countries may overestimate per capita private consumption. However, private health expenditures as a *share* of total private expenditure may not be biased if the income elasticity across households is close to one (and any bias in the data is independent of income). To estimate private sector financing, the household survey results were therefore adjusted by applying the percentage of household spending on health from these surveys to the total private consumption numbers from the national accounts. This adjustment yielded far more believable estimates of private health spending; in the above examples, the figure for the Republic of Korea was adjusted down to 2.9% of GDP and the corresponding figure for Fiji was 1.4%.

Comparability across data sources was a major issue for all three subsectors. For several countries there is a wide divergence in the quoted expenditure figures for the same year across data sources, and over fairly short periods of time (which may be explained by radical changes in the levels of spending from one year to the next for some countries, but seems very unlikely for others). Discussions with the country officers at the World Bank or with people

familiar with those countries led to a choice of which estimate was most plausible.

Estimating out-of-sample

One of the objectives of this study is to estimate total health expenditures for *every* country in 1990. Estimates of public sector expenditures for 12 countries and of private sector expenditures in a further 118 countries were not available. This section therefore develops predictive equations to estimate these expenditures for these 130 countries. We have assumed that public sector expenditure is not a function of private sector health expenditure, while the latter could be a function of the former. This hypothesis is grounded in the belief that most governments are largely unaware of the magnitude of the private health sector, or at least do not take it into account in determining their health budgets. The health services that people are willing to buy for themselves, in contrast, may depend on what the public sector is already financing.

Estimating public sector expenditure. We examined the relation between public sector expenditure and GDP per capita, government consumption as percent GDP, private consumption as percent GDP, life expectancy at birth, infant mortality rate, percent urban population, average years of schooling completed, and regional dummy variables.^c Regressions were estimated in both US dollars and International dollars; in each case the dependent variable, public sector health spending, was measured both per capita and as a percent of GDP. The independent variables were derived primarily from sources at the World Bank, with some augmentation from the OECD, the IMF (government and international financial statistics) and United Nations agencies.

For the per-capita specification, univariate tests with the different independent variables showed closer association with the logarithm of expenditure than with the expenditure itself. Strong univariate relations were observed, among others, for public sector expenditures per capita as a function of GDP per capita in US and International dollar terms (R^2 of 0.91 and 0.85, respectively), and of health status indicators such as infant mortality rate and life expectancy at birth. However, close relations between public sector expenditure denominated in per capita terms and income per capita are not so impressive as one might assume, as the following experiment demonstrates.

^c Each region is represented as a binary (dummy) variable. If a country is a member of a particular regional group, its value for that regional variable is 1. If it is not a member, that value is zero.

Take a set of countries with a range of income per capita equal to that in the dataset (US\$ 44 to 34 135; I\$ 402 to 21 701) and randomly assign each country a share of GDP spent on health between 1% and 8%, the range of shares of GDP found in the dataset. Estimated public health expenditure per capita is then calculated as the share of GDP times income per capita. Regressing this *randomly generated* estimate against income per capita (in a linear model) yields a surprisingly high R^2 . This Monte Carlo simulation has been repeated 8000 times. The expectation of the distribution of R^2 is 0.55 (max=0.79; min=0.24) for the US\$ simulation and 0.54 (max=0.76; min=0.3) for the I\$ simulation. The corresponding expectations for the regression using the logarithms of per capita expenditures and income are 0.76 (max=0.91; min=0.41) for the US\$ simulation and 0.70 (max=0.85; min=0.42) for the I\$ simulation. These results confirm that even randomly generated expenditure shares can suggest a close fit between per capita expenditure and per capita income. A more exacting test of the relation between public health expenditure and income as well as other independent variables that are highly collinear with income is to examine public health expenditure as a share of GDP, which is the specification used in the regressions.

We tested the most general model first, using all the independent variables. Non-significant independent variables were dropped until the most parsimonious form was generated. Groups of independent variables were F-tested, and retained if the F-test was significant. Four parsimonious regressions were estimated for the share of GDP: linear forms with independent variables in US\$ and in I\$, and double-log forms with independent variables in US\$ and in I\$.

For prediction, we chose the form with the highest adjusted R^2 . This equation:

$$\text{Public health expenditure as \% GDP} = 0.02 + 1.10E-6 \text{ GDP per capita} + 0.09 \text{ government consumption as \% GDP} - 0.03 \text{ dummy for MEC} - 0.03 \text{ dummy for OAI} - 0.02 \text{ dummy for LAC} - 0.03 \text{ dummy for SSA}$$

shows public expenditure on health as a share of GDP to be a linear function of GDP per capita in I\$, government consumption as a percent of GDP, and dummy variables for MEC, OAI and SSA (which are indistinguishable from one another) and LAC. (All coefficients are non-zero with P values less than 0.01). The adjusted R^2 was 0.79. Higher income was associated with a higher share of income spent on health—the elasticity from the double-log form was 1.43 (1.34 in US\$). Governments that consumed a larger share of GDP in total also had a higher

expenditure on health. The significant dummy variables indicate greater regional differences in share of GDP spent on health than can be explained by income per capita alone. However, the infant mortality rate and life expectancy at birth were not related to public sector health expenditure. Thus the equation says nothing about causal relations between expenditure and health status. (We will return to this question in the final section).

