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BEST HEALTH ACCOUNTING PRACTICES USING SHA 2011

PAHO Pan American Health Organization
World Health Organization Regional Office for the Americas

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Abbreviations and Acronyms

ALO	average length of stay
ATC	Anatomical Therapeutic Chemical Classification
BMGF	Bill and Melinda Gates Foundation
CFC	consumption of fixed capital
CHE	current health expenditure
CIF	cost, insurance, freight
COFOG	Classification of Functions of Government
COI	cost of illness
COICOP	Classification of Individual Consumption by Purpose
COPNI	classification of the purposes of non-profit institutions serving households
COVID	coronavirus SARS-CoV-2 disease
CPC	Central Product Classification
CRS	Creditor Reporting System
CSO	Central Statistical Office
DAC	Development Assistance Committee
DIS	disease
EFPIA	European Federation of Pharmaceutical Industries and Associations
FA	financing agents
FOB	free on board
FP	factors of provision
FS	classification of revenues of health care financing schemes
FS.RI	institutional units providing revenues of schemes
FTE	full-time equivalent
GBD	global burden of disease
GDP	gross domestic product
GFCF	gross fixed capital formation
GFS	government finance statistics
GGE	general government expenditure
GHED	Global Health Expenditure Database
HA	health accounts
HAPT	Health Accounts Production Tool
HBS	household budget survey
HC	classification of health care functions

HEDIC	Health Expenditures by Diseases and Conditions
HF	classification of health care financing schemes
HH	households
HIV/AIDS	human immunodeficiency virus/acquired immune deficiency syndrome
HP	classification of health care providers
HSA	health satellite account
IC	intermediate consumption
ICD	International Classification of Diseases
ICF	International Classification of Functioning, Disability and Health
ICHI	International Classification of Health Interventions
ICPC	International Classification of Primary Care
IEC	health-related information, education and communication
IHAT	International Health Accounts Team
IMF	International Monetary Fund
IMS	information management system
IP	inpatient care
IQVIA	IMS health, quintiles VIA
ISCO	International Standard Classification of Occupations
ISIC	International Standard Industrial Classification of All Economic Activities
JHAQ	Joint Health Accounts Questionnaire (OECD-EUROSTAT-WHO)
LAC	Latin America and the Caribbean
MoD	ministry of defense
MoF	ministry of finance
MoH	ministry of health
NA	national accounts
NCU	national currency unit
NGO	non governmental organization
NHA	national health accounts
NHI	national health insurance
NPI	non-profit institution
NPISH	non-profit institutions serving households
OECD	Organisation for Economic Co-operation and Development
OOP	out-of-pocket
OP	outpatient care

OTC	over-the-counter
PAHO	Pan American Health Organization
PFC	private final consumption
PG	(WHO NHA) producers guide (guide to producing national health accounts)
PHC	primary health care
PPP	purchasing power parity
R&D	research and development
RI	reporting items
SHA	System of Health Accounts
SHI	social health insurance
SITC	Standard International Trade Classification
SNA	System of National Accounts
SNL	sub national level
SPSS	Statistical Package for Social Statistics
SUT	supply and use table
UH	universal health
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
WB	World Bank
WHO	World Health Organization

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INTRODUCTION

Resources used in the health system need to be adequate in amount and used for the satisfaction of the consumption needs of the population and according to health priorities. To support decisions involved in this process, it is important to measure and analyze these resources. Health accounts are a systematic description of the resources flowing in the health system related to the consumption of health care goods and services. They represent a system of interrelated classifications to provide a comprehensive view of the health system. The agreement of reporting health spending under a standard framework was reached by the World Health Organization (WHO) Member States in 2011 (*1*) and endorsed by the countries of Latin America and the Caribbean (LAC) given the recognition of the contribution of expenditure data to informing decisions in the health system. The current global standard involves expenditure monitoring at the national level using the System of Health Accounts 2011 (SHA 2011), 2017 edition (*2*). To comply with their function of informing policy decisions, the accounts need to be reliable, timely, and detailed enough to reflect the characteristics of the flows in each country.[1] This document will be useful to perform more comprehensive accounts based on experience from years of direct technical cooperation to countries and collaborative work on reporting to WHO's Global Health Expenditure Database (GHED).

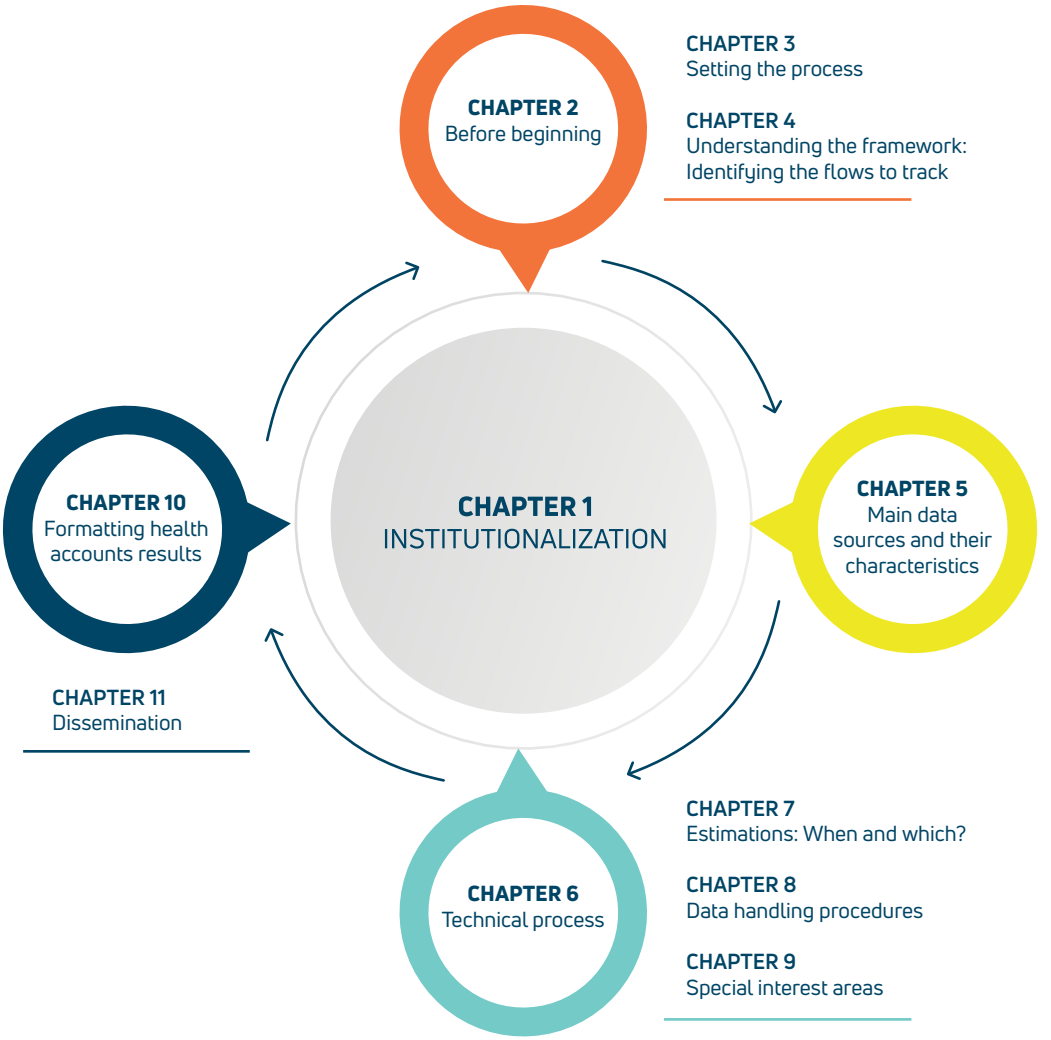
This document will be complementary to the SHA 2011 manual and related guidelines,[2] with a practical approach including a detailed set of examples of "how to" methods to reach the expected goals. It begins by presenting the idea of health accounts as a continued process to inform policies and monitor their implementation from a spending point of view, notably for the case of the LAC region. Chapter 1. Institutionalization is expected to be enhanced with this document (see Figure 1). The subsequent chapters include the various stages, beginning by describing relevant points on how to initiate (Chapter 2). Before beginning, linked with Chapters 3. Setting the process and 4. Understanding the framework: identifying the flows to track. Chapter 5. Main data sources and their characteristics discusses the main data sources. Chapter 6. Technical process refers to the technical HA process and is related to Chapters 7. Estimations: when and which, 8. Data handling procedures, and 9. Special interest areas, applying previously described principles. Chapter 10. Formatting health accounts results deals with the reporting of the results and is related to Chapter 11. Dissemination. Besides the quantitative examples in the various chapters, some of the most frequently asked questions and their responses are included.

[1] Health accounts share the quality characteristics of any other statistical framework. For example, a balance is needed between timeliness and completeness, as both are imperative for policy use. See Section 11.5 on quality.

[2] SHA is available in full and concise versions in the "methodology" section of the World Health Organization Global Health Expenditure Database Documentation Center, and the guidelines are in the same site but under the "guidelines" section. Available from: https://apps.who.int/nha/database/DocumentationCentre/Index/en.

In explaining issues related to the use of the System of Health Accounts and the consequent creation of data sets on health spending flows, the document is intended for health accountants and all interested parties in the topic, aiming to assist in institutionalizing the accounting process and preventing or minimizing the most frequent errors. Interested parties willing to better interpret a health accounts report or data can also find keys to this aim. The authors hope that it is useful for experts in health, health accounting, and other fields as well as novices in the area. Readers can use the specific sections to solve doubts as the goal of the document is that each section can be read and discussed separately. Although the document and each of its chapters are self-standing, mention is made to related guidelines that are available and not repeated here. Moreover, as health accounts are a dynamic area, methodological updates will be released periodically.

Figure 1 The health accounting process as presented in this document



Source: Own elaboration

CHAPTER 1

INSTITUTIONALIZATION

In a changing world, institutionalization is crucial to create stability and continuity in the production of health accounts for a smooth and successful information structuring for policy use.

Health accounts aim to inform policy. The experience to date has shown that relevant HA become part of the reporting landscape and statistical information in a country when they are linked to the interest and use of relevant actors and when they are led by the national health authority. This is called "institutionalization." Institutionalization is a continuous process of generating and using HA (*3*). This is crucial in a changing world, as it creates stability and continuity. It involves structured organized knowledge, which is especially important in view of personnel turnover. People move, but organizations and their roles are relatively more permanent. The generation of health accounts requires a stable institutional scenario that is methodologically independent of political influences but feeds, monitors, and evaluates health policy. Crucial to the institutionalization process is the leadership of the national health authority (i.e., Ministry of Health), as health accounts represent a critical function of their role as steward of the system.

Institutionalization is built on three key components:

1. Institutionalization of data collection
2. Institutionalization of account production
3. Institutionalization of data analysis and use

HA involve all of the actors of society, as all individuals are related in some way to the health system. The role performed by each of them can be specific or multiple. Examples are organizations producing health care services, such as hospitals, health centers, and independent practitioners involved as health care providers; organizations involved in funding and managing resources such as social security institutions, ministries, and other public sector entities; and consumers and their organizations representing health system beneficiaries. The collaboration of each of them is also necessary for the quality and usability of the accounts.

Institutionalization of data collection

Data collection refers to retrieving complete information from all actors in the system and the detail needed for the accounts. In principle, every actor generates its own records, which can be useful in the generation of HA. Institutionalization here refers to the process of automating data collection, which facilitates easier access to the information for the analysts. Especially when many actors are involved and, hence, it is difficult to collate all of their information at once, approaching data collecting institutions (e.g., ministries, central banks, statistical offices, umbrella organizations) is the best way forward. It also includes enhancing the responsibility for producing information by creating active participation of the actors of the health system and its users (i.e., collectors of information, producers of data, analysts). HA data use can facilitate feedback for improving the health information system.

Institutionalization of production of accounts

In the region of Latin America, the production of health accounts has proved to be better institutionalized under the leadership of the ministries of health.[3] In fact, the role of the national health authority is needed to support collaboration and coordination (based on mutual trust) with all of the relevant health actors in the country. This includes various ministries, social security, central banks, statistical offices, and universities, just to mention a few. HA are a fundamental instrument of the stewardship role of the national health authority and therefore should be produced with their full involvement. The process achieves continuity and professionalization in annual production to generate HA. The importance of HA as a fundamental instrument of governance is reflected in the resources dedicated to their production in a formalized structure.

Production also relates to ensuring the standards necessary to reach quality in process and content. Standardization covers all stages, from planning to creation of reports, considering the proper classifications as well as achievement of the detail to cope with users' information needs.

Institutionalization of data analysis and use

It has been recognized that using relevant data can lead to quality improvement and can even influence generation of data on accounts. Use of data inherently needs to create demand through timely linking of results and policy decision-making. Data use focuses on issues related to creating interest in results (aimed at all stakeholders) and refers to dissemination for and communication with various audiences. Stakeholders are interested in distinct results and as such need different approaches. Dissemination of results and further work to facilitate their use in decision-making is a key part of the HA process. HA results can be so abundant and rich that specific policy briefs can be generated annually in a diversity of policy-relevant areas.

Data analysts and users range from ministries, central banks, and statistical offices to civil society, umbrella organizations, universities, researchers, policy analysts, and the media and population groups.

Advances and needs in institutionalization in LAC countries

Although there is no comprehensive analysis of the HA situation in LAC, practically all countries have received some technical cooperation (*3*). Shared learning is needed to solve structural and specific data problems in the region, as well as to assist in the expanded practices evolving in health accounts to enlarge the benefits of the process.

In LAC, as a feature of the regional situation, some countries have developed full or incipient health satellite accounts (HSAs), and in most cases these countries have progressively produced SHAs (e.g., Brazil and Chile). A relevant question remaining is whether the process of generating satellite and SHA accounts can be optimized in such a way that it becomes fully complementary.

- The transition from previous expenditure reporting practices to SHA 2011 is still in progress.
- As in other regions of the world, the switch to the new framework makes it possible to identify lacunae in the accounts, complement developments, and improve content, while the reflection associated with the new model allows for expansion of usability (*4*).

[3] In many countries, and certainly in OECD Member States, health accounts are created in statistical offices.

- In some countries, it appears that the virtues of SHA 2011 and its tools (such as the Health Accounts Production Tool, or HAPT[4]) have not been incorporated into its generation. Although the tool is not of compulsory use, it has proved to help reduce analysis time and mistakes while handling big databases with consistency.

Key aspects in support of institutionalization. Specifically for LAC, attention is needed with respect to (the lack of) political will, as well as ensuring technical knowledge of producers and users. This refers also to the need for empathy and collaboration among stakeholders as well as among members of the technical committee.

Main barriers to institutionalization. As in all countries, specific attention is needed to issues related to (a) the lack of mandate or continuity in the process and prioritization of health accounts and associated needs, (b) the creation of an appropriate information system, and (c) lack of budget and training, insufficient staffing, and frequent rotation. Also, in many cases, the results of the process are not well disseminated, not known, or not used.

Questions and answers

1. Q: What is institutionalization?

   A: Institutionalization is a process creating stability and continuity. It involves structured organized knowledge, data production, and data use.

2. Q: What are the pillars of institutionalization?

   A: Data collection, account production, and data analysis and use.

3. Q: Why is the use of the results important?

   A: Health accounts are expected to be generated for decision-making in the health system. Without the data and results being used, the accounts turn into a technical process and run the risk of being diminished in importance or even stopped. Certainly, use of results in good harmony with policy decision makers is essential to identify decisions to be made and monitor their results.

[4] See Box 2 for a detailed presentation.

CHAPTER 2

BEFORE BEGINNING

Before beginning a health accounts study, there are important considerations to keep in mind. A first goal is that developing an HA exercise will improve knowledge of the national health system and its financing, as well as the health accounting framework, and knowledge of how SHA can better reflect the health system. This is not a straightforward process as it relates to practice. Also important is that the SHA framework is flexible, and the team can explore it completely or partially in progressive expansion based on specific needs and possibilities. Thus, the further the framework is applied, the deeper the experience.

This document reviews the SHA framework, and in this chapter the scope of HA[5] and the objectives of the health system are presented. It also shows key basic accounting principles to be considered in beginning a new study. These include the boundaries delimiting the health spending components and the triaxiality of the framework, whose dimensions are expected to be included in each HA exercise and its statistical criteria.

2.1. Scope and objectives

SHA provides a basis for estimating health care expenditure expressed in three dimensions: consumption, provision, and financing. It is a flexible tool to analyze the national health system with the aim of contributing to its instrumental and ultimate objectives. This possibility makes health accounts a powerful stewardship tool.

System of Health Accounts (SHA) 2011 purposes

Health accounts aim at providing a framework of main aggregates, organized according to classifications relevant for system analysis and international comparisons of expenditures. SHA is a basis for collecting and estimating health care expenditure expressed in three dimensions – consumption, provision, and financing – that reflect health system resource flows (monetary and non-monetary). An important point is that as SHA focuses on health spending, analysis of resources is initiated once the resources have entered the system. It is possible to link SHA 2011 data to the full domestic financial cycle (e.g., fiscal space).

As a whole, SHA classifications can provide an overview of the totality of the health system (*5*). The analysis of resource flows allows for oversight of health system functions and contributes to the monitoring of health system objectives. It provides a comprehensive and expandable health spending monitoring and stewardship tool.

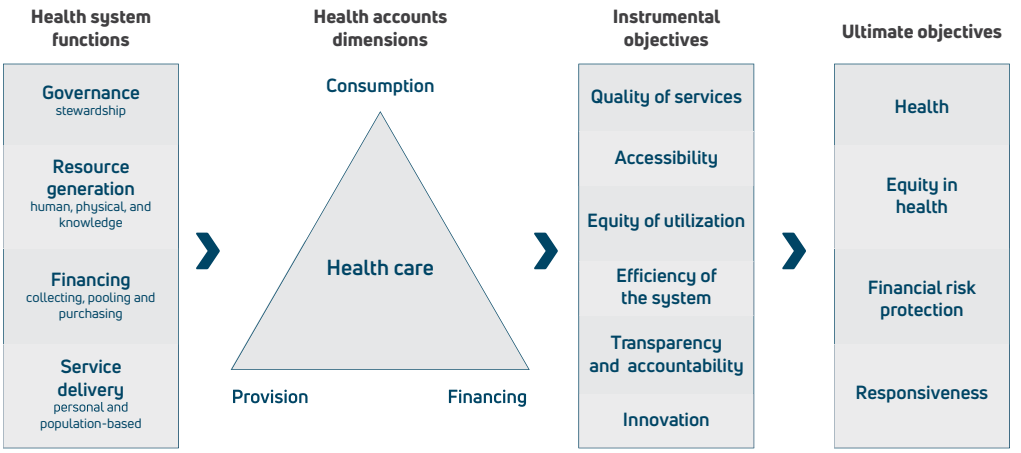
The analysis of the flows gives the possibility to focus on each of the various dimensions using one or more classifications simultaneously and to integrate the information on various dimensions. The analysis aims at systematically covering this complete process (e.g., how resources are obtained, how resources are obtained to cover specific population groups, and how resources are obtained to cover specific population groups receiving health care services [e.g., vaccinations, more specifically vaccinations against COVID-19] by disease in isolated rural areas [by subnational level, etc.]).

[5] Based on SHA 2011, Chapter 2 (OECD, Eurostat, World Health Organization (2017), A System of Health Accounts 2011: Revised edition. Paris: OECD Publishing; 2017:23. Available from: https://www.who.int/publications/i/item/9789240042551).

The use of SHA study results is multiple. Findings can identify the need for an intervention as well as possibilities for resolution from an expenditure point of view. Specifically, the expanded analysis can be related to the instrumental and ultimate objectives (see Figure 2). Each of the health system functions can also be mapped to SHA classifications; for example, governance and stewardship is key for the functioning of the health system, and it is accounted for through one specific category of functions and the corresponding provider. Resource generation (referring to human, physical, and knowledge) is reflected in the provision dimension and related classifications. Given the relevance of the financing analysis to ensure the resources to operate the system, there is a dimension devoted to it in SHA. It reflects the financing functions (collection of funds, pooling, and purchasing/allocation). Service delivery represents another relevant area relating the health system to the beneficiary population. Service delivery can be analyzed through provision and consumption with the corresponding classifications.

The financing system is also based on three functions (*6*) – resource mobilization, pooling, and purchasing/allocation – that can be fully analyzed through the three SHA dimensions (consumption, provision, and financing). Resource generation is displayed under two financing classifications (who provides the resources and under which type of transaction); the pooling function is related to the other two financing classifications (the financing arrangements through which the resources are received and the agencies managing them); and the purchasing and allocation functions are described through the linkage of the financing dimension with provision and consumption (who are the providers of the services entitled by the financing arrangements). SHA results in specific spending aggregates related to each of the three dimensions, including foremost the health financing functions.

Figure 2 Links between health systems functions and objectives and the SHA 2011 framework



Source: See Figure 2.1 in OECD, Eurostat, World Health Organization (2017), A System of Health Accounts 2011: Revised edition. Paris: OECD Publishing; 2017:27. Available from: https://www.who.int/publications/i/item/9789240042551.

Instrumental objectives, as presented by WHO (*7*), refer to the quality of the services delivered (e.g., specific goods and service monitoring), accessibility of the health services, equity in utilization, efficiency of the health system and system delivery, the transparency and accountability of the system and its providers, and finally innovation (e.g., spending on operational research and development).

The ultimate or final objectives relate to health at the personal and population levels, equity in health for all people, financial risk protection at the individual and population (group) levels, and the responsiveness of the health system.

The health systems' functions can be linked to specific SHA categories and can be analyzed through each of the health accounting dimensions. The SHA classifications allow distribution of health expenditures in detail, which is increased through cross classifications. These are the standard results expected from health accounts. The reported aggregates are the starting point for further analysis and can contribute to the monitoring and evaluation of the instrumental and ultimate objectives. To this aim, often additional types of information and methodological procedures are needed. For example, for accessibility, the location of the providing units, the time to reach them, and the functioning of the various resource types can complement and contextualize the expenditure data. In some cases, specific specialized approaches can be used for the analysis in terms of efficiency, equity, and so forth, to which SHA contributes.

As the health system has the main purpose of promoting, improving, maintaining, and recovering the health condition of the population, there is a specific linkage of the health spending analysis through the classification of diseases and other beneficiary characteristics that can be related to the ultimate objectives of the health system.

Box 1 SHA classification links between health financing and service delivery functions

The health system financing functions are clearly mapped to the SHA financing classifications.

- *Revenue collection* can be analyzed not only as a total but from the point of view of who has provided the resources (FS.RI classification), as well as the mechanism of collecting them (FS classification, showing the revenues of financing schemes).
- *Resource pooling* can be analyzed through the financing schemes (HF), which reflect the financing arrangements with related rules and regulations including entitlements, as well as through information from the related agencies operating the schemes (FA, financing agents).
- *Allocation of resources and the purchase of services* are reflected in the linkages of the financing dimension and those of provision and consumption (e.g., HP and HC, respectively).

The *purchasing/allocation* function is directly linked to **service delivery** and bridges the providers of goods and services (HP) and a specific health care function classification (HC), detailing the services consumed by the population. Within the provision dimension, the analysis can be complemented by the inputs used in service delivery and the investment in capital goods. The consumption dimension can be also complemented through beneficiary characteristics such as age, gender, health condition and disease, income level, and geographic location, among others. In addition, the financing dimension involves analysis through the arrangements and their managers. The dimensions are interlinked, which allows for a multiple cross-classification analysis and meaningful insights into resource flows.

2.2. SHA 2011 boundaries, triaxiality, and accounting principles

A basic prerequisite of a proper analysis is a good boundary setting of the activities to be included. SHA 2011 depends heavily on the principle of linking three axes, so-called triaxiality. This section concludes with a description of the statistical criteria to be followed and the best estimate principle, meaning that the estimates are the best ones made with the available knowledge and data at the moment of production of the accounts.

2.2.1 Boundaries: Meaning and compliance

A clear boundary is necessary to measure health expenditure. In SHA 2011, the definition of what is considered health spending (boundary setting) is based on services (or "functions") as expressed in the functional classification (HC). This definition covers both current and capital health spending.[6]

Criteria used in boundary setting in SHA 2011

Four criteria are considered in determining whether an activity/service or good is included in or excluded from measurement, that is, whether it is regarded to be health spending or not (*2*):

a. The *primary* intent is health, which means the primary purpose of improving, maintaining, and preventing the deterioration of the health status of persons and mitigating the consequences of ill health.

b. *Qualified medical or health knowledge* and skills in carrying out these activities/functions are applied; this can be in a direct form, through health personnel, or in an indirect form, under the supervision of health personnel/institutions (e.g., through regulation or licensing).

c. *Consumption is for final use of the resident population*, which means that the goods and services are provided directly to the population and that the beneficiary population consists of residents of the country. The implication is that imported health goods and services are included, whereas those provided to non-residents (exported goods and services) are excluded (see Section 9.6 on trade).

d. A *transaction* of health care goods and services exists. This means that care offered by family members without any remuneration or compensation is excluded.

Memorandum items: reporting and health-related items

The standard SHA 2011 classifications provide the categories to describe and analyze health resource flows. However, more categories can be important for the country, as well as the need to monitor spending that does not comply with the four criteria above. Non-health spending can be policy relevant for a country. The framework offers the possibility to monitor this expenditure

[6] Capital and current spending are separated, for example, because they serve different purposes: future consumptions and actual present consumption, see chapter 3, in OECD, Eurostat, World Health Organization. A system of health accounts 2011: Revised edition. Paris: OECD Publishing; 2017:38. Available from: https://www.who.int/publications/i/item/9789240042551.

in two kinds of memorandum items that are registered "below the line." The first category (called "reporting items") relates to activities that are part of the health boundary but not identified with a single category in any of the classifications. An example is the total pharmaceutical expenditure, which includes all medicines used in the treatment process as well as medicines sold separately (e.g., at pharmacies and related retailers).

When these memorandum items involve spending categories not included in the health functional boundary, they are called "health-related items." These are often the resources used in a set of services/activities that may be under the scope and policy oversight of the national health authority but are not strictly "health" items as per the SHA 2011 definition. For example, social protection or water and sanitation services/activities are commonly related to the health system, and therefore a request could be expected to include these data in the analysis. In this case, SHA2011 recommends reporting them as "below the line items." Another example of a "health-related item" can be the registration of external loans to the health sector (e.g., for hospital construction, acquisition of vaccines).

Borderline cases

It is not always clear which activities are in/out of the health boundary. In SHA 2011, a set of borderline cases is discussed (*2*). One example is the separation of cosmetic and reconstructive surgery. Both types of activities are performed in medical settings, usually hospitals and clinics. Both are performed by medically trained personnel. Both are accompanied by a transaction and performed for residents or non-residents. Still, according to the SHA definition, cosmetic surgery does not have the primary intent of health, so it is to be excluded. Reconstructive and other health procedures are to be included.

2.2.2 Triaxiality

SHA dimensions: financing, consumption, provision

The three basic dimensions of SHA relate to consumption, provision, and financing, for which the core classifications are HC, functions, HP, providers, and HF, financing schemes. A country's health account should at least contain the data for these three basic or core classifications. Additionally, the HA can include revenues of schemes, FS, financing agents, FA, factors of provision, FP, and diseases, DIS. For capital, a separate classification is introduced linking the capital goods to, for example, providers as the owners and users of these goods. In practice, WHO basic data collection promotes the inclusion of revenue related to schemes, diseases, and capital.

SHA 2011 is based on a triaxial framework. What is it, and how can compliance with triaxiality be ensured? Triaxiality[7] was introduced as the unbreakable identity between spending by functions, by provider, and by financing classifications. This means that there is an equivalence among the three accounting dimensions (consumption, production, and financing). That is, what has been consumed has been produced and has been financed in the health system. Whereas SHA 2011 includes more classifications in the structure of the accounts, triaxiality is at its basis, referring to the identity in spending terms of all of the classifications used in the description of a country's health system (not limited to HC, HP, and HF).

[7] Triaxiality was already a basic term used in SHA 1.0/PG. OECD. A system of health accounts Version 1.0. Paris: OECD Publishing; 2000. Available from: https://www.oecd.org/health/health-systems/1841456.pdf.

The basis of SHA 2011 is consumption; therefore, external trade transactions can cause imbalances in triaxiality. The way these imbalances are factored in is the following. All health care goods and services available for consumption of the resident population in a country are either produced domestically or imported. When imported, they are specifically identified under a foreign provider (provider located abroad). Domestic health goods and services are to be consumed domestically or exported (consumption by non-residents). Consumption by non-residents is treated as exports and should be removed from the analysis as the boundary refers to domestic consumption. The financing flows should be adjusted accordingly. External trade is specifically discussed in Section 9.6.

2.2.3 Basic health accounting statistical criteria

SHA 2011 seeks to provide comprehensive coverage and a consistent, internationally comparable estimated set of data that are timely in terms of their usefulness for health policy analysis (see Figure 3). The accounting process is, as far as possible, compatible with international statistical frameworks, in particular the System of National Accounts (SNA) and the Government Finance Statistics (GFS).

- **Comprehensiveness of coverage**

SHA accounts for the whole set of health system transactions, determined by the functional boundary, meaning all consumption of health goods and services irrespective of who produces or who pays for them. As data are obtained from specific agencies, the target is first to ensure the coverage of the "big and strategic fish" and progressively reach those players that involve fewer resources or are less important.

- **Consistency and comparability of data**

SHA enables estimates that are consistent over time and among its components, classifications, and accounting process, which makes it comparable over time and across countries. In doing so, the estimates could deviate from the national boundary due to national borderlines and classification structures.

- **Statistical compatibility**

The consumption-based SHA framework is designed to be methodologically compatible with the System of National Accounts to enable comparing health data aggregates with those appropriate of the economy as a whole, for international comparisons. This means, for example, the indicator of health expenditure as a share of GDP.

- **Timeliness and accuracy**

Health accounts are expected to be produced yearly and progressively generate timely results to ensure policy relevance. As health accounts do not aim to be a "bookkeeping" process, timeliness and required detail involve in many cases estimations. To increase accuracy, the aim is to collect as many data sources as possible to enrich the process of selection and triangulation of content. The objective is to reflect the reality of resource flows in the country, in real time and as accurate as possible. Thus, revisions of results are to be performed regularly based on improvements in data availability, statistical procedures, and health system dynamics. The quality criteria of timeliness and accuracy are both essential but, in that sense, could be in conflict.

- **Transparency**

The metadata, or data on data, are as important as the data. They need to properly report sources, procedures, and estimation techniques, with assumptions and all relevant information to properly interpret, use, and even replicate the estimates.

- **Relevance**

Data that are not relevant are not used. Data produced according to SHA need to respond to the policy questions of the health system. In most cases and increasingly, detailed information is required to identify appropriately policy uses at the national, institutional, and program levels. Timeliness is closely related with relevance as well, given that data lagging more than one year may not be useful for current policy needs.

Figure 3 Basic accounting criteria

Source: Own elaboration based on Chapter 14, of OECD, Eurostat, World Health Organization. A system of health accounts 2011: Revised edition. Paris: OECD Publishing; 2017:320-321. Available from: https://www.who.int/publications/i/item/9789240042551.

2.2.4 Best estimate principle

Health spending is a challenging topic by nature. No exact measurement exists for the basic health expenditure in any country. Even in countries with advanced statistical systems, some modifications are made periodically to estimated expenditure levels due to improvements in sources and methods. Despite the efforts made, the information systems do not provide all relevant data in the detail needed. Hence, estimations are still required. Estimated data are better than no data. The use of such data will progressively ensure data availability and improvements of the estimation process. The results of a health accounting study should contain the best available estimations/data for the variables to date.

The notion of a "best estimate" has a transitory meaning, as it depends on the available data, statistical structure and organization, and informed judgment at a particular time. It defines the choice of data sources as well as how they are used. Health expenditure data evolve based on changes of definition, coverage, and methods used for their measurement and evolve with changing social, economic, and statistical environments. All statistical improvements in measurement can modify the values estimated, as is the case of basic macro-aggregates, which are usually adjusted periodically and are linked to improvement of data sources and refinement of methods. So, in short, the best estimate principle implies the use of statistical means resulting in data that, at the time of release, are considered to be the most plausible result and can be updated and changed as new information becomes available.

Questions and answers

1. Q: What to do when the national and the international boundary are different? Who has priority? For example, in my country cosmetic surgery is a major source of revenue from medical tourism. The official data include the revenues received and spending to generate the services. The revenues are specifically used to offer free health care for vulnerable population groups.

   A: According to SHA, cosmetic surgery is beyond the boundary, meaning that these resources, activities, and revenue need to be reported "below the line." However, the resources received to fund health care for vulnerable groups are included. As SHA 2011 accounts for resources once they have entered the system, the relationships of the two groups of transactions (cosmetic surgery and funding for health care for vulnerable groups) are not reflected in the accounts unless the below the line items are included. The priority is the international boundary for SHA 2011 reporting, but the relevance of the national boundary is maintained through separate but joint reporting of both types of transactions.

2. Q: How far can the boundary be expanded, for example, beyond health? If so, where to focus these activities?

   A: The boundary on health for international comparison is fixed; however, for national purposes, this can be expanded with elements of interest ("below the line items"). In this respect, non-health issues can also be included below the line. For instance, ministries of health can have water and sanitation activities as part of their basic responsibilities, and it is convenient to report all spending. However, water and sanitation are outside the SHA 2011 boundary. Thus, the compliance of the international and national frameworks is guaranteed by inclusion of memorandum items.

3. Q: Does expanding or diminishing the boundaries create problems for comparisons?

   A: For international comparisons, the boundary is fixed to the one described in SHA 2011; for time trends, it is advisable to keep the boundary as fixed as possible, although policy changes need to be taken into account and mentioned separately.

CHAPTER 3

SETTING THE PROCESS

Implementing health accounts is a process (*2*) requiring effort of a dedicated team able to adjust the framework to country characteristics and to coordinate and collaborate with all of the related stakeholders (data suppliers and data users). Ideally, the institutional setting of HA production will ensure appropriate interactions with the stakeholders, which is the basis for the success and quality of the process.

This section begins by delineating the suggested characteristics of the responsible team. The list and role of stakeholders is also provided to identify the importance and complexity of data compilation. In addition, the institutional setting of the HA team is discussed. Finally, the steps to be followed to produce an exercise of health accounts with an example of a data plan are presented.

3.1 HA team composition

> A dedicated team to perform the accounting of the health spending is preferably stable to retain the experience and cumulated knowledge. It is convenient that it consists of health financing experts and/or health economists and statisticians.

To have a successful health accounts production, some prerequisites may need to be fulfilled. A team needs to be created consisting of at least knowledgeable persons persons in the health system and in health accounting, preferably with health and economic backgrounds. If possible, the team will also include statisticians knowledgeable in integration, estimation techniques, surveying, and data analysis. Reports generated are expected to include basic interpretation of bivariate and multivariate tables as per country conditions and preferably linked to policy questions of relevance in the short and middle terms.

International experience shows that direct participation in the team of the main data provider organizations is profitable for the process (e.g., from social security, the statistical office). For example, given the importance of out-of-pocket, a strong coordination with the Statistical Office is needed to better handle the household budget survey and the final consumption information. The team leader is the one steering the process and keeping track of the progress and is responsible for the main communication with the stakeholders. The team will have to collect sources and data as well as analyze the various components to be included or excluded from the accounts. A good relationship with the statistical office and governmental organizations is strategic.

3.2 Data suppliers, users, and analysts

> The team needs a complete overview of all actors in the health system, ranging from providers of the goods and services and financing institutions to the users of the results.

Before data collection and analysis can start, it is necessary to think about the actors involved in the health system, based on the national context but keeping in mind the boundaries of SHA

2011. The list of actors should include not only the producers of health services and the financially related organizations but also the main stakeholders and users of the data to be produced.

Stakeholders: This group is led by the Ministry of Health, which is involved in the majority of rules and regulations as well as in plans, programs, and activities to improve the health status of the population. It should include as well a large set of governmental organizations such as social security institutions and policymakers related to health, directly and indirectly, but also insurance corporations and umbrella organizations (e.g., representing professional organizations in health provision and representing the population receiving the services). Universities, research centers, statistical offices, and selected media agencies can be included.

Data producers: Many of the stakeholders mentioned above are also involved directly or indirectly in the process of creating financial and non-financial data useful for the construction of the health accounts. More specifically, providers and financing organizations (supervisory insurance boards, among others) are producers of health data. The statistical office should also be included here, as it usually possesses a wealth of data and knowledge on the construction of accounts.

Data users: Availability and dissemination of data should not be restricted to a limited set of organizations. The more interest in the data from stakeholders and different actors such as academia, the better the production and the use of the accounts. Data use is a final way of quality control.

3.3 Institutional setting and interactions

> The team needs to be in close contact with policymakers but methodologically independent of them. A steering committee can be useful in the process as a sparring partner as well as a problem solver.

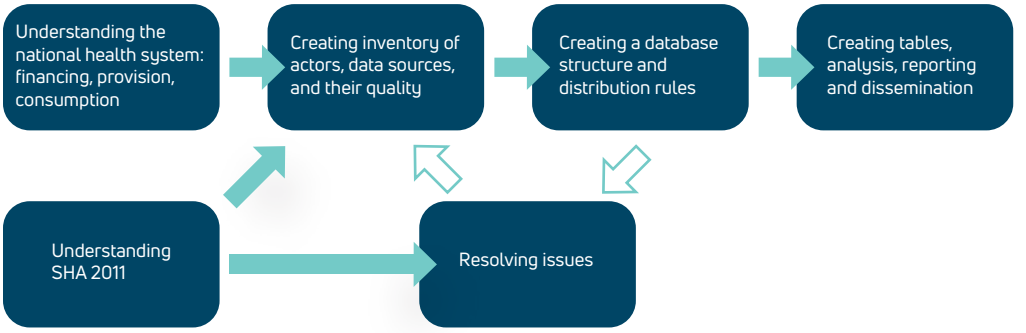
The setting of the health accounts team is important for the work that needs to be done. Although the team needs to be close to the decision center on health, it is convenient to be functionally as independent as possible to perform their activities. Institutional settings can be within the Ministry of Health, the health economics unit, or the planning office while maintaining strong institutional links with the statistical office and academia. Preferably the team has a financially independent status, meaning a separate budget to be used for the construction of the accounts. In a regular set of progress meetings, the most important stakeholders can be informed of the results and the problems the team encountered. In this respect, a steering committee could be useful not only as a discussion forum for the team but also as a group that could help in solving problems (e.g., lack of access to data) and validating results.

3.4 Generating health accounts: Basic steps

The basic steps to generate a health accounts study are similar across countries. In each case, the characteristics of the national health system can modify the process and the experience of refining it.

A graphical overview of the completed accounting process from start to finish is presented in Figure 4. Every accounting process starts with understanding the national system and creating an inventory of actors. Collecting the data and creating a database and related tables and graphs are integral parts of the process. Comparability and consistency (just to mention two criteria) require knowledge of the internationally agreed frameworks (SHA 2011) and the ability to resolve issues during the accounting process.

Figure 4 Health accounting: From start to finish



Source: Own elaboration adapted from Office for National Statistics. SHA guidelines. Practical guidance for implementing a system of health accounts in the EU. London: Office for ONS; 2004:44. Available from: http://www.apnhan.org/library/docs/SHA_Guide.pdf.

Generating HA involves not only capabilities and human resources but also political will and the establishment of collaboration and cooperation mechanisms. In fact, these are key factors to ensure a successful and relevant HA process. Most LAC countries have a group of specialized health accountants and independent health economists. Their well-established links to the health authorities, notably the ministries of health, allow guiding the process to become policy relevant. A few core activities stand out:

- Producing a set of accounts, including the relevant classifications in the detail required to be useful for policy analysis.
- Generating indicators useful for decision-making and relevant to current policy discussions.
- Involving all actors in the health system, ranging from health care providers generating data and producers of statistics related to health and macroeconomic issues to policymakers, analysts, and other potential users.
- Using actual hard data as much as possible, complemented with the necessary procedures to generate credible and useful evidence. Good documentation (i.e., metadata) supports the most effective and efficient account generation and the possibility of shared learning and its use.

Basic steps in the construction of health accounts are presented below, and many more are detailed in various other chapters in this document.

Step 1: Understanding the national health care system under study.

The team needs to become familiar with the institutional units involved in health service delivery and financing and their interaction as well as the entitlements of the various insurance packages and other rules and regulations. In short, they need to have a thorough idea of the activities related to health: who provides, who funds, and who benefits. It goes without saying that an understanding of the SHA technical process and the linkages to country health system characteristics is needed to initiate the study.

Step 2: Preparing the financial flows chart following Step 1.

The classifications of the financing dimension are expected to be represented and related to each other, with specific labels considering the health financing system flows in the country (e.g., see Figure 5).

Step 3: Setting the boundaries of the national HA and clarifying any differences with the SHA boundaries.

The SHA boundary is likely to deviate from the boundaries of national health systems due to differences in institutional arrangements, payment systems, provision structures, and country traditions. It is necessary to identify and document these divergences (e.g., inclusion of social care, water and sanitation, and education). Some countries generate a health account with national classifications and then map it to SHA 2011 for an international standardized comparison. Components outside the SHA 2011 boundary can be tracked and displayed as "health-related categories" or "below the line items" in such a way that the national boundaries can be analyzed.

