BASYS

# Human Resources of European Health Systems

**Final-Report**

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# Preface

All European health systems are experiencing rapid and fundamental change. New medical technologies, e-health commerce, changing demographic and social structures put pressure on health system's management, with a constant requirement to improve productivity. In addition financial restraints of public budgets and unemployment in most EC countries provide challenges to the human resource function. Reliable, consistent and comprehensive information on human resources working in the health sector is therefore prerequisite to any manpower policy in the health sector. Today, health care organizations employ more physicians and health professionals, and there are more women employed in more senior positions than ever before. However, shortages of doctors and nurses are reported from several Member States. Managing human resources of health systems in the rapidly changing environment obviously requires new competences. As one might anticipate, it is the consistent linkage of available information from various sources, the harmonization of definitions, and the common use of classifications that increase the capacities of health management information.

Human resources in the health sector can be analysed from different angles using different variables and dimensions (numbers, volumes, distributions by sex and age, by type of profession or by education). Due to the different organisation and structure of the health care sector as well as the education systems throughout European countries – and last but not least the policy priorities in the past -, there is a strong variability of data among the various countries. Closely related to the problem of variety of definitions and classifications of data is the problem of heterogeneous sources of data. The issue of fragmentation of sources and definition of variables constitutes one of the challenges of this project.

At the same time it is important to underline that there is an increasing interest in the evaluation of human resources in the health sector not only from an economic but also from a social perspective. Solutions how to meet the health needs of the population has become more and more relevant in politics, especially against the background of deep social, economic and demographic changes as well as unbalanced labour markets for health professions in selected countries.

Moreover, designing possible future scenarios based on reliable and comparable international statistics in order to put into action adequate planning programmes has become increasingly relevant (analysis of the past and the present is considered to be reductive and not sufficient to correspond to actual requirements).

The project on Human Resources of European Health Systems supported by a grant of the Health Monitoring Programme aimed at assessing the situation on human resources statistics in the Member States (MS) and developing perspectives for the further development of statistics in this area. A working group consisting of representatives of the national statistical offices and research institutes supported by a project board with experts from the Member States Denmark, Finland, Germany, Ireland, Luxembourg and the Netherlands as well as representatives of Eurostat and OECD leaded the project.

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# Executive summary

There is a growing appreciation of the key role of health accounting in understanding health system developments generally and a consequential widening of interest in manpower dynamics of the health sectors in Member States. In order to provide an adequate information policy for this new political orientation, the European Union has taken it upon itself to make the European health systems more comparable within the framework of the Health Monitoring Programme. This is in line with reporting about the proper functioning of Europoean Monetary Union and the Single Market. This requires a comprehensive information system providing policy makers with the necessary data on which to base their decisions.

Against this background Eurostat launched a project which aimed at developing a system which would provide data on Human Resources of European Health Systems in a consistent and comprehensive way. The project built on the work of the Eurostat/Working Group on Health Statistics and the existing Task Force on Health Care Statistics as well as on efforts by the OECD to introduce a System of Health Accounts (SHA) and related efforts made by some of the Member States. After signing the contract the project started in February 2001. A workshop was held at Augsburg on April 6-8, 2001. The workshop aimed at giving an introduction and description of the methodology to be used as well as to give an overview and developments in participating countries. The collection of meta data by using questionnaires started in July 2001. The aim was to receive comprehensive information on the sources and providers relevant for national labour accounting in the various Member States. Until today twelve out of eighteen countries returned the questionnaires. This final report describes the present results of the project focusing on the evaluation of meta-data received from the questionnaires returned and the description of the presentations given by the representatives of the participating countries at the workshop.

A positive outcome of the project is the broad availability of data in many of the countries which delivered information on meta data. At the same time, however, the main problem is the limited availability of data in some areas (actors according to the ICHA-HP classification) and the various level (age, gender, head counts etc.) to which data are broken down. This, as well as the differing level of quality of reporting causes difficulties in submitting comparable statistics on human resources on the European level.

The assessment of meta data on human resources of the health sector in the Member States shows that some countries, e.g. Denmark, Germany, Finland, Norway and the Netherlands have started to establish labour accounting systems for the health sector (HLA). In other countries no comprehensive approach on labour accounting in the health sector has been applied so far.

Regarding the current diversity of sources used for labour accounting in EU countries, the question of how to make the data basis for the calculation of human resources more comparable one has to consider several aspects such as the methodology and the definitions and classifications to be used, but also the selection of variables, statistics and indicators (see Chapter 5 for details).

For future *methodology* to be used we suggest to elaborate and implement an integrative statistical tool, so called Health Labour Accounts (HLA), at least at the 1-digit level which will be compatible to the SHA. Implementing a system of Health Labour Accounting for the health sector is certainly an ambitious aim. Thus, this suggestion should be considered as a long term initiative which at the same time will provide a way of building up HLA in all European countries. The system will be based on existing statistics. For reasons of filling gaps where other sources are not available, gathering structure information on age and gender and balancing data LFS and Census data might be used. Using both concepts (registers and LFS) the comparison of *data, definitions and classifications* of each of the concepts will be necessary for each sector in order to describe the disparities and correspondences between them (and to balance the differences in a next step). Regarding the *selection of variables* the development of a strategy for estimating FTE numbers for all actors and all countries have to be decided, selecting between the two optional concepts (LFS-concept and ESA 95-concept). Besides the priority of computing the estimation of data regarding FTEs (and head counts) by the Member States, another priority should be to include gender and age into future data collections in all countries.

Regarding *statistics* and the establishment of a complete data set covering all actors listed according to the ICHA-HP classifications, we suggest to follow a concept which goes beyond that proposed by the *OECD* 2001: beside Census data and LFS, we propose to use registers as well. The strategy proposed not only includes a systematic comparison and compilation of data deriving from registers and LFS (as well as the selection of best statistical sources) but also the comparison and balancing of the total sums resulting from registers, LFS, and other sources with System of Health Accounts. By using and combining a broad variety of already existing data in HLA this approach will provide added value for health policy information in all European countries.

Regarding *indicators* the design of manpower indicators should be linked to the indicators derived from the Health Labour Accounts (HLA) proposed within this project. By using this approach consistency with the System of Health Accounts (SHA) can be gained.

Using the principle of *ex-post* harmonisation on the existing heterogeneous sources future projects should focus on the establishment of comparable data on manpower. As a consequence, we recommend to focus in the next step on limited sections (i.e. hospital sector) for the collection of data on manpower. In the long-term this will result in the collection of more comparable data sets on manpower which will allow to complete Table 10 “Total employment in health care industries” of SHA for an increasing number of countries.

# 1 Introduction

While European wide labour accounting of human resources in the health sector is quite new, the European Union has a long tradition in general labour accounting. In 1960, a first attempt was made to collect comparable data on employment and unemployment (in total) from all six Member States (MS) of the European Community. Since that date the number of MS has risen to fifteen and the character of the European labour market has been transformed by the radical changes which have taken place, for example in activity rates, in the allocation of working time, and in the distribution of employment across the various sectors of the economy. The ongoing development of the now European Union has led to changed information requirements. The economic and the social implications of recent trends in employment in the health sector stresses the importance of monitoring these developments. Reliable and comparable statistics are needed to provide policy makers with appropriate and thorough information. The demand for accurate and comparable information on the health labour market has consequently become progressively more urgent.

Since a comprehensive framework for the collection of data is still missing, the sources used for the employment statistics in health care in the MS vary a great deal: labour force survey, census, micro-census, provider statistics, and registers. In order to gain more comparable data across the MS, the importance of a framework covering national health accounts and health labour accounts is inevitable.

Against the background of this scenario, one of the aims of this project is to contribute to the development of a system which will consistently and comprehensively provide data on human resources of European health systems. The borderline of health care systems as defined in the OECD manual “System of Health Accounts, (SHA)” covers all organisations providing preventive services, care and cure such as hospitals and other organisations (see 3.2). All organisations active in administering health care such as public sickness funds and economic sectors providing intermediate production for health care, e.g., the pharmaceutical and medico-technical industry are also important. Using the principle of *ex-post* harmonisation on the existing heterogeneous sources in a common framework the project provides recommendations to overcome the shortcomings of existing data collections. The indicators on human resources proposed in this project will support international and national analysis on health accounts as about 70 % of health expenditures are spent on human resources. They will be given the chance to make better use of the potentials of a growing labour market which is characterised by increasing specialisation, new qualifications, intensive work-sharing and a highly qualified labour force. Together with other on-going efforts, the Member States can develop a tool to better analyse the efficiency and effectiveness of their respective health care production.

This project builds on the work of the Eurostat/ Working Group on Health Statistics and the existing Task Force on Health Care Statistics (TF Care) as well as on the on-going OECD efforts of introducing a System of Health Accounts (SHA). Further common roots are the Dutch CCP1 and the Luxembourg CCP2 projects on health care resource statistics. The approach of the project is based on agreed and proposed international classifications such as the OECD „System of Health Accounts”, the ILO „Occupational

Classification (ISCO-88)" and the ISCED classifications. Within this project proper links to on-going data collections of Eurostat's Unit E3, to methodological work in the LEG framework and to the EUCOMP project approved under the HMP framework have been established. Furthermore, the project ties into activities under Pillar B of the HMP, formerly IDA-HIEMS. The project will build and further elaborate on recent methodological progress of Eurostat/OECD in health accounting and international comparisons.

Another aim of this project is to have the expected results of this project incorporated in class 4 "Health system" of the health indicator set of the ECHI-project (European Community Health Indicators). One part of class 4 is 4.2 "Health care resources" of which the subclass is 4.2.2 "Manpower". The ECHI-project phase II aims, in the long run, to further incorporate the results of this project as well as results from other recent and forthcoming expert projects on specific subjects running under HMP to establish a consistent and comprehensive indicator list.

The structure of this report is grouped around the following three aspects:

- § description of methodical issues of Health Labour Accounting (chapter 2)
- § overview and developments in participating countries (chapter 3)
- § indicators (chapter 4)

The chapter on methodology describes the various methodological approaches constituting a framework for Human Resources based on a different angle (economic sector, health system framework, actors). The OECD "System of Health Accounts (SHA)" provides international classifications on which the methodological approach of this project is based upon (3.2). Furthermore, this chapter refers to the various classification systems developed to classify the different dimensions of labour force accounting such as ISCO (occupation), ISCED (education) and functional classifications (activities). These classifications, at the same time, offer a basis to develop a more advanced and more consistent data basis on human resources in the future.

In order to further develop the existing methodology, a questionnaire was developed and sent out to collect the information available in Member States based on existing data collections (taking into account various methodological improvements resulting from previous projects, especially EUCOMP). Furthermore, this questionnaire aimed at obtaining data items for selected provider categories (e.g. hospitals) with definitions, commentary (assumptions/ interpretations) and sources per item.

Chapter three gives an overview of the current statistical collection of data on human resources in the various countries by referring to the sources of data and institutions providing these data and the classifications used. It also provides a comprehensive evaluation of the classification of sources of data/ institutions, the meta data on selected provider categories and the use of classifications in order to connect the methodological requirements with the current status of data collection.

Another part of this chapter discusses in short the various difficulties regarding the comparability of these data deriving from the level on which these data are collected and the classifications that are used.

# 2 Methodical Issues of Labour Accounting in the Health Sector

This chapter discusses several methodological issues of human resources statistics in the health sector. It starts with the principles of labour accounting systems and their analytical units. Then, the following paragraphs deal with different frameworks for acounting labour in the health sector and structure it by classifications. A further section is focusing on methodical issues linking the diferent sources in a consistent and coherent way.

## 2.1 Labour Accounting Systems

Labour Accounting Systems (LAS) are intended to be a comprehensive framework for looking at labour markets. LAS have been developed in Netherlands, Denmark and a few other countries. The principles of LAS are described in Hoffmann (1999), International Labour Organisation (1992), Leunis and Altena (1996) and Statistics Netherlands (1999).

*ILO, 1992:* said that some Labour Accounting Systems related issues, "such as possible solutions to estimation problems, would seem to be so specific to national data situations and user priorities that international exchange of information rather than agreement would seem most useful. On other issues ….. it would seem useful to develop international guidelines." For that LAS provide a logical framework for obtaining internally consistent estimates of key labour market variables and their distribution over the population.. (which) .. are necessary for the description and analysis of the state and dynamics of the labour market and its interaction with the rest of the economy.

