

**HEALTH EXPENDITURE DATA BASE**

**SOURCES AND METHODOLOGIES**

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## HEALTH EXPENDITURE DATA BASE: SOURCES AND METHODOLOGIES

### Introduction

Information on health expenditures in Latin America and the Caribbean has been increasing in recent years, but there are still significant gaps in what is available. For most countries in the region, data on central government health expenditure exists in some form or other. These figures are often produced by national financial authorities and ministries of health for international agencies such as the IMF, World Bank, IDB and United Nations, as well as for their own analysis. Expenditures at other levels of government (state, Provincial, Municipal etc.) are less well documented but are becoming increasingly important in the region. One large component of national health expenditures that needs attention is expenditures by social security systems. The quality and availability of data on social security health expenditures varies significantly from country to country, and is often available with a notable lag. Finally, private expenditures on health are relatively undocumented, with no data available for a large percentage of the countries in the region. These expenditures encompass not only household payments -- both direct payments for health care received and indirect payments through health insurance -- but also corporate health expenditures, and the health expenditures of community, religious, and charitable organizations, and other NGOs.

The Public Policy and Health Program first became involved in the effort to establish a regional health expenditure database in 1993 for the production of health financing and expenditure estimates in PAHO's 1994 edition of Health Conditions in the Americas. Constructing a database for the region required an extensive effort to pull together sources, review information and build estimates. This effort led to the creation of the current health expenditure database, with the hopes that this will be a useful source of information to policy makers and researchers in health financing, and that this database, with input and corrections from the countries, will continue to improve and adapt to regional needs.

This document reviews the methodology involved in creating the current PAHO national health expenditure database. The discussion is intended to inform users of the sources of data and estimation techniques, and to caution users about interpretations based on some areas where the data is less reliable.

Part I documents the general sources used in building the database and discusses the methodologies used to estimate private expenditures. It also addresses some of the issues involved in the decisions to select certain data sources, and other problematic areas in the data collection. Part II of this document contains the country references, the notes listing the specific sources of data and a more detailed description of the data construction.

### **Public Expenditures in Health**

As this database covers 48 countries and territories, it is unlikely that any single definition of what is Public Health expenditure will fit neatly with the health systems or national budgeting structures of each country or territory in the database. It was necessary however to make some decisions defining both what we consider should be included as 'health expenditures'

and what institutions we included in the public sector.

To facilitate the internal logic and consistency of the data, the definition of health expenditures is limited to those expenditures whose primary function is to improve or promote the health of the population. While it is well understood that investments in other sectors can make an important contribution to the health status of the population (for example, women's education has been very positively associated with better health in the household) the complexities of including these expenditures, and the difficulties in drawing policy conclusions from the resulting information, make it impractical to try to quantify the health sector at this level.

Improved water and sanitation is more closely associated with the health sector but the primary justification of these services is ensuring access to water. Including these expenditures in the health sector would clearly be more difficult from a technical standpoint as well. The differences across countries in institutional responsibility for water and sanitation, problems of data availability, problems of accounting for existing infrastructure and the depreciation of existing facilities and lines, as well as problems of comparability with private sector services, make it hard to effectively include these expenditures in this database.

The institutions that are being included in the public sector are those at all levels of government that have health expenditures, as well as institutions that might be classified as parastatal or semi public due to their legal status and ownership, like social security systems. The classification used here is:

- I. Government health expenditures
  1. Central Government Health Expenditure
  2. State, Provincial, or Regional Government Health Expenditures
  3. Local or Municipal Government Health Expenditures
- II. Social Security System Health Expenditures.

These categories are more fully defined below.

### **Government Health Expenditures**

Central Government health expenditures should include all expenditures on health made by the central authority, not only through the Ministries of health or their equivalent, but also through other branches of government that typically have health expenditures such as ministries of defense, education, agriculture, police, mines, etc. These will even include expenditures on private insurance for employees of central government agencies.

State/Provincial and Local/Municipal health expenditures would include the expenditures that these levels of government made from their own budgets, and under their own authority to the health sector. These funds would include transfers from the central authority to the local level that were then spent in health.

For a large percentage of the countries, the data on government health expenditures originated with the Government Financial Statistics of the International Monetary Fund. Other sources of public health expenditures included the United Nations publications,

country specific studies - some of which are quite detailed studies of the health sector, and the Regional banks such as the Caribbean Development Bank, Inter American Development Bank, The World Bank, and some additional data from WHO. For a few countries and territories, there was no information on government health expenditures available to the authors for certain periods. If no data was available, or only very little, these lines in the table were most likely left empty. If only a few years were missing, the data may have been estimated using the average share of GDP spent in proximal years.