Step 4: Investigating and evaluating data sources.

This stage includes an exhaustive list of all actors in the health system and their role in financing flows (see also Table 1). Every actor is involved in transactions related to health spending (e.g., remuneration, purchase, consumption). Each transaction has an institutional origin and a destination, and in both cases, there may be a register of the transaction. The target is to identify all records and acquire them as comprehensively as possible.

Registries of the transactions become the health accounts data sources. It is necessary to catalogue all data sources and their main characteristics and assess their quality and information on the dimensions that they might serve. If there is a double registry (origin and destination of the transaction), the assessment will indicate which is the best source and when to use it.

All metadata (information on the data) need to be collated. Basically, this includes, at a minimum, the following items: name of the source; institutions managing the source; type of source, such as (administrative) register or survey; data collection method, such as administrative, sample, or census; availability of data and periods; concept of measuring, such as budget, cost, spending, or turnover; breaks in series and their reason; coverage of actors; and configuration of the data.

The approach to be taken to use the records is related to data availability. Data availability is an important condition to determine the starting point of the accounting process. Often, detailed and comprehensive data are available for either the provider or financing dimensions. The more complete information is used as a starting point, and other available data allow for complementing and validating the process.

Two main types of data sources are administrative data and surveys, often to be complemented with interviews. A specific type of survey is included in the Health Accounts Production Tool (for a short description, see Box 2). Such surveys can be used to collect data from selected actors in the health system, specifically donors, NGOs, insurance institutions, employers/corporations, and providers. In most cases, it is assumed that governments have administrative data. In practice, however, there may be a need to survey subnational government levels when they lack an integrated information system. Other organizations (e.g., insurance) may have administrative records with the required detail. The information often needs to be analyzed and key details obtained for clarification through complementary interviews.

With respect to sources, basically each transaction is documented. The challenge is to identify the data sources and document them in the detail needed in the accounts (e.g., boundary, valuation). All providers of health services should be identified, not only those that are obvious such as hospitals and physicians but also those that provide a limited set of services as a secondary or ancillary activity (e.g., sale of medicines or other medical goods in a supermarket). If a business register is available, this would be a good starting point for a database of providers as well as financing agents. In many cases the statistical office is a source for this type of information, notably for the private sector. Other publicly available sources in various ministries could be used not only for the search for actors but also for the collection of programs and activities related to health. For more information, see Chapter 5, which deals with data sources specifically.

Step 5: Creating a health accounts database.

Data should be recorded in a software database or in spreadsheets, ideally in such a way that the software tool (such as the HAPT), for example, could directly be filled with the data.

Whichever process is going to be used, the following may be the main steps:

- Determining the structure of the database and the data records.
- Deciding which data to acquire and entering existing data into the database.
- Investigating gaps in data.
- Allocating SHA classification codes to all data entries except those requiring a distribution process.
- Acquiring complementary data to perform standard procedures to ensure availability of the basic accounting classifications (adjustments, estimations, distributions, etc.).
- Developing allocation keys to distribute categories as needed.

Step 6: Making background calculations and filling the tables.

Tables (see, e.g., Chapter 6) may be built automatically as in the HAPT, but a careful checking of the various cross tables and data structure is needed to detect any anomalies or errors following the process of data inclusion. Preliminary results are to be discussed with technical informed stakeholders for the various classifications and estimation procedures used.

Step 7: Preparing a detailed documentation of the health accounts work.

For a regular production of the accounts, it is necessary to record detailed data sources, calculation methods, adjustments, and the estimation procedures used to generate them (metadata).

Step 8: Checking the quality of the results.

In addition to quality checks performed during the production stages, specific checks are needed on the results. These include a confirmation of the data with other sources' results, validation of the latest year's data points with corresponding data points from the previous year, and investigation of any significant but unexplained changes. It is also important to discuss results with informed stakeholders (on production and use of the data).

Step 9: Presenting the results (output tables, key indicators, analysis for different audiences, etc.).

The final step relates to the presentation of the results, giving key indicators and summary information about the data, such as any significant divergences from accepted standards or information on coverage. The presentation may also include some targeted analyses.

Step 10: Planning the next cycle.

Teams beginning with health accounts would probably have to focus on the first-round completion. The planning of the new cycles will focus on the completeness of data sources, organization coverage, classifications involved, and so forth to slowly expand to reaching a complete account. Teams that have more experience are more likely to be careful in updating data sources, methods, and cooperation but also in developing and focusing on specific areas of work, including a better adjustment analysis to be linked to policy.

A tentative data collection plan is presented in Table 1.

Table 1 Health accounts project: Tentative data plan

Actor	Data needed (health content)	Possible sources	Team member responsible	Steering Committee member (if needed)
Central Government				
MoH	Budget documents	MoH; MoF		MoH
MoD	Budget documents	MoD; MoF		MoF
MoHE	Budget documents	MoE; MoF		MoF
Regional	Budget documents	MoF; provinces		MoF
Insurers				
National Insurance Agency	Financial reports; Statement of operations	National Insurance Agency		National Insurance Agency
Government	Statement of operations; Budgets	MoF		MoF
Health Insurance Program Umbrella organization	Financial reports; Statement of operations	Umbrella organization of health insurance		Umbrella organization of health insurance
Private, voluntary insurance	Premiums, by source; benefits, by type; claims	National Statistical Agency; Survey; Supervisory insurance agency		National Statistical Agency
Providers				
MoH hospitals	Statement of operations	MoH; hospitals?		MoH
MoD hospitals	Statement of operations	MoD; MoF		MoF
Regional government hospitals	Statement of operations	Hospitals? MoF reports?		MoF
Private hospitals Umbrella organization	Revenues by source; Statement of operations	SNA by activity category? Survey? Umbrella organization?		National Statistical Agency
Regional government facilities	Statement of operations	Facilities? MOH/MoF reports? Tax office? SNA by activity?		MoF; National Statistical Agency
Private policlinics	Revenues by source; Statement of operations	SNA by activity category? Survey? Umbrella organization?		National Statistical Agency
Private physicians	Revenues by source; Statement of operations	Facilities? Tax office? SNA by activity?		National Statistical Agency
Private pharmacies	Revenues, by type of product	SNA by activity category? Survey? Umbrella organization? Trade association?		National Statistical Agency
Traditional healers	Revenues	Survey?		MoH; National Statistical Agency
Other actors				
Nongovernmental organizations Umbrella organizations	Statement of operations; project lists	Survey? SNA by sector/SUT? MoH transfers? Donor reports?		National Statistical Agency
External resources	Statement of operations; project lists	Survey? OECD DAC health? Transfers to MoH? Donor reports?		MoF; National Statistical Agency
Employer health spending	Spending for on-site clinics; reimbursements; service purchases	Survey? SNA by activity?		National Statistical Agency
Households	Out-of-pocket spending, by type	Survey; SNA by sector and type; Revenue by provider type		National Statistical Agency
Social, economic, demographic characteristics		Survey		
Health functioning		Survey		
Supplemental records: based on needs, e.g., customs by product, retail sales, building permits, etc.				

Source: Based on table 9.3 in World Health Organization. Guide to producing national health accounts: with special applications for low-income and middle-income countries. Geneva: WHO; 2003:127-128. Available from: https://apps.who.int/iris/handle/10665/42711.

Questions and answers

1. Q: How can the best team members be secured?

   A: Members of the team need to be knowledgeable in different areas of the process, not only in data collection and analysis but also in various areas of health (care), accounting, and other disciplines relevant for the process from data collection to dissemination. Also, the team should represent the main stakeholders, meaning institutions such as the MoH, defense and other ministries, social security, main umbrella organizations, and the statistical office.

2. Q: What is the best location for the team and why is this important?

   A: The best location is a stable organization in which the team can operate independently of pressures but can build relationships with stakeholders. The exact location of the team can vary, but it is important that the team can count on full support and back up from the Minister of Health and other important stakeholders.

3. Q: Why is coordination important?

   A: Coordination is relevant because it allows for harmonious functioning in the accounting process. It creates a mutual learning environment and promotes a quality improvement process in the creation of the results. It is important that it be established with each actor contributing to data, analysis, and use of the results.

4. Q: Where can we get the information on actors of the health system in my country? Do I need to select some of them?

   A: First, you have to identify the nature of the actors in the system and search for the documents where they are referred to or reported. These can be records of umbrella organizations and ministries. The statistical office may have lists of actors by type extracted from business registers. The priority ones relate to policy relevance, size, and willingness to contribute.

5. Q: How important is the reliability and autonomy of the organization hosting the process?

   A: With respect to the way the data are collected, handled, and analyzed, it is of great importance that the team can deal with the information in complete autonomy but under the supervision of and in collaboration with the management of the institution hosting the team.

6. Q: How can we organize the discussion of preliminary results with stakeholders?

   A: Specific meetings during the process with relevant stakeholders knowledgeable on data use and generation are very useful. Explaining procedures, data sources used, and problems faced, as well as doubts and results, can allow stakeholders to become familiar with the information, provide advice, and complement data provision and responses.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CHAPTER 4

UNDERSTANDING THE FRAMEWORK: IDENTIFYING THE FLOWS TO TRACK

SHA is a system of classifications to organize spending through several analytical dimensions (*2*). Each dimension has several classifications, with categories of analytical interest generated for health policy. Each classification has a distinct standardized level of detail that can be expanded to cope with a country's analytical needs in a customized process. As every country is different, it is imperative to make an inventory of all actors and their relations in the system regarding each dimension.

Customization also includes the selection of the classifications to be implemented in each study. The basic accounting framework advises the use of at least one of the classifications of each dimension (consumption, provision, and financing). However, in practice, decisions require more detail, and an increasing number of classifications is becoming the practice (adding at least revenue and diseases and, separately, capital; for large countries, a geographical analysis is convenient).

Data work includes the analysis of each data point and all of the classifications selected for the study, integrated in a flow. In this section, each of the dimensions is analyzed through their classifications. Financing is discussed initially, followed by provision and consumption. Finally, diseases and capital are presented.

In this process, caution is advised to identify whether the national structure and classifications can have names identical to the international ones but be different in their content. It goes without saying that in view of international comparability, the content and structure of the international standards are leading. However, some margin of customizing exists (e.g., in the labels) with respect to coding and type of content. National deviations can be displayed as "below the line" items.

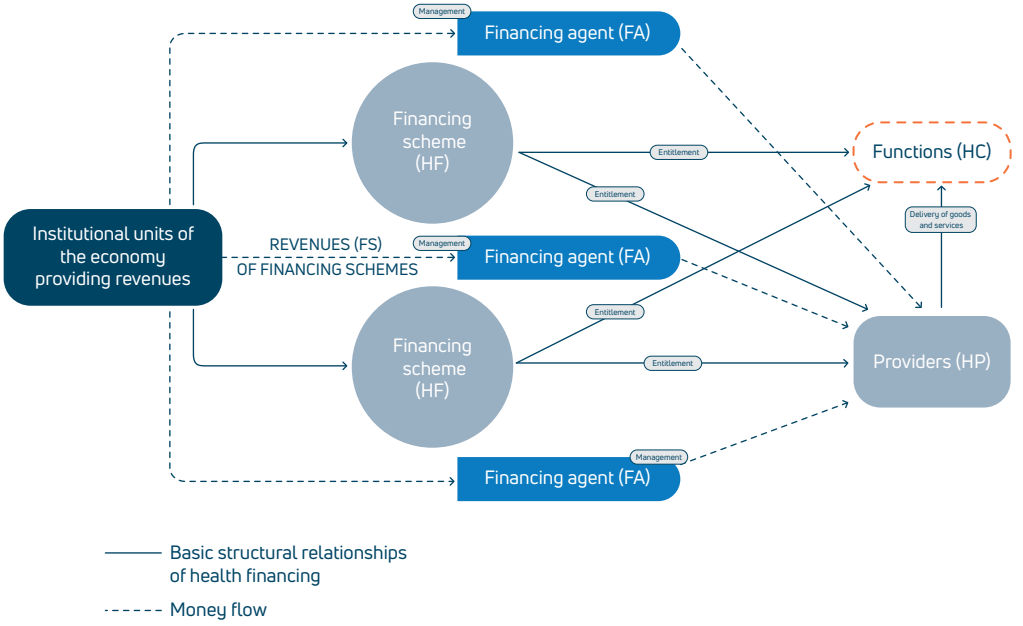
4.1 Financing flows to track

> How resources are obtained and organized in the health system are the basis of the analysis with the financing dimension. The representation of these resources along the flow allows to identify who provided them, under which modality, and to fit which entitlement of the population groups.

The financing dimension in SHA 2011 consists of four different but related classifications: FS.RI, the institutional units providing the financial means to the health system; FS, the revenues to be used by the financing schemes; HF, the schemes or arrangements entitling people to services, individually or collectively; and, finally, FA, the organizations managing the schemes.

These classifications are represented in Figure 5 (including the basic relations with provision and consumption of services).

Figure 5 Basic relations in health accounts



Source: Own elaboration based on Figure 7.1 OECD, EUROSTAT, World Health Organization. A System of Health Accounts 2011: Revised edition. Paris: OECD Publishing; 2017:157. Available from: https://www.who.int/publications/i/item/9789240042551.

In principle, a description of the revenues and the schemes would be the basic proposed analysis. In practice, to get a more complete picture of the financing system, the addition of the units providing the funds and the units managing them facilitates and complements the analysis. The flows are complex and involve the totality of the organizations in the system. A more complete (although not exhaustive) diagram of flows is presented in Figure 6 taking the financing schemes as the reference. The most important interactions between the various parts of the financing dimension are presented. Most flows are included, although exceptional flows such as government transfers to households (e.g., conditional cash transfers) are not shown.

The flow starts by representing the institutional units providing the resources to the health system (FS.RI). The classification does not aim at a deep analysis but seeks to identify such institutions. It is critical to establish, for example, domestic versus foreign origin and government versus private entities. The funds entering the system are analyzed through the revenue of the financing schemes classification (FS), with labels that indicate the origin and direction as well as the character of the flow.

Financing schemes (HF) are not institutions. They are a set of rules determining the entitlement as well as the collection and pooling of funds and the payment structures in the health system. They thus determine the coverage of specific population groups in terms of health care services and benefits. They are handled by the financing agents (FA). See the SHA description of code content for each classification and its detailed characteristics[8] (SHA 2011 Chapter 7, Chapter 8, and Annex D).

[8] For example, autonomous governmental bodies such as public hospitals can be registered as public institutional units but are treated as corporations in national accounts and in health accounts. If needed a separated subgroup can be created.

Financing agents (FA) are institutional units managing and operating the schemes. They are responsible for the payment structure and its documentation, and thus they are a key actor in health accounts generation. Financing agents are not always in a one-to-one relation to the schemes, as described in Chapter 7 of SHA 2011 (*2*).

The detailed flows displayed below initiate with the governmental financing (Figure 6.A). In general, there are not major differences in the origin and directions of the flows in governmental financing. The origin can involve domestic and foreign funding, and based on the policy a more diversified destination can exist.

Figure 6.A Government financing in SHA 2011

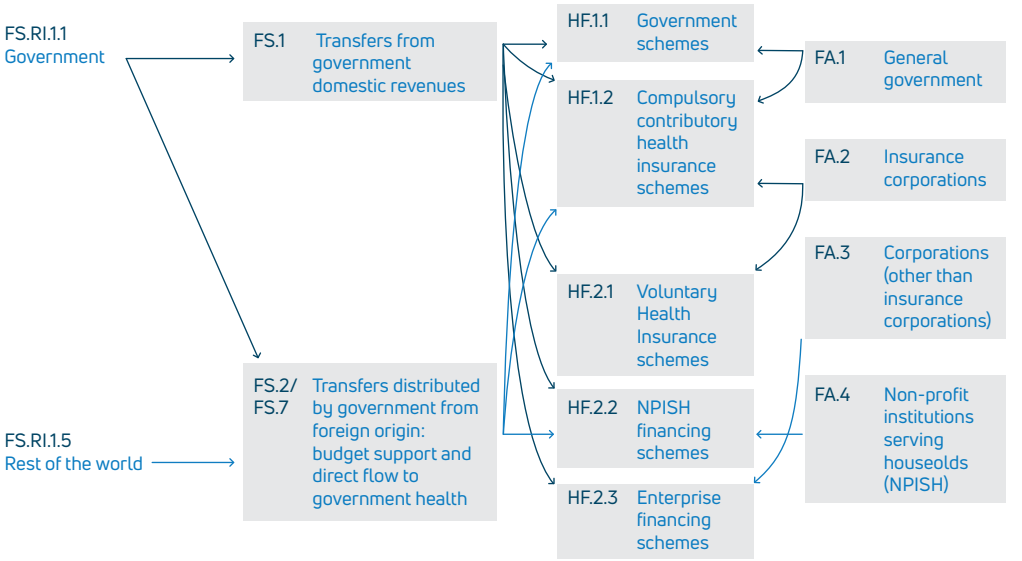


Figure 6.B displays the same flow but related to prepayment, notably for mandatory (e.g., social security) and voluntary health insurance. Origin and revenue appear more complicated, but they relate to two groups of schemes.

Figure 6.B Insurance financing in SHA 2011

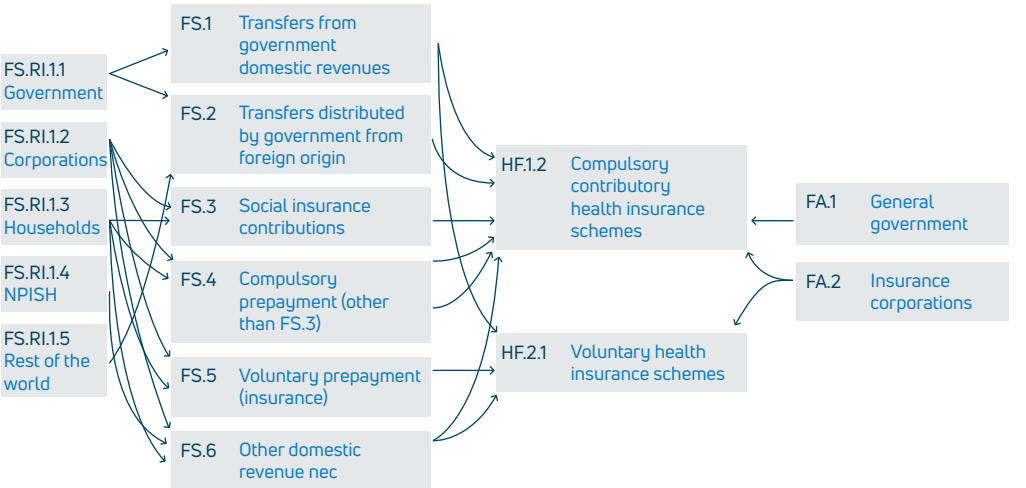
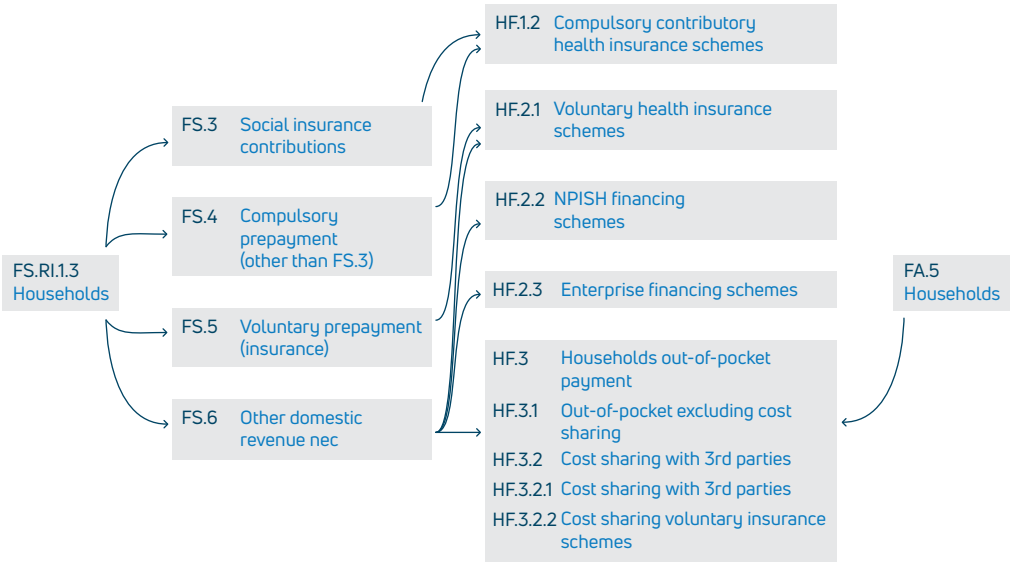


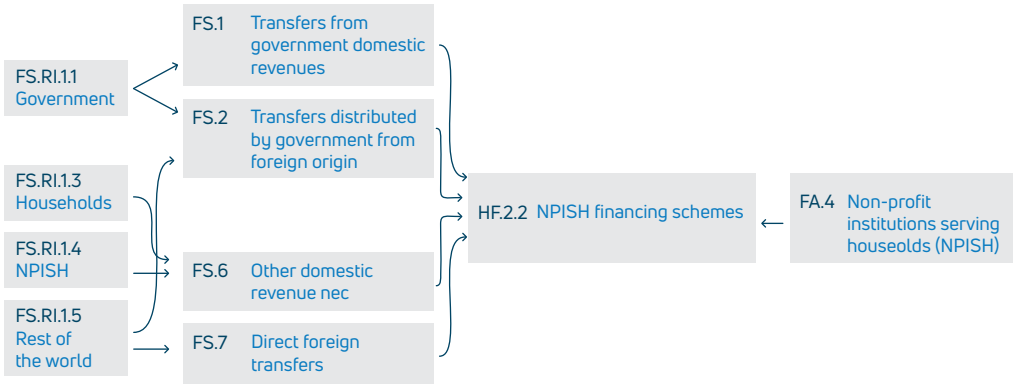
Figure 6.C provides a simplified overview of the financing flows related to households. It can be seen that households are reported in SHA 2011 both as prepayment and as out-of-pocket spending payers. Households are the only managing entity of OOP.

Figure 6.C Household financing in SHA 2011



The last portion of the concise overview of the financing flows relates to not-for-profit institutions serving households (Figure 6.D). These flows can also be related to domestic and foreign origins.

Figure 6.D NPISH financing in SHA 2011



Source: Own elaboration based on OECD, EUROSTAT, World Health Organization. A System of Health Accounts 2011: Revised edition. Paris: OECD Publishing; 2017: Chapters 7–8, and Annex D. Available from: https://www.who.int/publications/i/item/9789240042551.

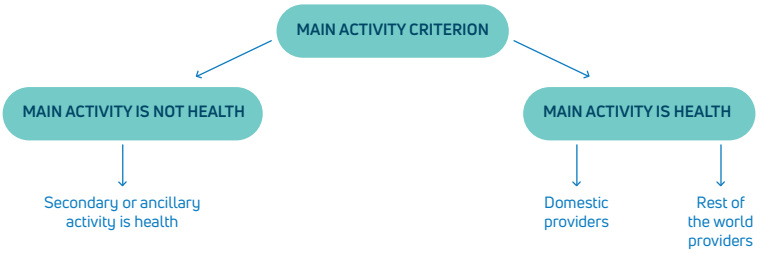
As every country is different, it is imperative to make an inventory of all actors and their relations in the system regarding the financing dimension. The next step should be to create a flow diagram in which all of these activities and actors find a place. Such a diagram is the basis to guide the work: identifying actors involved and their roles, the transactions to document, and the records to search for that purpose. When this diagram becomes too crowded and complex, the partial overview presented above can be useful to detail partially the flows to fully understand them.

4.2 Understanding the provider structure

In SHA, the provider structure refers to the types of facilities in the system, linked to their main activity as well as their technological structure.

Providers can be institutions and individuals offering health care goods and services to the population at the individual and collective levels. The structure of this classification reflects the facility types providing health care. The country rules and regulations determine to a large extent the categories assigned to the facilities. However, they also reflect the technological level (such as hospitals and health centers) and resolution possibilities in a general way. The coding of providers is based on the main activity of the facility. At the country level, provision may be organized based on levels of care, which in SHA 2011 are expected to be expressed as a cross classification of provision and services (HP x HC; see Table 15.1 in SHA 2011). In Figure 7, the HP provider structure is shown in relation to the main activity principle used in national accounts and SHA 2011. The main activity is determined in terms of value added, turnover, number of employees, or any other economic measure related to the importance of the activities (*8*). See Chapter 6 in SHA 2011 for more detail.

Figure 7 Provider structure



Source: Own elaboration based on Chapter 6, of OECD, EUROSTAT, World Health Organization. A System of Health Accounts 2011: Revised edition. Paris: OECD Publishing; 2017:121. Available from: https://www.who.int/publications/i/item/9789240042551.

4.3 Factors of provision (FP)

Two main inputs concentrate the policy interest: remunerations and pharmaceuticals. Both represent important expenditure drivers and are characteristic resources of health care. A full understanding of all of the items of this classification is useful, for example, in productivity and efficiency analyses.

Factors of provision are the inputs used by the providers of health goods and services consumed by the population. Therefore, information related to these inputs can be very policy relevant. In particular, remunerations (both in public and private sectors) and pharmaceuticals together often represent more than half of spending.

In many governmental sources, line items are available for inputs used in the provision of government-operated providers. Also, sources are available in the private sector (see the examples presented in Table 3 and Table 25).

A clear understanding of each category can be obtained in the explanatory notes in Chapter 9 of SHA 2011. An example is FP.2 Self-employed professional remuneration. Unlike remunerations in the public sector, which are usually available in budgets and refer to personnel, information on the self-employed in the private sector is scarce. An estimation can be based on national accounts and on tax office statistics. Private provision is considerable in many countries.

4.4 Functions as a core classification

Functions not only determine the boundary of the health care reporting system but also represent the goods and services consumed by the population.

Functions are clusters of activities and are at the core of the SHA 2011 framework. Functions are the basis to determine the boundary of the health care reporting system. There is no one-to-one relation between functions (HC) and providers, as one provider can offer more than one function, and a single function can be offered by several types of providers.[9] They can also be paid for by various agents under various schemes. HC refers to recurrent spending.

The classification is not always in correspondence with the detail of national reporting on functions and boundaries. Activities that are not specific to health can be under the responsibility of key health actors in a country but not included under the SHA health boundary (e.g., social care, education, environment, sports). Full adherence to the international agreed boundary and classes (as complete as possible) is imperative for international comparisons. All of the categories need to be disaggregated as much as possible, at least for policy analysis. Compilation can be limited by the nature of the national system and the nationally available data. A recognized difficulty is the

[9] Note also that a single provider can and usually does provide more than a single function; thus, in both ways a one-to-one relation between provision and function is not present.

separation of curative and rehabilitative care. The International Health Accounts Team (IHAT)[10] decided to introduce and allow a combination of these two groups of functions. Neither have all countries identified all services by mode of provision in detail, such as day care.

Health care is usually consumed in packages, meaning that various clusters of activities are consumed and presented as "one single product/function." This is the case of inpatient (IP) and outpatient (OP) care services. A contact normally consists of a personalized mix of services that is to be presented as one single class in the HC classification. The content of these packages may involve a visit to a health provider, additional procedures for diagnosis or follow-up, medication, and care. These are usually not disaggregated but reported as a single IP or OP service package.

Some goods and services (mainly ancillary services and medical goods) are obtained out of the package. This means that the beneficiary consumes them on his/her own initiative and/or they are billed separately. In these cases, the registration is no longer made as part of an inpatient or outpatient service package but follows its own coding: as an ancillary service, HC.4 (such as transportation, laboratory, and imaging), or pharmaceuticals and other medical goods, HC.5. These items are referred to as "not specified by function" in the SHA 2011 manual.

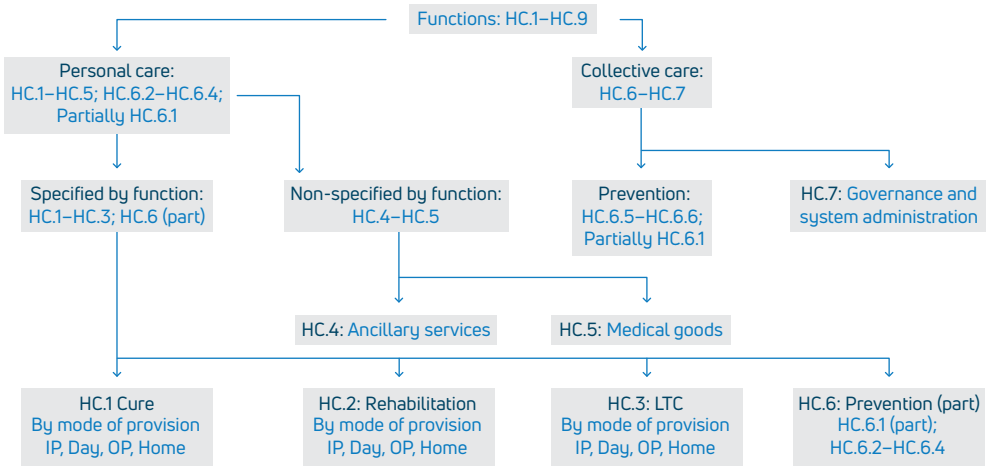
Related to this characteristic is the content of consumption. It should be considered that services are consumed at the moment of delivery, but goods can be consumed separately from the delivery (purchase). By convention, however, the consumption of pharmaceuticals and other medical goods is set equal to the purchase. This means that purchase is identical to consumption regardless of the real adherence to treatment.

Consumption can also be separated into personal or individual and collectively offered and used services. The latter refers to services aimed at the whole population and consists mainly of prevention as well as management and administration of the system. An explanation is needed on the issue of prevention. Prevention as a set of programs is classified as a collective function. However, some components of prevention, specifically HC.6.1–HC.6.4, are programmatic but are individually administered. At the same time, program control activities, which are collective, can involve activities with an individual benefit such as free provision of condoms or mosquito nets. Thus, these are named individualized collective services.

Figure 8 presents the logic of the functional classification and the links between the classes in broad aggregates.

[10] IHAT is the collaboration among OECD, EUROSTAT, and WHO in which topics related to SHA 2011 and joint data collection are discussed.

Figure 8 Functional classification logic



Source: Own elaboration based on Chapter 5 of OECD, EUROSTAT, World Health Organization. A System of Health Accounts 2011: Revised edition. Paris: OECD Publishing; 2017:71. Available from: https://www.who.int/publications/i/item/9789240042551.

4.5 Classification of the expenditure distribution by disease

An important observation is that the ICD, the International Classification of Diseases, is the standardized basis of reporting in SHA 2011. ICD refers not only to causes and conditions but also to seeking contact with the health system by beneficiaries.

One of the most important characteristics of beneficiaries and crucial in health analysis and policy is the classification of expenditure by diseases, grouped by type. These groupings can lead to major indicators such as types of care (for example, inpatient, outpatient, and pharmaceutical expenditures) by groups of diseases (e.g., for cardiovascular or respiratory diseases, injuries, or neoplasms). These indicators can be supplemented by non-expenditure information (e.g., on prevalence, at-risk populations, unmet needs) and by income bracket.

Currently, the WHO database on expenditure on health (GHED) (*9*) includes the reporting of expenditure by disease based on SHA, both at a national level and across countries.[11,12] The internationally accepted standard for classifying diseases is the WHO-published International Classification of Diseases (ICD), which is currently in its 10th revision and in transition to the 11th revision. ICD categorizes diseases by diagnosis in mortality and morbidity, and it is routinely used in hospital facilities and increasingly within outpatient ones. These are linked to public health policy, for example, related to disease prevention, public health programs, treatment, and reimbursement schemes. The disease classification in the HAPT regroups ICD based on global burden of disease main categories. For further information, see Chapter 10 in SHA 2011.

[11] A wider display of explanatory notes is presented in SHA 2011, Chapter 5; Chapter 10 includes the most often internationally used classifications of diseases, ICD and GBD (Global Burden of Disease).

[12] The EUROSTAT study of EU member states (HEDIC) demonstrated the feasibility of distributing expenditure by disease categories, while two WHO-supported pilot studies demonstrated the feasibility of comparable estimates in two developing countries.

4.6 Other classifications

No international guidelines are available for most of these additional breakdowns because they are determined by the national context.

Next to the standard distributions of the SHA classifications, a limitless number of other breakdowns can be created and used for policy-making. The most well-known are regional distributions and distributions by age and sex/gender. No international guidelines are available for the majority of these additional breakdowns as they are determined by the national context. For many of these distributions, hard data are not always present and "splitting keys" need to be developed to estimate the desired level of detail.

For age, a proposed distribution can be found in the SHA manual (Chapter 10), listing 5–year age groups and a separate category for 0–1 years. Other age groups can be created in case of need, for example 1–year age groups for the whole population or for specific age brackets for a specific goal such as family planning.

The distributions of spending by region are country specific as are the ones by income brackets, which makes the construction and use of keys necessary (see Table 2). These keys can range from population (groups) to output or turnover depending on the data to be used for the respective spending groups. Some examples of possible combinations of spending and regional sections are presented below.

Table 2 Keys for regional distributions (not exhaustive)

Data type	Possible key(s)
Local government data	Probably no key needed
Central government data	Local government shares in the total spending Population by region; weighted by real coverage and characteristics Number of government health employees by region
Social security data	Number of beneficiaries by region Population by region; weighted by real coverage and characteristics Social security health employees by region Number of social security locations by region
Private health insurance	Number of policy holders by region Idem in combination with average beneficiaries by policy Population by region; weighted by real coverage and characteristics Number of units of each insurance company by region
Donor data	Number of receiving organizations by region Idem by number of beneficiaries Idem by program Population by region; weighted by real coverage and characteristics
NPISH spending	Number of units by region Number of employees by receiving unit by region Number of beneficiaries registered Idem by program Number of employees by unit Population by region; weighted by real coverage and characteristics
OOP	Population by region; weighted by real coverage and characteristics Idem by age and gender Idem by disease
Providers	Number of institutions by region Idem by size, such as employees, turnover, etc.
Secondary data	When aggregated may need distributions
Surveys	National need distribution; as part of sampling, a weighting may be integrated

Source: Own elaboration based on SHA2011 framework and World Health Organization. Guide to producing national health accounts: with special applications for low-income and middle-income countries. Geneva: WHO; 2003:278–290, Annex D. Available from: https://apps.who.int/iris/handle/10665/42711.

4.7 Capital goods and accounts

The change in the stock of capital goods, the acquisition as well as the disposals, here are not estimated. An information system in place to track them is advisable.

Capital goods are important in health for policy-making and analysis, although health care is still a labor-intensive service industry. Capital is just as indispensable as personnel and materials used in the provision process. Capital goods can be described as all goods acquired in the accounting period by providers of health care goods and services that are being used repeatedly or continuously for more than one year.

The gross stock of capital goods[13] consists of three main aggregates: gross fixed capital formation (GFCF), changes in inventories, and acquisitions less disposals of valuables. The most important of these three aggregates is GFCF, containing infrastructure, machinery and equipment, and intellectual property products. The classification, as presented in Chapter 11 of SHA 2011 (*2*), is in this sense consistent with national accounts.

Acquired by providers means that the provider must be the owner; this includes financial leasing of capital, as in the final end the provider will become the owner, opposite to operational leases where the provider does not hold ownership. Capital goods acquired but not used yet (e.g., they are kept in stock as a back-up) are included in the capital account. Another exception refers to the accounting period. Capital goods with a construction period of more than a year, such as hospitals, are included partly during the production process, although the ownership is transferred only at the end of the building period.

The term gross in GFCF refers to consumption of fixed capital (CFC) that is included. CFC refers to the cost of the use of capital goods consisting of normal wear and tear and obsolescence. Here is also included damaged goods due to natural or man-made calamities when they are recurrent (e.g., storms). Damage due to unexpected calamities is registered "below the line" as capital loss and deducted from the capital stock.

Although many elements can be estimated in health accounts, the change in the stock of capital goods, the acquisition (investment) as well as the disposals, cannot be estimated (or can be estimated only with great difficulty and uncertainty). Often capital data is not health specific in the system of national accounts.

Questions and answers

1. Q: Is there a hierarchy in the classifications for an SHA exercise?

   A: All of the classifications in SHA are important. However, some are mandatory or high priority. For example, the classifications in the original triangle – HF, HP, and HC – are basic for current spending and HK for capital. Classifications related to financing are also high priority, including FS and FA next to HF. It is advised that a set of flow charts relating the various units in the financing of the health system be created to get a clear picture of the relationships and an idea of the importance of each part. Policy questions may help

[13] Stock of capital goods refers to the (value of) goods actually present, including those acquired but excluding those disposed of (sold, scrapped, donated, etc.) during the accounting period.

to highlight the disaggregation needed (e.g., data at the subnational level, on expenditure by disease).

2. Q: Do we need to develop all classifications at the same time?

   A: In addition to the basic data set, various other classifications can be developed. It is advisable to do so at the same time because the effort of data collection, which is usually time consuming, is more efficient. However, classifications can be added in a stepwise approach, in successive estimation exercises.

3. Q: What to do with national and SHA boundary differences?

   A: For international comparability, the SHA boundary has priority. For national purposes, the differences between the national and SHA boundaries can be displayed as below the line items.

4. Q: What to do when the names of national spending categories are the same as those of SHA 2011 but the content is different?

   A: To ensure international comparability (and nationally in time), it is advisable to follow SHA2011 descriptions (in labeling and content). There is always the possibility to include the national labels close to the labels and codes of SHA 2011 to ensure that both are reflected. The SHA 2011 coding is leading.

5. Q: How to handle the differences in level of detail in SHA versus national data?

   A: National data can require greater detail or can display less detail than the standard categories. The SHA 2011 classifications are flexible to ensure all levels of detail requested based on national data. Subcategories can be added when convenient. Accounting standard procedures can facilitate reaching greater detail when needed.

6. Q: Can we add new classifications?

   A: There is possibility to add new classifications. The criteria include disaggregating a single analytical axis, disaggregating it completely in the included categories, and avoiding duplication with existing SHA 2011 classifications. That is, any new classification should have mutually exclusive categories and be exhaustive, which means that each number can be coded only in one category. In principle, it is desirable that each classification is fully disaggregated in each data flow.

7. Q: Why are there similar names in various SHA 2011 classifications?

   A: Each SHA 2011 classification serves only one purpose. That means that even when the names in each classification are similar, the purpose remains different, and thus the content can vary. For example, the government as revenue source indicates the various transfer possibilities and channels, and as a scheme this reflects the patterns of entitlements. As a financing agent, it reflects the organizations paying. Schemes and agents may not have one-to-one correspondence, as one agent can run more than one scheme and one scheme can be run by more than one agent.

8. Q: Why are the totals expected to be the same in each classification?

   A: The reason is that the basis of the accounting is the final consumption, not the revenue or the entitlement. Thus, the flows follow and correspond to the final consumption (what has been consumed has been provided and paid for).

CHAPTER 5

MAIN DATA SOURCES AND THEIR CHARACTERISTICS

Health accounts (HA) use as a basic source the expenditure reports available from all agencies in the health system. Thus, a full search of data sources is an initial step. The starting point of the process is the list of the providers and financing institutions in the system. It is important to identify all of the data required from each actor and their possible uses since the beginning of the process. This is to optimize the data collection and to make more efficient data requests.

This chapter provides an overview of general data sources, followed by a description of those specifically related to each dimension (financing, provision, and consumption). Given that each national statistical system refers to the system of national accounts, one section is related to the potential uses of national accounts data to generate SHA. The last section focuses on an assessment of the usability of each data source as a specific process in the construction of health accounts.

5.1 Overview of general data sources

Data sources with health information exist in all countries. Each data source usually provides data for more than one classification. The expectation is to extract the maximum information, which may be explicit or implicit. At the same time, the data needed are scattered in several sources. This challenge leads to the need to use multiple data sources.

Many available data sources can be used in the construction of health accounts. These range from detailed executed ministerial budgets or other institutional information systems to specific scientific reports published on selected topics in health. Often, the same data source may be used to obtain more than one type of content.

Data sources relate not only to spending and other financial variables but also to non-expenditure data that can be used as proxies to build distribution keys or contextualize the system. In Table 3, an overview is presented of a selection of sources frequently used. Their potential content is detailed by each SHA financial classification and their possible usability in other classifications (such as providers, functions, diseases, and input factors).