### 2.2.1 Principles

In the developing a international comparable labour accounting system for the health sector certain principles should be considered, which can be derived from the accounting standards of international organisations, particularly the principles defined by ILO, SNA/ESA, LEG on Social Accounting Matrices and EUCOMP. This general principles for the accounting Human Resources of European Health Systems are

- *Complete coverage* (of all economic activities and the economically active population)
- *Compliance* with ILO and SNA etc. concepts
- *Transformation* of data referring to single days or weeks to monthly, quarterly or annual averages
- *Consistency*, the data satisfy accounting relationships between, e.g., jobs, employed persons, hours worked and wage sum, in addition tables are available to describe the links between the labour accounts and the primary sources
- *High quality* because the best sources are used for different variables and sub-populations and data are adjusted in four steps (see later)

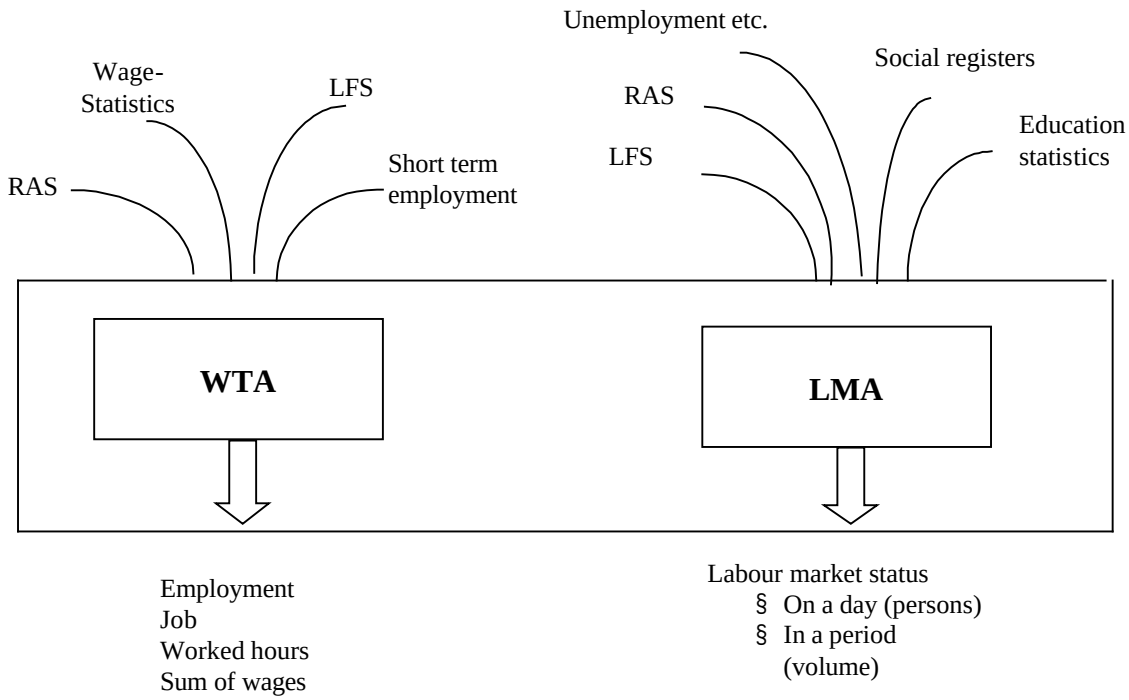
- *Comparability* over time: adjustments must be made for breaks in time series
- *Timeliness*, frequently available short-term estimates can be incorporated through their links with the source data
- *Transparency* of the compilations
- *Work organisation*: top-down statistical co-ordination and a minimum distance to the source statistics

*The four steps in the common methodology:*

- Harmonisation of variables, classifications, measurement units and reference periods (ex-post co-ordination)
- Adjustment for (incomplete) coverage
- Verification of accounting relationships and correction of measurements errors
- Balancing of remaining (small) differences

Usually LAS link varoius sources of data on both employment as well as working time and income. Figure 1 exhibits the various sources of data statistics which together determine the volume of head counts and full-time equivalents.

Figure 1: Various sources of data



### 2.1.2 Analytical units

It is worth commenting further on the analytical unit for a labour accounting system of health sector. Although the usual analytical unit in LAS is the individual person, a full understanding also requires data on other analytical units:

- jobs (including vacancies) - their creation, duration and destruction;
- workplaces, enterprises, establishments - their demography (births, deaths and life cycle);
- events - for example, the beginning and end of labour market states: a hiring and a separation - defining a period of employment; or a separation and a hiring - defining a period of unemployment. This is described as 'episodal' data in the Australian Survey of Employment and Unemployment Patterns and is needed for the work history studies mentioned above;
- the household or family this is increasingly the focus of 'static' labour market studies and will surely apply equally to LAS studies as they develop.

Obviously, there are several problems comparing health labour information without adjustment. The labour force survey provide an inconsistent variation of health care workers: Sweden 19,2 pct. and Portugal 4,1 pct. of total employment as compared to health expenditures. Statistics of physician and nurses vary by type and definition. Medical specialits are not classified by common classfications.

## 2.2 Human Resources in different approaches

### 2.2.1 Economic Sectors: The National Accounts Approach

Employment has traditionally constituted an integrated part of National Accounts which report on the total employment of the sector 85 “Health and Social Work”.

The European system of National Accounts (ESA 95) contains three basic employment concepts:

- employed persons
- full-time equivalent persons (FTEs)
- total hours worked

*Employed persons* are defined as the annual average number of employees and self-employed engaged in economic activity. Part-time workers, conscripts and persons temporarily absent from work are included. This concept is in accordance with definitions in SNA 1993.

*Full-time equivalent persons* are defined as the number of persons full-time employed, plus part-time employed converted to full-time equivalent basis. Full-time equivalent persons are useful in linking employment and wages and salaries, but also for cross-country comparisons.

*Total hours worked* is defined as actual hours worked by employees and self-employed, including overtime and excluding absence from work due to vacation, sick leave etc. The estimates are also influenced by calendar effects (movable public holidays, leap years). Total hours worked is considered to be the main concept for measuring the volume of "labour input", or the amount of productive services rendered by employed persons in ESA 95. Total hours worked, in combination with output or value added, are used in productivity studies (see Fløttum and Skoglund 1997).

*Compensation of employees*, and the components *wages and salaries* and *employers' social contributions*, are also defined according to SNA 1993 and ESA 1995. Wages and salaries are both in kind and in cash (including pay for overtime, and sickness and maternity allowances paid by employers).

The three basic employment concepts are specified according to occupational status (employees/self-employed), according to gender, and according to industry (about 180 industries). The three employment variables, together with variables describing compensation of employees, are linked by a set of relationships to a consistent subsystem in the national accounts.

### 2.2.2 A Health Systems framework for human resources: The SHA Approach

For discussing manpower in the health sector it is prerequisite to have clear understanding of the boundaries of the health sector. These boundaries are outlined in detail in the System of Health Accounts, SHA (Manual, Version 1.0, July 2000), which provides a framework of interrelated tables for standard reporting on health expenditure and the financing sources. The SHA has been written with the dual aim of providing a framework for international data collections and as a possible model of redesigning and complementing NHA. The set of core tables in the *System of Health Accounts* (SHA) addresses three basic questions:

- where does the money come from? (source of funding);
- where does the money go to? (provider of health care services and goods);
- what kind of (functionally-defined) services are performed and what types of goods are purchased?

As consequence the SHA is organised around a tri-axial system for the recording of health expenditure, by means of a newly proposed International Classification for Health Accounts (ICHA), defining

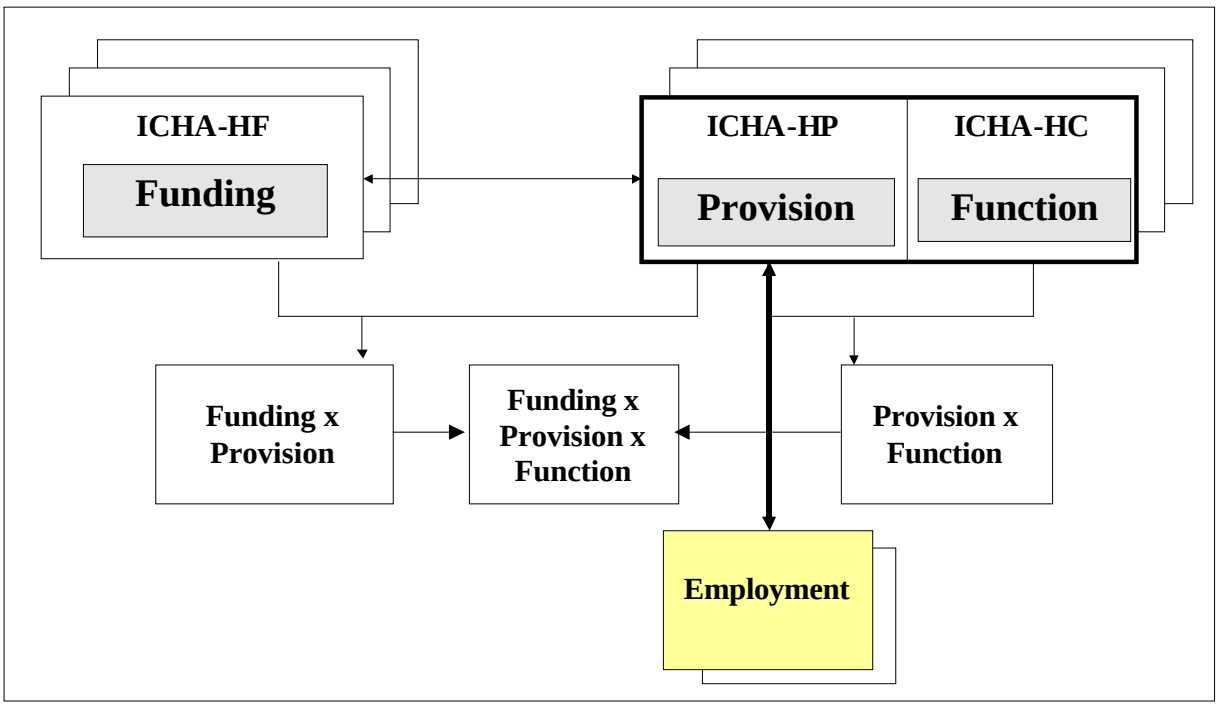
- health care by function (ICHA-HC),
- health care service provider industries (ICHA-HP) and
- source of funding of health care (ICHA-HF).

Within this tri-axial system the ICHA-HP classification of health care service provider industries provide the natural starting point for manpower accounting of the health sector. ICHA-HP includes the following providers:

- HP.1 Hospitals
- HP.2 Nursing and residential care facilities
- HP.3 Providers of ambulatory health care
- HP.4 Retail sale and other providers of medical goods
- HP.5 Provision and administration of public health programs
- HP.6 General health administration
- HP.7 Other industries (rest of the economy)
- HP.9 Rest of the world

The main characteristics of this approach is also shown in the following graph.

Figure 2: Role of Employment within SHA




Obviously, the accounting of employment is closely related to the production of health services as between the services of health providers and employment a basic production relation exist. The classification of health care industries serves the purpose of arranging country-specific institutions into common, internationally applicable categories and providing tools for linking data on personnel and other resource inputs as well as output and outcome measurement to the SHA.

The SHA recommends the use of international standards in reporting on flows of financing in health care. Some modifications which correspond to a slightly different treatment of the production boundary and of tax deductions in the SHA compared to the SNA, are explained in Table 1.

Paid household activities for informal home care substitutes home care by professional providers. Therefore home care allowances are compiled as health expenditures in SHA. Consequently, also informal home care providers have to considered in health labour accounts.

Table 1: Differences in the production boundary SNA and SHA

| SNA | SHA |
|---|---|
| - Outside | - Within |
| • Domestic and personal services produced and consumed within the same household (e.g. care of sick people | • Paid household activity for home care |
| • Domestic and personal services produced and consumed within the same household (e.g. care of sick people | • Occupational health care |
| - Within | |
| • Ancillary or intermediate services are nor recorded; e.g. Occupational health activities of enterprises | |

In order to improve and optimise data on health care human resources, various requirements have to be met:

- Health Care Human Resources data have to be defined in the context of SHA in order to allow meaningful analysis (borderlines and structure).
- A minimum breakdown includes providers by SHA categories and professional occupation/ qualification.
- The breakdown of providers should not only include cure/care (hospitals, practices) but also prevention, administration, education, R&D and intermediate production exclusively for health care (pharmaceuticals, medico-technicals).

### 2.2.3 Actors as basic production unit: The EUCOMP Approach

From a country perspective health policy is mainly dealing with human manpower within the national institutional setting. The actors classification by the EUCOMP approach provides for each MS a comprehensive list of all relevant providers. The EUCOMP-project an acronym for *'Towards Comparable Health Care Data in the European Union'* is an essential precursor to provide Member States with appropriate health information in order to make comparisons and to support national health policies.

The project aimed to produce a functional breakdown of health care systems in Member States, by reference to international health care classifications, detailing health care functions performed, as well as the activities linked to these functions. On top of that the project created a standardised comparative picture of all MS's health care systems by means of country profiles. The feasibility of the system was tested by applying it to

existing national data sets relating to health care delivery in selected areas in Member States. In a broader sense, the project also aimed to contribute to the development of comparable EU health care indicators and to assist Member States in health care policy making by sharing the functional descriptions of their health care systems and enabling the sharing of well-defined comparable data by Member States starting in selected areas.

Against the background of the general approach of the EUCOMP-project the following methods and related activities were indicated:

1. Development of an electronic questionnaire to collect the functional breakdown descriptions of Member States' health care systems based an work from previous projects (see above) and international healthcare classifications as proposed by EUROSTAT/OECD research for pilot data collections
2. Collection and completion of functional descriptions by all Member States
3. Development of a data collection instrument to obtain data items from Member States for selected areas with definitions, commentary (assumptions/interpretations) and sources per item.
4. Collation, analysis, refinement and assurance of the quality of data collected by reference to international health care classifications.
5. Definition of metadata for the selected areas by reference to the draft functional descriptions and activities by using data modelling techniques and software as appropriate.
6. Development of a basic template for a data collection system for input and basic analysis of the data.
7. Development of common data definitions for the selected areas and testing by using real data, which are already used and collected in the Member States (glossary).
8. Development of guidelines for the collection of data and metadata information for data collection and build these guidelines into the system.
9. Collection of further feedback from Member States and write the final report containing the proposed comparative functional breakdown of Member States health care systems.

The EUCOMP system was started by accumulating knowledge using meta data. Fixed process elements of the EUCOMP system included functions, activities and mode of production of health care providers. Variable process elements of this system referred to providers of health care. They defined the national work sharing applied by supplying functions in general and activities in particular by modes of production.

The EUCOMP project advances the process of producing truly comparable health care data forward an various levels by providing:

§ A comparable functional breakdown description of the health care systems for most Member States and for Iceland and Norway at an appropriate level with detailed descriptions (essentially structured metadata) of selected health care areas as a prototype.

- A manual and glossaries (in Member States own language and in English) as practical guidelines.
- A flexible framework for the functional breakdown descriptions of health care systems in the EU which can be supplemented and expanded so as to maintain a comparative picture of health care systems in the EU in the future.

In this context, the EUCOMP project advanced the process of producing truly comparable health care data forward on various levels by

- Using well defined structure as a basis for comparison and provides the high level metadata crucial to an effective understanding of public health data in context;
- Creating clear links between a common well defined standardised set of functions (and activities linked to these) and each set of local actors or providers in the health care sphere;
- Allowing boundary issues to be explored in a way which clarifies what activities are carried out where allowing better understanding and interpretation of the data in a clear and informative context while acknowledging delivery systems differences which must be taken into account;
- Prompting areas for further research, which promises to improve existing standards and data definitions;
- Preparing the way for work an detailed data definitions and metadata, which is essential in the longer term to enable Member State's focus an the priority areas for health care.