Estimating private health expenditure. We hypothesized that while the public sector is relatively insensitive to private sector spending in health, the private sector is sensitive to the size of government financing of health services. We therefore used public sector expenditures as an independent variable in the private sector equation. There are, however, two reasons why observed private spending cannot simply be regressed on observed public expenditure. First, the private sector estimates span 16 years from 1974 to 1990. Estimates of public sector expenditures are not always available for the same years. Second, if private sector expenditure is a function of GDP per capita, other socioeconomic variables, and public sector health expenditure—while public health expenditure is also a function of GDP per capita, the parameter estimates from OLS regression will be biased. To deal with both problems, we used the public sector regression developed above to *predict* public sector expenditure in the same year as the private sector expenditure estimate, effectively creating an instrumental variable for public sector health expenditure. Of course, the independent variables, GDP per capita, and government consumption as a share of GDP were also taken from the same year as the private sector estimate in generating the instrumental variable. We have assumed, in effect, that the functional relationship between the share of GDP spent by the public sector on health and GDP per capita and government consumption has not changed over the last 16 years.

Private sector health expenditures per capita and private expenditures as a percent of GDP were analysed as dependent variables. As before, regressions were run using US dollar and PPP-adjusted incomes. All independent variables were from the same year as the private expenditure estimate, for each country. In addition to those variables included in the public sector regressions, we added a dummy variable for former British colonies which gained independence after the Second World War and another for former French colonies, on the assumption that colonial history might play a significant role in explaining the variance in private health expenditures.

Parsimonious forms were estimated for eight different models, using three binary choices: per cap-

ita expenditure versus share of GDP, US\$ versus I\$, and linear versus double-log functional forms. The highest adjusted R^2 (0.86) was for private sector expenditure per capita in the double-log form using US\$ for the independent variables, so this equation was used for prediction:

$$\text{Natural log of private health spending per capita} \\ = -4.34 + 1.03 \text{ natural log GDP per capita}$$

The only significant ($P < 0.01$) variable in any specification was GDP per capita. The elasticity is 1.03 or indistinguishable from unity. In other words, the share of GDP privately spent on health is nearly constant over the range of GDP per capita. Notably, public sector expenditure was not significant in any of these regressions. Nor were there any significant regional dummy variables. The dummy variables for colonial history, meant to capture potential institutional effects, were also not significant. Separate regressions were undertaken for private sector estimates from each source (OECD, national accounts, household surveys, etc.) but the relations did not change. The lack of relation between private sector expenditure as a share of GDP, and GDP per capita (or any of the other independent variables) is confirmed in the regressions using share of GDP as the dependent variable. The adjusted R^2 for the linear form was less than 0.08 in both US\$ and I\$ forms.

Results

Global and regional spending on health care in 1990 was estimated by combining the observed values with those predicted by the regressions for the public and private subsectors. These regression estimates were used for 12 and 87 countries, respectively, but they account for only 0.03% and 2.0% of the estimated total expenditure in the two subsectors, because the great bulk of spending occurs in countries for which data were available and it was not necessary to predict values from the equations. There were 153 such countries for public spending and 78 for private spending.^d Expenditure estimated from the regressions is of course a larger share of the estimated total spending in the poorer regions. Only in Sub-Saharan Africa was more than 1% of the estimated regional public spending derived from the regressions, but the shares for private expenditure are 31% in Africa, 39% in the Middle Eastern Crescent, 15% in Latin America and the Caribbean, 6.2% in the Formerly Socialist Economies, and 3.6% in Asia.

^d A total of 138 and 73 countries were used for the public and private sector regressions, respectively. Data for additional countries were obtained after completion of the regression analyses.

Estimates of public, private and total health expenditures are provided in the Annex for every country: estimates derived from the regression analysis are in bold-face italics. For a few countries there was no information even on public spending, so the total health expenditure was estimated by using the same share of GDP, or the same level per capita, as in the other countries of the same region. Public and private shares can then be estimated by the same ratio as in the rest of the region. These estimates are used only to complete the regional and global totals and are not reported in the Annex. Estimates of public expenditure only, disaggregated by function and activity, are presented in Murray et al. (4).

The world as a whole is estimated to have spent US\$ 1.7 trillion (1.7×10^{12}) on health in 1990 (Table 2), which constituted 8% of the global GDP. The Established Market Economies accounted for over 87% of the total; inclusion of the Formerly Socialist Economies of Europe, which are also demographically developed, raises the share to 90% or US\$ 1532 billion (1532×10^9). It is even more striking that spending on health in the US alone is 41% of global health expenditures. In contrast, spending in developing regions was only 10% or US\$ 167 billion (167×10^9), even counting external assistance.

When expenditures are corrected for purchasing power parity, global spending amounted to a little under I\$ 1.9 trillion (1.9×10^{12}) (Table 3). This makes developing country expenditure much larger (380 versus 167 billion dollars), but there is little change in estimated spending by the EME and FSE countries. They appear to spend 80% of the total while the USA still spends 37%. External assistance to the health sector is only 0.7% of the total health expenditure in developing countries measured in International dollars, as opposed to 1.7% in US\$.

Approximately 60% of global health spending is from the public sector (inclusive of external assistance), while private sector financing constitutes the other 40%. The picture is very similar in the PPP-adjusted calculations. Because the EME countries dominate world health expenditure, the global public share is close to what it is in those countries (61%: it is higher if the USA is left out). Public expenditure is relatively more important in the FSE countries (71%), and much less important in the developing regions. This is particularly clear if expenditure is examined exclusive of external assistance: the public share is only 38% in OAI, 44% in SSA and 20% in India. With much variation among countries, the trend is for the public share of health financing to rise with income, reflecting high levels of spending on social insurance and public health programmes by governments in richer countries and much reliance on out-of-pocket purchases in poor countries.