Table 3 Frequent available data sources on health spending

	Data to be used on financing classifications				Data to be used on other classifications			
	FS.RI	**FS**	**HF**	**FA**	**HP**	**HC**	**FP**	**DIS**
Executed budgets health institutions, e.g., MoH, departments	Y	Y	Y	Y	Depending on detail	Depending on detail	Y	Depending on detail
MoF and other ministry budgets	Y	Y	?	Y		Depending on detail	Depending on detail	
Social security financial reports	Y	Y	Y	Y	Depending on detail	Depending on detail	Depending on detail	
Private health insurance reports - claims and premiums	?	?	Y	Y	Depending on detail - claims	Depending on detail - claims	Depending on detail - claims	Depending on detail - claims
NGO/NPISH financial reports	?	Y	Y	Y	Depending on detail	Depending on detail	Depending on detail	Depending on detail
Donor data (including OECD CRS*)	Y	Y	Y	Y	?	Depending on detail	Depending on detail	Y
Corporation financial reports, e.g., occupational health	Y	?	Y	Y	Depending on detail	Depending on detail	Depending on detail	Depending on detail
Umbrella organization reports, e.g., health professionals	?	?	?	?	Y	Depending on detail	Depending on detail	?
HBS, Household survey report	Y	Y	Y	Y	Depending on detail	Depending on detail	Depending on detail	Depending on detail
COFOG, COICOP data	?	?	Y	Y	Depending on detail	Depending on detail	Depending on detail	Depending on detail
Specific primary data collection, e.g., surveys	FS.RI	FS	HF	FA	HP	HC	FP	DIS
Donor, NGO, employer, government subnational department, provider (e.g., HAPT surveys)	Y	Y	Y	Y	Y	Y	Y	Y
Non-financial data, used as reference and distribution keys	Type of information				HP	HC	FP	DIS
Utilization/health care provision report	IPD	ALOS	OPV	Patients	Y	Depending on detail	?	Depending on detail
Central pharmacy				Medicines ATC	Partly			Partly
Household health surveys	IPD	OPV		Patients	Partly	Y		Y
Business surveys, e.g., health private providers	Turnover	Employees	Location	Activities	Depending on detail		Depending on detail	
Insurance/SS corporations	IPD	ALOS	OPV	Patients	Partly	Y		Depending on detail
Reports of main/total causes of hospital discharge and consultation	IPD		OPV		Partly	Partly		DIS

? = possible or partly; blank = no
IPD = inpatient days; ALOS = average length of stay; OPV = outpatient visits; ATC = Anatomical Therapeutic Chemical Classification
* OECD CRS is a source of information for foreign flows but is not the first choice when searching for flows of foreign funds.

Source: Own elaboration.

Most sources mentioned in this table are well known. However, two may need some additional explanation. These are the Classification of Functions of Government (COFOG) (*10*) and the Classification of Individual Consumption by Purpose (COICOP) (*11*) (see Annex 1 for more information and links to the original classification structure).

- COFOG, one of the standard classifications of the United Nations Statistical Department, contains data on government spending by function, of which one function is health (class 07). This is important to keep in mind because all public sector institutions may use this classification for international reporting to IMF, usually via the Ministry of Economy or the Ministry of Finance. Thus, it covers all of the governmental actors and includes the following categories: (a) inpatient (IP) care, (b) outpatient (OP) care, (c) medical goods, (d) public health, and (e) research and development (R&D) in health. It may allow an opportunity to assess the relevance of other ministries in health spending and help to identify those with a further need for detailed interaction.
- COICOP (also a UN standard classification) contains a specific category on health spending (class 06). In its most recent version (2018), the classification is more closely mapped to SHA 2011, which makes it easier to link to health accounts and national accounts. This classification is dealt with by the central statistical office (CSO) and is the basis of the household spending survey. It is expected that there will be greater detail in health spending from private sources. At a minimum, the categories to use cover IP care, OP care, and medical goods.

The team has to be aware that the level of detail and the content of these sources are not always directly usable in HA according to SHA and may need some adaptations to be suitable. For example, it is necessary to verify the boundary, units of measurement, valuation (e.g., includes/excludes refunds), and so forth.

5.2. Data on sources of funding

> Although the ultimate origin of funding can be important, for the accounting process the aim is to reflect how financing flows are entering the health system.

A short overview and description of a selected set of flows is displayed below for public, private, and external sources of financing.

Public financing sources

i. The first and more important piece of information is the budgets of the respective ministries. Priority is ideally given to the audited final executed budget. However, given the conflict of timeliness versus accuracy, the second-best choice is the preliminary executed budget. In most cases, budgets reflect line items according to input. But sometimes they are based on factors such as objectives, purposes, and so on. They can be found at an aggregate level, by institution and by provider.

ii. Ministries of finance report expenditure by function, covering the public sector. The COFOG classification is a major source of information on public finance by purpose. In many instances, these data are also reported to the IMF and UN to be presented in detailed tables on national accounts by country and functional area.

iii. Data on expenditure on health can be found in IMF GFS reports.[14] These have several levels of coverage (central, regional). The ideal reports are comprehensive and consolidated ones.

iv. If a consolidated source on expenditure for government is not available, the data have to be compiled by component. The source is the institutional reporting of expenditure on health, notably by ministries of health and social security, but often other ministries have health spending as well. Specific agencies such as central pharmacies may have specialized data on medical goods and their financing and distribution. Their reports may vary; for example, social security institutions have financial reports with statements by type of benefit (health purpose).

v. Next in the hierarchy are data reports provided by various international agencies such as the IMF country reports or World Bank Public Expenditure Reviews (PER), which are produced in collaboration with official authorities. These are not routinely produced.

vi. Finally, a source of information can be found in the various national financial reports related to the health system, which can be one-off studies.

Private financing sources

i. The most important source in the collection of data on private health spending is the COICOP report. COICOP provides information on household consumption by purpose, distinguished in a few main classes. National accounts tables use COICOP and may report the expenditure by the health and social care branch "Q" in SNA 2008. The collection and reporting of the data in branch Q are not always performed separately and often lack a breakdown of the three main components: health (Section Q86), social care with an overnight stay (Q87), and social care without an overnight stay (Q88).

ii. Another good source is the household budget survey (HBS), which is also a basis for consumption expenditure data in the national accounts. HBS often use COICOP structures. In this respect, it is important to ensure alignment with COICOP 2018, which can provide additional detailed information for SHA 2011. Given the recognized frequent biases (sampling and non-sampling errors), HBS data need to be triangulated and adjusted as needed, preferably in accord with national accounts.

iii. Private insurance companies can be a source of information on health spending, notably for private insurance outlays. They can report to the central banks or an independent insurance supervisory board through summary reports on the health insurance branch. Insurance companies usually report claims and premiums. Detailed data can also be obtained via surveys.

iv. Reports of non-profit institutions serving households (NPISH) may be centralized by an umbrella organization or a public entity with responsibility for recording their operation. When they are linked to external funds (e.g., the so-called international NPIs), the consortium of donors may report NPIs as receiving entities, providing details on the purposes of the grants. As both NPISH and donors deal with similar information in providing and receiving funds, information could facilitate the detection of a possible double count (for more information, see Section 8.3). To identify those that are largest

[14] It must be noted that the use of non-consolidated government expenditure reports can lead to overvaluation and double counting. See the section on double counting in Chapter 8.

and those with greater relevance, it can be important to engage in discussions with health program officers. The larger and strategic ones are surveyed, and the remainder can be selected via a sample. A sample of units can be generated from the business registries in case a survey is performed to collect the details (e.g., origin, destination, and use of funding). Reports can be obtained on the NIPSH websites with greater visibility. NA include this expenditure to generate supply and use tables (SUT), for example, and they may have further information with specific non-profit institution (NPI) data.

v. Regarding private corporations, their health spending can be available from their records in addition to insurance and social security. Reported premiums and contributions by enterprises should not be double counted with information from private and social insurance. In some countries, by law, once firms have a certain number of employees, they are required to offer self-funded health care services on their own premises. An estimate of these can be made if the number of such enterprises and their employees is known. This information can be obtained from the economic census and business surveys, but these are not frequently performed. The belief is that larger enterprises offer more health care provisions and that these can be linked to their VIP employees. A survey can provide detailed information (e.g., reimbursements, arrangements with providers, direct provision, and insurance for employees). Also important is that the largest health care services may already be known (e.g., hospitals by a certain industry such as oil or transport) and the specific records may be available in detail.

vi. A last set of reports by institutions collating secondary sources with diverse estimates originates from UNICEF, WHO, UNDP, and other organizations and includes poverty assessment reports.

Rest-of-the-world funds

i. The first choice should be country-specific reports originating in the Ministry of Finance or institutional reports of local organizations in the field of donor support. Sometimes it is useful to perform a survey to gather detailed health expenditure data in specific areas (e.g., related to recipients, origin, and use of specific funds).

ii. The second most important source of information on external funding of health spending is annual reports from donors in the health system and data displayed in donor websites, which can include the expenditure coming from external sources (e.g., international organizations such as WHO and USAID, governments, and private foreign institutions such as BMGF and The Global Fund).

iii. The OECD Development Assistance Committee (OECD DAC) (*12*) and the Creditor Reporting System (CRS) (*13*) are a third type of source. The reports of these groups allow for selecting data by recipient country and agency. The detailed databases also contain rich data by specific purpose, including the names and details of recipient agencies, which can be further monitored.

iv. The WHO technical note on methodology for the update of the Global Health Expenditure Database, (*14*) can guide the use and availability of these data sources. It contains information as well on other databases such as the Total Official Support for Sustainable Development initiative (TOSSD) (*15*) and the International Aid Transparency Initiative (IATI) (*16*).

v. A relevant point on the WHO technical note is that it offers for the first time an explicit proposal on non-aid flows; more specifically, these refer to payments for services by foreign insurance institutions for the resident population and foreign purchases of health care for resident population.

5.3 Data on health care provision, health care services, and beneficiary needs and characteristics

Detailed information on the uses of health financing flows involves the provider and consumption dimensions. They are usually less complete and more scattered, requiring a greater search effort, and their use may require more specific analysis.

- Income reports. The income reports of providers represent the payments received from the financing agents (FA) for the goods and services delivered. This means that both sides, the FA payments as well as the HP income reports, may contain the same or similar information. Usually, providers may have more than one FA purchasing agency; thus, information from providers can summarize the distribution of payers in an easier way, but providers are frequently found in a huge number and diversification. That is why the FA records are mostly preferred as a source. Information on the providers can be obtained from a sample of facilities considered as the prototype in the country to construct the expenditure distribution in detail. In some countries, it is possible to access information from tax offices and from umbrella organizations of providers, which can be useful to obtain grouped information (e.g., professional associations, hospital consortiums).
- Budgets and business surveys. In general, budget and business surveys (and economic censuses) contain information regarding income of professionals, employment, and intermediate consumption.[15] The most important labels for policy are remuneration of health personnel and pharmaceuticals. Many other aggregates could be strategic to identify efficiency gaps, but handling these two aggregates is challenging enough. Thus, any record and/or additional study needs to be searched for and analyzed in detail. The warehouse of medicines and medical goods (central pharmacy) in the Ministry of Health is usually a centralized source of information that needs to be targeted separately, as it has specific complexities to consider. One of these relates to the costs of distribution of medical goods to each provider as well as the records of medical goods by type. Medicines need to be collected in a structure similar to the Anatomical Therapeutic Chemical Classification (ATC), which is the standard used for medicine registrations.
- Specific surveys can be performed by the team to collate mainly complementary details to disaggregate data. Often, surveys include donors (those providing at least major funding in cash or in kind), NPISH (both external agencies resident in the country and domestic organizations dealing with health interventions or funding), insurance companies (paying for or reimbursing medical care), government units (mainly subnational governments in decentralized contexts), and health care providers (including pharmacies, laboratories, and

[15] Intermediate consumption refers to the goods and services used by providers to create the final consumption, which means the inputs used to generate health care provision.

imaging centers). A basic set of survey formats embedded in the HAPT (see Box 2) can be used to collect data even when the tool is not used for data analysis.

- Non-financial data are also frequently needed to understand and document the national context, to validate the HA results, and to generate expenditure distributions. Non-financial data can be included in records of OP (number of visits, type of patients, causes, etc.), IP (average length of stay, number of patient days, causes, etc.), and preventive services (usually reported separately as numbers and types of patients and services, e.g., vaccinations). Large hospitals may already have distribution and length of stay data by main causes according to ICD category. For OP reports, it is less frequent to have a list of causes of consultations; if such a list is available it can be used, and it will preferably be in accord with ICD or International Classification of Primary Care (ICPC) (*17*) classes. Also useful can be a list of top causes of OP and IP visits (the most frequent 10–20 causes), which is available in most countries. These are often collected and disseminated by the MoH and/or the central statistical office (CSO). These listings are the basis of the distribution, for which standardized approaches have been developed (see SHA 2011, Annex F). Thus, it is important that data collection include, to the extent possible, information on the location of providers, the population covered by them, and the services offered. An analysis of the type and number of facilities and their distribution in the country usually is at hand, although not always updated. It can also be used for disaggregating spending by subnational level (SNL).

5.4 The System of National Accounts (SNA) as a data source

> The statistical system generating the overview of the national economy includes health as a component. The data are produced as per the System of National Accounts standard and are available in most countries. For health accounts, major SNA aggregates are key reference values, but specific components of the accounts can also be used.

The national accounts aim at providing an official overview of the national economy to allow analysis of their composition, functions, and performance. They represent the main statistical data system in a country, which is based on the System of National Accounts (SNA) elaborated by the United Nations. Its current version was released in 2008 (SNA 2008) (*8*). However, some countries still operate the former 1993 version. The structure of the SNA is standard, but countries may develop the full accounts or part of the accounts proposed and select the format of presentation.

The System of National Accounts[16] uses in principle three approaches to integrate all available structured data sources: the production approach, the income generation approach, and the expenditure approach. The generated accounts are linked in a so-called sequence of accounts (SoA). However, not all economies use all three approaches for their production of accounts (in particular, the use of the expenditure account is usually very limited).

The information available in SNA is frequently found in each country. The following are the main characteristics and content of SNA that can be used as a data source for SHA 2011.

[16] See also Annex 1 for a concise description and SNA-related classifications.

Data from national accounts are useful as benchmark and reference material. One of the most used indicators is GDP, but private final consumption (PFC) and general government expenditure (GGE) are also often used in health account production and analysis.

In addition to SNA main aggregates, the information displayed in the various SoA tables can be of interest for SHA accounts. Some challenges exist in trying to make the two standards compatible, as described below.

(a) **Scope**: The boundary of health in NA is largely related to health personal care. The health industry is one branch in the economy (branch Q: health and social care, of which Q86 refers to health). To use NA health data for SHA, other specific components are needed, notably administration, insurance, and retail sales as well as occupational health, reported outside the health branch.

(b) **Valuation**: The valuation in NA is often on basic prices, which are much lower than those paid by consumers. The focus of SHA is on consumer prices. The national accounts valuation needs to be adjusted for compatibility when needed.

(c) **Interphase**: An interaction between NA and SHA is convenient given that the general and deep analysis in NA is performed only periodically (e.g., every 10 years), and in the intermediate period adjustments are required to update the values. Data in SHA can help NA to better adjust such values in time.

Below the sequence of accounts (SoA) is presented, highlighting the potential use of SHA (e.g., in gap filling) to triangulate and identify data sources (see Chapter 7 for examples).

The *production account* allows for identification of the value of the production of the health sector according to SNA (a reduced health scope relative to SHA). It displays relevant information such as market output and non-market output, intermediate consumption, taxes and subsidies on products, and consumption of fixed capital. The production account is valued at basic prices. Given the different boundary and valuation, it is difficult to integrate with the consumption approach in SHA.

The *distribution of income account* that also applies to the health sector includes key components such as compensation of employees, taxes, subsidies, operating surplus, mixed income, and consumption of fixed capital. Compensation of employees and of independent workers (mixed income) and consumption of fixed capital are components useful for factors of provision but also involve a reduced coverage level that needs to be complemented.

The *secondary distribution of income account* has current transfers such as taxes on income and wealth, social contributions, social benefits, and other transfers including property income. Some components can be taken as the social contributions, which are useful (at least as a reference value) for the classification of revenues of schemes (FS).

The *redistribution of in-kind income account* includes social transfers in kind (market and non-market), which can be useful if those related to the health sector can be accessed. If so, the details include current transfers within the general government, international cooperation, and transfers to NPISH. Social insurance scheme service charges can also be considered here, but SHA takes a proportional share of the total for health. The premiums and claims of non-life insurance can be used if those related to health are available.

The *use of income account* includes the final consumption expenditure, used as a denominator to generate indicators and as a reference value of SHA private consumption, individual and collective (e.g., public health services).

The *use of adjusted disposable income account* displays consumption as actual final individual or collective consumption. Individual expenditure by government and NPIs is added to household consumption. This total is valued in purchasers' prices, and if the boundary is aligned, values can be equivalent to the total current health expenditure in SHA if household spending is displayed separately from the government and NPIs.

The *capital account* includes capital formation, consumption of fixed capital, changes in inventories, acquisitions less disposals of valuables, and acquisitions less disposals of non-produced assets. For SHA estimates, all of these components can be useful if available for health, excluding non-produced financial assets.

In a nutshell, the use of SNA data is possible in SHA when the health sector and other components (such as pharmaceuticals) can be complemented and the valuation approaches purchaser prices.

5.5 Assessing usability of sources

> Data sources obtained may overlap, complement, diverge, and even contradict each other. The analysis of their content is basic to selecting their use, and equally important is oversight of their quality to identify strengths and weaknesses.

Not all sources are of equal importance and quality. In Table 4 (*18*), an overview is presented of a selection of sources, by type, and their strengths and weaknesses in a concise format. In addition to a list of data sources, their possible use, and a hierarchical structure, some other characteristics can be very important. Each source has its own priorities and goals, meaning that it makes a difference whether a source is created for statistical, administrative, or policy/political purposes.

Table 4 Strengths and weaknesses of data sources

Origin	Strengths	Weaknesses
Public records: government and other public • Budget expenditure • Economic censuses and surveys • Tax reports • Import and export statistics • Reports on transfers from external resources	Accessible, reliable, accurate, comprehensive, consistent	Barriers to access, data distortions, deviating aggregation, time lags
• Ministry of Health annual reports • Financing and regulatory agency reports • One-time documents such as task force reports, white papers, parliamentary commission reports • NGO reports or studies • Academic studies • International agency reports	Detailed, comprehensive	Unidimensional, restricted scope, limited analytical rigor, deviating classifications
Insurer records • Individual companies • Industry associations and umbrella organizations • Special analyses of tax records or other official reporting requirements	Restricted scope, fast availability	Weak in detail, only remunerations, lacking centralized reporting systems, unwillingness to share, difficulty in tracking reporting units
Provider records • Financing and regulatory agencies (administrative records and surveys) • Industry associations • Special analyses of tax records	Specific, comprehensive	Representativeness of all types and completeness of units questionable, dynamic changes in characteristics, adverse incentives and underreporting, deviating classifications and content
Household surveys and records and related reporting • Censuses and surveys • Academic and non-profit institution studies • Marketing studies	Cross classifications with demographic, economic, and social data on payers and users; only source of information on spending in the informal market	Usually infrequent; sampling and non-sampling errors, memory bias, lack of complete or collective information

Source: Own elaboration based on World Health Organization. Guide to producing national health accounts: with special applications for low-income and middle-income countries. Geneva: WHO; 2003:278–290, Annex D. Available from: https://apps.who.int/iris/handle/10665/42711.

Questions and answers

1. Q: Are all data sources equally important and, if not, which ones have preference?

   A: In principle, all (national and international) data sources can and need to be used. This does not mean that they are all equally important. For example, COFOG is more important than COPNI; however, when available it can be useful. The hierarchy of data sources is determined by the content of spending data and their level of detail in comparison with SHA data needs and the expected quality of the data.

2. Q: How to choose a data source when you have more than one report with the "same" content but different values?

   A: You have to consider boundaries, timeliness, quality of the data, and completeness to establish which is the more convenient, as exemplified in Table 4.

3. Q: How can a satellite account be used for SHA?

   A: A satellite refers to an extension of national accounts to integrate more specific data. The starting points are different as SHA refers to final consumption and the related financing of the services consumed and provided. The majority of the data collected for a satellite can be used in the construction of SHA results. The notes on section 5.4 are also the basis. Main topics to consider are valuation, boundary, and components (e.g., subsidies, transfers).

4. Q: Is it necessary to use more than one data source to generate a data point?

   A: Yes. It may happen. For example, this is the case when there is more than one data source available for a data point. Verification, triangulation, and quality control are needed for all to select the best. When the data partially cover the content expected, adjustment of the data sources is needed to generate the best result. Triangulation may also require verification considering other classifications. For data processing, different data sources may contribute with partial information that may need to be integrated to obtain an aggregate.

CHAPTER 6

TECHNICAL PROCESS

Information available at the country level has been created with various specific purposes. SHA is expected to use the available information to integrate them in the accounts. Information systems are often fragmented, with differences in similar components and in their coverage and periodicity. The basics in dealing with data are described in this chapter.

The first section displays the steps to be covered in data processing. Then the mapping and coding are presented, followed by notes on the creation of a database. Before concluding the technical processing of the data, the triangulation and integration are to be performed, and thus the chapter closes with some notes on these processes.

6.1 Steps of data processing

> To be converted into SHA 2011 data, a process is needed to standardize content, integrate the data sources, and analyze them. This process involves the integration of a database and mapping, and validating the quality of the results. These are at the core of health accounts

Once the appropriate data related to transactions of health spending are obtained, a technical process of mapping and adapting to SHA 2011 boundaries and classifications is needed. The aim is to display them as a database. The generation of cross tabulations is one of the expected results and a means to extract significant details for policy use. The processing of the data can be summarized in five steps, as follows.

A. Entering the data into a spreadsheet or database package

The first step in the process starts by creating an inventory of all actors in the system: providers and organizations related to the financing flows. The data collected at the start usually are related to financing and/or providers. In the first instance, the data collected will be placed into a spreadsheet or a database package, keeping full identification of the source and all related metadata to facilitate further processing. Note that the magnitude of the data to be used will be extensive and a proper organization from the beginning is needed.

B. Linking to SHA classifications

In an early phase, each data point is to be allocated to classification codes, and it is imperative to use and add all of the metadata in as detailed a manner as available. In many cases, the data collected are too aggregated to fit one to one each classification item. This is the case, for example, when payments are made to several providers, the allocation of resources of providers is linked to several functions, or the functions provided deal with several diseases. In these cases, a disaggregation is needed, which will be discussed later. For an example, see Table 6.

In many countries, the statistical system is already related to international classifications that are linkable to SHA 2011. These are often used in national accounts and are related to specific SHA coding such as the International Standard Industrial Classification of All Economic Activities (ISIC) linked to providers (HP), the Central Product Classification (CPC) linked to functions (HC), COICOP and COFOG linked to functions and schemes (HC and HF),

the International Classification of Diseases (ICD) linked to diseases (DIS), and the Anatomical Therapeutic Chemical Classification (ATC) linked to factors of provision and disease (FP and DIS) classifications (see Annex 1 for concise descriptions). Having this coding available and introducing it as an automatic link to SHA codes can reduce errors and facilitate a speed-up process.

C. Investigation of data source quality

During the data collecting and processing, several questions about the data sources often arise, for which contacting the data suppliers will be needed. Also in this stage, a more in-depth discussion and collaboration with national accountants, clinicians, financing officers, non-profit institutions (NPIs), retailers, and so forth can be helpful (see Table 4).

D. Initial cross-classification work

Results are usually displayed as tables consisting of the cross of two classifications that provide a partial view of the flow showing the "origin" and "destination" of resources, which usually are policy relevant (e.g., how the schemes are funded, which services are offered by which types of providers, and which diseases receive which services). The initial cross tabulation may be more useful if it includes additional information fields containing the problems to be resolved in subsequent steps (see Table 7).

E. Tables including metadata

If the team uses the HAPT, the tables and the relevant related metadata information are included in the system. Tables can be generated automatically in any level of detail necessary. Tables allow a first evaluation in searches of unusual numbers or combinations of codes. Levels, coding, and coding combinations need to be evaluated and corrected as needed. This process needs to be documented extensively (see Table 8).

Using other types of software, such as a database setup with rules, a statistical analysis program (such as R, Stata, or SPSS), or a spreadsheet containing many visual basic program parts, makes this cross tabulation more arduous, but it is still possible. However, caution is needed to minimize errors, and their active search through systematic rules can be set to identify those undetected ones routinely. These are also included in the HAPT (see Table 50), but some specificities can exist in each country due to the complexity of the health systems at the country level (e.g., specific arrangements that are infrequent in other contexts).

6.2 Creating a health accounts database

The generation of health accounts involves a large amount of data that need to be organized to facilitate processing. An HA database has few specific requirements.

Creating a database is an essential step in the SHA data collection and construction process (*19*). A database is a standard means of presentation wherein the names of the variables are used as headings of columns (in this example, the columns include the names of the selected classifications) and rows contain the record with the information. They include "a clean formatting" to be used for analysis without (sub)totals. In this case, each column should include the codes for the selected classifications to display complete flows. The advantage of working through this format is that the consistency of the data in all classifications is ensured and the generation of tables cross-classifying data is facilitated. This improves the usability of the data as compared with the creation of bivariate tables. Among the disadvantages of creating bivariate tables is that the totals are not by definition identical, which is de facto not a problem when the flows are generated in the database.

The format should be in agreement with the software to be used. In some statistical analysis packages, negative values are not allowed to be displayed and need to be corrected or eliminated. Depending on the nature of the negative value, the solution involves an aggregation with another record or deletion. Also, sometimes numerical content is not allowed to be mixed with values such as the power "-E," which could show very small amounts. An example of visualization of a database is displayed in Table 5.

Table 5 Database generated with flows coded

Record number	Organization	Department	Amount	Description	HF	FS	FA	FS.RI	HP	HC	FP	DIS	Comment
1	MoH	Dep of services	58	EIC on NCD	1.1.1	1,1	1.1.1	1,1	6	6,1			FP is undecided
2	MoH	Dep of services	73	DPT vaccine	1.1.1	1,1	1.1.1	1.1	6	6.2	1.1	1.7	
3	MoH	Dep of services	75	See focal point	1.1.1	1,1	1.1.1	1,1	6				FP is undecided; provider and function unknown, need a distribution key
4	MoH	Dep of services	53	Malaria detection	1.1.1	1,1	1.1.1	1,1	6	6,3		1,3	FP is undecided
5	MoH	Dep of services	95	Malaria detection	1.1.1	1,1	1.1.1	1,1	6	6,3	1,1	1,3	
6	MoH	Dep of services	76	Malaria detection	1.1.1	1,1	1.1.1	1,1	6	6,3		1,3	FP is undecided
7	MoH	Dep of services	46	Malaria detection	1.1.1	1,1	1.1.1	1,1	6	6,3		1,3	FP is undecided
8	MoH	Dep of services	66	Malaria detection	1.1.1	1,1	1.1.1	1,1	6	6,3		1,3	FP is undecided
9	MoH	Dep of services	72	See focal point	1.1.1	1,1	1.1.1	1,1	6				Provider and function unknown; HP is probably HP.4 or HP.5
10	MoH	Dep of services	90	DPT vaccine	1.1.1	1,1	1.1.1	1,1	6	6,2	1,1	1,7	
11	MoH	Dep of services	43	Injuries	1.1.1	1,1	1.1.1	1,1	6	6,5		5	FP is undecided
12	MoH	Dep of services	3	Injuries	1.1.1	1,1	1.1.1	1,1	6	6,5		5	FP is undecided
13	MoH	Dep of services	72	Contraception	1.1.1	1,1	1.1.1	1,1	6	6,6		2,3	FP is undecided
14	MoH	Dep of services	38	Contraception	1.1.1	1,1	1.1.1	1,1	6	6,6		2,3	FP is undecided
15	MoH	Dep of services	97	Central pharmacy	1.1.1	1,1	1.1.1	1,1	7,1	5.1.1	1.1.nec		FP is undecided
16	MoH	Dep of services	44	Central pharmacy	1.1.1	1,1	1.1.1	1,1	7,1	5.1.1	3.2.1		FP is undecided
17	MoH	Dep of services	69	Central pharmacy	1.1.1	1,1	1.1.1	1,1	7,1	5.1.1	3.2.1		FP is undecided
18	MoH	Dep of services	50	See focal point	1.1.1	1,1	1.1.1	1,1	7,1				Provider and function unknown
19	MoH	Dep of services	52	See focal point	1.1.1	1,1	1.1.1	1,1	7,1				Provider and function unknown
20	MoH	Admin	16	MoH central admin	1.1.1	1,1	1.1.1	1,1	7,1	7,1	1,1		
21	MoH	Admin	52	MoH central admin	1.1.1	1,1	1.1.1	1,1	7,1	7,1	1,1		
22	MoH	Admin	75	MoH central admin	1.1.1	1,1	1.1.1	1,1	7,1	7,1	1,1		
23	MoH	Admin	5	MoH central admin	1.1.1	1,1	1.1.1	1,1	7,1	7,1	1,1		
24	MoH	Admin	62	MoH central admin	1.1.1	1,1	1.1.1	1,1	7,1	7,1	1,1		

Source: Own elaboration.

6.3 Coding and mapping all classifications

The health accounting process involves the organization of the data in a system of classifications; thus, coding and mapping is one of the core activities. The target is to build complete resource flows using as many of the proposed classifications as needed for the analysis. An option for the teams is the use of the Health Accounts Production Tool (HAPT),

The key process of health accounting is to analyze spending through the SHA 2011 classifications. To reach that goal, the data collected are to be coded and mapped across the selected classifications. Coding is the process of assigning a classification code to each amount, while mapping refers to the coding across the selected classifications (*20*). During the data collection process, a start can be made with a review of the collected data, evaluating their use and quality (see, e.g., Table 6). At the same time, the coding of each individual record can be undertaken, and the related metadata added. The aim is to assign a code from each of the selected classifications to each amount to reflect complete flows.

An important evaluation includes the identification of those amounts for which the coding cannot be directly allocated. This can be due to a lack of complementary information. Also, a single amount may need to be distributed among several codes of a single classification, which is often the case for classifications of functions, factors of provision, and diseases. It must be decided if and which distribution rules are needed and how these are going to be generated to distribute the amounts.

When the amounts need to be distributed, the number of records related to the single original data entry can be large. The increase varies with the number of rows to be distributed, the number of codes in the distribution, and the number of classifications involved in the distribution. An example is presented in Table 6. The number of records used in case a few classifications have more than one additional code needed can increase dramatically. One code for FS (revenues of schemes) and a few additional codes for HP (providers), HC (functions), and DIS (diseases) increase this one data entry to 80 lines of information.

Table 6 Number of records due to split rules: Example

		Number of data points		Resulting number of records in the data set
Start:	FS – revenues of schemes	1		1
Related classifications				
HF – financing schemes		2		2
FA – financing agents		No split needed		2
HP – providers				
HF 1st record		3		
HF 2nd record		2		
HC – functions				5
Each HP: 4 split rules				20
FP – factor of provision		Unknown number of splits		
DIS – diseases				
HC records 1 and 2: 5 split rules			40	
HC records 3 and 4: 3 split rules			36	
HC record 5: 4 split rules			4	
Total		Total number of records as a result of splitting 1 FS record		80

Source: Own elaboration.

Although the splits can be generated relatively easy in Excel format, the possibility of errors is substantial, and the process of splitting and correcting can be time consuming. The software available to support a full HA exercise, the HAPT, can be used for this purpose (*21*) (see Box 2).

Box 2 The Health Accounts Production Tool (HAPT)

In 2013, WHO launched a software application, the Health Accounts Production Tool (HAPT), intended to help health accountants obtain more rigorous estimates with less effort. In 2023, a new version of the tool providing more options is to be released by WHO.

The HAPT is a new approach to health accounting. It guides HA teams through the entire production process and promotes the work in a systematic and organized way, increasing local capacity for health accounts production. This is because the steps need to be followed in a specific sequence so that the process can be advanced. The HAPT enables automation of mapping, reducing error-prone estimates and production times. The descriptive information and the characteristics of the data allow generation of an unbreakable link between each amount and the selected classifications. The splits of the amounts among several categories of a classification can be systematically made through explicit and documented rules. The rules are to be prepared either inside or outside the tool and are based on available information (e.g., averages, samples).

The HAPT also facilitates the standard reporting of results for national planning and policy purposes. The inclusion of new classifications and the possibility to expand the details or the aggregation of the results allow a customized overview of relevant spending. Moreover, the results displayed are facilitated, as the database allows for the generation of tables as required, mainly bivariate but also multivariate. With the time saved on repetitive procedures, the team can focus more on updating and analysis.

HAPT key features:

Functionality

- A platform to manage complex data sets and reduce data gaps.
- It includes a survey and an import function to streamline data collection and analysis.
- It has a built-in auditing feature to facilitate review and correction of double counting of expenditures.
- It generates automated cross-classified tables either bidimensional or multidimensional in nature.
- It generates an automated report including main procedures and registration of key steps.

Advantages

- Relatively easy to manage and to adjust to national needs.
- Helps users manage data, enter/import data (and surveys), map them (including repeat mapping) across all of the classifications in SHA, and understand the health accounts cycle.
- It can create an interactive diagram to help analysts visualize the flow of funding through the health system.
- It facilitates consistency of totals and subtotals across tables.
- It helps the concentration of data and metadata to facilitate replication and generation of future accounts.
- It helps institutionalization.

The HAPT contains various modules enabling the setup of the data structure by actors in the system, the data used, and, most important, the mapping of each data point to each classification selected in the setup, as well as flexible and easy reporting.

Mapping: practical example

The example below displays the process of coding and mapping, some of the most frequent problems faced, and their solutions.

The example involves the report of the government (e.g., budget of the Ministry of Health) on an executed amount of 35 NCU for health provision. This information already suggests codes for the four classifications of financing. First, a verification of the situation of the country is needed to ensure that knowledge of health system financing and spending is updated and complete. As the government provided the resources, the corresponding institutional unit is government (FS.RI.1.1). The resources provided were transfers from the central government (FS.1.1), and the agency performing the payments is also governmental (FA.1.1.1). As the payments are

related to a law indicating that the Ministry of Health is responsible for providing health to all residents, the scheme is related to the central government (HF.1.1.1[17]). The team needs to obtain additional information to know which provider or which service or disease this scheme relates to. The example refers to a set of related data sources covering all agencies involved in health care provision, coded by the team after data collection. The Ministry of Health runs a single scheme in the country spending 10 NCU for the provision of preventive services, with potential coding of HF.1.1.1, FS.1.1. Moreover, the MoH provides 20 NCU on behalf of refugees to the social health insurance agency, with potential coding of FS.1.2, HF.1.2.1. The government also transfers to NGOs 5 NCU, with a coding of FS.1.4, HF.2.2.1. In total, the government has executed 35 NCU.

Another document allows one to see that the health spending of other agencies includes social security contributions from employees (10 NCU) and employers (also 10 NCU), coded as FS.3.2 and FS.3.1. The social insurance scheme spends 25 NCU to be used for health service provision (HF.1.2.1). Corporations spent a small amount of 5 NCU on voluntary health insurance (HF.2.1, FS.5) for their employees. Households spent 15 NCU on pharmaceuticals (HF.3). This description is used by the analyst to create an initial coding using SHA 2011 classifications.

Based on the data collected, as presented in Table 7, the data analyst initially verified the codes for the classification of FS (revenues of financing schemes) to HF (financing schemes). Note that in the table the corresponding code of FS for OOP (HF.3) is missing.

Table 7 Data collected

FS	Amount (NCU)	Meta data	HF	Amount (NCU)	Metadata
FS.1.1	10	MoH prevention revenues	HF.1.1.1	10	MoH prevention arrangement
FS.1.2	20	Refugee insurance	HF.1.2.1	25	Social security payments to providers
FS.1.4	5	NGO support	HF.2.1	5	VHI scheme
FS.3.1	10	Corporation insurance payments of employees and employer part	HF.2.2.1	5	NGO scheme
FS.3.2	10		HF.3	15	OOP of households
FS.6.2	5	Insurance premiums of corporations			
Total	60		Total	60	
Initial notes (to be complemented in the coding process):					
	Totals are identical, but some codes must be wrong.				
	Household scheme has no revenue source.				
	Social security scheme lacks some funding.				

Source: Own elaboration.

The start of the cross classification provides a useful additional insight into the possible inconsistencies in the codes used and the amounts attributed to each code. The various steps in the process are presented in Table 8 to Table 10.

[17] When the country wants to discriminate the flows by specific ministry, an extra digit can be added.

Table 8 Cross classification: Iteration 1

			FS	FS.1.1	FS.1.2	FS.1.4	FS.3.1	FS.3.2	FS.6.2	Total
			Total	10	20	5	10	10	5	60
		Check	55	10	20	5	10	10	0	55
HF	Total	55								
HF.1.1.1	10	10								
HF.1.2.1	25	40								
HF.2.1	5									
HF.2.2.1	5	5								
HF.3	15									
	60	55		10	20	5	10	10	0	
Errors:	**FS**	FS.6.2 Corporation schemes has no corresponding HF codes.								
	HF	HF.1.2.1 SHI check sum is larger than the original amount, so either HF.1.2.1 is too low or FS.1.2, FS.3.1, and FS.3.2 contain errors.								
		HF.2.1 VHI and HF.3 OOP have no matching FS revenues.								

Source: Own elaboration.

The analysis of the related (meta)data and discussion with the data suppliers provided some additional information, resulting in a correct cross classification as presented below.

Table 9 Cross classification: Iteration 2

								FS.3.2	FS.6.2	
			FS	FS.1.1	FS.1.2	FS.1.4	FS.3.1	FS.5.1	FS.6.1	Total
			Total	10	20	5	5	5	15	60
		Check	60	10	20	5	5	5	15	60
HF	Total	60								
HF.1.1.1	10	10		10						10
HF.1.2.1	25	25			20		5			25
HF.2.1	5	5						5		5
HF.2.2.1	5	5				5				5
HF.3	15	15							15	15
	60	60		10	20	5	5	5	15	
Solution:	**FS**	Apparently FS.3.2 social insurance contributions from employers needed to be private health insurance premiums, so wrong code involved.								
		Moreover, both FS.3.1 and FS.3.2 were incorrect; amounts are corrected based on new information.								
		FS.6.2 was incorrectly coded as corporation scheme but needed to be OOP, so recoded as FS.6.1.								

Source: Own elaboration.

When all of the classification aggregates are included (see Table 10), the table becomes larger and more complicated but also complete.

Table 10 Cross classification: Iteration 3

											FS.3.2		FS.6.2	
			FS	FS.1	FS.1.1	FS.1.2	FS.1.4	FS.3	FS.3.1	FS.5	FS.5.1	FS.6	FS.6.1	Total
			Total		10	20	5		5		5		15	60
		Check	60	35	10	20	5	5	5	5	5	15	15	60
HF	Total	60	60	35	10	20	5	5	5	5	5	15	15	60
HF.1	35	35	35	30	10	20	0	5	5	0	0	0	0	35
HF.1.1	10	10	10	10	10	0	0	0	0	0	0	0	0	10
HF.1.1.1	10	10	10	10	10									10
HF.1.2	25	25	25	20	0	20	0	5	5	0	0	0	0	25
HF.1.2.1	25	25	25	20		20		5	5	0				25
HF.2	10	10	10	5	0	0	5	0	0	5	5	0	0	10
HF.2.1	5	5	5							5	5			5
HF.2.2	5	5	5	5	0	0	5	0	0	0	0	0	0	5
HF.2.2.1	5	5	5	5			5							5
HF.3	15	15	15	0				0		0		15	15	15
	60	60	60	35	10	20	5	5	5	5	5	15	15	

Solution:	**FS**	Apparently FS.3.2 social insurance contributions from employers needed to be private health insurance premiums, so wrong code involved.
		Moreover, both FS.3.1 and FS.3.2 were incorrect; amounts are corrected based on new information.
		FS.6.2 was incorrectly coded as corporation scheme but needed to be OOP, so recoded as FS.6.1.

Source: Own elaboration.

Both issues (data and coding errors) can efficiently be taken out of the hands of the analysts when the HAPT is used. All of the aggregations are done automatically, as well as the identity of all classifications as warranted. However, all decisions are in the hands of the health accountant.

Although the HAPT has many advantages, it does not prevent analysts from making errors (see Tables 11 and 12 on the results and process following data inclusion in the HAPT).

Using the same set of information (see Table 7), the HAPT generates the initial table. The inclusion of the basic data set, starting in FS, is shown below. As in the previous example, the FS.6.2 and the HF.3 were kept blank, resulting in a table with a total of 55 NCU; thus, these missing items have to be mapped. To create a temporary solution, HF.3 was linked for 5 NCU funding expressed in FS.6.2, which is inherently wrong but provides a total of 60 NCU, which is correct.

Table 11 SHA 2011 created using the HAPT

Revenues of health care financing schemes		FS.1	FS.1.1	FS.1.2	FS.1.4	FS.3	FS.3.1	FS.3.2	FS.6	FS.6.2	All FS				
Financing schemes		Transfers from government domestic revenue (allocated to health purposes)	Internal transfers and grants	Transfers by government on behalf of specific groups	Other transfers from government domestic revenue	Social insurance contributions	Social insurance contributions from employees	Social insurance contributions from employers	Other domestic revenues	Other revenues from corporations nec	All FS	Data presented in Table 7 and related text			
HF.1	HF.1 Government schemes and compulsory contributory health care financing schemes	30	10	20		20	10	10			50				
HF.1.1	HF.1.1 Government schemes	10	10								10				
HF.1.1.1	HF.1.1.1 Central government schemes	10	10								10	HF.1.1.1	10		
HF.1.2	HF.1.2 Compulsory contributory health insurance schemes	20		20		20	10	10			40				
HF.1.2.1	HF.1.2.1 Social health insurance schemes	20		20		20	10	10			40	HF.1.2.1	25		
HF.2	HF.2 Voluntary health care payment schemes	5									5				
HF.2.2	HF.2.2 NPISH financing schemes (including development agencies)	5									5			HF.2.1	5
HF.2.2.1	HF.2.2.1 NPISH financing schemes (excluding HF.2.2.2)	5									5	HF.2.2.1	5		
HF.3	HF.3 Household out-of-pocket payment								5	5	5				
HF.3.nec	HF.3.nec Unspecified household out-of-pocket payment (nec)								5	5	5	HF.3	15		
All HF	All HF	35	10	20	5	20	10	10	5	5	60				
Data sources used:	Data presented in Table 7 and related text		FS.1.1	FS.1.2	FS.1.4		FS.3.1	FS.3.2		FS.6.2				Governments	
Governments			10	20	5		10	10		5					

Source: Own elaboration.

