

Health and Education

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This chapter describes the kinds of data needed to calculate purchasing power parities (PPPs) for health and education. Data are required on prices to calculate basic heading PPPs and on government and household expenditures to weight the basic heading PPPs to obtain PPPs for higher levels of aggregation.

Most of the chapter describes how the 2005 round of the International Comparison Program (ICP) was conducted. The final section describes the changes that, building on earlier experience, will be introduced in the 2011 round.

In this volume, chapter 15 on government services (compensation) explains the general treatment of government services in the ICP, and much of what is written there also applies to government expenditures on health and education. However, this chapter is both narrower than chapter 15 because it deals only with government expenditures on health and education, and yet broader than chapter 15 because it also deals with household expenditures on health and education.

Special Features of Health and Education

Countries have different arrangements for providing their citizens with health and education goods and services. In a few countries, households are left to their own devices and must purchase these from private schools, clinics, hospitals, and so on. At the other extreme, a few governments supply all their citizens with health and education goods and services without charge. In the vast majority of countries, however, health and education are provided through a mixture of government-run and private schools, clinics, hospitals, and other institutions. Because of the different ways in which health and education services are provided, the ICP tries to measure the total volumes actually *consumed* by households regardless of whether they are paid for by households themselves or by government. This chapter explains how this measurement is made. Related to this explanation, in the remainder of this chapter the term *services* is generally inclusive of goods and benefits.

This chapter also describes how to compare the real output of health and education services produced by governments in different countries. The services that governments produce are not sold at market prices, and national accountants have assumed that the value of the outputs of such services is equal to the cost of their inputs. Traditionally, that is how the gross output and value added of government (and, where relevant, nonprofit institutions serving households, NPISH) have been measured in the national accounts, and the same procedure has been used for international comparisons.

Recently, however, many developments in the areas of both health and education have suggested that, over a period of years, the value of outputs is not equal to the value of the inputs used to produce them. In health services, for example, notable improvements have been made in diagnostic equipment, new treatments have been devised for cancer and AIDS patients, and microsurgery has drastically reduced recovery times so that patients are discharged much sooner than before. Meanwhile, anyone who looks only at the costs of providing education and health services is ignoring the fact that some countries are using their inputs more efficiently than other countries because they are making better use of new technical developments in providing these services. The changes that will be introduced in the 2011 ICP to capture these productivity differences in the provision of health and education services are explained in the last section of this chapter.

Organization of This Chapter

In the sections that follow, the first, health goods and services, explains the concept of “actual consumption” as the sum of individual household expenditures and government expenditures on health services. Because actual consumption covers both the household and government sectors, the estimation of PPPs requires information on both the prices of medical products and services *purchased* by households and the production costs of health services *produced* by government. In the second section, education services receive the same treatment.

Compensation of employees is the main cost component of the government’s production of health and education services. For the 2005 ICP, countries were required to provide information on the compensation of employees for 50 standard government occupations using the *System of National Accounts* (SNA) definition of employee compensation (Commission of the European Communities et al. 1993). The third section explains how this requirement was implemented.

For three ICP regions—Africa, Asia-Pacific, and Western Asia—PPPs calculated by comparing the compensation of employees produced results that were judged to be implausible because of the great differences in the levels of government salaries among countries in these regions. Some poor countries in which government salaries were usually very low were shown as having larger government services in real terms than the richer countries in which government salaries were much higher. An adjustment was therefore made for all government services, including health and education. This adjustment, which was based on the estimated ratios of capital assets per employee, is described in the fourth section of this chapter. However, the description there is brief because full details are given in chapter 16 on government services (productivity adjustments).

The final section of this chapter describes the changes planned for the 2011 ICP round based on the lessons learned in the 2005 and earlier rounds.

As noted earlier, chapter 15 on government services (compensation) explains the data requirements and methods used to calculate PPPs for all government services, both collective and individual. Thus to the extent possible, this chapter tries to avoid repeating chapter 15, and instead refers the reader to that chapter.

Health Goods and Services

This section illustrates how the household and government expenditures for health are combined in order to make comparisons across countries with different levels of government input to what is actually consumed by households.

Actual Consumption of Health Care

In some countries, the government provides households with most of the health goods and services they need. In other countries, households must buy most health goods and services in the market. Thus the only way to make useful comparisons among all countries is to compare the *actual consumption* of health goods and services regardless of whether government or private households actually incur the *expenditure*. Actual consumption is obtained by combining purchases of health goods and services by both households and government with the value of the health goods and services produced by government.

Basic Headings for Health Goods and Services

Box 11.1 shows the basic headings for final expenditures on health goods and services. These basic headings fall into two categories: *goods and services* and *production costs*. The basic headings for *goods and services* (110611.1 to 130212.4) refer to purchases by households and government of health goods and services from market producers. Examples are medicines, bandages, dental treatments, and therapeutic massage. The same specifications are used for collecting the prices of pharmaceutical products, other medical products, therapeutic appliances, and medical services whether purchased by households or by government.

