National Health Accounts in Developing Countries: Appropriate Methods and Recent Applications

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Acknowledgments

Abstract

Better information on the financing of the health sector is an essential basis for wise policy change in the area of health sector reform. Analysis of health care financing should begin with sound estimates of national health expenditure -- total spending, the contributions to spending from different sources, and the claims on spending by different uses of the funds. The member countries of the OECD have successfully established such comparative health expenditure accounts in terms of standardized definitions of the uses of funds and breakdowns by public and private sector sources. This has resulted in important research on health system differences which could explain variations in the level and composition of financing. The United States has developed a more detailed approach called National Health Accounts, which expands the OECD method into a more disaggregated "sources and uses" matrix. In the developing countries, analysis of health expenditures has been much less systematic, despite several decades of calls by international researchers for more attention.

This paper reviews previous work done in developing countries and proposes renewed attention to national health expenditures, adapting the recent experience of the United States. Because most developing countries have more pluralistic health financing structures than are found in most industrialized countries, an enhanced and adapted version of the "sources and uses" matrix method is proposed. This method should be modified to address the relevant categories of expenditures prevalent in the developing countries. Examples of recent applications of such "national health accounts" from the Philippines, Egypt, India, Mexico, Colombia, and Zambia are presented. Experience to date suggests that development of sound estimates using this method in low and middle income countries is feasible and affordable. National health accounts estimates can significantly influence policy. They provide decision makers with a holistic picture of the health sector, showing the actual emphasis of spending and the roles of different payers. They also provide a consistent framework for modelling reforms, and for monitoring the effects of changes in financing and provision. An easy to use software tool has been developed for training and data management. Regional networks of collaborating national groups are proposed as a first step in expanding use of the method and to gain both national and cross-national comparative benefits.

I. Introduction

An understanding of the financial dimensions of health care systems is increasingly recognized as an important contribution to health policy development. In the industrialized countries, especially those belonging to the Organization of Economic Co-operation and Development (OECD), systematic accounting of national health expenditures has been carried out for several decades.

The creation of standardized definitions and accounting methods across countries and the routine collection of data has provided the means for fruitful inquiry into the financial and health implications of different national patterns of health care financing [1,2] For example, researchers have been able to track the declining returns in life expectancy gains from increasing health expenditures, raising the important question of what is being purchased with the dramatic increases in health finances of the last decades and what is an appropriate level of national health spending [3]. National patterns of health care provision, use, and cost differ substantially, feeding back into aggregate expenditures. As governments and firms seek to control rising expenditure levels, they increasingly look to the experience of others for both positive and negative examples. Comparable data on expenditures and other health care inputs, throughputs, and outputs are an essential precondition for this type of comparative analysis [4].

In the United States, "national health accounts" have been estimated by the Federal Government for some years. The U.S. methods meet the OECD standards but also go beyond them to estimate a detailed matrix of the "sources and uses" of health expenditures, with more extensive breakdowns of both public and private sources of spending. The OECD method only allocates sources of spending to "public" and "private". The U.S. approach is particularly useful in pluralistic health care systems, where finance comes from multiple sources and where providers may receive payment from more than one source. It is less useful where a single source of health spending is dominant nationally as in most OECD member states. However, such pluralistic health care systems are common in developing countries and becoming more so.

Developing countries are increasingly concerned about the financial dimensions of the health sector as well. With lower national incomes, health expenditure levels, and health status, this concern may be particularly important for poorer countries, where health sector efficiency differences may have a large impact on mortality. As lower and middle income countries establish new public and private systems of

health care financing, such as user fees and health insurance, they are also concerned to make the right strategic choices to assure sustainable health sector development [5]. However, most developing countries have little experience with estimating national health expenditures.

This paper proposes that improved estimates of national health expenditures in developing countries should be seen as an essential prerequisite for systematic national efforts to reform the health sector. Because of their pluralistic health care systems, developing countries should adopt a U.S.-like "national health accounts" (NHA) methodology in developing these estimates. It is argued, based on several recent experiences, that this is both feasible and extremely useful. The NHA method results in more accurate estimates as well as estimates that are more useful for policy development and evaluation. It is also flexible and expandable to meet the demand for more advanced analysis in the future.

The paper initially reviews experiences in national health expenditure studies in developing countries. Section III reviews the major methodological issues that need to be resolved in expanding use of national health expenditure estimates. Section IV reviews previous methodological proposals for developing countries. Section V contrasts the OECD and NHA methods used in the industrialized countries, highlighting the gains from the NHA approach for developing nations. In section VI, recent applications of NHA methods in developing countries are summarized and their results compared to the simpler estimates of expenditures that preceded them. Gains in the rigor of estimation and policy relevance from the NHA approach are discussed. The last section describes innovations based on recent experiences in developing countries, which are proposed for wider experimentation. A simple and user-friendly computer software program, developed by the Data for Decision Making Project at Harvard University, is now available for training and implementation of NHA studies. A regional program of inter-country collaboration is proposed for expanding the use of NHA in developing countries.

II. Health Expenditure Analysis in Developing Countries

Abel-Smith [6,7] under WHO auspices carried out the first major national comparative studies of health expenditures. His first study included Sri Lanka (then Ceylon) and Chile. The second study included fourteen developing countries: five from the African Region, five from the Americas, two from the Eastern Mediterranean Region, and two from the Western Pacific Region. WHO and others encouraged further country specific work in the 1970s. WHO's report on "Financing of Health Services" [8], a special issue of the World Health Statistics Quarterly [9], and a USAID-financed study on "Health Care Financing in Developing Countries" [10] all described a general methodology for such studies and summarized several country cases. With growing international interest in economic issues in the health sector during the 1980s, researchers and governments began carrying out country assessments of health expenditures more frequently. This was stimulated by the efforts of international organizations. The World Bank, WHO, and other aid organizations frequently commissioned consultants (both domestic and international) to estimate national health expenditure patterns as part of more general health sector assessments, precedent to the development of projects. The World Bank's 1987 publication "Financing Health Services in Developing Countries" [11] reported on such estimates from 49 countries. The main source of country level data was unpublished research and consultancy reports.

