



# [03.01]

## Measurement of Government Output

### Chapter 18: Health and Education

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## ACRONYMS – Chapter 18

BH	Basic Heading (of ICP Expenditure Classification)
CFC	Consumption of fixed capital
CIS	Commonwealth of Independent States
EU	European Union
Eurostat	Statistical Office of the European Union
GDP	Gross domestic product
ICP	international Comparison Program
IEA	International Association for the Evaluation of Educational Achievement
ISCED	International Standard Classification of Education
NPISH	Non-profit institutions serving households
OECD	Organisation for Economic Cooperation and Development
PIRL	Progress in International Reading Literacy Survey
PISA	Programme for International Student Assessment
PPP	Purchasing power parity
SNA	System of National Accounts
TIMMS	Trends in International Mathematics and Science Study
UNESCO	United Nations Educational, Social and Cultural Organisation

## CHAPTER 18 HEALTH AND EDUCATION

### I INTRODUCTION

#### *Health and education services are comparison resistant*

This chapter deals with two kinds of final expenditure that present special difficulties for international comparisons – health and education. They are sometimes described as “comparison resistant”. There are two difficulties. First, countries have different arrangements for providing health and education to their citizens. In a few countries households are left to their own devices and must purchase education and health services from private schools, clinics, hospitals and so on. At the other extreme a few governments supply education and health services to all their citizens without charge. In the vast majority of countries, however, health and education services are provided through a mixture of government and private schools, hospitals etc. These different ways of providing health and education services makes it difficult to compare the total volumes consumed in each country and volume comparisons are, of course, the principle purpose of the ICP.

A second problem is that it is hard to measure the output of health and education services provided by governments and by non-profit institutions serving households. This is because the services they produce are not sold at market prices. Traditionally, national accountants have solved this problem by assuming that the value of their output is equal to the cost of their inputs. That is how gross output and value added of government and NPISH have traditionally been measured in the national accounts and the same procedure has hitherto been used for international comparisons.

In recent years there have been many developments in the areas of both health and education which suggest that, over a period of years, the value of outputs is not equal to the value of the inputs used to produce them. For example, the same number of medical staff and the same quantities of drugs may be used to treat malaria patients both now and ten years ago. But the drugs are now more effective and medical knowledge about the disease has advanced so that more patients are cured and the cures take less time. Comparing just the cost of inputs over the period fails to capture the improvements in productivity that have occurred through better drugs and better medical procedures.

For some years now the OECD and Eurostat have been working with their member countries to develop ways of measuring government output that reflect these gains in productivity. For ICP2011, OECD and Eurostat intend to apply similar methods to capture productivity differences between countries in the provision of health and education services. Applying these new methods requires rather detailed information on expenditures in hospitals, schools etc. so that it is not feasible to expect all countries to use these methods. For ICP2011, therefore, countries in Asia, Africa, Latin America, West Asia, and the CIS area will continue to use the input methods described in Parts II-IV of this chapter. The methods that will be used by the OECD-Eurostat group of countries are described in Part V.

#### *Layout of the chapter*

Part II of this chapter deals with health services. It explains the concept of “actual consumption” as the sum of individual expenditures on health services and it explains what information countries

should supply on health expenditures and the kinds of prices that are to be collected. Part III deals with education services in the same way.

The input method depends crucially on the information that countries provide on compensation of government employees. These must refer to the same occupations in all countries and compensation must be calculated using common definitions and methods. Part IV explains what is required.

Finally, Part V summarises the methods that will be used by the OECD-Eurostat group of countries. At the time of writing these methods have not yet been finalised and the method actually used may differ in detail from what is described there.

## II HEALTH

### *Actual consumption of health care.*

In some countries the government provides households with most of the health goods and services that they need. In other countries households must buy most health goods and services on the market. In some countries NPISHs operate many clinics and hospitals while in other countries there may be few NPISHs in the health field. The only way to make useful comparisons between all countries is to compare **consumption** of health goods and services regardless of which institutional sector actually makes the **expenditure**.

Box I shows the Basic Headings (BH) for final expenditures on health goods and services. Households, government and non-profit institutions serving households (NPISH) may all purchase or provide health goods and services for households. The total of **individual consumption expenditures** by these three institutional sectors gives the **actual consumption** of health goods and services by households. This is the statistic of interest for international comparisons.

<b>Box 1 Basic headings for expenditures on health goods and services</b>	
<b><u>Individual consumption expenditure by households</u></b>	
<b>Medical products, appliances and equipment</b>	
11.06.11.1	Pharmaceutical products
11.06.12.1	Other medical products
11.06.13.1	Therapeutic appliances and equipment
<b>Out-patient services</b>	
11.06.21.1	Medical services
11.06.22.1	Dental services
11.06.23.	Paramedical services
<b>Hospital services</b>	
11.06.31.1	Hospital services
<b><u>Individual consumption by non-profit institutions serving households (NPISH)</u></b>	

12.01.11.1 Health

**Individual consumption expenditure by government**

**Health benefits and reimbursement**

- 13.02.11.1 Pharmaceutical products
- 13.02.11.2 Other medical products
- 13.02.11.3 Therapeutic appliances and equipment
- 13.02.12.1 Out-patient medical services
- 13.02.12.2 Out-patient dental services
- 13.02.12.3 Out-patient paramedical services
- 13.02.12.4 Hospital services

**Production of health services**

- 13.02.21.1 Compensation of employees)
- 13.02.22.1 Intermediate consumption
- 13.02.23.1 Gross operating surplus
- 13.02.24.1 Net taxes on production
- 13.02.25.1 Receipts from sales

***Basic Headings (BHs) for health***

The BHs in Box 1 are of two kinds – **goods and services** on the one hand and **production costs** on the other.

- The BHs for **goods and services** refer to purchases by households and government of health goods and services from market producers. Examples could be medicines, bandages, dental treatment and therapeutic massage.
- The BHs for **production costs** (from 13.02.21.1 onwards) refer to health services that are produced by doctors and other health workers, clinics, hospitals, convalescence homes etc. funded by government. These services are not sold on the market and so there is no market price at which they can be valued. Instead the value of these services is taken as equal to the costs of production. These costs are listed in the BHs under “Production of health services.” Compensation of employees and intermediate consumption are the main production costs. Gross operating surplus usually consists only of consumption of fixed capital although certain types of health services provided by government may be sold at market prices in some countries and in this case there will also be a net operating surplus. Net taxes on production (taxes *minus* subsidies on production) are small or zero in many countries. Receipts from sales (if any) are then deducted to get the net cost of producing health services.
- Like government, non-profit institutions serving households (NPISHs) do not sell their services at market prices so the value of the health services they produce is also calculated by adding costs and deducting any sales receipts. However, there is no breakdown of costs for

NPISHs. There is just a single BH for NPISHs covering the total costs (less sales) they incur in operating hospitals, clinics, convalescence homes and so on.

