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National Health Accounts Estimation Methods: Household Out-of-pocket Spending in Private Expenditure

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Dr. Ravi P. Rannan-Eliya
Fellow
Institute for Health Policy
72 Park Street, Colombo 2
SRI LANKA
Email: *ravi@ihp.lk*
Web: http://www.ihp.lk/

In association with:
Asia-Pacific NHA Network
http://www.apnhan.org

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Abbreviations

GDP – Gross Domestic Product
ICHA – International Classification for Health Accounts
MOH – Ministry of Health
NHA – National Health Accounts
OECD – Organization for Economic Cooperation and Development
PG – WHO National Health Accounts Producers Guide
SG – ONS/Eurostat SHA Guidelines
SHA – System of Health Accounts
SNA – System of National Accounts
UNDP – United Nations Development Program
WB – World Bank
WHO – World Health Organization

Key Words

National Health Accounts, household expenditure, out-of-pocket, household surveys, estimation.

Responsibilities and Acknowledgments

1. INTRODUCTION/BACKGROUND

1.1 Why this guide?

The production and use of national health accounts is rapidly expanding around the globe. To assist practitioners in the field, WHO has delivered the *"Guide to Producing National Health Accounts"* (World Health Organization, 2003), which has been joined by a number of other useful guides to this field, such as the *"SHA Guidelines: Practical guidance for implementing a System of Health Accounts in the EU"* (Office for National Statistics (UK), 2004). So why produce another set of guidelines? And why guidelines for household out-of-pocket spending?

The answer to this question and the justification for this additional set of guidelines are:
- (i) The most problematic component of private expenditure for measurement is how much households spend out-of-pocket, and this is typically the first or second largest source of health care financing in developing countries.
- (ii) Despite this and the existence of the WHO guides, estimation of private expenditures continues to present countries with the greatest difficulties, frequently undermining the credibility of health accounts estimates, and often having a significant negative impact on policy-makers' views as to the policy implications and credibility of NHA statistics.
- (iii) In most countries, private expenditures account for the largest source of error in estimates of national health spending, and represent the most substantial barrier to reliable international comparisons.
- (iv) Within the diversity of methods adopted by countries, there are clear examples of best practice, which would be highly beneficial, both at the national and international level, if adopted.

The increasing use of national health accounts in all parts of the world has highlighted many of these issues. In particular, differences in the methodological approaches by health accountants in different countries explain a large part of the differences in levels of private expenditure being reported. As interest in and the need for comparable international comparison of health expenditures grows, there is increasing need for methodological improvement and standardization, and for more detailed data on private spending. It is hoped this document will help health accountants in all parts of the world in developing better and more reliable estimates of household expenditure.

The objectives of these guidelines are to review and assess current approaches to identify best practices, and provide some additional practical guidance for improving existing methods and strengthening international comparability. It should be read in conjunction with the WHO *"Guide to producing national health accounts"*, and supplements this by providing more focused practical tips on how to address this often challenging subject. Some additional references are also made to the ONS/Eurostat *"SHA Guidelines: Practical guidance for implementing a System of Health Accounts in the EU"*. [1] It does not represent the final statement on how these expenditures should be estimated, as the methods are likely to continue to improve in the future, as more experience is gained from implementation around the world. Nevertheless, it should provide useful guidance both for health accountants and for the users of health accounting estimates to judge whether a particular set of methods meets current

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[1] In the rest of this document, the WHO publication is referred to as the *Producers Guide*, and cross-references to specific paragraphs in it are indicated in the text by the letters *PG x.xx*. Similarly, references to sections in the ONS/Eurostat publication are made as *SG x.xx*.

international best practice and whether they have exploited the key approaches commonly used.

1.2 The importance of improving estimation of private expenditures

Private expenditure consists of expenditures by households (out-of-pocket spending), firms, non-profit organizations and medical insurance schemes, but outside a few high-income nations, it consists predominantly of household out-of-pocket spending. It is this component of private expenditure that this guide focuses on. This is the one which raises the biggest challenges in estimation, and where there is most potential for improvement in current methods.

Whilst acknowledging the unreliability of most national estimates of private expenditures, the relative size of private expenditure in overall national health expenditures is clear. On average, private expenditure on health accounts for 1.5-3.0% of GDP in most countries, with its share of overall spending being higher in poorer countries than in rich countries (Table 1).

Table 1: Levels and share of private expenditure in countries at different income levels, 2003

GDP per capita	Private expenditure on health (% of GDP)	Private expenditure (% of total expenditure on health)	Out-of-pocket (% of private expenditure)
< $1,000	2.7	52	86
$1,000 - 9,999	2.2	35	80
$10,000 +	2.4	31	74

Source: WHO World Health Report 2006

In most low-income and lower-middle income developing countries, private expenditure accounts for 25-60% of total expenditure on health, but in most high-income economies, private expenditure accounts for only 15-25% of total expenditure on health. Moreover, out-of-pocket spending accounts for most private expenditures for health, and this proportion is higher in poorer countries. This has an important consequence. In the richest countries, the size and trend of private expenditures have far less policy significance than in poorer countries, and consequently, obtaining accurate estimates of private, out-of-pocket expenditures is often not a priority for policy-makers or statisticians. A key implication of this and one central to this guide is that many poorer countries should not be satisfied with the methods used in many developed countries, but should instead opt for a higher bench-mark. The accuracy of estimates of private expenditure matters far more in most developing countries than in the average developed country, and the rigor of the methods must match this need.

Difficulties in obtaining reliable estimates of private expenditure often undermine efforts to establish health accounts. In recent experience, in Asia, Africa and Middle East, a common reason for national authorities to refuse to accept the first NHA estimates, or to permit their publication, has been the lack of credibility in the estimates of household spending and the associated ratio of household to public sector spending. Although in many of these instances, the authors of the estimates have felt this reaction to be unfair, the reality has been that, in almost all these cases, the estimation methods have not met best practice standards. What these guidelines hope to achieve is to assist health accountants understand the pitfalls in estimating household spending, and to

avoid such problems. For assistance and guidance in estimating the other components of private expenditure, the reader is referred to the Producers Guide.

2. MEASURING PRIVATE EXPENDITURES – APPROACHES AND ISSUES

2.1 Definitions

Private expenditures

Private expenditures are expenditures incurred by organizations or individuals outside the public sector. In the terminology used in the WHO NHA Producers Guide, this refers to expenditures by private financing agents, and these consist of four types: (i) private enterprises or firms, (ii) households, (iii) private health insurance schemes, and (iv) non-profit institutions serving households (NGOs in common parlance).

Household out-of-pocket expenditures (OOP)

Out-of-pocket expenditures by households in health accounts typically comprise direct spending by households, after deducting third-party payments, such as insurance. However, for estimation purposes, it is often necessary to estimate the gross level of direct spending, before taking into account reimbursements by third-party sources. In these guidelines, the measurement approaches described can be considered to apply generically to measurement of any household spending, whether it is later adjusted for third-party payment or not.

Financing agents

These are institutions or entities that channel the funds provided by financing sources and use those funds to pay for, or purchase, the activities inside the health accounts boundary (PG 1.17). The term *financing agent*, as used in WHO PG, is equivalent to the term *sources of funding* as used in the OECD System of Health Accounts (SHA 6.7-6.8). For the most part, the focus of this set of guidelines is the measurement of household out-of-pocket expenditures, when households are acting as financing agents (that is, sources of funding). In general, when the term out-of-pocket spending is used, it is referring to spending by households in their role as financing agents.

Financing sources

These are institutions or entities that provide the funds used in the system by financing agents (PG 1.17). The use of the term is relevant when the ultimate burden of financing of the financing agents (sources of funding) is considered (SHA 6.8). For the most part, these guidelines do not focus on the problem of measuring expenditures by financing sources, as these are either simply the equivalent of the corresponding financing agent amounts, or can be directly estimated using administrative data to determine what proportion of funds flowing to a financing agent is from households. For example, when considering the household financing of social insurance premiums, it is usually easy to obtain the amount of household payments by examining administrative data of the social insurance scheme. For the most part when households act as financing agents, they are also acting as financing sources. However, there are instances when households may act as financing sources but not be financing agents; these most commonly occur when households pay contributions to either social health insurance schemes or private insurance schemes. In these cases, such household spending is not termed out-of-pocket spending.

International Classification for Health Accounts (ICHA) and System of Health Accounts (SHA)

The ICHA is the tri-axial system for classifying health expenditures proposed by the OECD (2000) in its System of Health Accounts (SHA), which requires expenditures to be categorized by function, by provider and by sources of funding. The SHA itself is a statistical framework or standard that is proposed by the OECD as a basis for

internationally comparable reporting of health accounts estimates, and which is also recommended for this purpose by WHO in its Producers Guide, which is a practical how-to-do manual.

National accounts

These are the set of statistics describing production and consumption in the overall national economy, and are the macroeconomic equivalent of health accounts. The international standards for national accounts are provided in the "System of National Accounts" published by the UN in 1993 in association with other international agencies, and commonly referred to as the SNA93 (United Nations, 1993).

Other definitions and terms

For more detailed definition and discussion of the above and other terms used in these guidelines, the reader is referred to the Producers Guide and "A System of Health Accounts" published by the OECD (2000).

2.2 Current approaches

National health accounts commonly use four different approaches to estimate household out-of-pocket spending for health. These approaches can be used alone or in combination:

    (i)   Direct derivation of estimates from data reported in surveys of household expenditure.

    (ii)   Indirect derivation of estimates from data reported in surveys of household expenditure by reference to national accounts estimates of household consumption.

    (iii)   Indirect derivation of estimates by triangulating and integrating different data sources, not all of which are household survey-derived, such as surveys of economic enterprises.

    (iv)   Use of estimates of household spending reported in the national accounts, which may themselves be based on versions of the first three approaches.

It is currently difficult to assess how prevalent each of these approaches is, as many published health accounts do not indicate the data sources and methods used, whilst there has been no global inventory of the methods used, outside the OECD region.[2] However, the impression from review of many estimates is that direct derivation is commonly used in many developing countries, and also in a few developed countries in Europe. The second indirect method of derivation is used in a smaller number of countries. The third method is used in a large number of both developed and developing countries, and often applied to specific and not all components of household spending. The fourth strategy does not, in practice, represent a different technical method, as national accounts similarly use a variety of methods, but which are no different to the first three already mentioned.

Exhibit 1 illustrates the diversity of methods with specific examples from countries. As can be seen, many countries actually do not rely on one method, but use a mix of methods to estimate household spending, depending on data availability. The main message of this guide (see also PG 7.43-7.46) is that the latter approach and the use of non-household survey data sources are often to be preferred. The reason for this is

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[2] Detailed description of the methods used in several OECD, and in future other non-OECD countries, health accounts are found in the country reports on the first implementation of a System of Health Accounts available from the OECD website (www.oecd.org).

that there are many reasons to treat cautiously estimates of spending derived directly from household surveys, as discussed in Section 2.3.