The regional departments of the World Bank continued to demand data on health expenditures and commissioned a series of regional review papers. These included papers on Asia [12], Latin America [13] and Africa [14]. For none of these papers, however, was substantial new country-level data collection undertaken. The sources of estimates remain the same set of mainly unpublished consultancy reports and country assessments noted above. Each of these regional studies lamented the lack of better quality data, echoing similar complaints from Abel-Smith and others previously.

The available international comparative studies combine data from countries with quite good estimates of national health spending and those with poor or incomplete estimates. Some of the more careful national-level studies done over the last two decades include Egypt [15], Jamaica [16], China [17], and Indonesia [18]. Almost all of these studies distinguish analysis of expenditure sources from that of expenditure uses, providing separate tabulations for each.

For the 1993 World Development Report "Investing in Health" (WDR-93) [19], the World Bank commissioned a more comprehensive collection of country-level estimates with collaboration from other international organizations. WDR-93 reported on 127 countries for 1990. Total national health expenditures were estimated, broken down by "public" and "private" sources, with the former including expenditures by social health insurance. No estimates of "uses" were developed. Despite significant data problems, the WDR figures drew attention to global patterns of health care financing, the variation in public and private roles in paying for the health sector, and to the linkage between finances and health system performance. Figure 1 shows some of the aggregate results from that analysis.

Due to lack of data for some important parts of health expenditure, usually private sector spending, 46 countries were estimated "out of sample" using a simple multivariate model. The reason why 31 countries were reported to spend 1.6 percent of GDP from private sources was that the regression model "predicted" 1.6 as the average proportion of GDP. Country estimates were derived from a combination of sources and estimates from earlier years had to be inflated up to 1990 figures, usually using the national GDP inflator. There were few reliable and comprehensive country studies of national health expenditures. Rather, the analysts combined consultancy reports, recent survey results, and data reported to international organizations, such as WHO, ILO, IMF and others. The analysts noted that despite several decades of international calls for attention to health expenditure data, there had been little success in establishing reliable and regular estimates for most developing countries.

> *"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. 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"* [20] p. 141.

The time and resources available for compiling the WDR-93 estimates were quite limited. A more careful review of existing data sources or incorporation of more recent or newly uncovered data sometimes led to dramatic changes in the size and composition of health spending for individual countries. For example, one review of the WDR numbers for non-OECD countries found only 42 countries for which there were reasonably reliable estimates of private health expenditures. Of these, revised estimates for 36 countries differed from those published for the WDR-93. The average level of private spending in these 36 countries was 13% higher than the average of the estimates reported in WDR-93 [21].

Govindaraj, Murray, and Chellaraj also reviewed spending estimates for Latin America for the World Bank [22]. Their revised figures are shown in Figure 2. For major countries, total expenditure was usually re-estimated at a higher level than in

WDR-93. Upwardly revised estimates of private spending were usually the main source of the increase. This is particularly significant in Latin America, where governments have often considered the private health sector as a minor player in the national health system. For example, poor expenditure data in Mexico and Colombia may have disguised the growth of private health care during the 1980s, reflecting popular dissatisfaction with social security health services [23].

Recently published data and the large differences reported on reanalysis suggest that national health expenditure estimations are still not sufficiently reliable or standardized. The implications of differences in estimates are not trivial. For example, it is often assumed that poorer countries are overall low health spenders. Recent results show that some low and middle income countries, such as India, Argentina, and Colombia spend much more proportionally than previously thought, some of them equal to or greater than much wealthier OECD members. This suggests that health sector inefficiency may have important macro-economic implications for nations outside the OECD.

III.   Methods and Methodological Issues

The demand for national health expenditure estimates in the industrialized and developing countries has led to a steady flow of efforts to develop commonly accepted definitions and standards for measurement. Such standards facilitate interpretation of national estimates and comparative analysis across countries and over time.

There are two major aspects of national health expenditure estimation on which discussion has focussed. The first relates to the scope of national health expenditure estimates; the categories and definitions to be used; and the analytical framework. The second concerns the methods used to derive estimates for individual items of expenditure. The following discussion addresses the first set of issues. Data quality and methods are discussed in the penultimate section of the paper.

Determining the scope of national health expenditure estimates, that is, what should be included or excluded from the category "health expenditure", has been the subject of extensive professional debate [6,7,8,10]. Universally acceptable resolution of this debate is difficult for both ideological reasons (health is recognized as being affected by much more than health care, but where should one draw the line?) and practical ones (expenditures are combined in specific ways in each country and are often not easily disaggregated). It is widely accepted that national estimates should focus on those expenditures whose "primary intention" is health improvement [24] , but that others might be included and preferably should be separately identified. This approach has been followed in the estimates presented in this paper. However, more extensive discussion and consensus on the scope of national health expenditure will be a critical step for expanding applications in developing countries.

Another issue related to the scope of national health expenditure estimates is the question of compatibility with the "System of National Accounts" (SNA)   [25, 26] that has been developed to standardize national income accounts estimates internationally. The most recent revision to the SNA encourages the development of satellite accounts, which could include those for health expenditures. However, there are important differences in the treatment of certain expenditure categories between previous national health spending estimates and national income accounting methods. At present, these issues have not been carefully reviewed or discussed in developing countries, and they go beyond the scope of this paper.

The categories and definitions used to classify health expenditure estimates have included a variety of types of classifications and also varied according to the level of

aggregation used. Categories and definitions are needed both for the <u>sources</u> of health expenditures and for the <u>uses</u>. For example, based on a review of the studies and manuals referred to in this paper, there are five main types of classifications of <u>uses</u> typically employed or proposed.

1.   Providers and institutions

2.   Functions or types of health care services

3.   Line items or economic expenditure categories

4.   Regions or geographic/administrative categories

5.   Socio-economic categories

There is usually a considerable lack of uniformity in how the items in these categories are defined across countries. Even seemingly simple definitions, such as what is meant by expenditure on "hospitals" (in category 1 above) can be problematic. For example, national statistics in India define hospitals as units of 10 beds or more, while in Thailand they must have 25 beds or more. In the United States, physician services to inpatients are billed separately from hospital charges and appear in the U.S. accounts as physician services. In most other OECD countries, physicians are paid by hospitals and their costs appear in the hospital accounts. Such classification issues must be identified and resolved for national estimates to be comparable.