Table 2: Regional total health expenditures in 1990 United States dollars

Region	1990 GDP (1990 US\$ × 10 ⁶)	1990 Public health expenditures (1990 US\$ × 10 ⁶)	1990 Private health expenditures (1990 US\$ × 10 ⁶)	1990 Aid flows for health (1990 US\$ × 10 ⁶)	Total health expenditures (1990 US\$ × 10 ⁶)	Total health expenditures	
						As % GDP	Per capita (1990 US\$)
Established Market Economies	15 974 547	905 998	577 287	0	1 483 285	9.29	1 869
Middle Eastern Crescent	1 248 990	25 414	18 887	330	44 631	3.57	88
Formerly Socialist Economies of Europe	1 380 409	34 864	14 250	0	49 114	3.56	142
India	291 561	3 499	13 703	286	17 488	6.00	20
China	365 557	7 494	5 248	77	12 819	3.51	11
Other Asia and Islands	817 304	13 972	22 303	542	36 817	4.50	53
Latin America and the Caribbean	1 106 035	26 218	17 065	542	43 825	3.96	98
Sub-Saharan Africa	275 580	5 102	5 432	1 072	11 607	4.21	22
All regions	21 459 983	1 022 561	674 175	2 848	1 699 585	7.92	320

Total health expenditures as a share of GDP reach a high of more than 9% in the EME region. Including external assistance to the health sector, the share of GDP spent on health is remarkably similar in most other regions, ranging from 3.5% to 4.5% in US dollars and 3.5% to 3.9% in PPP terms. The exception is India, which spends 6% (Fig. 1). If external assistance is subtracted from the total, the shares are more varied and more correlated with income: poorer countries spend a smaller share of GDP out of their own resources. Sub-Saharan Africa spends the lowest share of GDP on health, and for many African countries such as Burkina Faso, Guinea-Bissau, Liberia and Mozambique, aid exceeds half of the total health expenditures.

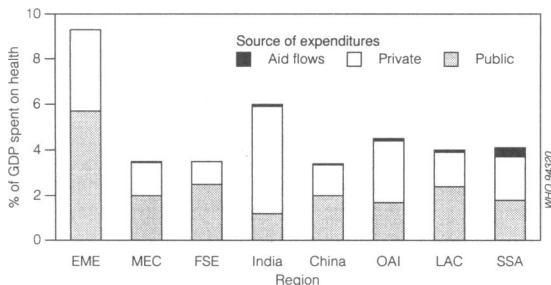
Since EME has the highest incomes and a relatively large share of GDP devoted to health, there is

a great dichotomy between per capita health spending in this region and the rest of the world. In EME, on average, US\$ 1859 per capita is spent on health. In FSE, which has the second highest level of health expenditures per capita, spending is only US\$ 144. Spending in the other regions is \$103 in Latin America, \$97 in the Middle Eastern Crescent, \$61 in Asia, \$23 in Sub-Saharan Africa, \$21 in China, and only \$11 in India. Using purchasing-power parity ratios to compare expenditures narrows the gap between the North and South. While the EME region spends about I\$ 1793 per capita, the FSE region, which still has the second highest level, spends about I\$ 241 per capita. Latin America spends I\$ 181 per capita, the Middle Eastern Crescent about I\$ 167, Other Asia and Islands about I\$ 111, and Sub-Saharan Africa approximately I\$ 50.

Table 3: Regional total health expenditures in 1990 International dollars

Region	1990 GDP (1990 I\$ × 10 ⁶)	1990 Public health expenditures (1990 I\$ × 10 ⁶)	1990 Private health expenditures (1990 I\$ × 10 ⁶)	1990 Aid flows for health (1990 I\$ × 10 ⁶)	Total health expenditures (1990 I\$ × 10 ⁶)	Total health expenditures	
						As % GDP	Per capita (1990 I\$)
Established Market Economies	15 202 504	864 110	565 850	0	1 429 961	9.41	1 802
Middle Eastern Crescent	1 514 707	33 401	27 668	1 097	62 166	4.10	122
Formerly Socialist Economies of Europe	2 208 580	58 643	22 911	0	81 554	3.69	235
India	878 687	10 544	41 298	861	52 703	6.00	62
China	2 346 464	48 103	33 685	494	82 281	3.51	72
Other Asia and Islands	1 752 350	23 630	42 678	2 161	68 469	3.91	98
Latin America and the Caribbean	1 987 172	45 075	31 589	1 344	78 009	3.93	174
Sub-Saharan Africa	649 021	10 783	12 164	3 441	26 388	4.07	50
All regions	26 539 483	1 094 289	777 843	9 398	1 881 530	7.09	354

Fig. 1. Sectoral composition of estimated regional health expenditures in 1990, as percentage of regional GDP.



Discussion

This study has demonstrated large gaps in our knowledge of health expenditures. Neither the World Health Organization nor the World Bank has devoted resources to maintaining a database on national health expenditures. Costly *ad hoc* studies could be avoided in the future, if data collection were more systematized.

Government health expenditures are not difficult to obtain once the most appropriate source of data in each country has been identified. The International Monetary Fund already maintains a database of government expenditure. With some extra investment of resources, WHO or the World Bank could supplement this routinely collected information and generate more complete information on national health expenditures. For relatively little cost, government expenditures could be monitored annually.

Despite attempts by the ILO to collect information on a regular basis for parastatal expenditures on health (chiefly through social security systems), the figures suffer many critical problems, including that of double counting. Reporting should be coordinated with a system such as the one just discussed for the collection of government expenditures. Parastatal expenditure data, divorced from an analysis of government action and expenditure in the health sector, are at best incomplete and at worst misleading.

Measurement of private sector expenditures is clearly inadequate in the developing world. Even for those countries with detailed *ad hoc* studies, the data are subject to doubt. For example, the high level of private expenditures estimated for India, which is at odds with the pattern in the rest of the developing world, may be real or may be a measurement artifact. One way forward would be the development of national health accounting akin to the OECD health expenditure database. However, the majority of developing countries probably cannot institute such information systems in the near future. Rapid assessment

techniques therefore need to be developed and implemented, in conjunction with an international database on government expenditures, to fill the information gap in the short term.