Exhibit 1: Some examples of national methods used to estimate household out-of-pocket spending on health

Canada
Out-of-pocket spending for hospitals and institutions are calculated from a national database of hospital returns and a survey of residential care facilities. Expenditures for retail purchases of drugs and personal health supplies are obtained from industry data sources including retail trade data. The remaining items of out-of-pocket expenditure are derived from household survey data.

Denmark
Household purchases of pharmaceuticals are derived from the national Medicinal Products Statistics register, which tracks all pharmaceutical sales at pharmacies through electronic recording. Household expenditures for physicians, dentists, glasses, hearing aids, hospitals and sanatoriums are derived directly from the national accounts estimates of private consumption.

India (Karnataka)
Household spending on health was derived from the state sample of a national survey of health care utilization and expenditure conducted over a period of one month by NCAER, a national research organization.

Jordan
Estimates of spending are obtained by multiplying the rates of per capita health care utilization by an adjusted estimate of the mean price of a visit derived from the same survey source (Jordan Living Conditions Survey). This is computed separately for six different expenditure ranges as reported in the same survey.

Kenya
Estimates of household spending were based on the data from a nationally-representative household consumption survey. As the data were thought to include payments which were later reimbursed by third-party financing schemes, and since it was thought that there was some element of unknown over-reporting by respondents, the overall amounts were reduced by 25% before finalizing the estimates.

Philippines
For survey years, household spending estimates are taken directly from the National Statistics Office's (NSO) Family Income and Expenditure Survey (FIES) conducted every three years. For intermediate years, the estimate is based on multiplying the share of household expenditure that is health (estimated by linear interpolation between successive FIES) by the national accounts estimates of household consumption.

Note on sources:
The above examples are intended to be illustrative of methods that have been used for estimating household expenditure. They are not necessarily the currently used in the referenced countries. The methods described for Canada and Denmark were used in their first implementations of the SHA standard for year 1999. The Indian example is taken from a study of health accounts in Karnataka by Garg (1998), that for Jordan from its first NHA estimates for year 1998 (Brosk et al., 2000), that for Kenya from its first NHA estimates for the year 1994 (Department of Planning and Reform, 1999), and that for Philippines

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from its annual NHA publications released by the Philippines National Statistical Coordination Board (2001).

2.3 Problems in the use of household surveys to estimate household out-of-pocket expenditures

There are three aspects that health accountants must consider when contemplating the routine use of household surveys as the primary data source for health accounts:

(i)   The existence of sampling error in surveys;
(ii)   The existence of biases arising from non-sampling errors;
(iii)   The lack of annual repetition of most household surveys.

Of these, the first is generally well understood, but it is the second, which is under-appreciated, and which is behind the most important errors that usually arise when estimating household spending.

Health accountants have often in the past based their estimates of household out-of-pocket spending directly on the results of a household survey. However, in most situations, even in low-income developing countries, this approach is not recommended. It is natural and intuitive that if there is a survey which asks a reasonably representative cross-section of households what they spend on healthcare, the results of this questioning should correspond accurately to the actual level of household spending, subject to some error owing to statistical variation or sampling error. Unfortunately, in reality this is very rarely the case. Household surveys are associated with two types of error that are of importance when measuring the volume of health spending: (i) sampling error, and (ii) non-sampling error.

2.3.1 Sampling error in surveys

Sampling error arises from factors related to the sampling design, in particular, if the sample frame is not representative of the overall population, and from the inherent variation between individuals in a population. The first type of sampling error is fixed in the sense that if a section of the population is not surveyed, the error will have the same impact in all samples taken. The second type of sampling error is variable in that it will vary from one sample to another.

A fixed sampling error will introduce a bias in the results, which will remain even in repeated samples, whilst the second introduces variance in the results between different samples. Common examples of the first is if a survey does not cover all areas of the country, or does not adequately cover rural areas, or if a survey excludes higher income households. These types of problems are usually self-evident from the survey design, and potentially affect all household surveys. One of these problems, which involve the sampling frame, is of specific relevance to health surveys. This occurs when, as is usually the case, a survey of the health expenditures and utilization of a population sample excludes in its sample those residing in institutions, such as hospitals, nursing homes and prisons. This is a particular problem as such individuals living in institutions often have above average health expenditures. Studies in some countries suggest that the permanently institutionalized population may account for as much as 5-10% of overall national health care use, and health accountants may in such a scenario need to conduct separate small surveys of the institutionalized population's health care use and expenditures. However, this problem is likely to be less in most developing country settings as the percentage of the population who is institutionalized in hospitals or residing in other institutions is usually less than in developed countries, and it can be minimized if the survey asks for all health expenditures by all members of the household, even if they are not present in the household at the time of the survey interview.

Another type of sampling error can arise if there is significant seasonal variation in healthcare use and expenditure, and if the sample is not designed to collect data from all periods in the year. This problem must be dealt with at the design stage, either by collecting data on the expenditure of households throughout a full year, or by rotating the sample over a year, so that households are interviewed on a continuous basis during the year, even if it is not the same households.

Sampling error is relatively well understood and can be easily quantified. It is covered in most standard statistical texts, and is discussed further in WHO NHA Producers Guide (PG 8.17-8.21), and in a useful guide on design of household surveys in developing and transition economies produced by the UN (Department of Economic and Social Affairs, 2005). It is an outcome of the inherent variation between individuals, and the variation in the specific individuals selected in any given sample. This type of sampling error will tend to decrease with increasing size of the survey sample, and so can be a significant problem if the household survey sample is less than 3-5,000 households. The health accountant should also bear in mind that the impact of sampling error will also be greater for expenditures that are less frequent or are more variable between individuals, for expenditures that are a smaller proportion of overall health spending, and when the reference period used in a survey is shorter. Finally, it should be noted that in sample surveys that use stratification, the stratification is usually designed to optimize efficiency or reduce sampling error with respect to specific items, and this may not apply to the health components.

2.3.2 The problem of non-sampling bias

However, in practice, the main problem that affects the reliability and comparability of health accounts estimates is the existence of non-sampling errors. The significance of this type of error tends to be under-appreciated in health accounts work in many countries.

The existence of non-sampling error is referred to in the Producers Guide (PG 8.22-8.29). Non-sampling errors are biases that are associated with most surveys and arise from defects in the design and implementation of the survey, or from the inherent limitations of human behavior when responding to survey questions. The most important of these is that individuals are rarely able or willing to accurately recall exactly what they did in any given time period. They may fail to accurately recall when an event occurred, thus reporting it to have occurred in the wrong time period, or forget that it had occurred in the period in question. They can fail to recall correctly the number of times an event occurred in a given time period, or fail to correctly report the actual amount of expenditure associated with a particular event.

To add to this problem, most surveys for practical reasons must rely on proxy respondents to obtain information – individuals who provide information on behalf of other individuals who are not directly interviewed. This is normal in most surveys when dealing with children, as adults are typically expected to provide information concerning them. Whenever proxy respondents are used, there is a greater chance that the respondent will fail to recall a pertinent event, not having experienced it directly themselves, or because they simply lack any knowledge of it. In the case of adult respondents who proxy for children, male adults in many societies often have less knowledge of events involving their children than their actual mothers, and so the choice of adult proxy respondent can have significant implications for the size of any non-sampling errors. The types of errors mentioned so far all occur with cooperative respondents, without any deliberate intent to mislead the interviewer. However, in

addition, errors may arise as a consequence of embarrassment or a wish to conceal information. This can, for example, be a problem when surveys seek information about the use of traditional medical providers, which may be associated in some countries with social stigma, or when the illness or healthcare use itself is considered private or sensitive. Another way in which it can occur is if the survey instrument is too exhaustive, in which case some respondents may learn that not reporting certain events will result in the interview taking less time.

The size of the bias that these errors can introduce is large (see Exhibit 2), and tend to show the following patterns:

(i)   The number of events forgotten increases proportionately with the length of the recall period.

(ii)   Events with less salience or impact on the individual are more likely to be forgotten.

(iii)   Proxy respondents tend to report 20% fewer events.

In general, surveys which use recall periods of twelve months for inpatient events will be associated with significant forgetting of events, and surveys which use recall periods of more than two to three days for outpatient events will be associated with significant forgetting of events.

Exhibit 2: US NCHS research

In the 1960s, a considerable amount of research was conducted into the problems of non-sampling error and response bias in health interview surveys by the National Center for Health Statistics in the USA (Cannell, Fisher, and Bakker, 1965; Cannell and Fowler, 1965; Cannell, Marguiz, and Laurent, 1977). Their researchers surveyed large samples of individuals about their health care visits and spending in communities where it was possible to obtain reliable data on actual visits from the administrative records of the providers. The communities chosen were stable and relatively culturally homogeneous and educated by the existing US standards, and could be considered to be a population where recall errors might be minimized. The investigators were able to test, through randomization, the impact of changes in the instrument design on responses, including the effect of changes in recall periods.

What the researchers found was that respondents were liable both to forget, or fail to report, events that took place in a given recall period, as well as report events that had not taken place in the same recall period. The net impact of the two forces tended to be an underestimation of events. The net bias was found to be associated with a number of factors, including design of the questions, whether a proxy respondent was used and their relationship to the individual of interest, the length of the recall period, the type of event, the age, sex, education and socio-cultural characteristics of the respondent, and whether the illness was acute or chronic. For example, when asked about inpatient admissions, the total number of admissions reported by adult respondents who were responding on behalf of other adults in the family was 18% under-estimated when the events took place 1-20 weeks before the interview, increasing to 45% under-estimation when the recall period was 40-53 weeks before.

It was found that significant recall loss of events occurred with recall periods of more than one week for outpatient events, and more than six months for inpatient events. In general, the size of the recall loss increased monotonically with increased length of the recall period. There has not been substantial research in developing countries to replicate these investigations, but evidence from several surveys (Ross and Vaughan, 1986), and other health accounting studies conducted in places as diverse as Taiwan,

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Bangladesh and Sri Lanka provide confirmatory evidence that the US results can be generalized to other settings (Data International, 1998).

At the same time, it is frequently found that specialized health surveys which focus only on health events and health expenditures can result in over-reporting of events, with more events or expenditures reported for a given time period than what actually occurred. Household budget surveys, which are conducted to collect data on all items of household expenditure, will tend to result in lower estimates of health spending than specialized health surveys, which focus only on healthcare use. Nevertheless, the general household budget survey can still be unbiased in one respect, since it will tend to provide a less biased estimate of the proportion of overall household consumption that is for health than a health survey which concentrates on health items and provides only minimal time to collecting data on general income or consumption (Exhibit 3).