The EUCOMP project provides a framework which encompasses data independent of the provider structures in Member States whilst still integrating with details of the organisation of health care in a way that clearly shows the impact of provider structures in each country. This will provide a context, which will allow differences apparent in indicators relating to many areas such as hospital activity, personnel numbers and indeed in a whole range of other registers to be better interpreted and more easily understood. By creating standards EUCOMP contributed substantially to solving comparability problems since standards foster data comparability to solve comparability problems. However, the guaranteeing of completeness, consistency, common boundaries, and applying homogenous breakdowns were separate items.

However, there are still problems to be solved which derive from differences regarding national traditions, the remaining responsibility for the organisation of health care with the MS, and , therefore, differences regarding the legal basis for organising health care in the various Member States. All this results in the insufficient comparability of health care data across Europe. The solutions proposed within this project included the notion of creating a system that does not depend on National Health Care organisations, which will neither replace existing national data collections nor national definitions.

## 2.3 Classifications

Classifications are the backbone for comparing human resources between countries. Based on ESA95 and national labour accounting systems all European countries using international classifications, however in different versions and modifications. There are

mainly two reasons for differences, first the different education system for health professions, and secondly, the different organisation of health systems. As both aspects are in the domain of the Members States a harmonisation cannot be expected and is not intended. The development of Manpower Accounting in the health system will therefore require for international purpose to some extent ex-post-harmonisation and the development of common procedures for reporting in a consistent and coherent way. SHA provides the common framework for this reporting.

Comparing the ICHA-HP classifications with classifications developed by NACE (used by national accounting systems) the dimensions of human resources include the following dimensions:

- Volume of work (head counts, part-time, FTE, hours)
- Occupation (ISCO)
- Education (ISCED)
- Activities (Functional classification)
- Working Place (Provider Classification)

### 2.3.1 General Industrial Classification (NACE)

NACE Rev 1 (Statistical Classification of Economic Activities) is obligatory for the Member States since 1993. The classification includes the Section N: HEALTH AND SOCIAL WORK (before 1993: Health and Social Work ISIC/ NACE 93).

On a voluntary basis, the Member States are required to provide NACE data at three digits. This will include the following:

§ Section N Health and social work
  - 85 Health and social work
  - 851 Human health activities
  - 852 Veterinary activities
  - 853 Social work activities

The boundaries of health sector according to NACE differ obviously from the SHA concept. Some of the conclusions derived by *Montserrat* 2001 from figures of the LFS in the MS are:

- The use of sector N of the NACE classification seems very difficult. Without breakdown at three-digit level the weight of the non-boundaries between social sector and health seems to be excessive and the use of these information in the framework of the new SHA became impossible;
- At the three digits level it appears very clear that employment on NACE sector N is predominately on auxiliary professions and health related professionals.

### 2.3.2 Occupational classification (ISCO)

ISCO-88 (International Standard Classification of Occupations) has been designed and constructed around two key concepts: the concept of the job and the skills required for competent performance of the job. A job is defined as the set of tasks or duties designed to be performed by one person. For the Majority of jobholders the job is predefined before they are recruited into the post. Employers, professional bodies or institutions formulate jobs as bundles of tasks and duties allocated to employees who are recruited to these jobs. Associated with a job may be job description, detailing the required tasks and duties and a job title, through which the postholder identifies with a particular job. In some cases, particularly for self-employed individuals, the job is designed and conducted by the postholder.

Skill is defined in ISCO-88 as „the ability to carry out the tasks and duties of a particular job“ (ILO, 1990; p.2). To develop a taxonomy around this concept of occupational competence, two different dimensions of skill are defined. The level of skill associated with competent performance of a job is intended to measure the complexity and range of the tasks and duties concerned. The specialisation of skill defines the field(s) of knowledge required, tools and machinery used, material worked on and kind of goods and services produced.

The major change brought about by ISCO-88 is the concept of a skill level. In ISCO-88 this is related to the amount of formal education and formal or informal training and work experience generally associated with competent task performance.

To provide an operational indication of the concept of skill levels, ISCO-88 references four broad levels which are equated with levels of formal education (see Table 2) via the International Standard Classification of Education (ISCED). As the ILO indicates:

These four skill levels provide a quasi-hierarchical structure to the organisation of the classification. Although ISCO-88 avoids the terminology, “Elementary Occupations” can be regarded as “Unskilled”, and “Manual” or “Blue-collar” occupations are concentrated within major groups 6 to 9.

Table 2: ISCO-88 skill levels and education/qualifications

| Skill level | Corresponding education/qualifications |
|---|---|
| First skill level | Primary education (begun at ages 5-7 and lasting approximately 5 years) |
| Second skill level | Secondary education (begun at ages 11-12 and lasting 5-7 years) |
| Third skill level | Tertiary education (begun at ages 17-18 and lasting 3-4 years, but not giving equivalent of university degree) |
| Fourth skill level | Tertiary education (begun at ages 17-18 and lasting 3-6 years and leading to university degree or equivalent) |

Source: ILO (1990).

Ten major groups constitute the broad structure of the classification at its most aggregated level. As can be seen from Table 3, eight of the ten major groups are related to the four ISCO skill levels. For the managerial major group (Major Group 1; Legislators, senior officials and managers) the range of tasks which can constitute a managerial occupation was deemed too large to link directly with a particular skill level. For the armed forces (Major Group 10), many countries had indicated that the information required to categorise occupations within their armed forces would not be available for statistical classification.

Table 3: ISCO-88 skill levels

| Major Group | ISCO skill level |
|---|---|
| 1.Legislators, senior officials and managers | - |
| 2. Professionals | Fourth skill level |
| 3. Technicians and associate professionals | Third skill level |
| 4. Clerks | Second skill level |
| 5. Service workers and shop and market sales workers | Second skill level |
| 6. Skill agricultural and fishery workers | Second skill level |
| 7. Craft and related workers | Second skill level |
| 8. Plant and machine operators and assemblers | Second skill level |
| 9. Elementary occupations | First skill level |
| 10. Armed forces | - |

Source: ILO (1990)

ISCO-88 was developed during the mid 1980s to facilitate international comparison of occupational statistics and to provide a conceptual framework for those national statistical offices in the process of developing or revising their national occupational classifications.

Unlike its two predecessors (ISCO-58 and ISCO-68), the classification has been adopted, or is in the process of being adopted, by a large number of countries. In part this reflects both the more rigorous conceptual basis of ISCO-88 compared with its predecessors and the practical approach to its development which involved drawing upon the experience of a number of countries then in the process of reviewing and revising their national classifications. The resulting EU-version of ISCO-88, known as ISCO-88 (COM), was then mapped onto the national classification at the most detailed level of the national classification, with this mapping providing a detailed "table des correspondences".

Human resources information using ISCO are provided by the Community LFS, which is a joint effort by the Member States to co-ordinate their national employment surveys. The existing Labour Force Survey collects data on the basis of a large sample and using a common questionnaire following the ISCO codification on professions. With some exceptions the LFS is available for EUR-15 for the period 1983-2000. The number of households covered averaged between 500.000/ 600.000 in the EU. A sampling plan guarantees that for characteristics relating to 5% of the population of working age the relative standard error at NUTS II level (or equivalent) does not exceed 8% assuming the design effect for the variable unemployment.

However, perfect comparability among Member States is difficult to achieve. Nevertheless, the degree of comparability of the Community Labour Force Survey results is considerably higher than that of any other existing set of statistics on employment or unemployment available for Member States. This is due to:

a) the recording of the same set of characteristics in each country;
b) a close correspondence between the Community list of questions and the national questionnaires;
c) the use of the same definitions for all countries;
d) the use of common classifications (e.g. NACE for economic activity);
e) the data being centrally processed by Eurostat.

The Community LFS, although subject to the constraints of the Community's statistical requirements, is a joint effort by the Member States to co-ordinate their national employment surveys, which must serve their own national requirements. Therefore, in spite of the close co-ordination between the National Statistical Institutes and Eurostat, inevitably, there remain some differences in the survey from country to country.

Although the comparability between results of successive surveys has been improved, the following factors may detract from perfect comparability:

a) the population figures used for the population adjustment are revised at intervals on the basis of new population censuses;
b) the reference period may not remain the same for a given country;
c) in order to improve the quality of results, some countries may change the content or order of their questionnaire;
d) countries may modify their sample designs;
e) the manner in which certain questions are answered may be influenced by the political or social circumstances at the time of interview.

The LFS can produce reliable data for professions following the ISCO classification coded at 2 digits (ISCO Codes 22: Life science and health professionals and ISCO Code 32: Life

science and health associate professionals). However, due to the size of the sample it is possible to produce representative data sufficiently desegregated by profession (doctors, dentists etc.) and by professional status (independent, salary earning) via LFS (ISCO at 3 digits). Also, the NACE codification for the group N Health and social work sector can provide certain figures mixing the health and the social sector which are useful for certain general purposes, but difficult to correlate with the general framework of the health accounts.

Despite the existence of successive international standards in this area since the late 1950s, many countries of the EU had developed their own classifications of occupations, some of them without using international standards. It's important to take account of the fact that the Community LFS includes breakdown of the ISCO 88(COM) only at the three digits level. However, deviations between the national and the European classifications have been notably reduced (continuously at the 2-digit level and moderately at the 3-digit level). The 2001 LFS in Member States will, for the first time, require on a voluntary basis the ISCO 88(COM) on a 4-digit breakdown which can be more relevant for statistical human resources purposes (see Appendix).

The collection of data on the LFS is implemented following the NACE Rev 1 (Statistical Classification of Economic Activities) which is obligatory for the Member States since 1993. The natural crossing variable of health professions related to the ISCO 88(COM) is with the sector N of the NACE. The categories potentially related to health in ISCO 88(COM) are professionals, technicians and associate professionals, office clerks, service workers and shop and market sales workers.

According to Montsserat 2001 a total of 13.106.794 persons declared to work in the whole European Union on the NACE sector N (health and social work) in 1999. From this total, the breakdown following ISCO 88 (COM) provides the following information:

Table 4: Cross variable data Nace N/ ISCO 88(COM) for the year 1999

| | Categories | Number | |
|---|---|---|---|
| | Total | 13 106 794 | 100.0% |
| 513 | Personnel care and related workers | 3 647 654 | 27.8 % |
| 323 | Nursing and midwifery associated professionals | 2 104 965 | 16.1 % |
| 222 | Health professionals (except nursing) | 1 517 974 | 11.6 % |
| 223 | Nursing and midwifery professions | 941 908 | 7.2 % |
| 322 | Health associate professionals (except nursing) | 754 888 | 5.8 % |
| 346 | Social work associate professionals | 652 330 | 5.0 % |
| 244 | Social science and related professionals | 459 849 | 3.5 % |
| 411 | Secretaries and keyboard-operating clerks | 413 690 | 3.2 % |
| 512 | Housekeeping and restaurant service workers | 389 784 | 3.0 % |
| 419 | Other office clerks | 290 744 | 2.2 % |
| 332 | Pre-primary education teaching associate professionals | 269 760 | 2.1 % |
| 422 | Client information clerks | 207 669 | 1.6 % |
| 321 | Life Science technicians and related associate professionals | 156 202 | 1.2 % |
| 343 | Administrative associate professionals | 150 858 | 1.2 % |
| | Others | | 8.8 % |

Some of the conclusions deriving from these figures are:

- The use of sector N of the NACE classification seems very hard. Without breakdown at three-digit level the weight of the non-boundaries between social sector and health seems to be excessive and the use of these information in the framework of the new SHA became impossible;
- At the three digits level it appears very clear that employment on NACE sector N is predominately on auxiliary professions and health related professionals. The importance of traditional professions (doctors and dentists) seems to be not so important than in the past;
- Any attempt in terms of breakdown by age, sex or sub-national level will never be possible using the ISCO (88)COM as a isolated statistical tool;
- The design of the sample and the good quality and comparability of LFS can produce interesting estimative results at the four digits level. It seems to be necessary to establish a practice of contact with some experts in the National Statistical Institutes to explain and verify some strange categories (or not) working in the health sector;
- A deep study on characteristics and some definitions about national methods of coding at the 4 digit level seems to be necessary to understand the presence in the LFS at the three digit level of some astonishing categories (5 697 Writers and creative or

performing artists in EU working in the health sector; at 4-digit level: How many choreographers and dancers?).

### 2.3.3 Educational classification (ISCED)

The International Standard Classification of Education (ISCED) was designed by UNESCO in the early 1970's to serve as an instrument suitable for assembling, compiling and presenting statistics of education both within individual countries and internationally. ISCED covers all organized and sustained learning opportunities for children, youth and adults including those with special need education, irrespective of the institution or entity providing them or the form in which they are delivered.

Within the framework of ISCED, the term education is understood to involve organized and sustained communication designed to bring about learning. ISCED embraces both, initial education at the early stages of a person's life prior to entry into the world of work, as well as continuing education throughout a persons' life. ISCED includes a variety of programmes and types of education which are designated in the national context, such as regular education, adult education, formal and non-formal education, life-long education, part-time education, dual systems, training, etc.

The methodology ISCED is based upon translated national educational programmes into an internationally comparable set of categories for the levels of education and the fields of education. ISCED rests on three components:

- § internationally agreed concepts and definitions,
- § the classification systems and
- § an operational instruction manual and a well defined implementation process.

The basic unit of classification in ISCED, remains the educational programme. Educational programmes are defined on the basis of their educational content as an array or sequence of educational activities which are organized to accomplish a predetermined objective or a specified set of educational tasks. However, one has to note that some educational activities cannot be easily described in terms of an educational programme in the above sense. In other cases educational programmes may have specific characteristics that do not meet the usual criteria that are chosen in ISCED for the classification of programmes but still fall under the coverage of ISCED. Resulting from this, they should be classified together with those regular educational programmes to which they are most similar with respect to the criteria provided.