The basic headings for *production costs* (130221.1 to 130225.1) refer to health services produced by the doctors and other health workers, clinics, hospitals, convalescence homes, and so forth funded by government. Because these services are not sold on the market, 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. Compensation of employees and intermediate consumption are the main production costs. Gross operating surplus

BOX 11.1 Basic Headings: Expenditures on Health Goods and Services

The total of the expenditure on the following basic headings by both households and government make up the *actual consumption* of households of health goods and services.

Individual consumption expenditure by households

Medical products, appliances, and equipment

- 110611.1 Pharmaceutical products
- 110612.1 Other medical products
- 110613.1 Therapeutic appliances and equipment

Outpatient services

- 110621.1 Outpatient medical services
- 110622.1 Outpatient dental services
- 110623.1 Outpatient paramedical services

Hospital services

- 110631.1 Hospital services

Individual consumption expenditure by government

Health benefits and reimbursements

- 130211.1 Pharmaceutical products
- 130211.2 Other medical products
- 130211.3 Therapeutic appliances and equipment
- 130212.1 Outpatient medical services
- 130212.2 Outpatient dental services
- 130212.3 Outpatient paramedical services
- 130212.4 Hospital services

Production of health services

- 130221.1 Compensation of employees
- 130222.1 Intermediate consumption
- 130223.1 Gross operating surplus
- 130224.1 Net taxes on production
- 130225.1 Receipts from sales (*minus*)

usually consists only of consumption of fixed capital, and there is no net operating surplus. However, 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) are small or zero in many countries. Receipts from sales (if any) are then deducted to obtain the net cost of producing health services. This deduction is carried out to avoid double counting, because payments made by households for government health services are already included as household expenditures in the basic headings under “health” (group 1106 in the ICP expenditure classification).

Health Basic Heading Expenditures

Countries are required to supply expenditures in their national currency for all the basic headings shown in box 11.1.

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 pay only part of the cost of health goods and services and the government pays the rest. The government may pay its share of the costs directly to the provider—such as the pharmacy, doctor, or hospital. In this case, the expenditure shown for households is only the part they pay. Or people may pay the full cost directly to the provider and are then reimbursed by the government. In this case, the expenditures shown are the amounts paid by the purchaser *minus* the reimbursement.

Reimbursements are deducted only if they come from the government. If a household is reimbursed by a private health insurance company, no deduction is made, and the expenditures recorded for households are the full costs without deducting any reimbursements received from insurance companies. (Premiums paid to private health insurance companies *minus* reimbursements are recorded under the basic heading 111251.1, insurance. They are regarded as purchases of insurance services and not health services.)

For the *individual consumption expenditure by government*, the expenditures for the basic headings listed under health benefits and reimbursements are again the amounts *actually* paid:

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

Expenditures for the basic headings 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 the gross operating surplus, *minus* any receipts from sales.

All or most of the gross operating surplus consists of consumption of fixed capital (CFC). The 1993 SNA explains that the CFC should be calculated using the current replacement costs of the assets concerned—hospital buildings, medical equipment, ambulances, and so on (Commission of the European Communities et al. 1993, paras. 6.179–6.200). Some countries have not yet calculated estimates of consumption of fixed capital according to the SNA rules. These countries will have to use estimates of depreciation as shown in the government accounts. Because these estimates are usually based on historic costs, “depreciation” is almost always lower than the CFC—and by substantial amounts in countries that have had high rates of inflation. This factor affects not only the comparability of the

expenditure weights but also that of total GDP. Countries participating in the 2011 ICP should therefore attempt to estimate CFC on government assets according to the SNA recommendations.

As noted earlier, net operating surplus and net taxes on production are usually zero. Receipts from sales consist mainly of fees for medical services paid by households to government hospitals and clinics. Because these expenditures are already included in the household expenditure, they must be deducted here to avoid double counting.

Prices for Health Goods and Services

In addition to providing expenditure weights, basic headings are the starting point for countries to select the specific goods and services they will price in order to calculate PPPs. Table 11.1 lists examples of products selected for the household expenditure on pharmaceuticals, other medical products, therapeutic appliances, and medical services.