The resulting “errors” in the HF classification (in combination with the FS classes) are mentioned on the right-hand side, meaning a/o the missing HF.2.1 (with a value of 5 NCU) and the wrong data in the HF.1.2.1 (5 NCU instead of 25), HF.3.nec, and FS.6.2 combination.

Correcting these errors in the basic data sets before importing again leads to a correct table, as can be seen below. Also indicated is the explicit need to validate the data and their classifications before starting the importing and distribution process in the HAPT. It is important to highlight as well that a find and replace function (as in Word or XLS) and other choices allow for correction of codes.

Table 12 SHA 2011 created using the HAPT: Corrected

Revenues of health care financing schemes		FS.1	FS.1.1	FS.1.2	FS.1.4	FS.3	FS.3.1	FS.5	FS.5.1	FS.6	FS.6.1	All FS				
Financing schemes		Transfers from government domestic revenue (allocated to health purposes)	Internal transfers and grants	Transfers by government on behalf of specific groups	Other transfers from government domestic revenue	Social insurance contributions	Social insurance contributions from employees	Voluntary prepayment	Voluntary prepayment from individuals/households	Other domestic revenues	Other revenues from households	All FS	**Data presented in Table 7 and related text: corrected**			
HF.1	HF.1 Government schemes and compulsory contributory health care financing schemes	30	10	20		5	5					35				
HF.1.1	HF.1.1 Government schemes	10	10									10				
HF.1.1.1	HF.1.1.1 Central government schemes	10	10									10	HF.1.1.1	10		
HF.1.2	HF.1.2 Compulsory contributory health insurance schemes	20		20		5	5					25				
HF.1.2.1	HF.1.2.1 Social health insurance schemes	20		20		5	5	5	5			25	HF.1.2.1	25		
HF.2	HF.2 Voluntary health care payment schemes	5			5			5	5			10				
HF.2.1	HF.2.1 Voluntary health insurance schemes							5	5			5			HF.2.1	5
HF.2.1.nec	HF.2.1.nec Unspecified voluntary health insurance schemes (nec)											5	HF.2.2.1	5		
HF.2.2	HF.2.2 NPISH financing schemes (including development agencies)	5			5							5				
HF.2.2.1	HF.2.2.1 NPISH financing schemes (excluding HF.2.2.2)	5			5							5	HF.3	15		
HF.3	HF.3 Household out-of-pocket payment									15	15	15				
HF.3.nec	HF.3.nec Unspecified household out-of-pocket payment (nec)									15	15	15			Governments	
All HF	All HF	35	10	20	5	5	5	5	5	15	15	60				
Data sources used:	**Data presented in Table 7 and related text: corrected**		FS.1.1	FS.1.2	FS.1.4		FS.3.1		FS.5.1		FS.6.1					
			10	20	5		5		5		15					

Source: Own elaboration.

Although the HAPT is a possible solution to create health accounts tables, it is not the only option. However, it should be noted that if using another type of software, the team has to address the fact that the totals and relevant subtotals of tables are identical. This implies that using any type of database software is better than table-type software.

6.4 Triangulation and consolidation

Triangulation and consolidation are part of the basic processing of the data. These represent regularly performed procedures to ensure primary quality control.

The verification that the totality of the flows is included in the exercise and that the coding is consistent and complete is one of the basic steps to be performed. Here is described the process of triangulation, useful to ensure that the totals are identical across all the classifications used and that key components are fully and correctly represented. Given that some of the flows can be reported by several of the actors involved in their resources (e.g., as origin and recipient), the consolidation is used to avoid double counting. This is the case with, for example, reported premiums paid by employers, income received by insurance enterprises, or transfers reported by national and subnational governments.

6.4.1 Triangulation

Triangulation is used in health accounts to increase the validity (correctness of the entries used) (*22*) of the data collected. It is a specific type of "integration." Integration is the generic term used in national accounts of the activity or process of uniting (*23*) different elements, that is, molding together various details based on different sources.

By comparing data, the better source can be identified and major weights assigned. This is useful to ensure that fundamental biases arising from the use of a single approach or a single source are overcome or prevented. Triangulation is a procedure that compares data entries related to a specific actor or activity, depending on the level of aggregation performed, to ensure that the amounts and their consistency in coding across classifications are correct. It also allows combining data to complement partial documentation.

An example of a triangulation/integration process is presented in Table 13. In this example, various sources of information (ranging from national accounts to hospital umbrella organization records data) are used to reach a result in which consumption spending is identical to provision turnover in health and the payments by all parties combined.

Table 13 Triangulation

Basic data	Expenditure	Source
Consumption	100	National accounts (NA)
Consumption	90	Household budget survey
Consumption	120	Hospital umbrella organization
Consumption	85	Administrative financing records
Triangulation		Explanation
Consumption	100	Consumption based on NA is preferred, as it is the result of an integration process of many different sources of data.
Provision	100 = 120 – 20	Provision may include services provided to non-residents and activities outside the health boundary. As provision needs to equal consumption, a reduction of 20 units is performed.
Financing	100 = 85 + 15	Financing data are known to underestimate the OOP spending of households, so 15 units are added to reach a common target.

Source: Own elaboration.

Integration is a process that combines a set of data to reach the best result possible. It is basic and essential in national accounts. This same type of process is identified and used in the SHA analysis and the construction of tables in such a way that the basic SHA identity always holds, meaning that all classifications in the various dimensions have the same total.

6.4.2 Consolidation

Part of the integration process deals with an activity called consolidation. Consolidation refers to combining assets, liabilities, and other financial items of two or more entities into one single unit. In essence, consolidation merges together the various parts and erases the transactions among these distinct parts, as if all activities relate only to one unit. All revenue is accounted for only once, and all spending as well. This means that the transfers from one part to the other are not taken into account. Adding the amounts from both entities would lead to double counting of revenue (transferred) and spending (transferred). This means that consolidation is much more than just adding together the various parts of a bookkeeping system. In the context of financial accounting, the term “consolidate” often refers to financial statements wherein all subsidiaries report under the umbrella of a parent company (*24*). An example of consolidating the accounts of governmental parts into a single unit is presented in Table 14.

Table 14 Consolidation of units

T- accounts of government units
Territorial government

Expenditure		Revenue	
Grant to local government	10	Tax revenues	100
Other expenditure items	90		
Total	100	Total	100

Government consolidated unit

Expenditure		Revenue	
Territorial spending items	90	Tax revenue	100
Other expenditure items	40	Other revenue	30
Total	130	Total	130

T- accounts of local government units

Local government

Expenditure		Revenue	
Other expenditure items	40	Grants from central government	10
		Other revenues	30
Total	40	Total	100

Source: Own elaboration.

In this simplified example, the territorial government provides a grant of 10 units to the local government. The territorial government receives tax revenues, and the local government collects other local revenues additional to the grant from the territorial government. In a consolidation process, the territorial and local government transactions are combined. This means that the grant given by the territorial government (spending), which is equal to the grant received (revenue) by the local government, will be accounted for only once in the revenue and once in the spending, within the consolidated T account. When they are combined, the amount accounted for as part of the spending (sum of territorial + local government) is also included in the revenues (sum of territorial + local government). Thus, although not visualized specifically, they are integrated as part of other revenue and other spending. De facto, the revenue and the spending is canceled but included once in each side of the account.[18]

This process is also to be performed while analyzing multiple intermediation, wherein the flow involves several actors before it reaches the unit spending it.

Another way of handling a consolidation process is the creation of a matrix (see Table 15) in which all transactions and their relations are presented, leading to an elimination procedure and the same consolidated results (see Table 14).

[18] A T-account is a way of presenting revenue and spending in a bookkeeping format that displays the two sets of transaction totals separately. See World Health Organization. Guide to producing national health accounts: with special applications for low-income and middle-income countries. Geneva: WHO; 2003:146. Available from: https://apps.who.int/iris/handle/10665/42711.

Table 15 Consolidation matrix example

	Territorial government		Local government		Elimination		Consolidated results	
	Spending	Revenue	Spending	Revenue	Spending	Revenue	Spending	Revenue
Tax revenue		100					0	100
Other revenue				30				30
Grants to local government	10			10	-10	-10	0	0
Other items of spending	90						90	0
Local other items of spending			40				40	
Total	100	100	40	40	-10	-10	130	130

Source: Own elaboration.

Questions and answers

1. Q: What is the best way of linking the data to the classification items?

   A: There is no single best way of linking data to classifications. Possible solutions can be found in Excel in combination with visual basic, a database, or the use of the HAPT. WHO promotes the use of the HAPT, which has advantages in terms of consistency in coding and ease of use. However, for some specific problems, Excel or any other means can be used.

2. Q: Is all coding fixed and, if not, what are the levels of freedom the team has?

   A: Coding as such is not fixed, but certain combinations of codes across classifications can be highly unlikely or even conceptually impossible. In the construction of the accounts, a large level of freedom is present. In case of doubt, it is always possible to contact WHO and ask for additional clarifications.

3. Q: What is meant by triangulation?

   A: Triangulation is a term introduced in the construction of SHA 1.0 and means the linking and integration of the data of the three main classifications: HP, HF, and HC. The purpose is to ensure that the same transactions are analyzed in such a way that the total spending in all classifications is the same. In the new SHA, triangulation refers to all classifications that can be integrated in the analysis.

4. Q: What is consolidation and why is it needed?

   A: Consolidation is the process in which two or more units are treated as one, meaning that all transactions between these units are to be treated once. In practice, although not visualized, each amount is included. This is needed to prevent overestimation of total current spending due to double count.

CHAPTER 7

ESTIMATIONS: WHEN AND WHICH?

Health accounts are expected not only to describe the health spending landscape and flows in the country but also to identify the most strategic and policy-relevant health spending issues. Missing or incomplete data can prevent health accounts from complying with these purposes and generate a biased image of flows in the country. Estimations are needed to correct these biases.

Health accounts are built using the available records as much as possible, complemented with primary data collection when needed. Usually, data are generated with different purposes; thus, in most cases the data requested for SHA 2011 are not included or may not be available at the level of detail required for the classifications used.

Estimations are needed for adjustments or when data are missing, incomplete, or unreliable. Health information systems are often difficult to restructure, and primary data collection is expensive in terms of time and resources. Especially to complement and adjust data, estimations have become a usual practice when producing statistics and main aggregates. In national accounts, wherein the most important aggregate is the GDP, many data are estimated. Health accounts have borrowed and built on national accounts experience and procedures.

As SHA aims to be comprehensive, gaps in relevant data need to be filled. When direct measurement is not possible, estimates are generated. More and/or more important estimations require more time. When is the best time to start the estimations needed? This depends on the time available for the accounting exercise and the importance as well as the number of estimations to be made. In general, it is best to start early in the process with the collection of additional data and cooperation and coordination with national accountants and other experts in statistics. Creating estimations to reflect an existing flow involves a process that needs to be supported with data to ensure consistency. Decisions on how to proceed need to consider specific techniques depending on related data.

This section includes a practical introduction to estimations, providing the rationale, requirements, and a general overview of the most frequent approaches used. The section also offers an overview of the related context in which these procedures are used and the data required to perform them.

7.1 Interpolation and extrapolation

> When discontinuous data in time exist, the missing year(s) can be filled using interpolation. Frequently used approaches involve linear and compound growth rates.

In the data collection process, information gaps need to be filled. Filling the gaps through an estimation requires a statistical basis such as the relationship between the gap to be filled and the information used to fill it. For instance, the level or relative weight of that point is likely to be the same as in previous years or is likely to be in line with related information available.

A method frequently used is interpolation of the available data points to address the intermediate missing values. Linear and compound growth rates are the most frequent approaches used in this case. How do they differ? Gap filling using a compound growth rate results in the same percentage increase every year, while gap filling using a linear growth rate results in an identical absolute increase every year. The choice of the approach needs to consider not only the matching of the

values to be linked but also the conglomerate they are part of. When the estimated series are a component of a group of variables of an aggregate, the resulting trend may need to be cross checked by comparing it with the trend of the aggregate.

It is also possible to use macro-related data or another aggregate related to health spending to generate the missing data points (such as OOP spending trends versus private final consumption or social security health spending versus general government health spending).

An example of filling missing years by linear and compound growth rate interpolation is presented in Table 16. A linear approach divides the absolute difference in equal parts over the number of periods to be filled; the compound method uses an equal growth rate across the periods to be filled.

Table 16 Gap filling using linear and compound growth

A	B	C	D	E
2	**Years**	**Data**	**Linear**	**Compound**
3				
4	0	300		
5	1		325	324
6	2	350		
7	Increase year 1		25	24
8	Growth rate year 1		8.2	8.4
9	EXPLANATION			
10	Linear		=(C6 - C4)/2 equals 25 NCU	
11	Compound		=(C6/C4) ^ (1/COUNTA(B5:B6)) equals 8%	

Source: Own elaboration.

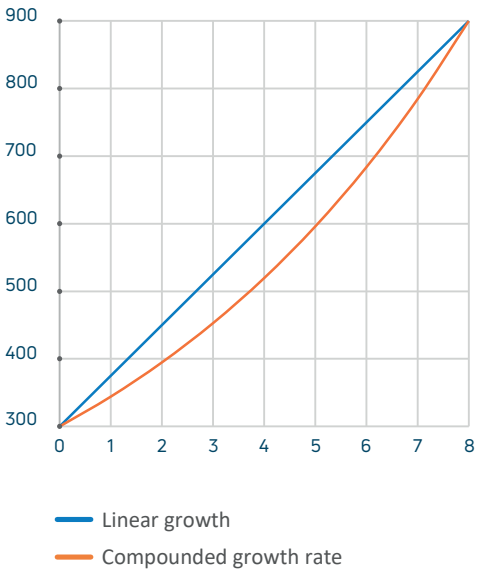
If the number of years to be filled is small (e.g., only one year as in the example above), the difference between a linear average or a compound average is relatively small (Figure 9). In this case, the growth rate for linear gap filling is 8.3% in year 1 (or 25 NCU) and the rate for compound filling is 8.0% (24 NCU in year 1). As the gap is only one year and the difference is relatively small, both can be used. However, as more years need to be filled and the gap becomes relatively large, the difference in linear and compound average becomes bigger. In the latter case, the compound approach appears to be more accurate. In Table 17, an example with a large number of periods (years) to be estimated is used to show the difference between the two methods.

Table 17 Gap filling interpolation using compound growth

A	B	C	D	E
2	Years	Data	Linear growth	Compounded growth rate
3	0	300	300	300
4	1		375	344
5	2		450	395
6	3		525	453
	4		600	520
	5		675	596
	6		750	684
	7		825	785
	8	900	900	900
7	Growth rate year 1		25.5	14.7
8	Growth rate year 8		9.1	14.7
9	EXPLANATION			
10	Linear		=(D11 - D3)/8	
11	Compound		=(D11/D3) ^ (1/COUNTA(C4:C11))	

Source: Own elaboration.

Figure 9 Linear and compound growth compared



In this case, the difference between the two ways of gap filling is more obvious. In the linear model, the growth rate diminishes from 25% in the first year to 9% in the last year, and, of course, the growth rate stays steady at 15% in the compound model. In the linear method, the absolute change on a year-by-year basis is a steady 75 units, while in the compound method this fluctuates and grows with passing years (starting at 44 units and ending in year 8 at 115 units). The year-to-year growth rate using a linear distribution can be especially disturbing.

Before performing an interpolation, it is necessary to verify that no major changes in policy or in the structure and operation of the health system have occurred in the period with the gap; otherwise, a specific analysis of the potential changes is needed. A reference indicator can also be used, as explained below.

7.1.1 Gap filling using a proxy variable

Gap filling provides a reliable result if the series offers quality data. Another related variable for which information is available for the complete time period can be used as a proxy to generate the estimate. In Table 18, another example is given in the process of estimating missing data cells. Details on the process are provided in Box 4. The assumption here is that OOPS is estimated based on a survey that is not available every year. Thus, there is a need for gap filling. Additionally, the levels of the survey results are not aligned as expected, with a continued and progressive higher trend. However, there was not a special policy change in place during the time period (no change in tariffs for user fees, etc.). But there were new medicines, new services, higher prices, and population growth, leading to an increase in health spending and also in OOPS. Is the series displaying an increase from 2010 to 2016 of 80 NCU acceptable followed by a decrease of 70 NCU in 2017? How much is the expected increase across the period?

The macroeconomic scenario in the country is described in the national accounts. The GDP includes the private final consumption (PFC), a component related to household spending. PFC at purchaser current prices contains data on household health spending and, as such, is comparable to data on OOPS. It can be expected that growth in OOPS can be aligned with PFC growth. Moreover, in most cases, health spending increases faster than GDP. Thus, using PFC to project OOPS offers a conservative proxy. The solutions are displayed numerically below.

In cases of dubious data points in the data series, linear or compound growth gap filling is not the best starting point. Dubious data points need to be detected and evaluated. A possible solution can be to consider the inclusion of a "break in series"[19] (*25*) and not to use the available dubious data points of the variable to be estimated. A break in series implies that the data are not adjusted or estimated but are left with a major difference and a note indicating the reason. However, the periods before and after the break in series need to be completed.

[19] Breaks in statistical time series occur when there is a change in the standards for defining and observing a variable over time. Such changes may be the result of a single change or the combination of multiple changes at any one point in the time of observation of the variable. See reference 30.

Table 18 Gap filling using proxy variable

A	B	C	D	E	F	G	H	I
2	Year	OOP	PFC	PFC year-to-year growth	OOP using PFC year-to-year growth	Difference between OOP using PFC and OOP in 2021 distributed	Cumulative difference	Result for OOP based on PFC
3	2010	100	500		100	112	0	100.00
4	2011		505	1.01	101	113.5	1.53	102.53
5	2012		510	1.01	102	115.1	3.08	105.08
6	2013		520	1.02	104	116.6	4.65	108.65
7	2014		530	1.02	106	118.2	6.24	112.24
8	2015	150	535	1.01	107	119.9	7.85	114.85
9	2016	180	540	1.01	108	121.5	9.49	117.49
10	2017	110	541	1.00	108	123.1	11.14	119.34
11	2018		543	1.00	109	124.8	12.82	121.42
12	2019		546	1.01	109	126.5	14.52	123.72
13	2020		550	1.01	110	128.3	16.25	126.25
14	2021	130	560	1.02	112.0	130.0	18.00	130.00
15								
16	Compounded rate all years	1.02	1.01					
17	**EXPLANATION**							
18	OOP compounded rate	1.02 = (C14/C3) ^ (1/COUNTA(B4:B14))						
19	PFC compounded rate	1.01 = (D14/D3) ^ (1/COUNTA(B4:B14))						
20	Yearly difference between OOP and OOP based on PFC in 2021 using OOP and compounded PFC					1.01		
21	Yearly difference between OOP and OOP based on PFC in 2021 using OOP and compounded PFC					101 = (C14/F14) ^ (1/COUNTA(B4:B14))		
22	Resulting column G for each year; here 2021					130.0 = G13 * $G$20		
23								
24	Cumulative difference in column H; here for 2021						18.00 = H13 + G14 - G13	
25	Result in column I							130.00 = F14 + H14

Source: Own elaboration.

In this example, OOP clearly has a few outliers that are not trusted. In this case, it was decided to use the growth rate of private final consumption (PFC) of national accounts as a proxy (column F). However, the growth rate of PFC is not high enough to reach the trusted OOP spending number in 2021 (in column C), so the difference between the OOP of 130 units and the calculated OOP based on PFC (112 units) is distributed using a compound rate (in column G). Accumulating the compound rate difference (column H) and adding it to the OOP according to the growth of PFC provides the growth pattern of PFC and a reliable OOP result (in column I). A more detailed explanation is given in Box 3.

Box 3 Explanatory note for Table 18: Gap filling using proxy variable

The start is OOP, which has a break in series in 2015–2017 but without any real reason.

The data on PFC are continuous but different in the year-by-year change in percentages; the compound growth rate on PFC is 1.01 per year over the period.

Column F is created using OOP for 2015 and consecutive years in combination with the year-to-year growth rate of PFC. The resulting OOP in 2021 reaches a value of 112 NCU, while the valid OOP as presented in column B should

be 130 NCU, a difference of 18 NCU over the period 2010–2021. This difference of 18 NCU results in a cumulative additional growth change of 1.01, which will be distributed as shown in column G. The absolute cumulative values to be added to the data in column F are shown in column H.

The final result is presented in column I as the sum of column F and column H.

7.1.2 Gap filling using multiple sources of information

In many cases, gaps need to be filled in spite of partial availability of financial information. In the example in Table 19, some classes of medical goods are lacking data, so additions must be made to complete the components of the functional category HC.5 Medical goods according to the SHA 2011 methodology. The explanation of the procedures is offered in the table.

In the first data columns, the available information is presented. The usual data sources include the Household Budget Survey (HBS; column D), which is not always available every year and sometimes lacks the details needed as per SHA classifications. Additionally, national accounts consumption spending for the health branch and national accounts production statistics data are used (columns E and F, respectively). An explanation (column G) is added as well as columns on the use of the data in the remainder of the estimation process.

Consumption data are integrated in the national accounts using all information available related to production and consumption of all branches, and as such this is the best information available at a national level and also for medical goods. The HBS data refer only to consumption without a counterpart on production, and as in other surveys they include sampling and non-sampling errors. When available, HBS data are integrated in the consumption spending information in national accounts. Production and consumption data are integrated.

NA data are presented as a first step in column H. In this column, the production statistics of national accounts are presented for some missing cells (for details of HC.5). These data are adjusted to represent purchaser prices instead of the basic prices used in national accounts statistics.

In a second step (column I), the shares of the HBS are related to the levels of national accounts data. This concerns HC.5.1 Pharmaceuticals and other non-durable goods and HC.5.2 Therapeutic appliances and other medical durable goods. In brief, the procedure followed (explained in column J) includes the share of the HBS for the corresponding component of medical goods purchased by households multiplied by the national accounts total on consumption of medical goods (see the description column, J, after step 2).

In step 3 (column K), the data created in step 2 are combined with the data in step 1. In step 4 (column L), estimations are introduced for those items for which no expenditure or national accounts data are available. This relates to HC.5.1.1 Prescribed medicines and HC.5.2.9 All other medical durables (in this case including hearing aids and other orthopedic appliances, etc.). In the column of additional information (column M), it is explained how the data for these items are estimated. Finally, in step 5 (column N), the results of steps 3 and 4 are combined, providing the complete picture for this example.

Table 19 Gap filling using multiple sources

A	B	C	D	E	F	G	H	I	J	K	L	M	N
2		**Classification of HC functions**	**HBS health**	**NA (consumption health)**	**NA (production health)**	**Explanation**	**Estimation step 1: use NA data in line with HC classes**	**Estimation step 2: adapt HBS to NA data**	**Description/explanation**	**Estimation step 3: combine data of step 1 and step 2**	**Estimation step 4: fill in gaps**	**Additional information**	**Estimation step 5: combine step 3 and step 4**
3	HC.5	Medical goods (non-specified by function)	600	700			700	247	NA medical goods at purchaser price is assumed to be the best; so 700 NCU	700			700
4	HC.5.1	Pharmaceuticals and other medical non-durable goods	400						NA consumption: HC.5/HBS – HC.5 * HBS – HC.5.1; E3/D3 * D5; 467 = 700/600 * 400	467			467
5	HC.5.1.1	Prescribed medicines									432		432
6	HC.5.1.2	Over-the-counter medicines			35	Sales by pharmacies	35		Assumed: Pharmacy sales = NA production at purchaser prices; H6 = F6; 35 = 35 NCU	35			35
7	HC.5.1.3	Other medical non-durables											
8	HC.5.2	Therapeutic appliances and other medical durable goods	200					233	NA consumption: HC.5/HBS – HC.5 * HBS – HC.5.2; E3/D3 * D8; 233 = 700/600 * 200	233			233
9	HC.5.2.1	Glasses and other vision products			150	Sales by opticians	150		Assumed: Optician sales = NA production at purchaser prices; H9 = F9; 150 = 2150 NCU	150			150
10	HC.5.2.2	Hearing aids											
11	HC.5.2.9	All other medical durables									83	All other medical durables is remainder of HC.5.2; L11 = K8 – K9; 83 = 233 – 150	83

Source: Own elaboration.

Something to keep in mind when using NA production data is the difference in basic prices (the standard valuation in SNA for production) and purchaser or consumer prices (used in SHA). The difference might be explained by not only the value added tax (VAT) but also the transport and trade margins of wholesale and retail sellers. These account for the difference between basic and purchaser prices.

7.1.3 Extrapolation

Extrapolation is closely linked to interpolation. The difference is that interpolation refers to creating missing data between two data points and extrapolation refers to creating missing data points before the first one or after the last one. Extrapolated data points are created outside the available series.

Methods to generate extrapolated data are close to those used for interpolation. The requirement is to have at least one data point, but preferably a series. The extrapolation is based on growth rates, such as those used for interpolation, applied to the last value available. It can also be used in a reference series, such as in interpolation (e.g., as shares of the reference series). For a more detailed explanation, see the available PAHO material (*26*). An example applying interpolation and extrapolation to OOPS estimates is presented in Chapter 9.

Various other methods are available to estimate missing data points. Below specific examples of apportioning, imputing, and indirect estimation are introduced as alternative estimation methods.

7.2 Imputing with indirect estimations

> Transactions can be estimated using complementary data from similar services and/or similar departments of facilities.

Estimation methods create a monetary value for an existing transaction through accounting rules and available records (*27*). An example can be found in goods and services that are supplied by producing units even when they do not receive value (money) in exchange. Thus, a transaction is clearly present, but without a monetary exchange involved. Although there is no financial transaction, an exchange of values is present, which is monetized.

In the example shown in Table 20, the hospital and the neighboring nursing home have an integrated kitchen located in the hospital. The kitchen prepares the meals for the hospital and for the nursing home. The total kitchen cost of 15 000 NCU relates to a total of 10 000 meals, resulting in an average meal “price” of 1.5 NCU. This means that the nursing home receives a calculation bill for 4800 meals at a cost of 1.5, resulting in 7200 NCU.

Table 20 Estimation of kitchen services

A	B	C	D	E	F
2	**Hospital and nursing home integrated kitchen spending**				
3		**Number of meals**	**Spending**	**Price per meal**	**Description**
4	Specialized meals	7500			
5	General meals	2500			
6	Total number of meals produced	10 000			
7	Total kitchen costs		15 000	1.5	=D7/C6; 15000/10000 = 1.5
8	Delivered to the nursing home unit		Estimated cost		
9	Specialized meals	4000	6000		=C9 * E7; 4000 * 1.5 = 6000
10	General meals	800	1200		=C10 * E7; 800 * 1.5 = 1200
11	Total number of meals delivered	4800	7200		

Source: Own elaboration.

In the example in Table 21, using different valuations for the two kitchen services, the management of the hospital concludes that the specialized meals prepared cost double the amount of time and ingredients than the normal standard meal. In other words, 7500 specialized meals are equivalent to 15 000 normal meals. Keeping this difference in mind, the equivalent price per meal results in 0.92 NCU (15 000 NCU divided by 16 250 equivalent meals; see cell E8). The calculated "price" of a normal meal is 0.92 NCU (cell E11), and the "price" of a specialized meal is 1.85 NCU (cell E12). The resulting internal bill for the nursing home is 8123 NCU (in cell F13; adding together 800 * 0.92 = 738 and 4000 * 1.85 = 7385).

In comparison with the original estimation, the nursing home receives a bill that is 923 NCU higher (8123 – 7200).

Table 21 Estimation of general and specialized kitchen services using different meal prices

A	B	C	D	E	F	G	H
1	**Hospital and nursing home integrated kitchen spending (different pricing procedure)**						
2		Number of meals	Spending	Price per equivalence meal	Total cost per type of meal	Description/explanation	
3	General meals	1250			1154		
4	Specialized meals*	7500			13 846		
5	Specialized meals equivalent to general meals	15 000				=C4 * 2; 7500 * 2 = 15000	
6	Total equivalent meals	16 250				=C3 + C5	
7							
8	Total kitchen costs (NCU)		15 000	0.92	15 000	=C6/D8; 16250/15000 = 0.92	=F3 + F4; 1154 + 13846 = 15000
9							
10	Delivered to the nursing home unit		Estimated cost				
11	General meals	800	738	0.92		=C11 * E8; 800 * 0.92 = 738	=D11/C11; 738/800 = 0.92
12	Specialized meals	4000	7385	1.85		=C12 * E8*2; 4000 * 0.9 + 2 * 2 = 7385	=D12/C12; 7385/4000 = 1.85
13	Nursing home estimated cost total		8123		8123	=D11 + D12; 738 + 7385 = 8123	
14	* Specialized meals cost double the general meal.						

Source: Own elaboration.

7.3 Estimation using working time

> Imputing a value when no records of a transaction are available can be done using the main inputs involved. In health care, often the human resource is the key factor.

Estimation of a monetary value where no records for the data points are available (*18*) may involve an "educated guess" about reality based on external information and experience. Existing records of a similar transaction can be used, but from another (related) provider or service. The assumption is that the structures are equivalent. Records in another unit or institution (e.g., vaccination in a hospital in region A as in the example below) can be used when they are considered "similar" or a good proxy.

An example is provided in Table 22. Records available in a hospital in region A include data on the number of vaccinations and the hours worked. In hospital B, the records include a total number of vaccines used and an hourly wage rate for nurses. A calculated number of vaccinations per hour in region A results in an average unit time in that hospital, which is assumed to be a good proxy for the time used in the hospital in region B. This unit time is applied to the total number of vaccinations performed in the hospital in region B to estimate the total time used in vaccination. As the average hourly wage in the hospital in region B is available, a calculation of spending on the vaccination program can be made. The resulting spending of 1440 NCU is assumed plausible.

Table 22 Estimating vaccination spending

A	B	C	D	E	F	G	H
2	**Region A**						
3		Used number of vaccines	Number of hours worked in vaccination	Estimated vaccinations used per hour		Description	
4	Vaccination in hospital A	15 000	80	188		Estimated time used per vaccination	=C4/D4; 15000/80 = 188
5	**Region B**						
6		Used number of vaccines	Number of hours worked in vaccination*	Hourly wage in hospital		Description	
7	Total number of vaccinations	9000	48	30		Estimated number of hours	=C7/E4; 9000/188 = 48
8	Imputed spending on vaccinations				1440		=D7 * E7; 48 * 30 = 1440
9							
10	* Estimation using estimated number of vaccinations per hour in Region A						

Source: Own elaboration.

Different situations may involve the need of an estimated value. They include social, environmental, and other sectoral information of relevance to complement the SHA estimates, even when these are not part of the health spending scope. An example is presented in Table 23, related to household health care provision of a family member with no reimbursement or payment involved. In this case a health service is provided, but without a transaction or an associated record as there is no exchange of value in cash or in kind. In SHA 2011, such values are out of the boundary due to the lack of transaction; when relevant, however, they can be included as "below the line items" (see Section 3.1).

In some LAC countries, such as Mexico and Brazil, there have been explicit demands of researchers and policymakers for SHA-based data on household unpaid work in health care. This topic may gain increasing importance, given that long-term care (LTC) in these countries relies on family members' care and monetary valuation of this work may be relevant for public policy formulation.

Table 23 Estimating unpaid household care

A	B	C	D	E	F
2	**Household home and social care: HC.3.4 and HCR.1.1**				
3		Remuneration (in NCU)	Estimated number of hours worked	Estimated hourly wage	Description
4	Household home care (remunerated)	1000	50	20	=C4/D4; 20 = 1000/50
5	Household home care (not remunerated)		35		
6	Total number of hours worked		85		
7		Estimated expenditure			
8	Household home care (not remunerated)	700			=D5*E4; 700 = 35 * 20

Source: Own elaboration.

In the example used here (see Table 22), households are getting a remuneration of 20 NCU per hour for 50 hours per quarter worked to take care of a family member. The additional (30) hours are not remunerated as these are located outside of the health system, but social security would want to have an estimate of the costs related to this non-remunerated part. Assuming the hourly wage per quarter is a good proxy, the cost would increase by 700 NCU (35 hours at an average wage of 20 NCU) if this social care is remunerated by the social department.

7.4 Apportioning

Apportioning is a proportional type of distribution, and it can also be used for gap filling.

Apportioning is defined as dividing, distributing, or assigning appropriate shares of an aggregate (*28*). In Table 24, an example of apportioning is presented. Administration spending of health care providers should be included as part of the service delivery package. Thus, expenditure on administration of health facilities needs to be attributed to the services packages or departments of the health facility to ensure that all spending is accounted for.

Table 24 Apportioning hospital administration expenditure

A	B	C	D	E	F	G	H
2	**Hospital data**		**Spending**	**Shares in total**	**Shares without administration**	**Administration distributed**	**Explanation**
3	**Inpatient**						
4		General care departments	20 000	11.0	11.6	21 163	=F4/100 * D13+D4; 11.6/100 * 10000 + 20000
5		Specialized care departments	35 000	19.2	20.3	37 035	=F5/100 * $D$13 + D5
6		ICU	65 000	35.7	37.8	68 779	=F6/100 * $D$13 + D6
7							
8	**Outpatient**						
9		General care departments	12 000	6.6	7.0	12 698	=F9/100 * $D$13 + D9
10		Specialized care departments	24 000	13.2	14.0	25 395	=F10/100 * $D$13 + D10
11		Emergency room	16 000	8.8	9.3	16 930	=F11/100 * $D$13 + D11
12							
13	**Administration**		10 000	5.5			
14							
15	**Total hospital spending**		182 000	100.0	100.0	182 000	=SUM(G4:G13)

Source: Own elaboration.

In this example, the spending of the administration of the hospital is to be attributed or apportioned to the various departments providing services to the patients. For this apportioning, the shares of spending of the departments are used as a "distribution key" for "administration." This means that the amount spent on hospital administration is divided between all of the departments of the hospital based on the relative importance of their spending, excluding administration (to be distributed) from the total. This results in an equivalent increase for those departments. The total spending of the facility does not change, but administration is embedded in the various departments. For example, the share of estimation of administration spending for the "general inpatient care department" is 11.6% (see cell F4), which leads to an additional spending for this department of 1163 units, resulting in a total amount of 21163 units (see cell G4).

7.5 Creating split rules for detailed classification items

When detailed data are not available or not complete, distribution keys can be used to create a plausible split or distribution of the aggregate.

Related to the definition of apportioning is "allocation." Allocation is defined as assigning an amount for a specific purpose (or purposes). Allocation uses in many instances what is called an "allocation key." An allocation key is defined as a measure or indicator to apportion an aggregate

into its components. Formally, allocation keys are used to distribute, estimate, adjust, or weight values derived from an aggregate. Examples are presented below and in Chapters 8, 9, and 10.

Depending on the data sources, their level of detail, and their starting point in the accounting process, distributions may be necessary in any of the classifications of SHA 2011 for which keys may be developed.

Various sources of information and their possible use in SHA classifications and distributions are presented in Table 25.

Table 25 Most used sources for distribution keys and estimation of spending

	Financing classifications				Other classifications				Remarks
	FS.RI	**FS**	**HF**	**FA**	**HP**	**HC**	**FP**	**DIS – depending on detail**	
Utilization data report					HP	HC – depending on detail	?	DIS – depending on detail	
Provider report – financial					HP	HC – depending on detail	FP – depending on detail	?	Used for distribution keys and estimation of spending
Provider report – non-financial					HP	HC	FP	DIS	
Central bank report – insurance and trade	?	?	?	?	HP – depending on detail	HC – depending on detail	?	?	
OECD CRS report	FS.RI	FS	HF	FA	?	HC – depending on detail		DIS – depending on detail	
Tax report/data	?	?	?	?	HP	HC – depending on detail	FP – depending on detail and HP	?	
Central pharmacy report and IMS/IQVIA	?	?	?	?	HP	HC	FP – depending on detail	DIS – by ATC	
Business survey/ data					HP	HC – depending on detail	FP – depending on detail		
Earmarked data flows, e.g., HIV	FS.RI	FS	HF	FA	?	?		DIS	
Costing studies	?	?	?	?	HP – depending on detail	HC – depending on detail	FP – depending on detail	DIS – depending on detail	
Cost of Illness (COI) report	?	?	?	?	HP – depending on detail	HC – depending on detail	?	DIS depending on detail	
NA consumption data - SUT		FS	HF	FA	HP	HC	?		Used for estimation
NA employment data					HP – depending on detail	HC – depending on detail	FP – depending on detail	DIS – depending on detail	Used for distribution keys and estimation of spending
NA price and quantity information					HP – depending on detail	HC – depending on detail	?	?	Used for distribution keys and estimation of spending
NA trade data					HP – depending on detail	HC – depending on detail	FP - depending on detail	DIS – depending on detail	Used for distribution keys and estimation of spending
? = possible or partly; blank = no									

Source: Own elaboration.

Because the most detailed data are usually available for the financing dimension, split rules or divisions in this area are scarcely needed or are relatively simple. For instance, the split of social security revenue by contribution areas can be made based on legislation showing shares of contributions by employees, employers, and the government, when relevant. For providers (HP) and for functions (HC) and diseases (DIS), splits may need to be developed more often (see also Chapter 9). For HC splitting rules, data on activities can be used. However, if detailed data on diseases are available, these can be used to relate them to functions. Disease data may also be linked to sales by various retail organizations. General rules for a split decision are difficult to establish because they depend on the data available. In general, days of stay, hospital beds, and occupancy rates can be used to create a view on inpatient care in hospitals. Then, combined with data on outpatient visits and related patient data, a split in HC.1.1 (inpatient curative care) and HC.1.3 (outpatient curative care) can be provisionally made. Sales by retailers can be directly used to link to pharmaceuticals or other medical goods such as glasses and hearing aids to providers and/or functions.

On the other hand, if very detailed information is available on the use of the services (e.g., provided by insurance companies and social insurance institutions), the HC distribution may be easily constructed, but the provider classification (HP) might pose some problems, for which a combination of other data may be needed. Data on pharmaceutical use can be located not only in pharmacies and hospitals but in many cases also in drugstores and supermarkets. National accounts data on supply and use can be helpful to get an idea of the relative importance of at least pharmacies (and to a lesser extent drugstores and supermarkets) but much less so hospital use of medicines and medical products. A combination of sources is needed in such cases.

Based on a detailed set of financing information, the analyst may again perceive the need to search for information helpful in the creation of provider split rules as well as functional classification details. An example of this process is given in Table 26. The explanatory notes related to the decisions made are provided in Box 4. Completion of the process involves a stepwise approach usually requiring more than one cycle of accounting.

Table 26 Split rule for HC: Functions based on provider information and general data

A	B	C	D	E	F	G	H	I
2	**Ministry of Health**							
3	1. Number of hospital beds	100						
4	2. Number of inpatient days	7000						
5	3. Number of outpatients	11 000						
6	4. Number of doctors	500						
7	5. Number of nurses	1500						
8	**Hospitals**							
9	Total turnover (units in NCU)	150 000						
10								
11	**Additional information based on:**							
12	WHO research	1 outpatient represents 5 outpatient visits						
13	National costing study	4 outpatient visits represent 1 inpatient day						
14	Time use surveys	Doctors spent 40% of their time on inpatients						
15		Nurses spent 90% of their time on inpatients						
16	**National accounts information**							
17	Average yearly hours worked	Hours per person per year	Number of persons		Annual salary sum			
18	Doctors: 50 weeks; 50 hours per week	2500	30		79500			
19	Nurses: 40 weeks; 30 hours per week	1200	200		45000			
20	**Calculations**							
21	**Estimation and distribution**	**Inpatient (IP) curative care**	**Outpatient (OP) curative care**			Inpatient (IP) curative care	Outpatient (OP) curative care	

A	B	C	D	E	F	G	H	I
22	Inpatient equivalences	7000	13.750	20 750		=C4; 7000	=C5*5/4; 5/4 * 11000 = 13750	
23	Doctors working time	30 000	45.000	75 000		=C28 * C18 * D18; 0.4 * 2500 *30 = 30000	=D28 * C18 * D18; 0.6 * 2500 * 30 = 45000	
24	Nurses working time	216 000	24.000	240 000				
25				315 000				
26	**Shares for IP and OP calculations**					IP curative	OP curative	
27	IP equivalences	0.34	0.66			=C22/E22; 7000/20750 = 0.34	=D22/E22; 13750/20750 = 0.66	
28	Doctors working time cost	0.4	0.6			=C23/E23; 30000/75000 = 0.4	=D23/E23; 45000/75000 = 0.6	
29	Nurses working time cost	0.9	0.1			=C24/E24; 216000/240000 = 0.9	=D24/E24; 24000/240000 = 0.1	
30								
31	**Total hospital**							
32	**Remainder to be distributed based on equivalence in IP days**							
33		**Spending**	**Inpatient (IP) curative care**	**Outpatient (OP) curative care**		Spending	Inpatient (IP) curative care	Outpatient (OP) curative care
34	IP equivalences							
35	Doctors working time cost	79 500	31 800	47 700		=F18; 79500	=C28 * C35; 0.4 * 79500	=D28 * C35; 0.6 * 79500 = 47700
36	Nurses working time cost	45 000	40 500	4500		=F19; 45000	=C29 * C36; 0.9 * 45000 = 40500	=D29 * C36; 0.1 * 45000 = 4500
37	Total hospital turnover	150 000				=C9; 150000		
38	Remainder to be distributed based on equivalence in IP days	25 500	8602	16 898		=C37-C35-C36; 150000 - 79500 - 45000 = 25500	=C22/E22 * C38; 7000/20750 * 25500 = 8602	=D22/E22 * C38; 13750/20750 * 25500 = 16898
39								
40	Total	150 000	80 092	69 098		=SUM(C35:C36,C38)	=SUM(D35:D36,D38)	=SUM(E35:E36,E38)
41	Check				150 000			

Source: Own elaboration.