### ***Expenditures on health BHs***

Countries are required to supply expenditures in national currency for all the BHs shown in Box 1.

For **individual consumption expenditure by households**, the expenditures should be the amounts actually paid by households to purchase health goods and services. In some countries households only pay a part of the cost of health goods and services and the government pays the rest. Governments may either pay their share of the costs directly to the provider – the pharmacy, doctor or hospital, for example and in this case the expenditure shown for households is only the part that they pay. In other cases, people have to pay the full cost directly to the provider but they are then reimbursed by government. In this case, the expenditures shown are the amounts paid by the purchaser *minus* the reimbursement.

Note that reimbursements are only to be deducted if they come from government. If households are reimbursed by a **private health insurance company**, no deduction is made and the expenditures recorded for households must be the full costs without deducting any reimbursement received from the insurance company. (Premiums paid to private health insurance companies *minus* reimbursements are recorded under “Insurance”, BH – 11.12.51.1. They are purchase of insurance services and not health services.)

For **individual consumption expenditure by government**, the expenditures for the BHs listed under “Health benefits and reimbursements” are:

- the total costs paid by government for health goods and services provided free to households;
- the government share of the total costs in cases where governments pay part of the cost directly to the providers; and
- the amounts paid to households in cases where households initially pay the full cost but are then reimbursed by government for part or all of the costs.

Expenditures for the BHs listed under “Production of health services” are the amounts recorded in government accounts for compensation of health workers, purchases of goods and services as intermediate consumption in operating hospitals and other health facilities, net taxes on production and gross operating surplus.

All or most of the gross operating surplus consists of consumption of fixed capital (CFC). The 1993 SNA<sup>1</sup> explains that this should be calculated using the current replacement costs of the assets concerned – hospital buildings, medical equipment, ambulances and so on. Some countries do not yet have estimates of consumption of fixed capital calculated according to the SNA rules and these countries will have to use estimates of depreciation as shown in the government accounts. As these are usually based on historic costs “depreciation” is almost always lower than CFC and by substantial amounts in countries which have had high rates of inflation. This affects not only the comparability of the expenditure weights but also of total GDP and countries participating in ICP2011 should make efforts to estimate CFC on government assets according to the SNA recommendations.

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<sup>1</sup> See paragraphs 6.179 to 6.200

## Prices for health goods and services

In addition to providing the expenditure weights, the BHs are the starting point for countries to select specific goods and services that they will price in order to calculate PPPs. Here are examples of the products selected for household expenditure on pharmaceuticals, therapeutic appliances and medical services:

Product Name	Product Descriptions
<b>Pharmaceutical products</b>	
Acetaminophen/Paracetamol (international brand)	Dose: 500 mg.; Size of quantity: 10; Form: Tablet; Medicine category: Antinflammatory; Purpose : Maintenance; Trading name: Tylenol; Laboratory: McNeil
Co-trimoxazole (national brand)	Dose: (8+40)mg/ml; Size of quantity: 100 ml; Form: Paediatric suspension; Medicine category: Antibacterial; Purpose : Otitis media (ear infection); Trading name: Septrin; Laboratory: GlaxoSmithKline
Ranitidine (generic brand)	Dose: 150 mg.; Size of quantity: 10; Form: Tablet; Medicine category: Antacid; Purpose : Maintenance; Trading name: Zantac; Laboratory: Glaxo Wellcome
Salbutamol (international brand)	Dose: 0.1 mg. per dose; Size of quantity: 1; Form: Inhaler; Medicine category: Antiasthmatic; Purpose : Maintenance; Trading name: Ventolin; Laboratory: GlaxoSmithKline
<b>Other Medical Products</b>	
Adhesive bactericidal plaster	Price for: 1 piece; Type: Bactericidal; Brand: Well known; Intended use: For wounds; Dimensions: 1.9 x 7.2 cm; Packaging: 10 pieces; Comments: Specify brand
Pregnancy test-set	Price for: 1 set; Brand: Well known; Type: Midstream test; Intended use: Urine test for early detection of pregnancy; Packaging: Plastic package; Comments: Specify brand
<b>Therapeutic Appliances and Equipment</b>	
Mineral spectacle lenses	Price for: 2 pieces; Type: Corrected curve; Brand: Well known; Material: Ordinary mineral lens; Features: Orbicular, not tinted, no astigmatism; Focus: Point focal; Spherical power: $\pm 2$ diop; Price excludes: Additional accessories and special processing mounting; Comments: Specify brand and price for two lenses.
Complete set for measuring arterial pressure	Price for: 1 piece; Brand: Well known; Complete set: Phonendoscope, aerotonometer membranous, supercharger, compression blood pressure cuff; Comments: Specify brand and price for a set
<b>Medical services</b>	
Consultation with a general medical practitioner (public)	Price for: 1 service; Duration: $\pm 15-20$ minutes; Timing: Normal working hours; Standard examination: Yes; Issuance: Prescription; Service type: Public health service
Consultation with a general medical practitioner (private)	Price for: 1 service; Duration: $\pm 15-20$ minutes; Timing: Normal working hours; Standard examination: Yes; Issuance: Prescription; Service type: Private health service

For the goods and services selected for all BHs for household expenditure and for BHs for government under “Health benefits and reimbursements”, the prices must refer to **full market prices**. This is an important point; even though costs may be shared between government and households so that purchasers pay less than the full price when they buy medicines or visit a doctor, the prices reported must always be the full price. In practice, this does not usually cause any particular problem for the price collectors. The pharmacist, the doctor, and the dentist are all able to report the full market prices for the goods and services they provide. However it should be made clear to the price collectors that they are to report prices that nobody may actually pay in reality. In this sense, they are being asked to report “fictitious” prices.

The last item shown under “Health benefits and reimbursements” is “Hospital services” (BH 13.02.12.4). This covers the provision of medical services, pharmaceuticals, etc. that are provided to patients who stay overnight in hospitals during the course of their treatment. The quality of, and the ways in which, these services are provided differ greatly from country to country and in the past it has proved very difficult to collect internationally comparable prices for hospital services. For that reason it is recommended that for ICP 2011, a reference PPP should be used for this BH.

For the “Production of health services” by government, countries will report costs for compensation of employees. For all other BHs under this heading no prices are required because reference PPPs are used.