Income and health status as determinants of health expenditure. The data reviewed in this study suggest that private sector expenditure on health depends on nothing but income, and moreover that the share of GDP is constant across countries. Private health spending relative to GDP is unrelated to income, mortality, the size of government, geographical region, education or public health expenditure. It is particularly surprising to find no association with education or with public expenditure, since the former was expected *a priori* to influence people's understanding of their health needs and their demand for health care, while the latter should provide an alternative to private expenditures. Apparently public and private spending are not simply substitutes, because they finance services that differ in kind, or quality, or in utilization by different population groups. And education may have effects on health status and even on the use of health care which do not show up in aggregate private spending. Of course, private health expenditure may be determined partly by historical, cultural and institutional factors not captured in this analysis; and errors or mis-specifications in the data may reduce the statistical significance of the variables tested.

In contrast to private spending, public health expenditure has an elasticity substantially greater than one. Total health expenditure, however, also includes external assistance that flows primarily to low-income countries (45). Is total health expenditure a luxury item? For all developing countries with observed data (not derived from our estimating equations), a double-log regression of total health expenditure per capita against income per capita gives an elasticity of 1.003, which is indistinguishable from unity. In other words, the *share* of GDP spent on health does not increase with income. As noted above, however, average total health expenditure in EME is substantially higher than in all other regions, so a regression including these countries shows health care to be a luxury item. Compared with the pattern in poorer countries, high health expenditure in EME is not accounted for simply by higher average income.

How do we expect health expenditures to change with income per capita? More income means more resources with which to deal with health problems. We suspect, however, that there are two separate factors involved in the "health problems" which generate demand for health care: *observed or objective* health status and *perceived or subjective* health

status. Murray & Chen (46) draw a fundamental distinction between health status as observed by a medical professional and that perceived by the individual. Numerous interview surveys in poor developing countries have recorded higher rates of self-reported morbidity and disability in rich than in poor households (47). Such counter-intuitive patterns of reported morbidity may be at least partly explained by changing expectations of health status. If expectations of good health increase faster than the actual health status—because people have more access to health care, or because more education makes them understand more about health—then the perception of ill health may increase with income. The result will be increasing expenditure which is only loosely related to objective health problems.

The importance of perceived health status may help explain why health expenditure is so much higher in the EME countries and why it continues to rise as a share of income. In poor countries, it may also explain why the rich treat health care as a luxury. However, it is private health spending that seems most likely to respond to this perceived need, whereas government health expenditure might be expected to derive more from observed need as measured by mortality and disability. This would be the case particularly for public health measures that do not respond to subjective demand. This explanation would predict a higher elasticity for private than for public expenditure on health, just the reverse of what we observe.

The relation between total health expenditure and income per capita will be some combination of the effects of both kinds of health status, among other things. If perceived health status is more of a luxury whereas treatment for observed health problems is more of a necessity, then the elasticity of the combined tendencies to spend might increase with the income per capita as “health status” comes to be more a matter of subjective perception. However, as a population ages and develops chronic health problems which are costly to treat, even objective health status may generate pressure to spend an increasing share of the income on health care. And because objective health problems can be life-threatening, people may reasonably be willing to spend increasing shares of their income on health care as they become richer, even with no changes in the underlying demographic or epidemiological situation or in their subjective perceptions.

The relation between income and expenditure on health cannot be understood without taking account of the expanding role for the public sector in financing health care, as observed in nearly all OECD countries and a number of middle-income countries as well. This makes public spending respond to per-

ceived health status and the demand for health services from the population and not only to objective needs. But because that leads to rapidly increasing total expenditure, greater public involvement in financing care also tends to stimulate greater public control of spending, at least to keep the share of GDP from continuing to grow. Any understanding of what accounts for health expenditure and how it is related to health status that goes beyond the superficial will have to disentangle these effects.

What does health expenditure buy? The relations studied here raise the perennial question about what health expenditures actually purchase, in particular whether they buy improved objective health (“curing”) or something more subjective (“caring”), or whether they are largely wasted through inefficiency in the production of services and the choice of which services to provide. Using the improved estimates of national health expenditures including external assistance provided in this study, we can examine some relations between health expenditures and measures of health status.

One such analysis is shown in Fig. 2. GDP per capita and a human capital variable summarizing schooling levels were used to predict for 58 countries both the observed total national health expenditure (as a share of GDP) and the life expectancy at birth:

$$\text{Total health expenditure as \% GDP} = -0.0485 + 0.0119 \text{ natural log GDP per capita} - 0.0055 \text{ natural log human capital}$$

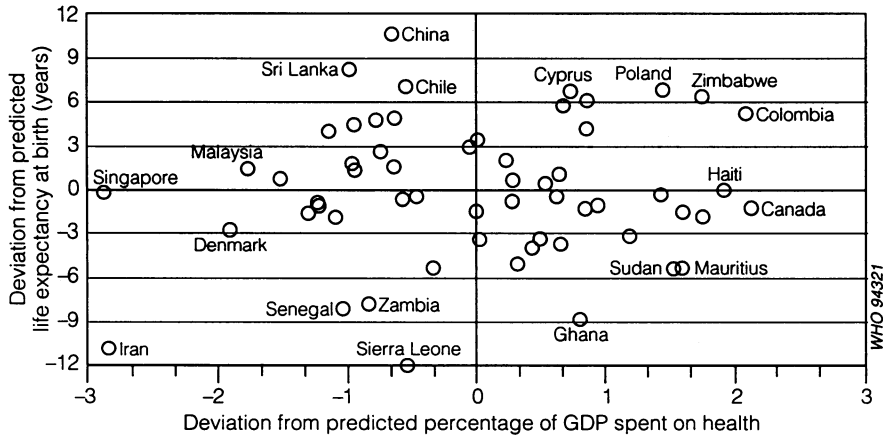
and

$$\text{Life expectancy at birth (years)} = 41.98 + 3.120 \text{ natural log GDP per capita} + 5.316 \text{ natural log human capital}$$

Estimates of expenditures derived from the regressions reported earlier were not used in this exercise, which was limited chiefly by the availability of estimates for private health spending and the human capital variable. (Human capital was just significant at the 0.05 confidence level in explaining health expenditure; otherwise all variables were significant at the 0.01 level. In a similar analysis for 73 countries (1), human capital did not contribute significantly to explaining health spending.) The values of expenditure and life expectancy predicted from these equations were then compared with the observed values, and the differences or *residuals* plotted (Fig. 2).