Box 4 Explanatory note for Table 26. Split rule for HC: Functions based on provider information and general data

The start is the data as presented in rows 2 to 19 for the MoH and additional sources.

The first part of the calculation deals with the equivalent data calculation of IP and OP.

For this, the data on equivalent values as calculated by WHO and the time use surveys are used (see rows 22 – 24). Overall, 1 outpatient represents 5 outpatient visits, and 4 outpatient visits represent 1 inpatient day; thus, 11 000 outpatients are equivalent to 11 000 * 5 (visits per patient)/4 (visits representing 1 IP day) = 13750 IP days. This means that IP represents 34% of the equivalent IP days (7000/20750) and OP refers to 66%, (13720/20750).

These data are for the shares of IP and OP and are shown in rows 27 – 29.

The salary sum of 124 500 (79500 + 45000) is distributed across IP and OP using the shares in working time by IP and OP departments of doctors and nurses. Doctors' and nurses' earnings are to be distributed across IP and OP (see lines 23 and 24). Thirty doctors work 2500 hours each annually (75 000 hours in total), of which 40% is dedicated to inpatients, resulting in a share of 30 000 hours. For OP, the total is 45 000. For nurses, a similar calculation can be made (216 000 hours in IP [see cell G24] and 24 000 in OP [see cell H24]).

The earnings of doctors (79 500 NCU) and nurses (45 000 NCU) are distributed among IP and OP using the relative shares of each in the IP and OP departments. Doctors spent 40% on IP and 60% on OP, resulting in a cost of 31 800 NCU for IP and 47 700 NCU for OP (79 500 in total). For nurses, a similar estimation is made (see rows 35 and 36).

The remainder of 25 500 (150000 – 124500) is distributed using the equivalent values of IP and OP shown in row 22. For IP 34% is calculated, amounting to 8602 NCU; the OP total is 16898 NCU (see row 38).

The completed distribution between IP and OP is shown in row 40.

Additional examples can be created in a similar way for, among others, the following topics:

a. HC based on HP or HF

b. HP based on HC and HF

c. HF and FS based on HP, SUT, etc.

7.6 Separating curative care in general and specialized services

A split of the function cure in general and specialized care can be very useful for a variety of classifications such as providers, functions, and diseases. It can also facilitate efficiency analysis. Such a split needs more detail but can be estimated with a high level of plausibility. Data on utilization and resource use are needed.

In SHA 2011, inpatient and outpatient curative care is detailed into general and specialized types of care. A split may require additional data. A few billing systems can be distinct (without being exhaustive):

(a) a fee for service in which every activity is separately billed

(b) a package of services or bundles of care

(c) a system based on DRGs (diagnostic related groups)

In a fee for service, there is no need for splitting as all activities are separately available. In the other two processes, splitting rules may be created. Depending on the content of the packages and the DRGs, a split may be necessary on IP and OP curative care before a split in general and

specialized shares can be made. A package of services usually relates to an IP or an OP set of curative activities; a DRG, on the other hand, can contain both IP and OP types of services, which makes a split in general and specialized care more difficult. Examples of the use of equivalent data calculation are presented in Tables 24, 26, and 27 (see also Table 38).

The example here for demonstration purposes uses the maternity ward as a starting point (see Table 27). The maternity ward is responsible for all types of delivery as well as the prepartum and postpartum checks. The spending of the ward is calculated by the bookkeeping department as amounting to 12 000 NCU. A specific study executed recently showed that every delivery on average required at least 10 prepartum checks and 1 postpartum check. Eight OP checks represent the value of one IP day. Moreover, another study revealed that complicated deliveries are 3 times more expensive than a normal delivery day.

Combining all of this information results in an average cost of 29 NCU (2864/100) for a normal delivery and 183 NCU for a complicated delivery (9136/50), both types including the expected prepartum and postpartum checks in the OP department. For a more detailed description, see Box 5.

Table 27 Splitting maternity ward into general and specialized care

A	B	C	D
2	**Information**	**Data**	**Explanation**
3	***Basic information***		
4	Expenditure maternity ward	12000	
5	Number of IP days	450	
6	***Maternity ward: number of services***		
7	- Number of normal deliveries	100	
8	- Number of complicated deliveries	50	
9	- Number of pre- and postpartum checks (OP visits)	500	
10	***Maternity ward: number of IP days***		
11	- Number of normal deliveries	200	
12	- Number of complicated deliveries	250	
13	***Equivalence***		
14	OP visits equivalent to normal IP day	8	
15	Complicated deliveries equivalent to normal delivery days	3	
16	***Calculations***		
17	OP checks equivalent to IP days	62.5	
18	Complicated delivery days equivalent to normal delivery days (expenditure)	750.5	
19	Total normal IP days equivalence	1012.5	
20	"Price" per equivalent IP day	11.85	
21	***Estimated expenditure***		
22	Normal deliveries	2370	
23	Complicated deliveries	8889	
24	OP pre- and postpartum checks (visits)	741	
25	Check	12000	
26	***Estimated expenditure - including pre- and postpartum checks (visits)***		
27	(assuming each delivery has the same number of checks)		
28	Average OP check (visit) per delivery	3.3	=C9/(C7 + C8); 500/(100 + 50) = 3.3
29	"Price" per OP check (visit)	4.94	=C24/C9 * C28; 741/500 * 3.3 = 4.94
30	Normal deliveries	2864	=C7 * C29 + C22; 100 * 4.94 + 2370 = 2864
31	Complicated deliveries	9136	=C8 * C29 + C23; 50 * 4.94 + 8889 = 9136
32	Check	12000	=C30 + C31; 2864 + 9136 = 12000

Source: Own elaboration.

Box 5 Explanatory note for Table 27: Splitting maternity ward into general and specialized care

This box explains some specific issues related to the distribution in general and specialized curative care in the maternity ward. The basic information is presented in rows 4 to 16.

The first set of calculations refers to equivalent data, shown in rows 17 to 20; the basic expenditure calculations are shown in rows 22 to 24. To calculate the OP visits into equivalent IP days, the number of visits in row 9 (500) is divided by the number of visits representing one IP day (8 visits; row 14), resulting in equivalent IP days of 62.5. A similar calculation is made for the equivalent data of complicated deliveries in row 18. Together with the normal deliveries, these estimations result in a total of equivalent IP days of 1012.5 (see row 19). The average "price" per equivalent IP day results from the total spending of the ward and the number of IP days (12 000 NCU/1012.5 days = 11.85 in row 20). The next few rows show the basic estimations of deliveries and checks. For example, normal deliveries have an estimated spending of 2370 (200 * 11.85; see row 22). The other two rows present similar calculations for complicated deliveries and prepartum and postpartum checks.

However, prepartum and postpartum checks are related to deliveries, so a separate additional calculation is made to distribute these checks across normal and complicated deliveries. This is shown in rows 28 to 31. The basic information in rows 7 to 9 allows a calculation of an average of 3.3 checks for each delivery. Combining the average number of checks (3.3; row 28), the total number of checks (500; row 9), and estimated spending on OP checks (741; row 24) results in an average "price" of an OP check of 4.94 NCU (row 29). The estimated spending on normal deliveries (row 22) of 2370 NCU supplemented by the calculated spending on checks of 493.8 (100 * 4.94) results in an estimated total spending for normal deliveries of 2864 NCU (row 30). For complicated deliveries, a similar calculation can be made (resulting in 9136 NCU; row 31).

Check rows on the totals are included in the various stages of estimations (row 25 and row 32) to ensure that the totals as calculated are identical to the original starting amount of spending of 12 000 NCU.

Questions and answers

1. Q: Why is gap filling needed? Is it not possible just to skip a missing data point?

   A: It is always better to estimate a data point than leaving it blank. As health accounts are estimated for a year, a missing data point distorts the structure of the spending. In this respect, any missing data point is to be estimated if no data can be retrieved. A hierarchy on the priority of gap filling is related to the amount and policy relevance.

2. Q: What are split rules, why are they important, and when to make them?

   A: Split rules relate to the separation of classification items in various components; e.g., a provider such as a hospital delivers not only inpatient services but most likely also outpatient services. If not all of the details in spending for all types of inpatient and outpatient services are available, splits have to be introduced. It is not acceptable in this case to attribute all hospital spending only to inpatient services. See the corresponding section above on how to perform the splits. The best procedure can be selected in cooperation with experts in the field and at the time the data collection process is starting.

CHAPTER 8

DATA HANDLING PROCEDURES

The expected quality of health accounts includes completeness without double counting or data gaps. In this chapter, specific procedures are described related to basic data handling such as double counting avoidance and multiple intermediation accounting, but also changes from fiscal to calendar year and weighting results. This last topic is treated in the next paragraph.

8.1 Weighting results

When data on the full universe are not available, weighting methods can be used to take account of special circumstances or compensate for distorting factors in the results.

Weighing and weighting. Weighing is the process of measuring the relevance of the spending under analysis (*29*). Weighting is used to give some elements more influence or "weight" on the result than other elements in the same set. Weight functions occur frequently in statistics and analysis (*30*) related to surveys and sampling regardless of the technique used in health data collection (see Box 6) (*31–33*).

It is nearly impossible to obtain complete data for all of the surveyed units. Therefore, an additional effort on completing and having reliable data is necessary. This process is usually achieved through weighting. Weighting can be described as complementing survey responses to account for entities that either were not surveyed or did not return a complete response. The basis is considering certain characteristics and the results of the responding units. These characteristics can be as simple as the number of units and as complicated as the number of full-time-equivalent personnel, value added, turnover of the unit, or any combination thereof.

Box 6 Sampling

Traditionally, statistics deals with census and sampled data. For sampled data, a traditional overview can point to probabilistic and non-probabilistic sampling. The current trend, due to a lack of resources to perform sampling as required, has been the emerging field of small sampling.

The sample is the specific group of the population, be it persons, corporations, institutions, or other entities.

In the case of health accounting related to data collection on institutions, most common is a voluntary response sample, as in many countries it is not obligatory for market and non-market providers or financing institutions to report on their health spending. This indicates the importance of collaboration with all relevant stakeholders.

> *Probability* sampling involves random selection, aiming to identify the distribution and assigning equal probability to each unit in the universe to be measured. Examples are simple random sampling, systematic sampling, stratified sampling, and cluster sampling.
>
> *Non-probability sampling* involves non-random selection based on convenience or other criteria (e.g., ensuring that the "big fish" are included), notably given that spending is not normally distributed. Examples are convenience sampling, voluntary response sampling, purposive sampling, and snowball sampling.
>
> *Small sampling* can be needed if target groups are small or hard to access or data collection entails prohibitive costs. Methodological solutions for small sample sizes are developing rapidly, and software implementations of these methods are becoming increasingly available.

Any survey is recognized to have basic problems related to sampling, design, implementation, and so forth, which are expected to be analyzed to the extent possible to prevent/correct them. These are called sampling and non-sampling errors. A sampling error is a deviation in the sampled value versus the true population value due to the fact that the sample is not representative of the population. A non-sampling error is an error that occurs during data collection, causing the data to differ from the true values and not be related to the chosen sampling technique.

Some examples of weighting modalities:

1. Weighting based on the number of units in the population.
2. Weighting based on the indicative size of the number of units.
3. Weighting based on the number of employees (head counts).
4. Weighting based on the number of full-time equivalents.
5. Weighting based on value added.
6. Weighting based on turnover.

In the HAPT, weighting modalities are introduced to create a more concise picture of the surveyed group. These groups relate to NGOs, insurance companies, and employers. But it is obvious that, for other groups such as donors, providers, and government units, a complement of the data collection may be necessary. Weighting can be performed outside the HAPT.

Whichever weighting process is followed, it is the job of the health accountant in combination with experts in the field (in this case, the experts in the surveying units) to create an adjustment as close as possible to reality. In Tables 28 to 32, various ways of using data weighting are shown as examples, from a very simple to a more complicated way.

Example 1

The simplest way of weighting is using average health spending of the response and multiplying it by the number of units in the universe, although this provides a very unsatisfactory outcome because the number of responses is not characteristic of the units in the universe.

Table 28 Weighting based on the number of units in the universe

A	B	C	D	E	F
2	**Universe of units**	**Sample response**	**Estimated average spending per unit**	**Estimated total**	**Explanation**
3	100	3	300	3000	=B3 * D3; 10 * 300 = 3000

Source: Own elaboration.

Example 2

The process can be refined. In the example below, three groups are created (or a larger number of groups) for which the criteria for each group are to be decided. It is assumed that some of their characteristics are similar. The three groups (derived from a survey of employers), with distinct characteristics from each other, are Group 1: Agriculture and Services; Group 2: Machinery and Trade; and Group 3: Construction and Building. Group 1 consists of three responding units, Group 2 has five units, and Group 3 has two respondents. In each of the three groups, one single employer provided information on its health spending (units 1, 4, and 9, respectively). The spending on health of the respondent organization is treated as an appropriate proxy for the non-responding units in each group. Obviously, however, this pairing procedure works better when key information related to health spending is available and a verification of similarities can be

performed.

Respondent 4 shows health spending of 300 NCU and is representative of the four other corporations, resulting in estimated health spending for Group 2 of 1500 NCU. Using a similar strategy for the other two groups, a total of 2800 NCU is estimated as health spending.

Table 29 Weighting based on the indicative size of the number of units

A	B	C	D	E	F	G	H
2	**Universe of units**	**Branch of industry**	**Sample grouping**	**Measured spending**	**Estimated per group unit**	**Estimated group total**	**Explanation**
3	1	Agriculture and Services	1	100	100	300	=sum(F3:F5); 100 + 100 + 100 = 300
4	2				100		
5	3				100		
6	4	Machinery and Trade	2	300	300	1500	=sum(F6:f10)
7	5				300		
8	6				300		
9	7				300		
10	8				300		
11	9	Construction and Building	3	500	500	1000	=sum(F11:F12)
12	10				500		
13				sum		2800	=sum(F3:F12)
14	**Notes:**	Response received from units 1, 5, and 9					
15		Units 1 to 3 belong to the agricultural sector and are assumed to have similar health risks.					
16		Units 4 to 8 belong to the machinery and retail and wholesale trade sector and have similar risk profiles but higher than agricultural enterprises.					
17		Units 9 and 10 belong to the construction and building sector and have the highest health risks.					

Source: Own elaboration.

Example 3

The survey responses may offer more information (e.g., on the number of employees), which allows a more accurate estimation of the expected health spending of the units. Here it is assumed that the number of employees has a reliable relation with the health spending of the enterprise.

In example 3, two possible ways of estimating total health spending are proposed: one based again on three different groups (agriculture, machinery, and construction) as in the previous example (Table 30 [Part A]) and the other based on an average calculation of the health spending of the responding units without a distinction by group (thus based on the totality of the response; Table 30 [Part B]).

In Table 30 (Part A), for each group the average health spending per employee is calculated using the responding unit(s). For Group 1, this results in 20 NCU (100 NCU/5 employees). The two non-responding units in Group 1, with two and 11 employees, are attributed an equal amount of health spending per employee, resulting in 40 NCU for unit 2 and 220 NCU for unit 3. Using a similar

approach for the other two groups results in total health spending of 4023 NCU.

In Table 30 (Part B), a slightly different approach is followed. The estimation presented is based on the assumption that the average health spending per employee of the responding units is a good proxy. The response of the three units with data (units 1, 4, and 9) is used as a basis. These three units together employ 50 people and have health spending of 900 NCU, resulting in average health spending per employee of 18 NCU. This means that for unit 5, with 23 employees, health spending is estimated at 23 * 18 = 414 NCU. In Table 30 (Part A) for the same unit (unit 5), a health expenditure of 627 NCU is estimated (23 * 27.3) using the group average per employee.

The total employment of all units reaches 191 persons and, calculated at an average of 18 NCU per employee, results in total health spending of 3438 NCU in Table 30 (Part B), around 14% lower compared with the results of Table 30 (Part A).

Table 30 Weighting based on the number of employees (head counts): Average of each of the three groups (A) and average of the responding units (B)

A	B	C	D	E	F	G	H
2	Part A: Calculation based on group data						
3	Universe of units	Number of employees	Measured spending	Spending per employee	Explanation	Estimated spending	Explanation
4	1	5	100	20	=D5/C5; 100/5 = 20	100	=E4 * C4; 20 * 5 = 100
5	2	2				40	=E4 * C5; 20 * 2 = 40
6	3	11				220	=E4 * C6; 20 * 11 = 220
7	4	11	300	273	=D7/C7; 300/11 = 27.3	300	=E7 * C7; 27.3 * 11 = 300
8	5	23				627	=E7 * C8; 27.3 * 23 = 627
9	6	15				409	=E7 * C9;
10	7	27				736	27.3 * 15 = 409
11	8	13				355	=E7 * C11; 27.3 * 13 = 355
12	9	34	500	14.7	=D12/C12; 500/34 = 14.7	500	=E12 * C12; 14.7 * 34 = 500
13	10	50				735	
14							
15				sum		4023	=sum(G5:G13)
16	**Notes:**	Response received from units 1, 5, and 9					
17		Units 1 to 3 belong to the agricultural sector and are assumed to have similar health risks.					
18		Units 4 to 8 belong to the machinery and retail and wholesale trade sector and have similar risk profiles but higher than agricultural enterprises.					
19		Units 9 and 10 belong to the construction and building sector and have the highest health risks.					

A	B	C	D	E	F	G	H	I	J
2	Part B: Calculation based on average in response								
3	Response received from unit number	Number of employees in the unit	Measured spending	Average spending per employee in sample	Explanation	Universe of units	Number of employees in universe of units	Estimated health spending	Explanation
4	1	5	100			1	5		=H4 * $E$7; 5 * 18 = 90
5	4	11	300			2	2		=H5 * $E$7; 2 * 18 = 36
6	9	34	500			3	11		=H6 * $E$7
7	sum	50	900	18	=sum(D4:D6)/ sum(C4:c6); 900/50 = 18	4	11		=H7 * $E$7
8						5	23		=H8 * $E$7
9						6	15		=H9 * $E$7
10						7	27		=H10 * $E$7
11						8	13		=H11 * $E$7
12						9	34		=H12 * $E$7
13						10	50		=H13 * $E$7
14									
15							sum	3438	=sum(I4:I13)
16	**Notes:**	Response received from units 1, 5, and 9							
17		Units 1 to 3 belong to the agricultural sector and are assumed to have similar health risks.							
18		Units 4 to 8 belong to the machinery and retail and wholesale trade sector and have similar risk profiles but higher than agricultural enterprises.							
19		Units 9 and 10 belong to the construction and building sector and have the highest health risks.							

Source: Own elaboration.

Example 4

Although an estimation based on number of employees can be a good measure, certainly related to health spending, an alternative would be to use the number of full-time equivalents (FTE), assuming that more working time may result in higher health spending for the organization. An example using FTE is shown in Table 31 (Part A) and Table 31 (Part B).

As in example 3, in Table 31 again either the group average can be used to calculate the health spending of the missing units in the group (see Table 31 [Part A]) or the average of the responding units can be used as a proxy for the estimation (see Table 31 [Part B]). In the first case, Group 1 (4.5 FTE) shows health spending of 22.2 per FTE, Group 2 (with 11 FTE) an amount of 27.3, and Group 3 (with 28.3 FTE) 17.7 NCU per FTE. The total estimated health spending would amount to 4078 NCU. The estimation of the health spending for unit 5 would amount to 643.6 NCU (23.6 FTE * 27.3 average per employee in Group 2).

In the second case, again the average estimated amount of the three responding units is used as a basis. The three respondents employ 43.8 FTE and spend 900 NCU on health, resulting in an average per FTE of 20.5 NCU. For unit 5, the estimation would result in 484.9 NCU (23.6 FTE * 20.5 average health spending). For all units in the population the total estimate results in 3671.9 NCU, around 10% lower than the estimation based on group averages.

Table 31 Weighting based on the number of full-time equivalents: Average of each of the three groups (A) and average of the responding units (B)

A	B	C	D	E	F	G	H
2	Part A: Based on group data						
3	**Universe of units**	**Number of FTE***	**Measured spending**	**Spending per FTE**	**Explanation**	**Estimated spending**	**Explanation**
4	1	4.5	100	22.2	=D5/C5; 100/4.5 = 222.2	100	=E4 * C4; 22.2 * 4.5 = 100
5	2	2				44.4	=E4 * C5; 22.2 * 2 = 44.4
6	3	10.3				228.9	=E4 * C6; 22.2 * 10.3 = 228.9
7	4	11	300	27.3	=D7/C7; 300/11 = 27.3	300.0	=E7 * C7; 27.3 * 11 = 300
8	5	23.6				643.6	=E7 * C8; 27.3 * 23.6 = 643.6
9	6	15				409.1	=E7 * C9; 27.3 * 15 = 409.1
10	7	25.8				703.6	=E7 * C10; 27.3 * 25.8 = 703.6
11	8	12.5				340.9	=E7 * C11; 27.3 * 12.5 = 340.9
12	9	28.3	500	17.7	=D12/C12; 500/28.3 = 17.7	500	=E12 * C12; 17.7 * 28.3 = 500
13	10	45.7					
14							
15				sum		4078	=sum(G5:G13)
16	**Notes:**	* FTE: Full-time equivalents					
17		Response received from units 1, 5, and 9					
18		Units 1 to 3 belong to the agricultural sector and are assumed to have similar health risks.					
19		Units 4 to 8 belong to the machinery and retail and wholesale trade sector and have similar risk profiles but higher than agricultural enterprises.					
20		Units 9 and 10 belong to the construction and building sector and have the highest health risks.					

A	B	C	D	E	F	G	H	I	J
2	Part B: Based on average in response								
3	**Response received**	**Number of FTE***	**Measured spending**	**Average spending per FTE in sample**	**Explanation**	**Universe of units**	**Number of FTE in universe of units**	**Estimated spending**	**Explanation**
4	1	4.5	100			1	4.5	92.5	=H4 * $E$7; 4.5 * 20.5 = 92.5
5	4	11	300			2	2	41.1	=H5 * $E$7; 2 * 20.5 = 41.1
6	9	28.3	500			3	10.3	211.6	=H6 * $E$7
7	sum	43.8	900	20.5	=sum(D4:D6)/ sum(C4:c6); 900/43.8 = 20.5	4	11	226.0	=H7 * $E$7
8						5	23.6	484.9	=H8 * $E$7
9						6	15	308.2	=H9 * $E$7
10						7	25.8	530.1	=H10 * $E$7
11						8	12.5	256.8	=H11 * $E$7
12						9	28.3	581.5	=H12 * $E$7
13						10	45.7	939.0	=H13 * $E$7
14									
15							sum	3671.9	=sum(I4:I13)
16	**Notes:**	* FTE: Full-time equivalents							
17		Response received from units 1, 5, and 9							
18		Units 1 to 3 belong to the agricultural sector and are assumed to have similar health risks.							
19		Units 4 to 8 belong to the machinery and retail and wholesale trade sector and have similar risk profiles but higher than agricultural enterprises.							
20		Units 9 and 10 belong to the construction and building sector and have the highest health risks.							

Source: Own elaboration.

Example 5

Without being exhaustive, an estimation based on value added created in the respective units (assuming that these values can be taken from NA reports or business surveys) is presented below. A similar exercise can be made using turnover (also taken from NA, business surveys, or an ad hoc survey). Using averages by group, total estimated health spending is 3668 NCU.

Table 32 Weighting based on value added

A	B	C	D	E	F	G	H
2	**Universe of units**	**Measured health spending**	**Value added (3)**	**Health as share of value added**	**Explanation**	**Estimated health spending**	**Explanation**
3	1	100	150	0.67	=C3/D3; 100/150 = 0.67	100	=$E$3 * D3; 0.67 * 150 = 100
4	2		40			26.7	=$E$3 * D4; 0.67 * 40 = 26.7
5	3		300			200	=$E$3 * D5; 0.67 * 3000 = 200
6	4	300	340	0.88	C6/D6; 300/340 = .088	300	=E6 * D6; 0.88 * 340 = 300
7	5		600			529	=E6 * D7; 0.88 * 600 = 529
8	6		400			353	=E6 * D8; 0.88 * 400 = 353
9	7		750			662	=E6 * D9; 0.88 * 750 = 662
10	8		500			441	=E6 * D10; 0.88 * 500 = 441
11	9	500	900	0.56	=C11/D11; 500/900 = 0.56	500	=E11 * D11; 0.56 * 900 = 500
12	10		1000			556	=E11 * D12; 0.56 * 1000 = 556
13							
14				sum		3.668	=sum(G3:G12)
15	**Notes:**	Response received from units 1, 5, and 9					
16		Units 1 to 3 belong to the agricultural sector and are assumed to have similar health risks.					
17		Units 4 to 8 belong to the machinery and retail and wholesale trade sector and have similar risk profiles but higher than agricultural enterprises.					
18		Units 9 and 10 belong to the construction and building sector and have the highest health risks.					

Source: Own elaboration.

As can be seen, all of the various examples provide a different set of results.

Is one estimation better than the other? Yes, the first two examples are very rough. The others are more elaborated. Which estimation is better depends on the amount of information available and the amount of time spent by the team and its stakeholders in obtaining better and more detailed data.[20] Overall, hard data on all units in the population is best, as no estimation is needed. However, this is usually not the case, and estimations may be necessary. The examples presented here can also be used to estimate specific financing flows for a set of units in a population if a relation between the expected result and the variable can be assumed and explained.

The estimation examples presented here are aimed at total current health spending for all units in the population. The weighting processes used are not exhaustive, which means that other similar techniques can be used.

[20] For example, in the health system, a high share of part time workers is often found. Thus, calculating FTE can require effort. Using head counts and FTE makes a huge difference in the quality of the estimation and the result.

8.2 Converting fiscal to calendar years

By convention, there is a relative equivalence of fiscal and calendar year. This allows for traceability of reported data. Basic procedures to be used in cases of need are presented in this section.

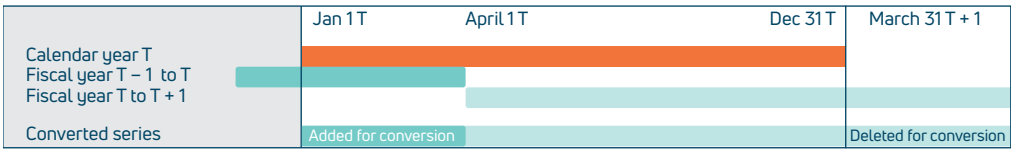
In many countries, government, social, and other health insurance data and financial information are not always reported for a calendar year but have a different time frame. A fiscal year is also known as a financial year and can be different from a calendar year. Often, reports are generated by either fiscal year or calendar year. The principle in SHA 2011 is to have comparable data, for which it is internationally agreed to record and present data on a calendar year basis. In most cases the rebasing of the data is not considered, but the international agreement is to treat fiscal and calendar years as "equivalent." This process implies that fiscal years ending before July 1 are allocated to the current year. Fiscal years starting after July 1 are allocated to the next year. Here the assumption is that the changes do not have a substantial influence on the annual data. A major advantage is that the reported data can be numerically identified in the calendar year, while in a recalculation it may be difficult to track known values.

A rebasing of fiscal to calendar year depends on economic and financial conditions related to a policy interest. A balance is needed in terms of the effort in time and the relevance of the resulting change. If a conversion is considered necessary, the data are recalculated to present a calendar year. By convention, the current year is labeled as "T."

In the discussion that follows, the assumption is that the fiscal year runs from April 1 to March 31 and that calendar year estimates are required, although the entire discussion can easily be modified to accommodate any fiscal year.

The easiest way to convert fiscal years to calendar years is to assume that equal expenditures occur in each month, as wages and other operational spending occur monthly. The amount is divided in the corresponding number of months (12 months). As the fiscal year partially overlaps the calendar year, some months need to be transferred from one year to the other to match a calendar year. In the following example, FY T – 1 overlaps from January to March, and the monthly amounts for that period are kept for the estimation of year T. For FY T + 1 April to December is used, with January-March used in the next calendar year (calendar year T + 1) (see Figure 10 for a graphical presentation).

Figure 10 Fiscal to calendar year conversion



Source: Own elaboration.

In Table 33, the fiscal year runs from April 1 in year T to March 31 in year T + 1. Thus, nine months of the fiscal year overlap with the calendar year.

Table 33 Fiscal to calendar year conversion

	Calendar year				
	Total	**Jan-March T**	**Jan-March T + 1**	**Data for calendar year T**	
Data fiscal year T – 1	1200	300		300	=300
Data fiscal year T	1320		330	990	=1320 – 330
Converted to calendar year T				1290	=300 + 990

Source: Own elaboration.

In this case, the value of the January-March T is calculated as 1200/4 =300 NCU based on the FY T-1 data. The same period for FY T + 1 results in 330 NCU (1320/4), which represents 990 NCU to be attributed to calendar year T (1320 – 330). The total for year T in this case is 1290 NCU.

The underlying assumption is that the expenditure structure of January-March in year T-1 does not deviate from the structure in T if no large policy measures were in place that took effect in January-March of T or T-1. Inflation in health care can be assumed not to play a major role, and seasonal effects are consistent over time (the seasonal effect of year T is similar to the one in year T-1). If any of these assumptions are not met, an adjustment of the data of the converted periods may be needed.

A familiar problem relates to the fact that not all fiscal data are available at the time that health accounts are calculated (see Table 34). In that case, an assumption on the missing data needs to be made taking into consideration possible changes in policy and/or inflation.

Table 34 Conversion with only 6 months of data in the fiscal year

	Calendar year				
	Total	**Jan-March T**	**Jan-March T + 1**	**Data for calendar year T**	
Data fiscal year T – 1	1200	300		300	=300
Data fiscal year T (only 6 months)	600				
Estimated fiscal year T	1320		330	990	=1320 – 330
Converted to calendar year T				1290	=300 + 990
Note: Fiscal year data refer to 6 months (October T – 1 to March T), resulting in an estimated annual amount of 1320 NCU (660/6 * 12).					

Source: Own elaboration.

In this example, the data for FY T are available only for six months, and based on the assumptions mentioned above, the total for FY T amounts to 660 * 2 = 1320 NCU; three fourths of the total (990 NCU) is attributed to calendar year T, resulting in total spending for calendar year T of 1290 NCU.

Table 35 assumes an additional price change in year T of 10%. The spending amount of FY T, representing six months of data, again amounts to 660 NCU. With 10% inflation, the spending for these six months increases to 726 NCU and the year total to 1452 NCU.

Table 35 Conversion with 6 months of data and a price change of 10%

	Calendar year				
	Total	**Jan-March T**	**Jan-March T + 1**	**Data for calendar year T**	
Data fiscal year T – 1	1200	300		300	=300
Data fiscal year T (half-year data and 10% price increase)	726				
Estimated fiscal year T	1452		363	1089	=1452 – 363
Converted to calendar year T				1389	=300 + 1089
Note: Fiscal year data refer to 6 months (October T – 1 to March T) and inflation of 10%, resulting in an estimated annual amount of 1452 NCU (660/6 * 12 * 1.1).					

Source: Own elaboration.

The price change is set high to show an influence on the data estimation for year T. If price inflation (see Box 7) is playing a significant role, the procedure presented above may need to be adjusted depending on the data available. A monthly price index for health services may be available from national accounts price data. When this is not the case, the service price index (or the Consumer Price Index [CPI]) may be used, or the GDP deflator is a solution. The GDP deflator can be adjusted to fit health service price changes, but in that case additional assumptions such as the weight of health services in price data may be needed. Box 7 shows a simplified example that is valid for more complex cases, such as monthly variations in quantities and prices, that here are represented as 1 in all cases. Inflation of 10% per month is quite high, and it is likely to be lower in real cases. The example allows one to see, however, that the result of the adjustment is for the most part not important. Thus, the adjustment from fiscal to calendar year may not reflect major changes.

Box 7 Influence of inflation on the transformation from fiscal to calendar year

Fiscal year	Calendar year	Quantity - Q	Price change - P	Accumulated value of P x Q		
T – 1	January	1	1.1	1.10	Sum of value of the fiscal year (Apr–March)	23.52
T – 1	February	1	1.1	1.21	Sum of value of the fiscal year (Apr–March)	31.31
T – 1	March	1	1.1	1.33	***Transformation***	
T	April	1	1.1	1.46	Deduction from fiscal year (Jan–March year T)	11.43
T	May	1	1.1	1.61	Addition from previous fiscal year (Jan–March year T – 1)	3.64
T	June	1	1.1	1.77	Difference between calendar and fiscal year (%)	7.49
T	July	1	1.1	1.95		
T	August	1	1.1	2.14		
T	September	1	1.1	2.36		
T	October	1	1.1	2.59		
T	November	1	1.1	2.85		
T	December	1	1.1	3.14		
	January	1	1,1	3.45		
	February	1	1.1	3.80		
	March	1	1.1	4.18		

Source: Own elaboration based on World Health Organization. Guide to producing national health accounts: with special applications for low-income and middle-income countries. Geneva: WHO; 2003:278–290, Annex D. Available from: https://apps.who.int/iris/handle/10665/42711.

Inflation of 10% per month creates a difference of around 7.8 NCU between a fiscal year and a calendar year in which the fiscal year starts three months into the new calendar year. One can conclude that an effect is visible only in the case of large changes.

More discussion on this subject can be found in the PG (*34*). One example is that the price change is not estimated as an average but taken as the original consumer price change in national accounts. The yearly spending is redistributed considering these price changes. It is advised to check with the statistical office regarding which of the procedures and methodologies are used in order to maintain consistency in the methods and time series between health spending and national accounts. As mentioned, monthly changes are not very relevant and calendar year spending and fiscal year spending are treated as equivalent, without any adjustment performed.

8.3 Double counting in health spending and how to avoid it

The quality of an HA report is influenced by the careful attention given to sources that can lead to double counting. In this section, proposals to avoid double counting are presented.

In health accounting, two general recommendations deserve special attention. One is to be as exhaustive as possible in the compilation of the health spending flows, and the other is to avoid double counting. When resources flow from one to another organization, they can be reported by

both and double counted. Double counting can be described as counting the value of the same expenditure related to a specific set of activities or products more than once, resulting in over-estimation of spending. Double counting can be present in different situations, including, among others, when the same funds are reported at the central government and subnational levels; the spending on health insurance by employers and by the health insurance reports; donors providing development funds and receiving organizations reporting those revenues, either as cash or in-kind goods; and especially when multiple intermediation exists (the flows transit among more than two organizations).

Possible double counting is rarely detected in the spending data provided by donors and receiving organizations, whether ministries of finance, ministries of health, or non governmental organizations. Even when it is known which donor provides funds to which national institution, a double count is not always obvious. This is mainly due to the fact that most often the reports involve different amounts given and spent in the same period of time.

How to avoid a spending sum being counted more than once? Information on "who receives what from whom" can help, but it may not be sufficient to determine the amount of double counting to be erased. For an exact determination – how much was received and how much was spent that year – additional information can be useful to complement the analysis. This refers, among other elements, to information on the amount received and executed, the activities for which the spending was directed by donors and receiving organizations, and the administrative/overhead costs. However, in many cases this information is not fully available, and assumptions need to be made regarding which data source is most reliable and closer to the spending as well as which data from which organization need to be diminished or deleted. But in all these cases, whether all of the information is available or not, decisions on what to include/exclude and how much from which organization are needed. In many cases, it boils down to the level of trust related to the various partners in the process and the knowledge about their spending process.

Some examples and possible decisions are presented in Table 36.

Table 36 Double counting example

DONOR NAME	AMOUNT	ACTIVITIES	RECEIVING ORGANIZATIONS
Private donor (donor 1)	1000	HIV medication; family planning; IEC contribution for flyers	Family Planning (FP) on site; MoH
Multilateral donor	200		MoH
(NGO) NAME	**AMOUNT**	**ACTIVITIES**	**DONOR ORGANIZATION**
Family Planning (FP) on site	200	Family planning	Private donor
MoH	600	HIV	Multilateral donor, private donor (donor 1)

Source: Own elaboration.

In the example, a private donor provides a sum of 1000 to an NGO (Family Planning on site) and the MoH. The receiving organizations – the NGO and the MoH – together have received only 800, including 200 provided by a multilateral donor.

What to do? Assumptions have to be made on how much to include and from whom. For example, it could be decided that the donation of the multilateral donor (200 NCU) is reliable and is in total

received by the MoH. The underlying assumption is that even when the amount registered by the MoH is different, the report at hand is partial. In other cases, the credit can be given to the national organizations when the records are known to be unique and complete. However, it is also not certain that the amounts mentioned by the donor are all spent by the MoH in that year.

For the MoH, this would result in funding of the private donor of the remaining part, which is 400 (600 in total received minus 200 of multilateral origin), if the reliability of the MoH is not disputed. Out of the 1000 of the funding by the private donor, 400 can be traced to the MoH, leaving another 600 to be decided on. The NGO states to have received only 200, so what to include is a serious matter requiring additional information; in any event, a decision must be made: include either 200 as reported by the NGO or 600 as the remaining part of the private donor. Criteria to be used need to be defined, such as the consistency of totals, trust in records and reports, execution bottlenecks, and the detail of the information (e.g., planned, budgeted, and executed spending). Of course, the easiest method, when possible, is to collaborate with informed partners regarding how much they have spent, from which source, how much was left from previous years, how much is left for following years, and so forth. It is imperative to report decisions and criteria in the metadata.

The second example deals with a case of multiple intermediation, meaning that one institution receives funds from a donor and then acts itself (completely or partly for the funds received) as a donor for another receiving organization. A private donor provides 400 to an NGO: Family Planning on site. The NGO reports revenue of 200 but also spending of only 150 to local FP communities.

Table 37 Multiple intermediation

DONOR NAME	AMOUNT	ACTIVITIES	RECEIVING ORGANIZATIONS
Private donor (donor 1)	400	HIV medication; family planning; IEC contribution for flyers	Family Planning (FP) on site
Family Planning (FP) on site	150	FP	FP local community 1
(NGO) NAME	**AMOUNT**	**ACTIVITIES**	**DONOR ORGANIZATION**
Family Planning (FP) on site	200	Family planning	Private donor (donor 1)

Source: Own elaboration.

The simplest route is to accept the 200 received by FP on site as the donation of the private donor (e.g., as the remaining amount may be spent in another year) and to consider the 150 received by the local community as the donation of Family Planning on site. The difference between the 200 received and the 150 going to the local community can be treated as administration and supervision spending by FP on site. Of course, additional information or discussion with involved parties to corroborate this decision would be beneficial for efficiency and accuracy reasons. But even without information, a rational, plausible decision must be made.

Multiple intermediation can be visible or detected in many different parts of the health system, but most obvious between related sources of financial flows such as central and subnational governments, government and donor levels, donor levels among themselves, and donors and NGOs. It is important to keep track of the administrative issues/spending/cost related to each of the actors involved, as these are part of the spending totality. In a nutshell, surveys and documentation searches must include origin and destination as well as uses and all of the details possible from the agencies potentially involved in a double count situation.

Questions and answers

1. Q: How to detect double counting? Why does using multiple sources lead to easy-to-detect double counting?

   A: It is not always easy to detect possible double counting. It depends to a large extent on the information received from various sources and the detailed knowledge of the structure of the organizations involved in financing of health services. Multiple sources are in many cases indispensable to provide different viewpoints on the data to be used and to increase the quality of the accounts. The comparison of the received and spent funds by origin can indicate a double count. When various data sources report the same resources, these can lead to double count, when they are not identified to be the same flow.

2. Q: Is weighting always necessary, and what should be taken into account?

   A: Weighting can be a strategy to simulate a distribution when the data available do not cover the total universe [or sample] and the results available are considered to represent the universe. In many cases, weighting can be important as the complete population of all data sources is usually not available. It is important in this case to concentrate on the "big fish" in data and policy perspectives. The rest of the universe can be dealt with through groups constructed and samples created as needed.

3. Q: Is it necessary to use the calendar year and to make an estimation in case calendar and fiscal year deviate?

   A: By convention, there is no need for conversion (see rule of data before and after July 1 above). All statistics at the macro level relate to a calendar year, so from that perspective it is useful that consumption data also relate to a calendar year for health accounts. Whether or not an estimation for the difference is needed depends on changes in seasonality, the influence of policy changes, and possible inflation rate differences between calendar and fiscal years. Also, an analysis of the difference between the two approaches can be helpful in deciding if and for which parts of the data collection fiscal year adaptations are needed.

4. Q: To what extent are estimations acceptable, and are certain areas of the classification structure prohibited for estimations?