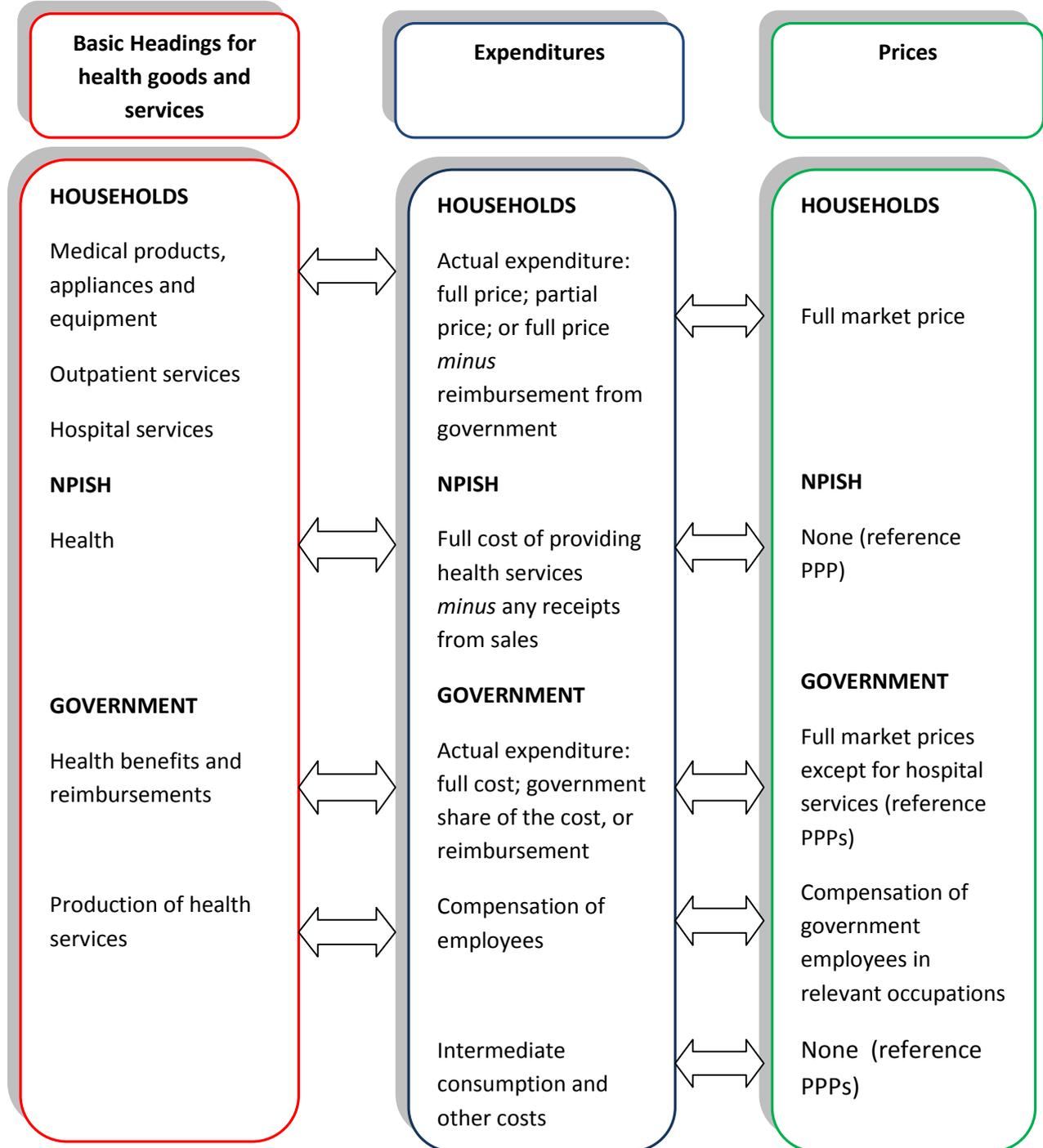
For NPISHs, no prices are required and a reference PPP will be used for the “Health” BH.

Box 2 shows the Reference PPPs that are used for health services.

<b>Box 2: Reference PPPs for health services</b>	
<b>Basic heading</b>	<b>Reference PPP</b>
<b><i>Health benefits &amp; reimbursements</i></b>	
13.02.12.4 Hospital services	PPPs for production of health services by government (before deducting receipts from sales)
<b><i>Production of health services</i></b>	
13.03.22.1 Intermediate consumption	PPPs for individual consumption expenditure by households on the domestic market (excluding all basic headings with reference PPPs)
13.02.23.1 Gross operating surplus	PPPs for gross fixed capital formation
13.02.24.1 Net taxes on production	PPPs for production of health services by government (without net taxes on production and before deducting receipts from sales)
13.02.25.1 Receipts from sales	PPPs for production of health services by government (before deducting receipts from sales)

Box 3 summarises the discussion above. It shows the expenditures and prices to be collected for each Basic Heading.

**Box 3. Expenditures and prices required for health basic headings**



### III EDUCATION

#### *Actual consumption of education services*

Education services includes educational courses provided through radio and television, adult education courses, language schools and pre-primary nursery schools as well as primary, secondary and tertiary education. It excludes driving lessons and recreational course such as bridge and painting lessons and it also excludes purchases by households of educational material including text-books and stationery.

Like health services, education services are provided to households by government and NPISHs as well as being purchased directly by households. Box 4 shows the BHs relevant to expenditures on education services. The sum of expenditures by households, NPISH and government is defined as actual household consumption of education.

<b>Box 4 Basic headings for expenditures on education services</b>	
<b><u>Individual consumption expenditure by households</u></b>	
11.10.11.1	Education
<b><u>Individual consumption by non-profit institutions serving households (NPISH)</u></b>	
12.01.11.2	Education
<b><u>Individual consumption expenditure by government</u></b>	
<b>Education benefits and reimbursement</b>	
13.04.11.1	Education benefits and reimbursements
<b>Production of health services</b>	
13.04.21.1	Compensation of employees
13.04.22.1	Intermediate consumption
13.04.23.1	Gross operating surplus
13.04.24.1	Net taxes on production
13.04.25.1	Receipts from sales

#### *Basic headings for education*

As in the case of health services, the education BHs are of two kinds – those referring to purchases of services from schools, universities, etc. and the costs of production for health services provided directly by government and NPISH. The content of these cost components was described above in connection with health services and is not repeated here.

#### *Expenditure on education services*

Countries are required to estimate expenditures on all the BHs in Box 3. For households the expenditures will cover fees for private education at all levels and also any part payments that may be

levied by schools and universities run by NPISH and government. In some countries households may be reimbursed for all or part of their education expenses through bursaries or other scholarship awards from government or NPISHs. Household expenditures on education are recorded net of these receipts; as in the case of health services, expenditures to be recorded here are the amounts actually paid by households.

For NPISH the expenditures will cover all the costs of running and maintaining schools, colleges and universities. In many countries religious organisations operate schools that may be limited to children whose parents belong to a particular faith. These schools may provide teaching in a full range of subjects or they may provide only religious instruction. The costs of running these schools will be included here.