The ISCED classifications refer to different levels of education:

- § pre-primary education (level 0)
- § primary or first stage of basic education (level 1)
- § lower secondary or second stage of basic education (level 2)
- § (Upper) secondary education (level 3)
- § Post secondary non tertiary education (level 4)

- First stage of tertiary education (not leading directly to an advanced research qualification) (level 5)
- Second stage of tertiary education (leading to an advanced research qualification) (level 6)

For the description of some of these levels complementary additional dimensions are necessary:

For lower secondary education (level 2) e.g. the type of subsequent education or destination and the programme orientation are considered additionally.

Another three dimensions are necessary to subclassify the upper secondary education level (level 3): type of subsequent education or destination, programme orientation and cumulative theoretical duration in full time equivalent since the beginning of level 3.

At level 4 three complementary dimensions are taken into consideration: type of subsequent education or destination, the cumulative theoretical duration in full-time equivalence since the beginning of level 3 and the programme orientation.

Three complementary dimensions are equally needed to subdivide level 5: the type of programmes dividing programmes into theoretically based/ research preparatory/ giving access to professions with high skills requirements programmes on the one hand, practical/ technical/ occupationally specific programmes on the other hand; the cumulative theoretical duration in full time equivalence and the position in the national degree or qualification structure (first, second or further degree, research).

In general, primary education covers basic education beginning at the age of six over a period of at least four years; the average period of time however is 6 years. Secondary education in general comprises two different stages (see above). Lower secondary education in most countries corresponds to the accomplishment of compulsory school attendance for children. Upper secondary education provides a more advanced diploma. Tertiary education comprises education programmes subsequent to a qualification gained after having accomplished education at the secondary level and after having accomplished compulsory school attendance

The fields of education in the modified ISCED version of 1997 comprise 25 fields of education. In order to cover various fields of education having similarities broad groups had been established. One such example is the broad group Health and Welfare comprising educational programmes in medicine, medical services, nursing, dental services and social services. In the operational manual a code list describing exactly how educational programmes / subject groups are allocated to the different levels of education is given. The field of Health and Welfare is subdivided into the following programmes:

- Medicine (anatomy, epidemiology, cytology, physiology, immunology and immunoaematology, pathology, anaesthesiology, paediatrics, obstetrics and gynaecology, internal medicine, surgery, neurology, psychiatry, radiology, ophthalmology)
- Medical services (public health services, hygiene, pharmacy, pharmacology, therapeutics, rehabilitation, prosthetics, optometry, nutrition

- § Nursing (basic nursing, midwifery)
- § Dental services (dental assisting, dental hygienist, dental laboratory technician, odontology)

Health professions such as physicians (general practitioners, specialists) are covered by ISCED level 5. Examples of a first university degree under ISCED 5A are Bachelor's degrees (after 3-5 years) although programmes leading to a first degree in Medicine and Dentistry are generally of longer duration (5-7 years). ISCED 5A, second or further degrees covers qualifications gained after completion of programmes leading to post-graduate qualifications or "specialist" degrees in professional fields such as Medicine for which completion of a first degree is the minimum entrance requirement (these may have some research components but not of the level or type of level 6). It also covers post-graduate certificate or diploma courses of 1-2 years duration for specialisation in specific fields, such as Public Health or a special field of Medicine. ISCED 5A, research comprises programmes of specialisation in professional fields, such as specific branches of Medicine that are largely based on research.

In some European countries the first qualification covered by ISCED 5B (advanced vocational programmes of 2-4 years of duration) might also be relevant for the (advanced) education and training of midwives and nurses (Denmark, France, Germany, Netherlands, UK, and Sweden). Since this category will not be relevant for all types of education and training programmes throughout Europe, not only because of the design and the duration of the program but also because of the level of qualification achieved. As a consequence, the scope of responsibilities and tasks of nurses differ significantly. This raises the question, whether a functional component regarding the various professions in the health sector should be taken into consideration for labour accounting.

### 2.3.4 Functional classification

Both the professional classification and the educational classification do not properly classify human resources by their functions in the health sector as organization and rapidly changing environments lead to different activities of the same type of profession. Physicians and nurses might work in care and in cure and partly substitute it each other. As one might anticipate, it is the pressure on productivity of human resources in health care that drive system toward new institutional solutions and professions.

### 2.3.5 Volume of work

Labour Force Surveys and some other sources contain data on actual hours worked. The approach used in the national accounts is to estimate total hours worked from information on standard hours of work in each industry, according to legislation and agreements, and adjust for overtime and absence from work. The main relation used is:

(3) total hours worked = number of full-time equivalent persons x standard hours of work per year

x (1+ rate of overtime - rate of absence from work)

An average number of holidays in a year (resulting in 230 working days and 46 working weeks), combined with a standard working week of 37.5 hours, will yield 1725 hours of work per year. Owing to year-to-year variation of movable public holidays, the standard hours of work per year has in the last years ranged from 1718 to 1740, this means 1.3 per cent. However, some industries and groups of employees (employees above 60 years of age etc.) have shorter standard hours of work per year.

Special calculations are carried out for employees with shift or rotation jobs. These employees, which we mainly find in oil industries, some manufacturing industries and health care, have also shorter standard hours of work per year than other employees.

Overtime and absence from work are estimated from varies sources: wage statistics of Business and Industry Surveys, the register of employees in central and local government, the Labour force survey etc. The estimates are most uncertain for private service industries.

The number of employees in market production is estimated by combining information from the Labour Force Surveys and the register-based employee statistics. Register-based employees by industry are reconciled with total number of employees from LFS by proportional adjustments. The number of employees in non-market production, including central and local government, are calculated by using estimates on compensation of employees and average wages and salaries in these industries. The number of self-employed by industry is estimated from LFS.

Total hours worked per quarter and by industry is estimated on the basis of figures for employed persons and estimates on changes in average working hours. The estimation method is in principle the same as that applied for the calculations of the annual national accounts. Average working hours in a quarter are influenced in part by the calendar (number of public holidays etc.), and in part by absence and overtime. Absence due to vacation is assumed to have a stable quarterly pattern, with the exception of the timing of Easter which occurs in turns in the first or second quarter. Absence due to vacation is estimated on the basis of LFS. Estimates for other types of absence and overtime are based on information from the Business and Industry Chambers, wage statistics etc.

As outlined above, the Norwegian approach focuses on employed persons, while the concepts jobs and filled posts are not used. This means that we, in contrast with a general LAS-structure, have no explicit treatment of persons with more than one job. The main reason for this simplification has been shortcomings in the statistics. Another consequence of the Norwegian approach is that characteristics like shift work system, pay system and amount of compensation of employees are related to employed persons and not to posts or jobs.

The labour accounting system in the Norwegian national accounts does not comprise unemployed persons and persons outside the labour force. However, consistent estimates for these concepts are provided by the Labour Force Surveys. This link is utilised in labour market analyses. Statistics on the number of vacancies are compiled by agencies outside Statistics Norway. No attempt has been made to overcome the inconsistency problems involved in utilising these data in the labour accounting system.

As mentioned above, the Norwegian approach contains estimates of total hours worked, in agreement with the general LAS-structure. The aim is to estimate hours actually worked, but we do not make a clear distinction between hours worked and hours paid for.

The only demographic variable introduced in the Norwegian employment figures is gender. In the national accounts statistics by county, which has been constructed with 2-4 years intervals, regional breakdowns of employed persons are compiled.

## 2.4 Linkage of different sources

### 2.4.1 Multiple sources

Labour Accounting Systems, National Accounts and Health Accounts are using various data sources to compile coherent aggregates. Some statistics focus on the total, others on parts of the total. Their reliability often varies. One of the core statistics is the Labour Force Surveys (LFS) The strong point of this statistics is that total population aged 16-74 is classified as either employed persons, as unemployed persons or as persons not being in the labour force. All persons working more than one hour in the survey week, or who were temporarily absent from work because of illness, holidays etc., are classified as employed persons. Conscripts are classified as employed persons.

The estimates from LFS on total employment, calculated as annual averages, are considered to be quite reliable and are heavily used in analysing and monitoring the labour market. Besides, LFS contain information on personal characteristics like gender, age and education. The main weakness is that sampling errors may occur. The statistical uncertainty may be significant when focusing on sub-sectors of health systems. Besides, changes in definitions, estimation procedures and survey weeks have caused some breaks in the time-series.

Statistic offices are producing statistics from establishment and enterprise surveys focusing on specific sub-sectors: hospitals, pharmacies, etc. The statistics are based on Business Registers and usually contain data on employment, compensation of employees, output, value added etc. The data are considered to be quite reliable in case a high fraction of the total number of establishments is surveyed in the industries covered (all large establishments). However, some industries are not covered at all. The main strength from a national accounting point of view is that estimates on compensation of employees and employment are quite consistent with other economic estimates.[1]

Another important source in national accounts is the financial statistics for central and local government. The central and local government accounts provide information in a standardized form based on the same principles and definitions as in the national accounts. The statistics comprise data on compensation of employees and wages and salaries, but not employment.

[1] These statistics have been considerably revised from 1995/96 by adapting to the EU regulations on structural statistics. The statistics are to a much larger degree than before based on the enterprises' accounts as the main information source.

Table 5: Main sources on employment and wages and salaries used in the national accounts

| Classification of sources used in the project [1)] | Classification used by Skoglund [2)] | Contain information on |
|---|---|---|
| Establishment register (1) | Central and local government Accounts | Compensation of employees<br>Industry |
| | Register of employees in central and local government | Employed persons/jobs<br>Average earnings per month<br>Gender<br>Industry |
| Establishment register (1) | Register-based employee Statistics | Employed persons (employees)<br>Gender<br>Industry |
| Business survey (2) | Establishment/enterprise surveys | Employed persons/jobs<br>Part-time employment<br>Compensation of employees<br>Industry |
| | Survey-based wage statistics | Average earnings per month/hour<br>Working hours<br>Gender<br>Industry |
| Census (3) | - | Head Counts |
| | - | Full-time equivalent |
| | - | Profession |
| | - | Gender |
| | - | Age |
| Micro census (4) | Labour force survey | Employed persons/jobs<br>Occupational status<br>Part-time employment<br>Working hours<br>Gender<br>Industry |
| Register (individuals) (5) | Register of wages and salaries | Wage totals per year<br>Type of wages<br>Industry |
| Composite Statistics (6) | - | Head Counts |
| | - | Full-time equivalent |
| | - | Profession |
| | - | Gender |
| | - | Age |

1) This refers to the indicators selected in order to classify the sources of data provided for the various countries (see also 3.1).
2) see Skoglund (2001), p.6

For some industry groups, especially in private services, no wage statistics have been compiled by statistical offices. Wages and salaries are specified per hour (manual workers on quarterly bases), or per month (other employees on annual bases). The wages statistics also provide data on overtime and absence from work.

The procedure used for the estimation of employment figures from different sources in the national accounts may be outlined as follows:

First, basic statistics of different kinds are compiled by detailed industry. Data referring to a single date are transformed to annual averages. Inconsistencies between the data sources

are revealed either directly or indirectly through the use of formal relations between the variables. The estimation of employee figures is closely linked to the estimation of wages and salaries by industry. The main relations used is:

(1) number of full-time equivalent persons x wages and salaries per full-time equivalent person = total wages and salaries

(2) number of full-time equivalent persons = number of employed persons x conversion factor for part time employees

The conversion of employed persons to full-time equivalent persons is based on information on part-time employment from the Labour Force Surveys, establishment surveys, wage statistics, and registers of employees in central and local government. The conversion factor (equal to or less than 1) vary according to industry and sex.

In industries with many statistical sources, consistency is obtained mainly by adjusting employment rather than wages and salaries. The adjustments are rather comprehensive in manufacturing and central and local government industries. The assumption is that employment data normally are more inaccurate than data on wages and salaries. In some industries, like agriculture, information on total wages and salaries is not available from establishment surveys, but estimated by relation (1) and (2).

The estimates for all industries are then derived as a first step, as a compromise from the information available. This process is heavily based on detailed quality assessments of the different sources.

Next, detailed estimates are aggregated to main industries and to national totals. The number of persons employed according to the Labour Force Surveys is then compared to these aggregates. The reason for making these comparisons for aggregated industries is that detailed LFS estimates may be biased by sampling errors or measurement errors. Besides, the definition of employment in general government is not consistent in LFS and national accounts.

Discrepancies lead to adjustments on the detailed industry estimates. The adjustments are not implemented as an automatic procedure, but mainly directed to industries with weak statistical information on employment. For industries covered by establishment surveys, the employment estimates are normally adjusted upwards. The main reason for this is that employees with short hours of work are not always reported by the establishments (but are covered by LFS). The process of adjustments is repeated until the result is considered to be acceptable, which means that the total estimates of employed persons in the national accounts and LFS are approximately equal. For the main industries, deviations in the figures are accepted to some extent.

The main reason for using Labour Force Surveys as the frame of total employment estimates in national accounts is that the definition is harmonised in SNA 1993/ESA 1995 and ILO/LFS (with the exception of foreign employees). Besides, LFS provide consistent estimates of employed and unemployed persons in the economy.