TABLE 11.1 Examples of Health-Related Products, Appliances, and Services Selected for Household Expenditure

Type of product, appliance, or services	Description
<i>Pharmaceutical products</i>	
Acetaminophen/Paracetamol (international brand)	Dose: 500 mg; size of quantity: 10; form: tablet; medicine category: anti-inflammatory; purpose: maintenance; trade name: Tylenol; laboratory: McNeil
Co-trimoxazole (national brand)	Dose: (8 + 40) mg/ml; size of quantity: 100 ml; form: pediatric suspension; medicine category: antibacterial; purpose: otitis media (ear infection); trade name: Septrin; laboratory: GlaxoSmithKline
Ranitidine (generic brand)	Dose: 150 mg; size of quantity: 10; form: tablet; medicine category: antacid; purpose: maintenance; trade name: Zantac; laboratory: Glaxo Wellcome
Salbutamol (international brand)	Dose: 0.1 mg per dose; size of quantity: 1; form: inhaler; medicine category: anti-asthmatic; purpose: maintenance; trade name: Ventolin; laboratory: GlaxoSmithKline
<i>Other medical products</i>	
Adhesive bactericidal plaster	Price for: 1 piece; type: bactericidal; brand: well known; intended use: for wounds; dimensions: 1.9 × 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
<i>Therapeutic appliances and equipment</i>	
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: ± 2 diopters; price excludes: additional accessories and special processing mounting; comments: specify brand and price for 2 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
<i>Medical services</i>	
Consultation with a general medical practitioner (public)	Price for: 1 service; duration: ± 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: ± 15–20 minutes; timing: normal working hours; standard examination: yes; issuance: prescription; service type: private health service

Source: ICP.

As noted earlier, the same specifications are used for pharmaceutical products, other medical products, therapeutic appliances, and medical services whether they are purchased by households or by government. In addition, the same set of national average prices is used to estimate the PPPs for both household and government expenditures because no separate price collection is carried out for health goods and services purchased by households as opposed to those purchased by government. For the goods and services selected for all basic headings for the household expenditure and for basic headings 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 prices. Thus the price collectors will often be reporting prices that no one is actually paying, but the prices reflect the overall value of the products.

In practice, this situation usually does not present a problem for the price collectors. Generally, the pharmacist, doctor, and dentist are all able to report the full market prices for the goods and services they provide. When that is not the case, in some countries the full prices of the goods and services can be obtained only by consulting the accounting records for the government department responsible for the provision and supervision of health care.

“Hospital services” (basic headings 110631.1 and 130212.4) covers the medical services, pharmaceuticals, food, and accommodation provided to patients who stay overnight in a hospital during the course of their treatment. The quality of and the ways in which these services are provided differ greatly from country to country. Indeed, in the past it has proved very difficult to collect internationally comparable prices for hospital services. For that reason, a reference PPP is used for these two basic headings.

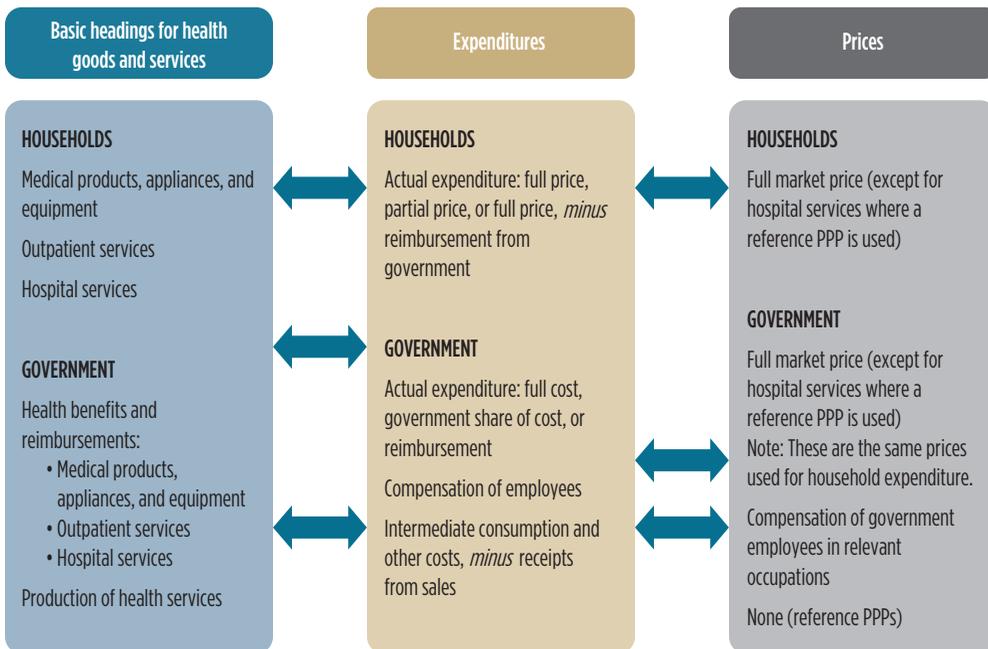
For the production of health services by government, countries report costs for compensation of employees as explained later in this chapter. For all other basic headings within this heading, no prices are required because reference PPPs are used. Table 11.2 shows the reference PPPs used for health services.

Figure 11.1 summarizes this section on health goods and services by showing the expenditures and prices required for the health basic headings.