For government, expenditures are divided between “Education benefits and reimbursements” and “Production of education services”. The first of these is generally quite small in most countries and will consist of payments such as bursaries or scholarships awarded to specially gifted children. This BH will also cover payments made in respect of special education requirements for children with special needs. “Production of education services” is a very large item in many countries. It consists of the costs of operating schools, colleges and universities. These consist mainly of compensation of employees and intermediate consumption. Gross operating surplus is usually only consumption of fixed capital. As noted in the discussion of health services, CFC should be calculated using current replacement costs. Depreciation as recorded in the government accounts will almost always be based on historic costs and may substantially underestimate CFC calculated according to SNA recommendations.

### ***Prices for education services***

Prices are only required for Household purchases of education services – BH 11.10.11.1. Here are two examples of the kinds of services for which prices are required:

<b>Secondary education (Upper Secondary)</b>
Pupil aged 15 at the beginning of the school year
General school leaving certificate giving access to University level education
Day school (not boarding school)
Pupil is a resident (national of the country concerned)
Annual fee for education only, excluding payments for meals and collateral services
<b>Other education programs (Foreign language course or lessons)</b>
Group study
English or French language
Intermediate level
Each lesson lasts 1 hour
Fee per lesson

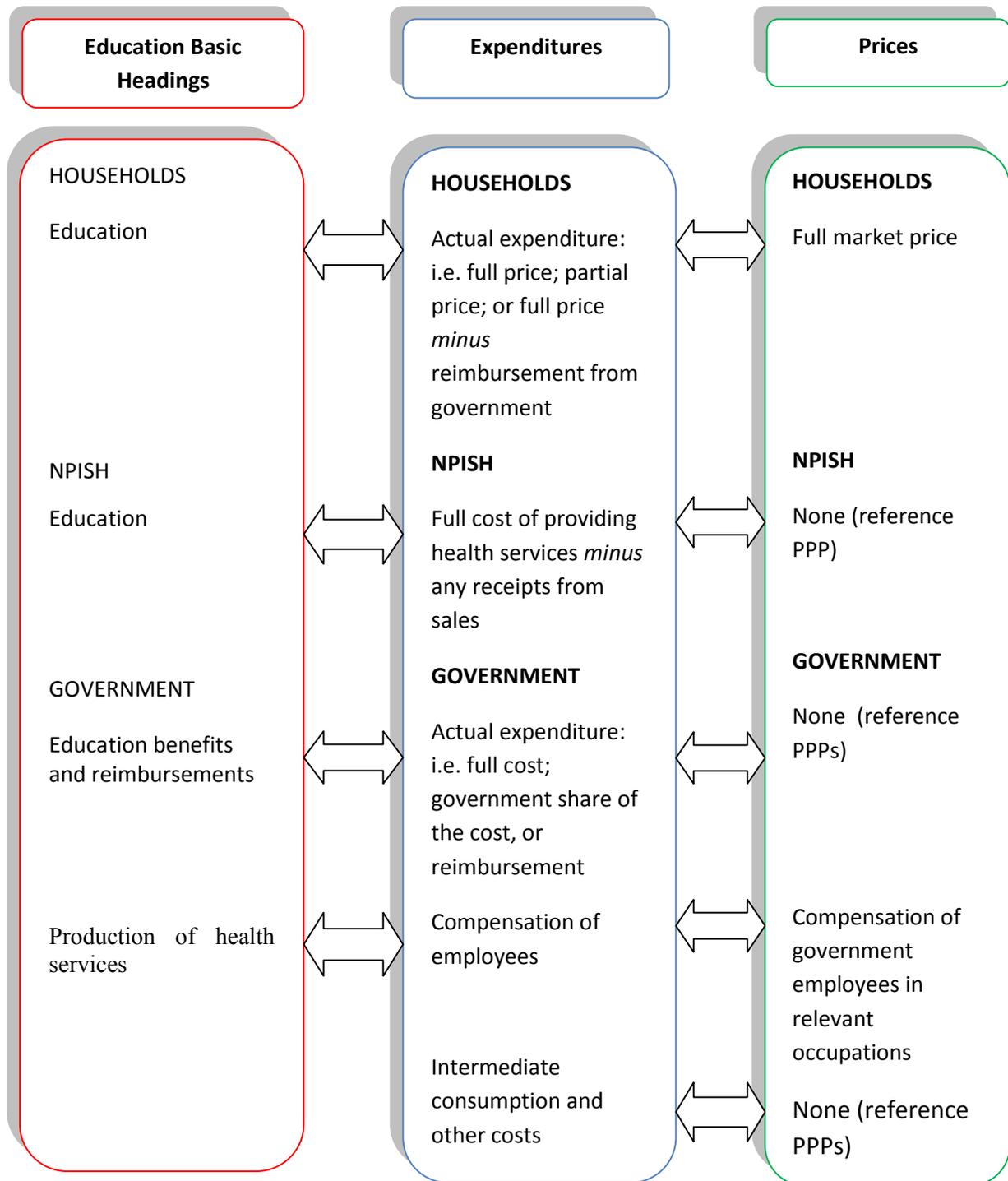
Countries must report the full prices for the education services purchased. If households pay only part of the cost with the remainder being paid by government or an NPISH, the price to be reported is the sum of the two components.

Costs are only required for compensation of employees – BH 13.04.21.1. Reference PPPs are used for all other education BHs as shown in Box 5

<b>Box 5 Reference PPPs for education services</b>	
<b>Basic heading</b>	<b>Reference PPP</b>
<i><b>Education benefits &amp; reimbursements</b></i>	
13.04.11.1 Education benefits and reimbursements	PPPs for production of education services by government (before deducting receipts from sales)
<i><b>Production of education services</b></i>	
13.04.22.1 Intermediate consumption	PPPs for individual consumption expenditure by households on the domestic market (excluding all basic headings with reference PPPs)
13.04.23.1 Gross operating surplus	PPPs for gross fixed capital formation
13.04.24.1 Net taxes on production	PPPs for production of education services by government (without net taxes on production and before deducting receipts from sales)
13.04.25.1 Receipts from sales	PPPs for production of education services by government (before deducting receipts from sales)

Box 6 summarises the discussion above and shows the expenditures and prices required for the education basic headings.

**Box 6 Expenditures and prices required for education basic headings**



## IV COMPENSATION OF EMPLOYEES

Compensation of employees is the most important BH for the production of both health and education services. The BHs for the production of other government services also include compensation of employees and the collection of comparable statistics on compensation of government employees is an important part of the ICP. Countries are required to collect information on compensation paid to persons working in 50 different government occupations. These include thirteen health occupations and five occupations in education.