Another issue is whether these types of classifications are maintained as distinctive accounts or whether categories are mixed. The OECD classification system, discussed below, mixes provider, function, and line item categories in a single list. This approach has proved feasible and apparently addresses the policy concerns of many member countries. What will be the most useful classifications for developing countries is an important question for upcoming studies.

The <u>analytical framework</u> of "National Health Accounts" (NHA) that has emerged from the United States is the focus of attention in this paper. NHA, as practiced in the U.S. and adapted to developing countries, has two essential elements. First, it requires calculation and presentation of national estimates through a "sources and uses" matrix (see various tables in this paper for examples). This approach can be contrasted with the tabulation of separate accounts for sources of spending and uses of spending in what is sometimes referred to as a "T" account (sources on the left and uses on the right side of the "T", with equal totals). Studies using the "T" approach have sometimes also estimated a sources and uses matrix. But a NHA approach would <u>require</u> such an analysis.

The "sources and uses" method imposes an important discipline on national health expenditure analysis, which typically consists of separately compiled estimates of expenditures by sources and by types of providers, e.g. hospitals, doctors, etc. The

matrix approach requires that all expenditures estimated by the different sources be allocated to specific uses. Similarly, all expenditures reported by specific uses, such as all spending on government hospitals, must be traceable to the specific sources. The totals and the subtotals must add up and be consistent.

Thus, this method requires analysis not only of the sub-totals and their aggregates, but also an understanding of the *flow of funds* through the health care system. It stresses the need to know in an integrated way *who pays, how much, and for what*, rather than separating the *who* from the *what*.

This capability of linking sources and uses is an important aspect of the value of NHA for analyzing health care financing policies. This is because health financing is not solely concerned with raising funds for the health sector, but also plays an important role in determining the allocation of expenditures and the behavior of providers and consumers. Policies which affect the practice of the financers of health care (the sources), need to be designed, monitored, and evaluated in terms of their influence on the uses of funds in the health sector both in terms of who receives them and what they produce as a result. The "sources and uses" method is the means to that end.

The second element of NHA as developed in the U.S., which builds on the advantages of the sources and uses approach, is greater disaggregation of the sources of spending beyond the general categories of "public" and "private". Of course, this reflects the highly pluralistic U.S. health care financing system. However, as is argued in more detail below, this may be the more appropriate approach for developing countries, which, we are learning, also have highly pluralistic financing systems.

IV. Manuals and Methods Previously Proposed for Developing Countries

Several manuals and methodology reviews have been developed to encourage and complement the national studies on health expenditures carried out in the 1970s and 1980s. Mach and Abel-Smith [27], Griffiths and Mills [28], and Robertson et al. [29] all provide detailed guidance on the structure and methods needed to compile national estimates. These manuals stress the need for estimates to be comprehensive and based on consistent definitions. They acknowledge that data sources may leave something to be desired, but that countries can still develop sound estimates with a bit of creativity. Griffiths and Mills [24] review of methods provides a useful summary of these tools and their application.

In general, these manuals are based on a similar accounting framework, which emphasizes the "T" approach. Expenditures by government and private sources are compiled separately from expenditures on (or incurred for) types of programs or types of providers. The NHA methodology, based on systematic compilation of a "sources and uses" matrix, is not specifically highlighted nor recommended, although some examples are given of NHA-like analyses.

The first two manuals mentioned above also draw heavily from one national study done by E. Kam in Botswana [30, 31] with WHO assistance. Botswana's private health sector was tiny at that time, allowing researchers to estimate private spending through a telephone survey of private doctors. As a result, the manuals understate the difficulty of securing good estimates of private spending. This example raises the larger question of whether a single global manual can provide the level of detail and flexibility needed to meet the needs of the highly diverse developing countries.

V.   The OECD Methods and National Health Accounts.

The most successful effort to date in developing standardized estimates has been that of the OECD, which now receives annual reports of health expenditures from its 25 members [32]. The OECD provides members with a computerized questionnaire and written guidelines of definitions. OECD definitions of expenditure categories focus on expenditure "uses". "Sources" are broken down by public and private sector, with social health insurance included with public sector expenditures. These categories are a combination of types of services (acute hospital care, physician's services) and types of providers (psychiatric hospitals, nursing homes), and categories of inputs (prosthetics). Many OECD members compile somewhat different or more disaggregated expenditure accounts for their own use, but all assist in reporting comparably defined estimates for the OECD's comparative analyses. Often, data on some of the categories are not available in a country's report, as in the example given.

While complying with the OECD classifications, the United States augments them with its more detailed NHA approach [33]. NHA requires a similar compilation according to expenditure uses, but a much more detailed breakdown of the sources of expenditure. An example of this is given in Table 1. This results in the more detailed "sources and uses" matrix.

VI. NHA: Recent Applications in Developing Countries

Studies using the NHA approach have recently been completed in a number of developing countries. These include:

- *Mexico.* A study by the Fundacion de Salud Mexicana (Funsalud) as part of its study and proposals for health sector reform in Mexico[34].The Philippines. A series of studies carried out by the University of the Philippines from 1990-1995 [35, 36].

- *Egypt.* A study conducted by the Department of Planning, Ministry of Health with collaboration from Harvard University [37].

- *Colombia.* A joint study by the Department of National Planning, the Ministry of Health, and the Superintendency of Health as part of the background research for the implementation of Colombia's national health sector reform program [38].

In addition to these formal country studies, "sources and uses" matrices have been developed for policy work in a number of other countries. For example, in India, a World Bank [39] study used research by the National Institute of Public Finance and Policy [40], the Gujarat Institute of Development Research [41], and the National Council of Applied Economic Research [42]. In Zambia, an estimated matrix was developed by Rannan-Eliya from existing government data and recent national household surveys [43].

As with re-examination of the WDR-93 estimates, these country specific studies have shown that more careful derivation of national figures generally leads to higher totals, especially in terms of private expenditures. Table 2 compares these NHA-based figures with the previous figures used internationally. NHA methods also improve estimates of certain parts of health expenditure, for example payment out-of-pocket for drugs and pharmaceutical not given from medical facilities or the practices of medical personnel (doctors/paramedics).