TABLE 11.2 Reference PPPs, Health Services

Basic heading		Reference PPP
<i>Individual consumption expenditure by households</i>		
110631.1	Hospital services	PPPs for production of health services by government (before deducting receipts from sales)
<i>Individual consumption expenditure by government</i>		
130212.4	Hospital services	PPPs for production of health services by government (before deducting receipts from sales)
130322.1	Intermediate consumption	PPPs for individual consumption expenditure by households on the domestic market (excluding all basic headings with reference PPPs)
130223.1	Gross operating surplus	PPPs for gross fixed capital formation
130224.1	Net taxes on production	PPPs for production of health services by government (excluding net taxes on production and before deducting receipts from sales)
130225.1	Receipts from sales	PPPs for production of health services by government (before deducting receipts from sales)

Source: ICP.

FIGURE 11.1 Expenditures and Prices Required for Health Basic Headings

Source: ICP.

Education Services

Many of the issues surrounding the estimation of education PPPs are similar to those described earlier for health, and therefore many of the same concepts apply.

Actual Consumption of Education Services

Like health services, education services are both provided to households by government and purchased directly by households. The actual household consumption of education is defined as the sum of individual consumption expenditures by households and by government.

Education services include adult education courses, language schools, and pre-primary nursery schools, as well as primary, secondary, and tertiary education. However, driving lessons and recreational courses such as bridge and painting lessons are excluded. Education services may be provided through radio, television, and the Internet, as well as through conventional classroom teaching.

Basic Headings for Education

Box 11.2 shows the basic headings relevant to expenditures on education services.

Like those for health, the education basic headings fall into two categories: purchases by households and government of services from schools and universities (111011.1 and 130411.1) and the costs of production of education services provided directly by government (130421.1 to 130425.1). However, unlike for health, basic headings for education purchases refer only to

services; no goods are involved. Purchases by households of school uniforms, textbooks, exercise books, and other goods are not included in expenditures on education.

These cost components of the production of education services provided directly by government—such as compensation of employees, intermediate consumption, and gross operating surplus—are identical to those described earlier for health services.

Expenditures on Education Services

Countries are required to estimate expenditures on all the basic headings in box 11.2. For households, the expenditures will cover fees for private education and also any partial payments that may be levied by public and government-run schools and universities. In some countries, households may be reimbursed for all or part of their education expenses through bursaries or other scholarship awards from the government. Household expenditures on education are recorded after deducting these receipts; as it is for health services, the expenditures recorded here are the amounts actually paid by households.

For government, expenditures are divided between “education benefits and reimbursements” and “production of education services.” The first of these expenditures is generally quite small in most countries. It consists of payments such as bursaries or scholarships awarded to specially gifted children or to children from low-income families. This basic heading also covers payments made to meet the education requirements of children with special needs. By contrast, production of education services is a very large item in many countries; it is the costs of operating government-run schools, colleges, and universities. These costs consist mainly of employee compensation and intermediate consumption. Gross operating surplus is usually only the consumption of fixed capital; there is no net operating surplus. As noted in the discussion of health services, consumption of fixed capital 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 as defined according to SNA recommendations.

In many countries, the fees paid to government-run schools are quite significant. These fees are already included in the household expenditure on education services (111011.1), and so must be deducted to obtain the net expenditure by government on running schools and universities.

BOX 11.2 Basic Headings: Expenditures on Education Services

The total of the expenditure on the following basic headings by both households and government make up the *actual consumption* of households of education and services.

Individual consumption expenditure by households

111011.1 Education

Individual consumption expenditure by government

Education benefits and reimbursements

130411.1 Education benefits and reimbursements

Production of education services

130421.1 Compensation of employees

130422.1 Intermediate consumption

130423.1 Gross operating surplus

130424.1 Net taxes on production

130425.1 Receipts from sales (*minus*)

Prices for Education Services

Prices are required only for household purchases of education services (111011.1)—that is, education services from private (nongovernment) schools and universities. Here are two examples of the kinds of services for which prices are required:

- *Upper secondary education.* Specifications: (1) pupil is age 15 at beginning of school year; (2) pupil can receive a general school leaving certificate giving access to university-level education; (3) pupil attends day school (not boarding school); (4) pupil is a national of the country concerned; (5) pupil pays annual fee for education only, excluding payments for meals and collateral services.
- *Other education programs (foreign language course or lessons).* Specifications: (1) group study; (2) English or French language; (3) intermediate level; (4) one-hour lessons; (5) fee per lesson.

Countries must report the full prices for the education services purchased. If households pay only part of the cost and the remainder is paid by government, the price reported is the sum of the two components. In general, private (nongovernment) schools and universities can provide information on the full prices of the courses they offer—both the part paid by the student and the subsidy, if any, provided by the government.