Exhibit 3: Example from Sri Lanka of recall bias

Three nationally-representative surveys, which collected information on health care expenditures, were carried out in Sri Lanka between 1987 and 1991 by government agencies. These consisted of a national household income and expenditure survey (CFS 1987) conducted in 1987 by the Central Bank of Sri Lanka, another national household income and expenditure survey (HIES 1990) conducted in 1990 by the Department of Census and Statistics, and a specialized household health utilization and expenditure survey (HHUES 1991) conducted by the Department of Census and Statistics in 1991. All three surveys involved samples of approximately 9,000-10,000 households, drawn from the same national sampling frame maintained by the Department of Census and Statistics.

According to the three surveys, the annual per capita expenditures on healthcare goods and services having adjusted for inflation and expressed in constant 1990 rupees were Rs. 316 (CFS 1987), Rs. 395 (HIES 1990) and Rs. 1,676 (HHUES 1991). The latter estimates from the specialized health survey caused considerable controversy and disbelief in the sponsoring agency, which was the national health ministry. Many of the key policy-makers felt that the estimates were too high and not consistent with their own experience of the system. Consequently, the report from the survey was never authorized for official publication.

Clearly, these differences in the survey estimates were not explicable by changes in the health care system, the economy or general living standards during this time period, and can be explained largely by differences in non-sampling errors or bias between the three surveys. Although the health ministry officials were not aware of this, there was substantial evidence in the survey research literature to suggest that these types of errors could, in fact, be so substantial. In brief, since the two household income and expenditure surveys were household budget surveys whose main objective was a general one of obtaining data on the composition of all household spending, they tended to result in under-reporting of all expenses as exhaustive attention to any items, including health items, was not practical or feasible. On the other hand, the HHUES 1991 was specifically intended to examine healthcare use and so it employed a much longer and more detailed set of questions about healthcare items, which would have acted to reduce under-reporting. In addition, both the survey interviewers and the respondents were sensitized to the fact that the survey was specifically concerned with identifying healthcare use, and this is likely to have resulted

in over-reporting by respondents, as they were probed exhaustively to find any relevant events.

Faced with the possibility of this type of non-sampling error, many will hope that these problems will not affect the surveys they are using. It is, however, useful to note that these biases are almost universal, affecting well-designed surveys as much as not so well designed surveys. For example, the discrepancy between the National Medical Expenditure Panel Survey estimates of certain out-of-pocket expenditure items and those finally estimated in the US national health accounts is as much as 100%. Nor does using diary methods to collect expenditure data appear to solve the problem. Many countries now use such methods to collect data on expenditures, but these have not proven effective in eliminating non-sampling error. For example, in a relatively literate economy such as that of Hong Kong SAR, China, the use of diary-based methods in household budget surveys does not appear to prevent a 20-30% under-estimation of overall household consumption.

It is not possible to design and field a survey with zero non-sampling error-associated bias, so the correct strategy is to assume that such biases exist with every survey, and then develop a methodology which explicitly takes that into account. In practice this will mean complementing household surveys with other sources of data.

2.3.3 Non-regularity of household surveys

An important consideration that must be taken into account when considering the use of household surveys in estimating health accounts is their availability over time. Household surveys are expensive to undertake, and consequently in most countries are not conducted on an annual basis, if at all regularly. In some instances, household surveys are commissioned on a once-only basis as part of projects to develop health accounts, with no likely prospect of their subsequent repetition. In addition, the data collected by household surveys typically takes a long time to be processed and become available.

The non-availability of household survey data on an annual basis has important implications for a health accounts system. If the system relies predominantly on such data for estimating private expenditure, then the lack of data on an annual basis will make it very difficult to produce meaningful estimates on an annual basis. It is of value to observe, that most internationally-funded health accounts projects that have devoted resources to conducting large household surveys for the specific purpose of developing estimates of household health expenditure, have failed to achieve sustainability of the health accounts systems so developed. For this reason, it is important that health accountants identify alternative data sources and methods for estimating household expenditure. This again points to the need for developing other approaches.

2.4 Boundary issues

There are a number of household expenditures for health that are sometimes of interest, but which fall outside the boundary of what is considered health expenditures in the SHA framework. The major ones are household expenditures on non-specialized patient transport, and the use of non-reimbursed household time and services for

providing health and nursing care. In each case, these expenditures are not counted when making international comparisons of health expenditure using the SHA standard.

In the case of household expenditures for traveling to healthcare facilities, this are not normally included, unless they involve the use of specialized transportation equipment, such as ambulances, or if there is a special program to reimburse the patient for authorized travel costs. If such expenditures do occur, they would need to be measured.

In the case of services produced within households, these are not counted in the SHA framework, and can normally be ignored. However, if there is interest in measurement of these activities, the health accountant is advised to consult the technical literature for guidance, as this type of measurement faces a number of methodological challenges, which lie beyond the remit of this paper.

3. THE INTEGRATIVE APPROACH TO MEASURING HOUSEHOLD EXPENDITURE

This section presents an approach to estimating household expenditure that depends on taking into account data from both the funding and provider sides. It is recommended in place of approaches that rely on data only from the funding side.

3.1 Integrative approach to measuring household expenditure

There are two different perspectives from which health expenditure flows can be tracked: (i) from the *source of funding side*, and (ii) from the *provider side*. When considering household out-of-pocket expenditure, using household survey data represents the first perspective. An example of the second perspective is when the data on the revenue of private physicians, as reported in their tax returns, are used to estimate household out-of-pocket expenditure for private physician services. Taken alone, each of these perspectives should be considered as inadequate and methodologically wanting for estimating a health account. The best solution is to combine both perspectives in an *integrative* approach (see SG 10.4).

The integrative approach involves examining expenditure flows from the perspective of all agents in the system, and attempting to balance all data sources by linking estimates on any one item by one agent with those by other agents. In general, the integrative approach can and should be used to estimate all expenditure flows in a health account, not only at the household level, but also at other levels. This implies it should also be used to link the estimates of household spending with estimates of other funding flows in the health system. However, the focus of this discussion is on applying the integrative approach to estimate household expenditure flows specifically, although it is noted that ultimately the household expenditure estimates should also be matched with the data on flows in the rest of the healthcare system.

At the household level, the integrative approach involves looking at expenditure from both the provider (via data on their receipts or costs) and household sides (via data on their out-of-pocket spending), and reconciling the different data sources, taking into account their respective strengths and weaknesses, in order to obtain a composite estimate of actual expenditures, which reflects all the available information. Although this will entail more effort than relying on a single data source, it will yield results that are more robust and consistent, more comprehensive, and of higher quality than the original data sources. The integrative approach is the one that is recommended by these guidelines, and is described in a step-by-step manner below.

3.2 Compilation of data sources

The first step in the process is to compile and assess the available and immediately relevant data sources. When multiple data sources are available for a particular item, it is usual that that they will differ to some extent. These differences are normal and require that each data source be assessed for quality and the nature of any associated biases, before they are used. In general, the larger the number of different data sources that can be assembled for a particular expenditure item, the better.

When starting to evaluate the data sources and how they can be integrated, it is helpful to start thinking of the problem of estimating household expenditure not as one

problem, but as many discrete problems, each of which can be tackled, to some extent, independently. This helps to reduce the scale of the problem confronting the health accountant.

Household spending consists of many different categories of expenditure, e.g. spending for medicine, spending on doctors' services, payment of hospital fees, etc. For each of these expenditure flows, there may be different available and relevant data sources, and a different set of estimation problems. Total household spending is the sum of all such categories of spending, so the task of estimating household spending can be usefully broken down during estimation into a number of smaller discrete tasks, many of which can be managed, to some extent, independently of the others. Nevertheless, this is not to say that at the end of the process, the overall validity of the total household health spending estimate in relation to other expenditure flows should not be assessed.

In many instances, it is also useful to think of the problem of estimating an expenditure item as consisting of three different aspects:
  (i)   The absolute *level* of expenditure at a given time or during a time period.
  (ii)   The *composition* of an expenditure flow; for example, the percentages of household spending that are for drugs, doctors' fees and medical supplies.
  (iii)   The *trend* of an expenditure flow during a given time period; for example, what the percentage change in actual expenditure was each year during a ten year period.

Different data sources may not provide good information on all three aspects, but they may still be valuable if they provide information on just one or two of these aspects, as this can then be combined with information from other data sources to assemble an overall description of the expenditure flows.

An important implication of this is that not all data sources are used directly to make estimates. Some data sources may not provide any information about actual expenditures, but may be used to characterize critical aspects of an expenditure flow, such as its annual trend, or composition. Other data sources are not used in the final construction of an estimate, but are of value as they provide additional corroboration and evidence to validate or support estimates based on other data sources. This confirmation may not only be in terms of the level of expenditures, or the ratio of one expenditure aggregate to another, but also in terms of the pattern and trend in expenditures. For example, data on pharmaceutical imports can usually only with difficulty be used to generate estimates of pharmaceutical spending, but they might be used to confirm trends in pharmacy sales based on other data sources.

3.3 Common data sources relevant for estimation of household spending

The reader is referred to WHO PG for a detailed and comprehensive review of data sources (refer PG chapters 6-9). The following is a listing of the more commonly-used data sources that are relevant for estimation of household spending.

3.3.1 Household budget surveys
These are general surveys of household consumption or expenditure. They are available in most countries on a regular basis (annual to five yearly is the most common pattern), and are most often conducted with the primary purpose of constructing consumer price indices and examining the distribution of consumption and income.

3.3.2 Specialized surveys of household healthcare utilization and expenditure
These are special surveys that focus on healthcare use and expenditures, usually linking the questions on expenditures to the responses indicating some healthcare use. Typically, they are conducted singly as part of special projects or research studies, although a few are done routinely on a periodic basis in some countries. Sometimes, a general household general budget survey may also contain a special module devoted to health care use and expenditure.

3.3.3 Specialized surveys of household health care utilization only
These differ from the previous category in that they collect information only on healthcare use, and not on actual expenditures. However, for reasons discussed below, these surveys can still be useful for estimating health expenditure.

3.3.4 Routine business surveys and economic censuses
National statistical offices often conduct routine general business surveys and economic censuses of businesses for the purpose of estimating national accounts, collecting information on inputs and revenues. These may not be focused on healthcare providers specifically, but it is sometimes possible to obtain data on subpopulations of relevant enterprises. However, care must be taken in using these surveys, as the output of the surveyed businesses may not completely correspond to output of interest to the health accountant, for example if pharmacies also sell other non-health products. Allowance for this would then need to be made.

