

Revision of the

System of Health Accounts

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World Health
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Proposal
Unit 11

Classification by beneficiary/recipient characteristics

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**SHA Revision Unit 11:
Classification by beneficiary/recipient characteristics**

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Abbreviations

GDP – Gross Domestic Product

ICHA – International Classification for Health Accounts

OECD – Organization for Economic Cooperation and Development

SHA – System of Health Accounts

WHO – World Health Organization

Key Words

System of Health Accounts, health accounts, cost of illness, distributional analysis, equity

Responsibilities and Acknowledgments

TBC

1. INTRODUCTION

Purpose of the unit

1. This document outlines a proposal for classifying beneficiaries of health expenditure in the revision of the System of Health Accounts (SHA). The current SHA manual does not contain a definitive or final approach to the classification of expenditure by beneficiaries, although it does propose a number of approaches for exploration (see ; paragraphs 3.16 through 3.21), and outlines potential standard tables for specific beneficiary analyses (tables 6 and 7). Taking into account recent experience in classifying expenditures according to different types of beneficiary classification, this proposal presents a framework that was defined based on policy needs and data availability. The proposal also provides recommendations for specific classification schemes.

2. The document starts by reviewing what was originally suggested in the SHA Version 1.0, and relevant analyses that have been done in recent years. It then proposes an organizing framework to anchor such analyses, before moving to a discussion and recommendations for different types of beneficiary classification. It ends with a discussion of methodological issues, which often have to be kept in mind when developing standard classifications.

3. The document takes into consideration a number of antecedents and sources, in particular:

- The System of Health Accounts Version 1.0;
- The work of the OECD/Eurostat project on expenditures by disease, age and gender;
- The guidelines prepared by WHO for regional health accounts, and for disease-specific accounts;
- The work done by WHO to develop approaches for child health accounts;
- The work of the Equitap research network in Asia which has looked at equity in health expenditures in different countries;
- Discussions by an expert group convened by WHO to provide inputs into preparation of this document.

Background

4. As the use of the System of Health Accounts has increased the availability of comparable data on national health expenditures, there has been growing interest in analyzing the distribution of national expenditures by population groups. This is driven by three general motivations, namely concerns about social disparities in health outcomes, political and societal interests in the allocation of healthcare resources, and the need for data on spending variations in order to improve the sustainability and planning of healthcare systems.

5. Health inequality is a concern of both rich and poor countries alike. The existence of disparities in health outcomes naturally generates interest in knowing how these relate to disparities in access to healthcare resources and what disparities exist between population groups in healthcare spending. This motivation is underlined by the Final Report of the World Health Organization's Commission on Social Determinants of Health (2008) which has stressed the need for countries to measure and monitor disparities in social determinants of health outcomes, such as health spending.

6. The distribution of resources within healthcare systems is a matter of political and social interest in all countries, whether it is related to issues such as fairness and equity, or other

political, legal or administrative requirements. Such concerns with ensuring appropriate distribution of resources require reliable information on how healthcare spending is being distributed. Such data are particularly relevant in the policy context where achieving universal coverage in health systems or improving social solidarity are guiding strategic goals shared by most countries.

7. Many analytical and planning activities also require data on the disparities in spending on individuals and different population groups. For example, data on the variation in spending by age group is a critical input into most exercises that attempt to project future healthcare expenditures or healthcare resource requirements (Rannan-Eliya and Wijesinghe 2006). Such analyses are acquiring increasing importance as both developed and developing nations focus attention on the financing and sustainability of healthcare systems.

8. Disparities in healthcare spending are found within populations along many different social dimensions, which are potentially of substantive policy and analytical interest. Such dimensions include age, gender, race or ethnic group, geographic area and socioeconomic status. In addition, in the context of healthcare systems, variations in spending by type of disease or healthcare condition are of interest.

9. There have been efforts since at least the mid-1960s to estimate variations in healthcare expenditures within national populations. Rice (1967) made the first estimates of variations in spending by disease, age and gender in the USA. In developing countries, Meerman (1979) and Alailima and Mohideen (1983) pioneered the analysis of expenditures by socioeconomic groups, with their estimations of how government and private healthcare spending varied by income and other groupings in Malaysia and Sri Lanka. Few of these analyses have linked their estimates to health accounts data.

10. Despite the proliferation of similar studies in the past two decades, such analyses have produced generally results that are not comparable between countries or even between individual studies. Such comparisons are increasingly wanted and requested. An important reason for the lack of comparability was the lack of standardized statistics and definitions of health expenditures, but this problem is now largely resolved by the development of the SHA.