Box 7 lists these and the other occupations for which compensation of employees is required. Note that several of the occupations in Box 7 are relevant to more than one type of service. For example, nurses are primarily relevant for health services but they may also be employed in schools. Secretaries, cleaners and drivers are employed in the production of educational, health and collective services, and so on. This means that the information on compensation of employees for these and other occupations can be used to calculate PPPs for more than one basic heading.

PPPs are calculated for each Basic Heading by taking the un-weighted geometric averages of the price relatives (strictly speaking compensation relatives) for all the relevant occupations. Thus, for example, the PPP for BH 13.02.21.1 (compensation of employees for the production of health services) is obtained by calculating the price relatives for occupations 101 through 113 in Box 7 and finding their geometric average. In the case of BH 13.04.21.1 (compensation of employees for the production of education services) the PPP will be based on the occupations 301 to 305 and, in addition, occupations 106, 201 to 212 and 216 because persons with these occupations are also employed in schools and universities.

Occupations 102 and 103 specify the length of time that the person has served in the post years – i.e. *Doctor with 20 year's seniority*, and *Doctor with 10 years' seniority*. For all other occupations compensation is required for persons with **5 years' seniority**.

<b>Box 7. Standard Government Occupations</b>	
<b>Health Services</b>	<b>Collective services (continued)</b>
101 Doctor, Head of Department	213 Policeman/woman
102 Doctor, (20 years of seniority)	214 Prison Guard
103 Doctor (10 years of seniority)	215 Fire Fighter
104 Nurse, Head of Department	216 Social Worker
105 Nurse, Operating Theatre	217 Town Planner
106 Nurse	218 Civil Engineer
107 Nursing Auxiliary	219 Draughtsman/Draughtswomen
108 Physiotherapist	220 Construction Labourer
109 Laboratory Assistant	221 Chauffeur
110 Hospital Chief Executive	222 Agricultural Scientist
111 Secretary (Hospital)	223 Librarian
112 Cook (not Head Cook)	224 Data-base Administrator
113 Community Health Worker	225 Web Administrator
<b>Collective Services</b>	226 Bodyguard (Protecting Senior Officials)
201 Finance Department Manager	<b>Education Services</b>
202 Executive Official (skill level III)	301 Kindergarten Teacher

203 Executive official (skill level IV)	302 Primary Teacher
204 Computer Operator	303 Secondary Teacher
205 Bookkeeping Clerk	304 University Lecturer
206 Data Entry Clerk	305 Head Teacher
207 Secretary (not Hospital)	<b>Defence Services</b>
208 Telephone Switchboard Operator	401 Army: Private of Infantry
209 Messenger	402 Army: Commander of Infantry Regiment
210 Maintenance Electrician	403 Navy: Able Seaman
211 Building Caretaker	404 Navy: Commander of Frigate
212 Cleaner	405 Air Force: Airman (Ground Crew)
	406 Air Force: Fighter Pilot/Wing Commander

The compensation of employees that participating countries are to report for the selected occupations is defined in Box 8. It is consistent with compensation of employees as defined in the 1993 SNA except that:

- Overtime payments are excluded from gross salaries and wages. Experience has shown that it is very difficult to obtain data on overtime that are comparable across countries. Although this results in volume measures that are marginally too high, their comparability is judged to be improved by ignoring overtime.
- The only benefits in kind to be taken into account are the provision of free or subsidised housing and food or meals. Other forms of income in kind are both difficult to evaluate in ways which are internationally comparable and are insignificant in the majority of countries.

<b>Box 8 Compensation of employees</b>
<p><b>Compensation of employees</b> includes all payments in cash and kind made by government in a year. These payments in cash and kind comprise:</p> <ul style="list-style-type: none"> <li>• <b>Gross salaries and wages in cash</b> are recorded before deduction of taxes and social contributions payable by employees. They cover: <ul style="list-style-type: none"> <li>• Basic salaries and wages as laid down in government <i>salary scales</i>. Box 9 explains how salary scales are used for this purpose.</li> <li>• Other payments, over and above the basic salary or wage, such as: housing or residence allowance, passage or leave allowance, family allowance, special duty allowance or acting allowance, 13th month pay and other cash payments except overtime payments. (As noted above it is very difficult to obtain data on overtime that are comparable across countries and so overtime payments are excluded.</li> </ul> </li> <li>• <b>Income in kind</b> cover things such as free or subsidised housing, meals, transport allowance, uniforms and other items of clothing. As a practical matter it is recommended that only two kinds of income in kind should be included in compensation of employees, namely the provision of free or subsidised <i>housing</i> and free or subsidized <i>food or meals</i>. These should be valued at the cost to the employer of providing them. This is the cost of production when the items concerned are produced by the employer and the purchasers' price when they are bought by the employer and passed on to the employee.</li> <li>• <b>Employers' actual social contributions</b> are payments made by government for the benefit of their employees and cover contributions for old age pensions, and for insurance against sickness, accident and disability. They are calculated on the basis of the schemes in</li> </ul>

operation in the various countries. In many countries, the government does not make any actual social contributions on behalf of their employees and this item will be zero and there will be an imputed social contribution instead.

- **Imputed social contributions** are relevant for countries where governments make no actual social contribution. Since these contributions do not involve actual cash flows, they have to be imputed. The imputations have to be done in line with the corresponding imputations made in the national account.

The compensation of employees to be reported for the selected occupations should be calculated from the basic salaries and wages that are laid down in government salary scales. Once the basic salary or wage has been established for an occupation, it is relatively straightforward to compute its compensation of employees because most of the other components of compensation of employees (such as housing or residence allowance, family allowance, special duty allowance, etc) are normally related to the salary scale by being defined as percentage additions to the basic salary or wage. To determine the compensation of employees for the selected occupations, countries have first to locate the basic salary or wage for each selected occupation in the government salary scales. The procedure to be applied is described in Box 9.

<b>Box 9 Determining the basic salary for a selected occupation using a salary scale</b>							
<b>Grades and Categories</b>	<b>Steps</b>						
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>P4</b>	88,900	91,400	93,900	96,400	98,900	101,400	103,900
<b>P3</b>	76,800	78,800	80,800	82,800	84,800	86,800	89,000
<b>P2</b>	66,100	67,900	69,700	71,500	73,300	75,100	76,900
<b>P1</b>	53,600	55,000	56,400	57,800	59,200	60,600	62,000
<b>T4</b>	47,900	49,500	51,100	52,700	54,300	55,900	57,500
<b>T3</b>	41,200	42,600	44,000	45,400	46,800	48,200	49,600
<b>T2</b>	35,500	36,700	37,900	39,100	40,300	41,500	42,700
<b>T1</b>	31,100	32,100	33,100	34,100	35,100	36,100	37,100
<b>W4</b>	34,700	35,700	36,700	36,800	36,900	37,000	37,100
<b>W3</b>	31,300	32,300	33,300	34,300	35,300	36,300	37,300
<b>W2</b>	28,400	29,200	30,000	30,800	31,600	32,400	33,200
<b>W1</b>	25,700	26,500	27,300	28,100	28,900	29,700	30,050

1. Employees in public administrations are usually paid on the basis of a salary scale such as in the table shown above. The scale is divided into *grades* – P, T and W. Grades generally correspond to levels of education or skills.

