

**GUIDE TO PRODUCING REGIONAL
HEALTH ACCOUNTS WITHIN THE
NATIONAL HEALTH ACCOUNTS
FRAMEWORK**

© World Health Organization 2008

All rights reserved. Publications of the World Health Organization can be obtained from WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel.: +41 22 791 3264; fax: +41 22 791 4857; e-mail: bookorders@who.int). Requests for permission to reproduce or translate WHO publications – whether for sale or for noncommercial distribution – should be addressed to WHO Press, at the above address (fax: +41 22 791 4806; e-mail: permissions@who.int).

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use.

Contents

Foreword	6
Acknowledgements	7
Chapter 1. Introduction	1
A brief review of national health accounts	1
Regional health accounts in the context of NHA.....	2
Structure of this guide.....	4
Chapter 2. Establishing the conceptual framework of the regional health accounts	5
Partitioning the country into regions.....	5
Choosing the appropriate measure of health spending	5
Attributing expenditures to place of residence or place of service	9
Chapter 3. Structuring and staffing the project	12
Categorizing the actors in the health system.....	15
Deciding which tables and displays to produce	19
Building a data map	23
Chapter 4. Finding and evaluating data sources	24
National data	24
Subnational data.....	26
Evaluating the quality of data	27
Chapter 5. Populating the health accounts tables.....	31
Establishing an estimation methodology	31
Issues in building bottom-up accounts.....	32
Issues in developing top-down accounts.....	33
Handling the challenge of missing data	36
Triangulating estimates.....	37
Apportioning centrally incurred costs.....	38
Addressing medical migration and medical tourism	38
Chapter 6. Documenting the process and reporting the results	41
Internal documentation	41
External documentation	42
Chapter 7. Experiences and recommendations from health accounts teams	44
Chapter 8. Regional health accounts in Appia: A Numerical Example of Techniques	46
Appia and the Appian health system	46
Collecting and organizing data	48
Compiling the regional health accounts tables	57
References.....	77
Annex 1. Financing agents by provider and function, Appia	78

Tables

Table 1. ICHA-HC classification of functions of health care.....	7
Table 2. ICHA-HP classification of providers of health care.....	17
Table 3. ICHA-HF classification of health care financing	18
Table 4. Proposed classification scheme for financing sources (FS).....	19

Boxes

Box 1. Challenges faced in constructing regional health accounts.....	3
Box 2. Place of residence.....	10
Box 3. Constructing accounts by both place of residence and place of service	10
Box 4. Staging estimates by place of service or place of residence	11
Box 5. How long do subaccounts take to build?.....	14
Box 6. Finding the right contacts	25
Box 7. The importance of regional connections	26
Box 8. Developing regional health accounts in Germany	32
Box 9. Controlling regional data against national totals.....	34
Box 10. Using labour inputs to distribute spending.....	35
Box 11. A picture is worth a thousand words.....	43
Box 12. The value of feedback	45
Box 13. Converting fiscal-year data to calendar-year data.....	53

ACRONYMS AND ABBREVIATIONS USED IN THIS PUBLICATION

ASA	Appia Statistical Agency
FS	financing sources
GDP	gross domestic product
GEHI	Government Employee Group Insurance Programme
GGHE	general government expenditure on health
GU	geopolitical unit
ICHA	International Classification for Health Accounts
MoD	Ministry of Defence
MoH	Ministry of Health
NAFTA	North American Free Trade Association
NHA	national health accounts
NHE	national health expenditure
NIA	National Insurance Agency
OECD	Organisation for Economic Co-operation and Development
OOPS	out-of-pocket spending
PCHE	personal health care expenditure
SHA	system of health accounts
TCHE	total current expenditure on health
THE	total expenditure on health
WHO	World Health Organization
XalR	external resources

Foreword

Where we live defines in many ways how we live. When it comes to health services, for example, the situation may be very different in affluent and less affluent areas, urban and rural settings, or in the capital city versus the rest of the country. With equity increasingly becoming a key objective of health systems, there is greater need to track health expenditure, to provide a picture of its distribution by geographical unit. Such tracking of subnational health expenditures assumes more importance in countries where fiscal or managerial responsibilities have been devolved to lower administrative units. Being able to measure expenditure in the different subnational units of a country allows national and subnational decision-makers to formulate equitable health care policies. For example, regional health accounts have been used in some countries to draw attention to inequitable distribution of funds among regions, leading to a rethinking of the national health financing systems. Government allocation of resources needs to be consistent with identified national priorities, such as geographical areas most affected by a given disease, those areas with a larger proportion of the population living in poverty, those with poorer health outcomes, or those with less access to health care or with fewer health care providers per person.

Regional health accounts can assign expenditures to geographical units, on the basis of production or consumption of health resources. It is important to recognize that the nature of regional accounts can vary, depending on whether policy-makers are interested in learning about the capacity of an area to provide health services (expenditure by place of provision of service), or about expenditure on the health care of an area's population (expenditure by place of residence of the beneficiary). This publication describes the construction of health accounts by place of residence. The statistics produced using these guidelines would be comparable with national health accounts reporting expenditure on the health of a country's residents rather than on the services provided in the country.

This guide recommends building subnational health accounts at the same time as national health accounts, to make the most of efficiencies in time and resources. A more nuanced interpretation of regional health expenditure estimates is made possible when they are placed in the context of total health expenditure.



David B. Evans
Director
Department of Health System Financing
World Health Organization

ACKNOWLEDGEMENTS

This guide was drafted by Dan Waldo, with technical support from WHO's Department of Health Systems Financing. Feedback on initial drafts was given by an internal review team, including Driss Zine Eddine Elidrissi, Tessa Tan-Torres Edejer, Charu Garg, Patricia Hernandez, Catharina Hjortsberg, Maria Fernanda Merino Juárez, Michael Müller, A.K. Nandakumar, Eva Orosz, Pia Schneider, Nathalie Van de Maele, Cornelis Van-Mosseveld, and Jakob Victorin.

The guide has benefited from country implementation experiences and input from the national health accounts experts associated with those exercises, namely: Katharine Levit, Anne Martin, and Lekha Whittle (United States); Maria Fernanda Merino Juárez, (Mexico); Michael Müller (Germany); Rebecca Bennetts and John Goss (Australia); Christopher Kuchciak and Gilles Fortin (Canada); and Giovann Alarcón (Peru).

Pat Butler undertook technical editing for publication. The final production of the guide was managed by Nathalie Van de Maele and Tessa Tan-Torres Edejer.

Partial funding was received from the United States Agency for International Development (USAID) for the production of this guide.

CHAPTER 1. INTRODUCTION

A brief review of national health accounts

1.01. This guide is intended to help health systems analysts construct measures of health spending for parts of a country. The process is akin to that of preparing estimates of spending for the country as a whole, as described in the *Guide to producing national health accounts* (1) (hereafter referred to as the NHA Guide) However, specific issues may arise when subnational health accounts are being developed, and estimation techniques may need to be used in completing the account framework being developed. Thus, this text serves as an adjunct to the more extensive NHA Guide.

1.02. National health accounts (NHA) are designed to help answer questions about a country's health system. They provide a systematic compilation and display of health expenditure, tracing how much is being spent, where it is being spent, what it is being spent on and for whom, how spending has changed over time, and how it compares with spending in other countries. NHA can play an essential role in assessing the success of a health system and in identifying opportunities for improvement.

1.03. Health accounts are distinguished from other forms of expenditure review by one or more of the following:

- They classify the types and purposes of all the expenditures and all the actors in the health system, using a classification that is consistent with other socioeconomic accounting frameworks.
- They provide a complete accounting of all spending on health, regardless of the origin, destination, or object of the expenditure.
- They adopt a rigorous approach to collecting and cataloguing data, and to estimating flows of money related to health expenditure.

1.04. When constructed properly, a country's health accounts complement other reporting systems, to provide a more complete picture of the performance of the health system. Because of the similarity between the measurement concepts underlying the NHA and the system of national accounts used to estimate a country's gross domestic product (GDP),¹ health accounts can be used to illuminate the relationship between health spending and the total output of the economy. Because of the way in which financing is displayed, health accounts can help in understanding the roles of government, industry, households, and external organizations in the purchase of health care. Because of their reliance on standardized classifications of providers and functions, NHA illustrate the linkages between financing and delivery or outcomes of health services and goods.

¹ While the NHA methodology was developed using the principles and tools of the System of national accounts (2), it should be noted that the aggregate value of total expenditure on health, as built by NHA, is not exactly comparable to the construction of GDP. This may affect the health to GDP ratio for regions as they are smaller entities. More information is available on www.who.int/nha.

1.05. National health accounts can be an important tool in the stewardship of a health system. In addition to giving a picture of the financial state of the health system, health accounts can provide government and others with information that can be used to design better health system policies. Experience in the countries that have developed and used health accounts has shown that the accounts are helpful in answering questions such as:

- How are resources mobilized and managed for the health system?
- Who pays, and how much is paid, for health care?
- Who provides goods and services, and what resources do they use?
- How are health care funds distributed across the different services, interventions and activities that the health system produces?
- Who benefits from health care expenditure?

(See www.who.int/nha/use/en/ for examples and more details.)

1.06. The ideal NHA possess a number of characteristics, which are vital for their successful use in policy development and evaluation. They are *comprehensive*, covering the whole health system and all the entities that act in, or benefit from, the system. They are *consistent*, using the same definitions, concepts, and principles each time an entity or transaction is measured. They are *comparable* across time and space, allowing evaluation of changes in health expenditure over the years and of differences between different geopolitical entities. They are *compatible* with other aggregate economic measurement systems, so that health expenditure can be examined in an overall economic context. They are *timely*, providing accurate and useful information when policy-makers need it. They are *accurate*, so that policy-makers can safely use the information they contain to make sound decisions. They are *sensitive to policy concerns*, providing a level of detail needed for good macroeconomic planning. And they are *replicable*, which means that sufficient information is provided for users to be able to assess the validity of the figures they contain and for staff to update and extend them.

Regional health accounts in the context of NHA

1.07. Because the creation and maintenance of national health accounts are typically driven by the needs of political policy-makers, it is not surprising that among the first subaccounts requested are those for geopolitical subdivisions of the country. This is the case whether the health system is centralized or decentralized, and publicly or privately financed, because regional health accounts² help to answer essential questions about the health system, as listed below.

1.08. *Is the system equitable?* Are transfers from the central government to regions consistent with the goal of spreading the burden of health care spending evenly across the population? Are residents of some regions more heavily burdened by that spending than

² To be in line with the United Nations' *System of national accounts 1993* (2), accounts for areas smaller than the country are referred to as "regional health accounts" in this guide. The term "regional" is generic and can apply to any partition of the country; usually, this partition is geographical (by region, district, state, province, municipality, etc.). But regional health accounts can be constructed for any organizational structure, whether political, economic, or geographical.

those of other regions? Coupled with income estimates for the regions, health accounts can answer these questions directly.

1.09. *Is the system efficient?* Do some regions produce the same level of care as others at a lower cost? Do some regions produce more “health” for a given level of expenditure? Health accounts cannot answer the attendant “why?” question, but they can indicate where the investigation should begin, especially when coupled with information on outcome measures (morbidity and mortality) and process measures (such as number of hospital beds, health sector employment, and inpatient days of care).

1.10. *What effect does the financing system have on outcomes?* Combined with other data, regional health accounts can help to examine whether the financing mechanism exacerbates, has no effect upon, or in fact mitigates health disparities and inequities across regions. They can also help identify ways in which financing mechanisms can be used to reduce these disparities and inequities.

1.11. *How successful has the decentralization of health care financing been?* Where the central government has begun devolving responsibility and accountability for health care to subnational governments, how have financing patterns evolved? Are regional differences in the financing burden changing? Regional health accounts, especially considered in time series, can provide direct answers to these and related questions.

1.12. From the discussion that follows in this guide, it should be clear that, ideally, regional health accounts should be created in conjunction with national health accounts. This leads to efficiencies in time, data collection, conceptual work, and estimation, all of which will be of great value to the health accounts team. If the national health accounts have not been started, the team should seriously consider doing the two exercises together.

Box 1. Challenges faced in constructing regional health accounts

The following challenges are specifically related to the construction of regional health accounts (as opposed to national ones):

- Central/national data have to be disaggregated using a key; the challenge is to use a key that will allow significant results to be produced.
- Comparison between regions is more sensitive than comparison between countries; it is therefore important to ensure that the same methodology is used in different regions (training of team, use of same data collection methods and distributional keys, etc).
- Production data cannot be used as freely in regional accounts as in NHA, since cross-regional imports and exports of health care services and goods may be hard to track.

1.13. Even when the extent, focus and detail of regional health accounts differ from those at the national level, it is essential to use a framework that is consistent with the national health accounts. The same definitions, classifications, inclusions, and exclusions should be used across all regions and for the country as a whole. This is the case whether

the estimates are built “top-down” – basing the regional estimates on a national figure – or “bottom-up” – basing the national estimate on a sum of regional figures. Not only does this save considerable time and effort on the part of the health accounts team (although those savings alone would warrant the decision); it is also the only way to allow the region’s experience to be compared with that of the country as a whole, or of other regions. Lack of such comparability is a significant shortcoming of many of the regional health accounts developed to date.

Structure of this guide

1.14. This guide roughly follows the outline of the more expansive NHA Guide (1), from which a good deal of its material is drawn. Chapter 2 contains a discussion of the boundaries and concepts that characterize the health sector. Following this is a discussion of how to plan the regional health accounts process (Chapter 3). This includes some suggestions about the staff and other resources required. This chapter also includes a condensed discussion of the classification schemes that appear in the NHA Guide, and offers recommendations for the output of the health accounts process.

1.15. Chapters 4 and 5 provide some specific “how-to” suggestions. The strengths and weaknesses of the various types of data found at regional and national level are reviewed, with a particular focus on their use in regional health accounts. Following this review is a discussion of techniques that have been used in successful regional health accounts projects.

1.16. Chapter 6 contains a discussion of the reporting and documenting of the regional health accounts. Both of these activities are critical: the whole purpose of the exercise is to inform policy, so results must be disseminated in a useful way. At the same time, a chronicle of how these results were derived is essential, in order to be able both to defend the results and to replicate the exercise in the future.

1.17. Chapter 7 contains some helpful recollections and recommendations from teams that have already done regional accounts in their own countries.

1.18. Finally, a numerical example, extending the experience in the fictional country of Appia (introduced in the NHA Guide), shows how the techniques described in the NHA Guide might be applied in a regional health accounts exercise. Numerous examples from actual country experience are presented throughout this guide, but a theoretical exercise, such as Appia, has the advantage of allowing one to focus on the general approach without having to deal with the exceptions usually found in real life.

CHAPTER 2. ESTABLISHING THE CONCEPTUAL FRAMEWORK OF THE REGIONAL HEALTH ACCOUNTS

2.01. Two critical decisions must be made early in the regional health accounts project: how is spending to be partitioned among regions and what exactly is to be measured.

Partitioning the country into regions

2.02. There is no hard-and-fast rule on how to partition the country into regional units. The division may be made on the basis of health administrative regions, political units, administrative regions, economic regions, or geographic regions. The decision will almost certainly be based on the needs of national and regional policy-makers, as geopolitical health subaccounts are seldom the subject of international comparison. Often the decision is influenced by the availability of data (or the ability to allocate available data in a defensible way). Of course, if spending in different regions is to be compared, it is important that they be mutually exclusive. It also helps if, together, they account for all of the country's health spending, as this allows the NHA to be used in the estimation process, either as a source of control totals or as a denominator in making comparisons. Alternatively regional health accounts can be added up to produce NHA.

2.03. In defining the subnational units, care must be taken to establish consistent geographical boundaries. In several Latin American countries, for example, the ministry of health and the social security institution define subnational units differently. In such cases, geographical boundaries have to be reviewed carefully to ensure that the subnational entities are comparable before data from different sources are aggregated.

Choosing the appropriate measure of health spending

2.04. When creating regional subaccounts, a decision must be made concerning the NHA figure to be analysed: total health expenditure? personal health care expenditure? or some other subtotal of health spending?

2.05. First, though, what is "health spending"? In its *World Health Report 2000* (3), WHO defined a health system as including "all the activities whose primary purpose is to promote, restore or maintain health." Independently developing a definition in terms of economic transactions in the economy, the Organisation for Economic Co-operation and Development (OECD) (4) proposed that activities of health care in a country should be taken as comprising "the sum of activities performed either by institutions or individuals pursuing, through the application of medical, paramedical, and nursing knowledge and technology, the goals of

- promoting health and preventing disease;
- curing illness and reducing premature mortality;
- caring for persons affected by chronic illness who require nursing care;

- caring for persons with health-related impairment, disability, and handicaps who require nursing care;
- assisting patients to die with dignity;
- providing and administering public health;
- providing and administering health programmes, health insurance and other funding arrangements.”

2.06. Health expenditures refer to the resources consumed in market or market-like transactions associated with carrying out these activities. Thus, the boundary of the health accounts is set in terms of the intended functions of activities in the economy: activities intended to improve health, change health-related behaviour, or change the systems performing or financing the activities are included. The job of operationalizing this boundary falls to the country’s health accountants and their policy audience. The NHA Guide provides considerable detail on how to make decisions in this area.

2.07. Several points need to be made with respect to establishing the boundaries of health expenditures. First, the same rules should be applied when deciding which transactions in the economy are to be included in regional and national health accounts. Otherwise it will be difficult, or even impossible, to compare regional results with each other or with the national total. It will also be difficult or impossible to take advantage of work that has already been done at the national level. As mentioned earlier, efficiency is a significant reason for developing regional accounts as part of a larger national exercise.

2.08. Second, in making their estimates, the health accounts team will need to place a value on the activities included in the health accounts. In some cases, this is simply a matter of recording the value of market transactions. In other cases, the team will have to estimate a “market” value for the resources used to produce goods or services. In either case, care must be taken to measure the value of transactions and activities in the same way as in the national health accounts.

2.09. Third, there is no clear line separating included and excluded activities; for example, public sanitation services in general are excluded, but specific sanitation measures implemented to combat a specific disease may be included. Again, regional health accounts should be harmonized either to conform to the national health accounts in terms of what is included or excluded, or to allow eventual compilation into one NHA.

2.10. Because the boundary of the health accounts is defined in terms of the nature of the activity being performed, it is essential to have a sound way of categorizing those activities. As explained in greater detail in the NHA Guide, such a scheme is found in the OECD’s International Classification for Health Accounts functional classification of health care (ICHA-HC) (4). The ICHA-HC categorizes the types of goods and services produced by health care providers and by institutions and actors engaged in activities related to health care. As such, it plays an important role, not only as a basis for identifying transactions that lie within the health accounts boundary, but also as a basis for deciding which transactions contribute to the various specific aggregate measures of health expenditure. Unless there is a compelling reason not to do so, the health accounts

team should construct their work so that it conforms to, or can be translated to, the ICHA-HC categories, both nationally and regionally.³

Table 1. ICHA-HC classification of functions of health care

ICHA code	Description
HC.1	Services of curative care
HC.1.1	Inpatient curative care
HC.1.2	Day cases of curative care
HC.1.3	Outpatient curative care
HC.1.3.1	Basic medical and diagnostic services
HC.1.3.2	Outpatient dental care
HC.1.3.3	All other specialized medical services
HC.1.3.4	All other outpatient curative care
HC.1.4	Services of curative home care
HC.2	Services of rehabilitative care
HC.2.1	Inpatient rehabilitative care
HC.2.2	Day cases of rehabilitative care
HC.2.3	Outpatient rehabilitative care
HC.2.4	Services of rehabilitative home care
HC.3	Services of long-term nursing care
HC.3.1	Inpatient long-term nursing care
HC.3.2	Day cases of long-term nursing care
HC.3.3	Long-term nursing care: home care
HC.4	Ancillary services to medical care
HC.4.1	Clinical laboratory
HC.4.2	Diagnostic imaging
HC.4.3	Patient transport and emergency rescue
HC.4.9	All other miscellaneous ancillary services
HC.5	Medical goods dispensed to outpatients
HC.5.1	Pharmaceuticals and other medical nondurables
HC.5.1.1	Prescribed medicines
HC.5.1.2	Over-the-counter medicines
HC.5.1.3	Other medical nondurables
HC.5.2	Therapeutic appliances and other medical durables
HC.5.2.1	Glasses and other vision products
HC.5.2.2	Orthopedic appliances and other prosthetics
HC.5.2.3	Hearing aids
HC.5.2.4	Medico-technical devices, including wheelchairs
HC.5.2.9	All other miscellaneous medical goods
HC.6	Prevention and public health services
HC.6.1	Maternal and child health; family planning and counselling
HC.6.2	School health services
HC.6.3	Prevention of communicable diseases
HC.6.4	Prevention of noncommunicable diseases
HC.6.5	Occupational health care
HC.6.9	All other miscellaneous public health services
HC.7	Health administration and health insurance
HC.7.1	General government administration of health
	General government administration of health (except social security)
HC.7.1.1	
HC.7.1.2	Administration, operation and support of social security funds

³ The SHA manual (4) points out that ICHA schedules are tied to other international classifications of economic activity. This may not be so important for health accountants, but it is a useful feature to emphasize when discussing the health accounts project with the statistical office. For example, the Mexican accounts team found that, once the statistical office realized that ICHA was based on the Industrial Classification developed for the North American Free Trade Agreement, they felt it was acceptable to use it.

HC.7.2	Health administration and health insurance: private
HC.7.2.1	Health administration and health insurance: social insurance
HC.7.2.2	Health administration and health insurance: other private
HC.nsk	HC expenditure not specified by kind
HC.R.1–5	Health-related functions
HC.R.1	Capital formation for health care provider institutions
HC.R.2	Education and training of health personnel
HC.R.3	Research and development in health
HC.R.4	Food, hygiene and drinking-water control
HC.R.5	Environmental health
HC.R.nsk	HC.R expenditure not specified by kind

Source : NHA guide, table 3.2

2.11. The ICHA-HC schedule is very detailed and specific, and few countries have information on all the categories listed. Therefore, in practice, the number of categories may be limited to those that are relevant and feasible. It is advisable to keep as much detail as possible in the working tables, even though for display purposes the accounts may show detail only at the 2-digit level. It is also likely that the health accounts team will want to create additional subcategories of health expenditure to address country-specific policy issues. (See chapter 4 of the NHA Guide (1) and chapter 9 of *System of health accounts* (SHA) (4).)