Mexico's experience in this regard provided both some interesting answers and some provocative follow-up questions. Funsalud's NHA estimates of private expenditure, based on a national household survey, led to a calculation of total expenditure of 4.8 percent of GDP compared to 3.2 percent in WDR-93. Using the national income accounts, the total would be as high as 5.7 percent of GDP. Some level of economic

activity is being reported as "private expenditure on health services and health preservation" in the national income estimates that is not being picked up in other sources of data. This will require further investigation.

NHA estimates, carefully done, can dramatically alter the perceptions held by policy makers of the structure of the health care system and the role of the state within it. In India, the NHA matrix presented in Table 3 indicated that the government was a minor source of financing in primary health care services overall. Despite more than a decade of investment in primary care facilities, total expenditure on primary care services is dominated by private household spending (82%). Curative primary health care services make up 85 percent of all PHC spending. The government financing role is larger in personal preventive and public health services (44% of the total). The largest share of household spending on primary care services probably goes to non-qualified providers, rather than licensed physicians and pharmacies. The implication of these findings is that India urgently needs to develop and implement a new dimension of health policy related to the non-government provider sector.

In Egypt, the 1991 NHA estimates could be compared to a 1978 study which provided somewhat comparable figures. These are shown in Table 4. Not only has private spending increased, albeit modestly, but Ministry of Health expenditure has declined significantly as a percent of the total, while its responsibilities, in terms of hospitals, beds, and employees, have increased.

NHA has a particularly advantage in documenting how a particular type of service or type of provider is financed from different sources of expenditure. Indeed this is the main function of the "sources and uses" approach. In Egypt, the NHA estimates showed that two types of government-owned hospitals -- those of the Ministry of Health and the university hospitals owned by the Ministry of Education -- were quite different in the degree to which they were supported by patient charges. Household payments made up 1.9 percent of expenditures on MOH hospitals, but 14 percent of those on university facilities.

Because NHA represents a comprehensive picture of health case financing in a country, it provides the best framework for modelling reform strategies and for monitoring their effects. Year - to - year projections of total expenditure growth establish limits within which resources must be allocated. Analysts can simulate the potential changes in revenue generation, health care costs/prices, and demand within a constrained system. In this way, NHA has recently provided the basis for analysis of health insurance reforms in the Philippines [44] and in Jordan [45].

More disaggregated applications are also possible, although constrained by data availability. Decentralization of health care spending authority in many developing countries [46] may make regional, provincial, or even municipal accounts valuable. Managers of specific service programs, such as child health in family planning, should base their plans on the total resources available for such services, not just the government budgets.

Each of these examples highlights different results that emerge from NHA. For none of them is NHA the unique way in which this information could be obtained. Focused studies on specific questions could also be the source of these findings. What gives NHA its advantage is that by systematically bringing together data on sources and uses of expenditure, it can provide answers to a number of different questions at the same time. As with any basic statistical source, it can also provide the means to answer questions not anticipated in advance. As health financing policy increases in importance, this capacity increases in value.

NHA provides the best value when it is carried out periodically and used to track changes in the financing of the health care system. Three important questions facing many developing countries can be addressed by this approach:

- What is the contribution to and impact on national health spending of reforms which develop new sources of finance for the health sector, such as social health insurance?

- What are the functional and distributional implications of efforts to make financing-provision linkages more pluralistic (e.g. decentralization, use of public and insurance funds to finance private services, or use of private funds to finance public facilities)?

- What is the impact of policies to manage consumption and expenditure, e.g. new schemes such as global budgets, managed care, or prospective payment?

While NHA is not a substitute for well-designed micro-level studies of the health care system, it provides a valuable system-level complement.

VII.   Innovations in NHA Methods for Developing Countries

The NHA methods used in the US are well-documented in government reports and in frequent articles in the <u>Health Care Financing Review</u>, published by the U.S. Health Care Financing Administration. The developing country applications cited here have not been uniform, although they have all been based on the "sources and uses" matrix framework. The NHA approach has been shown to be feasible, affordable, and useful in developing countries. NHA will be much more useful if it is more widely accepted and carried out and if there now begins more systematic international collaboration to adapt recent experiences to universal needs and to develop common standards. There are three major steps needed to further develop this tool: a consensus on the scope and analytical framework for developing the NHA matrices; consistent definitions which can be applied in many countries, especially for uses; and improvement in methods for estimating NHA components for which data are generally poor or lacking. Based on recent experience, the following approaches are proposed for wider consideration.

Scope and Analytical Framework

The most commonly used definition of health expenditure has been "expenditures on activities whose *primary* intention (regardless of effect) is to improve health" [24]. This excludes large programs which have health effects, but whose primary goal is not health: for example, general food subsidies, housing improvement, and large urban water supply projects. However, this definition does leave room for significant differences in how countries account for health-related programs such as targeted nutritional services and water quality improvements. In some countries, these programs are run by the Ministry of Health and likely to be included in national expenditure estimates. In other countries, such programs may be run by ministries of Social Affairs, Public Works, or others and are less likely to be seen as health expenditures. It is probably best to account for such programs as individual line items, to allow inclusion or exclusion in making comparisons between countries.

A narrower definition would be to focus NHA on expenditure on health care and related <u>services</u>, which would include personal nutrition services and family planning, and list other ancillary expenditures separately. In practice, this is often what is done. However even this focus raises significant problems, such as medical education, which typically includes both training and services.

An easy resolution to this problem is unlikely, indeed, after several decades it still plagues the OECD estimates. Experience suggests a nested approach may be best, with health care and related services at the core, additional expenditures whose primary purpose is health improvement added on as needed but clearly identified, and so forth. Wider experience with NHA in groups of developing countries may help in the emergence of practical solutions.

Related to this is the question of linkage to the national income accounting and the SNA. For purposes of health policy analysis, NHA estimates are most useful when they tabulate all net health spending in a well-defined period, including both capital and recurrent expenditure, but avoiding double-counting. As such estimations become more common, it would be useful for a group of experts to examine how these diverge from SNA-based estimates.

The core concept of NHA is defining the <u>flow of funds</u>. Experience in applying NHA in developing countries suggests that the approaches used in the U.S. should be adapted to the specific needs of developing countries, as well as the more limited data available. This requires modifying definitions of both sources and uses.