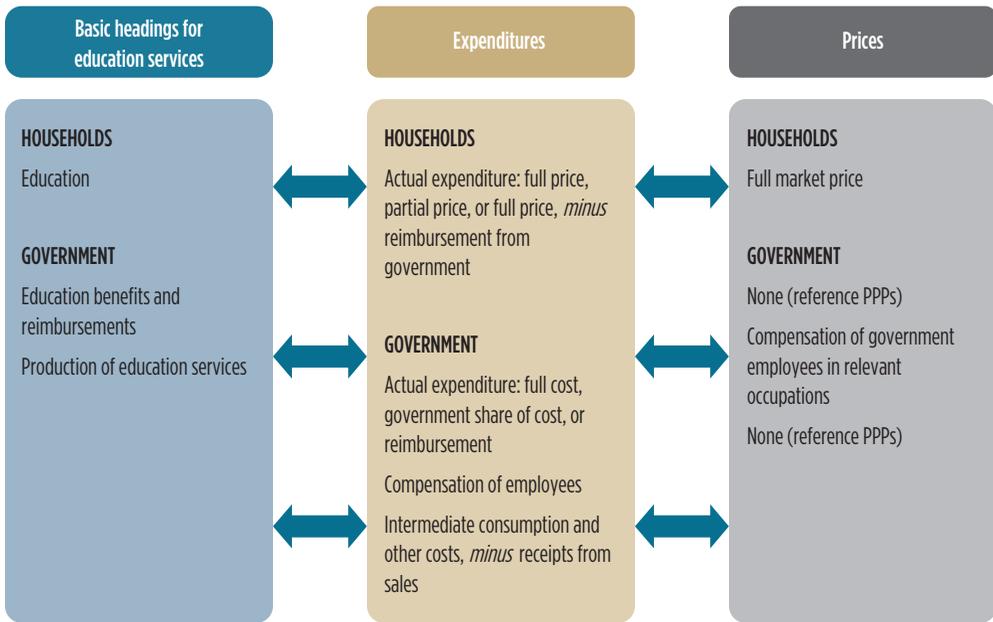
For the production of education services by government, countries report the costs of employee compensation as explained later in this chapter. For all other basic headings within this heading, no prices are required because reference PPPs are used. Table 11.3 lists the reference PPPs used for the other cost components, as well as for the basic heading education benefits and reimbursements (130411.1).

Figure 11.2 summarizes this section on education services and shows the expenditures and prices required for the education basic headings.

TABLE 11.3 Reference PPPs: Education Services

Basic heading		Reference PPP
Individual consumption expenditure by government		
Education benefits and reimbursements		
130411.1	Education benefits and reimbursements	PPPs for production of education services by government (before deducting receipts from sales)
Production of education services		
130422.1	Intermediate consumption	PPPs for individual consumption expenditure by households on the domestic market (excluding all basic headings with reference PPPs)
130423.1	Gross operating surplus	PPPs for gross fixed capital formation
130424.1	Net taxes on production	PPPs for production of education services by government (without net taxes on production and before deducting receipts from sales)
130425.1	Receipts from sales	PPPs for production of education services by government (before deducting receipts from sales)

Source: ICP.

FIGURE 11.2 Expenditures and Prices Required for Education Basic Headings

Source: ICP.

Compensation of Employees

Employee compensation is the most important basic heading within the production of both health and education services. The basic headings for the production of other government services also include employee compensation, and the collection of comparable statistics on compensation of government employees is an important part of the ICP. For the 2005 ICP, countries were required to collect information on the compensation paid to persons working in 50 different government occupations. They included 13 health occupations and 5 occupations in education.

Table 11.4 lists these and the other occupations for which the compensation of employees was required for the 2005 ICP. Several of the occupations listed in table 11.4 are relevant to more than one type of service. For example, nurses are primarily relevant to health services, but they also may be employed in schools. Likewise, secretaries, cleaners, and drivers are employed in the production of education, health, and collective services. Thus the information on compensation of employees for these and other occupations could be used to calculate PPPs for more than one basic heading.

PPPs are calculated for each basic heading by taking the unweighted geometric averages of the price relatives (strictly speaking, the “compensation relatives”) for all the relevant occupations. For example, the PPP for basic heading 130221.1 (compensation of employees for the production of health services) is obtained by calculating the price relatives for occupations 101 to 113 in table 11.4 and finding their geometric average. For basic heading 130421.1 (compensation of employees for the production of education services), the PPP will be based on occupations 301 to 305 as well as occupations 106, 201 to 212, and 216, because persons with these occupations are also employed in schools and universities.

Occupations 102 and 103—doctor with 20 years of seniority and doctor with 10 years of seniority—specify the length of time the person has served in the post. For all other occupations, compensation is required for persons with five years of seniority.