### **Social Security Health Expenditures**

Social Security systems are taken to be all public Social security Institutions, and publicly mandated social security systems such as the Obras Sociales of Argentina. The expenditures of these systems are considered public even though the revenues may be largely from mandatory contributions by employees and employers. In some countries contributions to insurance funds are mandatory, but workers have the option to choose between public and privately managed funds, or the funds are privately held and managed.

Where this is the case, as it is in Chile, the private funds are not included in Social security, but in private indirect expenditures.

### **Private Expenditures in Health**

Private health expenditures include primarily 3 sources of spending: 1. *Household direct health expenditures*, the direct spending of households to purchase of health care services and products, 2. *Indirect health expenditures*, spending by households and firms on health insurance or prepaid health coverage, and 3. *Other private health expenditures*, spending by NGOs, charities, and firms to purchase of health care services. Of these 3 areas of private spending, household direct expenditures make of the bulk of private spending.

### **Household direct health expenditures**

Since most countries survey their populations only sporadically, and because there are many countries with no household survey data on health expenditures, the data for household direct expenditures is a mixture of actual survey data, adjusted figures from previous surveys and estimations based on country specific data. Never-the-less, the figures for household health expenditures came largely from data available in surveys, or in studies based on survey data. The surveys used included household income and expenditure surveys, national health surveys, other multipurpose surveys, and surveys of living conditions. In one additional country, national accounts estimates provided much of the household data for this database.

In many cases the original survey reports were available for this analysis, but in a few instances we were unable to use original reports for a number of reasons -- including unpublished survey reports, the difficulty in obtaining some of the older reports, and occasionally, reporting in a format that was not amenable for use in this report. In these cases we relied instead on secondary sources for their analysis of the survey data.

There were two primary figures that we obtained for the analysis in the section on household direct health expenditures: (1) Household Health Expenditures as a share of Total Household Expenditures (or Total Household Consumption), and (2) Household Health Expenditures as a share of GDP. In most cases the data which was available was reported as either an actual amount spent on health -- from which we could calculate a share of household expenditure devoted to health -- or the share itself was already reported. This share was then converted to a share of GDP by multiplying it by the national ratio of final private consumption to GDP. In some cases, the secondary sources we quote had already calculated household health as a share of GDP, and in these cases, we reconstructed a share of household consumption devoted to health by multiplying this share of GDP by the ratio of GDP to Private final consumption.

Household health expenditures are reported in this study as either a share of total expenditures, or a share of total consumption. It is worth noting that the choice of denominator (total expenditure or total consumption) can be a source of difference in determining the level of household health expenditures. Where total expenditure is used, the denominator often includes such factors as taxes, automatic salary deductions for social security, and other non-consumption items. These items in the denominator reduce the share of household consumption expenditures allocated to health, and would thus tend to underestimate the share of health expenditures in final private consumption.

A problem which was frequently encountered was dealing with surveys limited to urban populations. When estimating household direct health expenditures, nationally representative surveys are always preferable to urban surveys, but often the only information available is from an urban survey. Those using these surveys must always be concerned that relying on urban populations to predict national levels of household health expenditures is likely to bias the results, but it is not at all clear in which direction the bias will be. When this is the case, there are several important factors to consider in the decision of whether and how to use the survey.

- How badly do urban surveys predict household direct expenditure shares at the national level?
- Which direction is this likely to bias the estimates?
- What are the alternatives?
- How rural is the country and what is the rural contribution to GDP?

It is often mentioned that urban populations tend to spend more on health than rural populations, and that relying on urban surveys to predict national levels of health expenditures will tend to bias results upwards. While this is clearly true in absolute terms, it is not necessarily true that urban households spend a greater share or percent of income on health. Table 1 presents 17 surveys that disaggregated household expenditures into rural and urban populations. In 6 of the surveys the rural expenditure share exceeded the urban share, in an additional 3 (Jamaica 1991 & 1992, and Peru 1985/86), the rural populations spent a greater share than populations living in the capitals and major urban centers. Since capital cities often receive the bulk of subsidized health services, surveys of national capitals, as shown here, may be just as likely to under-estimate the level of household expenditures at the national level as to over-estimate them.

Since determining the direction of bias may be difficult, an important question is also, "How badly would the urban portion of the surveys predict national expenditure levels"?