One approach, used in Egypt, Mexico, and Colombia, is to formulate the flow of funds in terms of three major levels: the original <u>sources</u> of funds, the <u>financing agents</u>, and the health care <u>providers</u> or other categories of <u>uses</u> of funds. Table 5 lists some typical examples of entities at these different levels. Figure 3 shows the flow of funds diagram used in the Egypt NHA study (the arrows connecting the boxes are omitted for clarity).

The sources of funds level refers to those entities who provide funds to the financing agents, who are direct purchasers of or payers for health care. There may be several levels of sources of funds before one reaches the level of financing agent, but in most cases we would be primarily interested in those which provide funds to the financing agents directly. For example, the Ministry of Finance may make allocations to the Ministry of Health and the Social Security Institute, both of which pay directly for health care to be provided. In this sense, the MOF is the source of funds for those financing agents.

Of course, the MOF receives its funds from the treasury or from taxes paid by households and firms, which are higher level sources. In some countries, it has been of significant policy interest to trace expenditures back to these ultimate sources in order to analyze the equity of spending patterns (see, for example, [49] and [50]).

Financing agents are those entities which pay for or purchase health care services. They may own and operate provider institutions, as the Ministry of Health does, or they may finance services provided by others, as typically does private health insurance. They receive funds from sources and pay them to providers.

It is important to note that entities can appear at more than one level. For example, households (a source) pay premia to insurance companies (a financing agent). However, households also act directly as financing agents, purchasing health care services directly from providers. Households can appear at both levels in the flow of funds analysis, since they play both roles. The NHA treat this as if households pay part of their expenditures to other financing agents and retain part themselves as financing agents, a transfer between the columns and rows in the matrices. This is the case in Figure 3.

The final level of the flow of funds analysis can use a variety of different categorizations of "uses". The main categories are listed in Section III above. Experience suggests that the easiest of these is the providers/institutions, since many of these entities maintain their own accounts. In our example, this includes MOH, social security, and private hospitals and clinics; private doctors' practices, pharmacies, and non-qualified practitioners. One could also add other non-service provision categories, such as research and training institutions and general administration as separate rows to make the totals complete.

Another very useful classification could be in terms of health service "functions". These could be as general as inpatient and outpatient curative services, personal preventive services, and population-based public health services. Or they could be more specific, for example, expenditures on control of specific diseases (e.g. tuberculosis), groups of diseases (STDs) (see for example [8], or health service clusters (maternal and child health, reproductive health and family planning). Such classification address important policy issues today, with the current attention on resource allocation according to disease burden and cost-effectiveness or goals of shifting expenditure more towards primary health care services. Other useful classifications of uses are line items (salary, equipment, drugs and pharmaceutical, etc.), socio-economic groups, and geographic regions.

Formulating the flow of funds analysis is complete when the levels are clearly distinguished, all relevant levels and entities are included in their appropriate place, and well-defined categories of uses have been agreed upon. It is then a simple matter to create the appropriate "sources and uses" matrices. These represent the flows between any two levels. For example, Table 6 shows the two matrices developed for Egypt linking sources and financing agents, and financing agents and providers.

Reaching Consensus on Categories

These approaches are adaptable to many different circumstances. Each country or group of analysts must formulate clear and consistent definitions. But once these are done, they are only limited by the available data in completing the analysis.

The OECD experience has shown that there is a significant benefit from being able to compare standard categories across countries. To obtain this benefit in developing countries, it is essential that <u>groups of countries</u> formulate common definitions, especially for the uses categories. Expanded use of NHA in developing countries should preferably be done by groups of countries together, based on common definitions of uses.

As noted above, the OECD categories of uses combine different aspects such as providers, functions, and line items in a single list. This list has emerged as a practical solution to the data available and the policy interests of participating countries. However, at this early stage in the use of NHA in developing countries, it would be desirable to keep these categories distinct and present them in separate matrices.

Common definitions of sources and financing agent entities are also desirable. This is especially true where countries with similar governmental and health sector structures could learn from each other's experience. Developing NHA with regional groupings of countries with similar institutional structures and colonial history would help foster such comparisons.

A longer-term goal might be to promote a common international standard of categories, as the OECD has succeeded in doing for the industrialized countries. But this goal will require the commitment of many different countries to work together on NHA. This is more likely to occur after countries gain experience in using the approach and more policy makers perceive its value.

Improving The Completeness and Quality of Data

While appropriate conceptualization of NHA is essential for sound analysis, data quality is also important. Poor data in a well-designed framework can lead to very erroneous results. Of course, data are never perfect. After several decades of estimating NHA, U.S. experts still debate the validity of some of their key measures. The health sector is also constantly changing, which may render once satisfactory data incomplete. For example, expenditure on "alternative" therapies is one of the fastest growing categories in the U.S., and new types of payer organizations are growing. The goal should always be better and well-justified estimates.

Indeed, one of the advantages of the NHA method is identifying the gaps in knowledge. An empty cell in the sources and uses matrix is both a source of underestimation of expenditures as well as a challenge to improving data sources.

Data on public sector health expenditures for many developing countries are reasonably reliable. Special attention must be given to distinguishing between budgets and actual spending and incorporating sub-national government spending (provinces, municipalities) into national totals. Government expenditure categories

cannot always be directly translated into the desired "uses" categories. For example, government hospitals may receive funds from the medical education, medical care, disease control, and family planning program budgets. Typically these problems can be addressed with a combination of more disaggregated expenditure analysis and special studies.

Social insurance spending may be carried out through a government department or a government-like entity. Typically, the problems and the solutions to improving social insurance spending data are similar to those for government spending.

The most significant data problems occur in estimating private health expenditures, specifically the expenditure size and composition of state and private firms and of households. Since private expenditures are the largest source of spending in many countries, and have typically been underestimated (see above), this gap is significant.

One source of private spending which has been largely ignored to date is direct spending by firms. Many firms finance health care for their employees and dependents, usually in four ways: payment of social insurance contributions; payment of private insurance premia, direct reimbursement of employee health care expenses, and financing of health care provision directly, either through firm-owned facilities or in other facilities.

The first type of expenditure is usually the most traceable, using the records of the social insurance institution. Private insurance spending will be recorded where private insurers are even modestly regulated. But the other types of expenditure are generally not well captured in existing data sources. NHA analysts may need to consult a wide variety of sources, such as ministries of industry or commerce, tax departments (if firm expenditures are tax-deductible), and private organizations such as a chamber of commerce or industry association. Sample surveys of firms, appropriately designed to capture size, industry, and regional differences, may be needed.