TABLE 11.4 Government Occupations, ICP 2005

Health services	Collective services (continued)
101 Doctor, head of department	213 Policeman/woman
102 Doctor (20 years of seniority)	214 Prison guard
103 Doctor (10 years of seniority)	215 Firefighter
104 Nurse, head of department	216 Social worker
105 Nurse, operating theatre	217 Town planner
106 Nurse	218 Civil engineer
107 Nursing auxiliary	219 Draftsman/draftswoman
108 Physiotherapist	220 Construction laborer
109 Laboratory assistant	221 Chauffeur
110 Hospital chief executive	222 Agricultural scientist
111 Secretary (hospital)	223 Librarian
112 Cook (not head cook)	224 Database administrator
113 Community health worker	225 Web administrator
Collective services	226 Bodyguard (protecting senior officials)
201 Finance department manager	Education services
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)	Defense services
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

Source: ICP.

The employee compensation that participating countries are to report for the selected occupations is described in chapter 15 on government services (compensation) and so is not repeated here. Compensation of government employees is calculated from the basic salaries and wages that are laid down in government salary scales. The procedure to be followed is also described in chapter 15.

The main points from chapter 15 on compensation of employees can be summarized as follows:

- Compensation of employees is consistent with the definition in the 1993 SNA. It includes basic wages and salaries, allowances in cash, income in kind in the form of food and accommodation, and employers' actual or imputed social security contributions.

- The *annual* compensation of employees must be reported for each selected occupation—not a particularly difficult requirement. Salary scales usually show annual amounts, and any revisions of the salary scales during the reference year are relatively straightforward to accommodate.
- 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 center may receive a cost-of-living allowance because prices are usually higher in those centers than in the rest of the country. These allowances must be weighted by the percentages of health and education workers that receive them in order to obtain average compensation for the country as a whole.
- For international comparisons, the employee compensation reported for the selected occupations should be adjusted for differences in the *numbers of hours worked* in the different countries. In addition to employee compensation, countries are required to report the number of hours regularly worked per week and the number of weeks worked per year after deducting annual leave and public holidays.

Productivity Adjustment for Health and Education Services

A review of the information on compensation of government workers in the Asia-Pacific region for the 2005 ICP revealed that the initial results, even after extensive validation of the data, did not appear to yield plausible volume measures. In particular, the quantities of government services in poor countries such as the Lao People's Democratic Republic greatly exceeded those in Hong Kong SAR, China, or Singapore. Similarly, in Western Asia the initial results produced volumes of comparison-resistant services for the Republic of Yemen that were much larger than those of its oil-rich neighbors. In Africa, too, implausibly large differences were found for several countries.

For the 2005 ICP, a productivity adjustment was therefore made for compensation of employees for all government services—health, education, and collective services—in the Asia-Pacific, Western Asia, and Africa regions. The adjustment was based on estimates of the value of fixed capital assets per employee, the assumption being that government employees in poor countries are less productive than those in the richer countries because they work with a smaller and less efficient stock of capital equipment. The adjustment method, which uses a Cobb-Douglas production function, is described in chapter 16 on government services (productivity adjustments) and is not repeated here. The same adjustment was made for health, education, and collective government services.

New Developments for ICP 2011

This section describes the changes planned for the 2011 ICP round based on the lessons learned in the 2005 and earlier rounds of the ICP.

Use of Output Measures

Member countries of the Organisation for Economic Co-operation and Development (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 issue is becoming increasingly important as

expenditures on both health and education services 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 OECD deals with the estimation of output measures of education and health services produced by governments (Schreyer 2009).¹ It considers the measures that can be used both over time within a country and for international comparisons.

For education, chapter 3 of the OECD study explains the procedure for international comparisons as follows:

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 International Standard Classification of Education (ISCED)² levels of education: (1) ISCED 0, pre-primary education; (2) ISCED 1, primary education or first stage of basic education; (3) ISCED 2, lower secondary or second stage of basic education; (4) ISCED 3 + 4, upper secondary and postsecondary nontertiary education; and (5) ISCED 5 + 6, tertiary education (including category “unknown”).

The “quantity measure” is the number of pupils at each level. Use of the number of pupil-hours is preferable, but comparable information is not available for many countries.

The “quality measure” is based on country scores from the OECD’s Programme for International Student Assessment (PISA).³ PISA tests 15-year-olds in science, literacy, mathematics, and general knowledge and now covers 62 countries. Two other international studies organized by the International Association for the Evaluation of Educational Achievement (IEA) are the Trends in International Mathematics and Science Study (TIMSS) and Progress in International Reading Literacy Survey (PIRL). 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)” (Schreyer 2009). By eliminating the effects of economic and social status on country scores, the corrected PISA results are better indicators of the quality of teaching. However, for those countries not covered by PISA, data from TIMSS and PIRL have been used.