3.3.5 Other routine surveys of healthcare providers and institutions
In addition to routine business surveys, there may be other routine surveys of healthcare institutions conducted by the government or even private sector. These can often be very useful.

3.3.5 Tax data
Tax data are a potential source of information on the revenues of private healthcare providers. However, in many countries access to this data may be difficult, as confidentiality restrictions may prevent sharing of data even between government departments, and tax authorities may not routinely classify and disaggregate revenue data specifically for health providers. In addition, the quality of tax data in many countries is often impaired by significant tax evasion.

3.3.7 Administrative data on user charges collected by public sector providers
In most countries, user charges collected by public sector institutions must be reported in public sector financial accounts. These are often a reliable source of information on user charges paid by households.

3.3.8 Industry market data on retail sales of pharmaceuticals and other medical goods
These may be generated on a routine basis by industry associations or market research firms.

3.3.9 Specialized surveys of private providers conducted for research purposes
These tend to be small-scale surveys and not representative of the whole country, but can provide useful information on the financial characteristics of private provision. Health accountants need to be constantly aware of the possibility of these surveys being conducted, and should investigate whether such surveys are available.

The reader should read the relevant chapters of the Producers Guide (PG chapters 6-7) and these guidelines before embarking on a search for data sources. This will give them a better understanding of the types of data that are relevant and why.

3.4 Assessing data sources

In order to assess the quality of a data source, it is critical that the health accountant understands the origins and processing of each data source, the purposes for which the data were collected, and how this might influence the quality of the data (PG 6.30-6.60). Not all data are the same.

In the case of survey data, the health accountant should collect information on the following at the very minimum (SG 5.1):

(i)   The agencies that designed and executed the survey – sometimes it will be necessary to contact them to obtain additional descriptive information about the data source. The identity of the survey agency can be used to infer the quality of field work, as this can vary significantly between survey teams organized for a specific project by an agency which does not regularly conduct surveys and those of full-time survey agencies with substantial statistical expertise and survey experience. The identity of the survey agency may also influence the reliability of responses concerning sensitive information – for example, in some countries private firms will report accurate data on their financial operations to a national statistical office interviewer, as they have familiarity with providing them with data and are comfortable with the guarantees provided of confidentiality.

(ii)   The primary purpose for which the survey was conducted – the objective will influence the focus and phrasing of the questions asked, the terms and classification used for items, the responses of the respondents, and the quality or reliability standards that were achieved. As noted above, it also important to know whether the focus of the survey was on health, as substantial intensity of questioning of individuals' health care behavior can result in over-reporting of such behaviors.

(iii)   The intended scope of the survey – most surveys conducted by other agencies do not cover the full range of respondents that are of interest to the health accountant, and this needs to be taken into account. For example, household surveys often exclude individuals who live in institutions, including hospitals, and who have above-average levels of health care use; industry surveys of retail pharmaceuticals may omit certain types of pharmaceuticals such as vaccines or vitamins, or certain geographical areas.

(iv)   The sample size and sampling design of the survey – these must be evaluated in order to assess the likely impact of sampling errors. In addition, many surveys are stratified and are not self-weighting, so this information is important to avoid making invalid generalizations from sample data.

(v)   The time periods for which the data source or survey pertain. Health expenditures are never constant, and so an estimate for one time period cannot be simply applied to another. In the case of a household surveys, it is important to note which months the survey refers to. If the survey was not over a twelve-month period, it may be subject to seasonal bias. In many parts of the world, there are substantial seasonal variations in illness and healthcare use during the year, and surveys will produce different estimates, depending on the time of the year. In addition, even if a survey was conducted over twelve months, it may not match the calendar year, and so adjustments may be necessary to match the estimates to periods for which health accounts estimates are being produced.

(vi)   The exact wording of questions used in a household survey is important. The wording of questions can significantly influence the responses, and may alert the health accountant to differences between the scope of the survey items and those of interest to the health accountant, as well as the

possibility that some questions may have been misinterpreted by respondents.

(vii)   Whether proxy respondents were used in a household survey, and length the recall periods used for specific items when asking individuals about their previous health care use and expenditures? This will influence the degree of recall bias that occurs (see earlier discussion).

(viii) Whether the survey collected information on items that can cross-validated using other independent data sources? This can be useful in gauging the bias in a survey, and does not necessarily have to rely only on items in the health expenditure scope.

(ix)   In the case of surveys of business enterprises, are the sales of the enterprises of interest exclusively health or not? For example, pharmacies are often surveyed in such surveys, but in many countries their output is not exclusively health-related, as they may also sell other products such as food, groceries and stationery.

The questions that the health accountant should be asking with each data source generally involve asking whether there is a bias, in what direction such bias may lie, and what its magnitude is likely to be. Such questions should include:

(i)   Does this data source correspond exactly to the items that I am trying to measure, or are there differences in scope?

(ii)   Is the sample collected by this survey representative of the population that I am interested in? Does it omit or include specific populations? (PG 6.38-6.39).

(iii)   Did respondents have incentives to systematically over or under-report items? For example, providers often have an incentive to under-report revenues and profits owing to fears that this may affect their tax payments or invite interest by regulatory authorities.

(iv)   Did the survey agency have incentives to over or under-estimate items? (see PG 6.42).

(v)   Are the recall periods in a household survey such that they may be associated with significant recall loss or under-reporting of events? This can occur with recall periods longer than one month in the case of inpatient events, and two to three days in the case of outpatient events.

(vi)   Is it possible that this survey may have resulted in over-reporting of events? This can occur with specialized health surveys which focus only on health events, and also in surveys where the respondents might believe that over-reporting might result in some future beneficial outcomes for themselves or their community.

(vii)   If the data source is an administrative one, for example, hospital statistics of activities and revenues, what is the quality of the administrative information system, and is there likely to be systematic biases on one direction or another?

It is not possible to make firm rules about exactly how much the factors above will actually influence the quality and bias of a survey, but qualitative judgments are an important element in the overall assessment.

3.5 Cross-validation of data sources

The initial assessment and prior experience will provide an initial impression of the potential errors, biases and weaknesses in each data source. The next step is to quantify, where possible, the potential size of such errors or discrepancies between data sources. This is done by systematically comparing each data source with other

independent data sources or with each other. In doing so, it is advisable to start first by examining discrepancies in aggregate healthcare expenditure, and follow by more detailed evaluation of discrepancies in estimates for specific items of healthcare expenditure. The following section outlines a number of procedures for doing this.

3.5.1 Cross-validation using national accounts estimates

Many household surveys that record expenditures on healthcare also record expenditures on all other goods and services. This is generally true in the case of household budget surveys. A useful starting point is to assess the consistency of what these indicate as to the level of aggregate healthcare expenditure, assuming that the surveys concerned are intended to be generalizable to the national population:

(i) Compare the total level of expenditure on all goods and services (or equivalently the per capita mean expenditure) reported by the survey with household consumption as reported in the country's national accounts. Note that in some countries household consumption is not separately identified in the published national accounts, but is reported together with consumption by non-profit institutions as *private consumption*; in these cases household consumption is usually 95-99% of private consumption, but the exact ratio can be obtained by inquiring from the relevant national accounts team.

(ii) Compare the mean per capita household expenditure for healthcare reported in the survey with that reported in all other general expenditure surveys and in other specialized surveys of health expenditure.

It is normal to find that there are discrepancies between the household budget survey estimates of aggregate household expenditure and those reported in the national accounts. Table 2 illustrates this with some household budget survey examples from a review of such discrepancies in several Asian countries. Although in all the examples noted in Table 2, the household survey estimate is lower than the national accounts estimate, this direction of the discrepancy can be in the opposite direction, and this may be more commonly seen in some regions such as Africa (Deaton, 2003). However, the main point to note from the table is that not only do household budget surveys frequently not match the national accounts estimates of household expenditure, but the size of the discrepancy is highly varied and cannot be easily predicted across countries. At the same time, it is noted that often the discrepancy is consistent over time within a country, indicating that systematic errors play a significant role in the differences observed. The reasons for such systematic differences between countries in the size of the discrepancy might be explained by the different structure of consumption in different countries, differences in the survey methods and questions used, and the varying extents to which the respective national accounts have incorporated the use of integrative methods in the estimation of general household consumption.

In the case of these Asian countries, we can conclude that the general tendency is for household budget surveys to under-estimate household expenditures, or that estimates of household spending which are based on the use of production data and commodity flow methods, as favored by national accountants, tend to be higher than those obtained by interviewing households directly.

Table 2: Comparison of national accounts and household survey estimates of household expenditure in selected Asian countries

Country	Household survey	Year of survey	Household expenditure according to survey	Household expenditure according to national	Discrepancy

				accounts	
Bangladesh	Household Income Expenditure Survey (HIES)	2000	1,249,025	1,838,528	-32%
China	Urban and Rural Household Surveys	2000	4,241,929	4,289,560	-1%
Kyrgyz Republic	Household Budget Survey (HBS)	2000-1	33,552,678	56,028,200	-40%
Malaysia	Household Expenditure Survey	1998-9	78,760,000	124,751,000	-37%
Thailand	Socio-Economic Survey	2001	54,977	206,668	-73%

Note: Various units and currencies used in table – numbers are not comparable between countries.
Source: Data provided by members of Asia-Pacific NHA Network (www.apnhan.org).

For most countries, the national accounts estimate of aggregate household consumption should be taken as the best estimate of household expenditure, since national accountants should have taken into account all the available information, both from the consumption and production side. This policy also has the advantage of consistency with the national accounts, which is not unimportant, since a key question in most health accounts is relating total expenditure on health to the gross domestic product. However, the assumption of reliability of the national accounts estimates should always be verified by asking the national accountants what methods were used to prepare the national accounts estimates of household consumption. In several countries, the national accounts estimates of household consumption is derived solely from the household expenditure survey without reconciliation with any production data, and thus there should be no discrepancy – this is the case with China in Table 1.

Similarly, the same comparison should be made between every survey's estimate of total healthcare spending and those reported in any other surveys. In making such a comparison, a common issue that arises is that the relevant surveys are not for the same year, and thus the figures are not directly comparable owing to inflation and changes in income levels. In this situation, the numbers must first be adjusted using an appropriate deflator before comparison: relevant deflators include *nominal GDP per capita* and *nominal private consumption per capita*.

If there is a difference between the survey and national accounts estimates, it should alert the health accountant to potential biases in the survey estimates. Clearly, if the estimate of overall survey estimate of household expenditure is different to that in the national accounts, then the survey's estimate of household health expenditure cannot be assumed to be somehow unaffected by any bias that affects the overall survey estimate. In this situation, there are two different estimations of household healthcare expenditure that can be made using the survey data:
  (i)   The *direct estimate*, which is simply the per capita expenditure level reported in the survey.
  (ii)   The *indirect scaled estimate*, which is obtained by scaling the household survey estimate to match the national accounts estimate of household consumption. This is done by multiplying the survey expenditure figure for

health spending by the ratio of the national accounts estimate of household expenditure to the survey estimate of aggregate household expenditure.