Household out-of-pocket spending can usually be estimated from two sources: national consumer expenditure surveys and more focused household health care use and expenditure surveys. The former are routinely carried out in many countries and have the merit of linking health expenditure with overall household spending patterns and generally accepted estimates of household income. However, general household spending questionnaires may be so extensive as to result in under-reporting of health-related spending. Health care may be one of hundreds of items asked about.

Specific health care use and spending surveys typically report higher levels of health expenditure than the general surveys[1]. This results from the use of probing and filter questions to identify health problems, with follow-up questions to elicit information about treatment events and expenditures. However, this can also lead to over-

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1/   A recent example was encountered in China, where national household consumption expenditures are estimated using a weekly diary record maintained by a national sample of households. This method is viewed as highly reliable by the State Statistical Bureau. A recent national health survey reported out-of-pocket health spending more than double that of the general survey. Researchers are investigating the causes of this difference [51].

reporting, since respondents are encouraged to report events and may not always be faithful to the recall period being used. Relatively small errors for short recall periods can become large amounts when annualized and multiplied up to a population level estimate. In countries where several sources of data may be available, comparison and triangulation from several surveys will help improve the accuracy of estimates.

Provider-level data, such as the reported earnings of doctors, clinics, and pharmacies, can also be used to validate household survey based estimates. Provider earnings data may be available from tax records or the national income accounts, but typically such data are not very accurate. Provider surveys can also be used when both price and volume data are reported, but the accuracy of responses to questions about earnings, even indirect ones, is often suspect.

For all of these types of data, classification of user expenditure according to provider types may have the best chance of succeeding. Classification by health care function may depend on more detailed responses in surveys and use of both survey and provider data sources.

"National Health Accounts": A Software Tool for Training and Data Management

NHA does not require much complex calculation to fill in and complete the sources and uses matrices, although multivariate analysis of household or health facility data might be useful for determining specific coefficients used in allocating certain expenditure items to different types of uses.

The Data for Decision Making Project at Harvard School of Public Health has developed National Health Accounts, a Windows-based software program [52]. The program is both a didactic tool and a data organization and management tool. Its didactic aspect is in helping analysts conceptualize and diagram the flow of funds. It prompts the user to list sources, financing agents, and uses and to identify the specific flows between them. It presents the results graphically and they can be easily modified if mistakes are made.

Once this conceptual task is done, the program creates the appropriate matrices in spreadsheet format and identifies the cells that must be filled in. For each cell, the program helps organize the estimates in money or percentage terms. It also keeps track of the references for each estimate and the degree of confidence in the estimate. The program will print out a "questionnaire" listing missing or poor quality estimates needed to complete the NHA. It can also be adapted to a variety of different definitions of uses.

VIII.   Conclusion

The financing of health care is both an important determinant of the success of health care systems as well as an indicator of status and change. Financing has succeeded in capturing the attention of researchers, governments, and international organizations concerned with health in the developing world. Yet, despite recognition three decades ago of the need for reliable and comparable health finance statistics, little effort is devoted to the collection and analysis of the most basic financial information needed for health policy reform: how much is spent on health care in a country, by whom, and what for?

Methods and manuals for national health expenditure surveys in developing countries have been available for some time, but only sporadically used. Meanwhile, over the last two decades, the OECD has systematically developed and applied a common format for reporting national health expenditures. The participation of OECD members in this common statistical endeavor has led to very fruitful comparative health systems research, which has highlighted the important role of health care financing. As developing countries increasing undertake health system and health care financing reforms, the time has come for a similar effort outside the industrialized world.

The National Health Accounts method, used by the United States, has recently been successfully applied in several developing countries. NHA relies on a matrix of expenditure "sources and uses" to track the flows of funds in a national health care system. The matrix approach imposes consistency on the use of differing data sources and help identify information gaps and needs.

NHA is a feasible and relevant approach for use in developing countries. As national health care reform strategies introduce more pluralism into health care finance and provision, the value of an NHA approach will increase. NHA can be carried out by a modest national team, with first round estimates available within six months to one year. It should be repeated periodically to monitor change and evaluate policy reforms.

NHA will be even more useful if countries are able to collaborate to develop standard definitions and estimation methods. It is recommended that this be done first at a regional or sub-regional level, where countries share common languages and institutional structures. Through such collaborative efforts, national teams can gain experience, adapt successful practices to local conditions, and learn from the efforts of others as well as themselves. It is expected that several such efforts, in different regions of the developing world, can be launched in the coming year.

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Table 1

National Health Expenditures in the United States, by Source of Funds and Type of Expenditure 1990 (in billions of dollars)

Type of Expenditure	Total	All Private Funds	Consumer Total	Out of Pocket	Private Insurance	Other	Total Government	Federal/1	State and Local/2
National Health Expenditures	$666.2	$383.6	$352.9	$136.1	$216.8	$30.6	$282.6	$195.4	$87.3
Health Services and Supplies	643.4	374.8	352.9	136.1	216.8	21.8	268.6	184.3	84.3
Personal Health Care	585.3	343.5	322.2	136.1	186.1	21.3	241.8	177.2	64.6
Hospital Care	256.0	116.0	102.2	12.8	89.4	13.8	140	104.6	35.3
Physician Services	125.7	81.7	81.7	23.5	58.2	0.0	43.9	35.1	8.8
Dental Services	34.0	33.1	33.1	18.0	15.1	--	0.9	0.5	0.4
Other Professional Services	31.6	25.2	21.5	8.8	12.8	3.6	6.4	4.9	1.6
Home Health Care	6.9	1.8	1.3	0.8	0.5	0.5	5.1	4.1	1.0
Drugs and Other Medical Nondurables	54.6	48.5	48.5	40.2	8.3	--	6.1	3.0	3.1
Vision Products and Other Medical Durables	12.1	9.4	9.4	8.2	1.3	--	2.7	2.4	0.3
Nursing Home Care	53.1	25.5	24.4	23.9	0.6	1.0	27.7	17.2	10.5
Other Personal Health Care	11.3	2.2	--	--	--	2.2	9.1	5.5	3.5
Program Administration and Net Cost of Private Health Insurance	38.7	31.2	30.7	--	30.7	0.6	7.5	4.8	2.7
Government Public Health Activities	19.3	--	--	--	--	--	19.3	2.3	17.0
Research and Construction	22.8	8.8	--	--	--	8.8	14	11.0	3.0
Research	12.4	0.8	--	--	--	0.8	11.5	10.0	1.5
Construction	10.4	8.0	--	--	--	8.0	2.5	1.0	1.5

1/ Detailed Federal Government financing program estimates are made for Medicare, Workers' Compensation, Medicaid, Department of Defense, Maternal and Child Health, Vocational Rehabilitation, Alcohol, Drug Abuse, and Mental Administration, Indian Health Services, and miscellaneous general hospital and medical programs.