11. The SHA Version 1.0 suggested two tables that would present the distribution of expenditures by patient condition or characteristics. Table 6 (see Table 1) suggested the cross-tabulation of personal health expenditures between major HC functional categories and the major chapters of the ICD-10 disease classification. In this table HC categories 1-3 were combined into one. In practice, such aggregation obscures what are probably the most important spending categories for this type of analysis, namely inpatient and outpatient expenditures. Table 7 in SHA version 1.0 (see Table 2) suggested the tabulation of personal health expenditures by age and gender, with age being grouped into seven categories (0-4, 5-14, 15-44, 45-64, 65-74, 75-84 and 85+ years).

12. There has been considerable effort since 2000 to carry out pilot studies to explore the feasibility of analyses based on these two tables. In particular, Eurostat and OECD have jointly collaborated on projects to estimate the distribution of spending by disease, age and gender in several member states. WHO has also sponsored a number of such studies in developing countries. These have demonstrated that the general concept is feasible, and can generate comparable data. In most of these country pilots, the age classifications used have been more detailed than initially proposed in SHA Version 1.0. Moreover, almost all recent studies that have attempted analyses of the distribution of spending by disease have successfully been able to separate the disease distribution of spending in inpatient care from that in outpatient care. Such a distinction, between inpatient and outpatient expenditures, is thus both of policy interest and feasible in terms of estimation.

Table 1: Personal expenditure on health by major ICD-10 category as proposed in SHA Version 1.0

	HC.1-HC.3 Personal health care services	In-patient services	Day care services	Out-patient services	Home care services	HC.4 Ancillary services to health care	HC.5 Medical goods dispensed to out-patients	HC.5.1 Pharmaceuticals and other medical non-durables	HC.5.2 Therapeutic appliances and other medical non-durables	HC.1-HC.5 Total personal health care services and goods
Infectious and parasitic diseases										
Neoplasms										
Endocrinal and metabolic diseases										
Diseases of the blood										
Mental disorders										
Diseases of the nervous system										
Diseases of the circulatory system										
Diseases of the respiratory system										
Diseases of the digestive system										
Diseases of the genito-uniary system										
Complications of pregnancy/childbirth										
Diseases of skin and subcutaneous tissues										
Diseases of musculo-skeletal system										
Congenital anomalies										
Perinatal morbidity and mortality										
Symptoms and ill-defined conditions										
Accidents, poisoning and violence										
All other categories										
<i>Total personal expenditure on health</i>										

Table 2: Personal expenditure on health by age and gender as proposed in SHA Version 1.0

	0-4	5-14	15-44	45-64	65-74	75-84	85+
Male							
<i>Personal health care services</i>							
In-patient services							
Day care services							
Out-patient services							
Home care							
<i>Ancillary services to health care</i>							
<i>Medical goods dispensed to out-patients</i>							
Pharmaceuticals and other med. non-durables							
Therapeutic appliances and other med. durables							
Total personal health care services and goods							
Female							
<i>Personal health care services</i>							
In-patient services							
Day care services							
Out-patient services							
Home care							
<i>Ancillary services to health care</i>							
<i>Medical goods dispensed to out-patients</i>							
Pharmaceuticals and other med. non-durables							
Therapeutic appliances and other med. durables							
Total personal health care services and goods							

13. In addition to studies that have looked at the distribution of expenditures by disease, age and gender, several projects in recent years have also focused on the distribution of health spending by socioeconomic characteristics of beneficiaries, in particular their income level. Few, if any of these have explicitly linked their estimates to health accounts data. Given the

growing policy interest in such analyses, there is a need to provide guidelines for the future development of such estimates on a standardized basis linked to the SHA and national health accounts statistics. One of the benefits of such SHA-linked estimates would be that such estimates would be consistent with the overall estimates of national health expenditure, which is often not the case with many of these studies.

14. If the SHA is to provide a basis for standardized comparisons or the distribution of expenditures by beneficiaries, a framework for such presentations must be provided. Comparability of results between different studies and estimates would require consistency in the following:

- The scope and types of health expenditures that are included in the comparisons;
- The schemes for classifying recipient or beneficiary groups along different social dimensions;
- The rules or basis by which expenditures are apportioned to individuals of different characteristics.

2. FRAMEWORK FOR ANALYZING EXPENDITURES BY DIFFERENT BENEFICIARIES

Concept and definition of beneficiaries

15. The analysis of variations in health spending explicitly recognizes that health expenditures are not uniform across the population. When we consider the possibility that expenditures do vary non-uniformly and we undertake to measure that variation, what this implies is that expenditures are measurably different between different units of the population. If such expenditure differences exist between different units, and such units can be classified according to some criteria, then the possibility of analysis of expenditures according to some social dimension arises. This implies that for the classification of expenditures by beneficiary characteristics or population groups the minimum requirements are that:

- Variations in health expenditure exist across units of the population;
- It is possible and feasible to measure differences in expenditure between different units of the population;
- The different units of the population can be distinguished and classified according to some measurable, definable and meaningful set of criteria.

16. The smallest statistical unit of the population is the individual. A beneficiary might be defined as individuals to whom singly or collectively as definable groups health expenditures can be assigned, on the basis that they are deemed to benefit from such expenditures.