2.12. While policy-makers want – and need – fairly detailed information about the various health care functions financed in their country, they also want and need a summary figure. This summary figure provides a snapshot view of the size and growth of the health system. It also provides a context for thinking about the detailed categories of spending. It is therefore important to define the aggregate measure carefully.

2.13. In its SHA manual (4), the OECD proposed three measures of health spending for use in international comparisons:

- Total expenditure on personal health care. This is the sum of expenditures classified under categories HC.1 to HC.5 and covers spending for goods and services directed at the care of specific individuals (as distinct from collective health or public health services).
- Total current expenditure on health (TCHE). This is the sum of expenditures classified under categories HC.1 to HC.7. It includes spending on personal health care, as defined above, plus spending on collective health services and on the operation of the system’s financing agents.
- Total expenditure on health (THE). This aggregate includes TCHE plus capital formation by health care provider institutions (HC.R.1).

2.14. In addition to TCHE and THE, the SHA manual encourages countries to estimate the other elements of health-related expenditure (categories HC.R.2 to HC.R.5) and to report these as “memorandum items”.

2.15. Policy-makers in different countries may have different ideas about what constitutes total health expenditure. For national policy purposes, some countries may want to include other health-related activities in addition to capital investment in their estimate of total health spending. Activities such as medical education and health-related professional training, health-related research, and health-related nutritional or

environmental programmes may also be seen as integral parts of the health system, which should be included in national estimates of total health expenditure.

2.16. Health accountants should establish an aggregate measure that best addresses the needs and concerns of national policy-makers. This aggregate may be TCHE or THE, or it may be another measure that includes any of the health-related functions in the ICHA-HC classification or the national variant of that classification. The important points are that the measure itself should be consistent over time, that it should be well defined, and that it should be clearly explained to users of the accounts. This aggregate can be called national health expenditure (NHE), as in this guide, or whatever other name conveys the sense of the measure.⁴

2.17. The choice of health expenditure concept depends on the needs of policy-makers. Do they want to look at the delivery of medical care? If so, the appropriate measure would be personal health care expenditure (HC.1–HC.5). Are they interested in the broader engagement of public health care? If so, it is appropriate to add HC.6 to the basket of activities to be estimated. Are policy-makers interested in the efficiency of the health care financing system? If so, then HC.7 should be added as well. Typically, there is less interest in geopolitical variation in the health-related categories of spending, so that regional health accounts might cover a subset of national health expenditure. However, health accountants may be asked, for example, to show the distribution of health facility construction, and it might be prudent to give some thought in advance to how this might be done. In fact, since policy-makers who receive information they have requested often come back with requests for additional data, the best course of action may be to include all categories of national health expenditure in the regional health accounts, preserving subtotals at the regional level. In any case, the regional accounts measures should be constructed to be consistent with the equivalent national measure or – if constructing NHA from regional accounts – with each other.

Attributing expenditures to place of residence or place of service

2.18. The second critical design issue to be addressed in constructing regional health accounts is how to assign health sector transactions to the regions. There are two options. One is to distribute expenditures among regions according to the place of residence of the beneficiaries or users of the service. The other option is to distribute expenditures according to the place where the service is provided. This choice – which may be influenced by the data available or by the needs of policy-makers – is probably the most important methodological decision to be made during the creation of geopolitical subaccounts, and needs careful consideration.

2.19. These two ways of organizing data are appropriate for different sets of policy concerns. Organizing by place of residence highlights differences in regional patterns in use of health care services. It also allows the burden of health care consumption to be compared, through the ratio of health expenditure to regional income.

⁴ See paragraphs 3.21 to 3.25 in the NHA Guide (1).

2.20. Organizing by place of service, on the other hand, highlights the use of funds by regional authorities (including those used to pay for treatment of people from other regions). It allows the importance of the health sector in different regions to be compared, through the ratio of health spending to regional domestic product.

2.21. Place-of-residence and place-of-service accounts will produce similar results to the extent that the regional health systems are self-contained (that is, to the extent that few people travel from one region to another to receive care). Usually, however, regional health systems are not self-contained. The difference between the two measures is particularly important if expenditure per capita is being examined. For example, tertiary-care facilities (such as university hospitals or specialty clinics) that provide services to the entire population are typically located in a limited number of regions. Allocating the expense of such a facility only to the residents of the region in which it is located seriously overstates per capita expenditure in the region. Similarly, if – because of its healthy climate – one region of the country is the centre of the rehabilitative care industry, per capita spending in that region will be seriously distorted if all expenditures in such facilities are allocated to the region. If the intent of the regional health accounts is to show how much the population of a specific region spends on its health care, there will be an overestimation in the utilization of some health care providers if there is no control for people from other regions treated by those providers.

Box 2. Place of residence

Measuring expenditures by place of residence means measuring expenditure on health care “imported” to the region (that is, a resident seeking care outside of the region, whether in another region of the country or abroad), and excluding “exports” of health care provided in the region to non-residents. Independently of where the purchaser or the provider is located, all health care goods and services are accounted for under the health accounts of the region of residence. So, medicines purchased by a resident of Region X, paid for by the resident and reimbursed up to 20% by central government, will be fully accounted for in the health accounts of Region X.

2.22. Of course, nothing precludes the construction of regional health accounts both by place of service and by place of residence. In fact, many data sources can provide information to build both sets of figures simultaneously. The advantage of producing both types of accounts is that the effect of “medical migration” can be seen by comparing the two sets of estimates (see Box 3). The controlling factor in deciding to do one type of

Box 3. Constructing accounts by both place of residence and place of service

Constructing regional accounts by place of residence and by place of service allowed the health accounts team in Hungary to observe that “residents of the (central) region of Budapest-Pest county consumed 26 per cent more healthcare services than the region would receive on the basis of their characteristics and that the healthcare institutions in the region received 34 per cent more resources that they would receive than the national average in similar institutions. In contrast, the inhabitants of Szeged, Debrecen and Miskolc regions consumed between 10 and 15 per cent fewer healthcare resources than in case of a need-based allocation, while providers working in these regions received 15 per cent less resources. Thus while, consumption of healthcare resources located in Budapest by residents of other regions served to reduce inequalities, individuals living in the capital region nevertheless consumed much more than similar people living in less well endowed regions” (www.oecd.org/dataoecd/13/40/1883815.pdf).

account or both is the resource constraint on the health accounts project. First experiences at regional health accounts tended to be “production” regional accounts (that is place-of-service) because data for these were more easily available. In some cases, regions have used a mix of information, because of lack of resources. We strongly recommend against using this shortcut, as it will weaken the data produced and run the risk of the accounts not being recognized and used.

2.23. If resources exist to produce only one type of account, the better choice, from the standpoint of health policy (as opposed to economic policy), is to organize by place of residence. Typically, health policy-makers are concerned with the equity with which the burden of the health spending is distributed, especially in economies that are decentralizing. Place-of-residence accounts are much better suited to address this type of concern. These guidelines will cover only the building of regional accounts from the perspective of place of residence.

2.24. It may be that data limitations influence the choice of account type. For example, if heaviest reliance is placed on provider data, there may be insufficient information available to allocate a provider’s revenues to patients from different regions, in which case a place-of-service account may be the only practical choice. It may be helpful to build the place-of-service account first and then use other data to move to a place-of-residence account (see Box 4).

Box 4. Staging estimates by place of service or place of residence

Estimates of health spending in the USA are based on “a wealth of State-level information collected by the Federal Government for other purposes”. But the establishment-based expenditure figures place spending in the state of the provider rather than in the beneficiary’s state of residence. In their report, the health accounts team warns against “computing per capita health spending using State-of-provider expenditure data and resident population because of the misalignment between State of provider and State of residence.” The team plans to estimate border crossing for health care services and produce residence-based estimates in a subsequent report.

The report on the US state estimates can be found at www.cms.hhs.gov/NationalHealthExpendData/.

CHAPTER 3. STRUCTURING AND STAFFING THE PROJECT

3.01. After identifying the policy issues and research questions to be informed by the geopolitical subaccounts, the health accounts team needs to develop a project plan. This plan should address the logistics of the project, and give a timetable for its completion, and a profile of the health financing system, identifying actors and transactions.

Logistics⁵

3.02. Whether done as part of a larger national health accounting exercise or as a stand-alone exercise, regional health accounts are the product of four factors – people, equipment, data, and time – the requirements for which are in large part inter-related.

People

3.03. The human resources needed will depend on the nature of the process. Where the exercise is mostly centrally located, the team that prepares the national accounts will probably be employed. This may be a small group of experts working for or with concerned government agencies, or perhaps a single individual. The team members should be familiar with national economic statistics and accounting practices, with the country's health system and health policies, and with the data and information generated by different entities in the health system. The most important attributes of a health accountant are a facility with numbers, a willingness to question those numbers, a willingness to look for and consider alternatives to existing data sources, and an ability to link the “numbers” with the “big picture”. However, because health accounting requires a great deal of interaction with people in various parts of the health sector, at least one of the team members should have the social skills – and preferably the connections as well – to get responses from those people. Similarly, while health accounting does not necessarily require a training in economics, having at least one health economist available — if only as a consultant — is very helpful. Where practical, the health accounts team should include staff from several different organizations. This variety of backgrounds provides access to many different data sources that may be unknown to any one organization, and allows results to be appraised from different standpoints.

3.04. The more the workload is distributed among the regions concerned, the greater the size of the team will need to be. Correspondents at the regional level should be chosen for their familiarity with the health care financing situation in their region and with the strengths and weaknesses of data sources regarding that financing, and for their willingness and ability to commit to the time and cooperation needed to build and populate the regional health accounts. Special care must be taken to acquaint these correspondents with the goals and principles of health accounting, to ensure maximum

⁵ See also paragraphs 2.07–2.14 in the NHA Guide.

consistency in information reported from different regions. As the size of the project team increases, so does the importance of good leadership and communication skills.

3.05. As with national health accounts, experience suggests that regional health accounts benefit from the existence of a steering committee. A committee of high-level representatives from stakeholder organizations can help to keep the project on track. Such organizations include the ministries of health, finance, and planning, the national statistical office, the social health insurance organization, academic groups, and provider and consumer organizations. Developing health accounts – national or regional – often requires support from different institutions and health system regulators, and it is useful to have representatives on the steering committee who can request, or even require, their organizations to produce needed information or to validate available figures. A steering committee can also serve as an authoritative conduit for communicating findings to policy-makers, and facilitate the institutionalization of health accounts by establishing ownership at a high level of the nation’s sociopolitical organization. And, because of their connections to and involvement in the health sector, steering committee members can play a valuable role in establishing the research questions to be answered with the regional health accounts and in identifying sources of data for the accounts.

Equipment

3.06. Health accounts are data-intensive, but the tools required to maintain them are not necessarily expensive. The tables can be assembled using off-the-shelf spreadsheet software on a basic desktop computer. The same spreadsheet software can be used to develop graphics and charts. It is likely that the development of regional health accounts will require more data storage and retrieval capacity than the national accounts, with a consequent need for some form of electronic data warehousing. However, most often the data can be managed using off-the-shelf database software. While regional health accounts do not require a lot of computing power, there are times when large survey datasets must be processed. In these instances, the services of another organization (such as the national statistical organization) may be available to do that processing. If not, a more powerful desktop computer and a good statistical software package will be necessary.

Data

3.07. Health accounts require a great deal of data (see Chapter 4 for a more detailed discussion of this subject). Data on various types of government and private expenditure are needed, and can often be found in readily accessible sources, such as government financial accounts and records, reports of health insurance agencies, and survey reports. Much can be done with information that is already available; even limited and incomplete data can yield useful findings and stimulate greater interest in acquiring more knowledge. As with national health accounts, however, it is likely that some new data will need to be collected to complete the accounts. Two of the primary roles of the steering committee are to advocate the collection of new data and to secure access to all existing data sources. As important as the collection of data is the possibility to replace published

records — usually official statistics — with better estimates when relevant studies exist.⁶ The value of a set of health system accounts depends on the quality of the data that underlie them as much as on the staff who prepare them.

Time

3.08. The time needed to complete regional health accounts varies widely. The nature and maturity of the country's data systems, the size and experience of the health accounts team, and the extent to which similar work has already been undertaken all factor into the equation (see Box 5). One of the early tasks of the health accounts team is to establish a time line for the project, at which point these considerations can be evaluated. In a number of countries the regional health accounts are prepared at the same time as the national health accounts.

Box 5. How long do subaccounts take to build?

In Mexico, the health accounts team worked with four states to adapt the health accounts methodology to the Mexican context, a process that took about a year and involved one or two people per state. At the same time, the team asked states to start collecting data using an adapted version of the ICHA. This is a continuous and ongoing process. The team was able to get the first estimates after one year, again with at least one person working per state – although these people were not working exclusively on the health accounts.

Developing a preliminary sketch of the nation's health system⁷

3.09. The goal of health accounting is to array information about a nation's health system in ways that facilitate health planning, policy, and evaluation of system performance. To do this, health accountants must develop pictures of the flows of resources through the health system, refining the overall picture of the system so that details emerge. In preparing to develop regional health accounts, the team must pay particular attention to levels of decentralization, and develop a flow-of-funds chart depicting the sources of those funds, the intermediaries, and where they are spent. This is important not least because local governments may have funding sources that do not show in the rolled-up NHA flow of funds.

3.10. It is important to start the accounting exercise with some overall picture of what the health system looks like. Just as explorers start with existing maps as they develop a detailed description of a terrain, the health accounts team will use this preliminary sketch of the health care system to guide their efforts in classifying and measuring resource

⁶ A delicate balance must be struck here. On the one hand, where "official" statistics are incomplete every effort must be made to have them replaced with more accurate numbers. On the other hand, it takes time to have new results recognized as official, and this may delay the production or acceptance of the health accounts.

⁷ See also paragraphs 2.15–2.18 in the NHA Guide.

flows. Such a sketch may already exist in some form, especially if national health accounts have already been developed. Alternatively, it may be necessary to prepare such a sketch, on the basis of information supplied by key informants. In either case, it is advisable to review the material as an orientation exercise. Especially where responsibility for health care has been devolved to subnational units, the team should be alert to regional variations in the structure of the health system.

3.11. Development of this picture will benefit greatly from a diversity of inputs. Key informants — members of the steering committee, analysts from ministries, health boards, and trade associations, and academic researchers — each have a perspective that provides additional information. The nascent health accounts team that takes the time to hold a brainstorming session to develop this sketch will find their effort well rewarded.

3.12. The utility of this type of sketch lies in its providing initial guidance to the health accounts team. It is not essential to have detailed information — that comes later. The sketch helps the health accounts team to organize their early efforts, so that they can deal with what appear to be the main actors in the system, and points to sources of information, data repositories, and additional key informants.

3.13. The picture should be viewed as a preliminary sketch rather than a final portrait. The charts of early explorers were refined by subsequent explorations that changed both small details and large features. Similarly, the health accounting project may very well change the commonly held perception of the health system. The health accounts team should bear this in mind as they undertake their work, and keep an open mind about the number, relative position, and activities of the actors in the health system.

Categorizing the actors in the health system

3.14. Having defined the boundaries of health expenditure and the nature of the geopolitical regions to be analysed, and having sketched out the nature of the health care financing system, the health accounts team must find a way to sort the various actors in the system into categories. These categories must be meaningful for the end-users of the health accounts, and must conform to the data and data systems that underlie the health accounts.

3.15. The categories in any classification scheme need to be *mutually exclusive* and *exhaustive*. Mutual exclusivity means that any given entity can go into only one category. Exhaustiveness means that each and every entity can go into one category. Together, they mean that each entity goes into exactly one category. These two characteristics of classification schemes are critical to the success of the health accounts. Schemes that are not exhaustive will result in gaps in the coverage of health expenditure. Schemes that are not mutually exclusive will result in overestimates of spending where transactions or activities are counted twice. While exhaustiveness is fairly easily identified in a scheme, violation of the mutual exclusivity condition can be quite subtle. Typically it arises where two or more attributes of health spending are combined, such as a mix of provider types and function types, or when two or more attributes can be used to define the unit of analysis, such as diagnoses provided during a medical encounter (is it diagnostic care or

curative care). Health accountants must take great pains to make sure that their classification schedules (or decision rules) exhibit mutual exclusivity and exhaustiveness.

3.16. Fortunately, considerable effort has already been put into development of such schedules at the international level. The International Classification of Health Accounts (4) contains schedules for sorting financing agents and providers into mutually exclusive and exhaustive categories.⁸ A compatible schedule for classifying sources of funds used to pay for health was developed for the NHA Guide (1). These schedules are shown in the following sections.

3.17. This guide has been written with the assumption that the ICHA classifications are used in the national health accounts. If that is not the case, the reader should substitute the appropriate schedules. As mentioned earlier, it is important that the same broad classification structure is used to group entities in regional health accounts and at the national level. If this is not done, the wealth of information already developed cannot be tapped to build or cross-check the regional health accounts. Additional levels of detail can be added; on the other hand, it may be necessary to combine some categories at the subnational level where detailed data are not available.

3.18. The ICHA can best be understood if the following model is used to describe the health system:

<i>Functions of health care ...</i>	such as inpatient care or administration	classified by ICHA-HC
... are generated by		
<i>providers of care ...</i>	such as hospitals or pharmacists	classified by ICHA-HP
... who are paid by		
<i>financing agents ...</i>	such as Ministry of Health, social security, or households	classified by ICHA-HF
... who get their money from		
<i>sources of funds</i>	such as general tax revenue or donor organizations	classified by FS

Providers

3.19. Providers are the entities that produce or distribute the final goods, final services, and activities that fall within the health accounts boundary. The recommended classification scheme is very close to that in the SHA manual (4), differing only in the addition of a class of providers of health-related services such as biomedical research. The team should draw a distinction between the *providers* of health care and the *producers of goods and services used in that care*. In particular, the activity of pharmaceutical manufacturers is excluded from the accounts. The value of pharmaceutical products is registered in the accounts, not when those products are

⁸ As this guide went to print, a second edition of the SHA manual was in preparation. It is likely that the ICHA will be modified in the second edition.

manufactured, but rather when they are dispensed to outpatients through a hospital, pharmacy/chemist, clinic, or some other provider of care. Pharmaceuticals that are exported are not counted at all.

Table 2. ICHA-HP classification of providers of health care

ICHA code	Description
HP.1	Hospitals
HP.1.1	General hospitals
HP.1.2	Mental health and substance abuse hospitals
HP.1.3	Speciality (other than mental health and substance abuse) hospitals
HP.1.4	Hospitals of non-allopathic systems of medicine (such as Chinese, Ayurveda, etc.)
HP.2	Nursing and residential care facilities
HP.2.1	Nursing care facilities
HP.2.2	Residential mental retardation, mental health and substance abuse facilities
HP.2.3	Community care facilities for the elderly
HP.2.9	All other residential care facilities
HP.3	Providers of ambulatory health care
HP.3.1	Offices of physicians
HP.3.2	Offices of dentists
HP.3.3	Offices of other health practitioners
HP.3.4	Out-patient care centres
HP.3.4.1	Family planning centres
HP.3.4.2	Outpatient mental health and substance abuse centres
HP.3.4.3	Free-standing ambulatory surgery centres
HP.3.4.4	Dialysis care centres
HP.3.4.5	All other outpatient multi-specialty and cooperative service centres
HP.3.4.9	All other outpatient community and other integrated care centres
HP.3.5	Medical and diagnostic laboratories
HP.3.6	Providers of home health care services
HP.3.9	Other providers of ambulatory health care
HP.3.9.1	Ambulance services
HP.3.9.2	Blood and organ banks
HP.3.9.3	Alternative or traditional practitioners
HP.3.9.9	All other ambulatory health care services
HP.4	Retail sale and other providers of medical goods
HP.4.1	Dispensing chemists
HP.4.2	Retail sale and other suppliers of optical glasses and other vision products
HP.4.3	Retail sale and other suppliers of hearing aids
HP.4.4	Retail sale and other suppliers of medical appliances (other than optical glasses and hearing aids)
HP.4.9	All other miscellaneous sale and other suppliers of pharmaceuticals and medical goods
HP.5	Provision and administration of public health programmes
HP.6	General health administration and insurance
HP.6.1	Government administration of health
HP.6.2	Social security funds
HP.6.3	Other social insurance
HP.6.4	Other (private) insurance
HP.6.9	All other providers of health administration
HP.7	Other industries (rest of the economy)
HP.7.1	Establishments as providers of occupational health care services
HP.7.2	Private households as providers of home care
HP.7.9	All other industries as secondary producers of health care
HP.8	Institutions providing health-related services
HP.8.1	Research institutions
HP.8.2	Education and training institutions
HP.8.3	Other institutions providing health-related services
HP.9	Rest of the world

Source : NHA guide, table 4.3

3.20. The health accounts team may create specific subcategories of providers to accommodate particular characteristics of the health system or actors of particular policy interest. For example, hospitals may be classified according to ownership, with HP.1.1.1 being Ministry of Health general hospitals, HP.1.1.2 being district general hospitals, and so on. This is perfectly acceptable; indeed, it is to be encouraged to the extent that the data support the distinction, that policy warrants it, and that there is sufficient time. (See paragraphs 4.10–4.19 in the NHA Guide (1), and chapter 10 of the SHA (4) for definitions of each provider).

Financing agents

3.21. Financing agents are institutions and entities that pay for or purchase health care. They include institutions that pool funds collected from different sources, as well as entities that pay directly for health care from their own resources – most notably, households and firms.

3.22. As for providers of care, it is quite likely that the health accounts team will want to extend the ICHA-HF classification to address specific policy concerns. For example, the territorial government subcategories may be further subdivided to show individual ministries; or out-of-pocket payments may be subdivided to show cost-sharing at government facilities, co-payments and deductibles under insurance plans, and direct payments for other services. (See paragraphs 4.03–4.09 in the NHA Guide (1) and chapter 11 of the SHA (4) for definitions of financing agents.)

Table 3. ICHA-HF classification of health care financing

ICHA code	Description
HF.1	General government
HF.1.1	Territorial government
HF.1.1.1	Central government
HF.1.1.2	State/provincial government
HF.1.1.3	Local/municipal government
HF.1.2.	Social security funds
HF.2	Total private
HF.2.1	Private social insurance
HF.2.2	Other private insurance
HF.2.3	Private households' out-of-pocket payment
HF.2.4	Non-profit institutions serving households (other than social insurance)
HF.2.5	Private firms and corporations (other than health insurance)
HF.3	Rest of the world

Source : NHA guide, table 4.1

Sources of funds

3.23. The sources of funds are the actors who provide the money spent through the financing agents classified above. In some cases, the source of funds and the financing agent are the same – for example, households who spend money out-of-pocket for health care act both as a source of funds and as a financing agent. Although the distinction may

seem confusing and arbitrary at first, its logic will become more apparent as the team progresses through the accounting exercise.