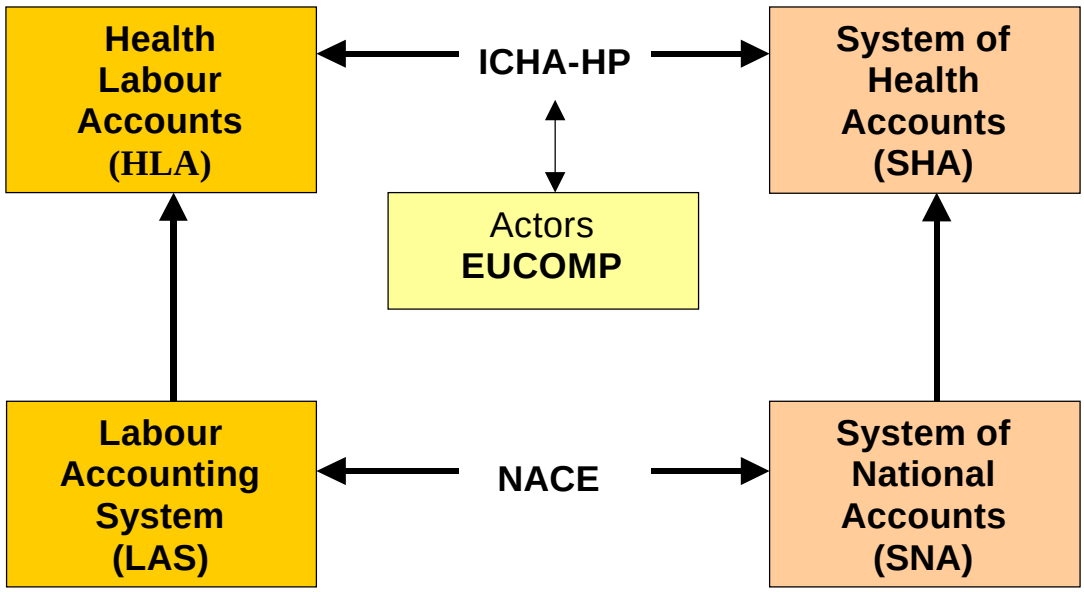
This process of reconciliation between Labour Force Surveys and other data sources is conducted separately for employees and self-employed. Industry data for self-employed persons are rather weak and the estimates for this category are based more directly on LFS.

The distribution of employment figures by gender is estimated from different sources, LFS being the most important. Since the tendency of part-time employment is considerably higher for women than for men, it is important to have a consistent treatment of the sex dimension in all parts of the accounting system.

### 2.4.2 Linking labour accounts and health accounts

Labour accounts form an integral part of national accounts. There are several reasons to link manpower data with financial data.

Figure 3: Linkage between HLA and SHA




Perhaps the most important link between labour accounts and manpower accounts are productivity ratios. The importance of productivity analyses in the health sector becomes evident if considering that health care is an important welfare factor.

There is a national and an international dimension of productivity analysis. At the national level, the following instruments are used:

- § instruments for keeping track of the efficiency in the production of health care services
- § instruments for resource allocation between different public sectors

At the international level, several aspects must be taken into consideration: although there are vast international differences in the structure of the health care sector, countries are facing similar problems and challenges in the health care sector. At the same time, however, certain problems exist in some countries but do not occur in others. This causes the demand for internationally harmonised statistics.

Labour productivity is usually measured as relation between output and total employment. However, in health care, doctors are usually the "captain of the team" as pointed out by Victor Fuchs. Therefore, it might be of particular interest to measure productivity as number of doctors per unit of output (see Sundhedsminsteriet 2000b). There are some methodological challenges dealing with the question of how to measure input in terms of labour or how to measure output in terms of production value? Last but not least, the overriding question is how internal consistency can be guaranteed between the two.

Within the sub-sectors of the health system different concepts for output measurement might be used. Traditional economic statistics look at the cost-side of production which turned out to be not sufficient; one solution in the hospital sector might be the use of the DRG-system for the production value taking into account the differences in the weight of costs between different activities.

# 3. Overview and developments in participating countries

18 questionnaires for the collection of metadata on human resource statistics for each EUCOMP actor were sent out to the Member States including Iceland, Norway and Switzerland and 14 questionnaires have been returned. Chapter 3 gives an overview of the sources of data on human resources and institutions providing data for each of the participating countries. The evaluation and classification of the sources of data is based on the information provided by the countries through the questionnaires.

## 3.1 Classification of sources of data/ institutions

Generally speaking, this project revealed that there is already a lot of experience in the field of statistics on human resources made in the various countries, but at the same time it became evident that the situation varies a great deal from country to country regarding the availability and quality of statistical data. Some countries have a high know-how and a high availability of information; in this case actions required are limited to the coordination of the national data according to the definitions and classifications established. In other cases it is necessary to implement statistical methods to do estimations on the lacking information.

In most of the countries data for labour accounting are derived from different sources. The significance and the dissemination of these sources for the various concepts of labour accounting differ between the countries. However, there are not only differences in sources but also differences in definitions, classifications and amount of detail as well differences in population coverage (units). In addition, conceptual differences must be taken into consideration. For the classification of sources of data provided for the various countries the following structure was chosen:

(1) Establishment Register
(2) Business Survey
(3) Census
(4) Micro census (sample survey)
(5) Registers (Individual)
(6) Composite Statistics

The definitions of the indicators given below do not express differences in population coverage (units) or conceptual designs adopted in the various countries.

*Establishment registers* are defined as general business registers which are registers of firms and institutions in a country. It comprises business records, notably employment records and wages. Registers are indexes which are kept on a legal basis/ commission.

*Business surveys* provide data on the various health care institutions such as hospitals, nursing homes etc. The are established on a regular periodical basis.

A *census* provides complete coverage of employment on a regular periodical basis. It is done through household surveys which provide a complete coverage of the whole spectrum of employment represented.

The *Micro census* is a sample survey covering a certain percentage of the population providing information on age, gender, profession, etc on a shorter periodical period.

*Registers on individual persons* of a professional group are provided by institutions, professional organisations etc. covering information on employment on different items.

*Composite statistics* are based on various sources of data.

For the classification of sources of data provided for the various countries the following indicators were chosen:

Table 6 assigns the various sources used for labour force accounting to the terms/definitions (1-6) given above for classification.

Table 6: Classification of Sources

| Country | Local Source-number | Local source name | English source name | No. of classification of sources |
|---|---|---|---|---|
| A | 1000 | Krankenanstaltenstatistik | Hospital statistics | 2 |
| A | 2000 | Berufsausübende Ärzte | Practising doctors | 1/5 |
| A | 2001 | Niedergelassene Ärzte | Doctors with office | 5 |
| A | 2002 | Berufsausüb. FÄ nach Fachrichtung | Practising specialists | 5 |
| A | 3000 | Hausapotheken bei PÄ | GP with an own pharmacy | 5 |
| A | 4000 | Mitglieder der Kammern der freien Berufe | Members of chambers for free-lance professions | 1 |
| A | 5000 | Mikrozensus, EU Arbeitskräftestichprobe | Labour Force Survey | 4 |
| A | 6000 | Volkszählung | Population census | 3 |
| CH | 1 | Statistique des hopitaux | Hospital survey | 2 |
| CH | 2 | Stat. établissements non hospitaliers | Nursing and residential care | 2 |
| CH | 3 | Recensement des entreprises | Enterprise/business surveys | 2 |
| CH | 4 | Enquête suisse sur la population active | Labour force survey | 4 |
| D | 1000 | ABDA Statistik | ABDA Statistics | 1 |
| D | 1100 | Arbeitgeberverband Versicherungen | Employer's Federation of insurance comp. | 1 |
| D | 1200 | Ärztestatistik der BÄK und der KBV | Register of Doctors BÄK and KBV | 1/5 |
| D | 1250 | Berichte der Bundesanstalt für Straßenwesen | Reports of the Federal Highway Research Institute | 2 |
| D | 1300 | Berufe des Gesundheitswesens | Health personnel statistic StBA | 6 |
| D | 1400 | Einzelhandelsstatistik | Retail Trade Employment | 2 |
| D | 1450 | Gesamtstatistik der Einrichtungen der freien Wohlfahrtspflege | Statistics of institutions of the voluntary welfare work | 2 |
| D | 1500 | Großhandelsstatistik | Wholesale Trade Employment | 2 |
| Country | Local | Local source name | English source name | No. of |

| | Source-number | | | classifi-cation of sources |
|---|---|---|---|---|
| D | 1600 | Statistik des Produzierenden Gewerbes | Statistics of the Manufacturing Industry | 2 |
| D | 1700 | BGW Hamburg | BGW-Accident Insurance Hamburg | 1 |
| D | 1800 | Bundesstatistik für Krankenhäuser | Hospital statistic | 2 |
| D | 1900 | Handwerkszählung | Statistics of Craftsmenship | 2 |
| D | 2000 | Kostenstrukturanalyse Ärzte ZI | Cost Structure Panel Doctors ZI | 2 |
| D | 2100 | Kostenstrukturerhebung der KZBV | Cost Structure KZBV | 2 |
| D | 2200 | Kostenstruktur Ärzte/Zahnärzte/Tierärzte | Cost Structure Doctors/Dentists etc | 2 |
| D | 2300 | Mikrozensus, EU Arbeitskräftestichprobe | Labour Force Survey | 4 |
| D | 2400 | Personalstatistik an Hochschulen StBA | Personnel statistic of universities StBA | 2/5 |
| D | 2500 | Personalstatistik öffentlicher Dienst | Labour Force Statistic in Public Sector | 5 |
| D | 2600 | Pflegestatistik StBA | Long-term care statistic StBA | 5 |
| D | 2700 | Statistik der BZÄK | Registers of BZÄK | 5 |
| D | 2800 | Statistik der GKV | SHI Statistic | 5 |
| D | 2900 | Statistik der GRV | SPI Statistic | 5 |
| D | 3000 | Statistik der GUV | SAI Statistic | 5 |
| D | 3100 | Schulen für Berufe des Gesundheitswesens | Schools of Health Personnel | 5 |
| D | 3200 | WIdO Pflegeeinrichtungsstatistik | WIdO Long-term care institutions | 2 |
| DEN | 1 | Løn- og beskæftigelsesregisteret | Reg. on payments and labour in hospitals | 5 |
| DEN | 2 | Bevægelsesregisteret | Register on mobility of health labour | 5 |
| DEN | 3 | Statistisk tiårsoversigt | Statistical 10-year survey | 3 |
| DEN | 4 | Statistisk Årbog | Statistical Yearbook | 6 |
| DEN | 5 | Det Fælleskommunale Løndatakontor | United local authority data office | 2 |
| DEN | 6 | Sygesikringens forhandlingsudvalg | Health insurance negotiation committee | 2 |
| DEN | 7 | Sundhedsstyrelsen | National Board of Health | 2 |
| DEN | 8 | Lægemiddelstyrelsen | Danish Medicines Agency | 2 |
| DEN | 9 | Statens Serum Institut | State Serum Institute | 2 |
| DEN | 10 | Statens Institut for Folkesundhed | National Institute of Public Health | 2 |
| DEN | 11 | Sundhedsvæsenets Patientklagenævn | The Patients Board of Complaints | 2 |
| DEN | 12 | Patientskadeankenævnet | The patients injury board of appeal | 2 |
| DEN | 13 | Lægemiddelskadankenævnet | The medicine injury board of appeal | 2 |
| DEN | 14 | Det Etiske Råd | The Danish Council of Ethics | 2 |
| DEN | 15 | Embedslægeinstitutionerne | The medical officer institutions | 2 |
| DEN | 16 | Sundhedsministeriet | Ministry of Health | 2 |
| DEN | 17 | Danmarks Statistik | Statistics Denmark | 6 |
| DEN | 18 | Dansk Institut for Sygehusvæsen | Danish Institute for hospitals | 2 |
| FIN | 1 | Statistics Finland KHR | Communal Personal Register | 5 |
| FIN | 2 | Statistics Finland Tyossakaynti | Finland Source Nr 2 | 5 |
| I | 1 | Dati di contabilità nazionale | National Accounts Data | 6 |
| I | 2 | Ministero della Sanità | Ministry of Health | 2 |

| Country | Local Source-number | Local source name | English source name | No. of classifi-cation of sources |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| I | 3 | Ministero del Tesoro | Ministry of Treasury | 1 |
| I | 4 | Censimento della popolazione | Population Census | 3 |
| I | 5 | Registro professionale medici e dentisti | Registries of doctors and dentists | 5 |
| I | 6 | Indagine sulle forze di lavoro | Labour Force Survey | 4 |
| I | 7 | Ministero delle Finanze | Ministry of Finances | 5 |
| I | 8 | Presidi residenziali socio-assistenziali | Social care residential facilities | 2 |
| I | 9 | Servizi pubblici per tossicodipendenze | Public facilities for drug addicted | 2 |
| ICE | 1000 | Starfsmenn á heilbrigðisstofnunum | Health Institutions' personell | 5 |
| ICE | 1100 | Læknaskrá | Register of licensed physicians | 5 |
| ICE | 2000 | Starfsleyfi heilbrigðisstarfmanna HTR | Licensed health professionals | 5 |
| ICE | 3000 | Félagatal Læknafélags Íslands | Reg. members of the Icel. Med. Assoc. | 5 |
| ICE | 3100 | Félagatal Félags Ísl. Hjúkrunarfræð. | Reg. memb. of the Icel. reg. nurses ass. | 5 |
| ICE | 3200 | Félagatal Tannlæknafélags Íslands | Reg. memb. of the Icel. Dental Assoc. | 5 |
| ICE | 3300 | Félagatal Lyfjafræðingafélags Íslands | Reg. memb. of the Pharmac. Soc. of Icel. | 5 |
| ICE | 4000 | Launabókhald starfsmannaskr. ríkisins | The State Accounting Office | 6 |
| ICE | 5000 | Vinnumarkaðskannanir Hagstofunnar | Labour market surveys | 4 |
| IRL | 1 | Regional Health Boards/Authorities annual reports, service plans and statistics | Regional Health Boards/Authorities annual reports, service plans and statistics | 6 |
| IRL | 2 | Dublin Area Teaching Hospitals annual reports, service plans and statistics | Dublin Area Teaching Hospitals annual reports, service plans and statistics | 6 |
| IRL | 3 | Health Research Board | Health Research Board | 6 |
| IRL | 4 | General Medical Services (Payments) Board (GPs, Pharmacists, Dentists) | General Medical Services (Payments) Board (GPs, Pharmacists, Dentists) | 2 |
| IRL | 5 | Other Voluntary Hospitals | Other Voluntary Hospitals | 2 |
| IRL | 6 | Private Hospitals | Private Hospitals | 2 |
| IRL | 7 | Private Nursing Homes | Private Nursing Homes | 2 |
| IRL | 8 | Dublin Fire Brigade (Ambulance Service) | Dublin Fire Brigade (Ambulance Service) | 2 |
| IRL | 9 | Health Board Ambulance Services | Health Board Ambulance Services | 2 |
| IRL | 10 | National Disability Authority | National Disability Authority | 2 |
| IRL | 11 | Physical and Intellectual Disability Services (Health Boards) | Physical and Intellectual Disability Services (Health Boards) | 2 |
| IRL | 12 | Child Care Services (Health Boards) | Child Care Services (Health Boards) | 2 |
| IRL | 13 | Non-acute care services (Health Boards) | Non-acute care services (Health Boards) | 2 |
| IRL | 14 | Labour Force Survey | Labour Force Survey | 4 |
| IRL | 15 | Department of Health &Children – Annual Health Sector Staff Census | Department of Health &Children – Annual Health Sector Staff Census | 3 |
| IRL | 16 | Community Welfare Services (Health Boards) | Community Welfare Services (Health Boards) | 2 |
| IRL | 17 | An Bord Altranais | The Nursing Board | 2 |
| IRL | 18 | Economic and Social Research Institute | Economic and Social Research Institute | 2 |