In the event of significant discrepancies between the national accounts and the household survey, the indirect scaled estimate is to be preferred for further analysis, as it is based on weaker assumptions than the direct estimate. The direct estimate makes the assumption that the reporting of all non-health care goods and services was biased, but that this bias did not apply to healthcare goods and services expenditure. The indirect scaled estimate makes the weaker assumption that any bias in the reporting of healthcare expenditures was no different to the bias in the reporting of all aggregate household expenditures.

3.5.2 Cross-validation using utilization rates

Some household healthcare surveys link the utilization of healthcare services to the related expenditures. In these surveys, the estimate of expenditure can be decomposed into two elements – *volume* and *price*. Volume is the number of visits made in the survey recall period to any healthcare provider, and price is the amount paid by the household for the average visit. Expenditures are, in fact, the product of the mean number of visits made to all healthcare providers and the mean cost of each visit, that is:

Expenditure, E = Volume (V) * Price (P)

With these surveys, three aspects of the expenditure can be potentially cross-validated:
  (i)   Total healthcare expenditure;
  (ii)   Volume of visits;
  (iii)   Price of visits.

Validation of the first (total healthcare expenditure) should be done using the same procedure as described earlier for any household expenditure survey. Comparison of the total spending can be made with all other available household expenditure surveys.

Validation of the volume of visits might be made by reference to reliable administrative data, where available. If these are not available, then consistent with the recommended integrative strategy, the health accountant might assess all the data sources, and determine a balanced estimate of the actual volume. In most countries, reliable administrative data generated by healthcare facilities do exist, for at least some types of provider, typically in the public sector. In a few countries, another source of reliable data is the national social health insurance system. It does not matter if the available administrative data do not cover all types of provider, as long as the household survey data on visit numbers distinguishes between the type of provider, and it is possible to compare the visit numbers for one or more types of provider using both data sources. Care should be taken when doing this to distinguish between ambulatory and inpatient visits.

Validation of the price of visits is generally more difficult, except in instances where national social health insurance systems have good data on fees paid by patients. In some countries, it is possible to compare the average price of a visit to a physician's clinic with data collected from surveys of such providers.

If the comparison of the volume estimates with independent data reveal a significant difference in visit rates for one or more types of provider, then the health accountant

must consider this as strong evidence that the overall number of visits reported in the survey is biased, and thus that the overall expenditures reported are also biased. However, in many instances it is reasonable to believe that whilst visit numbers may be biased, that the average price per visit is not subject to a bias as large as with the visit numbers.

The procedure just described of estimating the expenditure flow for a particular healthcare service by balancing household and provider data on the volume of healthcare services produced or consumed is in fact conceptually consistent with what national accountants refer to as the "commodity flow method". This method is the international standard that is used for estimation of national accounts according to the SNA, and it relies on balancing estimates on the production of goods and services with data on the intermediate, final and private consumption of the same. Adopting this approach where appropriate and relevant in health accounts has the advantage that it would bring methodological standards in health accounting work closer to those of the national accountants.

4. GUIDANCE FOR ESTIMATING SPECIFIC ITEMS OF HOUSEHOLD SPENDING

4.1 Introduction

As outlined in the previous section, there are three broad approaches to measuring household expenditure. The first two rely on data either from the financing (that is, households) or provider sides, and the third relies on integrating information from both perspectives. This latter integrative strategy is the one recommended by these guidelines. Health accountants following the approach presented in these guidelines will first compile an inventory of the available data sources and undertake a preliminary assessment of the quality and reliability of the data sources, as previously described. With this knowledge, the health accountant is well-placed to make the best use of the available data sources and compile estimates based on reconciling the conflicting data.

In most situations, the most important insight is to recognize that household spending comprises of several different expenditure flows, and that each of these can be estimated largely as separate statistical exercises. This is possible because, in practice, there will be specific expenditure items, for which there are different data sources available. Each of these data sources will be associated with their own specific errors and biases, but often these errors are independent of one another. For example, the errors associated with pharmacy sales data obtained from industry sources will be quite independent of the errors associated with the tax-reporting of income by physicians. Owing to the independence of the errors, each item of spending can be estimated as separate analyses.

The exact decomposition of household spending into different components to be estimated individually should be determined, based on the availability and organization of the data and the actual organization of health care services in the country. However, the following list, based on actual country experience, provides a good starting point. The actual optimal breakdown of expenditure flows during estimation will vary by country, so this should not be taken as definitive.

    (i)   Public sector user charges
    (ii)   Public sector informal payments[3]
    (iii)   Outpatient services from physicians and dentists
    (iv)   Private hospital services
    (v)   Pharmaceutical products
    (vi)   Preventive health services
    (vii)   Insurance-reimbursed expenditures
    (viii)   Other ambulatory care services and residual items

The remaining part of this chapter provides more detailed information on each of these.

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[3] Note of the editor: Informal payments are only one form of the non-observed economy. Informal activity occurs in both the public and private sectors. In its widest acceptance, the non-observed economy in the national accounts requires a more specific terminology:
- underground production (legal activities but deliberately concealed from public authorities),
- informal activities (legal activities with a low level of organization with little or no decision between labour and capital as a factor of production),
- illegal activities (activities forbidden by law or which become illegal when carried out by unauthorised persons).
For training material on its estimation, see http://www.unece.org/stats/documents/2007.04.noe.htm

4.2 Public sector user charges

In many countries, reliable administrative data exist on revenues collected by public sector facilities from patients in the form of official user charges. This is particularly the case in countries where all user charges are transferred to the central finance ministry and not retained at facility level. Of course, the reliability must be assessed by the health accountant in each country. In other instances, there is no centralized reporting of facility revenues from patient charges and facilities are permitted to retain the income, but an equivalent and acceptable alternative is to obtain such information though sample surveys of the facilities.

Where reliable data of this nature exist, it is usually best to use these data as the basis of the estimates of such spending in the final health accounts estimates, in preference to estimates based on household surveys, as the error associated with the latter is typically much greater. In addition, the use of administrative data (or regular surveys of public facilities) has the advantage that such data will be available on an annual basis for updating the health accounts in future years.

4.3 Public sector informal payments

The health accountant should not confuse official fees collected on the basis of official regulations by public sector facilities with other payments incurred by patients when patronizing such facilities. Such other payments can consist of officially-recognized and accepted cost-sharing expenses incurred by patients to purchase needed treatment inputs, and unofficial or informal fees paid to personnel working in the same facilities. The first type of expense is a form of legal cost-sharing, while the second type of expense is by definition illegal, and is often termed "informal" by some authors.

An example of the first type of expense is when patients must self-purchase medicines or laboratory tests from the private sector as part of their treatment in a public sector facility, usually because the public sector facility is out of stock of the necessary medicines or because it does not provide the relevant services. Often these payments are overlapping other legal payments made to government medical personnel who are engaging in officially sanctioned private practice, usually in their off-duty hours. These household payments can usually be estimated using the same data sources used to estimate expenditures at the relevant private provider (see sections 4.4 and 4.6), and should be classified as household out-of-pocket payments to private providers. So for example, in Sri Lanka, where official policy is to encourage public sector patients to self-purchase medicines which are in short supply, and where government doctors are allowed to engage in private practice, these payments are estimated in the general estimation of retail sales of medicines by private pharmacies, and in the general estimation of revenues of private doctors clinics.

The second type of expense involves fees that are not paid to and do not benefit the relevant institutions, but are private and informal payments made to employees in those institutions, usually for the purpose of preferentially accessing services in the public facility. Payment of such informal fees represent private market transactions and should be treated in the health accounts as out-of-pocket expenditure at private providers, since the personnel concerned are acting in a private capacity, even though they are public sector employees.

To the extent that such transactions are voluntary interactions between a patient and an individual, they can be treated as a market transaction between private actors, and thus not treated as part of the government's non-market production. Nevertheless, there is no definitive statement of how such transactions should be reported in the context of the SHA framework. In fact, the general problem of how to report private illegal payments or bribes to public sector employees in exchange for services produced in the public sector is an issue that remains debated in the national accounts field. On this issue, national accounts experts from international agencies, such as the World Bank and IMF, have expressed the position that these transactions should be reported as private sector payments, and definitely not be treated as involving production by the public sector, nor added to estimates of public sector production.

The fact that such fees are not reported in administrative data does not represent a difficulty or a problem in estimating official user charge revenues and allocating these to the health accounts. However, they do need to be estimated as expenditure flows to the private sector, and it is often difficult to estimate these payments reliably, since by their nature, they may not be properly reported by households in household surveys, or are unlikely to be reported by the personnel concerned. In these instances, it may be necessary to conduct a special survey of households to determine what payments are being made in association with visits to public sector facilities. This is recommended over conducting a survey of patients at the facilities or surveying the providers themselves, since in both instances cooperation or truthful responses may not be forthcoming. Nevertheless, estimation of informal payments remains a methodological challenge internationally, and the health accountant should not dismay at their inability to fully capture such expenditure flows.

4.4 Outpatient services from private physicians and dentists

Estimation of household expenditures at the clinics of physicians and dentists is challenging when these providers are largely financed by out-of-pocket payments by households (PG 7.55). International experience indicates that most household survey estimates of household payments for ambulatory services at private practitioners tend to be subject to significant non-sampling error. Although non-sampling error also affects the reporting of expenditures for inpatient services and purchases of medicines and other medical goods, it is better to consider ambulatory services as a class by themselves, since the evidence clearly indicates that the size of non-sampling error will be different for ambulatory services compared with other types of health care use and expenditure.

In a small number of countries where such services are financed by public insurance schemes, reliable data on almost all such transactions may be available from the records of the insurance agencies, but this is extremely rare in lower-income developing countries. In a larger number of countries, the tax authorities will have data on the income reported by such providers in their tax-filings, but in most countries (both rich and poor) such data are unreliable, with the general tendency for such reports to underestimate revenues. In addition, there is a specific problem that in order to use tax data effectively it is normally important to have access to the detailed records, since the definition of taxable income does not correspond to the concept of revenues which is what the health accountant is interested in. In order to translate data on taxable income into an estimate of actual revenues, it will often be necessary to add in or estimate the cost of production, which is the difference between revenues and income.