   A: In principle, there is no limit to the number of estimations made. However, the quality of estimated and total current spending data needs to be taken into account. No areas in any of the classifications are prohibited for estimations. But one area is more likely to include a set of estimated data points than another, even in the same classification, depending on data availability. Given that not always are all records perfect, estimations can increase the overall quality of the accounts. Additional information and cooperation are needed to reach the maximum level of quality possible.

5. Q: How appropriate is it to use estimation procedures to generate accounts?

   A: Health accounts aim at reflecting reality more than reflecting balance of records. Even with limitations in the information system, estimations have been developed and tested in macroeconomic accounts for decades. The procedures presented in this document are all currently used in national accounts. Thus, it is more appropriate to estimate than leaving incomplete or biased data, because they distort the results

CHAPTER 9

SPECIAL INTEREST AREAS

Policy attention has been focused in several areas of expenditure distributions. In many cases specific guidelines have been generated to ensure standardized approaches, which are supported in this document. Various topics are dealt with here. First, estimation of OOP is related to the SDG and UHC initiatives and represents one of the most important components of spending. Second, the expenditure distribution by disease allows financial flows to be linked to the epidemiological profile of the populations covered by each health system. Third, the universal crisis initiated by the COVID-19 pandemic requires an analysis of the financial burden distribution at the country level. Fourth, one of the expenditure drivers in any health system is medical goods and, more specifically, spending on pharmaceuticals. Finally, the chapter includes details on PHC spending and trade in health care.

9.1 OOPS estimation and distribution

Monitoring of household health spending at the point of health care consumption (OOPS) has become one of the most policy-relevant issues. However, in practice, OOPS is one of the most challenging measurement areas in health accounts.

Estimation of OOPS is one of the most frequent and most discussed issues. It refers to cost-sharing, self-medication, and other expenditures paid directly by private households at the point of use. Households can pay out of pocket in practically all facilities and units of the health system. These extended reporting possibilities are not consolidated in a single source in most countries. Estimation of total OOPS for all services and all providers can be done bottom-up or top-down. Bottom-up means that in a first step the records of the services and/or the providers concerning OOP payments are added, resulting in preliminary total OOPS in the health system. Top-down starts with a total estimation of OOP spending for the health system (e.g., from a national survey source). This total is distributed across the various providers, services, and diseases.[21] In practice, given the lack of complete data and sources, estimation of OOPS and its distribution requires a combination of top-down and bottom-up.

Frequent data sources include household budget, expenditure, or living conditions surveys; provider, insurance, and financial records; the integrated health data on private final consumption; and COICOP data in national accounts.

[21] It is proposed that OOPS is not to be distributed by factors of provision (FP). This is because, strictly speaking, OOPS pays for services or medical goods to providers and providers spend on FP using their income (including OOPS).

A few problems are obvious. The first issue is the lack of continuity of data sources (a problem most frequently observed in surveys). The most frequently used data sources for this estimate are household expenditure survey and household consumption data of national accounts (PFC, private final consumption). OOPS data are not collected each year. This means that interpolation and extrapolation may be required to complement the existing series. The second problem arises from the use (and integration) of different sources, with accompanying different levels of aggregation of data and usually different definitions and boundaries. It is not infrequent that in the same country several types of household surveys with different content are performed. This means that the various data source options need to be investigated as to their content. Solutions need to be found to explain differences, make changes to the data, and decide on the best source to use for the estimation.

Issues that need to be addressed include which data to use and from which source, which reference or proxy variable to use if data are unreliable, when to resort to a break in series, and which procedures to use (e.g., linear interpolation versus compounded growth rate interpolation).[22] The team needs to evaluate and describe in full the reasoning and choices made and, if possible, the advantages and disadvantages of the available options. See Chapter 7 for more information on accounting procedures.

In the example presented in Table 38, the focus is on the estimation of OOP for year T based on T – 1 (OOPS data for the previous year), in which a combination of top-down and bottom-up techniques is used.

[22] SNA classifications and data sets are presented in Chapter 5.

Table 38 OOPS estimation and extrapolation

A	B	C	D	E	F
2	**Basic data in national accounts mln NCU**				
3	**Year T – 1**		**Year T**	**Growth rate index (T – 1 = 100)**	**Explanation**
4	National accounts consumption				
5	Total consumption	120	130	108	=D5/C5 * 100; 130/120 * 100 = 108
6	Consumption branch Q: health & social care	100			
7	Consumption branch Q86: health care	80			
8	Household health consumption branch Q86	7			
9	National accounts production recalculated in consumption values				
10	Over-the-counter (OTC) pharmaceuticals wholesale plus transport and profit margins	3			
11	Optical shops turnover	1.5			
12	National accounts COICOP				
13	COICOP 06 health	7.5	8	107	=D13/C13 * 100; 8/7.5 * 100 = 107
14	**SHA 2011 data related to households (HH)**				
15	SHA OOP data in mln NCU	7.7			
16	Household OOP ratio of COICOP 06 (%)	103			=C15/C13 * 100; 7.7/7.5 * 100 = 103
17	Household OOP ratio of NA household health Consumption expenditure	110			=C15/C8 * 100; 7.7/7 = 110
18					
19	Estimation of household OOP based on COICOP 06		8.2		=C16/100 * D13; 103/100 * 8 = 8.2
20	**Household budget data (HBS)**			**HBS corrected based on NA consumption**	
21					
22	Household budget survey (HBS) total*	6		7.0	=C8; 7
23	Pharmaceuticals	4		4.7	=C8/C22 * C23; 7/6 * 4 = 4.7
24	Other medical goods	2		2.3	=C8/C22 * C24; 7/6 * 2 = 2.3
25	* HBS underestimates inpatient and outpatient household OOP payments.				
26					
27	**Calculations and distributions**			**Explanation**	**Explanation**
28		Year T – 1	Year T	Year T – 1	Year T
29	Remainder inpatient and outpatient OOP	0.7	0.7	=C15-E22; 7.7 - 7 = 0.7	=C29 * $E$13/100; 0.7 * 107/100 = 0.7
30	Pharmaceutical OTC spending	3	3.2	=C10; 3	=C30 * $E$13/100; 2 * 107/100 = 3.2
31	Remainder = prescribed medicines	1.7	1.8	=E23-C30; 4.7 - 3 = 1.8	=C31 * $E$13/100; 1.7/107 * 100 = 1.8
32	Optical sales	1.5	1.6	=C11; 1.5	=C32 * $E$13/100; 1.5 * 107/100 = 1.6
33	Remainder = other medical non-durables	0.8	0.9	=E24-C11; 2.3 - 1.5 = 0.9	=C33 * $E$13/100; 0.8 * 107/100 = 0.9
34					
35	Sum	7.7	8.2	=SUM(C29:C33)	=SUM(D29:D33)

Source: Own elaboration.

Box 8 Explanatory note for Table 38: OOPS estimation and extrapolation

In a nutshell, total OOPS is created by using the growth rate of COICOP on T/T – 1. Next the data of the HBS for T – 1 are brought in line with the data of NA. Finally, the distributions by the services and goods consumed and reported in the HBS are used to estimate the missing details in the HA data set. As mentioned in Chapter 5, COICOP and HBS contain at least an aggregate of IP, OP, and medical goods. The process used is explained in detail below.

The start in the estimation is the data as available in national accounts (rows 2 to 13) and the OOP data in SHA (row 15).

Total consumption in NA grows by 8% from year T – 1 to year T (index of 108; row 5). Also, the data for COICOP for these two years are already known, showing a growth of 7% (index of 107; see row 13).

OOP spending for T – 1 is available from the SHA data: 7.7 mln NCU, which is close to the data in COICOP in year T – 1 (7.5 mln NCU). Comparing SHA OOP with COICOP reveals a ratio of 103% of COICOP (7.7/7.5). Comparing SHA OOP with household health consumption in row 8 shows a share of 110 (7.7/7 mln NCU).

The team decided to use the ratio of SHA OOP/COICOP (1.03). SHA OOP results in 1.03 * 8 = 8.2 mln NCU in year T (row 19). If COICOP is not available, the team could use HH health consumption and the total final consumption growth rate in combination with the ratio of OOP/HH health consumption: 7 * 1.08 * 1.10 = 8.3 mln NCU (see row 8, row 5, and row 17, respectively).

In a second step, the team makes the distribution by services of the OOP data as calculated for year T – 1 and year T, from which preliminary data for selected providers can be derived (see rows 22 to 24).

The HBS data are the basis for the integrated household consumption data in the NA (7 mln NCU) and COICOP data (7.5 mln NCU). HBS underestimated IP and OP, which explains the difference with the household health consumption data. COICOP, on the other hand, includes medical goods that are not part of branch Q in NA, which explains the difference with the household health consumption data. The level of the HBS is underestimated, but we assume that the distribution across the items in the HBS is likely to be accurate.

The data on HBS total spending (6 mln NCU) are replaced by the integrated data of HBS of household health consumption (7.0 mln NCU; row 8). The shares of the two items – pharmaceuticals and other medical goods – are used to recalculate the HBS data portions for T – 1. Pharmaceuticals amount to 4.7 mln NCU (4/6 * 7.0), and other medical goods amount to 2.3 mln NCU (2/4 * 7.0). The distribution of pharmaceuticals and other medical goods in HBS is used to distribute the integrated household health consumption data.

The difference between OOP of SHA (7.7 NCU) and the HBS (7.0 NCU) is attributed to the IP and OP estimation in HBS (0.7 mln NCU; row 29). In fact, it is often considered that memory bias leads to underestimation of HBS. Pharmaceutical OTC sales (3 NCU; row 10) are derived from NA; the remainder compared with pharmaceuticals in HBS (4.7 NCU, as calculated and shown in row 23) is treated as prescribed medicine spending (4.7 – 3 = 1.7 NCU; see row 31). Optical sales are known from NA (1.5 NCU; row 11), and the resulting remainder compared with HBS other medical goods (2.3 NCU) is treated as other non-durable goods spending (2.3 – 1.5 = 0.8 NCU; row 33).

Taking the various components together (see rows 29 to 33) provides an estimated total of OOP spending of 7.7 mln NCU for year T – 1 (see row 35). The calculations for year T use the data/distributions as estimated for year T – 1 in rows 29 to 33 and the COICOP growth rate (as shown in row 13). The sum of the parts results in OOP spending for year T of 8.2 mln NCU.

9.2 Disease estimations and splitting

An important goal of the health system is to prevent and satisfy health needs. Health accounts can provide a relevant distribution of resource use per ICD/GBD grouping.

The various health conditions handled in the system may have an epidemiological relevance that is not necessarily similar to the amount of resources needed to treat them. New technologies can result in a very high cost with a lower disease burden for the patient. Some technologies have also resulted in a lower cost (e.g., due to expired patents of medicines). How to balance the resources given to a specific intervention and disease and their public health relevance has been among the challenges health systems have had to face. Analysis of expenditures by type of health intervention and disease has been developed to cope with this decision. Not all data

sources contain information on diseases, and even if they do, they may not record all diseases and conditions treated but are limited to a group of them. Whenever medical coding and billing information is publicly available and provided as a national database, as is the case of some countries such as Brazil, service code categories and reimbursement information may be translated into ICD-10 or GBD codes to support the elaboration of a disease expenditure database. There will always exist codes which do not have clear links to specific diseases and, as such, will require estimations and splitting using the approaches described below. The lack of unique data sources presenting the required information to allocate expenditure by disease has led to the development of a specific set of allocation strategies to reach an appropriate and plausible distribution. This effort has been progressively standardized based on past analytical experience. A systematic approach through the SHA 2011 health accounting methods has been followed as a means to reach greater comparability over time and across nations.

The international experience has given priority to the use of allocation keys related to the services and related diagnosis. In fact, a group of OECD countries has demonstrated a close relation of results using these allocations and measured spending (*35*). It is desirable that countries replicate the analysis to ensure that the selected allocation approach is reliable considering the specificities of their national health system.

The key principle to perform this analysis according to SHA 2011 is that all expenditure needs to be distributed, including all of the involved diseases and health conditions, avoiding double counting and omissions. This is opposed to the previous practice, where a disease distribution was performed by specific disease independently (so-called sub-accounts, e.g., on TB, malaria, HIV, etc.).

The general steps to generate this distribution are summarized in Box 9 (*36*).

Box 9 Steps for a top-down calculation of expenditure by disease

- The starting point is health care expenditure data by provider and/or function (SHA aggregates).
- For each type of provider and/or function, detailed non-expenditure data by diagnosis are obtained (e.g., number of consultations, IP days, ALOS, ancillary services and procedures).
- To be able to use all of them, they need to be converted into a comparable measure, for which a weighting process reflecting a similar intensity of resource use is performed.
- After this conversion, the equalized value by service and disease is calculated.
- The weights used are known as allocation or distribution keys.

Available records of spending by disease are usually limited in number or display a partial representation in budget labels. Specific disease categories with international monitoring relevance can be identified, such as vaccine-preventable diseases (in budgets, the reflected component can be vaccine purchases or costs of a vaccine campaign) or contraceptives. When there is indication of the disease/condition related to the spending, the attribution is direct. However, the budget usually does not contain all of the resources devoted to that aim (e.g., salaries of officers vaccinating) or refer to each of the most frequent diseases (e.g., diabetes and hypertension). Thus, the distribution of the expenditure by disease needs to address all of the spending identified for any disease and distribute non-disease-specific spending across all relevant diseases. Expenditure that cannot be allocated to one single disease code needs to be

distributed across various codes using "allocation keys." An allocation key can be described as a rule that will determine how the total amount is to be distributed across the various items or variables (here diseases and conditions).

Briefly, data can show numbers allocated to specific diseases (earmarked) and amounts to be allocated by various diseases (apportionable), as well as those not relevant for a disease distribution (e.g., most administrative spending). This means that the success of the distribution of the expenditure by disease relies on the information available and its complementarity through accounting procedures. A list of options is shown in Box 10.

Box 10 Allocation keys for pro-rating

Option hierarchy:

a. Allocation using keys, in which reference values need a close relation to the data to be distributed, such as cost studies by department (*37, 38*).

b. Allocation based on related services (e.g., IP days, OP visits).

c. Case-by-case adjustment (e.g., based on DRGs).

d. Development of specific studies ranging from expert opinion to measuring activities, which is expensive in terms of time and money.

The underlying principle in all pro-rating exercises is that value equals price multiplied by quantity.

The distribution by disease requires also a complete representation of the flow, including financing, provision, and related functions; the creation of homogeneous blocks in the estimation; and use of proper distribution keys (e.g., costing and/or utilization keys). The distribution keys are specific by disease and classification (HP, HC, etc.).

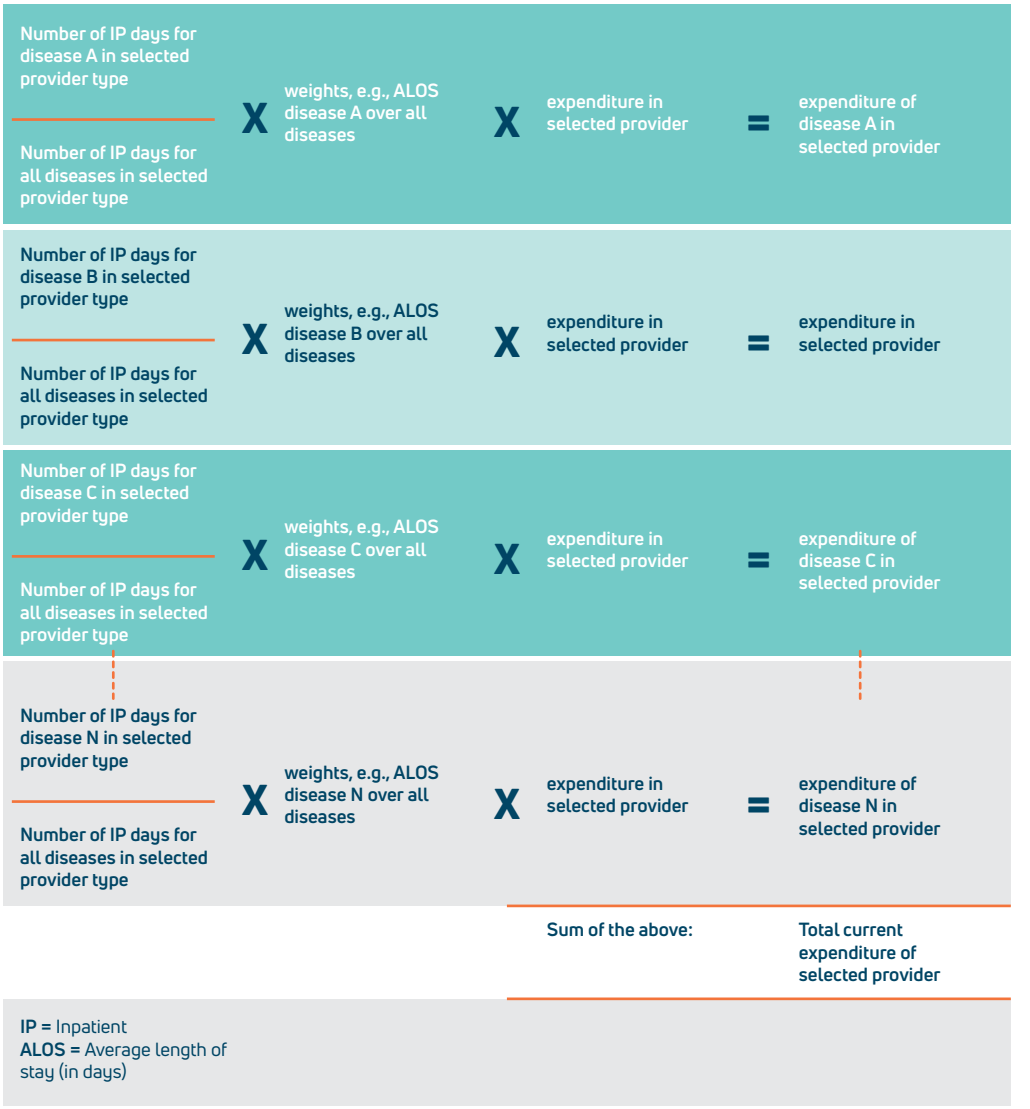
9.2.1 Distribution keys

As mentioned above, there may be a direct relation between the available funds and diseases. This means that the money is earmarked and can easily be attributed. However, in many cases there is no direct relation, and distribution keys need to be developed. Examples of preparation of distribution keys are included in the sections below.

9.2.1.1 Distribution keys: Inpatient care (IP)

Various financial and non-financial data are needed to create a distribution key (see Figures 11 and 12 for the approach proposed by WHO). These range from the spending by each (category of) provider to the number of inpatient days by disease and, if possible, a measure of the relative weight of the disease in the total use of resources of the selected provider (such as ALOS data by disease).

Figure 11 Inpatient key basic method



Source: Own elaboration based on OPD IPD. WHO GHED training material. Available from: https://apps.who.int/nha/database/DocumentationCentre/Index/en'.

Using the information from each set of providers supplying inpatient care allows an overview of spending by inpatient provision and disease.

9.2.1.2 Distribution keys: Outpatient care (OP)

A similar exercise can be constructed for providers of outpatient care using the number of visits related to each disease and the spending data by (category of) provider. If no data on visits are available, the number of patients can be used. As in IP care distributions by disease, relative weights are needed for OP care processes. These weights need to reflect the relative intensity of the resources used. However, if number of patients is used, the relative weight of each disease in the distribution is more important.

Figure 12 Outpatient key basic method

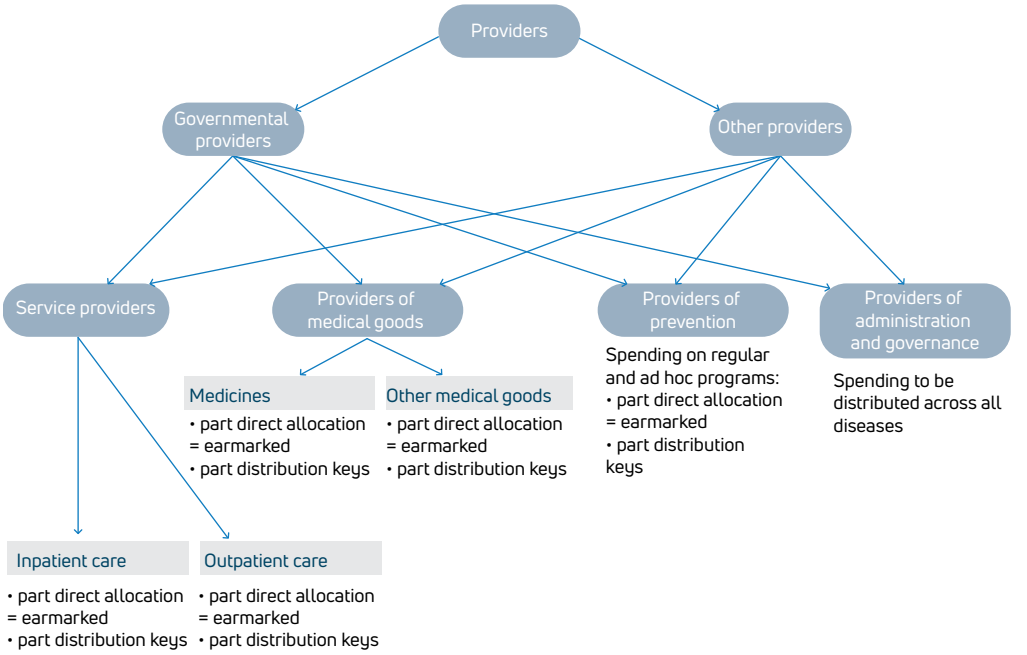
Number of OP visits for disease A in selected provider type / Number of OP visits for all diseases in selected provider type	X	weights reflecting intensity of resource use for disease A	X	expenditure in selected provider	=	expenditure of disease A in selected provider
Number of OP visits for disease B in selected provider type / Number of OP visits for all diseases in selected provider type	X	weights reflecting intensity of resource use for disease B	X	expenditure in selected provider	=	expenditure of disease B in selected provider
Number of OP visits for disease C in selected provider type / Number of OP visits for all diseases in selected provider type	X	weights reflecting intensity of resource use for disease C	X	expenditure in selected provider	=	expenditure of disease C in selected provider
Number of OP visits for disease N in selected provider type / Number of OP visits for all diseases in selected provider type	X	weights reflecting intensity of resource use for disease N	X	expenditure in selected provider	=	expenditure of disease N in selected provider
				Sum of the above:		Total current expenditure of selected provider

OP = Outpatient

Source: Own elaboration based on OPD IPD. WHO GHED training material. Available from: https://apps.who.int/nha/database/DocumentationCentre/Index/en'.

In Figure 13, an overview is given of possible distributions by disease and method used based on providers. Providers usually serve as carriers of the information, meaning how much is spent and on which services and procedures. In fact, each type of provider has a specific disease treating profile. In many cases, information on (some of) the diseases treated is known (e.g., treatment of diabetes). The remaining part of the spending by each of the provider categories has to be distributed using allocation keys (see the options in Box 9).

Figure 13 Current health expenditure distribution by diseases based on providers



Source: Own elaboration.

This analysis can also involve the insurance system. The problem could be that insurance companies and social security are not always willing to provide these data as a result of competition procedures or privacy issues. In some countries, health insurance umbrella organizations collect these data and might provide them at an aggregated level. In certain cases, the analysis performed with HA teams can offer additional managerial content.

The resulting distributions by diseases need to be confirmed with the data available from financing agents, financing schemes, and other sources. For example, is total earmarked spending by disease properly included? Is the IP/OP ratio for certain diseases within the expected range? Is spending by preventive programs by disease well reflected? Of course, something to consider in this assessment is the lack of relationship between epidemiological relevance and relative spending by disease. That is, some less frequent diseases are costly. Also, new treatment technologies such as new medicines may modify the distributions.

A special case is the presence of comorbidity, in which the allocation keys may also be considered (see Box 11).

Box 11 Comorbidity

The standard idea of registering diseases in SHA 2011 is based on the primary or principal diagnosis. If more than one primary diagnosis is recorded and these diagnoses cannot be separated, it is recommended that spending be pro-rated across all relevant primary diagnoses.

9.2.1.3 Example: Creating a disease distribution for general hospitals with inpatient and outpatient departments

The process described above works well if inpatient treatment and outpatient treatment of diseases are separated and the spending data for each of the two treatment processes are available. If total spending is aggregated at only one provider level (e.g., hospital), non-financial information on inpatient stays and outpatient visits can be used when they are available for their respective departments. A relative weighting of inpatient and outpatient data has to be performed given that the amount of resource use is not the same. It is likely that IP care consumes more resources. In some cases, based on costing studies, the equivalence in the value of the number of outpatient visits in hospitals in relation to the number of inpatient days is known. This can be used to create a single weighting structure for the creation of the distribution keys by diseases. If this information is not available, international data sets can be used, in which on average three to five outpatient visits are set equal to one inpatient day (*38*).

To start an example of the disease distribution for inpatient and outpatient visits (under the assumption that both are performed in a hospital setting), a separation of the data for hospital inpatient wards and outpatient departments is needed. In the example below (see Table 39 to Table 42 for the process and results), separation of IP and OP is based on the number of IP days, the number of OP visits, and the equivalence of IP days and OP visits.

The basic information and the initial calculations on equivalent data and their consequences for the cost distribution of inpatient wards and outpatient departments are presented in Table 39.A, and Table 39.B provides the data that are used as a measure of the intensity of resource use in both inpatient wards and outpatient departments.

Table 39.A Inpatient-outpatient distribution of general hospitals

A	B	C	D
2	**Information**	**Data**	**Explanation**
3	***Basic information***		
4	Total spending in NCU	12 000 000	
5	Number of doctors	100	
6	Number of nurses	300	
7	IP wards*		
8	Number of IP days	226 477	
9	OP wards*		
10	Number of visits	664 513	
11	***Additional information***		
12	Number of visits per IP day	4.5	Derived from costing study
13	***Equivalent data***		Creating a common measuring unit
14	Number of IP days	226 477	=C8
15	OP equivalent IP days	147 669	=C10/C12; 6000/4.5 = 1333
16	Total IP and OP equivalent days	374 146	=C14+C15; 5000 + 1333 = 6333
17	***Calculation***		
18	"Price" of equivalent day (NCU)	32	=C4/C16; 12000/6333 = 19
19	Cost of IP wards	7 263 797	=C8 * C18; 5000 * 19 = 94737
20	Cost of OP departments	4 736 203	=C15 * C18; 1333 * 19 = 25263
21	***check***	12 000 000	=C19 + C20
22	* IP = inpatient; OP = outpatient		

Source: own elaboration.

In row 15, the equivalent OP visits are calculated in IP days using the number of visits per IP day. In row 18, an average "price" per IP day is calculated using the total equivalent IP days and the spending of the hospital (see rows 4 and 16). The calculations for the IP wards and the OP departments are made using the equivalent data of rows 15 and 16. These are the basis for the distributions by disease presented below (Table 39.B).

Table 39.B Inpatient and outpatient data used as measures of intensity

Disease	IP days	"ALOS = IP intensity"	OP visits	Resource use = OP intensity
Inpatient & outpatient information (all diseases)	226 477	6.6	664 513	6.0
Inpatient & outpatient information by disease:				
Infectious and parasitic diseases	3627	7.9	7254	4.0
Neoplasms	16 679	7.5	116 753	6.0
Endocrine, nutritional, and metabolic diseases	4563	10.2	9126	6.0
Mental and behavioral disorders	4827	17.7	9654	10.0
Diseases of the circulatory system	18 294	8.5	36 588	4.0
Diseases of the respiratory system	17 601	7.2	70 404	6.0
Diseases of the digestive system	24 724	5	49 448	4.0
Diseases of the musculoskeletal system and connective tissue	7005	7.5	35 025	10.0
Diseases of the genitourinary system	19 004	5	38 008	3.0
Pregnancy, childbirth, and the puerperium	77 345	2.4	162 425	10.0
Injury, poisoning, and other consequences of external causes	21 404	7.7	107 020	2.0
All other	11 404	2.3	22 808	4.0
Intensity for OP visits: number of consultations per case per year				

Source: Own elaboration.

A separate calculation on the diseases treated must be made for both the IP and OP sections of the hospital. This means that in the IP key and the OP key methods (see Figures 11 and 12), the term “expenditure in the selected provider” needs to be replaced by “expenditure in the IP ward” and “expenditure in the OP department,” respectively.

The distribution key method needs data on inpatient days, average length of stay (ALOS), and expenditure data for the diseases treated in inpatient wards in the hospitals. In the example below for the IP ward, these data are introduced, and a calculation can be made (see Table 40 and Box 12 for the corresponding explanatory notes).

Table 40 Calculation of disease distribution for inpatient (IP) wards

Disease	IP days per disease	ALOS of each disease	All IP days	ALOS all disease	IP ward expenditure	Calculation result	Calculated shares	Recalibrated spending
Infectious and parasitic diseases	3627	7.9	226 477	6.6	7 263 797	139 242	2.4	171 189
Neoplasms	16 679	7.5	226 477	6.6	7 263 797	607 893	10.3	747 366
Endocrine, nutritional, and metabolic diseases	4563	10.2	226 477	6.6	7 263 797	226 176	3.8	278 069
Mental and behavioral disorders	4827	17.7	226 477	6.6	7 263 797	415 189	7.0	510 450
Diseases of the circulatory system	18 294	8.5	226 477	6.6	7 263 797	755 655	12.8	929 030
Diseases of the respiratory system	17 601	7.2	226 477	6.6	7 263 797	615 837	10.4	757 133
Diseases of the digestive system	24 724	5	226 477	6.6	7 263 797	600 737	10.2	738 569
Diseases of the musculoskeletal system and connective tissue	7005	7.5	226 477	6.6	7 263 797	255 308	4.3	313 886
Diseases of the genitourinary system	19 004	5	226 477	6.6	7 263 797	461 754	7.8	567 698
Pregnancy, childbirth, and the puerperium	77 345	2.4	226 477	6.6	7 263 797	902 068	15.3	1 109 036
Injury, poisoning, and other consequences of external causes	21 404	7.7	226 477	6.6	7 263 797	800 906	13.6	984 664
All other diseases	11 404	2.3	226 477	6.6	7 263 797	127 462	2.2	156 707
					sum	5 908 226		7 263 797
					difference	1 355 571		0
ALOS = Average length of stay (in days)								

Source: Own elaboration.

Box 12 Explanatory notes for Table 40: Calculation of disease distribution for inpatient (IP) wards

The starting point in the calculation in Table 40 is the availability of data on diseases treated in the IP wards, the number of inpatient days, the average length of stay for each disease, the totality of IP days, the ALOS of all diseases, and the total current expenditure in the IP wards.

The column calculation result is reached as follows (the data shown refer to "diseases of the respiratory system"). First, the share of IP days for each disease is calculated as the ratio of the columns IP days per disease and all IP days (17601/226477 = 0.077717). Next the relative weight of each disease is calculated as the share of the actual ALOS of the disease relative to the ALOS of all diseases (7.2/6.6 = 1.0909). These two ratios are multiplied and, finally, the resulting share is multiplied by the total expenditure of the IP wards (0.077717 * 1.0909 * 7 263 797 = 615 835).

Adding all of the calculation results provides a sum of 5 908 226, which is not identical to the total spending of the IP wards (7 263 797). This difference (1 355 571 NCU) is distributed across all of the diseases treated in the IP wards based on their relative importance in the spending (shown in the column calculated shares). For respiratory diseases, this share is 10% (10% of 1 355 571 = 135 557). This share of 135 557 is added to the calculated result, producing an estimated total spending for this disease of 757 132 (615 836 + 135 557).

As expected, the sum of the calculated results by diseases is not identical to the total cost or expenditure by IP wards, due probably to the fact that the average ALOS is skewed by the ALOS estimated for the category "all other diseases." Thus, a recalibration of the spending by disease is needed and can be performed based on the relative shares of each disease in the total.

For the OP department data, the number of visits and the spending of the departments are used. An estimation of the relative intensity on the use of resources compared with all other diseases is needed. Costing studies or time use survey results can be used to create the relative weight for each disease (see Table 41 for an example).

Table 41 Calculation of disease distribution for outpatient (OP) departments

Disease	OP visits per disease	Weight of each disease	OP visits all disease	Weight all disease	OP department expenditure	Calculation result	Calculated shares	Recalibrated spending
Infectious and parasitic diseases	7254	4.0	664 513	6.0	4 736 203	34 468	0.4	17 549
Neoplasms	116 753	6.0	664 513	6.0	4 736 203	832 138	8.9	423 669
Endocrine, nutritional, and metabolic diseases	9126	6.0	664 513	6.0	4 736 203	65 044	0.7	33 116
Mental and behavioral disorders	9654	10.0	664 513	6.0	4 736 203	114 679	1.2	58 387
Diseases of the circulatory system	36 588	4.0	664 513	6.0	4 736 203	173 850	1.9	88 513
Diseases of the respiratory system	70 404	6.0	664 513	6.0	4 736 203	501 793	5.4	255 480
Diseases of the digestive system	49 448	4.0	664 513	6.0	4 736 203	234 955	2.5	119 624
Diseases of the musculoskeletal system and connective tissue	35 025	10.0	664 513	6.0	4 736 203	416 058	4.5	211 829
Diseases of the genitourinary system	38 008	3.0	664 513	6.0	4 736 203	135 448	1.5	68 961
Pregnancy, childbirth, and the puerperium	541 415	10.0	664 513	6.0	4 736 203	6 431 409	69.1	3 274 448
Injury, poisoning, and other consequences of external causes	107 020	2.0	664 513	6.0	4 736 203	254 256	2.7	129 450
All other diseases	22 808	4.0	664 513	6.0	4 736 203	108 373	1.2	55 177
					sum	9 302 470		4 736 203
					difference	-4 566 268		0

Source: Own elaboration.

Box 13 Explanatory notes for Table 41: Calculation of disease distribution for outpatient (OP) departments

The starting point in the calculation in Table 41 is the availability of the data on diseases treated in the OP departments, the number of OP visits, the weight for each disease, the totality of all OP visits, the weight of all diseases, and the total current expenditure in the OP departments.

The column calculation result is reached as follows (the data shown refer to "diseases of the respiratory system"). First, the share of OP visits for each disease is calculated as the ratio of columns OP visits per disease and OP visits all disease (70 404/664 512 = 0.105948). Next the relative weight of each disease is calculated as the share of the actual weight of the disease compared with the weight of all diseases (6/6 = 1). These two ratios are multiplied and, finally, the resulting share is multiplied by the total expenditure of the OP departments (0.105948 * 0.90909 * 4 736 202 = 501 792).

Adding all of the calculation results provides a sum of 9 302 470 NCU, which is not identical to the total spending of the OP departments (4 736 202). This difference (-4 566 267 NCU) is distributed across all of the diseases treated in the OP departments based on their relative importance in the spending (shown in the column calculated shares). For respiratory diseases, this share is 5% (5% of 4 566 267 = -228 313). This share of -228 313 is deducted from the calculated result, producing an estimated total spending for this disease of 255 479 (501 792 – 228 313).

As can be expected also for OP departments, the sum of the calculated expenditure by disease deviates from the total spending of the OP departments. Thus, a recalibration based on the relative shares of each disease in the total is needed.

Performing the calculations for IP wards and OP departments separately results in an estimation of spending by selected disease for the hospital as a unit of provision (see Table 42 for a numerical example).

Table 42 Cost of inpatient and outpatient treatment by disease

Disease	IP spending	OP spending	Total
Infectious and parasitic diseases	171 189	17 549	188 738
Neoplasms	747 366	423 669	1 171 036
Endocrine, nutritional, and metabolic diseases	278 069	33 116	311 185
Mental and behavioral disorders	510 450	58 387	568 836
Diseases of the circulatory system	929 030	88 513	1 017 543
Diseases of the respiratory system	757 133	255 480	1 012 613
Diseases of the digestive system	738 569	119 624	858 192
Diseases of the musculoskeletal system and connective tissue	313 886	211 829	525 715
Diseases of the genitourinary system	567 698	68 961	636 659
Pregnancy, childbirth, and the puerperium	1 109 036	3 274 448	4 383 484
Injury, poisoning, and other consequences of external causes	984 664	129 450	1 114 114
All other diseases	156 707	55 177	211 883
Total spending	7 263 797	4 736 203	12 000 000

Source: Own elaboration.

The spending of the hospital is shown in the example above, including the overhead (such as medical and financial administration) of the hospital itself. However, the health system also has a certain amount of overhead expenses, classified as governance and administration of the health system (in SHA terminology, HC.7 and HP.7). Health system administration is part of the spending that needs to be distributed among all diseases, because it is part of the burden in the total spending. In the SHA manual, it is proposed that the share of each disease be used in total direct spending as the calculation ratio.

If the use of pharmaceuticals and medical goods is part of the package used in IP wards and OP departments, these inputs are already included in the estimation of the spending by ward and department and thus do not pose a problem. Similar treatment should be given to earmarked activities and spending on pharmaceuticals, other medical goods, and prevention activities, as in these cases there is a one-to-one relation with the respective diseases. However, if a one-to-one relation does not exist, difficulties arise. For example, a single type of medicine may be allocated to various diseases because there is no specific connection to medicines and diseases. The HEDIC (*39*) manual discussed the transition from the Anatomical Therapeutic Chemical Classification (ATC) to ICD and the associated results and pros and cons. It needs to be noted that these were among the first results of the application of the transition tables. Further investigation is needed to fully explain variations between disease classes and between countries, because differences in which drugs are authorized, for which indications, whether they are reimbursed, and by which financing agencies all need to be taken into account. The HEDIC project showed that most diseases are treated with medications from only one or two ATC groups (with a minimum cut-off point of 70% of the diseases) and that the majority of ATC groups are used to treat one or two diseases (also with a minimum threshold of 70%).[23]

9.3 COVID-19 distribution

> Specific guidance for data collection, coding, analysis, and COVID-19 expenditure reporting has been prepared by WHO. This document invites accountants to follow those guidelines, and here complementary comments are provided.

This section addresses some starting points in a COVID-19 expenditure measurement (*40*). Resources are channeled to COVID-19 in the context of a national emergency. That is why not only routinely mobilized resources were used but in an ad hoc way. Knowing in detail the flows to be followed can facilitate the collection of information and data required. COVID-19 spending is expected to be handled within SHA 2011, which provides the framework for health expenditure accounting. SHA 2011 allows for an explicit identification of COVID-19 subcategories in each classification. As COVID-19 impacts other diseases, it is advisable to include it as part of a complete distribution. To generate allocation keys, costing information may be required. Boundary criteria remain (e.g., health as the main purpose, medical knowledge involved, final consumption by residents), as well as accounting procedures. Relevant non-health components can be registered below the line.

[23] HEDIC unpublished data, presented at a 2016 workshop on disease in Egypt.

Priorities for the health financing of COVID-19 (*40*) have focused on two objectives: ensuring sufficient funding for common goods for health and removing financial barriers to health services. Key actions relate to increasing public funding for the health system response by expanding its priority and ensuring adequate, sustainable funding and a special budget program. Another key action relates to adjusting health financing policies to remove financial barriers to care, specifically by reducing or suspending user fees and other OOPS components; compensate health providers for losses related to lowered OOPS; and create other financial vehicles to assist providers in coping with pandemic spending. Health accounts contribute to monitoring these measures.

Methodological proposals: WHO, OECD, and EUROSTAT

WHO has elaborated a specific document guiding accounting for COVID-19-related spending *(41)* for accountants dealing with ICD coding. It is important to consider that two codes have been introduced specifically for COVID-19 in ICD-10[24]: code U07.1 (COVID-19) for a confirmed diagnosis by laboratory testing, irrespective of severity of clinical signs or symptoms, and code U07.2 when COVID-19 is diagnosed clinically or epidemiologically but laboratory testing is inconclusive or not available.

Codes related to COVID-19 but not specifically focusing on the disease itself include, among others, U08 (Personal history of COVID-19), U09 (Post-COVID-19 condition), U10 (Multisystem inflammatory syndrome associated with COVID-19), U11 (Need for immunization against COVID-19), and U12 (COVID-19 vaccines causing adverse effects in therapeutic use).

COVID-19 spending refers to detection/testing, treatment, and, finally, vaccination against the disease and its successors. For testing, nearly all countries have reconverted to COVID-19 units, expanded available health units, and created new facilities (e.g., ranging from moveable tents to hotels and convention centers). How to classify these arranged locations depends on their function or purpose, as with any other provider.

For example, a tent rented and operated by a hospital should be classified as a hospital (HP). The services offered, including those offered by the hospital personnel in the tent (e.g., IP, OP, and/or HC.6.3), and the factors of provision (FP) are included as part of the hospital, increasing the cost/spending. In the case of an independent building (such as a convention center converted into a vaccination center), this would be treated similarly, as in the case of a school in a vaccination campaign: the provider is the facility personnel offering the service.

Treatment is an important stage in the pandemic. Treatment refers here to two aspects: functions (HC) and providers (HP). Regarding the functions to use, this will relate to inpatient and outpatient care as well as home care. Inpatient care can relate to treatment in varying intensities in normal wards specifically designated for COVID-19 or in special ICU for the most severe cases. Subgroup codes can be included for each item of the functional classification. Providers can range from hospitals and medical centers to general practitioners providing supervised home care.