The result shows for each country whether it spends more or less than might be expected, given its income and education level, and whether its population lives longer or less than might be anticipated. Although income, education and health expenditure are not the only factors influencing life expectancy,

Fig. 2. Life expectancies and health expenditures in developing countries: deviations from estimates based on GDP and schooling.



this comparison indicates, roughly, whether health expenditure in a given country is buying increased life to the same degree as in other countries with similar resources and human capital. Points in the upper right and lower left quadrants in Fig. 2 correspond to countries showing a systematic relation between more health expenditure and longer life: that is, spending on health appears to be buying more years of life. Countries in the upper left quadrant achieve gains in life expectancy without spending so much—their health expenditure appears to translate more effectively into improved health status. The data do not indicate, of course, whether this occurs for reasons directly related to how resources are spent in health care, or because the population takes better care of its health through diet and other habits and therefore needs less medical care to achieve the same result. Countries shown in the lower right quadrant are in the opposite situation, with a shorter-than-expected life despite spending more on health care than would be expected on the basis of income and schooling.

Similar relations could be explored using other indicators of health status such as child mortality. The most interesting comparison would relate health expenditure to the total burden of disease in a country, including the effects of disability as well as premature mortality, as described elsewhere (48). We cannot provide a parallel analysis to that given in Fig. 2, however, for two reasons. One is that the disease burden has so far been estimated only for the eight regions of the world and for a few individual countries. The other is that even the regional estimates now available describe only the burden of disease *remaining* as a result of everything that has been done, including the expenditure on health care,

to improve health. Comparison should really be made with the *reduction* in disease burden that can be attributed to health spending, which implies a comparison with the situation that would exist in the absence of that expenditure.

Since no such estimates exist, we can only compare the current estimated health spending with the current disease burden: if the expenditure is effective in reducing the burden, the relation should be inverse. Table 4 shows regional disease burdens, in millions of disability-adjusted life years (DALYs), and total health expenditure in International dollars. Across all eight regions, more health spending is clearly associated with better health. However, this relation depends very much on regions with an extremely high disease burden (India and Sub-Saharan Africa) or high expenditure (EME); no inverse relation is apparent among the intermediate regions.

Table 4: DALY loss and public health expenditures in 1990, by region

Region	DALY loss (millions)	1990 Public health expenditure (1990 I\$ × 10 ⁹)
Established Market Economies	94	1 429 961
Middle Eastern Crescent	144	62 166
Formerly Socialist Economies of Europe	58	81 554
India	292	52 703
China	201	82 281
Other Asia and Islands	177	68 469
Latin America and the Caribbean	103	78 009
Sub-Saharan Africa	293	26 388
All regions	1 362	1 881 530

As shown in Fig. 2, there is some unknown mixture of varying effectiveness in health care spending, and differences in health status due to other factors such as income, education, and historical and cultural influences. When the burden of disease is estimated for more countries, it should be possible to separate these effects and begin to assess the overall contribution of health care expenditure to improved health.

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Résumé

Dépenses nationales de santé: analyse mondiale

Plus de 1000 sources de données, publiées et non publiées, ont été examinées concernant les dépenses publiques, parapubliques (sécurité sociale et programmes publics d'assurance sociale) et privées en soins de santé. Les estimations des dépenses publiques (publiques et parapubliques) ont été obtenues pour 153 pays et les dépenses privées pour 78 pays; un ajustement de ces estimations est souvent nécessaire pour pouvoir prédire les dépenses en 1990 à partir des dépenses des années précédentes. Ces valeurs ont ensuite été soumises à l'analyse économétrique et rapportées aux pays (revenu par habitant, degré de scolarisation, consommation publique totale) et aux régions. Plusieurs modèles ont été testés, les dépenses et les revenus étant évalués en dollars au taux de change et en dollars internationaux ajustés sur le pouvoir d'achat. Les dépenses publiques dans 12 pays et les dépenses privées dans 87 pays ont été évaluées par régression. Les valeurs observées et les valeurs attendues ont ensuite été additionnées pour estimer les dépenses de santé totales dans le monde. L'estimation ainsi obtenue montre qu'en 1990 US\$ $1,7 \times 10^{12}$ ont été consacrés dans le monde à la santé, dont 60% par financement public et 40% par financement privé. Quatre-vingt sept pour cent de l'ensemble de ces dépenses ont eu lieu dans les pays les plus riches; les Etats-Unis d'Amérique comptent

à eux seuls pour 41%. Les pays en développement ne représentent que US\$ 167 milliards, soit 380 milliards de dollars ajustés sur le pouvoir d'achat, aide extérieure comprise.

Pour l'ensemble de la planète, les dépenses de santé sont manifestement un luxe, vu la part importante du revenu consacrée à la santé dans les pays les plus riches. Dans le monde en développement, la part du revenu total prélevée pour la santé est cependant presque constante. Ce résultat concorde avec l'observation que les dépenses publiques, lesquelles sont plus importantes dans les pays riches que dans les pays pauvres, tendent à augmenter plus que les dépenses privées à la suite de l'augmentation du revenu. Les dépenses privées semblent ne dépendre que du niveau de revenu et, en particulier, être indépendantes du niveau des dépenses pour la santé du secteur public. Il apparaît ainsi que ces deux catégories de dépenses ne peuvent pas exactement se substituer l'une à l'autre, en partie probablement parce qu'elles répondent de manière différente aux besoins objectifs de santé et à la perception qu'ont les personnes de leur état de santé.