2. Within grades there are four *categories* and each category is itself divided into *steps* - 1 to 7 in this example. Each step is usually 12 months, though steps of 18 or 24 months are not uncommon. For each selected occupation the category that is most representative in each country is to be identified. Representative here means the *modal category* associated with the selected occupation. The appropriate step within the category is determined by the seniority specified for the selected occupation.

3. Take, for example, a *Secondary school teacher*—occupation number 303 in Box 7. If the distribution of teachers is 15 per cent T1, 25 per cent T2, 35 per cent T3, 20 per cent T4 and 5 per cent P1, then T3 is selected as the modal category. Since five years seniority has been specified for all occupations other than doctors, then if each step is 12 months, the salary for category T3 with five years seniority will be 46,800 (equivalent to five steps). But if each step was 18 months or 24 months, five years seniority would be equivalent to four steps and a salary of 45,400 in the case of 18 month steps and to three steps and a salary of 44,000 in the case of 24 month steps.

4. It can happen that the distribution of employees over the categories associated with a particular occupation is bimodal, or approximately bimodal. In such cases the salary of both categories should be determined and an arithmetic average taken of the two. For example, if in the distribution of executive officials in the previous paragraph categories T2 and T3 were both 30 per cent, the salary – assuming steps of 12 months – would be 40,300 for T2 and 46,800 for T3. In this case the basic salary for an executive official with skill level III would be the arithmetic average of the basic salaries established for these two categories – which is,  $(40,300 + 46,800) / 2$  or 43,550.

The compensation of employees reported for each selected occupation must be **annual**. This is not a particularly difficult requirement. Salary scales usually show annual amounts and any revisions to the salary scales that take place during the reference year are relatively straightforward to accommodate. When there are revisions, a weighted average needs to be calculated. This can be illustrated by returning to the example of the school teacher in Box 5. If a five per cent increase in salaries came into effect in October of the reference year, then for the first nine months the salary for category T3 would be 46,800 and for the last three months it would be 49,140. The weighted average of the two –  $([46,800 \times 9] + [49,140 \times 3]) / 12$  – provides the basic salary required, namely: 47,385.

The compensation of employees should also be the **national average** taking into account the differences in compensation in different parts of the country. Quite often health and education workers employed in the capital city or main commercial centre may receive a cost of living allowance because prices are usually higher than in the rest of the country. In a simple case where, for example, 10% of all secondary school teachers work in the capital city and receive an annual cost of living allowance of 70, the national average allowance will be 7 and this is the amount that will need to be added to the basic compensation to obtain a national average. In practice it may be more complicated with perhaps several different allowances paid in different parts of the country, but the principle is clear.

For international comparisons, the compensation of employees reported for the selected occupations needs to be adjusted for differences in the numbers of hours worked in the different countries. In addition to compensation of employees, countries are therefore required to report the number of hours

regularly worked per week – excluding overtime – and the number of weeks worked per year. The latter is obtained by deducting annual leave and public holidays. This information is supplied on the reporting form in Box 10 below.

<b>Box 10 Information to be reported for compensation of employees in government</b>	
Occupation code number	E.g. 106
Occupation description	E.g. Nurse
Annual compensation of employees <i>of which:</i>	
Gross wages and salaries	
Employers' actual contributions to social security funds	
Employers' imputed contributions to social security funds	
Income in kind	
Housing	
Food and meals	
Number of regular hours worked per week	
Number of days worked per week	
Number of days of annual leave per year	
Number of public holidays per year	
Year for which data are reported (2011 or nearest year available)	
Currency unit	

## V OECD EUROSTAT COUNTRIES

Member countries of the OECD and the European Union have for some years been looking for ways to replace input measures of government services by true output measures. This is becoming of increasing importance as expenditures on both health and education absorb a rising share of national budgets. Input measures cannot capture productivity increases which are particularly striking in the health field.

A 2009 study by the OECD<sup>2</sup> deals with the estimation of output measures of education and health services produced by governments. It considers the measures that can be used both over time within a country and for international comparisons.

As regards education, Chapter 3 of the OECD study explains the procedure for international comparisons.

<sup>2</sup> "Towards measuring the volume of output of education and health services", STD/CSTAT/WPNA/(2009)1, OECD, Paris, July 2009. Paul Schreyer is the main author with contributions by Alain Gallais, Sandra Hopkins, Francette Koechlin and Seppo Varjonen.

“The following steps describe the basic procedure to estimate output-based PPPs or their equivalent in form of a direct volume index:

- Stratification of expenditure on education services into homogeneous groups;
- For each stratum, identification of the quantity measure of education services;
- For each stratum, identification of the quality measure of education services. By combining it with the quantity indicator, a quality-adjusted volume or a spatial price index (PPP) can be derived.”

The “homogeneous groups” used are five ISCED<sup>3</sup> levels of education:

ISCED 0	Pre-primary education
ISCED 1	Primary education or first stage of basic education
ISCED 2	Lower secondary or second stage of basic education
ISCED 3+4	Upper secondary and post-secondary non-tertiary education
ISCED 5+6	Tertiary education (including category “unknown”)

The “quantity measures” are the numbers of pupils in each level. It would have been preferable to use the number pupil-hours but comparable information is not available for many countries.

The “quality measure” uses country scores taken from the OECD “Programme for International Student Assessment (PISA)”<sup>4</sup>. This tests fifteen year olds in science, literacy, mathematics and general knowledge and now covers 62 countries. Two other international studies are organised by the International Association for the Evaluation of Educational Achievement (IEA). These are TIMMS (“Trends in International Mathematics and Science Study”) and PIRL (“Progress in International Reading Literacy Survey”). The OECD study explains that “an important advantage of PISA is that it provides results that are corrected for the economic, social and cultural status of students (the so-called ESCS adjustment).” By eliminating the effects of economic and social status on country scores, the corrected PISA results are better indicators of the quality of teaching. Data from TIMMS and PIRL have, however, been used for countries missing from PISA.