Using 2005 data, the OECD study compares output measures, with and without quality adjustment, with input measures for the 30 OECD member countries plus Israel and the Russian Federation—see table 11.5. The comparison reveals 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 percent from the input measure. The output measure also sharply reduces the variability between countries. According to 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). (Schreyer 2009)

TABLE 11.5 Indexes of Real Final Expenditure per Head on Education (OECD = 100)

	Output method				Input method	Rank	% change between input and output with quality adjustment
	With quality adjustment	Rank	Without quality adjustment	Rank			
Iceland	130	-1	133	-2	189	-1	45.5
Israel	125	-2	134	-1	159	-3	-27.0
Mexico	124	-3	128	-3	92	-24	25.4
New Zealand	123	-4	119	-4	103	-17	16.4
Korea, Rep.	120	-5	116	-5	99	-21	17.7
United Kingdom	116	-6	111	-7	91	-25	21.6
Belgium	112	-7	112	-6	128	-8	13.7
Poland	110	-8	101	-16	87	-27	21.2
Australia	109	-9	106	-11	159	-2	-45.8
Denmark	107	-10	108	-9	133	-5	-24.1
Finland	106	-11	101	-17	105	-16	1.1
United States	106	-12	108	-10	127	-9	-20.4
Slovak Republic	105	-13	103	-15	85	-28	18.6
France	104	-14	104	-12	115	-13	-10.2
Norway	102	-15	109	-8	129	-6	-26.3
Netherlands	102	-16	98	-19	117	-12	-15.4
Sweden	101	-17	103	-13	148	-4	-46.7
OECD	100	-18	100	-18	100	-20	0.0
Czech Republic	97	-19	95	-20	98	-22	-1.3
Turkey	96	-20	103	-14	43	-33	55.3
Hungary	95	-21	90	-21	95	-23	-0.1
Canada	91	-22	85	-27	128	-7	-41.6
Ireland	90	-23	87	-23	118	-11	-31.5
Portugal	88	-24	88	-22	77	-31	12.5
Austria	87	-25	87	-24	114	-14	-30.3
Spain	87	-26	86	-26	100	-19	-15.9
Greece	86	-27	86	-25	101	-18	-17.0
Luxembourg	86	-28	83	-29	124	-10	-45.5
Switzerland	81	-29	82	-30	106	-15	-30.0
Italy	81	-30	83	-28	87	-26	-8.1
Germany	80	-31	78	-31	58	-32	27.4
Japan	79	-32	77	-32	83	-29	-5.1
Russian Federation	70	-33	69	-33	80	-30	-14.1

Source: Schreyer 2009.

For health, output measures are being recommended so far only for hospital services. The output PPPs will be based on the relative costs of about 20 surgical procedures and about 10 nonsurgical treatments. Various options have been considered for quality adjustments, but it has proved difficult to find comparable data, and no adjustments are planned for the 2011 ICP. Presently, experiments are under way with about a dozen countries, and the exact procedure that will be used for the 2011 ICP has not yet been determined.

Whether similar output measures will be used for other regions has also not been decided. It is possible that because of data limitations the input approach as applied in the 2005 round will have to be used again, with or without a productivity adjustment.

Government Occupations

The list of the 50 government occupations used for the 2005 ICP appears in table 11.4. For 2011, an updated list of 38 occupations will be used, of which 18 are relevant for health services and 16 for education—see table 11.6, which lists both the ICP and International Standard Classification of Occupations (ISCO) codes and job titles. The list was drawn up in consultation with the regional coordinators and representatives of a small sample of countries from the Africa, Western Asia, and Asia-Pacific regions. Other than the Eurostat-OECD countries, all countries will use this list.

Except for the Eurostat-OECD countries, government pay scales will continue to be used to calculate the compensation of employees, but countries will supply data for employees in each occupation at four career points: entry-level and after 5, 10, and 20 years of service. Unweighted averages of the four will be used to calculate PPPs.

The Eurostat-OECD group will use a list of only 26 occupations, but most of these will be comparable with the occupations in table 11.6. In addition, government pay scales will no longer be used to calculate employee compensation because in many of the Eurostat-OECD countries government employees now negotiate their salaries based on past performance. Countries will calculate average compensation using data on total wage bills and numbers employed. Some Eurostat-OECD countries will be asked to calculate as well the compensation of employees for the four career points to provide a link with countries in other regions.

Actual Versus Official Number of Hours of Work

In countries in which government salaries are very low, it may be the accepted practice that government workers are actually on the job for fewer hours than the official number, which is usually about 40 hours per week. In this way, employees can take a second job to supplement their government salaries. The salary comparisons are based on compensation per hour, and the denominator should be the actual rather than the official number of hours of work. If the official number of hours is greater than the actual number of hours worked, using the official number of hours as the denominator will mean that the compensation per hour is understated and thus the volume of government services will be overstated. Special efforts will be made in the 2011 ICP to ensure that countries report realistic estimates of the number of hours actually worked by government employees. The reporting form for compensation of employees to be used for the 2011 ICP appears in chapter 15. It asks countries to report both the official and actual number of hours worked in cases in which some government employees systematically work fewer than the official number of hours.