Ces estimations des dépenses nationales peuvent servir à analyser les achats réels des pays avec les ressources consacrées à la santé et, en particulier, à rechercher si les dépenses sont étroitement associées aux indicateurs que sont l'espérance de vie et le poids de la morbidité dans le pays. L'énorme disparité entre les pays et les régions concernant cette relation, même en tenant compte du revenu et du degré de scolarisation, montre que l'«efficacité» des dépenses à générer une amélioration de l'état de santé est extrêmement variable.

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Annex

1990 Total health expenditures: public, private, and aid flows (1990 US\$)

Regions and countries	Public health expenditures: As % GDP ^a	Private health expenditures: As % GDP ^a	Aid flows for health: As % GDP ^b	Total health expenditures			Public: As % total	Private: As % total	Aid flows: As % total ^b
				As % GDP	1990 US\$ (x10 ⁶)	1990 US\$ per capita			
<i>Established Market Economies:</i>	5.67	3.61		9.29	1 483 285	1 958	61.1	38.9	
Australia	5.34	2.33		7.67	22 736	1 294	69.6	30.4	
Austria	5.57	2.82		8.38	13 193	1 711	66.4	33.6	
Belgium	6.19	1.31		7.50	14 428	1 449	82.5	17.5	
Canada	6.70	2.34		9.05	51 594	1 945	74.1	25.9	
Denmark	5.30	1.00		6.30	8 160	1 588	84.2	15.8	
Finland	6.52	1.30		7.82	10 200	2 046	83.3	16.7	
France	6.97	2.43		9.40	105 467	1 869	74.2	25.8	
Germany	6.34	2.38		8.73	120 072	1 511	72.7	27.3	
Greece	4.10	1.29		5.39	3 609	359	76.0	24.0	
Iceland	7.29	1.04		8.34	480	1 884	87.5	12.5	
Ireland	5.85	1.37		7.22	3 068	876	81.1	18.9	
Italy	5.85	1.68		7.54	82 214	4 655	77.7	22.3	
Japan	4.81	1.64		6.45	189 930	1 538	74.5	25.5	
Luxembourg	6.00	0.56		6.56	628	1 662	91.4	8.6	
Netherlands	5.83	2.20		8.03	22 423	1 501	72.6	27.4	
New Zealand	6.02	1.35		7.37	3 150	925	81.7	18.3	
Norway	7.04	0.32		7.35	7 782	1 835	95.7	4.3	
Portugal	4.31	2.68		6.99	3 970	383	61.7	38.3	
Spain	5.17	1.42		6.59	32 375	831	78.4	21.6	
Sweden	7.85	0.94		8.79	20 055	2 343	89.3	10.7	
Switzerland	5.15	2.37		7.52	16 916	2 520	68.5	31.5	
United Kingdom	5.19	0.92		6.11	59 623	1 039	84.9	15.1	
United States	5.60	7.11		12.71	691 211	2 765	44.1	55.9	
<i>Middle Eastern Crescent:</i>	2.03	1.51	0.02	3.53	44 131	97	57.6	42.8	0.7
Algeria	5.34	1.60	0.00	6.95	3 738	149	76.9	23.0	0.1
Armenia	2.50	1.68		4.17	505	152	59.8	40.2	
Azerbaijan	2.62	1.66		4.27	785	99	61.2	38.8	
Bahrain	2.91	1.71	0.00	4.62	163	324	63.0	36.9	0.1
Cyprus	2.49	1.06	0.41	3.96	45	64	62.9	26.8	10.3
Egypt	0.79	1.61	0.20	2.61	1 443	28	30.3	62.0	7.7
Georgia	2.78	1.67		4.45	830	152	62.5	37.5	
Iran	1.45	1.10	0.00	2.54	13 618	244	56.9	43.1	0.0
Israel	2.07	2.13	0.01	4.20	2 236	480	49.3	50.6	0.1
Jordan (East Bank)	1.39	1.97	0.41	3.77	170	55	36.9	52.3	10.8
Kazakhstan	2.77	1.67		4.44	2 573	154	62.3	37.7	
Kirghizstan	3.32	1.65		4.97	517	118	66.7	33.3	
Kuwait	3.12	1.73	0.01	4.86	1 160	541	64.2	35.6	0.1
Malta	3.68	1.70	0.00	5.38	123	349	68.3	31.7	0.0
Morocco	0.86	1.61	0.08	2.55	642	26	33.6	63.3	3.1
Oman	2.51	1.69	0.02	4.22	325	209	59.5	40.1	0.5
Pakistan	1.65	1.64	0.19	3.48	1 382	12	47.4	47.1	5.5
Qatar	2.98	1.75	0.00	4.73	276	630	63.0	36.9	0.0
Saudi Arabia	3.06	1.70	0.00	4.76	3 846	260	64.3	35.7	0.0
Syria	0.34	1.64	0.08	2.07	506	41	16.6	79.4	4.0
Tadzhikistan	4.35	1.64		5.98	532	100	72.6	27.4	
Tunisia	3.13	1.63	0.15	4.91	614	76	63.8	33.3	3.0
Turkey	1.43	2.50	0.02	3.94	4 276	76	36.2	63.3	0.5
Turkmenistan	3.31	1.66	0.02	4.99	458	125	66.4	33.2	0.4
United Arab Emirates	0.90	1.75	0.00	2.66	752	472	34.0	66.0	0.1
Uzbekistan	4.25	1.64		5.90	2 391	116	72.1	27.9	
Yemen	1.11	1.72	0.36	3.19	223	20	34.7	54.1	11.3