Within prevention, risk communication[25] (*42*) activities and general information for the public are strategic to allow informed decisions mitigating the effects of a threat (hazard), usually under government and affiliated organizations. As in other cases, additional subcodes can be generated to ensure visibility and accountability.

[24] Also, specific coding is available for COVID-19 in ICD-11.

[25] Risk communication is the real-time exchange of information, advice, and opinions between experts or officials and people who face a threat (from a hazard) to their survival, health, or economic or social well-being. https://www.who.int/emergencies/risk-communications.

Another specific step is vaccination. Vaccination can also be performed in mobile facilities and temporary facilities such as tents, gyms, and schools. Again, the provider is the medical organization vaccinating, but it can be important to register the space separately (e.g., as a special subcode).

Next to this curative/preventive process, COVID-19 has led to spending on protective materials (i.e., personal protective equipment [PPE]) ranging from face shields and mouth masks to gloves and protective coats. Many are used in facilities but also by the general public and mostly paid for OOP.

On top of the current spending, additional investment is needed, ranging from specific refrigerators to medical ventilators and oxygen equipment.

Challenges

COVID resulted in joint decisions with political, health, and other systems to cope with the pandemic. Some processes were not included in the routine financial records of the health system, increasing difficulties in access. In other cases, an insufficient breakdown did not allow a proper analysis. Some of the spending was devoted to health and social as well as economic purposes, without boundary setting. Thus, lack of availability or access to records on specific COVID-19 spending is a significant challenge. For example, are communication campaigns by the authority in charge of the response (not necessarily the MoH) a health expense? (*43*).

Medical identification of cases can also be a challenge, notably in the case of nosocomial infections, comorbidity, and so forth.

Conceptual challenges include what the OECD and WHO guide refers to as financial transfers, such as subsidies and compensations for loss of revenue, which can be clarified in the guide. However, international agreements may not be in accordance with national ones. Examples include the case of household spending on PPE. Only face masks recognized for medical use with high protection are accounted for. All other spending related to personal protection categories is proposed to be excluded under the assumption that private protection has a primary purpose of compliance with regulation and fine avoidance as opposed to personal health protection or prevention. It is important to remember that, in SHA 2011, the effectiveness of goods and services is not a key criterion but the primary purpose is. Thus, this can be accounted for even when these purchases involve non-certified PPE. The internationally recommended exclusions not in agreement with national decisions can be registered below the line.

9.3.1. Measuring COVID-19 spending: Focus on household OOPS

Identification of financial sources is important for HA estimations. Basically, spending by the government (MoH, MoF, MoD, and other bodies as well as social security) is usually known at some level of detail. More difficult is the estimation for the private sector, specifically household OOP spending. Some specific items to be considered in this estimation are presented in Figure 14.

Figure 14 Possible OOPS in COVID-19

Services		Medical goods	
WHAT			
Payment for private health services + co-payments (public and private): consulttions/ hospitalizations, testing, vaccination	Medical equipment rental (oxygen, respirators, beds) for households (not refunded)	Purchase of pharmaceuticals by households (including oxygen) + Health services application for medicines by family members?	Purchase of households of other medical goods (PPE) + disinfectants (alcohol, etc.)
HOW			
Co-payments: Co-payment registrations at government and insurance agencies (fees, agreements) Payment for services: Payment for tests and hospitalization in private providers: COVID-certified care units, reports/surveys Non-certified units, surveys Test payment: Laboratory reports/surveys Vaccination (payment/ co-payment?): Records	Equipment rental: survey of rental equipment of providers	Purchase of medicines from pharmacies and non-specialized shops: Reports or surveys	Purchase of PPE from pharmacies and non-specialized shops Reports or surveys
WHERE			
Statistical office survey or report of price statistics? Company production statistics (certified) (total in company surveys) and household surveys, exit MoH-certified private services (diagnosis, tests), COVID co-payments? Insurance: refund requesting	MoH-certified private shops? Statistical office production statistics of companies Insurance companies: refunding requested? Exit survey Consider small sample size surveys of large providers	Statistical office retail sales records according to trade classification or activities and products (SITC, CPC, ISIC) Specific sale of remdesivir and baricitinib (Olumiant). Which ones are used? Favipiravir and merimepodib; bamlanivimab and etesevimab; casirivimab and imdevimab Import of such products (statistical office; customs reports by product type?) (statistical office production by product type), MoF and customs mass purchases distributed to the private sector Non-specific medicines, estimated on average, according to the WHO costing tool; corroborate with clinics, etc.	Statistical office retail sales records according to trade classification or activities and products (SITC, CPC, ISIC) Import (statistical office, customs reports by product type?) (statistical office production by product type), MoF and customs mass purchases distributed to the private sector
		MoH/social security registry of patients treated for COVID at home, not reimbursed? Household surveys, exit surveys, supplier surveys Consider small sample size surveys of large providers	Household surveys, exit surveys, supplier surveys Consider small sample size surveys of large providers Remember that imported goods (usually CIF) and trade records (usually only value added) are undervalued and their value must be adjusted

Source: Own elaboration.

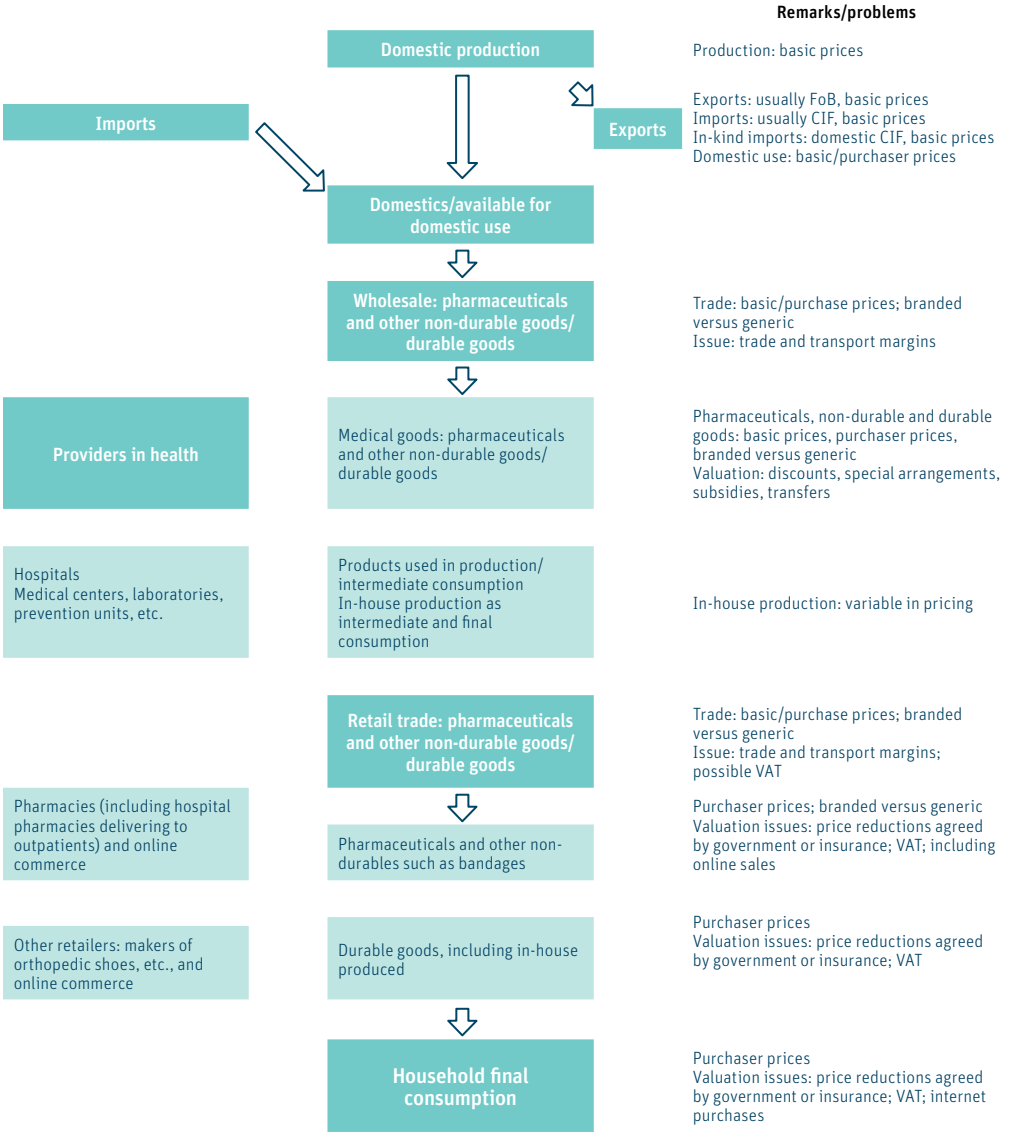
A distinction is made in services, on the one hand, and medical goods on the other. For each of these two broad groups, the "what," the "how," and the "where" are separated. The "what" deals with the activities or functions that are involved in this measurement. The "how" provides indications on the procedures and sources available. Finally, the "where" provides ideas on where to look for the information or which organizational units could be involved in data collection for COVID-19 OOP.

9.4 Medical goods: Pharmaceuticals and medical durables in perspective

WHO, OECD, and EUROSTAT have elaborated specific guidelines for estimation of pharmaceutical spending through two documents, one related to OTC and another related to hospital pharmaceutical consumption. This document proposes following those rules and includes additional comments regarding accounting for pharmaceutical spending.

Medical goods are an important topic in health expenditure tracking. These include pharmaceuticals, other non-durable goods such as bandages and wound dressings, and durable products such as hearing aids and lenses. Here attention is focused on pharmaceuticals given that they contribute directly to most health care services. Their spending may increase as part of new technologies affecting financial flows, including OOPS. The processes involved in pharmaceutical consumption are diverse both within and across countries (see Figure 15).

Figure 15 Flows of medical goods



Additional notes of interest in medical goods structure

Financing Sources: institutions or entities that provide funds
- Private sector – corporations and households
- Donors/foreign aid
- Government – tax/revenues

Financing/Procurement Agents: entities including insurance and pharmacy benefit schemes that pool and channel funds provided by financing sources to pharmaceutical procurement or management
Point of Warehousing: point at which pharmaceuticals and medical commodities are stored
Providers: entities that deliver pharmaceutical products
Functions: activities related to procurement, distribution, and use of pharmaceuticals such as warehousing, supply chain management, staff training, and logistics information systems

Specific prices:
CIF: cost, insurance, and freight
FOB: free on board

Waste and leakage: related not only to production and transport but also to storage
Over- and underuse: difficult to determine as consumption is defined as purchases rather than use; purchase and prescription access is problematic
Intermediate consumption: use of medical goods as part of the package of services received by patients. This is usually valued at the price paid by the provider without any consideration of the personnel involved. Thus, the value of intermediate consumed products cannot be directly compared with the value of final consumed goods.

Source: Own elaboration.

Analysis of the financial flows linked to pharmaceuticals faces complexities relating to the use of the data sources and, more specifically, to the valuation of the goods provided to consumers. Prices are determined by many factors and are not the same in the various distributional channels in the same country and certainly not the same across countries (e.g., the size of the pharmaceutical market in a country). Important is the interaction and the role of the government in this process by, for example, creating special pricing agreements for different sets of products with pharmaceutical companies through discounts, subsidies, and so forth, influencing the price paid by consumers. A policy promoting generic over branded medicines can modify completely price structures and consumption. Pharmacies and especially umbrella organizations can sometimes also negotiate discounts (e.g., with wholesalers of medicines and other products) for their members.

As a result, one of the main problems is to determine the final consumer value as many actors and levels are involved, and thus simple use of the available data (e.g., on imports or national production) is not always possible. One issue is the mark-up that is to be used to reach the trajectory of wholesale to retail trade. Also, internet purchases, either by pharmacies or by the general public, create additional difficulties in determining the level of pricing and spending in medical goods. Box 14 (*44*) provides an example of the relative distribution of consumer prices for the European pharmaceutical organization EFPIA.

Box 14 Price structure and mark-ups

PRICE STRUCTURE The world pharmaceutical market was worth an estimated € 754 555 million (US$ 852 647 million) at ex-factory prices in 2017. The North American market (USA and Canada) remained the world's largest market with a 48.1% share, well ahead of Europe and Japan. Distribution margins, which are generally fixed by governments, and VAT rates differ significantly from country to country in Europe. On average, approximately one third of the retail price of a medicine reverts to distributors (pharmacists and wholesalers) and the state.

Production/manufacturing:	65.6%
Wholesale:	5.1%
Retailers/pharmacies:	19.2%
Government VAT:	10.1%

Source: EFPIA, The Pharmaceutical Industry in Figures; Key Data 2018. Available from: https://efpia.eu/media/361960/efpia-pharmafigures2018_v07-hq.pdf.

Another important issue to consider for good measurement relates to the way intermediate consumption of medical goods is transformed (or not) into consumer prices. Intermediate consumption deals with the use of medicines and other medical goods in the treatment process of patients as part of the "package" of services delivered. This means that in many cases no registration is available as these medical goods are part of the billed package.

Estimating medical goods spending in all of its aspects, from sheer amounts by each of the relevant providers to each of the financing schemes and agents responsible for these amounts, depends on a large set of detailed information ranging from hard data to metadata on structures and programs as well as policy targets set by government and other financing agents. Sources of information useful in the estimation were discussed earlier in this document; in addition, and specific for medical goods, the CPC can be a source to be explored, as is IQVIA (in which IMS is now integrated).

Coding pharmaceutical spending may require understanding and identifying the role of spending in the flow. Box 15 (*45*, *46*) indicates the key criteria to distinguish specific situations when pharmaceuticals are provided as part of treatment or as part of medicine sales.

Box 15 Medical goods classification: HC treatment or HC sales?

Why is the category HC.5 included in SHA? The reason is to allow tracking of spending for medical goods used outside the package of care (separately dispensed). What denotes "separately dispensed or consumed"? It means not included in a package of treatment. Consumption in SHA means purchased.

A physician using medical goods, whether pharmaceuticals, wound dressings, or any other good, is part of the package of services and part of the treatment. A physician can also provide a prescription for medical goods to be purchased, which denotes a transaction outside of the package and is treated as HC.5. In most cases a package of IP or OP services has an all-inclusive "price" in which all activities are valued, including medicines and other medical goods. Normally, these are classified as HC.1, HC.2, HC.3, or HC.6.

However, if this medication that is part of the package is separately billed, the package it relates to may not be traceable. In that case, the medication is treated as if it was prescribed and purchased through a retailer, meaning that it is part of HC.5. If not treated this way, spending for medical goods and health services is underestimated. Specific guidelines are available for tracking pharmaceuticals consumed via retailers, and another guideline is available to improve estimates of pharmaceuticals distributed via hospital care.

9.5 PHC expenditure and SHA 2011

Specific guidance for data collection, coding, analysis, and reporting has been prepared by WHO. This document proposes following those guidelines. PHC can play a crucial role in the framework of UH and can increase the efficiency of the system.

During the 50th anniversary of the Alma Ata Declaration, the PHC discussion was highlighted and included in the health accounts agenda (*47, 48*) of the various global and regional meetings. In 2020, the COVID-19 pandemic reinforced the relevance of PHC (*49*). The challenge was and is how to measure PHC spending. An operational and measurable definition is needed, given that PHC is an overarching strategy. WHO consulted its Member States and took as a starting point the classification of functions, HC in SHA 2011, considering a selection of services offered by all providers (*50*). WHO recommends that each country describe PHC in its own terms; however, for the purposes of international reporting, the proposal is to be applied. In consultation with its Member States, OECD agreed to limit the measurement to HC by ambulatory care providers (HP.3) (*51*). For a more detailed analysis of differences in the OECD and WHO approaches and suggestions on potential inclusions, see Rathe et al. (*52*). A short overview of the differences in the two measurement options is provided below (see Table 43).

An indication of the expenditure data is given for some Latin American countries in a paper discussing the starting point and the measurement of the various proposals (*53*). Implementation of PHC spending measurement according to SHA implies not only a good description in terms of functions but also a possible link with all of the other classifications such as HP, HF, and diseases. Moreover, provision of preventive care is considered strategic, and such care is offered by several providers. The role of administration, governance, and stewardship of the health system is also important for the quality and implementation of PHC services, and thus the share attributable is also desirable. In both cases, the actual shares to include may need further investigation and discussion. Which providers are involved is determined by the health system structure and context of each country, and thus at minimum there must be agreement on the proper set of functions. Health accounts content should be adjusted accordingly and solve operational problems such as disaggregation of general and specialized ambulatory care. Proper PHC monitoring allows for recognizing the availability of PHC resources, the search of under-funded PHC fields, and the importance of ensuring their efficient use. A progressive convergence toward PHC reporting is expected in light of its crucial role for UH and SDG 3.

Table 43 Components of PHC expenditure as per WHO and OECD proposals

Code	Service/function	WHO definition all providers	OECD definition providers of ambulatory health care	Comments on differences
HC.1	Curative care			
HC.1.3	Outpatient curative care			
HC.1.3.1	General outpatient curative care	✓	✓	
HC.1.3.2	Dental outpatient curative care	✓	✓	
HC.1.3.nec	Outpatient curative care nec	✓		It is often difficult to separate general from specialized OP care
HC.1.4	Home-based curative care	✓	✓	
HC.3	Long-term care (health)			Aging of the population brings LTC to a daily health care need
HC.3.3	Outpatient long-term care (health)	✓	-	
HC.3.4	Home-based long-term care (health)	✓	-	
HC.5	Medical goods (non-specified by function)			Medical goods are often separately provided in retailers, not through OP providers
HC.5.1	Pharmaceuticals and other medical non-durable goods			
HC.5.1.1	Prescribed medicines	✓	✓	
HC.5.1.2	Over-the-counter medicines	✓	✓	
HC.5.1.3	Other medical non-durable goods	✓	-	
HC.5.2	Therapeutic appliances and other medical durable goods			
HC.5.2.1	Glasses and other vision products	✓	-	
HC.5.2.2	Hearing aids	✓	-	
HC.5.2.3	Other orthopedic appliances, ortheses, and prosthetics (excluding glasses and hearing aids)	✓	-	
HC.5.2.9	All other medical durables, including medical technical devices non-specified by function	✓	-	
HC.6	Preventive care			Epidemiological surveillance and disaster preparation are part of the basic services guiding routine preventive and curative care
HC.6.1	Information, education, and counseling programs	✓	✓	
HC.6.2	Immunization programs	✓	✓	
HC.6.3	Early disease detection programs	✓	✓	
HC.6.4	Healthy condition monitoring programs	✓	✓	
HC.6.5	Epidemiological surveillance and risk and disease control programs	✓	-	
HC.6.6	Preparing for disaster and emergency response programs	✓	-	
HC.7	Governance and health system and financing administration			Governance and administration are an integral part of all health care provision
HC.7.1	Governance and health system administration	✓	-	
HC.7.2	Administration of health financing	✓	-	
Note: WHO allocates 80% of retail purchases of medical goods and health system administration. The inclusion of services is not conditional on the type of provider.				

Source: Adapted from: Rathe M, Hernández-Peña P, Pescetto C, Van Mosseveld C, Borges dos Santos M, Rivas L. Gasto en atención primaria en salud en las Américas: medir lo que importa. Rev Panam Salud Publica. 2022;46:e13. Available from: https://www.paho.org/journal/es/articulos/gasto-atencion-primaria-salud-americas-medir-lo-que-importa. [Accessed 22 September 2022].

9.6 Trade in health: Exports and imports

SHA exports are excluded (or dealt with below the line), but health tourism is a key policy issue in many countries.

SHA focuses on consumption of health products – goods and services – by the resident population. This means that exports are to be excluded from domestic consumption, but imports are to be included. Although this might seem an easy distinction, it may be complicated because for many health providers this distinction is not separately registered. Estimation of imported and exported services has been weak and exacerbated by new phenomena such as internet services and e-health.

Traveling for health services (or "health tourism") is an increasing practice in many countries. For some countries, offering health services to non-residents is an additional source of revenues. There can be potential benefits of medical travel for both sides. For the exporting country, additional foreign earnings from increased health service delivery are visible, resulting in increased employment and improved infrastructure and (possibly) economies of scale; for the importing country, this may result in cost savings and (possibly) reduced waiting times and increased quality of service delivery.

Trade relates not only to the movement of patients between countries but also to providers/health care personnel delivering services abroad, meaning that the provider is crossing the border. In some other cases, the services cross borders (e.g., via electronic means).

Some specific issues related to trade in health goods and services are described below.

Residency

Diplomatic representatives, members of the armed forces, students, and patients undergoing medical care abroad remain residents of their home economies. Cross-border workers are residents of the economy in which they have their homes. Organizations or individuals, including refugees, are considered resident if they stay or are expected to stay for one year or more in their host countries.

Valuation

SHA records products in final purchasers' prices, including subsidies. In the national accounts trade statistics these medical products transactions across borders involve flows reported at FOB ("free on board") prices and CIF ("cost, insurance, freight"). Hence, it is important to note the difference and recalculate in final purchaser values.

Data sources for trade in health

International trade and balance of payments statistics will be the principal sources. The choice depends to a large extent on the organization of the health care system. However, usually data sources will not fit all needs.

Providers

Resident provider statistics may include information on delivery of services and goods to non-residents, but this information is scarce and usually limited to specific groups such as embassy personnel or refugees. Retailers such as pharmacies or optical shops and other providers of medical goods usually have no separate recording of sales to non-residents. Purchases abroad by retailers may be hampered by the same problems. Household purchases abroad, either physically performed or via internet, are even more difficult to trace.

Government administrative sources

Liaison offices may have information on agreements with other countries, and usually the balance of the spending is available; however, detailed information on goods and services imported and exported may not be. The same could be true for social security institutions. Moreover, this information is probably limited to reimbursements of services consumed abroad.

Private health insurance and household and tourist surveys

Travel insurance companies may have information on health services consumed abroad, but this may be seen as commercially secret information. Household information, as well as tourist survey spending, can be a valuable source, but again reimbursements need to be taken into consideration.

Other sources

The supply and use data of national accounts can be used. National accounts do not distinguish between imports of households for their own use and imports by corporations. In many cases, exports of health services are not separately listed but are included in an aggregate containing many different areas of goods and services due to the relatively small importance of each of those separately. Moreover, national accounts usually value supply in basic prices.

There are many other special topics of interest not developed in this document. Mention can be made of tax credits, exemptions, and subsidies on consumption of health care. Income tax systems in many Latin American countries and elsewhere allow deductions in the form of tax credits, subsidies, or exemptions for out-of-pocket health care expenditures and private medical health insurance for individuals, for employers providing health insurance, and for non-profit health organizations. As fiscal space for health care narrows, there is growing interest on measuring potential resources made available through the resumption of regular taxation in these areas. Data for these specific items may be available in national income revenue databases, sometimes with detailed specification of expenditure items, which may be translated into SHA function codes. These data could provide a first scenario on potential amounts, upon which models considering demand elasticity could be drawn.

Questions and answers

1. Q: Is there a limit on the issues or topics of special interest areas to be investigated?

   A: As spending is related to all activities of the health system, the choice is practically limitless. An example is the Netherlands, which has been producing HA yearly since 1972 and, in close cooperation with the Ministry of Health, produces several special interest topics reports each year.

2. Q: Why is the calculation of pharmaceutical spending so difficult if an abundance of information exists in nearly all countries?

   A: The availability of information is hampered by market structures, and information is often treated as confidential due to commercial reasons; e.g., Prices paid may vary among purchasers based on mark-ups, profits, agreements, caps, subsidies, controls, etc, which may be difficult to integrate. Seldom the records refer to all products sold, and all payments made.

3. Q: Is it necessary to include all diseases?

   A: WHO recommends including a disease distribution in which the level of unknown data is limited to a maximum of 25% to 30% of the current health expenditure. A complete distribution is required, but this does not mean that all diseases need to be separately included. It does mean, however, that the complete amount of spending is attributed to diseases.

CHAPTER 10

FORMATTING HEALTH ACCOUNTS RESULTS

A health account study provides information on health expenditure for a given period (usually a year) and displays the financial flows in a set of interrelated classifications. Both the classifications and their categories are policy relevant for the health system and are intended to be used by decision makers as well as by analysts and researchers, among others. Results are presented traditionally as a set of tables or selected indicators and are included in national, regional, and international databases and as time series. This chapter discusses the preparation of results and data to be analyzed and published.

Results can be presented in uni-dimensional, bi-dimensional, or multi-dimensional tables based on the available detail of the data and the classifications used. Tables are a systematic way to report data, but policymakers will often request a more concise and immediately meaningful presentation related to policy questions. Ad hoc tables can be generated and may involve additional classifications as per specific needs.

Key results will often need to be extracted from tables, as well as linked to macroeconomic and non-expenditure data to build indicators. Indicators are normally displayed as shares of the population, selected macro variables, and components related to relevant HA aggregates. Any additional layer of analysis can involve, for instance, benchmarks or comparisons with international indicators. Further suggestions are provided below.

10.1 Creation and use of cross tables

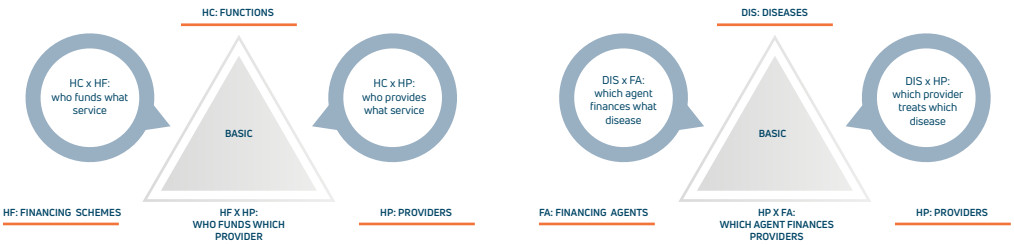
> Each SHA classification can be described independently, but a cross tabulation enlarges the depth and breadth of the analysis. Tables are a basic health accounts display.

The basic SHA structure focuses on three dimensions – consumption, provision, and financing – also called the integrated triaxial system. The "basic" three classifications of recurrent spending are functions (HC), providers (HP), and financing schemes (HF), complemented with the revenue of the schemes (FS). FS can be relevant, for example, in analyzing the role of external funds in health care. A set of tables crossing these classifications are part of the standard reporting. SHA 2011 displays capital and recurrent spending separately. Capital spending, represented by the HK classification, can also be cross classified, primarily by type of provider, to highlight users. In addition, it can be linked to other classifications to document their uses by service, disease, funding, and so forth.

The relations between (a selection of) the classifications are shown in Figure 16. Each combination of three dimensions can result in three different cross tables. It must be noted that neither the classifications nor the detail is mandatorily set, although the basic three (HC, HF, and HP) are recommended for consistency reasons. The main basic dimensions cross tabulated – HC x HP, HF x HP, and HC x HF – are in many instances complemented by important other classifications such as FS (revenue), DIS (diseases), and factors of provision (FP, inputs used by the providers). Specific categories such as remunerations and total pharmaceutical spending, extracted from FP (factors of provision), are also frequently monitored. The basic analysis of who finances which provider and which service(s) can then be enlarged according to how the provision of services and schemes is funded (or any other choice) by substituting or adding the basic classification by any other

within the same dimension (e.g., consumption: functions [HC], diseases [DIS], beneficiaries [BEN], location [SNL], sex, age; provision: providers [HP], factors of provision [FP]; financing: schemes [HF], agents [FA], revenue [FS], institutional units providing the revenue [FS.RI]).

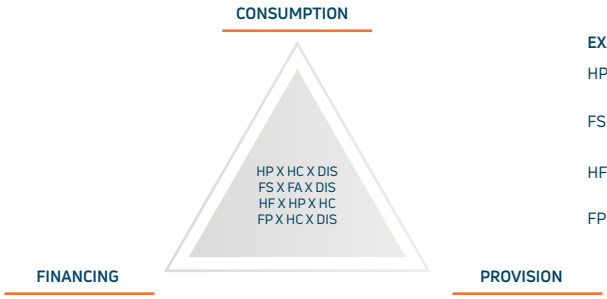
Figure 16 The "basic" and "expanded" dimensions: An example



Source: Own elaboration.

It is also possible to complement the analysis through three-dimensional tables by keeping three classifications in order to make a specific analysis in detail (see Figure 17). For instance, providers are assessed to see which services are offered to treat a specific disease or which revenues are earmarked and used by financing agents for a specific disease (e.g., external funding). This is also the case if a scheme (e.g., OOPS or government) is analyzed by provider and function or medicines by disease and service. There is no limit for cross tabulation, as any classification can be used as long as it is meaningful for the specific context and the data are available.

Figure 17 Some examples of three-dimensional analysis



Source: Own elaboration.

Using the HAPT makes it easy to create three- and more-dimensional tables. The most frequently used standard in any HAPT exercise is tables based on HF, HC, HP, FS, and HK (capital). Those typically recommended by WHO are FA, FP, and DIS. Non-standard classifications often used and relevant are age, gender, and subnational distributions (SNL), with categories created to fulfill ad-hoc needs. This results in a basic complete set of tables providing information on the most often requested policy subjects. Additional classifications can be developed on the categories of the National Health Plan, income support for COVID-19, and so forth.

The standard list of SHA classifications is crossed by itself in Table 44. The yellow highlighted cells reflect the most usual combinations resulting in two-dimensional tables. The non-colored cells are possible but not a usual combination.

Table 44 Usual combinations of classifications in SHA tables

	FS	HF	FA	HP	HC	FP	DIS	HK
FS								
HF								
FA								
HP								
HC								
FP								
DIS								
HK								

Source: Own elaboration.

10.2 Indicators

Indicators are key elements in policies for goal formulation and evaluation of achievements, as well as summarizing and simplifying information for communication.

In addition to tables, indicators are a useful means of presenting the results. An indicator is a quantitative measure that represents a complex system or phenomenon (the subject to be indicated) (*54*). Indicators in health spending provide insight into the relative situation of the (financing) health system in relation to other phenomena such as the general economy, as well as a comparison with other countries or changes in time and content. They can be specific, as in the case of programs or spending components, or general, such as CHE as a share of GDP.

Health accounts indicators summarize the various aspects or attributes of the spending and health financing system. Indicators as measurable variables are used as a representation of an associated phenomenon (see Table 45 for a selection of indicators).

Table 45 Selected examples of indicators used in health care analysis

Axis	Indicator	Mln NCU	Mln USD	% GDP	Per capita NCU*	Per capita USD*	Percentage of CHE**
General	Total current health expenditure	X	X	X	X	X	
	Total current health expenditure plus capital spending	X	X	X	X	X	
Health functions	Preventive spending						X
	Curative spending						X
	Inpatient spending						X
	Outpatient spending						X
	Health expenditure on long-term care	X	X				X
	Total LTC spending	X	X	X	X	X	
	Total pharmaceutical spending	X	X	X	X	X	X
Financing schemes	Government health schemes						X
	Compulsory contributory health insurance schemes						X
	Voluntary health insurance schemes						X
	Out-of-pocket expenditure on health						X
Providers	Hospital health spending						X
	Ambulatory health spending						X
Revenue of schemes	Externally funded expenditure on health						X
	Domestic public and compulsory private funds on health						X
	Privately funded expenditure on health						X
Factors of provision	Expenditure on human resources						X
	Expenditure on pharmaceutical inputs						X
Beneficiaries	Expenditure on health on non-communicable diseases	X	X	X	X	X	X
	Expenditure on health on injuries	X	X	X	X	X	X
	Expenditure on health age 65 and over	X	X		X	X	X
Subnational level	Expenditure by national divisions	X	X		X	X	X
Capital formation	Total public spending on capital formation	X	X				X
	Total private spending on capital formation	X					X
	Spending on medical equipment	X					X
		X					X

*For subnational level, the national population is to be replaced by the population of each subnational level.
**CHE for capital spending to be replaced by CHE plus capital spending.

Source: Own elaboration based on Table 15.1 of OECD, EUROSTAT, World Health Organization. A System of Health Accounts 2011: Revised edition. Paris: OECD Publishing; 2017:347. Available from: https://www.who.int/publications/i/item/9789240042551 http://dx.doi.org/10.1787/9789264270985-en. [Accessed 22 September 2022].

Indicators do not have to be limited to the list mentioned here. Many more can be created, usually to meet national or local needs. Some examples of additionally produced indicators are the following:

- Total participation of households in all financing schemes through the different contribution mechanisms.
- Government schemes and compulsory financing schemes as a percentage of general government expenditures.
- Expenditures on communicable diseases, non-communicable diseases, or injuries.
- Spending by average length of stay (ALOS), by discharge, or by outpatient visits.
- Spending by specific geographic area or age group.
- Expenditure on PHC as a share of government spending.
- Expenditure on social care related to HIV and long-term care.

These indicators may require additional data sets, such as reporting items of classifications or health care-related memorandum items. In addition, they may require the use of macro-economic information such as GDP, general government expenditure (GGE), and non-expenditure data.

In order to accurately compare indicators across countries and over time, a proper macro-economic variable needs to be selected as the denominator. In principle, variables should be related. For example, OOPS is linked to private final consumption (PFC), which includes all household spending, and general governmental expenditure data are related to general government health expenditure (GGHE). Also, remunerations can be related to compensation of employees in national accounts and GDP can be linked to all expenditure variables. Some indicators are standard in the international monitoring performed by WHO in GHED. For instance, availability of governmental resources is estimated through public spending as a percentage of GDP; prioritization of health is measured as GGHE as a share of GGE; and the level of governmental health spending is assessed through GGHE as a percentage of GDP and per capita public spending on health.

Three types of macro data series are considered: expenditure (GDP, GGE, and PFC), prices (exchange rates, purchasing power parities, PPP, GDP deflator), and population. In each country, specific organizations (e.g., MoF, statistical office) are responsible for reporting macro data. These agencies also communicate their data to international organizations that replicate them (*55*). An HA database aims at achieving consistency in time (*56*).

Which is the best practice for nationally produced and nationally used HA reports regarding macro variables? International databases are needed for consistency in international comparisons. However, their use may imply a change in the value of key indicators with respect to those reported using nationally produced macro variables. These differences relate, e.g., to timing of reporting.

10.3 International comparisons: Benchmarking

Benchmarking allows the spending performance of a country to be shown in relation to a reference or selected peers.

Benchmarking is the practice of comparing actual results with a standardized performance goal or number – a benchmark (*57*). It involves the evaluation or comparison of an HA result with a standard. Benchmarking is related to a specific topic and is to be used by setting a specific threshold/target. A benchmark or base number is used to compare actual results with a target and judge the improvement in time. For international comparisons, thresholds are related to a particular set of countries to be included in the benchmarking process. Benchmarking is important, as it creates a view on the position of a country in relation to its peers and makes it possible to establish specific programs or tools to improve the country's situation.

A usual threshold in comparisons of a certain set of activities is a percentage of the value of an indicator on the topic in the selected countries. Usually, the threshold indicates a measurement as acceptable/unacceptable, and it is set as a share or in an absolute amount of any measurement unit. Other boundary settings can be chosen as well, such as the average percentage in the selected geographical area or amount of spending per capita. The threshold relates to the boundary set below (e.g., OOPS below 20% of CHE) or over (e.g., public health spending at least 6% of GDP) the level of acceptability. The benchmark selection can encompass all of the countries in the world, a region (e.g., LAC), a certain World Bank income bracket, other socioeconomic criteria, or any combination of these.

A normal benchmarking process involves four steps: planning, analysis, integration, and action (see Box 16) (*58*).

Box 16 Benchmarking steps (exemplified)

Phase 1: Planning
Step 1: Identifying what to benchmark (e.g., current health spending)
Step 2: Deciding the benchmark target (e.g., GDP)
Step 3: Studying the available variables and determinants to decide on the best process

Phase 2. Analysis
Step 4: Finding reasons and devising improving processes (e.g., the need to reduce OOPS means an increase in GGHE)
Step 5: Setting goals for improving processes (e.g., GGHE will be increased by X% in 2030 to reach 6% of GDP)

Phase 3. Integration
Step 6: Communicating findings and gaining (policy) acceptance for the process
Step 7: Establishing new functional goals and setting the variable targets and sub-targets

Phase 4. Action
Step 8: Developing an action plan for implementation
Step 9: Implementing specific actions and monitoring progress
Step 10: Keeping the process continuous

Table 46 presents possible thresholds for all countries in the world (excluding USA) and LAC separately. Thresholds can be created according to two basic viewpoints: attaining a value larger than the threshold or attaining a value lower than the threshold. For example, to reach universal health (UH), it is assumed that public spending on health should exceed 6% of GDP but also that OOPS should be below 20% of CHE. In the example presented here, the benchmarks relate to health spending types as a percentage of GDP and to health spending per capita. It is important to consider that the size of spending influences what is compared and with which benchmark indicator. The smaller the amount, the larger relatively small changes are and the easier it is to exaggerate the conclusions taken from the data.

Table 46 Selected threshold measures, all countries and LAC, 2019

All countries (excluding USA)						
	CHE/GDP	**HF.1/GDP**	**HF.3/CHE**	**CHE per capita**	**HF.1 per capita**	**HF.3 per capita**
Average CHE/ GDP	7.5	5.2	22.8	675	465	154
Median value	10.4	7.8	59.2	4313	3386	677
Quartile 1	9.7	6.9	54.4	2633	1869	548
Quartile 3	11.3	9.3	70.8	5440	4603	867
Lowest share/ amount	1.5	0.5	0.1	20	4	0
Highest share/ amount	24.0	22.9	84.8	9666	6872	2445
LAC						
	CHE/GDP	**HF.1/GDP**	**HF.3/CHE**	**CHE per capita**	**HF.1 per capita**	**HF.3 per capita**
Average CHE/ GDP	7.9	4.1	28.4	661	342	188
Median value	6.2	3.3	28.4	491	242	150
Quartile 1	5.4	2.7	22.3	326	196	85
Quartile 3	7.8	5.2	43.3	1032	536	262
Lowest share/ amount	4.3	0.6	10.6	57	7	25
Highest share/ amount	11.3	10.1	56.0	2005	1091	548
HF.1 Government schemes and compulsory contributory schemes						
HF.3 Household OOPS						

Source: Own elaboration based on World Health Organization. Global Health Expenditure Database. Data Explorer. https://apps.who.int/nha/database/Select/Indicators/en.

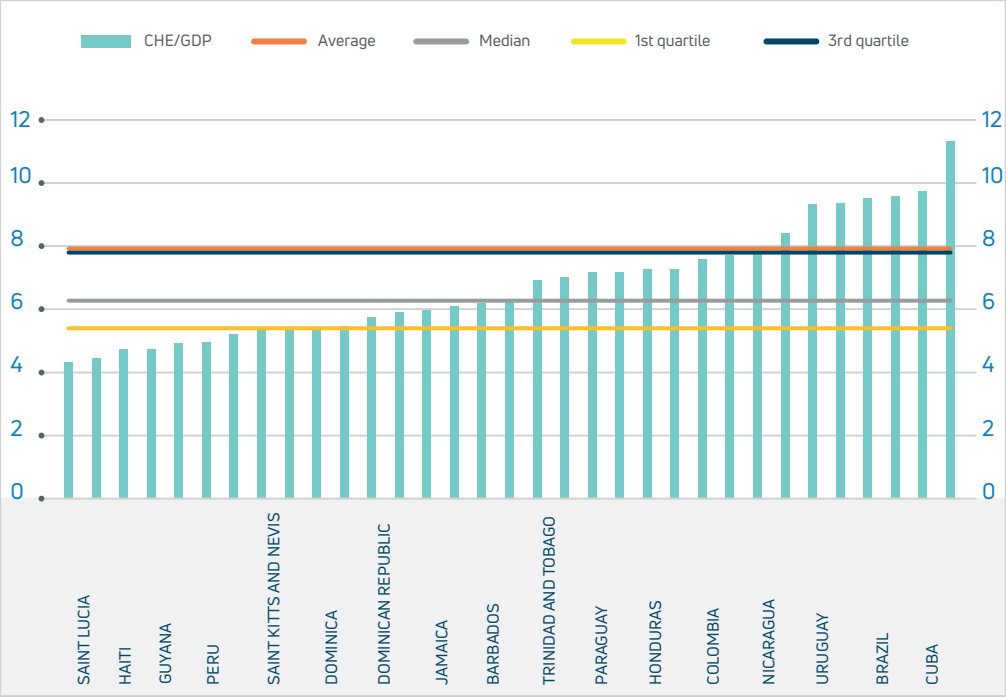
In both threshold measures, the average share as a percentage of GDP and the average amount spent per capita in US$ could be taken as a benchmark. As averages are always skewed by extreme outlier values (e.g., the USA in very high current spending), a better set of measures can be found in the median and the quartiles. The median value relates to an equal set of data points above and below (equal number of countries are above and below the median value); the first quartile relates to the set of data points of which 25% is below, while the third quartile refers to the 75% borderline.

Benchmark example for LAC

The government expenditure on health reported for LAC is 4% of GDP (lower than the benchmark of 6% of GDP advised by PAHO's Universal Health Strategy), which represents on average 342 USD per capita in 2019. OOPS as percentage of CHE reaches an average level of 28%, higher than the threshold of 20% advised by WHO. A graphical presentation of two selected measures is shown in Figure 18 and Figure 19, dealing with current health expenditure (CHE) as a share of GDP and OOP as a percentage of CHE in 2019.