| Country | Local Source-number | Local source name | English source name | No. of classifi-cation of sources |
|---|---|---|---|---|
| L | 1 | Affiliation de la sécurité sociale | Social Security Affiliation | 5 |
| L | 2 | Min de la Santé: Registre des médecins | Ministry of Health: register of | 5 |

| | | | | |
|---|---|---|---|---|
| | | | physicians | |
| L | 3 | Statistiques de l'emploi (p.code NACE) | Employment statistics | 2 |
| L | 4 | Pharmaciens en activité: registre nation | Practising pharmacists | 5 |
| L | 5 | Min.de la Santé : registre des autres professions | Other health professionals | 5 |
| L | 6 | Carte sanitaire | Hospital statistics | 2 |
| L | 7 | Secteur aides et soins-ETP | Long term care- FTE | 2 |
| L | 8 | Statistiques sur les médecins | Statistics on physicians | 6 |
| NL | 2 | Huisartsenregister (NIVEL) | Register of general practitioners | 5 |
| NL | 3 | Loonstructuuronderzoek | Wage structure database | 5 |
| NL | 4 | Enquete Beroepsbevolking | Labour Force Survey (LFS) | 4 |
| NL | 5 | Enquete werkgelegenheid en lonen | Survey on employment and earnings | 4 |
| NL | 6 | Arbeidsrekeningen | Labour accounts | 6 |
| NL | 7 | Intramurale gezondheidszorg | Intramural health care | 2 |
| NL | 8 | Extramurale gezondheidszorg | Extramural health care | 2 |
| NL | 9 | Geestelijke Gezondheidszorg | Mental health care | 2 |
| NL | 10 | Algemeen Bedrijfs Register | General register of enterprises | 1 |
| NL | 11 | Praktijken in de gezondheidszorg | Medical practices | 1/2 |
| NL | 12 | Register fysiotherapeuten (NIVEL) | Register of physiotherapists | 5 |
| NL | 13 | Semimurale voorzieningen voor gehandicap | Semi-mural facilities for the handicapped | 2 |
| NL | 14 | Verzorgingshuizen | Homes for the aged | 2 |
| NL | 15 | Verloskundigenregister (NIVEL) | Register of midwives | 5 |
| NL | 16 | GGZ Personeels Informatiesysteem | Mental Health Care Staff Information Sys | 5 |
| NL | 17 | Vereniging van revalidatie instellingen | Association of Rehabilitation clinics | 5 |
| NL | 18 | Rijksbegroting VWS | Central government budget; ministry of h | 1/2 |
| NOR | 1 | Statistikk for somatiske sykehus | General/specialised hospital statistics | 2 |
| NOR | 2 | Psykiatriske institusjoner | Psychiatric institutions statistics | 2 |
| NOR | 3 | Statistikk om tannleger | Dentists statistics | 5 |
| NOR | 4 | Statistikk over kommunehelsetjenesten | Municipal Health Service statistics | 6 |
| NOR | 5 | Pleie- og omsorgsstatistikk | Nursing and Care statistics | 5 |
| NOR | 6 | PAI-registeret | PAI-register | 5 |
| NOR | 7 | A/A-registeret | Employer/employee-register | 5 |
| NOR | 8 | Ambulansetjenester | Ambulance services | 6 |
| NOR | 9 | Legespesialister | Specialised physicians | 5 |
| POR | 1 | Ordem dos Médicos | Guild of Physicians | 5 |
| POR | 2 | Ordem dos Médicos Dentistas | Guild of Dentist Physicians | 5 |
| POR | 3 | Ordem dos Enfermeiros Portugueses | Guild of Portuguese Nurses | 5 |
| POR | 4 | Ordem dos Médicos Veterinários | Guild of Veterinarian Physicians | 5 |
| POR | 5 | Ordem dos Farmacêuticos | Guild of Pharmaceutics | 5 |
| POR | 6 | Instituto da Farmácia e do Medicamento | Instit. of Pharmacy and Medicament | 5 |
| POR | 7 | Sindicato dos Técnicos de Serviço Social | Union of Social Welfare Technicians | 5 |
| POR | 8 | Sindicato dos Odontologistas | Union of the Odontologists | 5 |
| POR | 9 | Sindicato dos Técnicos Paramédicos | Union of Paramedical Technicians | 5 |
| POR | 10 | Estatísticas Hospitalares SNS Continente | Hospital Statistics-NHS Mainland | 2 |

| | | | | |
|---|---|---|---|---|
| POR | 11 | Ests.Hosps.SNS Aç.Mad. e não SNS | Hosp. Stats. NHS Az. Mad. & non NHS | 2 |
| POR | 12 | Estatísticas dos Centros de Saúde | Official Clinics Statistics | 2 |
| POR | 13 | Estatísticas dos Postos Médicos | Medical Centres Statistics | 2 |
| SPA | 1 | Est. de Establecimientos Rég. Internado | Hospital Statistics | 2 |
| SPA | 2 | Memorias Plan Nacional sobre Drogas | National Plan for Substance Abuse Care | 2 |
| SPA | 3 | Encuesta de Población Activa | Labour Force Survey | 4 |
| SPA | 4 | Colegios de Médicos | Provincial Medical Councils | 5 |
| SPA | 5 | Colegio de Enfermería | National Nurse Council | 5 |
| SPA | 6 | Memorias Instituto Servicios Socilales | Social Affairs Institute Annual Reports | 6 |
| SPA | 7 | Registro de Especialistas en Formación | Specialist Training Program Database | 5 |
| SPA | 8 | Colegio de Odontólogos | Dentist Council | 5 |
| SPA | 9 | Consejo de Universidades | Universities Council | 5 |
| UK | 1 | Labour Force Survey | Labour Force Survey | 4 |
| UK | 2 | Annual Employment Survey | Annual Employment Survey | 3 |
| UK | 3 | Annual Business Inquiry | Annual Business Inquiry | 2 |
| UK | 4 | Short Term Employment Survey | Short Term Employment Survey | 4 |
| UK | 5 | Census | Census | 3 |
| UK | 6 | Scottish NHS non-medical database | Scottish NHS non-medical database | 2 |
| UK | 7 | Scottish NHS Medical & Dental Database | Scottish NHS Medical & Dental Database | 2 |
| UK | 8 | Scottish NHS earnings related database | Scottish NHS earnings related database | 2 |
| UK | 9 | Scottish NHS GP database | Scottish NHS GP database | 2 |
| UK | 10 | Scottish NHS dental database | Scottish NHS dental database | 2 |
| UK | 11 | PSSRU survey of nursing homes | PSSRU survey of nursing homes | 2 |
| UK | 12 | NI NHS HR management system | NI NHS HR management system | 2 |
| UK | 13 | Welsh NHS Workforce Census | Welsh NHS Workforce Census | 3 |
| UK | 14 | Welsh NHS workforce survey | Welsh NHS workforce survey | 4 |
| UK | 15 | English NHS workforce census | English NHS workforce census | 3 |
| UK | 16 | English NHS workforce survey | English NHS workforce survey | 4 |

1 = Establishment Register
2 = Business Survey
3 = Census
4 = Micro census (sample survey)
5 = Registers (Individual)
6 = Composite Statistics

A more detailed overview on the sources used for labour force accounting in the various countries, the classifications adopted and the break down of data to the various levels such as age, gender, FTE etc. is given in the tables of Annex 1. The following section summarizes some of the most relevant aspects of data collection on human resources in each of the countries.

In *Denmark* sector specific sources such as questionnaires and public register data are used. For future statistical development wage and labour registers will also be used. The current statistical status is broken down by:

- persons and FTE's
- age, sex, function, sector, unit and region
- hospital and primary sector by national boundaries

In *Finland* information on manpower in the health sector is provided by man power statistics (Health Care and Social Care) which are based on registers. These include

- registers provided by the municipalities (Public Health and Social Welfare) which is 80 % of the total
- population employment statistics (based on several registers such as income, tax, unemployment, education)
- labour force surveys

In *Germany* the sources of data used include the results of the "Mikrozensus" (annually 1% survey of the German population providing information on age, gender, profession, etc.) of the German Statistical Office (Statistisches Bundesamt, StBA) as well as other sources such as

- statistics of the central employment agency
- retail trade statistics
- wholesale statistics
- statistics of personnel in health professions (StBA)
- statistics of employers mutual insurance association
- statistics on long-term nursing care homes
- statistics of physician and dentist associations
- cost structure statistics (StBA)
- special surveys.

In *Iceland* the major source of information on manpower in the health care system is a database at the Directorate of Health. The database includes all health institutions, both hospitals, health centres and other health institutions. The database is not on an individual basis and it does not include age and gender, nor does it include worktime and compensation. The database of the State Accounting Office (Ministry of Finance) includes salary payment in some, but not all, hospitals and health centres. The data is on an individuals basis and can be broken down by age and gender as well as profession. There is, however, a number of other important sources of information:

- The Ministry of Health and Social Security (licenses, future development)
- The Ministry of Treasury (personnel and costs in the public sector)
- Statistics Iceland (labor market surveys)
- Trade unions (employees outside institutions)

National Accounts represent a very important source of information on employment in *Italy*. Estimations are currently carried out to relate production activities to the work productive factors, using the same concepts suggested by the SNA and ESA. FTE units are obtained by transforming the total number of jobs into full-time jobs. Finally, estimates of employed people, jobs[2] and full-time equivalent units are currently published. Estimates for the years since 1991 are updated using all the information obtained with different sources on employment (censuses, sample surveys, administrative data).

[2] Jobs are given by the sum of the primary jobs and the multiple jobs, regardless of the number of hours worked.

Since 1994 the Ministry of Health provides information on human resources working inside the National Health System (NHS). With this information it is possible to calculate figures by professional and by institution. Data published by the Ministry of Treasury provide information on employment in the Public Administration and on personnel costs. Registers for physicians, dentists, pharmacists and associations for nurses and paramedical personnel constitute another important data source of Italian manpower. For paramedical personnel there are no registers.The labour force survey covers numbers at the regional level; the number of people employed or unemployed is available also at the provincial level.

In *Luxembourg* there are three main sources of statistics on human resources in the health sector. Social Insurance date provide employment statistics, the statistics provided by the Ministry of Health are based on registers of health professionals, e.g. doctors, nurses, midwives, and pharmacists. They can be broken down by persons allowed to exercise, specialisation, active persons (however not for all professions), gender and year. Statistics on doctors provided by health insurance are based on two different databases: the Ministry of Health data base counting persons (also doctors working in the administration) and health insurance database which comprise statistics focusing on medical activity.

For the collection and creation of statistics on human resources available in the institutions Statistics *Netherlands* can use both internal and external sources. Internal sources to be used can be divided in sources available for all economic activities and sources specially developed for a single area or purpose. In the general applicable internal sources the most well-known and most important one is the labour force survey, conducted on a personal basis, but with possibilities to link the data to economic units. Of course other national surveys can be used in the health care area as well. Just as important as the general internal sources are the specific internal sources, that are the questionnaires sent to institutions in the health care area. These questionnaires are performed on an institution basis, with a very high response.

Besides internal sources the statistical office has the opportunities to use external sources supplying information on the labour market, to either complement existing internal sources or as an unique source in case no internal enquiries are performed. These external sources can be divided in two groups. The first group contains administrative records, meaning that these sources were not created for statistical purposes, but for some administrative reason. One important source to be mentioned in this category is the tax-register. The tax-register could be used to supplement information on self-employed professionals in the health acre sector. The use of the tax-register, however, is limited because the occupation included in the records is not checked for consistency. Another disadvantage is that only a selection of records of the tax-register are available, which makes the sample very small for the purpose needed.

The second category of external sources contains registers. Registers can be distinghuised in registers specific for the sector in study and registers owned by special research institutes. National health associations, like the organisation of general practititoners, the ordre of medical specialists, the national organsiation of physiotherapists, etc, all have very detailed and rather conplete lists of professionals. These registers could in theory be used for statistical purposes. The second class of registers are held by special research

institutes. The use of these registers can be very restricted, and are only mentioned for completeness.

In *Norway* there are two main sources of statistics on human resources in the health sector. The questionnaires which are sent out to all health and care institutions and to municipalities include the following information:

- data on number of employees/man years
  - by institutions/providers (also self-employed)
  - split into functions (curative, rehabilitation, laboratory etc, psychiatry for adults, psychiatry for children, joint services, long term care, care received at home, prevention etc.)
  - by the 31.12.
  - full-time and part-time (receive the part-time share and can thus estimate man year)
  - by education/occupations
- compensation of employees by the same functional breakdown.

Local government registers (PAI) provide another source of information on the

- coverage of most of the workforce in the health sector
- information on part time share, overtime work and wage rates
- information on certain reasons for being out of work
- total wages during the year
- combined with wage rates it is possible to estimate hours worked.

The National Institute of Statistics in *Portugal* collects data on the following health professional groups (available data - updating from 2001) by referring to registers provided by the specific professional institutions or unions:

- physicians
- dentists
- odontologists
- pharmaceutics
- pharmacy staff
- nurses
- paramedical technicians
- social welfare technicians

Mostly, data are collected by gender. Data by ages are only available for physicians (non-specialized and specialized physicians).