3.24. The NHA Guide (1) contains a suggested schedule for classifying sources of funds, which is reproduced here. (See paragraphs 4.20–4.26 in the NHA Guide). The SHA (4) does not present a schedule for classifying sources of funds.

Table 4. Proposed classification scheme for financing sources (FS)

Code	Description
FS.1	Public funds
FS.1.1	Territorial government funds
FS.1.1.1	Central government revenue
FS.1.1.2	Regional and municipal government revenue
FS.1.2	Other public funds
FS.1.2.1	Return on assets held by a public entity
FS.1.2.2	Other
FS.2	Private funds
FS.2.1	Employer funds
FS.2.2	Household funds
FS.2.3	Non-profit institutions serving individuals
FS.2.4	Other private funds
FS.2.4.1	Return on assets held by a private entity
FS.2.4.2	Other
FS.3	Rest of the world funds

Source : NHA guide, table 4.5

Deciding which tables and displays to produce

3.25. Like national health accounts, regional health accounts can be visualized as a set of tables displaying various aspects of a region’s health expenditure. In this sense, the tables serve two purposes. One is to show estimates of health expenditure in ways that are meaningful to decision-makers. The tables described here – and others similar to them – can be linked to fundamental policy questions such as:

- How are resources for health and health care mobilized? Who pays out the money?
 Who provides the money to be paid, and how?
- How are those resources organized and managed?
- What goods and services are provided and by whom?

3.26. NHA tables cross-tabulate any two of the dimensions of health expenditure (sources, agents, providers or functions). One of these dimensions can be thought of as the “origin” of the funds and the other dimension as the “use” of the funds. By convention, the origin dimension is shown as columns in the table, and the use dimension is shown as rows. Following this convention, each cell in the table shows the amount of resources used for the row category *i* of “use” from the column category *j* of “origin” (“spent by *j* on *i*”). In a departure from the mathematical convention that matrices are called by their row and column, NHA tables are called by column and row (e.g. financing sources–financing agents). This convention is rooted in long-standing health accounts tradition and reflects the flow of resources from the origin to the use.

3.27. Many of the tables have another purpose, which is to facilitate the estimation process itself. Estimating health expenditure is not simply a matter of adding up numbers: care must be taken to compare numbers from different sources that produce information about different dimensions of the health care system, and to identify areas in which no information is present. Some of the tables described here provide a framework for estimation, pointing to gaps, overlaps, and other problem areas to be addressed, as well as to those areas that appear to be solid.

Key indicators of health system performance

3.28. On the basis of international experience and trends in the focus of health policy, a list of key performance indicators has been drawn up (Figure 1). The health accounts team is encouraged to develop the regional accounts in a way that produces these indicators, but also to work with the steering committee and important users of the accounts to identify other indicators that address national or regional policy issues.

Figure 1. Key performance indicators for health systems^a

	Indicator	Expressed as:	Policy	ICHA
Consumption	THE _{GU}	%THE; per capita	Level and weight of regions' spending	
	External resources _{GU}	%THE _{GU} ; %THE	Distribution of external funds	FS
	GGHE _{GU}	%GGHE; per capita	Equity of government's expenditure	HF
	OOPS _{GU}	%THE _{GU} ; %OOPS	Inequity of households' expenditure	HF
	Expenditure on pharmaceutical _{GU}	%THE _{GU}	Weight of pharmaceuticals	HF x HC
	... of which paid by OOPS _{GU}	%OOPS _{GU}	Weight of pharmaceuticals in OOPS	HF x HC
	Expenditure on inpatient care _{GU}	%THE _{GU}	Share of total expenditure going to inpatient care	HC
	Government expenditure on inpatient care _{GU}	% GGHE _{GU} ; %THE _{GU}	... paid by government	HF x HC
	Expenditure on ambulatory curative care _{GU}	%THE _{GU}	Share of total expenditure going to ambulatory providers	HP
	Government exp. on ambulatory curative care _{GU}	% GGHE _{GU} ; %THE _{GU}	... paid by government	HF x HP
	Share of financing agents _{GU}	%THE _{GU}	Weight of agents' spending on regional patients	HF
	... of which local authorities _{GU}	% GGHE _{GU} ; %THE _{GU}	... paid by local government	HF
Financing sources _{GU}	%THE _{GU}	Share of each source funding regional consumption	FS	
^a GGHE: general government expenditure on health; GU: geopolitical unit; OOPS: out-of-pocket spending; THE: total expenditure on health; XalR: external resources.				

3.29. An important point regarding policy indicators relates to the choice of place of service or place of residence as the basis for the regional accounts. At the national level, it is appropriate to show total health expenditure as a percentage of gross domestic product, but often the aggregate economic measure at the regional level is income. This denominator is appropriate for place of residence estimates, because the same economic actors are included in the calculation of each measure. But regional income is not an appropriate denominator for place of service estimates, as the latter include spending by people whose income is not captured.

Selection of tables

3.30. The SHA manual (4) and the NHA Guide (1) each list a number of tables recommended for use in health accounts. These lists were derived by considering the policy usefulness of each table, the practicality of its preparation, and its ability to inform the estimation process. Policy usefulness should be the primary concern when selecting tables. Each country's health care policy debate is different in some degree from that in other countries, and each country's policy-makers have their own information needs, which must be addressed with health accounts data. The tables described here represent a general-purpose information set, and should not replace a frank – and early – discussion between the health accounts team and its customers about what is needed. Further, the usefulness of health accounts tables will be increased if they are linked to nonfinancial measures of health system performance, such as morbidity, mortality, and outcomes.

3.31. The team should consider production of at least the following tables.

- Health expenditure by financing source and type of financing agent.
- Health expenditure by type of financing agent and type of provider.
- Health expenditure by type of provider and type of function.

These tables incorporate the classification schemes described here and in the SHA manual (4) and the NHA Guide (1).

3.32. Experience in countries where health accounts have been created indicates that the dimensions included in these tables are critical for accurate estimation of total health spending. Consequently, tables that incorporate these dimensions are important tools in the creation of the aggregate totals or subtotals displayed in all of the tables.

3.33. Depending upon policy demands, time constraints, and availability of data, the team may wish to consider including some or all of the other tables listed in the SHA and NHA Guide, including:

- Health expenditure by type of financing agent and type of function.
- Cost of resources (or costs of production/inputs) used to produce health goods and services.⁹
- Health expenditure by age and sex of the population.

⁹ Measuring the costs of resources for regional health accounts is more difficult where there are large imports and exports of health goods and services between regions. Remember that we are measuring here the cost of resources for services provided to residents of the region.

- Health expenditure by socioeconomic status of the population.
- Health expenditure by disease category or health status of the population.

Level of detail

3.34. As described above, the classification schedules laid out in the SHA manual and the NHA Guide break the entities and transactions in the health system into fairly detailed groups. How much of this detail should be shown in the public presentation of tables will be determined by the robustness of the accounts at different levels of granularity or disaggregation, the policy relevance of the granularity, and the space available for data presentation. In the function dimension, the team should strive to show separately at least spending for personal health care, for public health activity, for administration, and for health-related activity. For financing agents and providers, detail at the 2-digit level of the ICHA-HF and ICHA-HP schedules (or a comparable level of detail in the alternative classification used) should be presented. More detail should be shown if relevant for policy purposes (for example, to highlight the distribution of central Ministry of Health funds among regions).

Building a data map

3.35. Having decided on the classification of actors and transactions in the health system and the data to be presented in the subaccounts exercise, the health accounts team should construct an exhaustive list of potential primary and secondary data sources. Such a list may have already been compiled for the national health accounts exercise or for some other reason. If not, it may have to be built from scratch, starting with literature reviews and interviews with key informants. In either case, this part of the accounting work is absolutely critical, as it is from this list that the raw material of the accounts will be drawn. The needs and data sources for each classification and its components should be reviewed.

CHAPTER 4. FINDING AND EVALUATING DATA SOURCES

4.01. The regional health accounts team is likely to be faced with a variety of data sources with different levels of aggregation – the same variety faced when developing national health accounts. The key in both cases is to determine which data sources are most reliable and to use these as the foundation for the accounts. A discussion of the relative strengths and weaknesses of various types of data can be found in Chapter 6 of the NHA Guide (1). The discussion here will focus on the types of data that can be found at both the national and the subnational level.

4.02. A special note is in order for the team doing regional health accounts: data that are strong at the national level may be less so at the subnational level and vice versa. The reasons for this are explained in more detail below, but the implication is that any data evaluation compiled for the national health accounts should be reviewed when the regional health accounts are being prepared, so that the most appropriate data are used in the most appropriate setting.

4.03. An obvious first place to look for data is in existing expenditure reviews and other studies of the health system. Even if such studies are incomplete, they can provide invaluable leads to data sources, and perhaps provide estimates of elements of the health accounts. Reviewing the strengths and weaknesses of these studies also can shed light on areas where information is most needed.

4.04. In searching for and evaluating data to be used in the health accounts, the team also has an opportunity to advocate for better data. As gaps in information are identified, the team – through its steering committee – should press for initiatives to fill those gaps. The cost-benefit ratio associated with such initiatives should be kept in mind. Can a small convenience survey point to the potential for a broader and more systematic one? Are data available in government repositories collected and filed without reporting? As discordances between the structure of existing data and the ICHA are identified, the team should press for revisions that result in better concordance, again bearing in mind the costs and benefits of such activities. Can the existing structure be subdivided in a way that supports the ICHA classification schedule? Can the sample frame be extended to include other types of providers, consumers, or financers?

National data

4.05. Typically, national data come from socioeconomic accounting exercises, centralized financing sources, or national surveys. The socioeconomic accounting exercises can be very useful, as the data will have already been largely cleaned up. A great deal of information may be available “off the shelf” in the national income accounts, especially if the ICHA is being used as the framework for the health accounts. The ICHA is compatible with other classification schedules used in national accounting, and the techniques used for preparing estimates of gross domestic product are the same as those used for estimates of health expenditures. And, of course, use of the identical estimates in the two accounts contributes to the comparability of the two. However, it

may not be possible to break down data from the national economic accounts to the regional level, in which case indicator measures may need to be used. In addition, the health accounts team may find that the health sector estimates in the national income accounts are weak. It could very well be that the health accounts exercise informs the national income accounts, rather than the other way around.

4.06. Use of centralized financing sources, such as the Ministry of Health or the social insurance directorate, carries a number of distinct benefits for the health accounts team. First, the data can be found in a single place, which reduces the need to obtain information from all the subnational areas. Even if different parts of the entity need to be visited to gather all the relevant information (for example, the accounting bureau for financial data and the epidemiology bureau for numbers of inpatient days), having all the data close at hand reduces the time and expense of the collection exercise. Second, the data are likely to have been measured in a consistent way, improving their comparability. Third, it may well be that the health expenditure of a centralized financing agent is not known at the regional level. For example, while the regional government may be aware that a programme is in place, it may not know the total amount spent on the programme. In some countries, salaries are paid from a central fund, and information on those salaries must come from the central ministry. The same applies to situations where drugs or equipment are purchased centrally and distributed to the regions.

Box 6. Finding the right contacts

It is important to find the right place to go within central ministries. For example, in Mexico the health accounts team found that, for some of the major actors in the health care financing system, it was better to contact the financial department of the organization rather than the department that usually provides health statistics.

The team also facilitated a cooperative effort between the National Statistical Institute and the Ministry of Health, to develop a single set of health expenditure numbers using a jointly agreed methodology. Aside from the obvious benefits of such cooperation, staff of the National Statistical Institute are experts on private spending, and contribute this valuable expertise to the health accounting exercise.

4.07. However, centralized administrative data have limitations. For example, funds may be transferred from the central ministry to subnational units as a lump sum, in which case the central ministry cannot provide information on the functions ultimately financed at the subnational level. Indeed, it may even be difficult to tell how much was spent on health as opposed to other goods and services. At the other end of the spectrum, in highly centralized health systems there may be little incentive to track expenditures at the regional level. In each of these cases, regional-level data of some type will be needed to describe accurately the use of central funds at the regional level.¹⁰

¹⁰Ideally, data on a single item will be provided by both the central government and the regional government. This affords an excellent opportunity to check data sources for consistency: Does the amount reported as transferred by the central government equal the amount reported as received by the regional government?

4.08. Data from national surveys, like administrative data, have the advantage that the number of sources to be contacted is limited. If the survey was constructed in a way that allows for valid estimates to be made at the subnational level, a second advantage is that the data will be comparable across those subnational units.

4.09. However, the time and expense of drawing and surveying a sample large enough to produce valid subnational estimates may be prohibitive. In this case, the survey may be capable only of providing a national total, against which some indicator may be controlled – a process illustrated in Box 9 (see page 34). A health accounts team with statistical resources at their disposal may wish to develop an econometric solution to this problem, perhaps estimating a demand equation at the national level and then substituting regional values to get a regional estimate.

Subnational data

4.10. Subnational data most often come from decentralized funding sources and convenience-sample surveys.

4.11. There are several reasons why the health accounts team may need to draw on subnational administrative records. First, subnational units may be under no obligation to report to a central authority any regionally generated funds spent on health. Second, subnational authorities may be the only source of information on how money received from the central government in a lump sum – for example for health and social welfare – is divided. Third, if administrative expenses are to be included in the regional health accounts, this information will almost certainly need to be collected directly from the subnational authorities (see Box 7). Even when data are available centrally, regional administrative data may offer greater detail than that found at the central level; for example, data might be available for individual facilities.

Box 7. The importance of regional connections

Decentralization of much of health spending in Mexico posed a challenge to the health accounts team there. Fortunately, the team established a mutually beneficial relationship with regional Ministries of Finance. The latter were interested in having consistent figures, as they needed information for decision-making related to health reform. At a national conference, the health accounts team presented the notion of regional health accounts to regional Ministry of Finance staff, who took the idea back to their institutions. Because regional Ministry of Finance staff generally know about spending that comes from outside the Ministry of Health budget (such as cost-sharing, municipal budgets, and spending on infrastructure), these contacts were invaluable to the team. The result was a collaboration in which both parties benefited. This experience provides a valuable lesson in the importance of reaching out to potential partners and in showing them how the health accounts work benefits them.

4.12. The drawbacks to using subnational administrative data lie principally in their potential lack of comparability. Setting aside issues of the period to which the data refer – which are not inconsequential – definitions and classification of functions may vary across the subnational authorities. A collateral benefit of regional health accounts may be the elimination of such variations, but in the meantime the health accounts team must

educate not one data correspondent but many, and the problems posed by turnover among correspondents are multiplied. It is almost impossible to overstate the importance of checking (and double-checking) the definition of what is being provided by each subnational authority – each time the data are received!

4.13. Health accountants may also have access to data from either regional surveys or “convenience surveys”.¹¹ The team may find that probability-type surveys (in which respondents are drawn with a known probability from a known universe) have been conducted in one region. It may be possible to generalize these results to other regions using some type of econometric modelling. In contrast, a convenience survey involves identifying significant actors in health care financing or delivery at the subnational level and obtaining data on their operations. Convenience samples are difficult to generalize, but can provide valuable information about activity within the limited subnational area. A thoughtfully constructed and carefully administered convenience survey can be cost-effective and more easily executed than a full-blown probability-sample survey.¹²

Evaluating the quality of data

4.14. The decision to use a given data source or not is an important part of the health accounting exercise. Having a large quantity of data is not in itself an assurance of success: uncritical use of available data, or the failure to consider all available sources, can seriously dilute the accuracy of the results.

Survey data

4.15. Survey data play a central role in the estimation of household spending on health care, and it is important to use them prudently. The quality of a survey is linked to three attributes: sampling error, non-sampling error, and sample frame bias. These attributes are discussed at some length in the NHA Guide (1), and entire books have been written about each; the discussion here will focus on the use of survey data at the regional level.

4.16. Sampling error refers to the effect of sample size on the reliability of the estimates produced. Often, surveys are designed at the national level and the sample size is chosen in relation to that level; producing statistically reliable estimates at the regional level would increase the sample size and related survey costs. In that case, the limited number of respondents at the regional level may make the sampling error unacceptable. The health accounts team should then consult with the statistical authority to explore ways to develop regional-level estimates. It may not be necessary to expand the sample to cover all regions all the time. For example, if the regional relationships are thought to be fairly stable over time, one might add a rotating supplementary sample to the national survey to derive one regional estimate each year. The team’s steering committee may be

¹¹ A survey in which the sample is not randomly selected; results may, therefore, not represent the whole population.

¹² See Chapter 8 of the NHA Guide – especially the discussion of rapid assessment techniques – for a more extended discussion of survey data.

able to help by encouraging an increase in the national sample size, or a stratification of the sample so that sufficient observations are drawn from each region to produce results of adequate reliability.

4.17. Non-sampling error is more difficult to assess. Unlike sampling error, which is derived mathematically from the number of observations and the size of the population, non-sampling error is tied to cultural factors. In the particular case of regional health accounts, non-sampling error can arise if a particular question can be interpreted differently in different regions. For example, the wording of questions about out-of-pocket payments may not specifically include in-kind payments, which are more common in rural regions than in urban regions. This error will distort regional differences in health care costs.

4.18. Sample frame errors typically come from the nature of the sample itself. For example, if a national survey used a cluster sampling technique (where specific locations are chosen and respondents are randomly chosen in each location), a nationally representative sample may not be representative at the regional level.

4.19. In summary, survey data can be very useful, but must be carefully evaluated to make sure that they can be reliably applied to regional accounts. An experienced survey statistician should be consulted if surveys will be constructed or used in the accounting process.

Non-survey data

4.20. Non-survey data can come from a wide variety of sources, for example, government budget data, government special reports (“white papers”), insurers’ administrative data, trade association annual reports, academic research, business case studies, qualitative research documents, focus group results, data from convenience samples, or opportunistic data (anecdotes). As varied as these sources are, there is a common set of questions that can be asked to assess their quality.

4.21. Do the boundaries implicit in the data conform to those in the regional accounting exercise? In some countries, ministries may have their own way of dividing the country, and it is important to identify the extent to which the boundaries are consistent. Equally important, do the data use the same concept of health expenditure as the health accounts?

4.22. How complete is the base on which the source is built? Government budget data, at one extreme, probably capture all money appropriated for use by the government entity. At the other extreme, anecdotal evidence may consist of an interview with a single respondent. Clearly, the wider the net is cast, the more likely it is to bring in a good representation of what is in the sea. Unfortunately, there is no rule of thumb to decide if a source is inclusive enough: practice and experience — and the advice of others — will lead to an intuitive “feel” for that aspect of data quality.

4.23. Does the data source or its sponsor have an agenda to push? Very often, data are assembled or created to advance a particular argument or agenda. Data may then be of poor quality – not because the sponsors or compilers of the data are being deliberately deceptive, but for instance because they stop looking once they have found evidence to support their position. Data that support one position or another in a political debate are not necessarily wrong, but their source and the way they have been assembled should be studied very carefully before they are used to build health accounts.

4.24. How were the data assembled? Was the collection process a rigorous one, or did the compilers accept all entries without question? Did they actively look for data, or simply take what was close at hand? Is there evidence of an attempt to review the results critically, or was the information simply documented and released? Once again, there is no rule of thumb for assessing this aspect of a data source’s quality: personal experience and the advice of colleagues are the only guides.

4.25. How homogeneous are the entities about which the source provides information? This is somewhat akin to the concept of confidence interval for survey data. If there is reason to believe that all the entities in the universe closely resemble one another, then the rigour of the data collection process becomes less important. Unfortunately, there is often no way to assess the homogeneity of the universe without some type of analysis – in which case the non-survey data would not be needed. However, anecdotes and indirect evidence from other sources can help to develop a partial picture of the subject universe, which may be sufficient to allow a tentative guess about its homogeneity.

Choosing among data sources

4.26. The team may often be confronted by more than one estimate or data source for a particular aspect of the health accounts.¹³ Naturally, the better quality data sources are to be preferred over the poorer quality ones, but assessing the relative quality is never straightforward. When making such an assessment, the team should consider the following aspects:

- Congruence with boundaries and classification schemes. Which data source is best aligned with the definition of health care and with the classification schedules being used to distinguish among flows of money? Do the labels used by the data sources capture the true nature of the activities or transactions recorded?
- Congruence with time period. Which data source most closely fits the time period covered by the health accounts? For example, is one source several years old? Or does one of the sources report figures for the fiscal year and the other for the calendar year? Does one source measure budgeted amounts and another actual expenditures?

¹³ “A man with one watch knows what time it is; a man with two watches is never quite sure” Lee Segall

- Congruence with content. Which data source most closely conforms to the concepts being measured in the accounts? For example, does one source measure stocks and another measure flows?
- Congruence with monetary measure. Does one source measure inflation-adjusted expenditures and another nominal expenditures?
- Congruence with geopolitical borders. Do the various data sources cover the entire country without overlap?

4.27. One way to resolve conflicting or divergent data source reports is to look for overlapping confidence intervals. These confidence intervals can be rigorously defined, as in sample surveys, or more loosely constructed in the case of non-sample data. If two (or more) intervals overlap, the health accountant is entitled to suspect that the “real” value being sought lies within the overlap area, and thus to shrink the ultimate confidence band around the estimate. The result is far from stochastic — that is, it lacks the rigour of the formal confidence interval of sampling theory. But it does provide more than one chance of being correct, and it can help in explaining the accounts to sceptics who suspect that the analysis is biased.

4.28. Another way is to use the conflicting data sources to establish an upper and lower bound on the estimate. The process of completing the estimation tables can help to find the most plausible figure in that range.

CHAPTER 5. POPULATING THE HEALTH ACCOUNTS TABLES

5.01. Once the groundwork for the regional health accounts has been laid and the basic framework put in place, the team can turn its attention to the task of filling in the framework.

Establishing an estimation methodology

5.02. As is the case with national health accounts, there are no hard-and-fast rules governing the estimation of regional health accounts. The steps taken by the team will depend on the nature, quantity and quality of the data available, as well as the nature, form, regional delimitation and purposes of the accounts themselves. This chapter, however, contains some suggestions for ways to approach specific situations. The team may combine these approaches with others of their own making to complete their estimates. It is important to remember not to mix sources of information that classify expenditure by providers and by consumers. The regional health accounts described here classify expenditure by consumer (which means that data on expenditure by providers have to be adjusted).