17. The proposal is that the basis for assigning expenditures to an individual should be that the individual concerned is the direct recipient or beneficiary of the particular expenditure, either as an individual or as a member of a group of individuals. The individual receipt of expenditures involves the receipt of services financed by those expenditures, and would cover most individual patient treatment services that are given to individual patients. The receipt of expenditures as a group arises when expenditures are incurred to provide collective or non-personal services that benefit groups of individuals. An example of this would be health education campaigns to discourage smoking, and which are targeted at a particular demographic group or the population as a whole. It would also include administrative activities that are undertaken to administer the health system, since these are intended to improve overall population health.

18. Although the identification of beneficiaries with individuals provides a clear basis for allocating expenditures, the concept of beneficiary needs further elaboration to deal with all the likely dimensions of analysis. Most such dimensions are consistent with the mutually exclusive categorization of all individuals, but not all. For example, an individual cannot have more than one age or one gender at a time. However, when the dimension of analysis concerns characteristics of individuals that are not mutually exclusive or can be coincident in the same individual, the individual is not ultimately the unit of analysis. An example of this is the analysis of expenditures by type of illness or disease. Although all illnesses are a personal or individual phenomenon, it is possible for individuals to experience more than one type of illness at the same time. Thus, in an analysis of expenditures by disease category, it is not possible to separate the population into mutually exclusive categories of individuals. It is meaningful in this situation to allocate expenditures by individual according to the diseases that each individual suffers from, and to sum these expenditures by type of disease, but it is not feasible or meaningful to sum these expenditures by groups of individuals.

19. Considering this issue, it is proposed that for the purpose of distributional analyses linked to the SHA framework, beneficiaries be defined as consisting either of mutually

exclusive groups of individuals each categorized by some unique individual characteristic or of non-mutually exclusive groups of recipients who benefit from mutually exclusive types of expenditures that can be each assigned to individuals. In the latter case, an individual can be a recipient of more than one type of expenditure, and in each instance can be assignable to a different group in relation to each type of expenditure.

Scope of health expenditures considered in distributional analyses

20. This proposal is intended for use in extending the SHA framework to analysis of variations in spending across beneficiaries in different population groups, with the ultimate objective of facilitating comparisons between countries and between studies. This requires that the scope of expenditures considered in analyses be clearly articulated in relation to the overall SHA framework. At the same time, the expenditures must be of a type that can be assigned or allocated to beneficiaries along the possible dimensions of analysis. Finally, considerations of feasibility, reliability and reproducibility must be taken into account.

21. The boundary of what constitutes health care expenditures is defined in the SHA according to the functional purposes of the spending, with the exact boundaries being based on the categories set out in the ICHA-HC functional classification. It follows that any analysis of health expenditures by beneficiary that is elaborated as an extension of the SHA be also limited in its scope to expenditures falling within such boundaries. That being noted, it is still necessary to further narrow the scope of expenditures that are considered in analyses of expenditures by beneficiary. Since the SHA itself defines the boundary of health care expenditures using a functional approach, it is sensible and appropriate to do this in a similar manner.

22. The highest-level distinction that the SHA makes is between core health functions (ICHA-HC categories HC.1 – HC.7) and health-related functions (categories HC.R.1 – HC.R.7). All expenditures on core health functions relate to provision of healthcare services to individuals or groups of individuals. Those countries implementing SHA-based accounts also report all of these expenditure categories currently. Consequently, all expenditures on core health functions might be considered as being potentially available for analysis.

23. The core functions of health care are further divided into personal health care services and goods (HC.1 – HC.5) and collective health care services (HC.6 – HC.7). Personal health care services and goods by definition always benefit individuals and the receipt of a service by one individual usually means that the benefit cannot benefit another. These naturally lend themselves to beneficiary analysis since the recipient individual can always be identified.

24. Collective health services do not benefit individuals. However, they are intended to benefit groups of individuals, and so can be assigned to such groups. Their benefits maybe public within these groups in the sense of being non-rival or exclusive, that is the benefit of such expenditures by one individual in no way reduces the potential benefit that another individual receives. Nevertheless, if these expenditures are public in this sense, they can still be allocated to individuals within the group on an equal per capita basis, since each individual has the same potential benefit from these expenditures. Whether such a distribution is meaningful will depend on whether the target population is national or sub-national. If it is national, then such a distribution will not give rise to any variation in per capita health spending, but if such collective health service expenditures are targeted at sub-groups within the population, they may contribute to meaningful variations in spending between individuals.