TABLE 11.6 Occupations by Function, ICP 2011

ICP code and job title	ISCO code and job title	Health	Education	Other
1 Member of parliament	1111 Legislator			X
2 Senior government official	1112 Senior government officials	X	X	X
3 Hospital manager	1120 Managing directors and chief executives	X		
4 Data processing manager	1330 Information and communications technology service managers			X
5 Secondary school principal	1345 Education managers		X	
6 Government statistician	2120 Mathematicians, actuaries, and statisticians			X
7 Hospital doctor	2211 Generalist medical practitioner	X		
8 Specialist doctor	2212 Specialist medical practitioner	X		
9 Hospital nurse	2221 Nursing professionals	X		
10 University teacher	2310 University and higher education teachers		X	
11 Vocational education teacher	2320 Vocational education teachers		X	
12 Primary school teacher	2341 Primary education teachers		X	
13 Secondary school teacher	2330 Secondary education teachers		X	
14 Government accountant	2411 Accountants			X
15 Human resources professional	2423 Personnel and careers professionals			X
16 Database administrator	2522 Systems administrators			X
17 Judge	2612 Judge			X
18 Government economist	2631 Economist			X
19 Laboratory assistant	3212 Medical and pathology laboratory technicians	X		
20 Auxiliary nurse	3221 Nursing associate professionals	X		
21 Medical records clerk	3252 Medical records and health information technicians	X		
22 Office supervisor	3341 Office supervisors			X
23 Medical secretary (hospital)	3344 Medical secretaries	X		
24 Customs inspector	3351 Customs and border inspectors			X
25 Computer operator	3513 Computer network and systems technicians			X
26 Secretary (not medical)	4120 Secretaries	X	X	X
27 Accounting and bookkeeping clerks	4311 Accounting and bookkeeping clerks	X	X	X
28 Payroll clerk	4313 Payroll clerks	X	X	X
29 Cook	5120 Cooks	X	X	X
30 Building caretaker	5153 Building caretakers	X	X	X
31 Teacher's aide	5312 Teacher's aides		X	
32 Firefighter	5411 Firefighters			X
33 Policeman/woman	5412 Police officers			X
34 Prison guard	5413 Prison guards			X
35 Driver (general duty)	8322 Car, taxi, and van drivers	X	X	X
36 Office cleaner	9112 Cleaners and helpers in offices, hotels, and other establishments	X	X	X
37 Kitchen helper	9412 Kitchen helpers	X	X	X
38 Messenger	9621 Messengers	X	X	X
Total		18	16	24

Sources: ICP and International Standard Classification of Occupations (ISCO).

Nonprofit Institutions Serving Households (NPISH)

In the 2005 ICP, the Eurostat-OECD countries were required to break down expenditures by NPISH into six functional groups: housing, health, recreation and culture, education, social protection, and other services. In the other regions, no breakdown of NPISH was requested because it was assumed that many countries had very little information on NPISH and that their expenditures were relatively unimportant. However, this assumption turned out to be unfounded—in several countries a significant number of schools, hospitals, and clinics are operated by NPISH. In South America, for example, many schools and health facilities are operated by the Catholic Church, and thus an ad hoc survey had to be conducted to estimate NPISH expenditures on providing health and education services in this region. Only expenditure data were collected, and PPPs were obtained using reference PPPs based essentially on compensation of government health and education workers.

For the 2011 ICP, the ICP expenditure classification will be revised by creating three new basic headings for NPISH:

- 120111.1 health
- 120211.1 education
- 120311.1 other services.

All regions will be required to provide expenditure data for these three basic headings. The expenditures of NPISH will be calculated, as for government, by summing their costs and deducting receipts from sales of services. Also in the 2011 round, reference PPPs drawn from government health and education services will likely be used again as PPPs.

Conclusion

In most countries, health and education services are provided by both market and nonmarket producers. In the ICP, expenditures on services from both sources are combined in order to compare the “actual consumption” of health and education services across countries. Consumption of health and education services has important implications for both welfare and future economic growth. The intercountry comparison of the total volume of these services consumed by households is therefore an important output of the ICP.

In the national accounts, market health and education services are measured in the same way as any other market services, whereas nonmarket services have traditionally been measured by adding up the costs of providing them. The same approach has been used in previous rounds of the ICP, but in the 2011 round the OECD-Eurostat group will use better methods for comparing some nonmarket health and education services. These countries will try to measure the output of these government services rather than the costs of the inputs used to produce them. A few countries in other regions may also be able to use an output rather than input approach, but it is most likely that PPPs for other regions will continue to be based on inputs rather than outputs. A more realistic measurement of government-produced health and education services remains a goal for future rounds of the ICP.

NOTES

1. Paul Schreyer is the main author of this report, with contributions by Alain Gallais, Sandra Hopkins, Francette Koechlin, and Seppo Varjonen.
2. UNESCO, Paris, 1997.
3. For details, see <http://www.pisa.oecd.org>.

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