5.03. It follows from the discussion of data sources that regional health accounts can be compiled in two ways. They can be built “bottom-up”, i.e. primary data are compiled initially at the subnational level and then aggregated at the national level. This method is most practical in countries where data are routinely collected at the subnational level and where health financing is mostly decentralized. The second approach is “top-down”, i.e. the national estimates are built first, and then disaggregated into subnational components, cell by cell. For some spending, disaggregation is simple, because the data were originally separate. In other cases, distribution formulae need to be developed to allocate elements to each subnational unit.

5.04. In practice, most countries that have developed regional health accounts have employed the top-down approach. Australia, the Philippines, Sri Lanka, and the United States provide excellent examples of this approach. Other countries have used a combination of methods. For example, in Mexico, some ministries operate centrally, and estimates for these ministries are made top-down (for example, health expenditure by the Ministry of Social Development). Other ministries have devolved responsibility for spending to state governments; that spending – as well as municipal spending – is estimated using a bottom-up approach. No country has yet built a completely bottom-up set of regional health accounts, principally because the data systems required for this do not exist.

5.05. The use of any estimation methodology inevitably involves the exercise of professional judgement. For this reason, the health accounts team should consult with experts at central and regional levels (including steering committee members) as much as possible before beginning work. For the same reason, the team should publish the methodology used, to encourage feedback about alternative methods and improvements.

Issues in building bottom-up accounts

5.06. A health accounts team that wants to develop some estimates from the bottom up must address three issues. The first is *consistency*. In order to be of value to policy-makers, the estimates from one region must be comparable with those from other regions. At a minimum, the underlying classification and coding approaches must be homogeneous across regions, regardless of the structure of health care financing, the way care is provided, and the nature of, or differences in, the benefit package or health care basket available at the regional level. Beyond that, the use of similar estimation methodology – most importantly the approach to the estimation of missing data – will help ensure that the comparison of one region with another produces results that reflect the reality of the health care situation rather than differences in measurement (see Box 8).

Box 8. Developing regional health accounts in Germany

In Germany, the Health Division of the Federal Statistical Office is in charge of compiling national health accounts. So far only two of the 16 German *Bundesländer*, or states, have published regional health accounts.

The *Bundesland* Baden-Württemberg calculated its regional health accounts for 1995–2000. The process was conducted by the Statistical Office of Baden-Württemberg, but the NHA classification of providers, functions and financing agents was adopted. The Health Division of the Federal Statistical Office served as a consulting agency.

The *Bundesland* Rheinland-Pfalz also calculated its regional health accounts for 1995–2000. The process was conducted by a private institute on behalf of the Ministry of Health of Rheinland-Pfalz. The institute served as a consultant to the Federal Statistical Office for the NHA, and so could ensure that the NHA framework was adopted. The Health Division of the Federal Statistical Office, however, was not involved in the process.

A more comprehensive approach to the calculation of regional subaccounts, involving the Federal Statistical Office and the Statistical Offices of the *Bundesländer*, is envisaged for the coming years.

5.07. The second issue is *completeness*. To be most effective, the regional health accounts should cover all the actors in the health sector and in health financing. The team may find that their first product is a consistent and thorough set of accounts for government financing agents – a laudable and useful first step. But without information about private financing and donor funds at work in the regions, it is impossible to make statements about any of the key issues in health – efficiency, equity, or effectiveness.

5.08. The third issue is the prevention of *overlap*. Just as with national health accounts, it is important to establish and preserve the geographical boundaries of the regional accounts. For example, payments by one region for care provided in another cannot be counted as spending in both regions: to do so would violate the mutual exclusion principle that is one of the basic properties of health accounts. Such payments can be shown separately, perhaps to reconcile total spending by financing agents in the region with total spending on health within the region. But in the overall set of regional health accounts, the transactions may be linked to only one of the regions – the place of residence of the recipient.

5.09. To ensure that these issues are appropriately addressed, regional health accounts teams should establish and maintain close ties with each other. Experience has also shown that bringing all the regional teams together (either physically or virtually) brings synergy and cross-fertilization to the process that benefits the final product.

5.10. The process of developing bottom-up estimates of health spending requires patience. It may take several iterations of the health accounts exercise and careful cultivation of metadata by the health accounts teams for the issues raised above to be successfully addressed. Only then can the regional health accounts be aggregated to give a valid national health account.

5.11. Essentially, the tools and techniques used to build regional health accounts are the same as those used to complete national health accounts matrices. The NHA Guide (1) contains a description of some of these tools and techniques.

5.12. In building bottom-up regional health accounts, teams are likely to encounter areas where data are missing. In such cases, it may be possible to infer the missing material for one region from observations in another region. For example, if there has been a survey of transportation costs in one region, that information might be combined with information on the number of clinic visits to estimate transportation costs in other regions. This process has some inherent limitations – for example, the team must assume that distance from site of care is similar across regions – but may be helpful in establishing a rough first estimate of missing data. If comparable work has been done to produce national estimates, the team can take advantage of that work, after evaluating it for its suitability for use at the regional level.

5.13. If all regions' spending is being estimated in the exercise, it is also helpful to review the sum of those estimates at the national level. This review will help to ensure that the myriad individual judgements and estimates made at the regional level make sense in terms of “the big picture”.

Issues in developing top-down accounts

5.14. In contrast to bottom-up accounts, typically developed by regional teams, top-down accounts tend to be developed by a single team starting with data secured at the national level. These data usually take one of two forms: aggregated data and national data.

Aggregated data

5.15. The first form of national-level data is an aggregation of data from the regional level or lower. Where expenditure data are available on a regional basis, disaggregation is straightforward. For example, in a publicly funded hospital system, the expenditures for each facility may be known. It is then a simple matter to sum the expenditures of all facilities in a particular region to obtain estimates of public hospital spending. This procedure is common even in formerly centralized states that have devolved the implementation and evaluation of their delivery and financing systems. In some cases,

similar data may be available on private facilities, for example when trade or professional associations collect data at regional level. In situations like this, the exercise will look very much like a bottom-up exercise – even if the health accounts team is working at the central level.

5.16. The health accounts team needs to make sure that these expenditure data truly reflect what is happening at the regional level. To this end, it is very helpful to establish a network of regional contacts who are familiar with the financing situation. Aside from the benefit conferred by having several people looking at the work, these contacts can often provide valuable information about regional variations in the health care system.

National data

5.17. The second form of top-down data comprises data available only at the national level. When data are not available on a subnational basis, the expenditures under consideration can be distributed using proxy variables (sometimes called “keys”) as indicators of the likely distribution (see Box 9).

5.18. In some cases, the sum of region-based estimates does not equal the national total, which is presumed to be more accurate. Typically, the team can assume that the “error” – the difference between the regional sum and the national total – is proportionate across the regions and adjust the regional figures accordingly. For example, a one-time survey of household spending on health in Mexico was calibrated to national estimates produced from other data, producing state-level figures consistent with the national total and reflecting regional variation as found in the survey itself.

Box 9. Controlling regional data against national totals

The US health accounts team reconciles state data with national totals. “Expenditures in private physician offices and clinics, specialty clinics, and miscellaneous health and allied services are based on State distributions of business receipts from taxable establishments and on revenues from tax-exempt establishments, as reported in the 1977, 1982, 1987, 1992, and 1997 Census of Service Industries [a complete enumeration of businesses, conducted by the statistical authority every five years]. To estimate the distribution of expenditures among States between census years, we use growth in business receipts of sole proprietorships, partnerships, and corporations for taxable establishments [reported to the central tax authority]; for tax-exempt establishments, we use growth in population. These distributions are then separately scaled to national totals.”

Source: Martin AB, Whittle LS, Levit KR. *Trends in state health care expenditures and funding: 1980-1998. HealthCare Financing Review*, 2001, 22(4):135.

5.19. In other cases, a closely related expenditure figure can serve as a proxy. For example, in Sri Lanka, provincial governments have their own budgets for medical supplies. At the same time, the central health ministry, which purchases the supplies and distributes them to the provinces, accounts for a large part of public spending on medical supplies. The central ministry does not maintain clear records of how its centrally procured supplies are distributed, so Sri Lanka’s health accountants distribute the central

ministry spending among provinces by assuming that the ratio between provincial and central spending on supplies is identical across all provinces.

5.20. In yet other cases, the proxy will be some measure of inputs or outputs. For example, because labour accounts for a large share of expenditure, regional estimates of health personnel spending (preferably wages but, failing that, work hours) might be used to allocate a national total among regions (see Box 10). The number of inpatient days might be used to allocate a national estimate of ministry hospital spending if facility level costs are not known. Some proxy measures can be more elaborate than a single indicator. For example, if information exists regarding the prices of multiple inputs into a cell in the health accounts, a sort of market basket can be developed as a distribution tool.

Box 10. Using labour inputs to distribute spending

In the USA, “industrial inplant services [are those] provided [directly] by employers for the health care needs of their employees. These services may be furnished either on-site or off-site. We estimate expenditures for industrial inplant services using the number of occupational health nurses [using several different government and non government sources] and average annual wages in the health services sector [from one of the central statistical authorities].”

Source: Martin AB, Whittle LS, Levit KR. *Trends in state health care expenditures and funding: 1980-1998. HealthCare Financing Review*, 2001, 22(4):137.

5.21. Distributing spending on a population basis should be a last resort. In practice, health resources are not generally distributed according to the population to be served, so the assumption of equal distribution per capita is unlikely to produce meaningful conclusions in terms of the equity, efficiency, or effectiveness of the financing flows. However, if no better proxy measure is available, this method can be used as a temporary solution, pending discussions with subnational authorities about spending in their jurisdiction and development of a relevant monitoring and assessment tool.¹⁴

5.22. Of course, using proxy measures limits the conclusions that can be drawn from the results. For instance, when per capita data are used to construct one of the dimensions, nothing can be concluded about per capita distributions. When resource indicators are used, a productivity analysis may be meaningless. In any case, the proxy measure must be chosen carefully, as an inappropriate proxy can distort the regional accounts to such an extent that they become meaningless. The health accounts team would be well advised to consult with regional authorities and health systems experts to probe for hidden – or even overt – dangers of proposed proxy measures.

¹⁴ In the US state health accounts, spending for “drugs and other medical non-durable products” (part of HC.5) is estimated in two parts: “spending for prescription drugs and spending for non-prescription (over-the-counter) medicines and sundries. For both parts, we base our estimates on retail sales data reported in the 1977, 1982, 1987, and 1992 Census of Retail Trade, Merchandise Line Sales [a complete enumeration of businesses conducted by the statistical authority]. We interpolate distributions for intervening years using population data.”

Handling the challenge of missing data

5.23. Among the most serious challenges facing the team constructing a set of regional health accounts is missing data. Because the health accounts are laid out as a matrix, in theory the column and row totals must add up to the same figure. In practice, the team will encounter gaps in information about actors, services, or beneficiary populations that create imbalances in the accounts. Sometimes these gaps extend to the national level; sometimes they exist only at the subnational level. In any case, they require both an immediate and a long-term solution.

5.24. The first step in finding both the short-term and long-term solution is to learn more about the size of the information gap. The team should meet with knowledgeable sources to determine the following.

5.25. *How important are the missing numbers likely to be?* Does the gap reflect something around 2% of total health spending, or something closer to 20%? The answer to this question will determine how great a priority to put on finding a solution.

5.26. *How many actors are affected?* Is there a single actor for whom data are missing? A thousand? A million? The answer to this question will help determine what type of collection effort will be needed to fill in the gap.

5.27. *Are secondary data, metadata, or data on a related activity available?* If so, it may be possible to make an intelligent guess at the missing figures.

5.28. In the short term, the team will need to exercise their professional judgement (or rely on the professional judgement of other experts) to place a number in the gap created by missing data. Sometimes this is easy. For example, if there are data at the national level, these can be disaggregated using key variables. Or there may be data on a related activity or even anecdotal evidence that can be used to make estimates. Sometimes the team must simply make a “best guess”, relying on the arithmetic equality of total spending by financing intermediaries and total receipts of health providers to help to set upper and lower limits on the missing number. Depending on the suspected size of the gap and the homogeneity of the actors affected (their similarity to each other), a cost-effective solution may be a small non-randomized survey of a handful of actors. Such a survey can be executed more quickly than a traditional random survey and, if the actors are representative, can provide valuable input to the estimation process.

5.29. The team should work with their steering committee to devise a longer-term response to the challenge of missing data. Often this takes the form of “piggy-backing” on an existing survey or census; for example, questions could be added to an ongoing household budget survey to elicit the information needed. If a convenient vehicle does not exist, the team may need to carry out its own survey – or, better yet, find somebody to do one for them. The national statistical agency may be willing to undertake this work, especially if a strong case can be made that the data gap affects more than just estimates of subnational health spending. If the area of health care financing that falls into the data gap is not changing very much, the survey need not be repeated frequently. Of course, if

resources are limited, the team may be forced to adopt a long-term solution that consists of finding more or better metadata.

5.30. The purpose of building health accounts is to produce routine statistics (in preference to ad hoc exercises). This is only realizable if data collection relies mostly on existing information and gradually becomes an integral part of the national or health information system. This is why we raise here the limitations of survey work and the use of “short surveys”. Countries that started building health accounts with little means but strong institutional will were able to ensure institutionalization of data production, while improving the information set.

Triangulating estimates

5.31. The previous section dealt with the challenge of too little data. Fortunately, there is never a problem with too much data, although multiple sources can pose a challenge when they present conflicting numbers. This can be a particular problem when one of the sources is an official report.

5.32. As discussed earlier, there are a number of steps the health accounts team can take to decide which of several competing estimates to use for a particular entry. The first step is to evaluate the credentials of the various sources. Which data are most recent? Which are from the most reliable source? Secondly, the confidence intervals of the various estimates (if they are known) should be examined. If the confidence intervals overlap, this suggests that the apparently conflicting estimates may, in fact, be statistically equivalent. Finally, the various estimates should be compared with other entries in the health accounts matrix, as the art of health accounting lies in balancing the row and column entries to form a coherent and defensible picture of the health system.

5.33. Multiple data sources may allow the team to “triangulate” their estimates, i.e. to look at a given element from two different perspectives. This is much more reliable than viewing it from a single perspective. For example, knowledge of the amount of wages and salaries in hospitals can help to determine whether the estimate of total hospital output is reasonable.

5.34. Triangulation helps the team not only to reach a decision on the contents of a single cell, but also to confirm the contents of other cells. A significant advantage of health accounting is that it looks at the whole health care financing system, not just individual pieces. Suppose that the preliminary figures show that traditional healers account for double the proportion of total health spending in one region than in another. Is that in line with conventional wisdom and with other observations of the health care system? If not, more examination is necessary. Are consistent definitions used in all regions? Were the same techniques used to derive the different estimates? Does one region have better data than the others? On the basis of this examination, the team may decide to reduce the figure for spending for traditional healers in one region, or to raise it in all the others, or to adjust the figure for spending on allopathic practitioners. Or the team may decide that the discrepancy reflects reality, which may force policy-makers to

reconsider the conventional wisdom about the health care system. Triangulation is used throughout health accounts exercises.

Apportioning centrally incurred costs

5.35. Many countries have programmes – targeting, for example, malaria, family planning, or HIV/AIDS – that reach the whole country but that are funded and managed centrally. The expenses of such programmes need to be apportioned to the regions. Ideally, spending would be allocated to the areas where the impact of the services is felt. However, in many cases, the regional breakdown of costs is not known and must be estimated. If there are no reliable indicators of organizational activity at the regional level, the health accounts team may have to use the number of people served in each region as a basis for allocating the national costs. This is not ideal – it makes any analysis of regional efficiencies in the delivery of services impossible – but it may be a useful starting-point for discussions about how to improve the data. Reports on vaccination campaigns or small surveys can help in the allocation of the amounts.

5.36. A similar challenge arises in the allocation of central administrative expenses,¹⁵ budget support from donor organizations, donor contributions to vertical programmes, and government subsidy of centrally administered social insurance schemes. Ideally, records would show the expenditures attributable to each region, but this is not likely to be the case. One method is to apportion the administrative expenses in proportion to the personnel costs of the regional authorities, or in proportion to the benefits – the amount of programme money – that generated the administrative expenses. If all else fails, one could use the number of beneficiaries to allocate the spending. Any of these approximations vitiates a discussion of the relative efficiency of central operations across regions, but can serve as a useful first step towards such an analysis.

Addressing medical migration and medical tourism

5.37. In assigning expenditures to the appropriate region, it is essential to identify and handle the costs associated with medical migration (care provided to residents of another region) and medical tourism (care provided to nonresidents of the country).

5.38. Ideally, the data used to build the accounts would be sufficiently detailed to identify the location of the provider and the residence of the recipient of care. Unfortunately, this is not usually the case. The team must then find other ways to distribute expenditure. Where budgetary expenditures are used to develop the accounts, information is typically available by provider or by purchasing entity, but not by the residence of the beneficiary. This distinction is important when there is significant movement of patients across regional boundaries. Expenditures can be distributed by

¹⁵ In the national health accounts, “administrative expenses” as a category refers to funds spent by financing agents in administering their programmes. The costs incurred by providers of care in managing their operations are counted as part of the cost of the goods and services provided. Thus, hospital administrators’ salaries are counted as hospital care in ICHA category HP.1, while the salaries of the regional ministry of health are included in HP.6.

residence of beneficiary only if this information can be determined, for example from surveys of patients attending treatment facilities or of beneficiaries supported by funding agencies (see paragraph 5.40 below).

5.39. The health accounts team will face considerable challenges in developing internally consistent estimates of spending at the subnational level. Initially, time constraints may force the team to construct the regional health accounts using the approach consistent with the greatest amount of (or most solid) data, and to make exceptions where data are limited. This is not a compromise but rather an acknowledged methodological shortcoming: the resulting set of estimates will contain inconsistencies (hopefully not so many as to render the exercise useless). The team should always be alert to possibilities for developing or modifying data sources to improve estimates in later cycles of the regional health accounts.

5.40. Typically, medical migration is addressed through conversion of expenditures from a place-of-service basis to a place-of-residence basis, using some type of patient survey. This might be done starting with financing agent data. In some countries, the social security or national health service maintains records of each hospital case; such data are a tremendous boon to the health accounts team. Even in the absence of a complete tally, the authority may have sample data. For example, in the United States, administrative records are extracted for 5% of people covered by the old-age social insurance scheme (Medicare). These claims records show the location of the provider as well as the residence of the beneficiary, allowing flows of patients between states to be modelled on a diagnosis-by-diagnosis basis. Survey data from private-sector firms on use of care by diagnosis for non-elderly patients are used to re-weight Medicare flows to an aggregate that reflects the entire population.

5.41. In other cases, it may be more efficient and effective to survey particular facilities. It will probably be best to survey a convenience sample, for example of providers with a high probability of drawing people from other subnational units. This is particularly useful when there are few providers of this type. However, results from such samples cannot be generalized to the entire population. It may be best to make an assumption of limited or no migration for un-surveyed providers (unless some other assumption is more warranted).

5.42. Medical tourism poses a greater problem for regional health accounts than for the national health accounts. Under the principles of health accounting, care provided at facilities in the country to people from outside the country does not count towards national health expenditure; rather, it is a form of export. The revenues attributable to these nonresidents should be excluded from the accounts, although they may be shown separately if the transactions are of policy interest (e.g., countries engaged in medical tourism are likely to be interested in monitoring generated production). The amount of this care may be small in relation to overall national expenditure, but will account for a larger share of provider revenues in regions in which the facilities that attract nonresidents are located.

5.43. Accounting for medical tourism is similar to accounting for medical migration. Provider records may show which patients are nonresidents, allowing the health accounts team to develop estimates of the cost of that care. Additional probing can be useful, though, because often the care provided to nonresidents is reimbursed at different (typically, higher) rates than that provided to residents. Thus, a simple count of patient days or visits may underestimate the effect of medical tourism. Conversations with administrators of facilities with significant levels of medical tourism can be useful in this regard.

5.44. Expenditures on health care provided abroad should be accounted for in the region of residence. Often the social security system or the government covers expenditures for health care abroad. These central funds should be assigned to regions on the basis of user information.

CHAPTER 6. DOCUMENTING THE PROCESS AND REPORTING THE RESULTS

6.01. In general, guidelines on preparing health accounts, whether at the national or subnational level, must be somewhat vague. The number and types of data sources vary across countries, as do the quality of data and the policy uses to which the accounts will be put.

6.02. However, there is one aspect of health accounts for which the guidance can be firm, unequivocal, and absolute. That aspect is documentation, and the firm, unequivocal, and absolute guidance is: “Write it down!”

6.03. This is true of the day-to-day workings of the health accounts team. A substantial part of the accounts work is of interest only to the team itself – data discoveries, methods used to convert data from a cash basis to an accrued basis, and so on. But if a written record of this work is not kept, the experience gained by the team will be lost as staff turnover and time erode the collective memory.

6.04. It is also true of the final results. If these results are not disseminated the exercise is futile. The team must arrange for the major findings to be presented in ways that are useful to policy-makers.

Internal documentation

6.05. Hundreds, if not thousands, of decisions are made during the preparation of a set of health accounts: What data sources were found, how they were obtained and from whom, which were used and why, how particular transactions were classified, where information gaps had to be filled with judgements, and so on. Some of these decisions are the result of long deliberation and others the result of a moment’s reflection. What they have in common is their likelihood of being lost from one iteration of the accounts to the next.

6.06. For this reason, it is vital to maintain a daily journal that chronicles the progress of the accounts from start to finish. From this journal comes the working documentation that will guide the next cycle of the accounts, strengthening the consistency between accounts.

6.07. Journal entries should document the following issues as they arise during the course of the project.

- *Conceptual decisions*, such as modifications to classification schedules. Often the reasons for these decisions are forgotten in the bustle of preparing the estimates. Writing the decisions down as they are made preserves them for future use.
- *Contacts*, and whether they were useful, could be useful, or should be avoided in the future. Health accounting is prone to “snowball sampling”, in which one contact

points to others, who in turn point to others. Recording this process as it happens is much easier than trying to reconstruct it later on.

- *Data sources*, and potential improvements. It is useful to record: who provided the data; how they were obtained and how long it took; when the next cycle of data collection is likely and when the new data will be available; and whether discussions were begun on potential improvements in the data collection or processing. It is also important to document the known limitations of the data, as well as limitations that appeared when the data were fitted into the accounting matrices.
- *Methods used*, and potential improvements. Most often, potential improvements occur to the team after the work is over, but sometimes it is apparent at the time the estimates are made that, with more time or more expertise, a different method could be tried.