2/ Detailed State and local financing program estimates are made for Temporary Disability Program, Workers' Compensation, Medicaid, General Assistance, Maternal and Child Health, Vocational Rehabilitation, hospital subsidies, and school health.

NOTES: 0.0 denotes less than $50 million. Research and development expenditres of drug companiesother manufacturers and providers of medical equipment and supplies are excluded from research expenditures, but are included in the expenditure class in which the product falls. Numbers may not add to totals because of rounding.

SOURCE: [33] Data are from the Health Care Financing Administration, Office of the Actuary: Data from the Office of National Health Statistics.

Table 2

**Comparison of Recent NHA Estimates of National Health Expenditures with WDR-93
Estimates**

Country	Year of Estimate	Total Health Expenditures as Percent of GDP	Government and Social Insurance Expenditure as Percent of GDP	Private Health Expenditure as Percent of GDP
Egypt (WDR)/1	1990-91	2.6	1.0	1.6
Egypt (NHA)/2	1990-91	4.7	2.0	2.7
Mexico (WDR)/1	1990-91	3.2	1.6	1.6
Mexico (NHA)/3	1992	4.8	2.8	2.0-3.0
Philippines (WDR)/1	1990-91	2.0	1.0	1.0
Philippines (NHA)/4	1991	2.4	1.3	1.1
Colombia (WDR)/1	1990-91	4.0	1.8	2.2
Colombia (NHA)/5	1993	7.3	3.4	3.9

Sources:

1/ [19]

2/ [37]

3/ [47]

4/ [35] (estimate excludes "business firms, private schools, community health financing schemes, and philanthropic
organizations" for which data were not yet available)

5/ [48]

Table 3

India: National Health Spending and Primary Health Care --
An Estimated "Sources and Uses" Matrix for National Health Expenditure in 1991
(in percent of total expenditure)

Uses	*Sources*				
	Central Govt.	*State and Local Govt.*	*Corporate/ 3rd Party*	*Households*	*Total*
Primary Care	4.3	5.6	.8	48	58.7
(Row %)	(7.3)	(9.5)	(1.3)	(81.7)	(100)
Curative	.35	3.00	.8	45.6	49.7
(Row %)	(.7)	(6.0)	(1.6)	(91.7)	(100)
Preventive and	3.95	2.65	*	2.4	9
Public Health	(43.9)	(29.4)		(26.7)	(100)
(Row %)					
Secondary/tertiary	.9	8.4	2.5	27	38.8
inpatient care	(2.3)	(21.7)	(6.4)	(69.6)	(100)
(Row %)					
Non-service provision	0.9	1.6	*	*	2.5
Total**	**6.1**	**15.6**	**3.3**	**75**	**100**

Source: [39]

* No estimate available

** Total in 1991 = Rs. 320 per capita or 6% of GDP

Table 4

National Health Accounts in Egypt: A Comparison of 1978 and 1991 Estimates

Health Expenditure Measure	FY 1978 Estimates	FY 1991/92 Estimates
Percent GDP to health	4%	4.7%
MOH as percent of total	31%	19%
Private HH expenditure as percent of total	54%	55%
Health Insurance Organization as percent of total	4.6%	10%
University Hospitals as percent of total	4.6%	9%
Private drug purchases as percent of total	26.9%	32%

Source: [37]

Table 5

Typical Entities Used in National Health Accounts in a Developing Country

Sources	*Providers (one approach to classifying uses)*
Ministry of Finance	Government-owned hospitals
State-owned firms	Private for profit hospitals
Privately-owned firms	Private not-for-profit hospitals
Households	Government-owned clinics
Foreign aid	Private for profit clinics
	Private not-for-profit clinics
Financing agents	Private MD practices
Ministry of Health	Private other practices (cosmopolitan)
Ministry of Education	Pharmacies
Other ministries (defense, internal security, railways, etc.)	Traditional practicioners
State-owned firms	
Privately-owned firms	*Functions (another uses list)*
Social health insurace	Inpatient treatment of illness
Private health insurance	Outpatient treatment of illness
Non-governmental health service organizations	OP personal preventive care
Households	Population-based public
	Other services/functions

Other uses classifications

Line items (e.g. salaries, drugs, equipment, capital investment)

Socio-economic groups (e.g. income quintiles)

Geographic groups (e.g. provinces, regions)

Table 6a

Financing Flows, Egypt 1990/91: Sources to financing agents (LE millions)*

	Sources				
Financing agents	*Ministry of Finance*	*Donors*	*Employers*	*Households*	*Total*
Ministry of Finance	182 (4.4%)				**182 (4.4%)**
Ministry of Health	647 (15.5%)	135 (3.2%)			**782 (18.8%)**
Ministry of Education	270 (6.5%)				**270 (6.5%)**
Ministry of Social Affairs	7 (0.2%)				**7 (0.2%)**
Other ministries	100 (2.4%)				**100 (2.4%)**
Donors		51 (1.2%)			**51 (1.2%)**
Social Insurance Organization/Pension Insurance Organization			277 (6.6%)	93 (2.2%)	**370 (8.9%)**
Firms			70 (1.7%)		**70 (1.7%)**
Private Insurance/Syndicates			20 (0.5%)	10 (0.2%)	**30 (0.7%)**
Households				2,304 (55.3%)	**2,304 (55.3%)**
Total	**1,206 (28.9%)**	**186 (4.5%)**	**367 (8.8%)**	**2,407 (57.8%)**	**4,166 (100%)**