25. Expenditures on health-related functions pose a different set of issues. Some consist of expenditures whose purpose is to invest in inputs that the health care system needs, such as HC.R.1 (capital formation of health care provider institutions), HC.R.2 (education and training of health personnel) and HC.R.3 (research and development in health). The benefits of the

services created with these inputs cannot be assigned typically to specific individuals or groups of individuals, since the inputs will be utilized for producing many different services. For example, capital formation includes investment in new hospitals, which will benefit a wide range of individuals over a long period of time. At the same time, some of these expenditures might be partially assignable to specific groups of individuals. For example, the building of a clinic for diabetes treatment will specifically benefit individuals with diabetes, although in many instances it might not be knowable whether the facility might be converted in the future to some other purpose. The other expenditures in the health-related functional category are not for producing inputs for the health care system, but for producing collective services, i.e., HC.R.4 (food, hygiene and drinking water control), and HC.R.5 (environmental health). To the extent that these produce collective goods, they can be assigned to groups of individuals as with the collective health services in HC.6 – HC.7. However, an important issue with all the health care related functions is that none are routinely measured or reported in current SHA implementations, with the exception of HC.R.1 (capital formation). This is the case in both OECD economies (OECD 2008) as well as in developing economies (APNHAN 2008).

26. Given that most health-related functions are not routinely reported in most countries, and either comprise expenditures not for final health services but for inputs or for public goods that are not easily allocated to individuals, this document proposes that all standard distributional analyses of expenditures by beneficiary be restricted in scope to direct personal and collective service health expenditures (HC.1 – HC.7).

27. Nevertheless, some analyses will need to consider the allocation of expenditures in HC.R categories, where these can be easily separated and assigned to specific beneficiary groups. In these instances, it is proposed that distributional analyses make provision to report such expenditures as memorandum items, which is separately from the presentation of the distribution of expenditures in HC.1 to HC.7 categories.

Linkage to main SHA estimates

28. The analysis of expenditures by beneficiary involves consideration of the use and receipt of the associated services or goods. This necessarily requires that expenditures be analyzed at level of individual transactions at the point of production and receipt, when the individual who receives the service can be directly identified. All such transactions can be described according to the type of service involved, the provider generating the service, and the financing used to produce the service. Consequently, all such transactions can in theory be directly mapped or assigned to a provider (HP), function and financing scheme (HF). Consequently, it is proposed that distributional analyses should be linked to the main SHA estimates at the level of providers (HP), functions (HC) and financing schemes (HF). This implies that distributional analyses might involve cross-classification of expenditures between the dimension of analysis and providers, functions or financing schemes.

29. The SHA Version 2 incorporates the concept of financing sources (FS) for the first time, although such a concept has been used since 2007 in the annual SHA data collections conducted by OECD, Eurostat and WHO with their Joint Health Accounts (SHA) Data Questionnaire. The issue of whether distributional analyses should be linked to financing sources thus arises.

3. PROPOSED CLASSIFICATIONS OF BENEFICIARIES

30. Considering recent experience with and demand for distributional analyses, the following are the principle types of analysis that require a firm basis for beneficiary classification:

- Age and gender;
- Type of disease or illness;
- Socioeconomic status;
- Geographical region;
- Other demographic groups, such as ethnicity.

For each of these, this proposal provides further details below.

Age and gender

31. The analysis of expenditures by age and gender are probably the most established form of distributional or beneficiary analysis (Rice 1967). The analysis of expenditures in relation to age and gender have acquired increasing importance owing to the growing attention being given to the implications of population ageing for health care systems and health care financing. Such analyses require that expenditures be classified with sufficient detail in the age categorization to show the significant variations in spending that exist, and to permit adequate modeling of the impact of future changes in age structure. This is particularly so for the highest age groups, which are demographically the fastest growing in most countries. Although the level of expenditures in the very highest age groups (>85 years) is currently on aggregate small in all countries, they are the fastest growing and also likely to be much larger as populations age.

32. Most studies in OECD countries, and some recent studies in developing countries such as Sri Lanka have shown that per capita health expenditures increases with age above the age of 30 years, before peaking in the age range 70-85 years, and declining afterwards. Although the OECD country studies have generally found that the peak occurs in the 75-85 year age bracket, the Sri Lankan study suggests an earlier peak. This not only underlines the importance of sufficient detail in the higher ages, but also the importance of enabling adequate comparisons across countries.

33. In recent years, several studies have attempted to extend a health accounts framework to look at the distribution of spending by age and gender. Many of these also incorporate an analysis of spending by disease. Of particular relevance are national studies in Australia (Australian Institute of Health and Welfare 2005), Netherlands and USA (Roehrig et al. 2009), the Eurostat Feasibility Study of Health Expenditures by Patient Characteristics (BASYS, CEPS, and IGSS 2006), and WHO-sponsored pilot studies in Sri Lanka and Thailand. The Dutch study has in turn provided the basis for draft OECD guidelines on estimating expenditures by age, gender and disease (Slobbe, Heijink, and Polder 2007). These studies have demonstrated the general feasibility of estimating expenditures by age and gender in a wide range of national settings and data contexts.