6.08. The journal itself is an important resource, but it can be made even better with some reorganization. By its nature a journal is chronological, which means that decisions and revisions of those decisions may be separated by pages of other material. After the accounts are finished, it is useful to convert the journal to a document in which notes are arranged by topic. This provides a handy reference for subsequent teams, and also allows the team to reassess their work processes away from the time pressure to complete the accounts.

External documentation

6.09. The goals of an external document are different from those of the internal documentation. Where the latter contains an analysis of the “how” of the accounts process to the exclusion of almost everything else, the external document highlights the results of the process. To be most persuasive, the external document must convey a sense of the role of the health accounts team as an “honest broker” of information. Sufficient detail on methods and data must be included so that there is no suspicion that “the books have been cooked”. Users need to feel that the regional health accounts present an accurate and unbiased picture of what is actually occurring in health care financing and delivery.

6.10. Although the nature of this report will vary with the national situation, there is some international experience from which the team can draw guidance. The report itself can be either in paper or electronic form.¹⁶ A good way to organize the report is as outlined below.

6.11. *Executive summary*. It is important to have an executive summary of the project. This summary contains the major policy findings, i.e. the answers to the research and policy questions that originally impelled the project. Experience in most countries is that

¹⁶ The US health accounts team has an extensive website devoted to its work (www.cms.hhs.gov/NationalHealthExpendData/). It contains a section devoted to regional health accounts, and one on national estimates and projections. The team feels that this method of dissemination allows earlier and more thorough coverage of issues than paper publications, although they also prepare articles for publication in research journals.

the traditional academic format for reports does not lend itself to this type of product, as policy-makers often have neither the time nor the inclination to read through a lengthy document. The inclusion of well-designed graphs, charts and “bullet points” (sentence fragments) is preferable to long paragraphs of discussion (see Box 11).

Box 11. A picture is worth a thousand words

If resources allow, it is helpful to develop a chartbook for policy-makers. This book can include the basic health indicators as well as the regional health accounts. An example of such a chartbook, developed for policy-makers in the USA, can be found at www.cms.hhs.gov/NationalHealthExpendData/ (although the US team has yet to incorporate the results of their subnational accounting project). Another book is being prepared in the United Republic of Tanzania (www.idrc.ca/uploads/user-S/10633150901district_accounts.pdf).

6.12. *Description of the health system.* This section helps to orient readers who are unfamiliar with the organization of the delivery and financing of care. Even analysts familiar with the system can find such a section helpful, as few people have a complete overview. A chart showing the flow of funds in the system can be very useful.

6.13. *Tabular presentation of accounts data.* This section presents the detailed tables from which the executive summary is derived. It is probably helpful to follow the format used in the national health accounts report (if one exists), to facilitate comparisons.

6.14. *Definitions.* This section defines the boundaries of the regional health accounts, including any differences from the national health accounts. It also describes the classification schedules used to categorize the actors and activities in the health sector.

6.15. *Data and methods.* Here the team should describe in some detail the sources of their data and the methods they used to adapt those data to the health accounts definitions. There should be a frank discussion of weaknesses in the data, including gaps and places where the definitions, timing or nature of the data available was ill-suited to the accounts framework. The team should also discuss areas for improvement and plans for future work (introduction or expansion of surveys, potential data sources to be explored, etc.). The report should not dwell on the weaknesses, but should put them in the context of the overall reliability of the results. Health accounts can be remarkably robust even when some data are weak.

6.16. The timing and length of this external report will depend on the resources available to the team, but it should always be considered an essential part of the project. First, it is the face of the project for policy-makers, without whose support the project is unlikely to continue. The reality is that projects compete for financing, and those of most help are most likely to be funded. Second, it contributes to the growing international body of literature on health accounts, which in turns helps to achieve convergence on best practices in health accounting.

CHAPTER 7. EXPERIENCES AND RECOMMENDATIONS FROM HEALTH ACCOUNTS TEAMS

7.01. The experiences of teams that have prepared regional health accounts provide some useful tips for teams that are just starting.

7.02. **Know the health system before you begin.** This admonition was discussed in the NHA Guide (1) and bears repeating here. Understanding how the health care delivery and financing systems work helps the team decide where to begin their work.

7.03. **Stay organized and document well.** Document decisions so that work does not have to be repeated. Some teams reported frustration in trying to pick up or replicate work done in the past by colleagues who had moved on.

7.04. **Don't let the search for perfection stand in the way of completing a good product.** Methodologies will improve over time. If resources do not permit a full-blown regional account, then pick the important pieces and work on those. Policy-makers can provide important insight into which pieces those might be.

7.05. On a related note, **allocate your time wisely.** For example, US health accountants found that one piece of their estimate, accounting for 3% of total spending, consumed 30–40% of their time. They asked themselves whether the accuracy achieved was worth the time spent, and may revise their workplan in future cycles.

7.06. **Try to develop a continuous project.** Work done in fits and starts, or in between other projects, suffers from loss of momentum and loss of “train of thought”. Further, teams have found that project iterations are helpful, as they lead to accumulated knowledge.

7.07. **Keep an inventory of your data sources and build on it. Use what you have to develop what you need.** In the USA, the health accounts team used their position to shape the data collection efforts of the national statistical agency, securing private financing data at the subnational level as part of the economic census.

7.08. **Develop relationships with the national statistical authority.** This is useful for many reasons. One is that it makes more efficient use of resources. For example, in Mexico the national statistical authority developed hybrid satellite accounts for health, which showed very different results than the accounts developed by the Ministry of Health. A working party was convened to reconcile the two sets of numbers, and the two institutions are now developing plans to produce a single set of health accounts. Similar collaborations between the health accounts team and the statistical authorities have taken place in the United States. A second reason for developing ties with the statistical authority is that it can lead to improved data. Cooperation and discussion can give early access to economic data. Even better, it can lead to refinements of existing data collection mechanisms, to provide data at the regional level that are useful to the health accounts. Such an experience has been reported by a number of countries.

7.09. **Develop relationships with regional authorities.** This is important. Regional authorities know the connections between programmes, as well as the local sources of data, and this first-hand knowledge really helps in understanding and evaluating bottom-up data. Feedback from regional authorities on first drafts of the results has been very valuable to teams, providing quality assurance checks (see Box 12). Working with regional authorities also creates a network of people who are familiar with the concepts and definitions of national health accounts, which over time contributes to improved quality.

Box 12. The value of feedback

When the Mexican health accounts team took their estimates back to the states, they created quite a stir. Regional authorities had little to say about the estimates of private spending, but a great deal to say about the public spending figures. Not only did these numbers differ from published figures, but in some cases different parts of the Ministry of Health were using different sets of figures. The team helped Ministry of Health policy-makers in the states see how the numbers fit with budget data, and helped them produce consolidated reports for their ministers. As a result of this work, data are now co-signed by both the policy and financial heads of the state Ministry of Health, policy-makers are learning to see the “big picture” beyond the ministry, and the political commitment to state health accounts is evolving.

7.10. **Think long-term.** Set up infrastructure that will lead to improvements in the future. This includes external links, such as the regional networks, collaboration with the national statistical authority, and development of data sources, as described above. It also includes internal procedures, processes, and relationships that will help the project to survive and thrive.¹⁷

¹⁷ The Mexican health accounts team is working to expand the legal framework for the production of the accounts. Currently this authority covers federal and state funds used to finance the new health insurance scheme (*Seguro Popular*). The team would like to extend this umbrella to the other parts of the health system. They are also working to have health accounts established as a subsystem of the national health information system (similar to the subsystems for births, deaths, hospital discharges, etc.).

CHAPTER 8. REGIONAL HEALTH ACCOUNTS IN APPIA: A NUMERICAL EXAMPLE OF TECHNIQUES

8.01. This chapter illustrates the different techniques that a health accounts team might employ in the course of their work. Of course the actual data (and data gaps) that teams have to deal with in the real world differ from country to country, so this chapter should be seen as a series of practical examples rather than as a prescriptive approach. The example is based on the fictional country of Appia, which was introduced in the NHA Guide (1).¹⁸ Insertions in **bold** indicate the particular technique being used.

8.02. To streamline this example, we assume that the team has been asked to estimate personal health care expenditure (PCHE) plus public health provision. The remaining parts of NHE can be estimated in a similar fashion. Similarly, the example will estimate the table of financing agents and providers (FAxP) without disaggregating to functions of health care; again, this is for the sake of brevity and techniques similar to those shown here can be used to create cross-tabulations of providers and functions (PxP) and financing agents and functions (FAxP).

Appia and the Appian health system

8.03. The fictional country of Appia comprises four regions, which are quite dissimilar in terms of economic activity, population density, and income per capita, as shown in Exhibit 8.1. Appia's currency is the crouton (¢).

Indicator	Total	Capital	Coastal	Lowland	Interior
Population (000)	6 325	633	1 898	2 530	1 264
% of total		10.0%	30.0%	40.0%	20.0%
0-4	1 025	51	152	506	316
5-16	1 923	95	532	827	469
17-34	1 783	234	588	696	265
35-64	1 410	190	569	450	201
65+	184	63	57	51	13
GDP (millions)	¢2 398 420	¢ 529 188	¢1 057 186	¢ 705 870	¢ 106 176
% of total		22.1%	44.1%	29.4%	4.4%
GDP per capita	379 197	836 000	557 000	279 000	84 000
Economic activity and population density		Commerce and government; densely populated	Industry; densely populated	Agriculture; lightly populated	Subsistence farming; sparsely populated
Income level		High	Moderate	Low	Very low
Health infrastructure		Well-established primary and secondary care facilities; all of Appia's tertiary care facilities are here	Well-established primary and secondary care facilities	Fairly good primary care facilities; some secondary care facilities	Scattered and poorly equipped primary care facilities; nonexistent secondary care
Population health		Well above average	Average	Below average	Poor; high rates of malaria and tuberculosis

¹⁸ There are a few differences between the narrative of the NHA Guide and this chapter. The two examples were developed several years apart, and the example has been modified to better illustrate techniques common to regional health accounts.

8.04. The description of the Appian health system here is reproduced from the NHA Guide (1) (paragraph 9.74 and following, including Table 9.2). The Appian central government ministries of particular importance to health spending are those of finance, health, education and defence. In addition, the National Insurance Agency (NIA) is responsible for administering the national health insurance system. Appia has a nationally owned electricity utility, AZap, which operates as a parastatal organization, receiving support and occasional subsidies from the central government through the Ministry of Industry, and which provides health care for its employees.

8.05. Local governments have been established in each of the four regions. Each region has its own taxing authority, and regional tax revenue is supplemented by central government funds derived from a national income tax.

8.06. Appia's health system is rather pluralistic. Most hospitals and polyclinics are government-owned, dating back to pre-reform days. Ownership of the polyclinics and primary care hospitals has been transferred to regional governments, but the Ministry of Health continues to own and operate the secondary and tertiary hospitals. The Ministry of Defence owns its own hospitals and polyclinics, which are open only to military personnel and their dependants. In recent years, private hospitals and polyclinics have emerged in the wake of political and economic reforms, as the central government privatized the delivery of some health care.

8.07. In addition to the ambulatory services offered at Appia's polyclinics, inhabitants can receive services in other settings. There are a growing number of physicians in private practice and, especially in the Interior Region, heavy reliance on traditional healers. A substantial proportion of outpatient prescription drugs are purchased from private community pharmacies. A few employers also maintain on-site clinics for workers – a legacy of the earlier political structure.

8.08. Workers and their families, and active military personnel and their families, are covered by national health insurance, run by the NIA. This insurance is financed by payroll taxes, and by subsidies from the Ministry of Health. The Ministry of Health pays directly for people who are not in the workforce. NIA beneficiaries make a co-payment to the provider at the time of service. Many employers offer supplementary insurance that pays for services in Appia's nongovernmental facilities (not covered by national insurance). Individuals not eligible for such coverage can purchase their own policies.

8.09. Some small national non-profit organizations and a number of foreign organizations are also active in Appia's health insurance and delivery system. The group Doctors for Global Health and the International Red Crescent are active in the country, as is Project Hope.

8.10. National health accounts for Appia were developed last year, and the authorities are now anxious to have regional accounts consistent with the national figures. The Appian health accounts team has been called on to prepare these estimates as quickly as practical.

Collecting and organizing data

8.11. The team decides that the most practical approach is to start with the national table of financing agents by providers and by functions (FAxPxP) as an outline and work down to the regional level. This table is shown in Annex 1. They revisit their contacts and data to review the material available for the regional health accounts project.

Ministry of Health

8.12. The Ministry of Health (MoH) data are fairly easy to distribute among regions. Ministry of Health officials provide the team with a spreadsheet showing these figures (Exhibit 8.2). Ministry of Health hospitals are secondary or tertiary care facilities, which accept patients from across the country. Patient records indicate the residence of the patient. Because the Ministry is interested in tracking patient flows across regions, tabulations already exist for each facility by residence of the patient.

8.13. Ministry of Health subsidies of regional medical facilities are reported by facility. The team recognizes that these subsidies cover people living outside the region who come to the facility for treatment, so some estimation will be required to convert these figures from place of service to place of residence.

Exhibit 8.2							
MoH report on expenditure							
		Site of service	Total	Residence of patient/population			Central activity
				Capital	Coastal	Lowland	
1.	MoH hospital total spending	Total	9 387	938	2 839	3 854	1 756
2.		Capital	2 165	844	568	402	351
3.		Coastal	2 186	94	1 703	389	0
4.		Lowland	3 442	0	568	2 698	176
5.		Interior	1 594	0	0	365	1 229
6.							
7.	MoH patient copayment revenue	Total	107	19	31	45	12
8.		Capital	37	18	8	8	3
9.		Coastal	24	1	18	5	0
10.		Lowland	35	0	5	29	1
11.		Interior	11	0	0	3	8
12.							
13.	MoH hospital revenues from NIA	Total	6 740	735	1 862	2 883	1 260
14.		Capital	1 738	676	461	323	278
15.		Coastal	1 615	72	1 262	281	0
16.		Lowland	2 367	0	394	1 855	118
17.		Interior	1 020	0	0	237	783
18.							
19.	MoH hospital operating deficit	Total	2 540	184	946	926	484
20.		Capital	390	150	99	71	70
21.		Coastal	547	21	423	103	0
22.		Lowland	1 040	0	169	814	57
23.		Interior	563	0	0	125	438
24.							
25.	Regional hospital subsidy	Total	5 299	---	---	---	5 299
26.		Capital	225	---	---	---	225
27.		Coastal	960	---	---	---	960
28.		Lowland	2 087	---	---	---	2 087
29.		Interior	2 027	---	---	---	2 027
30.							
31.	Polyclinic subsidy	Total	6 473	---	---	---	6 473
32.		Capital	640	---	---	---	640
33.		Coastal	1 284	---	---	---	1 284
34.		Lowland	1 957	---	---	---	1 957
35.		Interior	2 592	---	---	---	2 592
36.							
37.	Operation of Ministry orphanages	Total	1 600	19	326	432	823
38.							
39.	Public health activity		5 262	69	302	763	2 770
40.	Activities against epidemics		3 338	---	---	---	---
41.	Surveillance	Total	948	---	---	---	948
42.	Malaria abatement	Total	2 390	0	0	0	2 390
43.	Miscellaneous health-related activities		1 924	---	---	---	---
44.	Family planning	Total	1 538	69	302	763	380
45.	Child health screening	Total	386				386
46.							
47.	Administration	Total	3 365	---	---	---	3 365

Regional governments

8.14. Checking again with their contacts in the Ministry of Finance and the regional governments, the team acquires the breakdown of spending by these entities (Exhibit 8.3). Regional expenditures for public health activity are easy to allocate, as they relate to school health programmes in the region itself. On the other hand, data on regional facilities are arrayed by type of provider, making them difficult to use directly in estimating spending by place of residence. The team recognizes that additional data will be needed for the accounts.

Exhibit 8.3					
Regional government reports of health spending, calendar year 2002					
(All figures are by place of service)					
Region	Regional government hospital revenues	Subsidy of regional hospitals	Government polyclinic revenues	Subsidy of regional polyclinics	Public health activity
Total	19 712	41	25 981	521	726
Capital	1 416	1	3 310	153	78
Coastal	5 428	4	8 446	228	99
Lowland	9 935	30	9 236	135	319
Interior	2 933	6	4 989	5	230

National Insurance Agency

8.15. The team requests a meeting with NIA staff to discuss regional estimates for the National Insurance Agency. During the course of the discussion, they discover that total spending has been tabulated for the country as a whole, but not for regions. The team asks for a tabulation of claims by place of residence, place of service, and type of provider, but NIA staff respond that this tabulation would be too expensive and time-consuming. With the intercession of the NIA member of the NHA Steering Committee, the staff agree to prepare a tabulation of a random sample of 7% of claims. This is delivered the following month (Exhibit 8.4). The health accounts team recognizes that these data are useful, but that they must be combined with other data in order to produce reliable figures.

Exhibit 8.4						
NIA tabulation of claims (7% sample)						
			Place of residence of patient			
	Ste of service	Total	Capital	Coastal	Lowland	Interior
MoH hospitals	Total	465	51	139	192	83
	Capital	117	46	28	20	23
	Coastal	107	5	87	15	0
	Lowland	170	0	24	137	9
	Interior	71	0	0	20	51
Regional hospital	Total	1 059	50	344	570	95
	Capital	77	36	16	14	11
	Coastal	331	14	246	71	0
	Lowland	585	0	82	469	34
	Interior	66	0	0	16	50
Private hospitals	Total	817	602	204	11	0
	Capital	603	596	5	2	0
	Coastal	214	6	199	9	0
	Lowland	0	0	0	0	0
	Interior	0	0	0	0	0
Visiting nurses	Total	25	0	0	9	16
	Capital	0	0	0	0	0
	Coastal	0	0	0	0	0
	Lowland	9	0	0	9	0
	Interior	16	0	0	0	16
Government poly	Total	1 201	134	445	474	148
	Capital	137	123	10	4	0
	Coastal	449	7	416	26	0
	Lowland	465	3	15	439	8
	Interior	150	1	4	5	140
Private polyclinic	Total	353	56	154	123	20
	Capital	71	52	19	0	0
	Coastal	144	4	132	8	0
	Lowland	133	0	3	115	15
	Interior	5	0	0	0	5

AZap: an example of converting fiscal year to calendar year data and adjusting to NHA totals

8.16. AZap has its own clinics, which serve employees in their catchment area. A discussion with the company comptroller's office reveals that the physician services reimbursed by the company are almost exclusively by local providers. Using AZap's financial records, the office is able to provide the team with fiscal-year information

Box 13. Converting fiscal-year data to calendar-year data

The decision to use three-quarters of one year's data and one-quarter of the next year's data is based on an assumption that spending occurs evenly throughout the year. If there were a reason to believe otherwise, the team would be justified in using different proportions. Note that the $\frac{3}{4}$ - $\frac{1}{4}$ rule is rather insensitive to price inflation, as shown in the table below. Say, for example, that price inflation is 25% per year. Assuming that price-adjusted expenditure occurs evenly through the year, each quarter's nominal expenditure would be 5.7% higher than the previous quarter's. Even so, the proportion of each fiscal year's spending that accrues to the calendar year is quite close to the $\frac{3}{4}$ - $\frac{1}{4}$ division used.

Illustration of the insensitivity of the $\frac{3}{4}$ - $\frac{1}{4}$ rule to inflation				
Quarter	Spending level		Quarters of fiscal year going to calendar year 2	
	Even nominal expenditure	Even price-adjusted expenditure	Even nominal expenditure	Even price-adjusted expenditure
<i>Fiscal year 1</i>				
First quarter	100.0	91.8		
Second quarter	100.0	97.0	100.0	97.0
Third quarter	100.0	102.6	100.0	102.6
Fourth quarter	100.0	108.6	100.0	108.6
Total	400.0	400.0	(75.0%)	(77.0%)
<i>Fiscal year 2</i>				
First quarter	125.0	114.7	125.0	114.7
Second quarter	125.0	121.3		
Third quarter	125.0	128.3		
Fourth quarter	125.0	135.7		
Total	500.0	500.0	(25.0%)	(22.9%)
Calendar year 2			425	423

(Exhibit 8.5). The team converts the fiscal year data to calendar year data by taking three-quarters of the total for fiscal year 2002 and one-quarter of the total for fiscal year 2003, and scaling the results to agree with the figure in the NHA table. These results can be used both for place-of-residence and place-of-service estimates. (See Box 13 for a note on the conversion.)

Exhibit 8.5				
Spending in AZap clinics, by fiscal year				
	Fiscal year 2002	Fiscal year 2003	Converted to calendar year 2002	Controlled to NHA figure
All clinics	1 176	1 318	1211.50	1 216
Capital Region	348	414	364.50	366
Coastal Region	474	529	487.75	490
Lowland Region	241	255	244.50	245
Interior Region	113	120	114.75	115
Reimbursement	50	58	52.00	53
Capital Region	14	17	14.75	15
Coastal Region	20	24	21.00	22
Lowland Region	11	12	11.25	11
Interior Region	5	5	5.00	5
Note: fiscal year 2003 ends 30 September 2003				
Source: Ms Pilar, 10 August 2004				

Other actors

8.17. Some of the smaller actors can be rather easily addressed. For example, the nonprofit organization Doctors for Global Health operates entirely in the Interior Region, so the entire NHA amount – whether measured by place of residence or place of service – can be attributed to that region. Similarly, company-owned polyclinics (HF.2.5.2, HP.3.4.2) are located exclusively in the Coastal Region for employees living and working there, so that these expenditures can be attributed entirely to that region.

8.18. The Ministry of Defence (MoD) maintains financial data on each of its hospitals and polyclinics, making the allocation easy. Except for the Capital Region hospital, which is a tertiary facility, each hospital and polyclinic draws from its own region; records from the Capital hospital permit the team to distribute money back to the regions for transferred patients (see Exhibit 8.6).

Exhibit 8.6						
Ministry of Defence report on expenditure						
	Site of service	Total	Residence of patient/population			
			Capital	Coastal	Lowland	Interior
MoD hospitals	Total	116	32	38	25	21
	Capital	40	32	3	2	3
	Coastal	35	0	35	0	0
	Lowland	23	0	0	23	0
	Interior	18	0	0	0	18
MoD polyclinics	Total	506	136	140	121	109
(except construction)	Capital	136	136	0	0	0
	Coastal	140	0	140	0	0
	Lowland	121	0	0	121	0
	Interior	109	0	0	0	109

8.19. The Government Employee Group Insurance Programme (GEHI) maintains records at the regional level. GEHI staff provide a report (Exhibit 8.7) and indicate that all expenditures in a region are attributable to residents of the region.