The sample in this table is clearly not representative of the region as a whole, but it does provide useful evidence on this point. As Table 1 shows, the difference between the Urban and National shares never exceeds 0.5% of expenditures. At an aggregate level, this is roughly a magnitude of 0.3% of GDP.

If there is a question as to whether or not to use an urban survey, having an idea of how urban surveys predict relative to alternative methods can also be helpful. One of the alternative methods is to generate a national estimate from GDP per capita and a calculated regional elasticity (these estimations can include more variables (see Henderson, (1994), Govindaraj, et. al.(1995) or Suarez, et al (1995)). Table 2 shows the share of GDP spent by households on health, based on the results of a national survey. It also shows the national share that would be predicted if you only had the urban portion of the survey to represent national levels, and the national share that would be predicted if the regional elasticity and per capita GDP were used instead. In comparing the estimates obtained by using the urban portion of surveys with the forecasted household expenditures from the regional elasticity, on average, the urban portion of the survey was a better predictor of the national expenditures. Overall however the regional elasticity itself was not too bad a predictor. This finding however is not too surprising since the regional elasticity was calculated from a sample of more than 40 surveys, including the ones in this table.

The extent to which an urban survey will badly represent the level of national expenditures of a country will also depend on two factors: i. the degree of urbanization of the population, and ii. the share of the rural population in GDP. An urban survey in Venezuela, where less than 10% of the population is rural, is likely to provide a very good estimation of national expenditures. An urban survey in Bolivia, where 42% of the population is rural is another story. However, if that 42% were also small in terms of their share of GDP, the urban survey may not be far off. For policy purposes it is clearly better to have information on what rural populations, and those below the poverty line are spending on health, but from the perspective of national aggregation of expenditures, their overall contribution may not effect national aggregates much.

What are the alternatives for using the Urban surveys? The two extreme possibilities for dealing with urban surveys are to throw them out and use other estimates, or to use them directly to represent national levels of expenditures, but depending on the information available in country, other possibilities do exist for adjusting urban figures. Rannon-Elyi (1996) provide an example of calibrating survey data with national pharmaceutical data, which could also be done as an adjustment to urban surveys. This type of data however may not be readily available to researchers, and was not available for this database.

The adjustment method used for this database for the urban surveys from Argentina and Brazil, took the percentage differences between urban and national income levels, and the regional elasticity to adjust the urban shares. An example of this for Brazil is given below.

## Example 1: Brazil

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From a regional study, including more than 40 household surveys, PAHO obtained an estimate of the regional elasticity of household health expenditures with respect to Income of 1.03.

There was information from an urban survey of the South East part of Brazil (Rio de Janeiro and Sao Paulo) that households spent an average of 1923CR – or 6.2% of their expenditures -- on health. There were also estimations that households in the urban SE spent 31,013CR per capita on average, while the average for the rest of Brazil was 24,229CR . Using the relationship:

$$\text{elasticity} = (\% \text{ change in Health Expenditures}) / (\% \text{ change in Expenditure})$$

The estimates of National health expenditures were calculated as follows:

$$HE_{\text{National}} = HE_{\text{urban}} ( 1 + (\text{elasticity}) * (\% \text{ change Expenditure}))$$

This calculation gave an estimated value of 1445CR per capita for national health expenditures, or 5.96% of household expenditures.

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There are two additional complications that should be considered when using urban surveys. The first is that the share of household expenditures devoted to health in rural areas may be artificially high because of the way in which data is collected. Rural households often consume products that were produced in the household (particularly food items), and survey questions regarding expenditures on food don't always capture all the food items consumed. Total household expenditure or consumption used in the denominator to calculate the share of household expenditure devoted to health would be too low, and the health share would then be too high.

The second is that public facilities may be providing services directly in urban areas, but in rural areas public health systems may require individuals to seek care in private facilities, and then seek reimbursement for the expenditures incurred. Surveys rarely ask that respondents specify expenditures net of those that were or will be reimbursed. On the other hand, the true costs facing rural households may still be underestimated. Most surveys only capture direct out-of-pocket expenditures for medical products and services. Rural populations are likely to face greater loss of productive time and greater travel costs which aren't accounted for in this study.

Despite the possible sources of bias mentioned above, in many cases the urban surveys were the only data available. In this context we felt that the urban household surveys still provided the best information available on the patterns of household direct health expenditures, and that they are likely to be better estimates of national household health

expenditure levels than estimates based on the regional elasticity. For this reason we chose to use these surveys and note that the survey was based on urban populations. As mentioned earlier, in two specific cases, Argentina and Brazil, we have made preliminary adjustments based on the percentage difference between the urban population surveyed and the national income level. Future surveys and analysis should provide better information in this area.