In *Spain* statistics on manpower derive from three different sources. The "Instituto Nacional de estadistica (INE)" provides statistics on

- physicians and stomatologists
- dentists (odontologists and stomatologists)
- certified nurses
- pharmacists

by using various statistical sources provided by Provincial Councils of Physicians, National council of Odontologists and Stomatologists, National Council of Nurses and National Council of pharmacists (referring to professionals with an University Degree).

Another source of information are surveys on active population providing information on physicians and odontologists, certified nurses, pharmacists, other health and non-health personnel. Complementary information is provided by

- the Ministry of Health
- administrative database of Physician Specialist Training Program
- administrative database of General Practitioner Certification
- encuesta nacional de hospitales

There are several sources of data on human resources in the *United Kingdom:* The UK census (near complete enumeration of both public and private sector), sample surveys of businesses and of households (designed specifically to capture information on employment) and data provided by the Ministries of Health (designed specifically for the public health sector).

## 3.2 Meta data on selected provider categories

The following tables give an overview of items of meta data available for selected provider categories following the OECD classification according to the manual System of Health Accounts (SHA)[3]. The assignment of the range of information (items of the various national data sources) was done by using a broad interpretation, i.e. if only one of the sources listed under a single ICHA-HP-Code indicated the availability of one of the items all the source listed were assigned.

Furthermore, the item FTE does indicate whether full-time-equivalents can be calculated or can be reported directly. The calculation of FTEs based on working-hours can be done from the calculatory side. However, it is not an indication that it is actually done in the various countries. Full-time equivalent employment, which equals the number of full-time equivalent jobs, is defined as total hours worked divided by the average annual number of hours worked in full-time jobs within the economic territory.[4] Referring to working-hours one should take into consideration that the distinction between overtime and the real working time which would correspond to FTE cannot be made without referring to more detailed information.

In general it is important to underline that meta data collected in this project for each country indicate potential sources available from which information on labour markets or professions could be derived. This, however, does not imply that all reported sources are currently used for the calculation of human resources by statistical offices. Some of these sources can be used for labour accounting in the future only after extensive statistical pre-work and editing.

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3 See OECD (2000), p. 137-147.

4 See ESA 1995, p. 248.

### 3.2.1 Hospitals

According to the definition given in the OECD manual System of Health Accounts (SHA) hospitals comprise licensed establishments primarily engaged in providing medical, diagnostic, and treatment services that include physician, nursing, and other health services to inpatients and the specialised accommodation services required by inpatients. Hospitals may also provide outpatient services as a secondary activity. Despite general hospitals which are engaged in providing treatment to patients with wide variety of medical conditions this item comprises mental health and substance abuse hospitals as well as speciality hospitals. The latter provide diagnostic and medical treatment to inpatients with a specific type of disease or medical condition other than mental, health or substance abuse. Hospitals providing long-term care for the chronically ill and hospitals providing rehabilitation, and related services to physically challenged or disabled people are included in the item speciality hospitals.

The data of nine out of ten countries are designed in a way which allows to provide information on head counts for the ICHA-HP-Code 110-130 (International Classification for Health Accounts of health care providers). The calculation of FTEs can be done in seven of the ten countries. The classification according to age and gender can be done in those countries where labour force surveys are used for the calculation of human resources. In other countries other sources may provide information on age and gender.

Table 7: Meta data on manpower statistics in hospitals

| ICHA-HP | Description | Items | Countries |
|---|---|---|---|
| 110 | General hospital | Head counts | D, DK, E, FIN, I, ICE, N, NL, P, UK |
| | | FTE | D, DK, E, ICE, N, NL, UK |
| | | Age | FIN, ICE, N, NL, UK |
| | | Gender | E, FIN, I, ICE, N, NL, P, UK |
| 120 | Mental health and substance abuse hospitals | Head counts | D, DK, E, FIN, ICE, N, NL, P |
| | | FTE | D, E, ICE, N, NL |
| | | Age | FIN, ICE, N, NL |
| | | Gender | E, FIN, ICE, N, NL, P |
| 130 | Speciality (other than mental health and substance abuse) hospitals | Head counts | D, DK, E, FIN, I, ICE, N, NL, P |
| | | FTE | D, E, ICE, N, NL |
| | | Age | FIN, ICE, N, NL |
| | | Gender | E, FIN, I, ICE, N, NL, P |

### 3.2.2 Nursing and residential care facilities

This item comprises establishments primarily engaged in providing residential care combined with either nursing, supervisory or other types of care as required by the residents. In these establishments, a significant part of the production process and the care provided is a mix of health and social services with the health services being largely at the level of nursing services.

A wide range of institutions providing long-term care (both health and social services) exists in most countries. The exact classification in the corresponding types of institutions depends on the country-specific division of labour in the care process, especially in long-term care. As a general rule, in health accounting all institutions should be listed, where a considerable share of all activities performed in that institution have a medical component or consist of nursing care with a strong medical component.

For the provider classification nursing and residential care facilities the classification according to head counts is less comprehensive than it is for hospitals. Only three countries (Finland, Italy and the Netherlands) provide data for the ICHA-HP-code 210-230 (UK provides data for ICHA-HP-code 210). The most detailed information on data on human resources in nursing and residential care facilities can be found in the Netherlands, followed by Finland.

Table 8: Meta data on manpower statistics in nursing and residential care facilities

| ICHA-HP | Description | Items | Countries |
|---|---|---|---|
| 210 | Nursing care facilities | Head counts | D, E, FIN, I, ICE, N, NL, UK |
| | | FTE | D, E, ICE, N, NL |
| | | Age | FIN, ICE, N, NL |
| | | Gender | E, FIN, I, ICE, N, NL |
| 220 | Residential mental retardation, mental health and substance abuse facilities | Head counts | FIN, I, NL |
| | | FTE | NL |
| | | Age | FIN, NL |
| | | Gender | FIN, I, NL |
| 230 | Community care facilities for the elderly | Head counts | DK, FIN, I, ICE, NL |
| | | FTE | NL |
| | | Age | FIN, NL |
| | | Gender | FIN, I, NL |
| 290 | All other residential care facilities | Head counts | D, NL |
| | | FTE | D, NL |
| | | Age | NL |
| | | Gender | NL |

### 3.2.3 Providers of ambulatory health care

This item comprises establishments primarily engaged in providing health care services directly to out-patients who do not require in-patient services. This includes establishments specialised in the treatment of day-cases and in the delivery of home care services.

Offices of physicians refer to establishments of health practitioners holding the degree of a doctor of medicine or a qualification at a corresponding level (ISCO-88 fourth degree level), primarily engaged in the independent practice of general or specialised medicine (including psychiatry, psychoanalysis, osteopathy, homeopathy) or surgery. These practitioners operate private or group practices in their own offices (*e.g*. centres, clinics) or in the facilities of others, such as hospitals. For dentists a similar range of establishments is included. The item offices of other health practitioners include a wide range of independent health practitioners other than physicians and dentists, e.g. chiropractors, occupational and speech therapists, etc. Out-patient care centres provide a wide range of outpatient services by a team of medical, paramedical and support staff usually bringing together several specialities. Medical and diagnostic laboratories provide analytical and diagnostic services. Providers of home health care services include establishments primarily engaged in providing a wide range of (skilled) nursing services. Other providers of ambulatory health care comprise a variety of establishments primarily engaged in providing ambulatory health care services other than establishments described before.

Head counts for offices of physicians and dentists can be provided by the data of the following countries: Denmark, Finland, Germany, Italy, Netherlands, Spain and United Kingdom (Norway provides headcounts for dentists but not for physicians). For other providers of ambulatory health care (ICHA-HP-Code 330 - 390) the situation is less uniform (see table below). Finland and the Netherlands provide very detailed and comprehensive data on each of the ICHA-HP-Codes within the section providers of ambulatory health care. They comprise head counts, age and gender, but only the Netherlands and UK provide FTEs.

Table 9: Meta data on manpower statistics for the sector "providers of ambulatory health care"

| ICHA-HP | Description | Items | Countries |
|---|---|---|---|
| 310 | Offices of physicians | Head counts | D, DK, E, FIN, I, N, NL, UK |
| | | FTE | D, E, N, UK |
| | | Age | D, DK, E, FIN, N, NL, UK |
| | | Gender | DK, E, FIN, N, NL, UK |
| 320 | Offices of dentists | Head counts | D, DK, E, FIN, I, NL, UK |
| | | FTE | D, E, NL, UK |
| | | Age | D, DK, E, FIN, I, ICE, UK |
| | | Gender | DK, E, FIN, I, ICE, NL, UK |
| 330 | Offices of other health practitioners | Head counts | D, DK, FIN, ICE, N, NL |
| | | FTE | D, ICE, NL |
| | | Age | D, DK, FIN, ICE, NL |
| | | Gender | DK, FIN, ICE, NL |
| 340 | Out-patient care centres | Head counts | D, FIN, I, ICE, N, NL, P |
| | | FTE | D, ICE, N, NL |
| | | Age | FIN, ICE, N, NL |
| | | Gender | FIN, ICE, N, NL, P |
| 350 | Medical and diagnostic laboratories | Head counts | D, FIN, NL |
| | | FTE | D, NL |
| | | Age | FIN, NL |
| | | Gender | FIN, NL |
| 360 | Providers of home health care services | Head counts | D, DK, FIN, N, NL, UK |
| | | FTE | D, N, NL, UK |
| | | Age | D, DK, FIN, N, NL, UK |
| | | Gender | DK, FIN, N, NL, UK |
| 390 | Other providers of ambulatory health care | Head counts | FIN, N, NL, UK |
| | | FTE | NL, UK |
| | | Age | FIN, NL, UK |
| | | Gender | FIN, NL, UK |

### 3.2.4 Retail sale and other provider of medical goods

This item according to the OECD classification comprises establishments whose primary activity is the retail sale of medical goods to the general public for personal or household consumption or utilisation. Establishments whose primary activity is the manufacture of medical goods for sale to the general public for personal or household use are also included as well as fitting and repair done in combination with sale. The ICHA-HP-Codes 410-490 comprise establishments which are primarily engaged in the retail sale of either pharmaceuticals, optical glasses and other vision products, hearing aids and medical appliances to the general public for personal or household consumption or utilization. This includes the fitting and repair provided in combination with the sale of medical goods. All other miscellaneous sale and other suppliers of pharmaceuticals and medical goods also include sales other than by shops, such as electronic shopping and mail-order houses.

Denmark, Finland, Italy, Norway, the Netherlands and UK provide head counts for the ICHA-HP-Codes 410 and 440. No information was given for retail sale and other suppliers of hearing aids by any of the countries. Data of some of the countries (Denmark, Finland, Netherlands, and Norway) can be broken down by age and gender for some of the ICHA-HP-codes.

Table 10: Meta data on manpower statistics for the sector "retail sale and other provider of medical goods"

| ICHA-HP | Description | Items | Countries |
|---|---|---|---|
| 410 | Dispensing chemists | Head counts | DK, FIN, I, N, NL, UK |
| | | FTE | N |
| | | Age | FIN, I, ICE, N |
| | | Gender | D, FIN, I, ICE, N, UK |
| 420 | Retail sale and other suppliers of optical glasses and other vision products | Head counts | DK, FIN, NL |
| | | FTE | NL |
| | | Age | DK, FIN, NL |
| | | Gender | DK, FIN, NL |
| 440 | Retail sale and other suppliers of medical appliances (other than optical glasses and hearing aids) | Head counts | DK, FIN, I, N, NL |
| | | FTE | N, NL |
| | | Age | DK, FIN, N, NL |
| | | Gender | DK, FIN, N, NL |
| 490 | All other miscellaneous sale and other suppliers of pharmaceuticals and medical goods | Head counts | D, DK, NL |
| | | FTE | D, NL |
| | | Age | D, NL |
| | | Gender | NL |

### 3.2.5 Provision and administration of public health programmes

This item according to the OECD manual comprises both government and private administration and provision of public health programmes such as health promotion and protection programmes.

Four out of ten countries provide data information on this ICHA-HP-Code. The items available for these data sources differ. Norway, Netherlands and Portugal can break down the data by head counts, FTE and gender. A breakdown by age is possible for Germany, Norway and the Netherlands.

Table 11: Meta data on manpower statistics for the sector “provision and administration of public health programmes”

| ICHA-HP | Description | Items | Countries |
|---|---|---|---|
| 500 | Provision and administration of public health programmes | Head counts | I, N, NL, P |
| | | FTE | N, NL, P |
| | | Age | D, N, NL |
| | | Gender | I, N, NL, P |

### 3.2.6 Health administration and insurance

According to the OECD manual this item comprises establishments primarily engaged in the regulation of activities of agencies that provide health care, overall administration of health policy, and health insurance.

Government administration of health refers to administrative bodies engaged in the formulation and administration of government policy in health and in the setting and enforcement of standards for medical and paramedical personnel and for hospitals, clinics, etc., including the regulation and licensing of providers of health services. Social security funds comprises the funding and administration of government-provided compulsory social security programmes compensating for reduction of loss of income or inadequate earning capacity due to sickness. Other social and private insurance refer to the funding and administration of social health insurance and health insurance other than by social security funds. All other providers of health administration includes private establishments primarily engaged in providing health administrations (other than private social and other private insurance).

Finland, Iceland and the Netherlands provide the most detailed information on data of the health administration and insurance sector. For some of the ICHA-HP-Codes the national data provided by these countries can be broken down by age, gender and FTE (except for ICHA-HP-Code 630 for which only Portugal submitted data on head counts and gender).