Exhibit 8.7		
Government Employee Health Insurance Programme		
2002 Calendar year report by place of service		
Payments to regional government hospitals	Total	109
	Capital	83
	Coastal	11
	Lowland	8
	Interior	7
Payments to regional government polyclinics	Total	402
	Capital	306
	Coastal	41
	Lowland	29
	Interior	26

8.20. Data from other actors will require more work. Data from the nongovernmental organizations (NGOs) (Exhibit 8.8) present the same challenges as the data from regional governments: hospital subsidies and physician services are reported by place of service rather than residence of patient, so the team will need to adjust the data. The NGO programme of health education is nationwide, consisting of radio and television announcements and pamphlets on various aspects of healthy behaviour.

Exhibit 8.8	
Nongovernmental organization expenditures, calendar year 2002	
Activity	Amount (¢)
Primary care services	286
Secondary/tertiary care services	263
Training	0
Research	230
Information, education, and communication	1 893
Administration	216
Other (specify)	0
Total	2 888
(see Exhibit 9.4 in the NHA Guide)	

8.21. The team realizes that it will be difficult to allocate household expenditures. During the national health accounts exercise, the Appia Statistical Agency (ASA) produced a special tabulation showing household payments for various health purposes (Exhibit 8.9). However, these data are by place of residence only. Further, during the national exercise, the team revised the “raw” survey tabulation to fit the overall picture of national expenditure.

Exhibit 8.9					
Appia household survey					
	Total	Region of residence			
		Capital	Coastal	Lowland	Interior
Payments to NIA	11 626	2 867	4 454	3 725	580
Payments to private medical insurance	4 400	1 975	2 150	275	0
Co-payments at hospitals	13 643	2 366	4 511	4 512	2 254
Co-payments at polyclinics	11 965	3 630	7 390	784	161
Purchase of prescription medicines	41 042	10 427	22 300	6 215	2 100
Payments to other health providers	19 763	4 470	6 410	3 431	5 452
Total (point estimate)	102 439	25 735	47 215	18 942	10 547
Source: Appia Statistical Agency					
Special tabulation prepared 28/05/2003					
Contact: Mr Andersson					

8.22. A similar situation is likely regarding data on private insurers (Exhibit 8.10). A survey of these insurers produced a report on aggregate premiums and benefits. Although benefits could be identified by type of provider, no information was available on place of service or place of residence. In a discussion with a small group of insurance executives, the team is told that “almost all” people insured under group policies live in the Coastal Region and that privately purchased policies are divided “about equally” between the Coastal and Capital Regions, with a few policies in the Lowland Region. While waiting for better information (perhaps from a larger survey), the team decides to assume that 90% of people insured under group policies live in the Coastal Region, and 10% in the Capital. The household survey data seem to show that individual insurance policies are divided 45–49–6 between Coastal, Capital and Lowland Regions, and the team decides to use this distribution (although either of these assumptions may well change during the course of the estimation).

Exhibit 8.10
Private insurance industry benefit outlays, calendar year 2002

Activity	Total (survey)	Group (NHA estimate)	Individual (NHA estimate)
Government hospitals	0	0	0
Other government facilities	0	0	0
Hospitals	560	218	342
Private for-profit hospitals	123		
Private non-profit hospitals	437		
Other facilities	1 236	482	754
Other private for-profit facilities	216		
Other private non-profit facilities	1 020		
Direct reimbursement (physician services)	2 640	1030	1610
Total	4 436	1 730	2 706

(see Exhibits 9.1 and 13.6 in the NHA Guide)

8.23. There are very few data on other actors (Exhibit 8.11). Figures on physician services, private hospitals and polyclinics come from Appia’s national product accounts and cannot be disaggregated to regions. The private hospital association was the source of data on private hospitals; there is no external source of information on traditional healers. The NHA estimate for private pharmacies was based on the household budget survey.

Exhibit 8.11		
Data from the SNA and other sources, calendar year 2002		
Activity	Total	Source
Private hospitals	25 827	Hospital association
Physician services	14 551	SNA + donors
Healers	5 498	NHA work
Private polyclinics	19 192	SNA
(see Exhibit 13.6 in the NHA Guide)		

Compiling the regional health accounts tables

8.24. Having reviewed the data, the team begins to complete the accounts. They begin with hospital spending, which represents a mixture of straightforward and more challenging estimates.

Working with fairly straightforward data

8.25. Ministry of Health hospitals are easily handled, as the MoH has sufficient data to allow both place-of-service and place-of-residence tables to be completed (**direct data entry**). The numbers are transferred from the ministry report (Exhibit 8.2) to summary worksheets (Exhibits 8.23 and 8.24 at the end of this chapter). Similarly, figures on spending in Ministry of Defence facilities can be transferred directly from the MoD report (Exhibit 8.6) to the accounts.

Estimating figures using multiple sources of data

8.26. Preparing estimates for regional government hospitals is more difficult, because of the relative scarcity of data. After reviewing the data available, the team decides to begin with place-of-service estimates. They enter the regional governments’ reports of total spending and regional government subsidies in lines 4–7 of a worksheet (Exhibit 8.12), along with the Ministry of Health figures for its payments to regional hospitals (from Exhibit 8.2) and the figures reported by the GEHI (from Exhibit 8.7). After subtracting these known third-party payments, the remainder represents NIA payments and household co-payments. The team uses the sample tabulation provided by the NIA (Exhibit 8.4) to make a provisional estimate of NIA payments by region of service (**using sample tabulations to make estimates**), scaling the sample data so that the total matches the NHA figure of ¢14 062 (lines 1 and 2 in the worksheet). This leaves household co-payments (line 11) as a residual.

Exhibit 8.12						
Regional government hospital worksheet I – place of service						
Item	Source of data	Total	Place of service			
			Capital	Coastal	Lowland	Interior
1. NIA claims	NIA tabulation	1 059	77	331	585	66
2. Scaled to NHA total		14 062	1 022	4 395	7 769	876
3.						
4. Total provider estimates	NHA sheet	19 712	1 416	5 428	9 935	2 933
5. Less: MoH	MoH report	-5 299	- 225	- 960	-2 087	-2 027
6. Less: Regional govt subsidy	Regional govt report	- 41	- 1	- 4	- 30	- 6
7. Less: GEHI	GEHI report	- 109	- 83	- 11	- 8	- 7
8. Equals: NIA + household		14 263	1 107	4 453	7 810	893
9. Less: NIA		-14 062	-1 022	-4 395	-7 769	- 876
10.						
11. Equals: households		201	85	58	41	17

8.27. The second step in the estimation process is to convert place-of-service estimates to place-of-residence estimates. The team has a reasonably clear sense of the migration pattern of patients insured by the NIA, based on the data in Exhibit 8.4. They assume that migration of patients covered by other financing agents follows the same pattern; for example, they assume that the proportion of MoH patients moving across regional boundaries for hospital care is the same as the proportion of NIA hospital patients (**keying one source of payment on another source**). They start by entering the NIA tabulation of regional hospital payments by region of residence in a new worksheet (Exhibit 8.13) (lines 1–11) and scale the sample data to agree with the NHA figure from that financing agent (lines 13–17). They follow the same procedure for MoH payments (lines 19–25). The GEHI figures are distributed as suggested by the insurance plan’s manager (lines 27–32).

8.28. To estimate household co-payments, the team relies on the provision of the Health Insurance Law that sets patient cost-sharing at 5% of the total cost of an outpatient visit (**using known legal requirements**). If they assume that the migration pattern for outpatient care is similar to that of inpatient care, and that the ratio of inpatient care and outpatient care is similar in the different regional hospitals, then household co-payments can also be distributed using the NIA migration patterns (lines 35–41). These assumptions are noted in the journal being kept by the team, with a reminder to test them a later date, perhaps by examining a sample of hospital patient records. (The team also notes in the journal that it would be technically more correct to divide the co-payments between NIA-related and GEHI-related payments, but that the GEHI share would be too small to be meaningfully allocated and the results might well be considered an exercise in false precision.)

8.29. This leaves the regional government subsidy to be addressed. These subsidies do not appear to be patient-specific, but rather facility-wide. If that is the case, then the place-of-residence distribution of each region’s subsidies is proportional to payments made on behalf of patients. The latter are found by summing the financing agent payments in the worksheet (lines 43–46). These spending patterns are used to distribute the place-of-service regional government subsidies back to place of residence (lines 48–55). This completes a provisional set of estimates for regional government hospitals, both by place of service and place of residence (lines 57–61).

Exhibit 8.13							
Regional government hospital worksheet II – place of residence							
Place of residence							
	Place of service	Total	Capital	Coastal	Lowland	Interior	
Step 2. Apply NIA migration patterns to place-of-service estimates to produce place-of-residence estimates							
1.	NIA tabulation of sample claims	Total	1 059	50	344	570	95
2.		Capital	77	36	16	14	11
3.		Coastal	331	14	246	71	0
4.		Lowland	585	0	82	469	34
5.		Interior	66	0	0	16	50
6.							
7.	Percentage distribution	Total	100.0%	4.7%	32.5%	53.8%	9.0%
8.		Capital	100.0%	46.8%	20.8%	18.2%	14.3%
9.		Coastal	100.0%	4.2%	74.3%	21.5%	0.0%
10.		Lowland	100.0%	0.0%	14.0%	80.2%	5.8%
11.		Interior	100.0%	0.0%	0.0%	24.2%	75.8%
12.							
13.	Scale NIA claims to NIA total	Total	14 062	664	4 567	7 569	1 262
14.		Capital	1 022	478	212	186	146
15.		Coastal	4 395	186	3 266	943	0
16.		Lowland	7 769	0	1 089	6 228	452
17.		Interior	876	0	0	212	664
18.							
19.	MoH payments -- scale NIA claim total to MoH total						
20.	(assumes that subsidized patients migrate in the same pattern as NIA patients)						
21.		Total	5 299	146	1 053	2 411	1 689
22.		Capital	225	105	47	41	32
23.		Coastal	960	41	713	206	0
24.		Lowland	2 087	0	293	1 673	121
25.		Interior	2 027	0	0	491	1 536
26.							
27.	Govt employee insurance payments from report						
28.		Total	109	83	11	8	7
29.		Capital	83	83			
30.		Coastal	11		11		
31.		Lowland	8			8	
32.		Interior	7				7
33.							
34.							
35.	Household payments – scale NIA claim total to household						
36.	(assumes that household payments are proportional to NIA payments)						
37.		Total	201	42	67	65	27
38.		Capital	85	40	18	15	12
39.		Coastal	58	2	43	13	0
40.		Lowland	41	0	6	33	2
41.		Interior	17	0	0	4	13
42.							
43.	Total funding excluding subsidy	Capital	1 415	706	277	242	190
44.	(sum lines 13-41)	Coastal	5 424	229	4 033	1 162	0
45.		Lowland	9 905	0	1 388	7 942	575
46.		Interior	2 927	0	0	707	2 220
47.							
48.	Regional government subsidy						
49.	Scale total funding excluding subsidy to column margins						
50.	(assumes regional governments subsidize all cases proportionately)						
51.		Total	41	0	7	27	7
52.		Capital	1	0	0	1	0
53.		Coastal	4	0	3	1	0
54.		Lowland	30	0	4	24	2
55.		Interior	6	0	0	1	5
56.							
57.	Total regional hospital spending	Total	19 712	935	5 705	10 080	2 992
58.		Capital	1 416	706	277	243	190
59.		Coastal	5 428	229	4 036	1 163	0
60.		Lowland	9 935	0	1 392	7 966	577
61.		Interior	2 933	0	0	708	2 225

Estimates involving considerable professional judgement

8.30. Estimating private hospital spending by region is even more tenuous, as there are no “hard” figures with which to work. The team does have the NIA claims sample (Exhibit 8.4) showing payments made to private hospitals by both place of residence and place of service. A follow-up call to the NGO that reported subsidizing secondary care confirms that this money went to start up a hospital in the Lowland Region. The NGO also reports that, because the hospital is quite new, its patient load is limited to residents of the Lowland Region. A hospital administrator in the Capital Region, interviewed by telephone, informs the team that there are no private hospitals in the Lowland or Interior Regions, which appears to be confirmed by the NIA tabulation of claims. No information is available on the distribution of private insurance payments.

8.31. The team decides to start from the place-of-residence perspective, beginning with NIA expenditures. The figures for NIA claims are scaled to reproduce the NHA total (lines 7–18 of the worksheet in **Exhibit 8.14**). The team knows that households must pay 5% of the cost of outpatient care in the form of cost-sharing, and the NHA figures show that 11% of NIA payments to private hospitals nationwide are for outpatient care. Assuming that this ratio is applicable to each region, the team has a formula that relates household cost-sharing to total NIA payments: $(0.05/0.95)*0.11 = 0.6\%$ (**keying one source of payment on another source**). If the team assumes that inpatient and outpatient migration patterns are similar (the assumption used for regional government hospital patients), it can develop estimates of NIA-related household cost-sharing by place of service and place of residence (lines 19–23).

8.32. For private insurance estimates, the team assumes that payments by place of residence have the same distribution as the people insured, rough estimates of which had been worked out in their talks with industry executives (see paragraph 8.22). The proportions, shown in lines 26 and 27 of the worksheet, are scaled so that they match the national payment totals, producing the figures in lines 36 and 46. The team uses the migration patterns of NIA patients (lines 29–33) to distribute place-of-residence payments by place of service (**keying one source of payment on another source**), based on an (untested) assumption that migration for private hospital care is similar for publicly and privately insured populations. These two assumptions weaken the estimates to a considerable extent, but are inescapable in the absence of other information.

8.33. After entering the information provided by the NGO (lines 48–52) the team is left with household payments to estimate. They begin with the ASA tabulation of household spending for hospital care, which is not differentiated by type of facility. The data are scaled to reproduce the NHA figures at national level (lines 54–61). Then “known” place-of-residence figures – in some cases truly known and in other cases provisional estimates – are subtracted to produce a “direct-purchase” figure by place of residence for each region (lines 62–66). These figures, plus co-payments associated with NIA spending (line 19), comprise the household expenditure in private hospitals (line 68).

Exhibit 8.14							
Private hospital worksheet							
	Region of Service	Total	Region of residence				
			Capital	Coastal	Lowland	Interior	
1. NIA claims	Total	817	602	204	11	0	
2.	Capital	603	596	5	2	0	
3.	Coastal	214	6	199	9	0	
4.	Lowland	0	0	0	0	0	
5.	Interior	0	0	0	0	0	
6.							
7. NIA claims distribution	Total	100.0%					
8.	Capital		72.9%	0.6%	0.2%	0.0%	
9.	Coastal		0.7%	24.4%	1.1%	0.0%	
10.	Lowland		0.0%	0.0%	0.0%	0.0%	
11.	Interior		0.0%	0.0%	0.0%	0.0%	
12.							
13. NIA benefits	Total	10 898	8 030	2 721	147	0	
14.	Capital	8 044	7 950	67	27	0	
15.	Coastal	2 854	80	2 654	120	0	
16.	Lowland	0	0	0	0	0	
17.	Interior	0	0	0	0	0	
18.							
19. Household payments for NIA services	Total	65	48	16	1	0	
20. (5% of outpatient payments = 0.6% of total payments)	Capital	48	48	0	0	0	
21.	Coastal	17	0	16	1	0	
22.	Lowland	0	0	0	0	0	
23.	Interior	0	0	0	0	0	
24.							
25. Distribution of privately insured people							
26. Group policies			10%	90%	0%	0%	
27. Individual policies			45%	49%	6%	0%	
28.							
29. Distribution of NIA claims	Total	100.0%	100.0%	100.0%	100.0%	0.0%	
30. (see lines 5-9)	Capital	73.8%	99.0%	2.5%	18.2%	0.0%	
31.	Coastal	26.2%	1.0%	97.5%	81.8%	0.0%	
32.	Lowland	0.0%	0.0%	0.0%	0.0%	0.0%	
33.	Interior	0.0%	0.0%	0.0%	0.0%	0.0%	
34.							
35. Distribution of private group insurance benefits							
36. (Apply NIA distribution to estimated	Total	218	22	196	0	0	
37. place-of-residence estimates)	Capital	27	22	5	0	0	
38.	Coastal	191	0	191	0	0	
39.	Lowland	0	0	0	0	0	
40.	Interior	0	0	0	0	0	
41.							
42. Distribution of private individual insurance benefits	Total	342	154	167	21	0	
43. (Apply NIA distribution to estimated	Capital	160	152	4	4	0	
44. place-of-residence estimates)	Coastal	182	2	163	17	0	
45.	Lowland	0	0	0	0	0	
46.	Interior	0	0	0	0	0	
47.							
48. Distribution of NGO hospital payments	Total	263	0	0	263	0	
49.	Capital	0	0	0	0	0	
50.	Coastal	0	0	0	0	0	
51.	Lowland	263	0	0	263	0	
52.	Interior	0	0	0	0	0	
53.							
54. ASA tabulation of hospital cost sharing (from Exhibit 8.9)	Total	13 643	2 366	4 511	4 512	2 254	
55. NHA hospital cost sharing							
56. MoH hospitals (Exhibit 8.2 line 7)	Total	107					
57. Regional govt hospitals (Exhibit 8.13 line 37)	Total	201					
58. Private hospitals	Total	14 106					
59. Total		14 414					
60.							
61. ASA figures scaled to NHA total	Total	14 414	2 500	4 766	4 767	2 381	
62. Less estimated cost sharing by place of residence							
63. MoH hospitals (Exhibit 8.2 line 7)	Total	- 107	- 19	- 31	- 45	- 12	
64. Regional govt hospitals (Exhibit 8.13 line 37)	Total	- 201	- 42	- 67	- 65	- 27	
65. Private hospital NIA cost-B41sharing (line 23)	Total	- 65	- 48	- 16	- 1	0	
66. Equals balance to be distributed (direct purchase of svcs)	Total	14 041	2 391	4 652	4 656	2 342	
67.							
68. Total household spending at private hospitals	Total	14 106	2 439	4 668	4 657	2 342	

8.34. Unfortunately, the team has no information with which to distribute the place-of-residence payments in line 66 by place of service, and the amount is too large to allow an arbitrary distribution. Because the patients incurring these costs are willing and able to purchase services directly from private hospitals, it is likely that they also have the means and willingness to travel some distance to receive care. In that case, the NIA migration patterns are not likely to reflect what is actually occurring. The amount of money to be distributed – €14 041 million – is equal to 17% of total household spending for care, and to almost 10% of personal health care expenditures. So the team conducts a quick convenience sample survey of private hospital administrators to follow up on the telephone conversation held earlier with a single administrator, to try to discover the relative size of the industry by region. The results are not totally satisfying: nobody seems willing to comment on revenue shares, partly because revenues are a closely guarded trade secret. Bed counts are better known, and the range of estimates of the Capital Region’s share of beds runs from 85% to 70%. The median “guess” is 80%, and respondents tend to think that occupancy rates are fairly consistent across regions.

8.35. The team still has to find a way to translate bed-days into revenues. They turn to their steering committee for help. One committee member is acquainted with the administrator of one of the larger private hospitals and agrees to approach him informally. The committee member is told, in strict confidence, that the hospital receives about 10% more per bed-day from privately insured patients than from NIA patients, and almost twice as much per bed-day from direct-pay patients than from NIA patients. With this information, the team makes the last in a series of assumptions for this part of their work – that these observations hold for all private hospitals – and build a small worksheet using this information (**Exhibit 8.15**). They enter the estimated payments by place of service for NIA patients and for privately insured patients (lines 1–7) and the total direct-pay figure to be allocated (line 9). Then they adjust each of these estimates to reflect the relative revenue per patient-day reported by the anonymous correspondent (lines 11–15). If all their assumptions are valid, the total in line 15 is proportional to patient-days, which the consensus holds to be distributed 80:20 between the Capital and Coastal regions (lines 15–18). Subtracting the NIA and private-insurance adjusted revenues leaves the direct-pay figure as a residual; this can be re-inflated to the total at line 9. Adding the re-inflated figure (line 23) and NIA co-payments produces an estimate of household payments by place of service (line 25). A migration pattern for direct-pay patients to connect place-of-residence and place-of-service figures would need to be estimated with a new set of information, but the team does not need this to produce their summary tables, and it is left for future work.

Exhibit 8.15					
Private hospitals					
Direct-pay worksheet					
		Place of service			Revenue per day relative to NIA patients
		Capital	Coastal	Total	
1.	NIA-related payments	8 092	2 871	10 963	1.0
2.	NIA payments	8 044	2 854	10 898	
3.	Household NIA copayments	48	17	65	
4.					
5.	Private insurance payments	187	373	560	1.1
6.	Group insurance payments	27	191	218	
7.	Individual insurance payments	160	182	342	
8.					
9.	Direct-pay patient payments	?	?	14 041	2.0
10.					
11.	Payments deflated (divided) by relative revenue per day				
12.	NIA	8 092	2 871	10 963	
13.	Private insurance	170	339.0909	509.0909	
14.	Direct-pay	?	?	7020.5	
15.	Total	?	?	18492.59	
16.					
17.	Assumed distribution of patient-days	80%	20%	100%	
18.	Payments deflated by relative revenue per day	14794.07	3698.518	18492.59	
19.	Less: NIA (line 12)	-8 092	-2 871	-10 963	
20.	Less: Private insurance (line 13)	-170	-339.0909	-509.0909	
21.	Equals: Direct pay	6532.073	488.4273	7020.5	
22.					
23.	Direct pay, inflated back to actual revenues	13 064	977	14 041	
24.	NIA copayments (Exhibit 8.14 lines 19ff)	48	17	65	
25.	Total household payments by place of service	13 112	994	14 106	

8.36. The team now has a set of estimates for private hospitals by place of service and by place of residence. Except for the NHA total figures and the sample claims from the NIA, the estimates rest on a series of reasonable but untested assumptions and informal conversations with industry experts. Since this section of the accounts represents a relatively large part of the total, it is clear that obtaining more rigorous data on the private hospital industry should be a priority. Journal entries reflect the team's intent to meet with ASA staff to explore possible modifications to the household budget survey. The team also makes notes to work on acquiring additional detail on private hospital activity by region, perhaps including some type of survey of the facilities' revenues, or information from the Ministry of Finance on tax receipts from these facilities.