34. In consistency with the recommendations of the Eurostat project (BASYS, CEPS, and IGSS 2006) and the OECD draft guidelines for producing estimates by age, gender and disease (Slobbe, Heijink, and Polder 2007), this document proposes that the standard classification when estimating expenditures by age and gender should consist of five-year age groups. However, in the youngest age group, since expenditures are usually much higher in the first year of life than in subsequent years, and given the concentration of child deaths in the first year of life, it is proposed that two age classes be used, namely 0 years and 1-4 years. The proposed

classification of beneficiaries by age and gender thus consists of the following age groups by gender: 0, 1-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85-90, 90-94, 95+.

35. In practice, the ability of analysts to generate estimates at this level of disaggregation will be limited by the available data sources. In some developed countries, and in many developing countries, such level of disaggregation is often not currently available in key data sources. Given this, and the need to facilitate comparison, an additional simplified classification is proposed for those situations where the use of the recommended classification is not feasible, or where it is necessary to simplify the presentation of results. This simplified classification by sex, is as follows: 0-4, 5-14, 15-29, 30-39, 40-49, 50-59, 60-79, 80+.

Disease or type of illness

36. Considerable work has been done in recent years on estimating expenditures by type of disease or illness within a SHA framework, both at a national level, and in comparative analyses of countries. At the national level for example, Australia has compiled successive sets of health expenditure estimates linked to its health accounts by age, sex and disease between 1994 and 2001 (Australian Institute of Health and Welfare 2005), whilst the USA has produced a time series of annual expenditures by disease between 1996 and 2005 (Roehrig et al. 2009). The Eurostat study of EU member states demonstrated the feasibility of distributing expenditures by disease categories, whilst two WHO-supported pilot studies have demonstrated feasibility of comparable estimates in two developing countries.

37. The OECD has published a set of draft guidelines for estimation of health accounts by age, gender and disease (Slobbe, Heijink, and Polder 2007). These guidelines correspond in substance closely to the approaches also implemented in Australia and Sri Lanka, demonstrating their general applicability. These guidelines and the experience gained in the Eurostat study and other national studies provide a rich basis to base a standard classification for analyses of expenditures by disease.

38. The internationally accepted standard for classifying diseases is the WHO-published International Classification of Disease (ICD), which is currently in its tenth revision (World Health Organization 2004). All recent work in this area utilizes disease categorizations based on the ICD-10 (or earlier ICD-9) classifications. Given its status as an international standard, and the widespread use of the ICD system in many statistical registries, this document proposes that any classification be based on the ICD-10 system, and that all underlying estimations be at the level of individual ICD-10 codes.

39. Two issues are encountered in use of the ICD-10 system to classify health expenditures. The first is that many patient episodes, from which the necessary primary data are generated, involve the treatment of more than one simultaneous disease or illness condition. There are three potential options for dealing with this issue: (i) to classify expenditures according to the primary diagnosis, (ii) to equally prorate the expenditures over the applicable diagnoses, and (iii) to distribute expenditures across the applicable diagnoses using disease-specific weights which reflect the relative resource intensity involved. Although the third is probably conceptually the most ideal, in practice the data requirements to support such an approach are immense and in most countries will not be currently met. The second option is more feasible, but in many situations the available data will only have recorded the primary diagnosis, and not all co-morbidities. Given this, it is proposed that the standard approach should follow the first option, which is also the one that is recommended in the draft OECD guidelines (Slobbe, Heijink, and Polder 2007). This is to classify expenditures according to the primary diagnosis, except in those instances where the primary diagnosis cannot be differentiated from other

diagnoses in the available data, when the expenditures should be pro-rated equally across all relevant conditions.

40. The second problem is that the ICD-10 system in its full implementation defines more than 30,000 different disease classes. Production of estimates according to the full, detailed ICD classification is both impractical in terms of actual final presentation, as well as often unfeasible given the sample sizes and level of disease coding of many primary data sources. These constraints necessitate the use of a more aggregate grouping of ICD classes. Typically, in recent studies, classifications involving 100-300 disease categories have been used. In the absence of an international standard classification, a variety of classifications have been used, and there is little consistency between them. The Dutch study that provides the basis of the OECD guidelines suggests the use of the International Shortlist for Hospital Morbidity Tabulation (IHSMT), whilst the recent studies in Australia and Sri Lanka have adopted modifications of the WHO Global Burden of Disease (GBD) categorizations. Other studies have restricted themselves to analysis of expenditures by broad ICD-10 chapters (BASYS, CEPS, and IGSS 2006), or have adopted nationally-specific groupings of ICD codes, as in the USA (Roehrig et al. 2009). Other classifications that are found in countries records include ICPC and ATC for ambulatory care and pharmaceuticals. All these classifications can be found in the Annexes section. Very few mapping to ICD exist, which could facilitate the use of information that is recorded under different systems (e.g. ICPC and ATC) but that need to be used together.