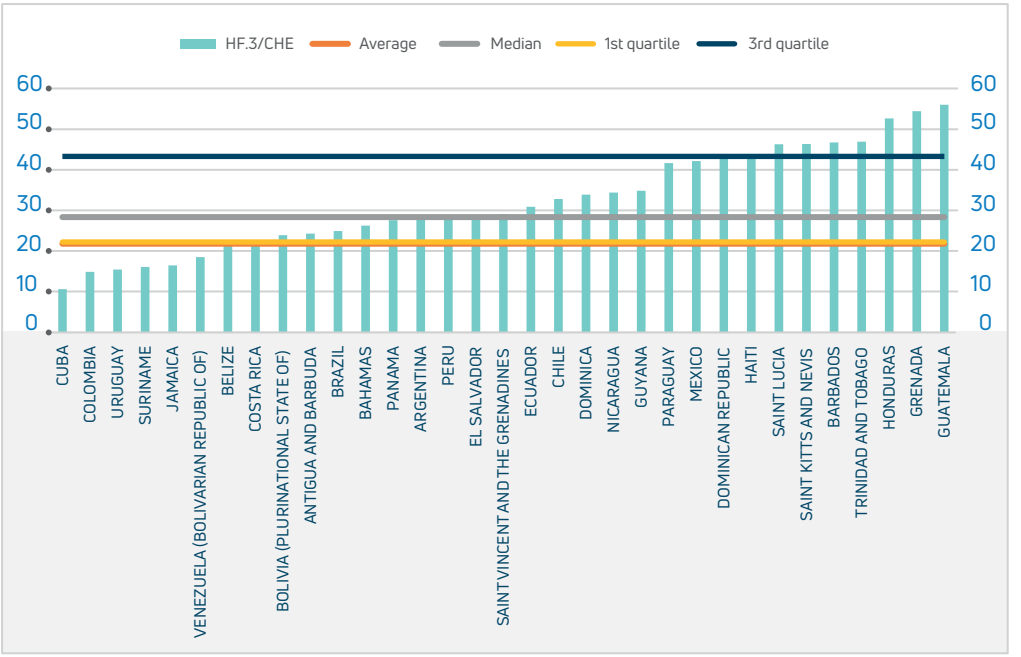
The data on government spending are crossed with the data on OOP in Figure 20. It can be seen that only three countries in the region have less than 20% OOP and more than 6% of government spending for health.

Figure 18 Current health expenditure as a share of GDP: LAC, 2019



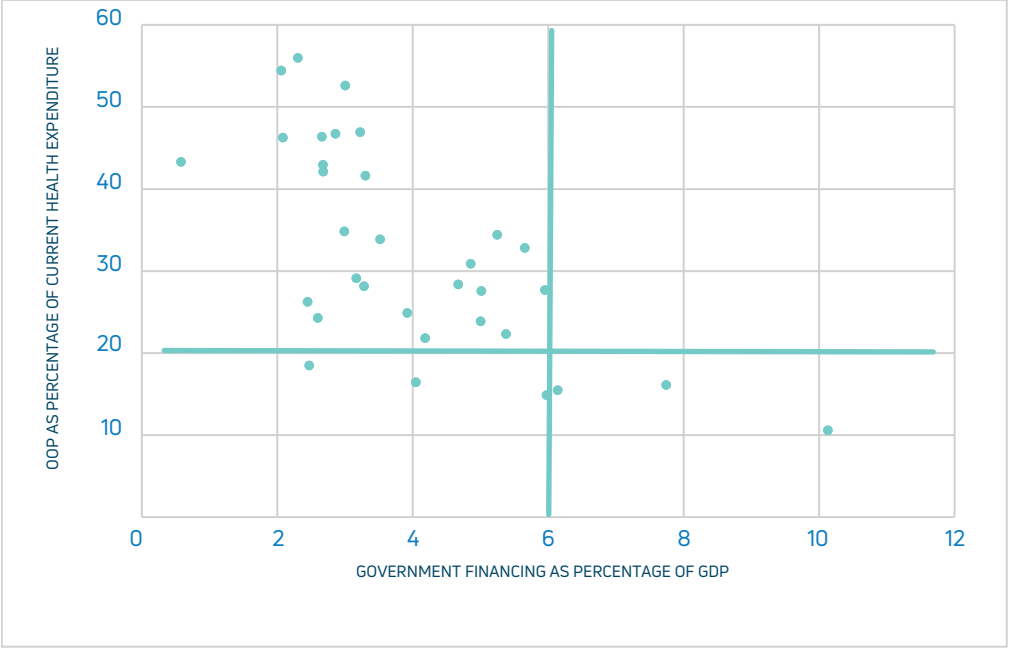
Source: Own elaboration based on World Health Organization. Global Health Expenditure Database. Data Explorer. https://apps.who.int/nha/database/Select/Indicators/en.

Figure 19 Out-of-pocket spending as a share of CHE: LAC, 2019



Source: Own elaboration based on World Health Organization. Global Health Expenditure Database. Data Explorer. Available from: https://apps.who.int/nha/database/Select/Indicators/en.

Figure 20 Country data on benchmarks of government financing as a percentage of GDP (6%) and OOP as a percentage of CHE (20%)



Source: Own elaboration based on World Health Organization. Global Health Expenditure Database. Data Explorer. Available from: https://apps.who.int/nha/database/Select/Indicators/en.

10.4 Time series

Why are time series relevant? More analysis and better monitoring of changes in expenditure and financing in time are among the advantages enabled by a consistent database.

The continued preparation of health accounts leads to an accumulated set of data. It is advisable to display annual health accounts results as a time series to facilitate their use. The characteristics of a database were discussed in Section 6.2. The use of SHA 2011 will ideally ensure compatible content across time. However, relevant changes occur over time. This imposes a commitment to ensuring the consistency of the data included in the database. The most frequent challenges involve the following:

(a) Changes in data sources, expected to increase accessibility and detail as a result of the experience of repeatedly producing health accounts.

(b) Changes in health system composition (e.g., when a new actor or service type emerges or disappears due to reform, regulation, or market reasons).

(c) Changes in the financing system, often reflecting reforms (e.g., subsidies and transfers or creation of new funds).

(d) Changes in methodology (e.g., the team receives advice from the statistical office, feels comfortable with disaggregation and filling gaps, and thus covers lacunae and/or refines results).

(e) Changes in the framework, such as the revision of SHA 1.0/PG to SHA 2011, and potential further changes that imply new categories and classifications and subsequently new data sources and possibly accounting rules.

In all cases, the process of ensuring consistency in time series content implies a pair of options:

(a) When a change reflects a new condition, it can be clearly highlighted as a break in series. For example, a new social security scheme may be in place that has no consequence for the corresponding codes (HF.1.2.1 and FS.3) in previous years. Often, the changes are not sudden, as the new system might not be fully operational for years. However, this may not be the case and the change can be fast (e.g., as in a new type of health transfer with relatively immediate operation).

(b) When the change is in measurement capabilities due to access to new data sources, ideally the team needs to try to retrieve the data source in order to back-cast the series so that the new component is updated in previous years.[26] For example, the team has access to an NGO registry and can improve the content of this component. If they access and exchange with a new group of organizations, the data request can involve previous years so that the full series can be adjusted. This is also the case when the team introduces new accounting procedures (e.g., filling gaps or disaggregating data) and relevant details can now be reported in the series, such as the expenditure distribution by disease.

[26] If back-casting is not possible, inclusion of a new set of actors, funds, activities, or the like will result in a break in series and needs to be documented extensively in the metadata.

To properly analyze time series data, it is important to determine first whether the health expenditure or its components increased due to changes in the price, the content of the service, or the quantity of the services provided. Often, a clear increase in expenditure can be detected, given the expansion of the covered population, services provided, and prices of inputs (e.g., due to new technologies). To assess the influence of changes in prices, a representation in constant values is advisable (see Table 47).

Table 47 Data series in current and constant values

A	B	C	D	E	F	G	H	I	J	K
2		**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
3	GDP current per capita spending	826	1145	1197	1208	1277	1193	1221	1246	1322
4	GDP price changes (inflation)	7.0	10.3	3.1	4.4	4.2	4.1	3.6	6.2	8.3
5	GDP deflator index (2010 = 100)	77.7	85.6	88.3	92.2	96.0	100.0	103.6	110.1	119.2
6	GDP per capita spending price corrected	1064	1337	1355	1310	1330	1193	1178	1132	1109
7	Explanation	Explanation =C3/C5 * 100; 826/77.7 * 100 = 1064								
8	GGHE per capita	22.8	34.0	64.5	89.8	159.0	162.6	90.5	89.9	85.0
9	OOP per capita	5.6	6.6	8.6	10.3	13.0	15.6	15.4	14.2	13.7
10	GGHE per capita price corrected (using GDP deflator)	29.32	39.71	73.06	97.46	165.61	162.57	87.35	81.69	71.33
11	OOP per capita price corrected (using GDP deflator)	7.2	7.7	9.8	11.2	13.6	15.6	14.8	12.9	11.5

Source: Own elaboration.

National accounts usually present spending in constant values, meaning data corrected for price changes next to spending data in current values. In health accounts, this process is less often used as health-specific price changes are not regularly calculated or estimated. For that reason, in many countries, the GDP deflator is also used for the presentation of health spending in constant values or otherwise stated in volume measures.

Nowcasting

A specific type of trend estimation relates to nowcasting or short-term projections of the available database, including a few years to come. The purpose of these procedures is to ensure the availability of more actual data to be used in policy analysis. The indicators to be included need to cover those of frequent use, usually at a higher level of aggregation. These estimations are to be replaced when actual data are available. A good practice is to indicate which are preliminary and which are revised actual data.

In terms of procedures, it is key to analyze (a) whether a change in spending can be expected due to changes in policy and the economic environment; (b) instances in which there is a change of the structure and function of the health system (e.g., due to an expanded health investment in goods,

personnel, etc.); (c) the suitability of the data available, both of the economic environment and the health system; and (d) the results comparing estimated projections and actual results once they are available to ensure that the projection procedures are optimized.

Nowcasting uses the absolute value and growth rates of spending by indicator, often linked to economic variables that take contextual changes into account, such as general government spending and private final consumption. For a detailed discussion and guidance on best practices for nowcasting, see the PAHO proposal (*30*). Longer-term projections have been discussed by OECD (*59–61*).

An example of an international database on health spending

Original country-specific data are available in three international databases – the European Union database (EUROSTAT), the OECD database (OECD.STAT), and the WHO database (GHED) – each covering their Member States. In these cases, the EU and OECD databases are also reflected in the WHO database. Also, the World Bank has a database on health expenditure that replicates data from the WHO GHED (data.worldbank.org).

WHO has acted as a repository of all HA data in its Member States since 2000 and displays the time series with updates of data and indicators in GHED. This is an open global database of health expenditure based on SHA 2011. The data are collected from officially nominated HA focal points and reported as a series from 2000 to T – 2. In 2021, the WHO Health Accounts Questionnaire (HAQ) was in a pilot period (based on the Joint Health Accounts Questionnaire already in use since 2005 for OECD and EU countries). Reporting includes an electronic format with bivariate T – 1 tables that are updated annually. In order to maintain a consistent long-running time series for analysis, countries are strongly encouraged to provide (updated) SHA 2011 tables for earlier years when possible.

There is a yearly data validation process between the partners in the joint data collection. The PAHO Regional Office and HQ continue to coordinate and correspond with national focal points in order to check the data submissions of the participating countries in the Americas. The aim is to finalize the data validation process within an agreed period after the initial data submission. Meeting such a target requires a suitable commitment of resources from WHO and the national reporting authorities.

In order to have internationally comparable data at a sufficient level of detail and as a strict minimum requirement, countries are invited to provide at least the core tables (HF x FS, HC x HF, HC x HP, and HP x HF) with sufficiently disaggregated data, together with methodological information (metadata). In order to have primary health care (PHC) estimations, countries are invited to provide more detail. Due to the COVID-19 pandemic, financing and expenditure data have also been requested, notably from public funds. For countries with more complete work on SHA 2011 classifications, tables available in the reporting template include HP x FP, DIS x FS, AGE x FS, and HK. Both the HAQ and JHAQ have macros to validate the consistency of and omissions from the tables (within tables as well as across tables).

Where appropriate, national health accountants are invited to discuss possible approaches with WHO in order to complement partial deliveries and complete the basic submission. Correspondents are asked to provide their feedback about the applied process of the data collection and proposals for modifications when needed.

Additional guidance for HAQ compilers is provided through published guidelines in addition to the SHA 2011 manual. The following guidelines are available to compilers to assist country implementation of SHA 2011 in certain expenditure domains (*62*):

- Implementation of the SHA 2011 Framework for Accounting Health Care Financing (2014 but update forthcoming).
- Accounting and mapping of long-term care expenditure under SHA 2011.
- Implementing the capital account in SHA 2011.
- Expenditure on prevention activities under SHA 2011 (supplementary guidance).
- Guidelines to measure expenditure on over-the-counter (OTC) drugs.
- Guidelines to improve estimates of expenditure on health administration and health insurance.
- Guidelines for improving the comparability and availability of private health expenditures.
- Feasibility and challenges of reporting factors of provision in SHA 2011.
- Improving estimates of exports and imports of health services and goods.
- Guidance on how to account for COVID-19-related transactions.
- Guidance on the content of the special COVID-19 spending reporting items.
- Improving data on pharmaceutical expenditure in hospitals and other health care settings (forthcoming).

10.5 Specific country-related quality control issues

Internal and external quality control ensure the plausibility and acceptance of results during the process. Resources include the automatic quality control functions within the production tool (HAPT), discussions with relevant stakeholders, and quality checks within the JHAQ/HAQ.

Quality refers to the level of excellence of the health accounts process and results. The quality process involves four areas: design, development, data management, and reporting.

- A proper design implies a deep understanding of the health system financing of the country. The objective is to generate a reflection of the health systems flows. It is needed to verify whether all major actors in the system are included and that the data to be used are consistent and complete as well as detailed enough for the exercise. All major and key flows should be fully represented and double counts and data gaps avoided.
- Development refers to data collection, processing, and validation, which is required given that HA integrate scattered data from different sources with various objectives, formats, and content. Their integration is a core process in health accounting. The SHA 2011 accounting principles and definitions of content should be followed. At least one classification of each dimension is included, covering full spending, warranting the identity of totals and subtotals. Thus, quality checks (see Table 48) on the data (*63*) are essential in the construction of a health account.

- Regarding data management, the process also relates to the creation of a database and cross checking the inputs up to the estimation techniques used and their related results (see Table 49). Next to the internal quality checks, meaning within the health accounts team, the quality verification also involves external actors. Key discussions involve budget and financing officers (for financing classifications), clinicians (for providers, functions, and disease), and so on.
- Reporting of health accounts relates to proper visibility, understanding, acceptance, and use of the results. Ideally, results should be extensively disseminated to cover all potential users, although technical elements such as SHA 2011 coding should be easy to understand. In addition to the SHA 2011 display, a national representation can be considered. Results explained and discussed in policy briefs with appropriate indicators can improve usability for and acceptance by decision makers (*64*).

Comparisons with previous estimations can be useful to identify major changes and, if there are changes, validation regarding new policies, prices, or market dynamics needs to be considered. Specific examples of estimations with their possible solutions are presented below.

The analysis of each data source is presented in Chapter 5, and the following sections highlight the relevant process of verification.

Table 48 Quality indicators examples

Key component	Criterion/indicator process oriented: minimum	Criterion/indicator process oriented: ideal
Composition	**Providers x functions x financing schemes + capital**	**All classifications necessary for policy-makers**
Coverage of public actors (e.g., providers, financing agents, revenues, schemes)	In number 80% of the main actors	In contribution 80% of the main actors
Coverage of private actors (e.g., providers, financing agents, revenues, schemes)	In number 80% of the main actors	In contribution 80% of the main actors
Out-of-pocket payments	Based on household survey triangulated with provision	Verified at provider level
Out-of-pocket payments plus insurance premiums	Based on household survey triangulated with provision and insurance	Verified at actor level
Out-of-pocket payments	Triangulated with national accounts and private consumption components	Benchmark is national accounts (notably for OOPS, although not exclusively)
Metadata	Sources, coverage, estimated items	All information needed to evaluate the system, including each estimation technique and its underlying criteria; definitions used
	Estimation techniques	
Replicability	Verify replicability of main estimation/adjustment procedures	Verify replicability of the results
Issues to improve	A list of issues to work on	Full roadmap for improvement with timeline
Static (one point in time; national and internationally compared)	Indicators (e.g., outlier detection)	No outlier unjustified
Dynamic quality measurement (compared over time)	Improvement in all aspects	Improvement preferably in weaker areas
Providers x functions x financing schemes	Current health expenditure at the first digit of each classification	All items that are policy relevant for the country at the level needed
Out-of-pocket payments	Yearly estimates for monitoring	Goal is <20% (universal health coverage), benchmark within the peer group of countries (income, disease burden)
Out-of-pocket payments plus insurance premiums	Yearly estimates/collection for monitoring	Goal varies with insurance coverage (impoverishment), benchmark within the peer group of countries (e.g., income, disease burden)

Source: Own elaboration based on: van Mosseveld C, Hernández-Peña P, Arán D, Cherilova V, Mataria A. How to ensure quality of health accounts. Health Policy. 2016;120:544–551, Table 3. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0168851016300549. [Accessed 22 September2022].

Table 49 Proposed solutions related to some general problems

Solutions for some of the most observed problems
a. Select the best data sources.
b. Apply the standard rules (SHA 2011 and SNA 2008).
c. Create a list of triangulation algorithms covering frequent problems.
d. Promote the reporting of detailed metadata.
e. Verify program activities/services provided and spending distribution by services and population group.
f. Promote collaborative work with national accountants and statistical offices.
g. Provide adequate supervision and/or follow-up for the national teams.
h. Monitor the quality indicators for each accounting exercise and identify the limitations of the exercise.
i. Use training programs (including remote options), communities of practice, and expert forums to address questions and doubts.
j. Distribute newsletters discussing best practices and common errors among data providers and stakeholders.
k. Use an observatory to validate methods and metadata validation, promote improvement of data sources, monitor quality, and ensure increased use of the information.

Source: Own elaboration based on: van Mosseveld C, Hernández-Peña P, Arán D, Cherilova V, Mataria A. How to ensure quality of health accounts. Health Policy. 2016;120:544–551. Table 1. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0168851016300549. [Accessed 22 September 2022].

A large effort goes into checking the consistency of the data across tables and classification (identical items need to have identical values in the various tables). There are some impossible combinations of classification items that can help guide the quality control verification. The HAPT performs these type of quality controls automatically (see Table 50). Also, assessing the plausibility of crosses in various tables can be time consuming; however, if the HAPT is used, this effort is supported by plausibility checks and rules.

Table 50 Coding verifications included in the HAPT: Some examples

Code combination	Resulting message in HAPT
HP.1 x HC.7	Impossible as hospitals cannot perform this service
HP.7.2 x HC.1.1	Impossible as insurance corporations cannot perform this service
HF.3 x FA.1	Impossible as government agencies cannot manage OOPS
HP.1 x HC.5.1	Check the coding as hospitals are not the regular providers of pharmaceuticals to the general public
HF.1.2.1 x FS.6.2	Check the coding as social security schemes are not the regular receivers of corporation revenues

Source: WHO HAPT 2021.

Checking the plausibility of results in relation to macro data such as GDP, GGE, and per capita values is important, as is checking growth rates of various items in relation to policy measures taken or to be taken. After verification by the team, a discussion of preliminary results with major stakeholders can help identify the plausibility and increase the credibility of the results. One of the factors to note is that HA are to be used in policy-making. Another point is that the results should help sustain, support, and monitor policies to improve health systems' performance. To comply with this purpose, it is essential that the process involve the cooperation of all stakeholders. Quality of the results cannot be achieved without the commitment of producers and users. Each

of the activities to generate an HA involves elements of quality (see Table 48); thus, the process should include time and effort to review results include time and effort to review results. It is important to establish the indicators that can be used to monitor and improve the quality of the results.

Quality assurance is a back-and-forth process in which a validation meeting with the relevant stakeholders is important; the data need to be checked and discussed before going public and publishing. Also, the distribution keys used, the interpretations made based on the data or the lack thereof, and the gap filling process need to be discussed and agreed. It is clear that in such a process not only cooperation between all parties and coordination are necessary but trust is essential. A final remark refers to the fact that the data as used in the quality process are those created during data production and represent the "best estimate principle" as mentioned in Section 2.2.4. This means that if better and newer data become available, they are incorporated.

Questions and answers

1. Q: Are cross tables flexible in content, for example, relating to specific national activities that are outside the international boundary?

   A: If the boundary is expanded with below the line items, these can be created in cross tabulations as well. The expansion of classifications within the boundary is also possible by adding subcategories. New classifications added are expected to comply with basic statistical rules, such as verifying that consistency within an analytical axis is present and reaching mutually exclusive content.

2. Q: How many dimensions can be created in the tables? Can classifications be included that are not in SHA?

   A: The number of classifications to be crossed is dependent only on the number of classifications used, the possible use made of the data, and the policy relevance of the crosses. It is possible to incorporate additional classifications (e.g., in the HAPT) when they are of specific country need and to include them in the cross tabulations. It is advisable to always develop those considered to be basic.

3. Q: Is there a hierarchy in indicators and, if so, which are the most important?

   A: In principle, no hierarchy exists in indicators, although some are more policy relevant than others. The national hierarchy is determined by national priorities. For an international comparison purpose, the indicators reported by WHO-GHED, OECD, PAHO, EUROSTAT, WB, and so forth can be considered.

4. Q: What is benchmarking, and how can it help SHA work?

   A: Benchmarking relates to a comparison of some aspects with selected peers, whether a set of related units, countries, and so on. It provides insight into the relative position of the item under study in relation to the data of the peer group. Knowing how much the national value deviates from the peer group can necessitate a policy intervention, a more exhaustive analysis with more information (to provide an explanation), or possible change of the data.

5. Q: Why are users of the information considered in the process?

   A: The use of health accounts reports is the key purpose of their generation. Results need to be communicated in a timely and appropriate format. If the data are not used for all types of information distribution, the process is doomed to fail.

CHAPTER 11

DISSEMINATION

Communication of the results is crucial and one of the cornerstones of institutionalization. The final part of the process of generating a health account includes the strategy to disseminate the HA results. Dissemination (wide distribution of HA results) is aimed at facilitating the use of the data to inform policy-making and policy dialogue (e.g., for monitoring, control, innovation, and creation of new targets). Producing information for domestic policy use and dialogue is the main objective of health accounts production, although reporting to international organizations is important for cross-country comparative and learning purposes. Dissemination involves the selection of the type of content and format as well as the proper channel to reach diverse audiences. Better informed decisions are expected to reach better results and help to create evidence for policy measures (*65*). Efforts in producing health accounts are doomed to fail if results are not communicated and not used.

- The target audience can range from policymakers within the health system and outside, parliamentarians and academics, and statisticians to newspaper journalists and the general public. Dissemination can also be a means to provide feedback to data providers, which refer to health personnel and managers at the program, provider, and organizational levels. Each of the target groups requires a specific communication approach as their goals are different from each other. The communication varies in content and in format.
- The content of the dissemination can cover various levels of in-depth analyses ranging from summary notes to highly technical, more complex and complete reports (e.g., key findings, selected indicators, policy briefs for specific decision makers, and monographic reports varying in purpose such as parliamentary reports, university presentations, etc.).
- The format is related to the content and audience, and as such it also varies. Examples are journal articles, press, media, and social media (e.g., TV, radio, Twitter, institutional websites, Facebook, blogs, and podcasts).
- Each report should be as targeted and concise as possible. Detailed technical work can be added in annexes and/or referred to in a dedicated website available to all interested parties. To aid accessibility, technical language should be avoided and graphical representations providing insights and facilitating understandability for policymakers and intended and interested readers should be used.
- It is important in the dissemination process to generate comments and remarks, as well as ideas from experts in the field and related areas of expertise, to gain acceptance of the process and the results. For this reason, a set of presentation meetings can be convened.

The support of a specialist on communications (or media specialist) for these purposes could make a big difference in impacting the audience (e.g., number of informed people, relevance of the subject-target population, underlying policy decisions). An example is WHO, which releases on its institutional website an annual report that includes an analysis of Member States' financing and expenditure situations and profiles of a specific group of components. It is frequently accompanied by an event involving representative officers of WHO at regional and national levels. OECD releases annual expenditure data updates, preparing with the support of media specialists a press statement calling attention to expenditure data for that year and inviting country representatives

to participate at the national level of the joint analysis. Each national view is compared with the average/collective overview released by OECD. At the national level, HA results can be specifically linked to policy areas. At the world and regional levels, specific online publications facilitate the periodic release of relevant analyses, often with comparative data, such as the Global Health Observatory (WHO), Health at a Glance (OECD international and regional levels), and Health in the European Union-Facts and Figures (EUROSTAT).

The specific thematic issues for the dissemination can involve a follow-up or change yearly. The most frequent areas include (*66*) (a) increased financing for health purposes, either by attracting new resources or maximizing their use; (b) informed health planning (budgeting, planning, monitoring, orientation of health system reforms); (c) allocation of resources to priority services (e.g., by illness or PHC); and (d) reducing the financial risk of health care users.

Products created based on the use of the SHA 2011 classifications benefit from a huge range of possibilities. The choices are very rich in terms of the expenditure analysis, given that the classifications and their categories are abundant and can be expanded with multivariate crosses, which allow for customization. To get a quick idea of the choices, Figure 21 shows the potential linkages to policy uses, which are the final purpose of the use of SHA results.

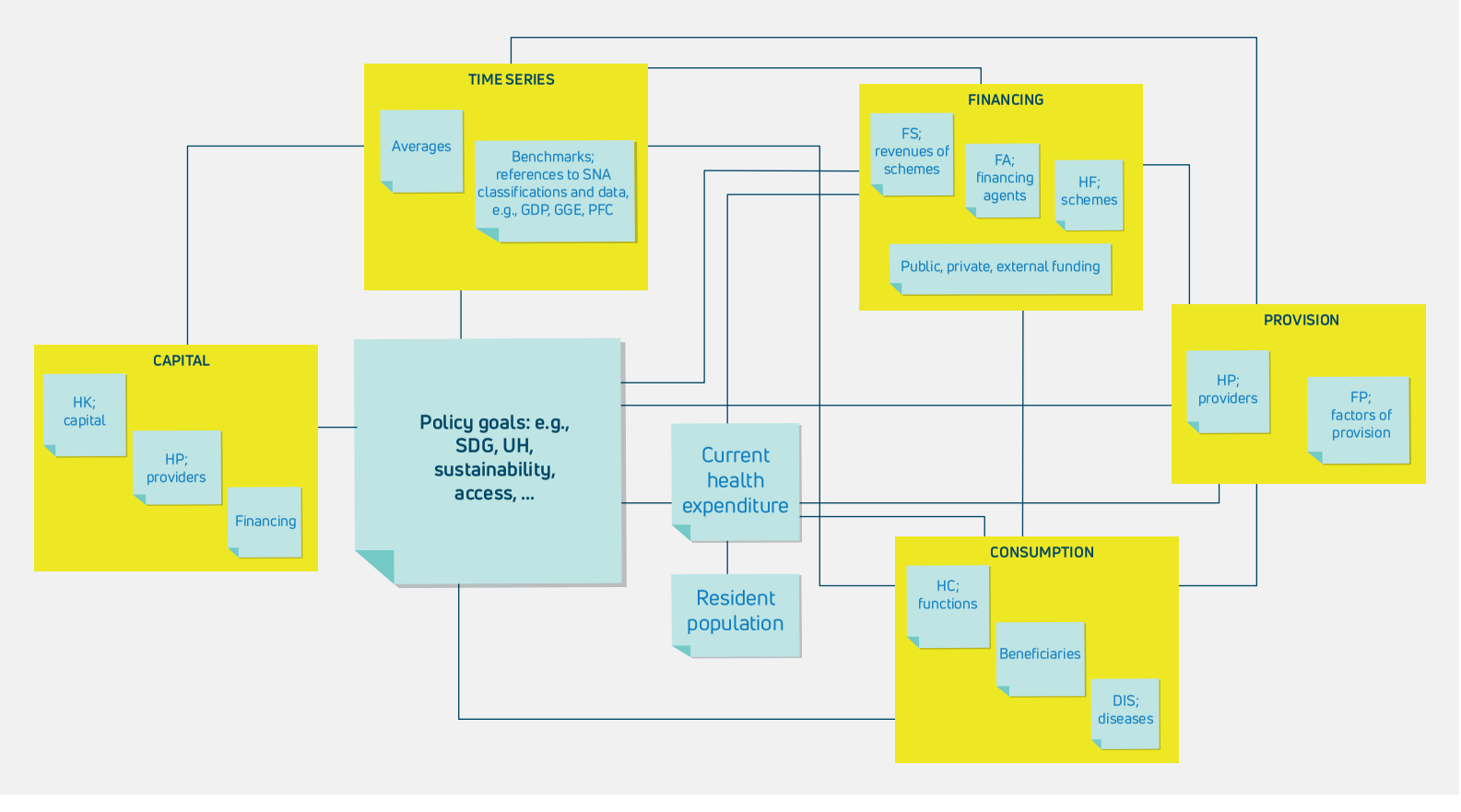
Some important characteristics of a selection of reporting formats are briefly described below. Maybe the most frequent format involves an analytical annual report.[27] This highlights the most important findings contained in the study, analyzed according to the dimensions and classifications used, to reflect the country's financing flows related to health consumption. It may be important to describe major context information of the country relating results with policy-relevant topics. Also, a summary set of indicators and major contextualized findings is advisable.

It is important to include the associated metadata, describing data sources, approaches, and estimation procedures to facilitate the proper interpretation and use of the results. When relevant, methodological changes introduced in each report compared with previous ones need to be described (e.g., new information, sources, or methods).

The relevance and complementarity of information involved in the below the line data included should be considered, not only as a reference of the data presented but also to complement national boundaries, among other reasons.

[27] The majority of documents and reports include (some of) the following paragraphs or sections: Executive summary (optionally Key findings), Introduction, Research performed/approach followed, Analysis, and Conclusions and recommendations.

Figure 21 An overview of areas of potential interest to nourish policy debate with HA data



Source: Own elaboration.

A publication of relevant annual monographic topics, varying according to areas of temporary interest or for decision-making, can become another specific yearly product. An example is expenditure by type of disease in detail (full display at least at the second digit or a specific field, e.g., mental health, reproductive health). The financing dimension can also be discussed, especially after or before an expected change: by revenues of financing schemes (FS), scheme strategies, and role of financing agents in general or in particular components (e.g., OOPS, government, decentralization). Also, population coverage can be analyzed according to scheme, expenditure by levels of care, and expenditure by detailed functions (e.g., preventive expenditure by type of disease, expenditure by factors of provision such as salaries and medicines). These can be topics described in detail. For more detailed discussion of the use of HA data in policy, see the PAHO related document (*67*).

Various policy briefs can draw attention to current policies or issues under discussion or relevant findings. A policy brief informs readers about a particular topic, suggests possible policy options, and makes recommendations (*68*). It also is a self-standing document that is easy to understand, with a concise format (*69–76*).

Questions and answers

1. Q: What is most important in dissemination: analysis or policy? Can the choice influence the content of the data collection?

   A: The answer to this question depends on who is asked. Policymakers may have a different priority in this compared with scientists. Scientists may favor understanding of, for example, social and health relationships, while policymakers may want to understand the relationship with courses of action. Similarly, health economists and the general public may have different ideas on this question. Health economists may focus on health system understanding, while members of the general public may expect solutions to their problems (e.g., how much care will cost them next year). But it can also be said that although each indicator is policy relevant, the analysis of the results can facilitate their use for policy.

2. Q: If different audiences need different sets of information, does that mean that a different analysis and reporting are needed for each group?

   A: Indeed, this could mean that some additional analysis may be needed. However, in the majority of cases the analysis does not change, but the way the data and the results are presented may differ in relation to the target audience.

3. Q: Is a policy brief fixed or flexible in its format and the way it is presented?

   A: A policy brief is a flexible means of presenting information in a concise way to the relevant audience, usually policymakers. Press releases can be seen as a type of brief.

4. Q: How long or short does a policy brief need to be?

   A: In principle, the length of a policy brief is not fixed, although it is advised to keep the brief as concise as possible and focus on the most important issues to be presented.

ANNEX 1. MAIN INTERNATIONAL CLASSIFICATIONS BRIEFLY DESCRIBED

International comparisons do not only relate to one country with another but can also refer to internationally agreed indicators and classifications. Standards that stand out as relevant are as follows:

a. Sequence of Accounts of the System of National Accounts (SNA)
b. International Standard Industrial Classification of All Economic Activities (ISIC)
c. Central Product Classification (CPC)
d. Standard International Trade Classification (SITC)
e. Classification of Functions of Government (COFOG)
f. Classification of Individual Consumption by Purpose (COICOP)
g. International Standard Classification of Occupations (ISCO)
h. International Statistical Classification of Diseases and Related Health Problems (ICD)
i. Anatomical Therapeutic Chemical Classification (ATC)

Additional classifications of lesser importance but still relevant are the Classification of Consumption by Purpose by NPISH (COPNI); the International Classification of Primary Care (ICPC); the International Classification of Functioning, Disability and Health (ICF); and the International Classification of Health Interventions (ICHI).

SNA. The System of National Accounts 2008 (2008 SNA) (*8*) is a statistical framework that provides a comprehensive, consistent, and flexible set of macroeconomic accounts for policy-making, analysis, and research purposes. The 2008 SNA is intended for use by all countries, having been designed to accommodate the needs of countries at different stages of economic development. It also provides an overarching framework for standards in other domains of economic statistics, facilitating the integration of these statistical systems to achieve consistency with national accounts. Health as a separate branch in the economy is an important part of this general economic integration framework in terms of output, turnover, value added, and employment.

ISIC. The International Standard Industrial Classification of All Economic Activities (ISIC revision 4) (*77*) is the international reference classification of productive activities. Its main purpose is to provide a set of activity categories that can be utilized for the collection and reporting of statistics according to such activities (SNA). As such, ISIC contains a comprehensive overview of all economic units performing activities that are economically relevant in an economy. ISIC has a direct relation with CPC, the classification of products. Health is a separate section: Section Q – Human health and social work activities – which as the title suggests is larger than just health. On the other band, medical goods as an integral part of health in SHA are not included in Section Q but are part of Section G – Wholesale and retail trade; repair of motor vehicles and motorcycles and (in more detail) 47 – Retail trade, except motor vehicles and motorcycles and 4772 – Retail sale of pharmaceutical and medical goods, cosmetic and toilet articles in specialized stores. For more details, see Annex A in ISIC and SHA.

CPC. The main purpose of the Central Product Classification (CPC) version 2.1 (*78*) is to provide a framework for the international comparison of statistics dealing with products and to serve as a guide for developing or revising existing classification schemes for products in order to make them compatible with international standards. CPC presents categories for all products that can be the object of domestic or international transactions or that can be entered into stocks. It includes products that are an output of economic activity such as transportable goods, non-transportable goods, and services. CPC covers production, intermediate and final consumption, capital formation, foreign trade, and prices. Section 9 focuses on community, social, and personal services and Division 93 on human health and social care services. As can be expected, medical goods are not included in this division but are integral parts of other divisions. See SHA 2011 Annex A and Annex E for more details on health. The latter annex deals explicitly with health products as defined in SHA 2011.

SITC. The Standard International Trade Classification (SITC) (*79*) is used to classify the exports and imports of a country to enable comparisons of different countries and years; its use is recommended only for analytical purposes. Data collection is recommended to be performed using the Harmonized System (*80*). The SITC groupings reflect (a) the materials used in production, (b) the processing stage, (c) market practices and uses of products, (d) the importance of commodities in terms of world trade, and (e) technological changes.

COFOG. The Classification of Functions of Government (1999) (*14*) is designed to be general enough to apply to the governments of different countries. The classification may be used to categorize data on purposes of expenditures for the compilation and analysis of statistics on national accounts and government finances. COFOG has a separate section on health (Section 07) that is divided into 07.1 – Medical products, appliances and equipment; 07.2 – Outpatient services; 07.3 – Hospital services; 07.4 – Public health services; 07.5 – R&D health; and 07.6 – Health nec.

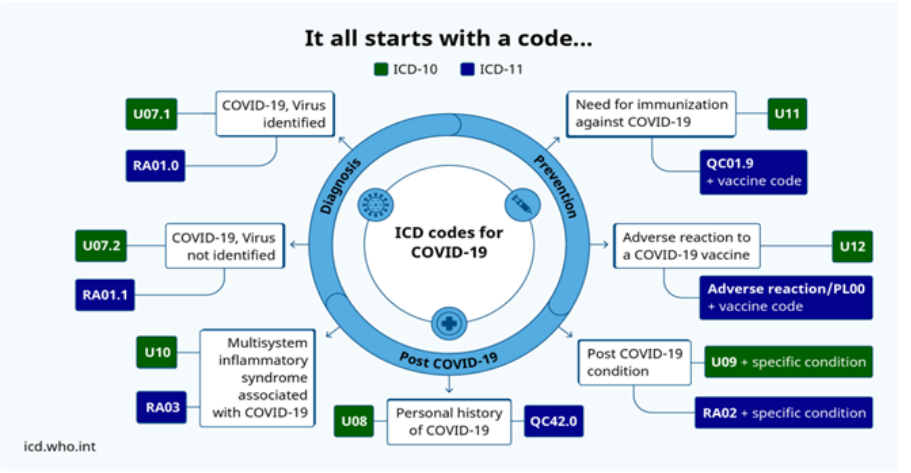
COICOP. The Classification of Individual Consumption by Purpose (2018) (*15*) is the international reference classification of household expenditure. The objective of COICOP is to provide a framework of homogeneous categories of goods and services that are considered a function or purpose of household consumption expenditure. COICOP 2018 is divided into three parts: Divisions 01 to 13 – Individual consumption expenditure of households, Division 14 - Individual consumption expenditure of NPISH, and Division 15 – Individual consumption expenditure of general government. As can be expected, COICOP has a separate division on health (06), but health is also included in two other divisions related to household spending (14 and 15, respectively, for non-profit institutions and the government with respect to personal spending). Division 06 – Health is divided in 06.1 – Medicines and health products, 06.2 – Outpatient care services, 06.3 – Inpatient care services, and 06.4 – Other health services. Division 14.2 – Health relates to NPISH health and Division 15.2 – Health to individual consumption expenditures of the general government.

ISCO. The International Standard Classification of Occupations is the international standard used for the classification of all professions (*81*). ISCO-08 is a four-level hierarchically structured classification that allows all jobs in the world to be classified into 436 unit groups. These groups form the most detailed level of the classification structure and are aggregated into 130 minor groups, 43 sub-major groups, and 10 major groups based on their similarity in terms of the skill level and skill specialization required for the jobs. ISCO is especially important for the data

collection and analysis of self-employed independent practitioners in the health field. These consist of Sub-major Group 22, Health Professionals (excluding the minor sub-group related to veterinarians, 225) and Sub-major Group 32, Health Associate Professionals (excluding the 324 minor sub-group, veterinary technicians and assistants).

ICD. The International Statistical Classification of Diseases and Related Health Problems is the diagnostic classification standard for all clinical and research purposes (*82*). ICD defines the universe of diseases, disorders, injuries, and other related health problems. Related is the ICD-CM Clinical Modification, which involves more granular codes than ICD-10 codes and can provide more information about the severity of a patient's condition, reasons to contact the health system, and so forth. Since the beginning of the COVID-19 pandemic and in response to Member State requests, the classification and terminologies unit has been progressively activating emergency codes for COVID-19, including in September 2020 (confirmed diagnosis of COVID-19 and suspected or probable diagnosis of COVID-19). Immunization to prevent COVID-19 and Adverse reaction to a COVID-19 vaccine were added in January 2021 (*83*).

Figure 22 ICD coding related to COVID-19



ATC. In the Anatomical Therapeutic Chemical Classification system (*84*), active substances are divided into different groups according to the organ or system on which they act and their therapeutic, pharmacological, and chemical properties. Drugs are classified in groups at five different levels. WHO is developing a linking system between diseases and the most often used drugs/medicines to combat these diseases. As there is no one-to-one relation between medication and disease, this a probability issue.

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Building health accounts with the expected detail, quality and usability is challenging. With the accumulated experience in generating health accounts, it is possible to reach a progressively more cost-effective process. To contribute to this aim, this compendium on best practices offers support to the work of novice and experienced health accountants.

The agreement of reporting health spending under a standard framework was reached by the World Health Organization (WHO) and Member States in 2011 and further endorsed by the Latin American and Caribbean countries. Health accounts are a systematic description of the resources flowing in the health system related to the consumption of healthcare goods and services, which need to be adequate in amount and used for the satisfaction of the population needs and according to health priorities. To support evidence-based decisions involved in this process, it is important to measure and analyze these resources.

This document will be complementary to the SHA 2011 manual and related guidelines, with a practical approach including a detailed set of examples of "how to" methods to reach the expected goals. It begins by presenting the idea of health accounts as a continued process to inform policies and monitor their implementation from a spending point of view, notably in the case of the Latin America and the Caribbean region.

PAHO
Pan American Health Organization
World Health Organization
Americas

525 Twenty-third Street, NW
Washington, D.C., 20037
United States of America
Tel.: +1 (202) 974-3000
www.paho.org