A second problem is dealing with older surveys. The share of the private sector in health financing has been growing steadily in the last two decades for most of the region, and in some countries other changes in the health sector have been quite dramatic (i.e. Brazil, Bolivia, Nicaragua, among others) . For these reasons, using an older survey to estimate current expenditure levels is, at best, a rough approximation. When this is the only data available, however, there may be few alternatives to using a survey 5 to 10 years old. As with the urban surveys, the reasonableness of adjusting an older survey needs to be determined on a case by case basis, using specific knowledge of the history and situation of the health sector in question.

The adjustment that was used for this database is similar to that used to adjust an urban survey to national estimates. The change in income and the elasticity is used to predict the change in health expenditures. The example below shows how this method would have been applied in the case of Jamaica, In this case, since we did have later data for Jamaica, we can also examine the accuracy of the estimate derived.

#### Example 2 Jamaica

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Using the regional elasticity of 1.03 mentioned above in example 1, and the following relationship :

$$\text{elasticity} = (\% \text{ change in Health Expenditures}) / (\% \text{ change in Income})$$

we can calculate an estimate of 1990 health expenditures as follows:

$$HE_{1990} = HE_{1984} ( 1 + (\text{elasticity}) * (\% \text{ change income}))$$

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Below is a table of the real per capita income and health expenditures for the years 1984, 1990 and 1994, and two examples of the estimated health expenditures we would have derived had we expanded the 1984 survey to 1990 and 1994 using this methodology. In this example, the differences between the actual and estimate are less than .3% of GDP. It is worth noting however, that Jamaica's health sector is one of the countries where this methodology can be applied with greater confidence because the levels of change in the health sector have been relatively minor, and while Jamaica experienced economic difficulties in the crises of the 1980's, the impact was less than in many of the countries in the region.

Finally, it is important to realize that surveys may under or over estimate household health expenditures because they may fail to account for a number of issues that will

affect final estimates. For example: (1) certain surveys may be designed to capture general living standards and may not have sufficient detail to adequately capture health expenditures, (2) they may not include data on institutionalized individuals or the expenditures of the recently deceased, (3) they may have been conducted at a time that doesn't capture seasonal patterns of health expenditures, (4) they may not sufficiently survey marginalized populations, (5) the reference periods for survey questions may lead to recall problems, and (6) questions patterns may not capture expenditures unrelated to specific illness. All of these may result in problems in the final health expenditure estimates. These are issues that will need to be dealt with in national health expenditure studies, and are beyond the scope of what can be addressed in this report. However, it is important to note these limitations so that users are aware of the constraints of the data sources.

Table 3: Comparison of Real and Estimated Household Health Expenditures in Jamaica

	1984	1990	1994
Real Per capita GDP (Jamaican \$)	11794	12663	12753
Per capita household Health Expenditures Estimates	**	140	141
Real per capita Household Health Expenditures	130	170	176
Share of GDP estimates	**	1.11	1.11
Share of GDP actual	1.10	1.34	1.38

## II. Methodology

For each country with survey data, or another reliable source of information on private expenditures, the data was directly entered into the database in the corresponding years. Then, in any given country, for the years which lacked data on household health expenditures, estimates for these expenditures were obtained by using a regional income elasticity<sup>1</sup> and country specific data on per capita income and government health expenditures. The methodology for obtaining the elasticity and the methodology used to

<sup>1</sup> It is perhaps more accurate to term this elasticity an expenditure elasticity since the proxy used for income is household expenditure. In practical terms, survey reports of income are generally less reliable than expenditure.

obtain the estimates are described below:

**Estimating the regional elasticity.** Using the share of GDP spent by households on health from the survey data, and the per capita GDP from the same year as the survey, the per capita household health expenditures was calculated for the country. This figure, along with the GDP per capita and government health expenditures per capita, was used to estimate the elasticity in two separate estimation models for the entire pooled sample of household survey data. All figures used were in constant 1980 US Dollars. Over 57 separate surveys were used to obtain the regional elasticity estimate.

Model 1 regressed per capita household expenditures on per capita income. Since it appeared to us that there should be a relationship between household health expenditure and government health expenditures, we also tested a second model, Model 2, which regressed per capita household expenditures on per capita income and central government health expenditures. The results are provided in Table A5.