Annex Table: continued

<i>Formerly Socialist Economies of Europe:</i>	2.53	1.03		3.55	48 942	144	71.2	29.1	
Albania	3.36	0.64		4.00	94	26	84.0	16.0	
Belarus	2.19	1.00		3.19	1 613	157	68.7	31.3	
Bulgaria	4.36	1.00		5.36	1 068	121	81.4	18.6	
Czechoslovakia	5.04	0.90		5.94	2 642	169	84.9	15.1	
Estonia	1.92	1.70		3.62	361	228	53.0	47.0	
Hungary	5.02	0.93		5.95	1 957	185	84.4	15.6	
Latvia	2.17	1.70		3.87	590	220	56.1	43.9	
Lithuania	2.58	1.00		3.58	594	159	72.0	28.0	
Moldova	2.91	1.00		3.91	623	143	74.4	25.6	
Poland	4.07	1.00		5.07	3 206	84	80.3	19.7	
Romania	2.38	1.49		3.87	1 355	58	61.4	38.6	
Russian Federation	2.02	1.00		3.02	23 527	159	66.8	33.2	
Ukraine	2.30	1.00		3.30	6 804	131	69.7	30.3	
Yugoslavia	4.11	1.00		5.11	4 518	264	80.4	19.6	
<i>India</i>	1.20	4.70	0.10	6.00	17 488	21	20.0	78.4	1.6
<i>China</i>	2.05	1.44	0.02	3.51	12 819	11	58.5	40.9	0.6
<i>Other Asia and Islands:</i>	1.71	2.73	0.07	4.50	36 817	61	38.0	60.6	1.5
Bangladesh	0.79	1.81	0.59	3.19	693	6	24.8	56.7	18.5
Bhutan	2.08	1.54	1.44	5.05	15	10	41.1	30.4	28.5
Fiji	2.06	1.44	0.26	3.76	52	70	54.9	38.3	6.9
Hong Kong	1.11	4.58	0.00	5.69	3 988	687	19.5	80.5	0.0
Indonesia	0.52	1.34	0.15	2.01	2 073	12	25.6	66.7	7.7
Laos	0.44	1.54	0.56	2.53	22	5	17.4	60.7	21.9
Malaysia	1.30	1.65	0.01	2.96	1 259	71	44.0	55.8	0.2
Mongolia	5.51	1.00	0.13	6.63	124	58	83.0	15.1	1.9
Nepal	1.04	2.34	1.15	4.54	131	7	23.0	51.7	25.4
Papua New Guinea	2.63	1.60	0.21	4.44	145	37	59.1	36.1	4.8
Philippines	1.00	1.00	0.15	2.15	1 001	16	46.7	46.4	6.9
Singapore	1.09	0.78	0.00	1.87	647	215	58.3	41.6	0.1
Solomon Islands	0.94	1.10	0.14	2.18	37	117	43.2	50.5	6.3
South Korea	2.71	3.89	0.01	6.61	15 634	365	40.9	58.9	0.2
Sri Lanka	1.51	1.91	0.32	3.74	305	18	40.4	51.1	8.6
Taiwan	2.28	2.02	0.00	4.30	6 559	323	53.0	47.0	0.0
Thailand	1.01	3.92	0.05	4.98	3 994	72	20.4	78.7	0.9
Tonga	3.90	1.61	0.95	6.46	6	63	60.3	25.0	14.8
Vanuatu	2.93	1.46	1.29	5.68	10	67	51.5	25.7	22.8
Viet Nam	0.83	1.00	0.28	2.11	191	3	39.3	47.4	13.3
Western Samoa	0.18	1.59	1.17	2.94	3	20	6.1	54.2	39.7
<i>Latin America & Caribbean:</i>	2.37	1.54	0.05	3.96	43 825	103	59.8	38.9	1.2
Antigua and Barbuda	2.69	1.70	0.16	4.55	19	241	59.1	37.3	3.6
Argentina	2.53	1.67	0.01	4.21	4 437	137	60.1	39.7	0.2
Barbados	3.24	1.70	0.10	5.04	83	323	64.3	33.8	1.9
Belize	2.85	2.41	0.63	5.88	23	120	48.4	41.0	10.7
Bolivia	1.60	1.59	0.82	4.01	180	25	39.9	39.6	20.5
Brazil	2.76	1.42	0.02	4.20	21 887	146	65.7	33.9	0.4
British Virgin Islands	1.54	1.73		3.27	5	375	47.1	52.9	
Cayman Islands	2.03	1.75		3.78	14	657	53.8	46.2	
Chile	3.32	1.38	0.03	4.73	1 315	100	70.1	29.1	0.7
Colombia	1.75	2.17	0.06	3.98	1 636	51	44.0	54.4	1.6
Costa Rica	4.79	1.64	0.08	6.51	371	132	73.6	25.2	1.2
Dominica	5.25	1.65	1.17	8.06	14	192	65.1	20.4	14.5
Dominican Republic	1.96	1.61	0.15	3.72	272	38	52.7	43.3	4.0
Ecuador	2.31	1.55	0.28	4.14	450	44	55.9	37.3	6.8
El Salvador	1.74	3.26	0.86	5.86	300	58	29.7	55.6	14.7
Grenada	4.10	1.65	0.21	5.96	12	133	68.8	27.8	3.5
Guatemala	1.63	1.60	0.46	3.70	251	27	44.2	43.2	12.6
Guyana	4.22	1.57	4.58	10.37	33	42	40.7	15.1	44.2