Table 1 from the OECD study shows output measures, with and without quality adjustment, compared with input measures for the 30 OECD Member countries plus Israel and Russia. Data refer to 2005. It will be seen that the use of output measures makes a substantial difference for most countries: in more than half the output measure (with quality adjustment) differs by more than 20% from the input measure. The output measure also sharply reduces the variability between countries. Quoting from the OECD study:

“In the input method, the index ranges from 43 (Turkey) to 189 (Iceland) whereas it varies between 70 (Russian Federation) and 130 (Iceland) under the output approach. For countries such as Iceland, Australia and Sweden, extremely high volumes in the input approach reduce to a more plausible level when an output method is applied. The introduction of the quality adjustment with PISA seems to [have a] rather limited influence on results. The adjustment is biggest for Poland where the index goes up by 8% (from 101 to 110)”.

3 International Standard Classification of Education (ISCED), UNESCO, Paris, 1997.

4 For details see <http://www.pisa.oecd.org>

**Table 1 Indices of real final expenditure per head on education (OECD = 100)**

	Output method				Input method	rank	% change between input and output with QA
	With QA*						
Iceland	130	(1)	133	(2)			
Israel	125	(2)	134	(1)	189	1	45.5
Mexico	124	(3)	128	(3)	159	(3)	-27.0
New Zealand	123	(4)	119	(4)	92	(24)	25.4
Korea	120	(5)	116	(5)	103	(17)	16.4
United Kingdom	116	(6)	111	(7)	99	(21)	17.7
Belgium -	112	(7)	112	(6)	91	(25)	21.6
Poland	110	(8)	101	(16)	128	(8)	13.7
Australia	109	(9)	106	(11)	87	(27)	21.2
Denmark	107	(10)	108	(9)	159	(2)	-45.8
Finland	106	(11)	101	(17)	133	(5)	-24.1
USA	106	(12)	108	(10)	105	(16)	1.1
Slovak Republic	105	(13)	103	(15)	127	(9)	-20.4
France	104	(14)	104	(12)	85	(28)	18.6
Norway	102	(15)	109	(8)	115	(13)	-10.2
Netherlands	102	(16)	98	(19)	129	(6)	-26.3
Sweden	101	(17)	103	(13)	117	(12)	-15.4
OECD	100	(18)	100	(18)	148	(4)	-46.7
Czech Republic	97	(19)	95	(20)	100	(20)	0.0
Turkey	96	(20)	103	(14)	98	(22)	-1.3
Hungary	95	(21)	90	(21)	43	(33)	55.3
Canada	91	(22)	85	(27)	95	(23)	-0.1
Ireland	90	(23)	87	(23)	128	(7)	-41.6
Portugal	88	(24)	88	(22)	118	(11)	-31.5
Austria	87	(25)	87	(24)	77	(31)	12.5
Spain	87	(26)	86	(26)	114	(14)	-30.3
Greece	86	(27)	86	(25)	100	(19)	-15.9
Luxembourg	86	(28)	83	(29)	101	(18)	-17.0
Switzerland	81	(29)	82	(30)	124	(10)	-45.5
Italy	81	(30)	83	(28)	106	(15)	-30.0
Germany	80	(31)	78	(31)	87	(26)	-8.1
Japan	79	(32)	77	(32)	58	(32)	27.4
Russian Federation	70	(33)	69	(33)	83	(29)	-5.1

\* QA: Quality adjustment

As regards health, output measures are so far only being recommended for hospital services. The output PPPs will be based on the relative costs of about twenty surgical procedures and about ten non-surgical treatments. Various options have been considered for quality adjustments but it has proved difficult to find comparable data and it is not planned to make any adjustments for ICP 2011. At the time of writing experiments are underway with about a dozen countries and the exact procedure that will be used for ICP 2011 has not yet been agreed.

## Annexes

### Annex 1 Government Occupations for Health and Education

#### HEALTH SERVICES

##### **CODE 101 Doctor, Head of Department**

*Doctor, Head of Department*, has the qualifications of a medical doctor and, in addition, is the senior doctor in a department which provides general medical care or carries out specialised activities such as surgery, cancer treatment, gynaecology, gerontology, medical research, blood bank.

The duties of a *medical doctor* are described under code 103 below. *Managerial responsibilities* include supervision of doctors and other medical staff and planning, directing and co-ordinating activities of the department.

##### **CODE 102 Doctor, ( 20 years of seniority)**

*Doctor, Senior Consultant* is a medical doctor with special knowledge and experience in a particular area of curative or preventive medicine but he or she does not have managerial responsibilities.

The duties of a *medical doctor* are described under code 103 below.

The *Doctors* whose average compensation is to be reported for Code 102 must have been working as qualified doctors for about twenty years.

##### **CODE 103 Doctor (10 years of seniority)**

*Doctors* provide curative treatments or preventative measures, or conduct research designed to improve or develop concepts, theories and operational methods for health services.

*Doctors* must have qualifications that are legally recognised and which will usually require at least five years of medical training in a specialised institution. This occupation is confined to doctors who are trained in Western medicine and excludes doctors trained only in traditional medicine such as herbal cures and acupuncture.

The *Doctors* whose average compensation is to be reported for Code 103 must have been working as qualified doctors for about ten years.

Their tasks include:

- Conducting medical examinations and making diagnoses;
- Prescribing and giving treatment for diagnosed illnesses, disorders or injuries;
- Giving advice on and applying preventative medicine methods and treatments;
- Conducting research into human disorders and illnesses.

Examples of the occupations classified here:

- Doctor, medical
- Physician

##### **CODE 104 Nurse, Head of Department**

*Nurse, Head of Department*, has the qualifications of a nurse and, in addition, is the senior nurse in a department which provides general medical care or carries out specialised activities such as surgery, cancer

treatment, gynaecology, gerontology, etc.

The duties of a *nurse* are described under code 106 below. *Managerial responsibilities* will include supervision of nurses and other medical staff and planning, directing and co-ordinating activities of the department.

**CODE 105 Nurse, operating theatre**

*Nurse, operating theatre* is a nurse with specialised skills relating to surgical operations.

The duties of a *nurse* are described under code 106 below.

**CODE 106 Nurse**

*Nurses* assist doctors in their tasks, deal with emergencies in their absence, and provide professional nursing care for the sick, injured, physically and mentally disabled, and others in need of such care, or they deliver or assist in the delivery of babies, provide antenatal and postnatal care and instruct parents in baby care.

*Nurses* must have qualifications that are legally recognised. In some countries it is a requirement to have a university degree in order to be able to practice as a nurse while in other countries a lower-level educational certificate is considered sufficient. In general, a nurse should have at least two years of formal training in a specialised institution.

Their tasks include:

- Giving nursing care and treatment to ill, injured or disabled patients;
- Assisting doctors in their tasks, dealing with emergencies and giving first-aid treatment in their absence;
- Administering medicine and drugs, applying surgical dressings and giving other forms of treatment prescribed by physicians;
- Checking on general health and progress of expectant mothers during pregnancy, and giving them professional advice and care;
- Delivering babies in normal births and assisting doctors with difficult deliveries.