The alternative to these data sources is to use production-side data collected directly from the providers themselves. Some countries do cover such clinics in their regular

business or enterprise surveys, and economic census, typically conducted by the national accounts or national statistics agencies. If the surveys contain a large enough sample of medical and dental clinics and the data are considered reliable, they may potentially be a source of such production-side data. The alternative is to conduct a survey of private practitioners to directly estimate their revenues. However, these surveys are very difficult to do well (PG 7.55), as they frequently face problems such as lack of cooperation from practitioners, lack of reliable sampling frames, and incentives for respondents to misreport. However, if best practice principles in survey design are followed, it may be possible to obtain useful data from such surveys. Such design considerations include minimizing respondent burden, providing credible guarantees of data confidentiality, asking information in a way that the respondent can understand and provide, and paying attention to questionnaire design. For an example of a private practitioner survey that was able to overcome some of these challenges see Rannan-Eliya et al. (2003).

General household expenditure surveys tend to substantially under-report such payments, and some household health-specific surveys have been found to over-report. It is very difficult, if not impossible, to overcome these errors through better survey design, so the integrative approach relies on supplementing household survey data with other data collected from the provider side. The following two methods have been used in countries, although they are not an exhaustive listing of potentially reliable methods.

Special note
Whatever methods are used, care should always be taken to take account of payments to private practitioners which are not assigned to households as the financing agent. If payments are made directly by third-parties, such as insurance schemes or employers, or if payments are made first by households who are later reimbursed by an insurance scheme, these payments must be subtracted from the gross revenues of private providers (and also from household survey estimates of out-of-pocket spending) in order to obtain the correct estimate of household spending (PG 7.38-39).

4.4.1 Price and quantity (PQ) method

This method relies on the fact that expenditures are, in fact, the product of the mean number of visits made to all healthcare providers and the mean price of each visit. This can be expressed using the formula that was introduced in the previous section, that is:

Expenditure, E = Price (P) * Quantity of visits (Q)

Note that the price referred to here is the mean price for a visit by all persons, and so this reflects the cost of both cheap and expensive visits.

This method can be applied when the available household survey data can decompose the household expenditure into visits made to providers and the amounts paid by visit, and when the providers are identified by type. In this scenario, the health accountant can separate the task of estimation into two: (i) estimating the volume of visits, and (ii) estimating the mean price of visits. This is advantageous since it can be assumed that the errors associated with the first are different to the errors associated with the second.

To apply this method, the health accountant must have other independent and more reliable data on the number of ambulatory care visits made to certain types of provider, if not all. Examples of these other data sources include (i) administrative data produced

by public sector providers, (ii) administrative data produced by public insurance schemes on visits made to providers controlled by the insurance scheme, and (iii) estimates of visits based on actual surveys of the providers themselves. If the number of actual visits to a given set of providers is reliably known, then the number of visits to other types of provider can be estimated by simply scaling the household survey estimates of visit numbers by the ratio between the two data sources, that is,

Visits to Provider B = Visits to Provider B as reported in survey * (Visits to Provider A as reported from provider data/Visits to Provider A as reported in survey)

This method makes the assumption that the size of any non-sampling errors that affect the reporting of visits to providers in the household survey is equal across all types of provider.

Validation of the household survey data on the price of visits is generally more difficult, except in instances where public insurance schemes have good data on fees paid by patients. In some countries, it is possible to estimate the average price of a visit to a physician's clinic with data collected from surveys of such providers. When doing this it is important to focus on the concept of a mean price, which is not the same as the typical or median price. The mean price is the average price paid by all patients for all types of service at these providers. Failing this, one assumption that can be made is that much of the error associated with reporting of household healthcare expenditures in the household survey involves the misreporting of how many visits took place. When individuals do recall that a visit took place, they tend to more reliably recall how much it cost. If this assumption that the error is largely related to the number of visits is correct, then the health accountant might simply assume that the estimated mean price reported in the household survey is correct. The caveat to this assumption is that the visits that survey respondents forget may tend to be less costly than average.

Once the estimates of price and quantity are obtained, the estimate of household expenditure is directly derived as the product of both. After this, the health accountant can turn to validation of these estimates using other data sources and common sense.

4.4.2 Aggregate scaling method

This method might be applied when the available household survey data provides estimates of the aggregate expenditures made at different types of provider, and where the gross payments made to one or more types of provider are known from other independent and more reliable data sources. In this scenario, the ratio of the more reliable data source to the household survey estimates of aggregate payments at that particular type of provider is used to adjust the household survey estimates of aggregate payments at the other types of provider.

For example, there may be three types of provider, A, B and C, of which more reliable administrative data on gross revenues are available for provider type C (estimate C_X). Estimates of aggregate expenditure at all three types of provider are available from the household surveys (estimates A_H, B_H, C_H). Then if the independent estimate of gross revenues at provider type C is considered reliable, then the estimates of gross revenues at provider types A and B could be calculated by:

Expenditures at providers types A and B = (Estimate A_H + Estimate B_H) * (Estimate C_X / Estimate C_H)

4.5 Private hospital services

For estimation purposes, private hospital spending is distinguished from that of public hospital spending because, in most countries, reliable administrative data are available for the latter. Estimation of household spending at private hospitals using household survey data faces similar challenges to that of estimating household spending for ambulatory care services. However, it is often easier to obtain reliable estimates of private hospital expenditures. Private hospitals are more likely to produce accessible administrative data (see PG 7.54, SG 5.35-6), their responses in surveys tend to be subject to less bias and misreporting, and non-sampling errors associated with household survey reporting of inpatient episodes tend to be less than for outpatient episodes.

The two methods described before (price and quantity method, aggregate scaling method) can also be applied to estimation of private hospital expenditures. However, it is often feasible to obtain estimates of private hospital revenues directly by means of surveys. If they are not carried out routinely for other purposes, then the health accountant should consider conducting one mainly for the purpose of health accounts. General experience is that such surveys of private hospitals are usually easier to undertake than those of private medical and dental clinics. Examples of agencies that might routinely collect such information include licensing authorities and industry associations of private hospitals. If reliable data are available directly from private hospitals, in general they should be used in preference to household survey data.

One complication that may be encountered in estimating expenditures at private hospitals is when private doctors admit and treat patients at these hospitals, and bill for their services independently. Such a situation is found in many countries ranging from Sri Lanka to the USA, and in these cases the patient payments for the physician's time do not pass through the hospital's financial accounts, and are not reported as hospitals revenues. In the SHA framework, such payments can be considered expenditures for inpatient care, but the provider is not the hospital but the medical specialist or doctor. The health accountant should be aware of this possibility, as it both complicates the interpretation of data, and adds to the challenges for estimation. First, household surveys of health spending often do not distinguish between patient payments to hospitals and those to independent doctors working at the same hospitals, and thus such household data may over-estimate the payments actually made to hospitals. Second, it can be difficult to obtain any data on the payments made to doctors in this situation, as the problem is analogous to the problem of estimating revenues of private doctors clinics with added complications. Estimation options in this situation can involve relying on the household survey data to estimate the likely amount of payments, using insurance claims data, if available, to estimate the proportion of hospital expenses that are incurred directly with doctors, and eliciting expert opinions on the share of a typical hospital admission bill that is paid directly to the doctors.

4.6 Pharmaceutical products

The retail sale of medicines from pharmacies and shops corresponds to the category HC-5.1 in the SHA ICHA functional classification, and is, in most countries, a large proportion of household out-of-pocket spending.

Experience in both low and high-income countries is that the most reliable and efficient method of estimating these expenditures is to use existing provider-side data sources. In many countries, these expenditures are routinely tracked and monitored by the pharmaceutical industry, as sales data for pharmaceutical products are considered

vital marketing data by most pharmaceutical firms (PG 7.56). There are private firms that collect and publish these data on a permanent basis in some of these countries, and they usually have reliable information on actual sales collected through large networks of data providers. A distinct advantage for the health accountant of these commercial data is that they are available on a regular basis, and often with a short time-lag. For many countries, a firm whose data the health accountant will find useful is IMS-Health (http://www.imshealth.com). These data are normally sold on a commercial basis, and in some countries, such as the USA, are purchased by the health accountants. However, health accountants in several developing countries have been able to access the necessary data on a *pro bono* basis by explaining the restricted nature of their needs, and confining their requests to non-commercially sensitive data.

When using these industry data, the health accountant as with any data source must always determine how the data were collected and identify any limitations. Although this type of industry data can be of high quality, it may need to be adjusted to take into account non-coverage of certain pharmaceutical products and certain sales channels, and, in some cases, the size of the samples used to produce the estimates may be associated with significant sampling error. It should be noted that the commercial firms who produce this type of data often can supply comprehensive information on their quality assurance procedures and assessment of their own data.

In the event that high quality industry data are not available, then the alternative is for the health accountant to estimate pharmacy sales using data on the manufacture, import and export of pharmaceuticals in the country. Such alternative estimations may also be done to corroborate the estimates obtained from the industry sources mentioned above (for example, Bangladesh). However, this is not an easy exercise to do well, as it requires knowledge of the mark-ups at various points in the distribution system, as well as the ability to adjust for unrecorded flows of pharmaceuticals, for example, due to smuggling or unregulated production (see PG 7.57). In general, the difficulties of making such estimates reliably is often over-estimated, and health accountants are advised to approach such an analysis with care.

4.7 Preventive health services

Internationally, preventive health activities are mostly financed by public sector sources. This is a functional use of spending, which differs from the categories of spending discussed earlier in this section, which are expenditure flows at specific types of provider. Nevertheless, some part of this is privately funded in all countries, and in some poorer countries this may be significant. In general, the problem of estimating these expenditures can be approached in parallel to estimating expenditures at specific provider types as described above. If the preventive health spending is part of an expenditure flow at private doctors, private hospitals, government health facilities or pharmacies, then the first goal should be to estimate the overall expenditure flow, and then to estimate what proportion of this expenditure flow is for preventive health. In making this estimation of proportions, the health accountant may find it useful to look at health surveys, which have measured the composition of household out-of-pocket spending. In addition, in a few countries the Demographic and Health Surveys have collected expenditure data, and this may represent a useful source of information.

4.8 Insurance-reimbursed expenditures

The health accountant should be aware of the potential for double-counting, which can occur when insurance schemes pay for household medical expenses. It can arise

when it is the practice for the insurance scheme to reimburse the patient after the expense has been incurred, instead of paying the provider directly. In this scenario, the financing agent for the expenditure should be recorded as the insurance scheme, but the patient may report the expenditure in a household survey or even in information given to the provider as being out-of-pocket.

In this scenario, it is best to first estimate separately the gross household out-of-pocket expenditures at each type of provider and volume of insurance reimbursements made to households. Having done that, the household out-of-pocket expenditure should be calculated as the gross payments made minus the value of the insurance reimbursements. At the same time, an expenditure flow from the insurance scheme to the provider should be recorded.