Note: Percentages of total shown in parentheses. Employers includes all organizations, entities and individuals that employ other persons. This column covers all payments made for the express and immediate purpose of obtaining health care for their respective employees They consist of private and public firms, as well as GOE itself.
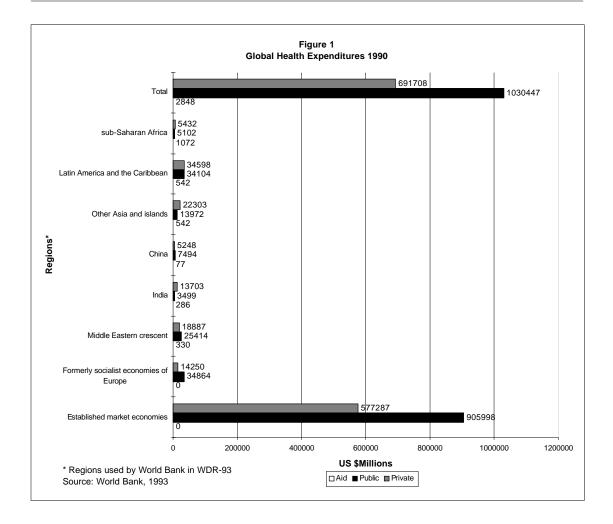
* In 1991 LE1=U.S. $.33

Source: [37]

Tabla 6b

Flujos Financieros, Egipto 1990/91: Agentes financiadores a proveedores (millones de LE)

Proveedores	Agentes Financiadores										
	Ministerio de Finanzas	*Ministerio de Salud*	*Ministerio de Educación*	*Ministerio de Asuntos Sociales*	*Otros Ministerios*	*Organizaciones de Seguridad Social y de Seguros, de Pensión*	*Donantes*	*Empresas*	*Seguros Privados*	*Hogares*	*Total*
Ministerio de Salud		782 (19%)								15 (0,4%)	**797 (19.1%)**
Hospitales Docentes	60 (1,4%)						3 (0,0%)			4 (0,1%)	**67 (1.6%)**
Hospitales Universitarios			270 (6,5%)				24 (0,5%)			48 (1,2%)	**342 (8.2%)**
Otros Gobierno	20 (0,5%)				100 (2,4%)		2 (0,0%)				**122 (2.9%)**
Instalaciones de Organizaciones de Seguros en Salud	64 (1,5%)					280 (6,7%)		1 (0.0%)		19 (0,5%)	**364 (8.7%)**
Organizaciones de Atención Curativa	38 (0,9%)						1 (0,0%)	20 (0,5%)	3 (1,0%)	38 (1,0%)	**100 (2.4%)**
Organizaciones No Gubernamentales				7 (0,0%)			16 (0,4%)	2 (0,0%)		30 (0,7%)	**55 (1.3%)**
Proveedores Médicos Privados							5 (0,1%)	37 (0,9%)	13 (0,3%)	900 (21,6%)	**955 (22.9%)**
Farmacias								10 (0,2%)	14 (0,3%)	1,230 (29,5%)	**1,254 (30.1%)**
Otros										20 (0,5%)	**20 (0.5%)**
Costos Administrativos de Organizaciones de Seguridad Social						90 (2,2%)					**90 (2.2%)**
Total	**182 (4,3%)**	**782 (19%)**	**270 (6,5%)**	**7 (0,0%)**	**100 (2,4%)**	**370 (8,9%)**	**51 (1,2%)**	**70 (1,7%)**	**30 (0,5%)**	**2,304 (55,3%)**	**4,166 (100%)**

Fuente: [37]

Figure 1
Global Health Expenditures 1990

Regions*

Region	Values
Total	691708 / 1030447 / 2848
sub-Saharan Africa	5432 / 5102 / 1072
Latin America and the Caribbean	34598 / 34104 / 542
Other Asia and islands	22303 / 13972 / 542
China	5248 / 7494 / 77
India	13703 / 3499 / 286
Middle Eastern crescent	18887 / 25414 / 330
Formerly socialist economies of Europe	14250 / 34864 / 0
Established market economies	577287 / 905998 / 0

US $Millions

□ Aid   ■ Public   ▨ Private

* Regions used by World Bank in WDR-93
Source: World Bank, 1993

Figure 2
Health Expenditures in Selected Latin American Countries -
Comparison of WDR 1993 and Follow-up Study

Source: [22]   □ public ■ private

Figure 3
Flow of funds in Egypt's Health Care Financing System, FY90 (LE millions)

Sources

MOF	Donors	Employers	Households
1,206	186	367	2,407
(29%)	(4%)	(9%)	(58%)
MOH - 829	MOH - 135	SIO - 277	SIO/PIO - 93
MOE - 270	Donors - 51	Firms - 70	Priv insurance - 10
MOSA - 7		Insurance - 20	Households - 2,304
Other ministries - 100			

Financing agents

MOH[1]	MOE[2]	MOSA[3]	Donors	Other Ministries	SIO /PIO[4]	Firms	Private insurance	Households
964	270	7	51	100	370	70	30	2,304
MOH - 782	Univ - 270	NGOs - 7	THO - 3		HIO - 280	HIO - 1	CCOs - 3	MOH - 15
THO - 60			Univ - 24		Administrative	CCOs - 20	Priv - 13	THO - 4
HIO - 64			CCOs - 1		expenses - 90	Priv - 37	Pharmacies -	Univ - 48
CCOs - 38			NGOs - 16			Pharmacies - 10	14	HIO - 19
Other public - 20			Private - 5			NGOs - 2		CCOs - 38
			Other public - 2					Priv - 900
								Pharmacies - 1,230
								NGOs - 30
								Traditional - 20

Providers

MOH[1]	Teaching hospitals	University hospitals	Other public	HIO[5] facilities	CCOs[6]	NGOs	Private medical sector	Pharmacies	Other private
797	67	342	122	364	100	55	955	1,254	110
(19%)	(2%)	(8%)	(3%)	(9%)	(2%)	(1%)	(23%)	(30%)	

[1] Ministry of Finance
[2] Ministry of Education
[3] Ministry of Social Affairs
[4] Social Insurance Organizations/Pensions and Insurance Organizations
[5] Health Insurance Organization
[6] Curative Care Organizations   Source [37]