**CODE 107 Nursing auxiliary**

*Nursing auxiliaries* assist medical, nursing, midwifery and dental professionals in their duties.

Nursing auxiliaries may not have a legally recognised qualification. Their tasks include:

- Preparing patients for examination or treatment;
- Changing bed linen and helping patients with their toilet;
- Providing hot water bottles and other comforts for patients;
- Serving and collecting food trays and feeding patients needing help;
- Sterilising surgical and other instruments and equipment;
- Assisting dentists by adjusting lights and passing tools and materials.

Examples of the occupations classified here:

- Dental aid
- Nursing aid
- Ambulance man/woman

**CODE 108 Physiotherapist**

Physiotherapists treat disorders of bones, muscles and parts of the circulatory or the nervous system by manipulative methods ultrasound, heating, laser or similar techniques, or apply physiotherapy as part of the treatment for the physically disabled, mentally ill or unbalanced.

Their tasks include:

- Conducting examinations to make diagnoses of disorders of bones, muscles and parts of the circulatory or the nervous system to determine proper treatment or refer to *Medical Doctors* as necessary;
- Treating disorders of bones, muscles and parts of the circulatory or nervous system by manipulative methods, and the use of ultrasound, heating, laser or similar techniques;
- Examining body deformities and disorders to determine and write specifications for artificial limbs or other appliances, helping to fit them and explaining their use;
- Advising communities and individuals on correct body postures, for work or otherwise, to avoid injuries and strain, and to strengthen muscles.

Examples of the occupations classified here:

- Chiropractor
- Physiotherapist
- Podiatrist

**CODE 109 Laboratory assistant**

*Laboratory assistants* perform technical tasks connected with research in life sciences.

Their tasks include:

- Preparing materials and equipment for experiments, tests and analyses;
- Collecting and preparing specimens such as plant, animal or human cells, and tissues or parts or organs for experiments and analyses;
- Assisting with and performing experiments and analyses;
- Estimating quantities and costs of materials and labour required for projects;
- Organising maintenance and repairs of research equipment.

Examples of the occupations classified here:

- Technician, bacteriology
- Technician, biochemistry
- Technician, blood bank
- Technician, pharmacology
- Technician, serology

**CODE 110 Hospital Chief Executive**

*Hospital Chief Executives* determine and formulate policies and plan, direct and co-ordinate the general functioning of the hospital within guidelines set by a board of directors or a governing body, to whom they are answerable for the operations undertaken and results obtained. They may not have any medical qualifications.

Their tasks include:

- Determining and formulating policies of the hospital;
- Planning, directing and co-ordinating the general functioning of the hospital;
- Determining and directing a particular policy, through consultation with subordinate managers;
- Reviewing the operations and results of the hospital, and reporting to governing bodies;
- Representing the hospital in its dealings with outside bodies, including government or other authorities.

**CODE 111 Secretary (hospital)**

*Secretary (Hospital)* carries out the duties described under Code 207 below but works in a hospital. He or she may have received formal training as a medical or hospital secretary or have acquired the necessary skills through on-the-job training

## EDUCATION SERVICES

### **CODE 301 Kindergarten teacher**

*Kindergarten teachers* teach children below primary school age. Primary education typically begins at age 5, 6 or 7. In some countries it is a legal requirement to have a university degree in order to be able to practise these occupations while in other countries a lower-level educational certificate is considered sufficient. Teachers of children with special-needs are excluded.

Their tasks include:

- Planning and organising activities designed to facilitate the children's development of physical and social skills;
- Promoting language development through story-telling, role-play, songs, rhymes and informal conversations and discussions;
- Observing children in order to evaluate and discuss progress and possible problems with parents;
- Supervising children's activities to ensure safety and resolve conflicts.

Examples of the occupations classified here:

- Teacher, pre-primary education/professional
- Teacher, pre-primary education/associate professional
- Teacher, nursery/associate professional

### **CODE 302 Primary teacher**

*Primary teachers* teach a range of subjects at the primary education level. Primary education typically begins at age 5, 6 or 7 and lasts about 5 years. In some countries it is a legal requirement to have a university degree in order to be able to practise these occupations while in other countries a lower-level educational certificate is considered sufficient. Teachers of children with special-needs are excluded.

Their tasks include:

- Supervising pupils in classroom and in other areas of the school;
- Preparing a programme of learning and giving instruction in areas such as reading, writing, arithmetic and other subjects, within a prescribed curriculum;
- Preparing, administering and marking tests, projects and assignments to train pupils and to evaluate their progress;
- Organising and supervising pupils' extra-curricular activities;
- Discussing their progress with parents and head teacher.

Examples of the occupations classified here:

- Teacher, primary education/professional
- Teacher, primary education/associate professional.

### **CODE 303 Secondary teacher**

*Secondary teachers* teach one or more subjects for educational or vocational purposes at some or all levels between the termination of primary education and the beginning of studies at colleges or universities. Teaching children with special-needs and teaching reading, writing and other primary subjects to adults are excluded.

Their tasks include:

- Giving lessons in their subjects and supervising pupils' class work and discipline;
- Preparing, assigning and correcting exercises;

- Administering and marking tests and examinations to evaluate pupils' progress;
- Preparing reports about pupils' work and conferring with other teachers and parents;
- Organising or assisting with extra-curricular activities such as debating societies or hobby clubs;
- Designing and modifying curricula and preparing educational and vocational courses of study.

Examples of the occupations classified here:

- Teacher, secondary education
- Teacher, secondary education/vocational training.

**CODE 304 University lecturer**

*University lecturers* teach at universities and similar institutions of higher learning. Their students have completed secondary education and may be undergraduates or post-graduates. They also carry out research and prepare scholarly papers and books.

Their tasks include:

- Designing and modifying curricula and preparing courses of study in accordance with requirements;
- Delivering lectures and conducting tutorials, seminars and laboratory experiments;
- Supervising experimental and practical work undertaken by students;
- Administering , evaluating and marking examination papers and tests;
- Directing research of post-graduates students.

Examples of the occupations classified here:

- Lecturer, college
- Lecturer, university

**CODE 305 Head teacher**

A *Head Teacher* is the senior teacher with managerial responsibilities for the school. Includes *Head Teachers* at kindergarten, primary and secondary schools.

Their tasks include:

- Managing the budget;
- Recruitment and staff training;
- Liaison with the parents;
- Designing and adapting the curriculum in accordance with government guidelines;
- Fund-raising;
- Teaching (the tasks of a teacher are described under codes 301 to 303 above).

Examples of the occupations classified here:

- Head teacher;
- Headmistress;
- Headmaster.