An additional complication may arise if the insurance reimbursements take place in a different time period to that of the original household out-of-pocket payment. In principle, all these payments should be counted as occurring in the period in which the actual medical service was provided, but it may be difficult to determine from the available insurance data for which period actual insurance expenditures relate to. In practice, this may not be a significant problem, as any errors are likely to cancel each other out, but there may be a small discrepancy from year to year. In lower-income developing countries, where overall insurance expenditures are small, this is a problem that usually will not justify significant efforts to resolve, but in countries where this is significant, the health accountant may need to obtain more detailed data on the timing of medical claims being reimbursed by the insurance scheme.

4.9 Estimating the residual items

4.9.1 Extending the integrative approach to estimate residual items

The preceding sections have covered the items that are most frequently estimated using non-household survey data. However, the listing is not intended to be exhaustive, and health accountants around the world are gradually adding to the list of data sources that are routinely used. Other examples include the use of industry data to estimate household expenditures on long term care or on purchases of optical goods (see SG 5.3.6).

Nevertheless, reliable provider-side data cannot be found for all items of household expenditure. Types of expenditure that commonly cannot be estimated with available data include expenditures for traditional medical providers, goods and services, dentists, services of paramedical practitioners, unqualified modern medical practitioners and purchases of medical durables. In these cases, the only available data sources may be household survey expenditure data.

Fortunately, if the integrative approach combining provider and household side data sources has been used to obtain more reliable estimates of most items of household health spending, the health accountant is in a better position to adjust for the potential errors associated with the available household survey expenditure data. The main problem with the use of household survey data, as has been emphasized in these guidelines, is the existence of bias due to non-sampling error. A large part of this bias is systematic and will affect all items of expenditure in a survey to more or less a similar extent.

If the more reliable estimates have been compiled for some items of household spending using the integrative approach then it is possible to use this additional

information to make reasonable inferences about the size of the bias affecting the other items. The larger the number of items of household expenditure that the health accountant has been able to estimate using other independent data sources, the more reliable and robust this approach will be.

4.9.2 Assumption of equal bias in household survey estimates

This can be illustrated in the following way. Consider a situation where there are five different items of household expenditure, X_1, X_2, X_3, X_4 and X_5. There is a household survey that reports expenditure levels for these items, i.e., h_1, h_2, h_3, h_4 and h_5. However these household survey estimates are considered unreliable measures of the actual levels of spending. Using a combination of data sources and the integrative approach, it is nevertheless possible to obtain reliable best estimates of the first three of these expenditures, that is x_1, x_2 and x_3. However, there are no independent data sources available to measure the last two items, and the only available data source is the household survey, which under normal circumstances would not be considered a reliable measure of the level of spending. In this situation is it possible to combine the information obtained in estimating the first three items with that in the household survey to obtain a more reliable estimate of the last two items. This can be done by assuming that the average bias or level of over or under-reporting in the household survey data for the last two items is the same as for the first three items. In that case, the best estimates for the last two items are given by:

$$x_4 = h_4 * \frac{(x_1 + x_2 + x_3)}{(h_1 + h_2 + h_3)}$$

and

$$x_5 = h_5 * \frac{(x_1 + x_2 + x_3)}{(h_1 + h_2 + h_3)} \; .$$

The critical assumption here is that the bias or discrepancy for each item in the household survey is the same. However, this is not in practice the case, since the bias usually systematically varies between different items. However, in the absence of any information as to the relative size of the bias for different items, this approach should result in the best possible estimates for the other items. Nevertheless, if there is some information on the size of the relative biases, the health accountant might adjust the estimates accordingly.

In many countries using this approach, health accountants are able to estimate 60-75% of overall household expenditures without relying on household survey data as the primary source of information (Figure 1). This leaves only a residual list of items for which household survey data may represent the only available source of information. By comparing the household and alternative estimates for the 60-75% of expenditures, for which more reliable estimates are available, it is possible to derive one or more adjustment factors to apply to the remaining items of expenditure collected in the household survey data. At its simplest, this would be the ratio of the independent estimates of the first set of items to the household survey estimate of the same items.

Figure 1: Extent of use of non-household survey data in estimation of out-of-pocket expenditure

Bangladesh	Sri Lanka

Hong Kong SAR, China

Canada
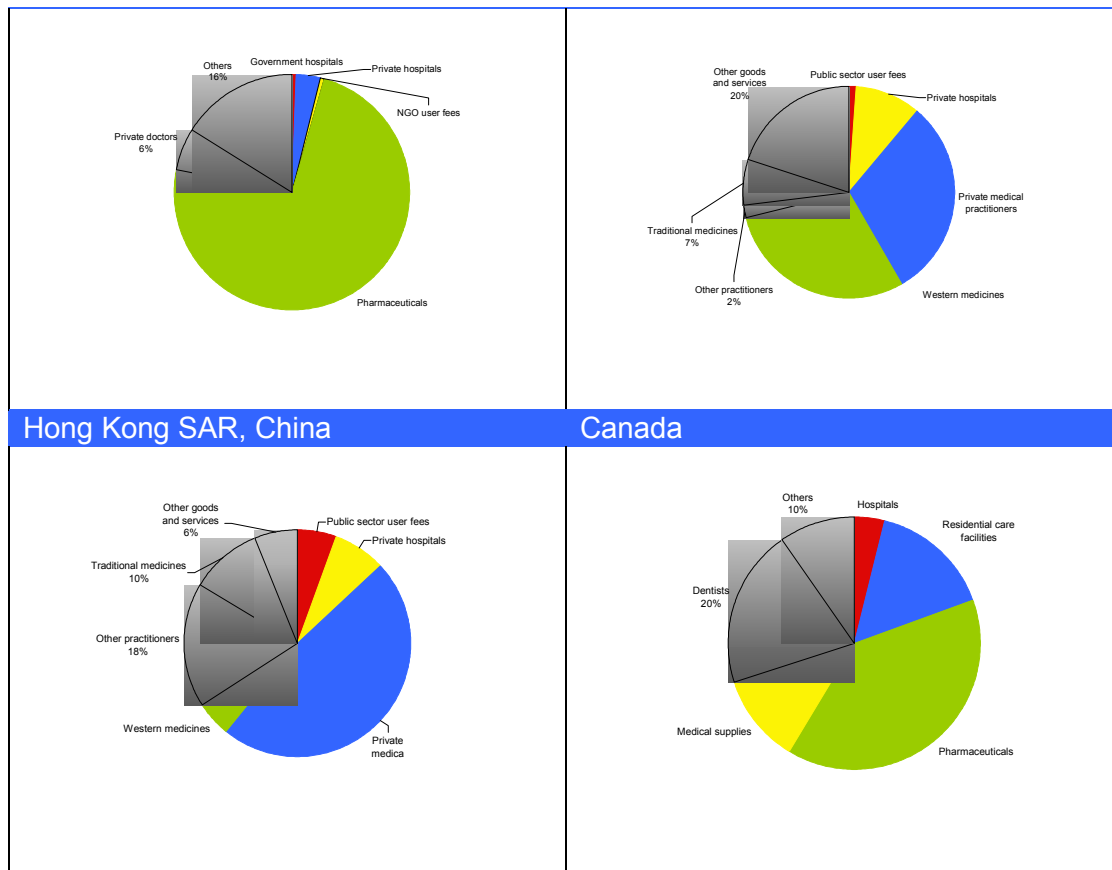
Note: The pie-charts represent the composition of out-of-pocket expenditure in the various health accounts. The colored segments represent items for which the primary data source is from the provider side, whilst the grey segments represent those items of expenditure, which are estimated predominantly from household survey data.

5. PRODUCING FINAL ESTIMATES BY RECONCILING AND INTEGRATING ESTIMATES

Chapters 3 and 4 have outlined the approach to compiling and assessing data sources, and estimating specific items of household expenditure. This chapter provides some tips on how individual estimates of expenditure and other relevant data might be combined and reconciled to produce a final estimate of overall household expenditures. These supplement sections 12.25-12.62 of the WHO Producers Guide.

5.1 Estimation of expenditures as a time series

A common error in many initial efforts to estimate a health account is to attempt to estimate expenditures only for one or two years, and consequently to focus the data collection and estimation exercise on those years of interest. Such an approach is not optimal for two key reasons:

(i)   Many data sources that provide information on household spending are not available for the years of interest, and thus cannot be directly compared to other data sources available for those years. In order to incorporate the information they provide and make full use of all available data, it is best to take a multi-year perspective.

(ii)   Many data sources are available less frequently than on an annual basis, whilst others are available with annual or greater frequency. If estimates are based only on the information available for a particular year, then the resulting numbers will tend to fluctuate from year to year simply as the data sources used change, introducing a variation in spending over time that is simply a statistical artifact.

It is strongly recommended for these reasons that the focus of the health accountant should be to estimate household expenditure as a time series of linked individual year point estimates, and not a single year estimate in isolation to estimates for other years. This represents best practice. It has the added benefit that most policy-makers and users are more interested in the trend in spending than in the actual level.

In estimating an expenditure flow as a time series, it is important to realize that different data sources can be valuable in two different ways: (i) they can provide information about the trend in expenditure, and (ii) they can provide information about the level of expenditure. In addition, even if data are thought to be biased, for example, tax data for private doctors may under-estimate their real revenues, they can still be useful by providing information as to the upper and lower bounds of an expenditure.

5.2 Organization of data

Most health accountants eventually organize and compile their estimates using spreadsheet or database packages. It is recommended that the novice health accountant should start first with commonly-used spreadsheet software, instead of attempting to work with database packages. The benefits are that most estimates of household spending cannot be based on administrative or transactional data, and must be derived through a process of reconciliation. It is easier to visualize and manipulate data during a reconciliation process in a spreadsheet than in a multidimensional database application. In countries where estimation of household expenditure is a

major component of the health accounts, it is recommended that a separate set of spreadsheets should be maintained for estimating these expenditures.

Depending on the particular approach chosen, most of the initial data collected for a health account will relate either to sources of funding or to providers. This will tend to dictate the general organization of a spreadsheet: whether the data should be organized by funding source or by provider (SG 4.5.2). However, in the case of household expenditure, where it is important to systematically reconcile data from both the funding and provider sides, it is often better to organize the spreadsheets according to the major components of household expenditure, for example, private hospital spending, purchases of medicines from pharmacies, government user charges, etc. These can be arranged according to one dimension of the spreadsheet, either in a vertical or a horizontal direction. The other dimension of the spreadsheet is most usefully reserved for organizing the data by year. This then allows easy visual comparison of data sources from different years, and by component of spending. Table 3 is an example that illustrates this.