41. Any classification that is used in the comparative analyses of the distribution of expenditures by disease or of the cost of illness must be based on the ICD-10 system, and must provide a level of aggregation that is both feasible in a wide range of countries, as well as useful from a policy perspective. From this perspective, the use of broad ICD-10 chapters is not adequate, as it is too aggregate in its groupings. The IHSMT and GBD classifications provide a more useful detailed grouping, and both are linked to the ICD-10 system. However, the IHSMT system is not widely used outside Europe, and reflects a bias that arises from its primary use in hospital settings. Consequently, this document proposes that international comparisons of expenditures by disease be based on the WHO GBD classification system, which comprises 19 broad chapters, further subdivided into approximately 175 subcategories. The WHO GBD classification has the advantage that it was primarily developed for comparison of disease burdens in a wide range of both developed and developing countries.

42. Where data permit, studies should report expenditures according to the detailed subcategories of the WHO GBD classification, and in all cases according to the 19 major categories. However, a significant proportion of expenditures in all countries are not for specific diseases or conditions, such as expenditures for health screening, or investigations. To allow for this, an additional category should be used to capture expenditures related to unspecified abnormal clinical and laboratory findings (ICD-10 codes R00-R23, R25-R99), and other ill-defined conditions and contacts with health services. (IF THIS IS ACCEPTED, THEN IT WILL BE NECESSARY TO INCLUDE A DETAILED ICD-10 CODE LISTING FOR THIS FINAL CATEGORY).

Table 3: WHO Global Burden of Disease (GBD) classification scheme

Code	Description
GBD.1	Communicable diseases, maternal and perinatal conditions and nutritional deficiencies
GBD.1.1	Infectious and parasitic diseases
GBD.1.1.1	Tuberculosis
GBD.1.1.2	Sexually transmitted diseases
GBD.1.1.3	HIV disease
GBD.1.1.4	Diarrhoeal diseases
GBD.1.1.5	Childhood diseases
GBD.1.1.6	Meningitis
GBD.1.1.7	Hepatitis
GBD.1.1.8	Malaria
GBD.1.1.9	Tropical diseases
GBD.1.1.10	Leprosy
GBD.1.1.11	Dengue
GBD.1.1.12	Japanese encephalitis
GBD.1.1.13	Trachoma
GBD.1.1.14	Intestinal nematode infection
GBD.1.1.15	Respiratory infections
GBD.1.1.16	Maternal conditions
GBD.1.1.17	Perinatal conditions
GBD.1.1.18	Nutritional deficiencies
GBD.1.1.19	All other communicable, maternal, perinatal, and nutritional conditions
GBD.2	Noncommunicable conditions
GBD.2.1	Malignant neoplasms
GBD.2.2	Other neoplasms
GBD.2.3	Diabetes mellitus
GBD.2.4	Endocrinal and nutritional disorders
GBD.2.5	Neuropsychiatric disorders
GBD.2.6	Sense organ disorders
GBD.2.7	Cardiovascular diseases
GBD.2.8	Respiratory diseases
GBD.2.9	Digestive diseases
GBD.2.10	Diseases of the genitourinary system
GBD.2.11	Skin diseases
GBD.2.12	Muskuloeskeletal diseases
GBD.2.13	Congenital abnormalities
GBD.2.14	Oral diseases
GBD.2.15	All other noncommunicable conditions
GBD.3	Injuries
GBD.3.1	Unintentional
GBD.3.1.1	Road traffic accidents
GBD.3.2	Intentional
GBD.3.2.1	Self-inflicted
GBD.3.2.2	Homicide and violence
GBD.3.2.3	War
GBD.3.3	All other injury conditions

43. Expenditure by disease is to be differentiated from costing studies. A disease costing study will seek to analyse the full impact of a disease, including economic impact or impact on the quality of life. These dimensions would not be included under expenditures by disease, as explained in earlier paragraphs. Expenditures by beneficiaries, therefore by disease, will distribute spending for health functions HC.1 through HC.7. Expenditures related to personal care can always be attributed to an individual with a specific condition or disease. Expenditures on collective care are attributed to groups whose health status can either be related to a disease (it could be preventive care for diabetes) or for the whole population (in which case it would get

distributed equally across all diseases). Expenditures by disease will only classify direct medical costs, as referred to in costing studies. Indirect and intangible costs are excluded.

44. Expenditure by disease is one of the most difficult beneficiary expenditure table to produce due to a complex data collection process. For this reason, the guidelines will not propose that all health accounts dimensions be distributed by disease. Most commonly, countries have produced Health care providers by disease or Health care functions by disease.

Socioeconomic status

45. Health outcomes vary in all countries by level of socio-economic status of individuals, and such disparities are a major policy concern both in countries and at global level. Consequently, policy-makers and others are interested in understanding how healthcare resources and expenditures are distributed across people at different socioeconomic levels. The WHO Commission on Social Determinants of Health (2008) has called on all governments to routinely measure such disparities.