Using the same techniques for more than one type of provider

8.37. Because the data available to the team for polyclinics are similar to those for hospitals, a similar methodology is used to estimate polyclinic expenditure. The team creates a spreadsheet (Exhibit 8.16) for estimates by place of service for government polyclinics. They enter the known totals from regional governments, the MoH subsidy, and the government employee insurance programme (GEHI) in lines 4–8 of the worksheet. The NIA tabulation of polyclinic payments by place of service, taken from the

report shown in Exhibit 8.4, is scaled to agree with the NHA total (lines 1 and 2) and entered into the spreadsheet as well. A provisional figure for out-of-pocket payments is then found as a residual (line 10).

Exhibit 8.16						
Regional government polyclinic worksheet – place of service estimates (excluding construction of facilities)						
Item	Source of data	Total	Place of service			
			Capital	Coastal	Lowland	Interior
1. NIA claims	Claims tabulation	1 201	137	449	465	150
2. Scaled to NHA figure		17 175	1 959	6 421	6 650	2 145
3.						
4. Total provider estimate	Regional worksheet	25 981	3 310	8 446	9 236	4 989
5. Less: MoH	MoH report	-6 473	- 640	-1 284	-1 957	-2 592
6. Less: MoD	MoD report	- 506	- 136	- 140	- 121	- 109
7. Less: regional govt subsidy	Regional govt report	- 521	- 153	- 228	- 135	- 5
8. Less: GEHI	GEI report	- 402	- 306	- 41	- 29	- 26
9. Less: NIA		-17 175	-1 959	-6 421	-6 650	-2 145
10. Equals: household		904	116	332	344	112

8.38. As with hospitals, the team makes an assumption that cross-region migration of polyclinic patients is similar for all financing agents. (This assumption is noted in the journal, with a suggestion to conduct a small convenience survey of polyclinic records to see whether it is valid.) This assumption allows the team to use the NIA claims tabulation to drive their estimates for other payers. For convenience, these claims figures are transferred to lines 1–5 of the worksheet ([Exhibit 8.17](#)), and the distribution of each place-of-service total among regions of residence is calculated in lines 6–10. These percentages are used to distribute MoH subsidies (lines 11–15) and the NIA payments (lines 16–20). The government employee health insurance programme numbers are entered in lines 21–25. Household payments at government polyclinics represent co-payments, so the team distributes the place-of-service expenditures back to place of residence in proportion to the payments from the NIA and GEHI (lines 26–35). At this point the team can sum payments by place of service and place of residence for all financing agents except the regional government subsidies (lines 36–40). They make a second assumption that the subsidies are distributed across all operations of the polyclinics and thus that they can be distributed to place of residence in proportion to payments from other parties (lines 36–45). Adding in the spending reported by place of residence for MoD polyclinics (lines 46–51) completes the picture for this class of provider (lines 52–56).

Exhibit 8.17							
Government polyclinic worksheet II – place of residence							
		Place of residence					
		Place of service	Total	Capital	Coastal	Lowland	Interior
1.	NIA claims tabulation	Total	1 201	134	445	474	148
2.		Capital	137	123	10	4	0
3.		Coastal	449	7	416	26	0
4.		Lowland	465	3	15	439	8
5.		Interior	150	1	4	5	140
6.	NIA claims distribution	Total					
7.		Capital	100.0%	89.8%	7.3%	2.9%	0.0%
8.		Coastal	100.0%	1.6%	92.7%	5.8%	0.0%
9.		Lowland	100.0%	0.6%	3.2%	94.4%	1.7%
10.		Interior	100.0%	0.7%	2.7%	3.3%	93.3%
11.	MoH payments	Total	6 473	624	1 369	2 026	2 454
12.		Capital	640	574	47	19	0
13.		Coastal	1 284	20	1 190	74	0
14.		Lowland	1 957	13	63	1 847	34
15.		Interior	2 592	17	69	86	2 420
16.	NIA payments	Total	17 175	1 916	6 364	6 779	2 116
17.		Capital	1 959	1 759	143	57	0
18.		Coastal	6 421	100	5 949	372	0
19.		Lowland	6 650	43	215	6 278	114
20.		Interior	2 145	14	57	72	2 002
21.	GEHI payments	Total	402	306	41	29	26
22.		Capital	306	306	0	0	0
23.		Coastal	41	0	41	0	0
24.		Lowland	29	0	0	29	0
25.		Interior	26	0	0	0	26
26.	NIA plus GEHI	Total	17 577	2 222	6 405	6 808	2 142
27.		Capital	2 265	2 065	143	57	0
28.		Coastal	6 462	100	5 990	372	0
29.		Lowland	6 679	43	215	6 307	114
30.		Interior	2 171	14	57	72	2 028
31.	Out-of-pocket payments	Total	904	114	329	351	110
32.		Capital	116	106	7	3	0
33.		Coastal	332	5	308	19	0
34.		Lowland	344	2	11	325	6
35.		Interior	112	1	3	4	104
36.	FAs excluding regional government subsidy	Total	24 954	2 960	8 103	9 185	4 706
37.		Capital	3 021	2 745	197	79	0
38.		Coastal	8 078	125	7 488	465	0
39.		Lowland	8 980	58	289	8 479	154
40.		Interior	4 875	32	129	162	4 552
41.	Subsidy	Total	521	144	225	145	7
42.		Capital	153	139	10	4	0
43.		Coastal	228	4	211	13	0
44.		Lowland	135	1	4	128	2
45.		Interior	5	0	0	0	5
46.	MoD polyclinics (from MoD report)	Total	506	136	140	121	109
47.		Capital	136	136	0	0	0
48.		Coastal	140	0	140	0	0
49.		Lowland	121	0	0	121	0
50.		Interior	109	0	0	0	109
51.							
52.	Total government polyclinics	Total	25 981	3 240	8 468	9 451	4 822
53.		Capital	3 310	3 020	207	83	0
54.		Coastal	8 446	129	7 839	478	0
55.		Lowland	9 236	59	293	8 728	156
56.		Interior	4 989	32	129	162	4 666

8.39. As with hospitals, the comparable estimation process for private polyclinics is more tenuous, as solid place-of-service figures are not available to anchor the place-of-residence estimates. The NIA payments are found simply by scaling the tabulations to match the NHA total (lines 1–11 of the worksheet in [Exhibit 8.18](#)). The law requires patients to pay 5% of the total charge as a co-payment, so an estimate of household co-payments through the NIA (lines 13–17) can be built from these figures.

8.40. In relation to private insurance, the team has slightly more information about place of residence than place of service. On the basis of their discussions with insurance executives (see paragraph 8.22), and assuming that expenditure per person insured is roughly equal across regions of residence, the team allocates the private polyclinic benefit figures 90–10 (Coastal–Capital) for group policies and 45–49–6 (Coastal–Capital–Lowland) for individual policies (lines 25–31). Again, assuming that migration patterns of NIA patients for private polyclinic care are similar to those of patients covered by other financing agents, the team can use the NIA claims tabulation (lines 19–23) to derive place-of-service estimates for each region of residence (lines 26–29 and 32–35).

8.41. This leaves cash-paying patients to be handled. The team begins by scaling the ASA tabulation of the household budget survey to reproduce the NHA figure for out-of-pocket payments at all polyclinics (lines 37 and 38). Then they remove NIA co-payments at government facilities (taken from the government polyclinic worksheet) and at private facilities (lines 39 and 40). The residual (line 42) can be taken as a provisional estimate of expenditures by cash-paying patients by place of residence.

8.42. The team now has to find a migration pattern for these expenditures. Polyclinic services are provided on an outpatient basis, which means that the cost to patients of travel – in terms of both time and money – is likely to be a larger factor than for hospital services. Thus, the team feels that NIA migration patterns are probably more descriptive for this service than the patterns for direct-pay hospital care, and use the former to distribute direct-pay polyclinic spending to region of service (lines 42–46).

8.43. Adding in the information about AZap’s clinics and the employer-operated clinics, the team has completed its provisional estimates of polyclinic spending ([Exhibit 8.19](#)). As with hospitals, the assumptions employed by the team play an important part in determining the results, and the team makes extensive notes in the journal regarding the need for future tests and possible data collection activities.

Exhibit 8.18							
Polyclinic worksheet – private polyclinics							
		Place of service	Total	Place of residence			
				Capital	Coastal	Lowland	Interior
1.	NIA tabulation	Total	353	56	154	123	20
2.		Capital	71	52	19	0	0
3.		Coastal	144	4	132	8	0
4.		Lowland	133	0	3	115	15
5.		Interior	5	0	0	0	5
6.							
7.	NIA payments	Total	4 973	789	2 170	1 733	281
8.		Capital	1 001	733	268	0	0
9.		Coastal	2 029	56	1 860	113	0
10.		Lowland	1 873	0	42	1 620	211
11.		Interior	70	0	0	0	70
12.							
13.	NIA-related out-of-pocket (OOP)	Total	262	42	114	91	15
14.	(5% of total service payment)	Capital	53	39	14	0	0
15.	(NIA payments represent 95%)	Coastal	107	3	98	6	0
16.		Lowland	98	0	2	85	11
17.		Interior	4	0	0	0	4
18.							
19.	NIA claims distribution	Total	100.0%	100.0%	100.0%	100.0%	100.0%
20.		Capital	20.1%	92.9%	12.3%	0.0%	0.0%
21.		Coastal	40.8%	7.1%	85.7%	6.5%	0.0%
22.		Lowland	37.7%	0.0%	1.9%	93.5%	75.0%
23.		Interior	1.4%	0.0%	0.0%	0.0%	25.0%
24.							
25.	Group insurance	Total	482	48	434	0	0
26.		Capital	99	45	54	0	0
27.		Coastal	375	3	372	0	0
28.		Lowland	8	0	8	0	0
29.		Interior	0	0	0	0	0
30.							
31.	Individual insurance	Total	754	339	370	45	0
32.		Capital	361	315	46	0	0
33.		Coastal	344	24	317	3	0
34.		Lowland	49	0	7	42	0
35.		Interior	0	0	0	0	0
36.							
37.	ASA tabulation of polyclinic payments	All Appia	11 965	3 630	7 390	784	161
38.	NHA OOP payments	All Appia	9 647	2 927	5 958	632	130
39.	NIA co-payments at government facilities	All Appia	904	114	329	351	110
40.	NIA co-B64payments at private facilities (line 13)	All Appia	262	42	114	91	15
41.							
42.	Residual household payments	Total	8 481	2 771	5 515	190	5
43.		Capital	3 253	2 573	680	0	0
44.		Coastal	4 938	198	4 728	12	0
45.		Lowland	289	0	107	178	4
46.		Interior	1	0	0	0	1
47.							
48.	AZap clinics	Total	1 216	366	490	245	115
49.		Capital	366	366	0	0	0
50.		Coastal	490	0	490	0	0
51.		Lowland	245	0	0	245	0
52.		Interior	115	0	0	0	115
53.							
54.	Employer-operated clinics	Total	3 024	0	3 024	0	0
55.		Capital	0	0	0	0	0
56.		Coastal	3 024	0	3 024	0	0
57.		Lowland	0	0	0	0	0
58.		Interior	0	0	0	0	0
59.							
60.	Total private polyclinic spending	Total	19 192	4 355	12 117	2 304	416
61.		Capital	5 133	4 071	1 062	0	0
62.		Coastal	11 307	284	10 889	134	0
63.		Lowland	2 562	0	166	2 170	226
64.		Interior	190	0	0	0	190

Exhibit 8.19											
Polyclinic worksheet – provisional estimates (excluding construction of facilities)											
	Total provider	MoH (HF.1.1.1.1)	MoD (HF.1.1.3)	Regional government (HF.1.1.2)	NIA (HF.1.2)	Government Employee Insurance (HF.2.1.1)	Private Group Ins (HF.2.1.2)	Private Indiv Ins (HF.2.2)	Households (HF.2.3)	AZap (HF.2.5.1)	Private firms (HF.2.5.2)
Place of service estimates											
Regional govt polyclinics	Total	25 981	6 473	506	521	17 175	402		904		
	Capital	3 310	640	136	153	1 959	306		116		
	Coastal	8 446	1 284	140	228	6 421	41		332		
	Lowland	9 236	1 957	121	135	6 650	29		344		
	Interior	4 989	2 592	109	5	2 145	26		112		
Private polyclinics	Total	19 192				4 973	482	754	8 743	1 216	3 024
	Capital	5 133				1 001	99	361	3 306	366	0
	Coastal	11 307				2 029	375	344	5 045	490	3 024
	Lowland	2 562				1 873	8	49	387	245	0
	Interior	190				70	0	0	5	115	0
Place of residence estimates											
Regional govt polyclinics	Total	25 981	6 473	506	521	17 175	402		904		
	Capital	3 240	624	136	144	1 916	306		114		
	Coastal	8 468	1 369	140	225	6 364	41		329		
	Lowland	9 451	2 026	121	145	6 779	29		351		
	Interior	4 822	2 454	109	7	2 116	26		110		
Private polyclinics	Total	19 192				4 973	482	754	8 743	1 216	3 024
	Capital	4 355				789	48	339	2 813	366	0
	Coastal	12 117				2 170	434	370	5 629	490	3 024
	Lowland	2 304				1 733	0	45	281	245	0
	Interior	416				281	0	0	20	115	0

More estimates almost entirely based on professional judgement

8.44. Estimating the distribution of physician services and services of traditional healers by place of service and place of residence poses perhaps the greatest technical challenge to the team. The paucity of information means that the team will have to use considerable professional judgement to complete these cells – even more than in the estimates of private hospitals.

8.45. The team first gathers the few figures that require little work. Regrettably, the only subnational figures on paper for place of service are from AZap and the external organization, Doctors for Global Health, and represent only a small fraction of the amount to be distributed. For place of residence, the team has the ASA tabulation of the household budget survey.

8.46. The team decides to start with the place of residence estimates, for which they have more information. From an earlier discussion with staff at the ASA, the team has concluded that the household survey figures (line 1 of the worksheet in [Exhibit 8.20](#)) include expenditures later reimbursed by insurance (see paragraphs 12.40 and 12.43 of the NHA Guide (1)). Knowing nothing of the regional distribution of these benefits, the team assumes – as for private polyclinics – that spending is proportional to the number of people insured (lines 2 and 3 of the worksheet). The AZap reimbursements (line 4) are taken from the electric utility report (Exhibit 8.5). To separate spending on physicians from that on traditional healers, the team must make a second major assumption – that 90% of spending on traditional healers is made by people in the Interior Region, where faith in traditional medicine remains quite strong, and that the remaining 10% is made by people in the Lowland Region areas adjacent to the Interior Region. Conversations with public health nurses tend to bear out the general thrust of this assumption, although the

exact proportions are difficult to quantify. With these two assumptions, the team can determine expenditure on physicians by place of residence (line 6).

8.47. Now these figures must be distributed by place of service. In the absence of any information on migration patterns, the team settles on using the pattern evinced for private polyclinics. They argue that the two types of providers can be thought of as substitutes for each other, so that people might well demonstrate the same tendencies to travel to see them. Thus, lines 7–11 of the worksheet are used to distribute insurance reimbursements and out-of-pocket payments (lines 12–21). Again, the AZap figures are taken from the utility’s report. To distribute services of traditional healers among regions, the team invokes a further assumption: that half of the purchases made by Lowlands residents are made in the Interior Region (lines 27–31).

8.48. Clearly, these estimates are greatly affected by the four major assumptions made. The results will need to be examined in the context of the whole matrix of personal health care, and the assumptions will need to be documented in the final report. The assumptions also point to places where further investigation is needed: regional distribution of the use of privately insured services and of traditional healers.

8.49. The final step in estimating regional spending for physician services is the treatment of NGO and rest-of-world figures. A follow-up call to the NGO that finances physician services produces the information that these funds subsidize the operation of practices in remote and underserved areas of the Interior Region, strongly suggesting that there is no migration involved. Similarly, the Doctors for Global Health programme is active only in remote parts of the Interior Region. Thus, these funds can be entered the same way for place of service and place of residence (lines 39-49), and the total figure for private physicians can be summed from its pieces (lines 51-55).

Exhibit 8.20							
Physician and healer worksheet							
		Region of residence					
		Region of service	Total	Capital	Coastal	Lowland	Interior
PLACE OF RESIDENCE ESTIMATES							
1.	Survey estimate of household payments to providers (physicians and healers)		19763	4470	6410	3431	5452
	Less: reimbursements to households (eliminate double counting)						
2.	Private group insurance payments (distributed 10-90-0-0)		-1030	-103	-927	0	0
3.	Private individual insurance payments (distributed 45-49-6-0)		-1610	-725	-788	-97	0
4.	AZap reimbursement for private physician services (from AZap report)		-53	-15	-22	-11	-5
5.	Less: household payments for healers (assume 0-0-10-90 distribution)		-5498	0	0	-550	-4948
6.	Equals: household payments for physicians		11572	3627	4673	2773	499
PLACE OF SERVICE x PLACE OF RESIDENCE ESTIMATES							
7.	Private polyclinic migration patterns (from polyclinic worksheet)	Total	19192	4355	12117	2304	416
8.		Capital	5133	93.5%	8.8%	0.0%	0.0%
9.		Coastal	11307	6.5%	89.9%	5.8%	0.0%
10.		Lowland	2562	0.0%	1.4%	94.2%	54.3%
11.		Interior	190	0.0%	0.0%	0.0%	45.7%
12.	Private group insurance payments	Total	1030	103	927	0	0
13.	(Distribute place-of-residence payments using private polyclinic migration pattern)	Capital	177	96	81	0	0
14.		Coastal	840	7	833	0	0
15.		Lowland	13	0	13	0	0
16.		Interior	0	0	0	0	0
17.	Private individual insurance payments	Total	1610	725	788	97	0
18.	(Distribute place-of-residence payments using private polyclinic migration pattern)	Capital	747	678	69	0	0
19.		Coastal	761	47	708	6	0
20.		Lowland	102	0	11	91	0
21.		Interior	0	0	0	0	0
17.	Household payments for physicians	Total	11572	3627	4673	2773	499
18.	(Distribute place-of-residence payments using polyclinic migration patterns)	Capital	3800	3390	410	0	0
19.		Coastal	4597	237	4199	161	0
20.		Lowland	2947	0	64	2612	271
21.		Interior	228	0	0	0	228
22.	AZap payments for physicians (from AZap report)	Total	53	15	22	11	5
23.		Capital	15	15	0	0	0
24.		Coastal	22	0	22	0	0
25.		Lowland	11	0	0	11	0
26.		Interior	5	0	0	0	5
27.	Household payments for healers	Total	5498	0	0	550	4948
28.	(Assume half of Lowland payments go to Interior)	Capital	0	0	0	0	0
29.		Coastal	0	0	0	0	0
30.		Lowland	137	0	0	137	0
31.		Interior	5361	0	0	138	5223
34.	Physician expenditure except Doctors for Global Health & NGOs	Total	14265	4470	6410	2881	504
35.		Capital	4739	4179	560	0	0
36.		Coastal	6220	291	5762	167	0
37.		Lowland	3073	0	88	2714	271
38.		Interior	233	0	0	0	233
39.	NGO spending	Total	286	0	0	0	286
40.		Capital	0				
41.		Coastal	0				
42.		Lowland	0				
43.		Interior	286				286
45.	Rest-of-world spending	Total	599	0	0	0	599
46.		Capital	0				
47.		Coastal	0				
48.		Lowland	0				
49.		Interior	599				599
51.	Total private physician expenditure	Total	15150	4470	6410	2881	1389
52.		Capital	4739	4179	560	0	0
53.		Coastal	6220	291	5762	167	0
54.		Lowland	3073	0	88	2714	271
55.		Interior	1118	0	0	0	1118

8.50. For expenditures in private pharmacies, the team relies on the ASA tabulation of the household budget survey for estimates by region of residence. There are no measures of spending by place of service, however. Noting that pharmacy services are often used in conjunction with visits to polyclinics or physicians, the team decides to use the migration patterns of private polyclinic and physician services combined to allocate spending from place of residence to place of service (Exhibit 8.21). Private pharmacies account for a large proportion of household spending – indeed, a large proportion of personal health care – so the team resolves to explore new data sources at the Ministry of Finance, or the Appia Statistical Agency, or both, for future iterations of the regional health accounts.

Exhibit 8.21							
Spending at private pharmacies		Region of service	Total	Region of residence			
				Capital	Coastal	Lowland	Interior
1.	Private polyclinic spending	Total	19 192	4 355	12 117	2 304	416
2.		Capital	5 133	4 071	1 062	0	0
3.		Coastal	11 307	284	10 889	134	0
4.		Lowland	2 562	0	166	2 170	226
5.		Interior	190	0	0	0	190
6.							
7.	Private physician spending	Total	15 150	4 470	6 410	2 881	1 389
8.		Capital	4 739	4 179	560	0	0
9.		Coastal	6 220	291	5 762	167	0
10.		Lowland	3 073	0	88	2 714	271
11.		Interior	1 118	0	0	0	1 118
12.							
13.	Combined spending	Total	34 342	8 825	18 527	5 185	1 805
14.		Capital	9 872	8 250	1 622	0	0
15.		Coastal	17 527	575	16 651	301	0
16.		Lowland	5 635	0	254	4 884	497
17.		Interior	1 308	0	0	0	1 308
18.							
19.	Percentage distribution	Total		100%	100%	100%	100%
20.		Capital		93%	9%	0%	0%
21.		Coastal		7%	90%	6%	0%
22.		Lowland		0%	1%	94%	28%
23.		Interior		0%	0%	0%	72%
24.							
25.	ASA tabulation (place of residence)	Total	41 042	10 427	22 300	6 215	2 100
26.							
27.	Distributed to place of service	Total	41 042	10 427	22 300	6 215	2 100
28.		Capital	11 704	9 697	2 007	0	0
29.		Coastal	21 173	730	20 070	373	0
30.		Lowland	6 653	0	223	5 842	588
31.		Interior	1 512	0	0	0	1 512

Ending with easy estimates

8.51. The remaining expenditures are dealt with summarily. Spending for visiting nurses is estimated directly from the NIA sample tabulation. Given the nature of the service, the team assumes that there is no cross-regional migration. In the absence of specific information, drug spending in Ministry of Health orphanages (Exhibit 8.2),

classified as HP.2.9 in the accounts, is distributed to regions in proportion to total orphanage expenses reported by the Ministry (**Exhibit 8.22**) (**keying health expenditures to some other measure of spending**).