#### **MODEL 1**

$$\text{LOG(HH)} = C_1 + \alpha_1 \text{Log}(Y)$$

#### **MODEL 2**

$$\text{LOG(HH)} = C_2 + \alpha_2 \text{LOG}(Y) + \beta_2 \text{LOG}(GH)$$

Where:

- $C_1$  = the constant from model 1
- $C_2$  = the constant from model 2
- $\alpha_1$  = the elasticity calculated from model 1
- $\alpha_2$  = the elasticity calculated from model 2
- $\beta_2$  = the parameter estimating the effect of Public health expenditures on household health expenditure
- $Y$  = GDP per capita
- $GH$  = Government Health expenditure per capita
- $HH$  = Household Health expenditures

Using the resulting elasticities of the two models, household health expenditures were calculated where necessary (i.e. no data existed for household expenditures for that year) using the following four estimations techniques:

**Estimation 1.** for countries in which no data on household expenditures were available in any year, and no government health expenditures in the year of the estimation:

$$\text{Exp}[C_1 + \alpha_1 * \log(Y)]$$

**Estimation 2.** for those countries with information on Government health expenditures, but no data on household expenditures:

$$\text{Exp}[C_2 + \alpha_2 * \log(Y) + \beta_2 * \log(GH)]$$

**Estimation 3.** for those countries with at least one year of information on private health expenditures, but no data on government health expenditures in the year of the estimation or the year in which the private health expenditure data exists.

$$HH_2 = HH_1 [1 + \alpha_1 * \Delta Y / \bar{Y}]$$

**Estimation 4.** for those countries with at least one year of information on private health expenditures, and for information on government expenditures in both the year of the estimation, and the year for which private health expenditure data exists.

$$HH_2 = HH_1 [1 + ((\alpha_2 * \Delta Y / \bar{Y}) - (\beta_2 * \Delta GH / \overline{GH}))]$$

Where:

- $\Delta$  = an operator indicating the difference between the base (or year for which household health expenditure data exists) year and the year of estimation.
- $\bar{\quad}$  = an operator indicating the average of the base year and the year of the estimation.

Finally, for some countries, a 'country specific' estimation took place which was usually the result of additional information available. For these countries the notes will describe any adjustments and the details of the procedure used. In the database household direct health expenditures listed in blue figures (or grey in black and white displays) indicate estimated expenditures.

### Indirect health expenditure

Although there has been a significant growth in private health insurance and prepaid health coverage in the region, there is still relatively less information within countries on

the size of this market, or on the levels of expenditures generated under these systems. This is largely due to the complications of collecting this information. Since health insurance companies and prepaid coverage systems are private enterprises this information is considered proprietary, and regulatory bodies usually do not require any publication of how and what these companies spend on health.

As a result, about half of the information on indirect expenditures is derived from household surveys, but this creates other problems. In general, health insurance premiums are paid in part by employers, and in part by employees. Thus, when household surveys provide information on health insurance expenditures, they typically capture only the employee's contribution. In another sense, this data is lacking because it is only a proxy for the health outlays of these companies. It reveals the revenues of the insurance firm, but gives no information on what share of these revenues is spent by the company to cover the medical costs of beneficiaries, and what is profit for the company.

For these reasons, the private indirect expenditures presented here should be viewed with caution. Never-the-less, the evidence of a growing number of health insurance companies, the increasing number of those with some private coverage, and the existing evidence from surveys combine to suggest that these figures are more likely to under-represent the size of this market than to over estimate it.

### **Other private health expenditures**

As with indirect expenditures, relatively little data exists on the levels of health expenditures by NGOs, charities, and expenditures by firms either directly purchasing health care for employees, or for on site health clinics, and company physicians and nurses. Anecdotal evidence suggests that these sources of health expenditure are not insignificant for many countries in the region, but little hard data exists. Only a few countries were able to provide any information on the size of this component of health expenditures.

### **Other Calculation Issues**

**On the calculation of "Real" values, or values in constant 1990 currency units:** Most countries in the sample had GDP deflators that could be used to adjust nominal values to real values, however in some cases no deflator was available. Since real or constant values were needed to estimate private expenditures, the best approximation that could be performed was to convert local currency into US dollars, apply the US deflator, then convert figures back into local currency at the 1990 exchange rate. In these cases, instead of the line reading "GDP DEFLATOR (1990)" the corresponding line reads "GDP DEFLATOR (1990\*)". As better deflators become available these can be added to the database, but in the mean time figures for these countries should be interpreted with caution.