46. Analysis of expenditures by socioeconomic status of beneficiaries has a long history, and methods for the analysis of micro-data for this purpose are well developed. Of particular note is the work sponsored by the European Commission since the early 1990s to examine equity in healthcare financing and delivery in European countries, and in the following decade in Asian countries. This work, led by the ECuity network in Europe has been examining disparities in healthcare spending in different European countries (van Doorslaer 1993) for two decades, and in Asia the EQUITAP network, which has emulated ECuity in Asia since 2000, has been supporting similar work (Rannan-Eliya and Somanathan 2006). At the same time, these efforts have rarely been directly linked to estimates of national spending as derived from the health accounts, although EQUITAP has attempted this in countries where the data are available.

47. Generally speaking, the results of such exercises can be presented either in the form of tables or as single statistics which summarize the overall level of inequality in spending. An example of such a single number statistic is the concentration index. However, in the context of extending the SHA framework to analyze the distribution of spending by socioeconomic status, an approach that directly apportions health expenditure by different population groups and presents this in tabular form is needed. To do this, beneficiaries need to be ranked and grouped according to their relative level of economic well-being.

48. Three alternative approaches are available and commonly used to measure relative affluence: income, expenditure and consumption. In general, economic theory prefers consumption, as it is most correlated with long-term economic well-being and resources. In the absence of consumption, expenditure is to be preferred to income for the same reason. In practice, all three are commonly used in household surveys, which are the primary data source for this type of analysis. It should be noted at this point that these types of analysis invariably will require use of household survey data, and are not generally feasible using provider-generated data.

49. Household surveys typically provide a measure of the consumption of a household. Total aggregate consumption of a household is not by itself a good measure of the relative well-being of household members, since this also depends on how many individuals this consumption is shared by. This points to the need to adjust household consumption for the size of the household. Two approaches are available in the literature to do this. The first involves simply taking the value of per capita consumption, which is derived by dividing total household consumption by the size of the household. The weakness of this approach is that it does not take into account the different consumption needs of adults and children, and any economies of scale that households can achieve by pooling household consumption. In response, economists have

proposed equivalence scales to adjust household consumption taking into account the actual size and age composition of the household. There is no standard, equivalence scale that is widely used across different organizations or in the literature. Some equivalence scales also are specific to individual countries, and must be estimated separately for each country. More detailed discussion of the different statistical computation methods that can be used, and these issues is provided in recent World Bank guidelines, authored by O'Donnell *et al.* (2008).

50. Nevertheless, in the interests of international comparisons, it would be best to adopt an equivalence scale that is both simple and applicable across a wide range of countries, and that is consistent with those used in other national studies. This proposal recommends that the "OECD-modified equivalence scale" be used, which was adopted by Eurostat in the late 1990s, and is a modification of an earlier OECD approach. This scale, first proposed by Haagenars *et al.* (1994), assigns a value of 1 to the household head, of 0.5 to each additional adult member and of 0.3 to each child.

51. Taking into account the experience gained in past studies and the conceptual merits of each, this document proposes in analyses of the distribution of expenditures by socioeconomic status that beneficiaries be classified ideally according to quintiles of their relative level of consumption per adult equivalent, and failing that expenditure, and then income. The computation of consumption per adult equivalent should be done by dividing the household consumption by the number of individuals in the household, assigning a value of 1 to the household head, of 0.5 to each additional adult member and of 0.3 to each child. Having computed the consumption level of each household in this way, they should be ranked so as to form equal population quintiles, in which each class contains an equal number of individuals.

Geographical region

52. WHO has recently produced guidelines for the estimation of the distribution of expenditures by geographical region¹. These provide detailed guidance on how such accounts should be estimated. In practice, the classification of areas must be done separately in each country, taking into account both policy needs and data availability and feasibility. Consequently, no standard classification of regions is feasible.

53. Nevertheless, two important issues are noted. The first concerns the basis on which expenditure should be assigned to an individual. Two alternatives are available. These are to assign expenditures to regions according to the location where the medical service is provided, and the second is to assign expenditures according to the region of residence of the beneficiary. From a conceptual perspective, the second is to be preferred. However, in practice, the data sources that are used to apportion expenditures often relate to where the expenditures were incurred, and this is not feasible. In these situations, it is often necessary to compromise and take a pragmatic approach.

54. The second issue is the treatment of collective health services expenditures. In most studies, collective services are ignored. It might be thought that this has little effect on the analysis of expenditures by different regions of beneficiary, since these expenditures can only be prorated across all individuals. However, in practice there can be variation in such expenditures across national regions, since in most countries the budgets for such services are to some extent separate for different regions. It is recommended that all such studies fully analyze such expenditures (HC.6- HC.7), apportioning them equally within relevant population subgroups.