Exhibit 8.22									
Miscellaneous MoH expenditures									
Providers and region of service / region of residence			Financing agent						
			Total orphanage spending	HF.1.1.1.1		Total			
Ministry of Health									
HP.2.9	MoH orphanages		¢1 600	¢ 218		¢ 218			
		Capital	19	3		3			
		Coastal	326	44		44			
		Lowland	432	59		59			
		Interior	823	112		112			
Providers and region of service / region of residence			Programme					Financing agent	
			Malaria abatement	Surveillance		Family planning	Child health		HF.1.1.1.1
Population	Spending	Direct		Population under 17	Spending		Ministry of Health		
HP.5	Public health provision		¢2 390	6 325	¢ 948	¢1 514	2 948	¢ 386	¢5 262
		Capital		633	95	69	146	19	184
		Coastal		1 898	284	302	684	90	681
		Lowland		2 530	380	763	1 333	174	1 329
		Interior	2 390	1 264	189	380	785	103	3 068

8.52. In a discussion with MoH staff, the team learns that the budget item, “Activities against epidemics”, classified as HC.6.3 in the national health accounts, actually consists of two items. One is a nationwide surveillance system designed to detect outbreaks of communicable disease; Ministry of Health staff report that the budget for this project is ¢948 million. The remainder of the line item is for a malaria control programme in the Interior Region, and the nature of the activities (distribution of mosquito nets, indoor residual spraying, etc.) means that the benefits accrue to the population of that region.

8.53. Their discussion also reveals that the budget item, “Miscellaneous health-related activities”, comprises two programmes. The family planning programme, coded in the national health accounts as HC.6.1, involves efforts in every region. Because of specific reporting requirements attached to the programme, the Ministry of Health is able to show how much is spent in each region as well as central expenses for promotional materials. The funds spent on the family planning programme are entered for each region, and the team allocates the amount spent at the ministry itself (production of pamphlets) among regions in proportion to spending in the regions (**allocating central funds proportionate to regional expenditure**). The other programme is a breastfeeding campaign. This information had not been available at the time the national health accounts were prepared, and as a result the spending had been erroneously classified as HC.6.9 instead of HC.6.1. Ministry of Health staff report that this programme consists of a team of health providers that travels from location to location, so that all expenses are incurred centrally. In the absence of a regional infrastructure for the maternal health programme, the health accounts team decides to allocate programme spending to regions on the basis of the number of women of reproductive age – the target population of the programme (**allocating central funds proportionate to target populations**). Similarly, the communicable disease surveillance programme is intended to protect everybody in the country, so the health accounts team decides to distribute this amount among regions in

proportion to population. (The same decision is made regarding the NGO health education programme.)

Reasonableness tests of the whole matrix

8.54. Having completed a first set of estimates, the team assembles two tables showing expenditure by place of residence and by place of service (Exhibits 8.23 and 8.24). Because the many assumptions made and the gaps in the data could potentially affect the results, a few tests are done to see whether the results “make sense”. The team develops a spreadsheet (Exhibit 8.25) that captures some of the relationships most likely to be examined by users of the accounts, and marks some figures that look out of place. For example, government spending per capita seems to be highest in the Capital Region (line 10), despite the influence of public health activities focused on other regions. When the spending is disaggregated by type of provider (lines 15–37), the team finds the difference lies mainly in hospital and polyclinic spending. Is this finding legitimate? Or is it an artefact of the estimation process?

8.55. Similarly, household spending as a percentage of GDP per capita is highest in the Interior Region (line 40). Is this because GDP was inadequately measured? Or because health expenditures were incorrectly estimated? Or a matter of policy concern? Residents of the Coastal Region appear to consume relatively more outpatient services than inpatient services (line 45), and the opposite appears to hold in the Interior Region. Again, are these findings the result of policies, preferences, or estimating techniques? The team must go back over their work, reviewing it for accuracy and for the effect of the assumptions they have made. After doing so, it is critical that they engage others to review their findings, both to have fresh eyes looking at the work and to solicit views on whether the findings reflect reality and, if so, what the story is behind the figures.

Exhibit 8.23														
Appia Regional Health Accounts – financing agents by providers														
by region of residence														
Personal health care expenditures plus public health activity														
Calendar year 2002 (millions of croutons)														
Provisional results														
Providers and Region of Residence	HF.1.1.1.1	HF.1.1.1.3	HF.1.1.2	HF.1.2	HF.2.1.1	HF.2.1.2	HF.2.2	HF.2.3	HF.2.4	HF.2.5.1	HF.2.5.2	HF.3		
	Ministry of Health	Ministry of Defence	Regional Govts	NIA	GEHI	Private group insurance	Private individual insurance	Households	NGOs	AZap	Private Firms	Rest of the World	Total	
HP.1.1.1.1	MoH general hospitals	2 540			6 740			107						9 387
	Capital	184			735			19						938
	Coastal	946			1 862			31						2 839
	Lowland	926			2 883			45						3 854
	Interior	484			1 260			12						1 756
HP.1.1.1.2	MoD general hospitals		116											116
	Capital		32											32
	Coastal		38											38
	Lowland		25											25
	Interior		21											21
HP.1.1.1.3	Regional govt general hospitals	-5 299		41	14 062	109		201						9 114
	Capital	-146		0	664	-83		42						477
	Coastal	-1 053		7	4 567	-11		67						3 577
	Lowland	-2 411		27	7 569	-8		65						5 242
	Interior	-1 689		7	1 262	-7		27						-400
HP.1.1.2	Private general hospitals				10 898		218	342	14 106	263				25 827
	Capital				8 030		22	154	2 439	0				10 645
	Coastal				2 721		196	167	4 668	0				7 752
	Lowland				147		0	21	4 657	263				5 088
	Interior				0		0	0	2 342	0				2 342
HP.2.9	Other residential care	218												218
	Capital	3												3
	Coastal	44												44
	Lowland	59												59
	Interior	112												112
HP.3.1	Office of physicians						1 030	1 610	11 572	286	53		599	15 150
	Capital						103	725	3 627	0	15		0	4 470
	Coastal						927	788	4 673	0	22		0	6 410
	Lowland						0	97	2 773	0	11		0	2 881
	Interior						0	0	499	286	5		599	1 389
HP.3.3	Visiting nurses				471									471
	Capital				0									0
	Coastal				0									0
	Lowland				170									170
	Interior				301									301
HP.3.4.1	Government polyclinics	6 473	506	521	17 175	402			904					25 981
	Capital	624	136	144	1 916	306			114					3 240
	Coastal	1 369	140	225	6 364	41			329					8 468
	Lowland	2 026	121	145	6 779	29			351					9 451
	Interior	2 454	109	7	2 116	26			110					4 822
HP.3.4.2	Private polyclinics				4 973		482	754	8 743	1 216	3 024			19 192
	Capital				789		48	339	2 813	366	0			4 355
	Coastal				2 170		434	370	5 629	490	3 024			12 117
	Lowland				1 733		0	45	281	245	0			2 304
	Interior				281		0	0	20	115	0			416
HP.3.9.9	Traditional healers								5 498					5 498
	Capital								0					0
	Coastal								0					0
	Lowland								550					550
	Interior								4 948					4 948
HP.4.1	Pharmacies								41 042					41 042
	Capital								10 427					10 427
	Coastal								22 300					22 300
	Lowland								6 215					6 215
	Interior								2 100					2 100
PERSONAL HEALTH CARE EXPENDITURE		3 932	622	562	54 319	511	1 730	2 706	82 173	549	1 269	3 024	599	151 996
	Capital	665	168	144	12 134	223	173	1 218	19 481	0	381	0	0	34 587
	Coastal	1 306	178	232	17 684	30	1 557	1 325	37 697	0	512	3 024	0	63 545
	Lowland	600	146	172	19 281	21	0	163	14 937	263	256	0	0	35 839
	Interior	1 361	130	14	5 220	19	0	0	10 058	286	120	0	599	17 807
HP.5	Public health provision	5 262		726						1 893				7 881
	Capital	184		78						189				451
	Coastal	681		99						568				1 348
	Lowland	1 329		319						758				2 406
	Interior	3 068		230						378				3 676
PHCE PLUS PUBLIC HEALTH		9 194	622	1 288	54 319	511	1 730	2 706	82 173	2 442	1 269	3 024	599	159 877
	Capital	849	168	222	12 134	223	173	1 218	19 481	189	381	0	0	35 038
	Coastal	1 987	178	331	17 684	30	1 557	1 325	37 697	568	512	3 024	0	64 893
	Lowland	1 929	146	491	19 281	21	0	163	14 937	1 021	256	0	0	38 245
	Interior	4 429	130	244	5 220	19	0	0	10 058	664	120	0	599	21 483

Exhibit 8.24														
Appia Regional Health Accounts – financing agents by providers														
by region of service														
Personal health care expenditures plus public health activity														
Calendar year 2002 (millions of croutons)														
Provisional results														
Providers and region of service	HF.1.1.1.1	HF.1.1.1.3	HF.1.1.2	HF.1.2	HF.2.1.1	HF.2.1.2	HF.2.2	HF.2.3	HF.2.4	HF.2.5.1	HF.2.5.2	HF.3		
	Ministry of Health	Ministry of Defence	Regional Governments	NIA	GEHI	Private group insurance	Private individual insurance	Households	NGOs	AZap	Private firms	Rest of the world	Total	
HP.1.1.1.1	MoH general hospitals	2 540			6 740				107					9 387
	Capital	390			1 738				37					2 165
	Coastal	547			1 615				24					2 186
	Lowland	1 040			2 367				35					3 442
	Interior	563			1 020				11					1 594
HP.1.1.1.2	MoD general hospitals		116											116
	Capital		40											40
	Coastal		35											35
	Lowland		23											23
	Interior		18											18
HP.1.1.1.3	Regional govt general hospitals	-5 299		41	14 062	109			201					9 114
	Capital	-225		1	1 022	-83			85					800
	Coastal	-960		4	4 395	-11			58					3 486
	Lowland	-2 087		30	7 769	-8			41					5 745
	Interior	-2 027		6	876	-7			17					-1 135
HP.1.1.2	Private general hospitals				10 898		218	342	14 106	263				25 827
	Capital				8 044		27	160	13 112	0				21 343
	Coastal				2 854		191	182	994	0				4 221
	Lowland				0		0	0	0	263				263
	Interior				0		0	0	0	0				0
HP.2.9	Other residential care	218												218
	Capital	3												3
	Coastal	44												44
	Lowland	59												59
	Interior	112												112
HP.3.1	Office of physicians						1 030	1 610	11 572	286	53		599	15 150
	Capital						177	747	3 800	0	15		0	4 739
	Coastal						840	761	4 597	0	22		0	6 220
	Lowland						13	102	2 947	0	11		0	3 073
	Interior						0	0	228	286	5		599	1 118
HP.3.3	Visiting nurses				471									471
	Capital				0									0
	Coastal				0									0
	Lowland				170									170
	Interior				301									301
HP.3.4.1	Government polyclinics	6 473	506	521	17 175	402			904					25 981
	Capital	624	136	144	1 916	306			114					3 240
	Coastal	1 369	140	225	6 364	41			329					8 468
	Lowland	2 026	121	145	6 779	29			351					9 451
	Interior	2 454	109	7	2 116	26			110					4 822
HP.3.4.2	Private polyclinics				4 973		482	754	8 743	1 216	3 024			19 192
	Capital				1 001		99	361	3 306	366	0			5 133
	Coastal				2 029		375	344	5 045	490	3 024			11 307
	Lowland				1 873		8	49	387	245	0			2 562
	Interior				70		0	0	5	115	0			190
HP.3.9.9	Traditional healers								5 498					5 498
	Capital								0					0
	Coastal								0					0
	Lowland								137					137
	Interior								5 361					5 361
HP.4.1	Pharmacies								41 042					41 042
	Capital								11 704					11 704
	Coastal								21 173					21 173
	Lowland								6 653					6 653
	Interior								1 512					1 512
PERSONAL HEALTH CARE EXPENDITURE		3 932	622	562	54 319	511	1 730	2 706	82 173	1 765	3 077	0	599	151 996
	Capital	792	176	145	13 721	223	303	1 268	32 158	366	15	0	0	49 167
	Coastal	1 000	175	229	17 257	30	1 406	1 287	32 220	490	3 046	0	0	57 140
	Lowland	1 038	144	175	18 958	21	21	151	10 551	508	11	0	0	31 578
	Interior	1 102	127	13	4 383	19	0	0	7 244	401	5	0	599	13 893
HP.5	Public health provision	5 262		726						1 893				7 881
	Capital	184		78						189				451
	Coastal	681		99						568				1 348
	Lowland	1 329		319						758				2 406
	Interior	3 068		230						378				3 676
PHCE PLUS PUBLIC HEALTH		9 194	622	1 288	54 319	511	1 730	2 706	82 173	3 658	3 077	0	599	159 877
	Capital	976	176	223	13 721	223	303	1 268	32 158	555	15	0	0	49 618
	Coastal	1 681	175	328	17 257	30	1 406	1 287	32 220	1 058	3 046	0	0	58 488
	Lowland	2 367	144	494	18 958	21	21	151	10 551	1 266	11	0	0	33 984
	Interior	4 170	127	243	4 383	19	0	0	7 244	779	5	0	599	17 569

Exhibit 8.25							
Tests of the resonableness of the results							
			Place of residence				
			Total	Capital	Coastal	Lowland	Interior
1.	Total spending		¢159 877	¢35 038	¢64 893	¢38 245	¢21 483
2.	Government	HF.1.x + HF.2.1.1	65 934	13 596	20 210	21 868	10 042
3.	Households	HF.2.3+HF.2.1.2+HF.2.2	86 609	20 872	40 579	15 100	10 058
4.	NGO & Rest of the World	HF.2.4 + HF.3	3 041	189	568	1 021	1 263
5.	Private enterprise	HF.2.5.x	4 293	381	3 536	256	120
6.							
7.	Population		6 325	633	1 898	2 530	1 264
8.							
9.	Spending per capita		¢25 277	¢55 352	¢34 190	¢15 117	¢16 996
10.	Government	HF.1.x + HF.2.1.1	10 424	21 479	10 648	8 643	7 945
11.	Households & private ins	HF.2.3+HF.2.1.2+HF.2.2	13 693	32 973	21 380	5 968	7 957
12.	NGO & ROW	HF.2.4 + HF.3	481	299	299	404	999
13.	Private enterprise	HF.2.5.x	679	602	1 863	101	95
14.							
15.	Government spending, by provider		65 934	13 596	20 210	21 868	10 042
16.	MoH hospitals	HP.1.1.1.1	9 280	919	2 808	3 809	1 744
17.	MoD hospitals	HP.1.1.1.2	116	32	38	25	21
18.	Regional govt hospitals	HP.1.1.1.3	8 913	435	3 510	5 177	- 427
19.	Private hospitals	HP.1.1.2	10 898	8 030	2 721	147	0
20.	Other residential care	HP.2.9	218	3	44	59	112
21.	Office of physicians	HP.3.1	0	0	0	0	0
22.	Visiting nurses	HP.3.3	471	0	0	170	301
23.	Government polyclinics	HP.3.4.1	25 077	3 126	8 139	9 100	4 712
24.	Private polyclinics	HP.3.4.2	4 973	789	2 170	1 733	281
25.	Public health	HP.5	5 988	262	780	1 648	3 298
26.							
27.	Government spending per capita		10 424	21 479	10 648	8 643	7 945
28.	MoH hospitals		1 467	1 452	1 479	1 506	1 380
29.	MoD hospitals		18	51	20	10	17
30.	Regional govt hospitals		1 409	687	1 849	2 046	- 338
31.	Private hospitals		1 723	12 686	1 434	58	0
32.	Other residential care		34	5	23	23	89
33.	Office of physicians		0	0	0	0	0
34.	Visiting nurses		74	0	0	67	238
35.	Government polyclinics		3 965	4 938	4 288	3 597	3 728
36.	Private polyclinics		786	1 246	1 143	685	222
37.	Public health		947	414	411	651	2 609
38.							
39.	GDP per capita		379 197	836 000	557 000	279 000	84 000
40.	Household and private ins as % of GDP per capita		3.6%	3.9%	3.8%	2.1%	9.5%
41.							
42.							
43.	Inpatient services	HP.1.x + HP.2.x	44 662	12 095	14 250	14 268	3 831
44.	Outpatient services	HP.3.x + HP.4.x	107 334	22 492	49 295	21 571	13 976
45.	Ratio		2.40	1.86	3.46	1.51	3.65

REFERENCES

1. WHO, World Bank, USAID. *Guide to producing national health accounts with special applications for low-income and middle-income countries*. Geneva, World Health Organization, 2003 (www.who.int/nha/docs/English_PG.pdf).
2. United Nations. *System of national accounts 1993*. New York, 1993.
3. *The World Health Report 2000. Health systems: improving performance*. Geneva, World Health Organization, 2000.
4. *A system of health accounts*. Paris, Organisation for Economic Co-operation and Development, 2000.

ANNEX 1. FINANCING AGENTS BY PROVIDER AND FUNCTION, APPIA

Exhibit 13.6 Appia: combined table of financing agents by providers and functions Calendar Year 2002 (millions of crowns)

Providers and Functions	Financing agents (FA)													Check against financing agents by providers (FA&P) table	
	HF.1.1.1.1 Ministry of Health	HF.1.1.1.2 Ministry of Education	HF.1.1.1.3 Ministry of Defence	HF.1.1.2 Regional Government	HF.1.2 National Insurance Agency	HF.2.1.1 Government group insurance	HF.2.1.2 Private group insurance	HF.2.2 Private individual insurance	HF.2.3 Households	HF.2.4 Nongovernmental organizations	HF.2.5.1 Nationally owned electricity utility, AZap	HF.2.5.2 Private firms	HF.3 Rest of the world		Total
HP1.1.1.1 Ministry of Health general hospitals	(2 540)				(6 740)				(107)					(9 387)	(9 387)
HC.1.1	1 194				5 931				0					7 125	
HC.1.3	629				809				107					1 545	
HC.R.1	717				0				0					717	
HP1.1.1.2 Ministry of Defence hospitals			(116)											(116)	(116)
HC.1.1			35											35	
HC.1.3			81											81	
HP1.1.1.3 Regional general hospitals	(5 299)			(41)	(14 062)	(109)			(201)					(19 712)	(19 712)
HC.1.1	2 914			23	9 422	60								12 419	
HC.1.3	2 385			18	4 640	49			201					7 293	
HP1.1.2 Private general hospitals					(10 898)		(218)	(342)	(14 106)	(263)				(25 827)	(25 827)
HC.1.1					9 718		198	310	12 780	238				23 244	
HC.1.3					1 180		20	32	1 326	25				2 583	
HP2.9 Other residential care	(218)													(218)	(218)
HC.1.3	218													218	
HP3.1 Offices of physicians							(1 030)	(1 610)	(11 572)	(286)	(53)		(599)	(15 150)	(15 150)
HC.1.3							979	1 530	10 993	272	50		569	14 393	
HC.5.1							51	80	579	14	3		30	757	
HP3.3 Visiting nurses					(471)									(471)	(471)
HC.1.3															

HP3.4.1	Government polyclinics	(6 473)		(519)	(521)	(17 175)	(402)			(904)				(25 994)	(25 994)	
	HC.1.3	5 481		430	441	14 633	334			765				22 084		
	HC.5.1	992		76	80	2 542	68			139				3 897		
	HC.R.1			13										13		
HP3.4.2	Private polyclinics					(4 973)		(482)	(754)	(8 743)		(1 216)	(3 024)	(19 192)	(19 192)	
	HC.1.3					4 162		437	620	7 471		1 039	2 584	16 313		
	HC.5.1					811		74	105	1 272		177	440	2 879		
HP3.9.9	Traditional healers									(5 498)				(5 498)	(5 498)	
	HC.1.3									5 498				5 498		
HP4.1	Pharmacies									(41 042)				(41 042)	(41 042)	
	HC.5.1									41 042				41 042		
HP5	Public health provision	(5 262)			(726)							(1 893)		(7 881)	(7 881)	
	HC.6.1	1 538												1 538		
	HC.6.2				726									726		
	HC.6.3	3 338												3 338		
	HC.6.9	386										1 893		2 279		
HP6.1	Government administration	(3 365)			(56)									(3 421)	(3 421)	
	HC.7.1.1	3 365			56									3 421		
HP6.2	National Insurance Agency administration					(6 518)								(6 518)	(6 518)	
	HC.7.1.2					(6 518)								6 518		
HP6.3	Insurance administrators (group)						(52)	(400)						(452)	(452)	
	HC.7.2						52	400						452		
HP6.4	Insurance administrators (non-group)								(574)					(574)	(574)	
	HC.7.2								574					574		
HP6.9	Other administrators											(216)		(216)	(216)	
	HC.7.2											216		216		
HP8.1	Research											(230)		(516)	(516)	
	HC.R.3		(286)									230		516		
HP8.2	Education		(43)											(43)	(43)	
	HC.R.2		43											43		
	Total financing agent spending	(23 157)	(329)	(635)	(1 344)	(60 837)	(563)	(2 130)	(3 280)	(82 173)	(2 888)	(1 269)	(3 024)	(599)	(182 228)	(182 228)
	Check against financing agents by providers (FA*P) table	(23 157)	(329)	(635)	(1 344)	(60 837)	(563)	(2 130)	(3 280)	(82 173)	(2 888)	(1 269)	(3 024)	(599)	(182 228)	

National health accounts are widely recognized as a valuable tool in the stewardship of a country's health system. Such accounts provide a systematic compilation and display of health expenditure, tracing how much is being spent, where, on what and by whom. As such, they can play an essential role in efforts to assess the performance of the system and identify opportunities for improvement.

However, policy-makers often need more detailed information, for instance on how funds are distributed and spent in different parts of the country. Such a breakdown of expenditure flows allows them to appraise, for example, the equity and efficiency of the health system, the effects of decentralization or the impact of the financing system on health outcomes. In this context, the preparation of regional health accounts, providing an overview of the flow of funds in particular subdivisions of the country, can be invaluable.

The present document offers detailed guidelines on the construction of such regional health accounts. Building on previous guides on the production of national health accounts, it shows how the various techniques and approaches can be used in the context of a subnational account. Particular attention is given to exactly what needs to be measured, and how spending should be assigned to the different regions so as to obtain the most useful information for policy-making. With extensive practical examples, as well as helpful tips from teams with experience in preparing regional health accounts, this guide is likely to become an essential tool for all those concerned with managing the financing of health care in countries.