Table 3: Organization of data in a spreadsheet example

Item	Data source	Comments	Year 1	Year 2	Year 3	Year 4
User charges at government facilities	Treasury records	Believed to be accurate	$100	$105	$107	$102
	Household survey	Small amounts – large sampling error		$220		
Pharmacy sales at retail price	Market research firm	Reliable, but excludes vitamins	$900	$920	$925	$940
	Industry association	Estimated from wholesale data	$850	$870	$890	$880
	Household survey	Subject to non-sampling bias		$1,200		

5.3 Reconciliation and integration of the estimates

As suggested earlier, it is best to separate the task of estimation into estimating individual components of household spending. Each of these components can be separately displayed in the spreadsheet, and estimation can proceed on a step-by-step basis, in which the first step is to finalize those expenditure items that are known with high reliability, followed by those for which some data are available. Those expenditure items for which few data are available should be finalized last. Estimation can start by entering those estimates for which there is a high degree of certainty, and for which no data reconciliation is necessary or appropriate.

If there are gaps in the time series for the initial items owing to missing data or unavailability of the data source for that year, then these can be filled through an appropriate process of interpolation or extrapolation (see PG D.02-D.21 for more detailed description of methods). This process of data imputation to fill gaps in a time series should always occur when the any set of numbers is finalized for a particular set of years. In doing this, the health accountant should be mindful about being consistent

in the underlying assumptions and in the choice of control variables, indicator series and inflation measures used (PG D.08-D.21), so that there is overall consistency between the estimates for different expenditure items. The appropriate set of indicator series or inflation measures will depend on the expenditure item and specific circumstances of the country. Examples that are commonly used in existing health accounts include nominal private consumption as reported in the national accounts, nominal GDP, and the GDP deflator or equivalent price measure. Note that none of these are simply population measure. When dealing with trends in household spending, it is useful to bear in mind that the most relevant macro-variable is not the gross size of the population but its overall purchasing power, which will reflect changes in real income levels, the composition of the population and other factors.

The process of interpolation is also important in allowing data sources that are for different years to be combined to produce an integrated estimate. This is illustrated in the following schematic example, which presents the hypothetical estimation of household expenditures at private dentists. As shown in Table 4 in this example, there are four different data sources available to estimate this expenditure item, but they are not available for all years. By a process of interpolation using appropriate indicator and inflation measures, it is possible to extend each of the original estimates to produce the parallel estimates shown in Table 5.

Table 4: Estimation of private dentists' revenues by integrating multiple data sources: original data

| Data source	Comment	Year 1	Year 2	Year 3	Year 4	Year 5
General household expenditure survey	Under-estimate when compared with national accounts	**$500**				**$900**
Specialized household health expenditure survey	Possible over-estimate according to key informants		**$1,200**			
Tax department data	Likely to be under-reported	**$260**	**$285**	**$345**	**$410**	**$470**
Dental Association Survey	Excluded dentists who not members				**$1,000**	

Table 5: Estimation of private dentists' revenues by integrating multiple data sources: original data plus imputations

Data source	Comment	Year 1	Year 2	Year 3	Year 4	Year 5
General household expenditure survey	Under-estimate when compared with national accounts	**$500**	$600	$700	$800	**$900**
Specialized household health	Possible over-estimate	$1,000	**$1,200**	$1,400	$1,600	$1,800

expenditure survey	according to key informants					
Tax department data	Likely to be under-reported	**$260**	**$285**	**$345**	**$410**	**$470**
Dental Association Survey	Excluded dentists who not members	$700			**$1,100**	

As noted in the comments, the tax data and general household expenditure survey data are thought to be under-estimates. However, they provide good information on the trend in expenditures. On the other hand, the specialized household survey is thought to be an over-estimate following the preliminary assessment. At the same time, the estimates from the Dental Association are thought to be of high quality, but subject to a small amount of underestimation since they do not include dentists who are not association members. Taking all these into account, the final estimate is derived, and shown as a thick red line in Figure 2. The level of this line is based on the inferences made about the relative biases of the different data sources, and its trend is based on the trend implied by the tax and general household expenditure data.

Figure 2: Derivation of final estimate of private dentists' revenues
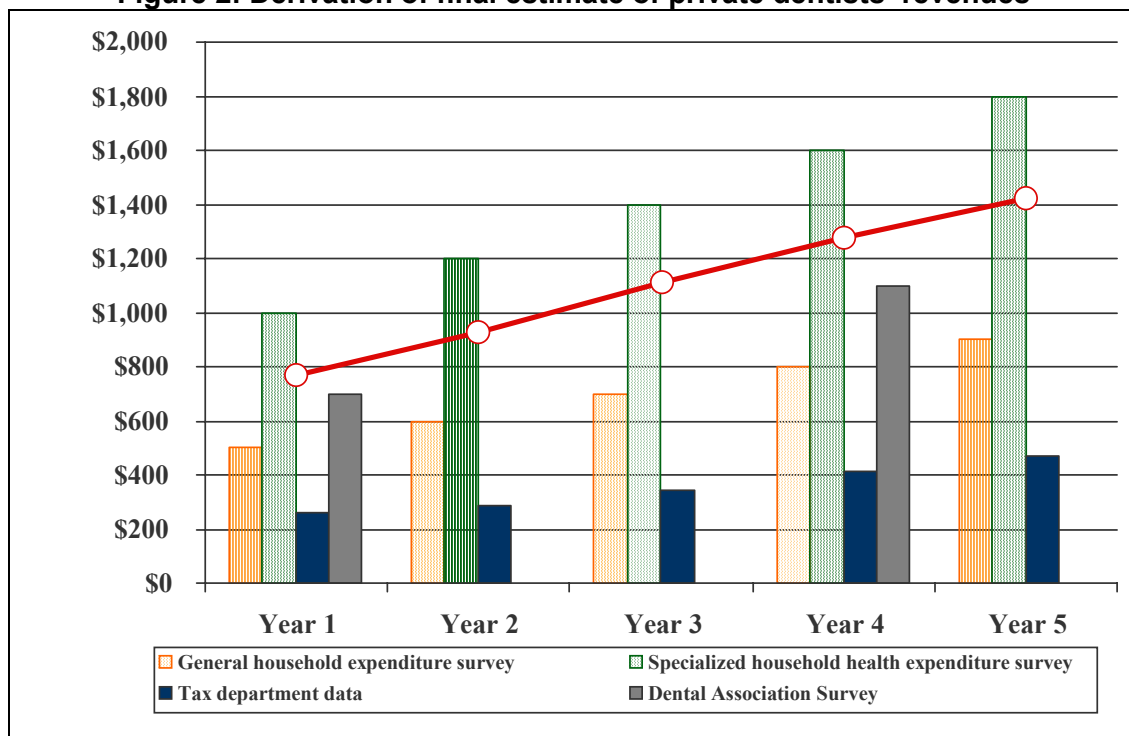
Note: The solid colors show the original data, and the hatched columns show the estimates obtained by imputation. The thick red line shows the final estimates.

For some expenditure items, it will be relevant to apply such methods as that described earlier, which multiplies price and volume. In these cases, it is useful to also enter the data that are being used to estimate price and volume and organize them separately, so that the steps taken to finalize these elements are also shown. This is illustrated by the example in Table 6.

Table 6: Estimation of household spending at private practitioner clinics, Hong Kong SAR, China

Data source	Item	1996	1997	1998	1999
Administrative data of government	*Visits to public hospital clinics (A1)*	11,337,548			13,091,650
General Household Survey	*Visits to public hospital clinics (A2)*	291,900			285,200
	Visits to private practitioner clinics (B2)	920,200			746,500
	Ratio of A1 to A2	38.84			45.90
Final estimates	*Visits to private practitioner clinics [Q=(A1/A2)xB2]*	35,741,047			34,266,889
	Gross revenues [E=QxP]	7,484.04			7,221.06

Note: The mean price (P) of a visit to a private doctor was estimated separately using survey data and interpolation.
Source: Gabriel Leung, Keith Tin, Hong Kong University Domestic Health Accounts Team.

Having proceeded sequentially in this fashion, it is often possible to build up estimates of a large percentage of overall household health expenditure (see Figure 2). There will, inevitably, remain some data for which no corroborating data exist other than the household survey data, which is considered subject to non-sampling bias. In these cases, the second-best solution is to estimate the average discrepancy between the household survey estimates and the final health accounts estimates for those expenditure items where other data have been used. This discrepancy or ratio can then be applied to correct for the unknown non-sampling bias in the estimates of the remaining items, following the approach suggested in section 4.9.2.

6. FINAL WORDS

Reliable and accurate estimation of private expenditures is a major challenge in estimating health accounts in most countries, and in particular in developing and transitional economies. Major differences in the way in which different countries estimate private expenditures accounts result in significant differences in the levels of private expenditures that are being reported, and represent a major barrier to achieving comparability of national estimates of health spending. Household out-of-pocket spending accounts for the largest part of private expenditures in most countries, and it is estimation of household expenditure that often presents the most problems for health accountants.

Despite the diversity in methods used, there are many ways in which current approaches to estimation can be significantly improved, by drawing upon emerging international best practices. In particular, health accountants need to be aware of the dangers in simply relying on household survey data to estimate household expenditures. Many decades of experience in both national accounts and health accounts have demonstrated that household surveys are poor instruments to measure the level of household spending, and are usually subject to significant sampling and non-sampling error.

It is recommended that health accountants adopt an integrative strategy to estimating not only household expenditures, but all expenditure flows in a health account. This strategy involves examining all available data sources and balancing estimates of expenditure flows from different perspectives. In the case of household spending, this requires using data from both the provider and household sides. Adoption of an integrative strategy represents not only current international best practice for estimation of household health expenditures, but also shifts health accounting practice closer to what is considered best practice in national accounts.

In applying the integrative approach, the health accountant should invest their time and resources where it is most cost-effective. Given that private expenditure estimates will often be subject to considerable error despite the best efforts of the health accountant, it is not wise to invest considerable time in focusing on minor components of spending with little policy significance. For example, trying to correct for the errors that arise because insurance payments are not made in the same year as the relevant medical expenditure is unlikely to be an efficient use of resources in most lower-income developing countries, where insurance is not a major source of financing. Similarly, the health accountant should first focus attention on improving estimates for those major items of household spending for which data are plentiful, and which are of policy importance. In many instances this will implying paying more attention to estimation of expenditures at private clinics and private hospitals than to estimation of expenditures for traditional providers and purchases of over-the-counter (OTC) medicines.

Nevertheless, estimation of household spending will still remain a challenge, and estimates will continue to remain subject to considerable error. It is important therefore that estimation methods continue to develop and improve. Health accountants are encouraged to document the different methods they use, so that international understanding of the available methods increases, and in order to allow other countries to learn from different national experiences. It is only through this process of transparency and mutual learning that the both national and global estimates of private spending will improve in the future.

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