¹ *Guide to Producing Regional health accounts*, WHO, 2008 (www.who.int/nha/developments/Guide%20to%20Producing%20Regional%20Health%20Accounts.pdf)

55. All health accounts dimensions need to be distributed when building regional accounts. Policy makers are interested in understanding the financing mechanisms in place in each region in order to focus their policies on the regions with more inequalities. Some regions may find their households bearing the largest share of funding or payments of health care, or financing schemes may be noted to be more used in some regions compared to others. Where the resources are being spent also informs policy makers on patterns of spending in regions, be it variations in providers or in functions (e.g., pharmaceutical goods), which can lead to policy incentives for a more efficient use of resources, or a better redistribution of funds.

56. When developing expenditures by regions, actual accounts can be built. We would call these regional accounts. Health accounts dimensions are computed for each region, and matrices are built per region (for example, crossing sources by agents, agents by functions, etc.). These matrices are recommended for expenditure by regions, while they are not feasible for other expenditure by beneficiaries.

57. Expenditures by regions can also be expanded to expenditure on the production of each regions. This is particularly interesting when governments need to understand production capacities of their regions, especially in relation to subsidies.

4. METHODOLOGICAL APPROACHES

58. The estimation of expenditures by beneficiary, regardless of the type of classification, in all cases requires additional data sources, beyond those used to construct the health accounts. Detailed guidelines on how different distributional analyses should be conducted are given in Unit 16. Nevertheless, some basic principles and issues are described here. They serve to illustrate the difficulties involved, as well as the practical constraints that will determine which distributional analyses and beneficiary classifications are feasible.

59. In contrast to studies that are not linked to the health accounts, a SHA-based analysis of expenditures by beneficiary must constrain its estimates according to the overall estimates of national health spending. Thus, SHA-based beneficiary analyses must generally adopt what is known as a top-down approach. In a top-down approach, the major components of spending in a health system are first identified, and then other data sources are used to distribute each component of spending across the population according to the beneficiary classification being used. The top-down approach can be contrasted with the bottom-up approach that is sometimes used in cost-of-illness studies. The bottom-up approach depends on the availability of detailed patient-level data, which are used to directly estimate from patient level records the expenditures by different patient characteristics. Such an approach may be desirable or even necessary in some situations, but should be adapted to support a top-down approach. This can be done by using the patient-level data to build up a picture of overall spending by patient characteristics, and then applying the resulting distribution to the estimates of national spending, thus combining a bottom-up approach with the top-down approach.

60. The general strategy that is adopted should proceed through the following steps:

- Identification of major spending areas or components within national health spending as reported in the SHA accounts.
- Identification of suitable data sources that permit the analysis of each identified major spending area by beneficiary characteristics.
- Use of the identified data sources as distribution keys to distribute spending across different beneficiary characteristics.

61. A spending area or component can be defined from a provider, functional or financing perspective. The choice of spending areas in this approach depends on the beneficiary analysis being attempted, and the availability of data. It will thus vary between countries, and no general recommendation can be made. For example, in most of the countries participating in the Eurostat study of expenditures by age, gender and disease, reported that it was most feasible to develop estimates by type of provider (BASYS, CEPS, and IGSS 2006). This was because most of the relevant data consisted of patient records generated at the provider-level. However, in the comparable USA study (Roehrig et al. 2009), a large proportion of the estimates were developed by analyzing expenditures generated in a household survey, which allowed direct mapping to conditions and other personal characteristics.

62. In general, studies of expenditures by disease will mostly rely on provider-generated data, since these tend to be coded at the necessary level of detail with respect to diagnoses. However, analyses of expenditures by different socioeconomic status will generally rely on household survey data, as typically only household surveys collect and report data that allow the status of a household to be assessed.

63. Once a spending area is identified, a data source must be used to distribute the expenditures by beneficiary characteristics. Suitable data sources will act as distributional keys, which provide information on the proportionate distribution of spending. For example, if inpatient expenditures are the spending area, large samples of patient records can be used to distribute expenditures by diagnosis. In an ideal situation, these patient records would contain

details of the actual expenditures incurred, but in other instances they will not. In the latter cases, the cost contribution of each patient might need to be estimated on the basis of other data, such as length of stay, medicines dispensed and other hospital facilities utilized.

64. The basic approach outlined above lends itself to analysis of spending by one dimension of beneficiary characteristics and one ICHA dimension. In practice, estimating a tri-axial distribution of spending by provider, function and financing scheme is more difficult and requires more detailed data. Specifically, it requires that the patient-level data used allow the coding of each transaction by all three dimensions. Certainly, at the current time this is often not feasible, even in OECD economies (BASYS, CEPS, and IGSS 2006). Nevertheless, this should be seen as the ultimate objective.

65. In situations where the primary data source does not support the coding of expenditures by all three dimensions of provider, function and financing scheme, an alternative approach is to use a second data source to impute the distribution of spending along the additional dimensions.

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