Annex Table: continued

Haiti	1.84	3.83	1.33	6.99	173	27	26.3	54.8	19.0
Honduras	2.57	1.62	0.35	4.54	264	52	56.7	35.7	7.7
Jamaica	2.89	1.67	0.48	5.04	200	83	57.4	33.2	9.5
Mexico	1.56	1.58	0.03	3.17	7 525	89	49.3	49.8	0.9
Nicaragua	4.90	1.93	1.77	8.61	129	34	56.9	22.5	20.6
Panama	5.18	1.65	0.31	7.13	343	142	72.6	23.1	4.3
Paraguay	0.98	1.62	0.19	2.79	153	35	35.1	58.2	6.7
Peru	1.80	1.34	0.07	3.21	1 312	61	56.1	41.7	2.2
St. Kitts and Nevis	3.48	1.67	0.85	5.99	8	212	58.1	27.8	14.1
St. Lucia	5.43	1.65	0.10	7.18	25	169	75.6	23.0	1.4
St. Vincent	3.90	1.64	0.15	5.69	11	102	68.5	28.8	2.7
Suriname	0.09	1.67	0.12	2.88	41	93	37.9	58.0	4.1
Trinidad and Tobago	2.83	1.68	0.03	4.54	222	180	62.4	36.9	0.6
Uruguay	2.49	2.07	0.06	4.62	380	123	53.8	44.8	1.4
Venezuela	1.95	1.64	0.01	3.60	1 735	88	54.2	45.6	0.1
<i>Sub-Saharan Africa:</i>	1.85	1.97	0.39	4.23	11 648	22	43.8	46.6	9.2
Benin	1.14	1.57	1.61	4.32	88	19	26.3	36.4	37.3
Botswana	3.83	1.34	1.02	6.19	174	139	61.8	21.6	16.5
Burkina Faso	0.83	1.52	6.12	8.46	59	7	9.8	17.9	72.3
Burundi	1.39	1.59	0.30	3.28	165	30	42.4	48.3	9.3
Cameroon	0.69	1.61	0.31	2.62	321	27	26.4	61.7	11.9
Cape Verde	1.31	1.61	3.40	6.32	24	64	20.7	25.5	53.7
Central African Republic	1.11	1.57	1.51	4.19	55	18	26.5	37.5	36.0
Chad	1.72	1.54	2.97	6.22	69	12	27.6	24.7	47.7
Comoros	2.50	1.57	1.32	5.40	13	28	46.3	29.2	24.5
Congo	1.88	1.62	0.48	3.99	114	50	47.1	40.7	12.1
Côte d'Ivoire	1.63	1.60	0.11	3.35	332	28	48.7	47.9	3.4
Equatorial Guinea	2.78	1.57	3.25	7.60	11	28	36.6	20.7	42.7
Ethiopia	1.57	1.52	0.71	3.80	229	4	41.3	39.9	18.8
Gabon	2.16	1.68	0.26	4.10	186	164	52.7	40.9	6.4
Gambia	2.13	1.56	3.84	7.53	19	22	28.3	20.7	51.0
Ghana	1.23	1.81	0.46	3.50	219	15	35.0	51.8	13.2
Guinea	1.55	1.57	0.78	3.90	99	17	39.7	40.3	20.0
Guinea-Bissau	2.55	1.54	4.06	8.15	16	16	31.3	18.9	49.8
Kenya	1.73	1.64	0.96	4.33	379	16	40.0	37.9	22.1
Lesotho	3.19	2.20	2.93	8.32	45	26	38.3	26.5	35.2
Liberia	1.64	0.97	5.63	8.24	9	4	19.9	11.8	68.3
Madagascar	0.74	1.27	0.55	2.56	79	7	29.0	49.6	21.4
Malawi	1.74	2.08	1.16	4.98	93	11	35.0	41.7	23.3
Mali	1.30	2.42	1.47	5.19	127	15	24.9	46.7	28.4
Mauritania	1.08	1.58	1.14	3.80	36	18	28.5	41.5	30.0
Mauritius	2.10	1.72	0.58	4.40	108	100	47.8	39.0	13.3
Mozambique	1.23	1.50	3.12	5.86	84	5	21.0	25.7	53.3
Namibia	1.88	1.62	0.43	3.92	80	45	47.8	41.3	10.9
Niger	1.72	1.56	1.70	4.98	126	16	24.5	31.3	34.1
Nigeria	0.99	1.56	0.17	2.72	944	10	36.5	57.4	6.1
Rwanda	0.52	1.56	1.37	3.44	73	10	15.0	45.2	39.8
São Tome and Príncipe	2.66	1.57	4.99	9.22	4	38	28.8	17.0	54.2
Senegal	1.65	1.39	0.62	3.66	214	29	45.1	38.0	16.9
Seychelles	3.03	1.69	1.32	6.03	20	289	50.2	28.0	21.9
Sierra Leone	0.48	0.75	1.20	2.43	15	4	19.6	30.9	49.5
Somalia	0.11	0.62	0.78	1.51	60	8	7.3	41.1	51.6
South Africa	3.20	2.36	0.00	5.56	5 048	77	57.5	42.5	0.0
Sudan	0.37	2.81	0.15	3.33	860	34	11.0	84.5	4.5
Swaziland	3.15	1.61	2.47	7.22	51	64	43.6	22.2	34.2
Tanzania	0.68	1.49	2.55	4.73	97	4	14.4	31.6	54.0
Togo	1.65	1.58	0.87	4.10	66	18	40.4	38.5	21.2
Uganda	0.45	1.80	1.15	3.40	136	8	13.3	53.0	33.7
Zaire	0.20	1.54	0.63	2.38	179	5	8.5	64.8	26.7
Zambia	2.07	0.97	0.13	3.16	139	17	65.4	30.6	4.1
Zimbabwe	2.51	3.03	0.69	6.23	379	39	40.3	48.7	11.0

^a Figures in bold-face italics indicate that the value was predicted using the regression equation.

^b Blank space indicates that the country receives no foreign aid for health.