Table 12: Meta data on manpower statistics for the sector “health administration and insurance”

| ICHA-HP | Description | Items | Countries |
|---|---|---|---|
| 610 | Government administration of health | Head counts | DK, FIN, I, ICE, P |
| | | FTE | ICE, P |
| | | Age | FIN, ICE |
| | | Gender | FIN, I, ICE, P |
| 620 | Social security funds | Head counts | D, FIN, ICE, NL |
| | | FTE | ICE, NL |
| | | Age | FIN, ICE, NL |
| | | Gender | FIN, ICE, NL |
| 630 | Other social insurance | Head counts | P |
| | | FTE | |
| | | Age | |
| | | Gender | P |
| 640 | Other (private) insurance | Head counts | FIN, NL, P |
| | | FTE | NL |
| | | Age | FIN, NL |
| | | Gender | FIN, NL, P |
| 690 | All other providers of health administration | Head counts | FIN, ICE |
| | | FTE | ICE |
| | | Age | FIN, ICE |
| | | Gender | FIN, ICE |

## 3.4 Use of classifications

Among the problems resulting from this evaluation of human manpower statistics in health care is not only the variability of data sources between the various countries used but also the variety of definitions and classifications adopted within the countries.

### 3.4.1 Classification of health care providers ICHA-HP

There are two main categories of data sources. One comprises business surveys and registers, which refer to the national actors classification and can be linked to ICHA-HP over EUCOMP. The other one includes Labour Force Surveys and Census/Micro Census which follows the NACE classification. The latter allows to collect data on a more detailed level including age, gender, profession, etc.

The table below gives an overview on the main kind of sources to collect data for each of the actors structured by the ICHA-HP classification. Based on a structure by actors at the 1-digit level the evaluation of sources of data for ICHA-HP code HP1 Hospitals across the various countries provides the following results.

In general, the provision of data for the hospital sector seems to be the most comprehensive one. Registers and business surveys are available in all countries, in Finland and Denmark there are supplementary sources of data to accomplish information

on human resources in hospitals. Only three out of nine countries provide data through registers classified by age and gender, i.e. Finland, Netherlands, and Norway. In Spain and Portugal these data can be broken by gender, but not by age. In Iceland the data provided by other sources (the State Accounting Office) can be broken down by age and gender.

For ICHA-HP code HP 2 Nursing and residential care facilities seven out of nine countries have registers or business surveys (except for Denmark and Portugal). Portugal did not submit any information on sources for this sector. Denmark uses other statistical sources, e.g. Census. Finland, Iceland and Italy use other statistical sources in addition to their registers. While in Finland all data gained by registers are classified by age and gender, in the Netherlands and Norway only certain registers can be classified according to a more detailed level. In Italy and Spain the data from registers can be broken down by gender but not by age.

For ICHA-HP code HP 3 Providers of ambulatory health care only two (Portugal and the Netherlands) out of nine countries gain data from registers exclusively. All other countries use various sources to accomplish manpower statistics for this sector. In the Netherlands general registers of enterprises do not allow to break down the numbers by age and gender, this, however, can be done by referring to the wage structure database and some other registers, e.g. the register of general practitioners or the register of midwives.

Eight out of nine countries have registers or business surveys for ICHA-HP code HP 4 Retail sale and other providers of medical goods of which Iceland, Netherlands, Norway and Portugal gain data from registers exclusively. Spain did not submit any information on sources for this sector. Denmark uses other statistical sources, e.g. census. Other statistical sources is used for some ICHA-HP code HP 4 by Finland, Germany and Italy. In Denmark, Finland, Iceland, Italy and Norway these data can be broken by age and gender. In Germany, however, this classification can be done by age and for certain registers, e.g. ABDA statistics also by gender. While in Finland the data gained by registers are classified by age and gender, in the Netherlands general registers of enterprises do not allow to break down the numbers by age and gender, but this can be done by referring to the wage structure database. In Portugal a classification by age and gender is not possible.

For Provision and administration of public health programmes for ICHA-HP code HP 5 five (Germany, Italy, Netherlands, Norway and Portugal) out of nine countries gain data from registers and three (Germany, Italy and Norway) of them also from other sources. While in Germany the data from registers can be broken down by age but not by gender, in Portugal and Italy a classification only by gender is possible. In Norway a breakdown by both age and gender is possible.

For ICHA-HP code HP 6 Health administration and insurance six out of nine countries have registers or business surveys of which Denmark, Germany, Netherlands and Portugal gain data from registers exclusively. Norway and Portugal did not submit any information on sources for this sector. The data from registers can be broken down by age and gender in Finland and the Netherlands. In Italy and Portugal, however, these data can be classified by gender but not by age. In Denmark and Germany a classification by age and gender is not possible.

Table 13: Source of data listed according to HP-codes

| Country | Registers, Business surveys available | Other sources (Labour Force Survey, Census, Micro-census) |
|---|---|---|
| | HP-Code | HP-Code |
| Denmark | 110, 120, 310-330, 360, 420, 440, 610, 790 | 130, 230, 310-330, 410, 490, 720 |
| Finland | 110, 220, 230, 320, 342, 349, 360, 391, 440, 610, 690, 1000 | 110-130, 210-230, 310-330, 342, 345, 349, 350, 391, 410, 420, 440, 610, 620, 640, 690, 710, 790, 1000 |
| Germany | 110-130, 210, 290, 310-330, 341, 342, 349, 350, 360, 391, 410-440, 490, 500, 620, 640, 710, 720, 1000 | 310, 330, 360, 490, 500, 1000 |
| Iceland | 110-130, 210, 230, 320, 330, 345, 410 | 110-130, 210, 330, 345, 610, 620, 690 |
| Italy | 110, 130, 210-230, 310, 320, 342, 410, 500, 610 | 110, 130, 210-230, 310, 320, 410, 440, 500, 610 |
| Netherlands | 110-130, 210-230, 290, 310-330, 341, 342, 345, 349, 350, 360, 391, 410, 420, 440, 490, 620, 640, 500, 710, 1000 | |
| Norway | 110-130, 210, 310, 320, 330, 345, 360, 410, 440, 500, 1000 | 310, 320, 345, 391, 500 |
| Portugal | 110-130, 342, 345, 410, 500, 610, 630, 640 | |
| Spain | 110-130, 210, 310, 320, 1000 | 310, 320 |
| UK | 110, 210, 310, 320, 340, 390, 410, | 110, 310, 320, 340, 390, 410 |

### 3.4.2 General Industrial Classification (NACE)

As shown in the table below, all countries participating in this project have established their national industry classifications in order to describe the industrial structures of own economies. They were developed based on International Standard Classification Revision 3 ISIC rev. 3) and the equivalent European Union classification, the Statistical Classification of Economic Activities in the European Community, Revision 1 (NACE rev. 1). Thus, in most instances these are directly comparable, in particular at higher levels of aggregation, with existing standard international classification such as ISIC rev. 3 or NACE rev.1.

Table 14: Industrial classifications used by Member States, Iceland and Norway

| Country | Source agency | Classification used | Compatibility with ISIC or NACE |
|---|---|---|---|
| Austria | CSO (ÖSTAT) | Austrian version of NACE Rev. 1 (ÖNACE 1995) | Completely corresponds to NACE Rev. 1 at 4-digit |
| Belgium | INS (STABEL) | Industrial Short-Term Indicators (ISTI) based on NACERev.1 | Completely corresponds to NACE Rev. 1 at 4-digit and ISIC Rev. 3 at 2-digit |
| Denmark | NIS | Dansk Branchekode 1993 (DB 1993) | Corresponds to NACE Rev. 1 |
| Finland | Statistics Finland | Finish Standard Industrial Classification 1995 (SIC 1995) | Corresponds to NACE Rev. 1 at 3-digit with a few exceptions and ISIC Rev. 3 at 2-digit |
| France | INSEE | Two kinds of industrial classifications<br>- Nomenclature d'Activité Française (NAF-1993)<br>- Classification des Produits Français (CPF-1993) | Complete correspondence between NAF and NACE Rev. 1 and ISIC Rev. 3 |
| Germany | Statistisches Bundesamt | Klassifikation der Wirtschaftszweige, Ausgabe 1993 (WZ 1993) | Corresponds to NACE Rev. 1 and can be converted to ISIC Rev. 3 |
| Greece | NSSG | STAKOD 1980 (STAKOD 1991 will be used for indices with base year 1993) | STAKOD 80: corresponds to ISIC Rev. 2<br>STAKOD 91: corresponds to NACE Rev. 1 |
| Iceland | Statistics Iceland | Icelandic Standard for Industrial Classification (ISTAT 95) | Corresponds to NACE Rev. 1 at 4 digit (with a few exceptions) |
| Ireland | CSO | NACE 70 (NACE Rev. 1 will be available) | Corresponds to ISIC Rev. 2 |
| Italy | ISTAT | Classificazione delle attività economiche (ATECO 1991) | Corresponds to NACE Rev. 1 (section-class) and to ISIC Rev. 3 (section – division) |
| Luxembourg | STATEC | NACELUX Rev. 1 | Corresponds to NACE Rev. 1 at 5-digit (additional) and ISIC Rev. 3 at 2-digit |
| Netherlands | CBS | Standaard Bedrijfsindeling (SBI 1993) | Adjusted to NACE Rev. 1 and ISIC Rev. 3 |
| Norway | Statistics Norway | Standard Industrial Classification (SIC 1994) | Follows NACE Rev. 1 and ISIC Rev. 3 but goes up to 5-digit |
| Portugal | INE | Classificação Portuguesa de Actividades Económicas-Revisão 2 (CAERev.2;1992) | Compatible with NACE Rev. 1 at 4-digit and ISIC Rev. 3 |
| Spain | INE | Clasificación National de Actividades Económicas (CNAE- 1993) | Corresponds to NACE Rev. 1 at 2-digit and ISIC Rev. 3 at 2-digit |
| Sweden | SCB | Swedish Standard for Industrial Classification 1992 (SE-SIC 1992) | Corresponds to NACE Rev. 1 at 4-digit and ISIC Rev. 3 at 2-digit |
| Switzerland | OFS | Nomenclature Générale des Activités économiques 1995 (NOGA) | Completely corresponds to NACE Rev. 1 at 4-digit and ISIC Rev. 3 |
| United Kingdom | ONS | 1992 Standard Industrial Classification (SIC 1992) | Corresponds to NACE Rev. 1 at 4-digit and 5-digit was added |

NA: Information is not available

Source: OECD, Workshop on Key Economic Indicators, Index of Industrial Production: Summary of practices in OECD Countries, May 22-25, 2000, Bangkok.

For the industrial classification all national classification concepts either directly refer to or correspond with NACE classifications. However, the evaluation of the questionnaires showed that the information regarding the availability of data at the various digit levels differ from those provided by the OECD source. According to the results of the

questionnaire the classification according to NACE Rev.1 at the 4-digit level apply for *Germany, Netherlands, Spain and United Kingdom*. In *Finland, Italy and Norway* the classification corresponds the NACE Rev.1 at the 5-digit level. The *Icelandic* classification of health and social work corresponds with NACE Rev. 1 at the 5-digit level with some exceptions. In *Denmark* the classification completely corresponds with the NACE Rev.1 at the 6-digit level.

Table 15: Classification of data on human resources according to NACE

| ICHA-HP | Description | Items | Countries |
|---|---|---|---|
| 110 | General hospital | NACE 4-digit | D, E, NL, UK, |
| | | NACE 5-digit | FIN, I, ICE, N, |
| 120 | Mental health and substance abuse hospitals | NACE 4-digit | D, NL, |
| | | NACE 5-digit | FIN, ICE, N, |
| 130 | Speciality (other than mental health and substance abuse) hospitals | NACE 4-digit | D, E, N, |
| | | NACE 5-digit | DK+, FIN, I, ICE, N, NL, |
| 210 | Nursing care facilities | NACE 4-digit | D, N, |
| | | NACE 5-digit | DK+, FIN, I, ICE, N, |
| 220 | Residential mental retardation, mental health and substance abuse facilities | NACE 4-digit | N, |
| | | NACE 5-digit | FIN, I, |
| 230 | Community care facilities for the elderly | NACE 4-digit | ICE, NL, |
| | | NACE 5-digit | FIN, I, |
| 290 | All other residential care facilities | NACE 4-digit | D, NL, |
| | | NACE 5-digit | |
| 310 | Offices of physicians | NACE 4-digit | D, NL, UK |
| | | NACE 5-digit | DK+, FIN, I, ICE, N, |
| 320 | Offices of dentists | NACE 4-digit | D, NL, UK |
| | | NACE 5-digit | DK+, FIN, I, ICE, N, |
| 330 | Offices of other health practitioners | NACE 4-digit | ICE, NL, |
| | | NACE 5-digit | DK+, FIN, ICE, N, |
| 340 | Out-patient care centres | NACE 4-digit | NL, |
| | | NACE 5-digit | FIN, I, ICE, N, |
| 350 | Medical and diagnostic laboratories | NACE 4-digit | ICE, NL, |
| | | NACE 5-digit | DK+, FIN, |
| 360 | Providers of home health care services | NACE 4-digit | NL, |
| | | NACE 5-digit | DK+, FIN, N, |
| 390 | Other providers of ambulatory health care | NACE 4-digit | NL, |
| | | NACE 5-digit | FIN, I, N, |
| 410 | Dispensing chemists | NACE 4-digit | D, ICE, NL, UK |
| | | NACE 5-digit | DK+, FIN, I, ICE, N, |
| 420 | Retail sale and other suppliers of optical glasses and other vision products | NACE 4-digit | D, ICE, NL, |
| | | NACE 5-digit | DK+, FIN, N, |
| 430 | Retail sale and other suppliers of hearing aids | NACE 4-digit | D, NL, |
| | | NACE 5-digit | |
| 440 | Retail sale and other suppliers of medical appliances (other than optical glasses and hearing aids) | NACE 4-digit | ICE, NL, |
| | | NACE 5-digit | DK+, FIN, I, N, |

| ICHA-HP | Description | Items | Countries |
|---|---|---|---|
| 490 | All other miscellaneous sale and other suppliers of pharmaceuticals and medical goods | NACE 4-digit | D, NL, |
| | | NACE 5-digit | DK+, N, |
| 500 | Provision and administration of public health programmes | NACE 4-digit | D, NL, |
| | | NACE 5-digit | I, N, |
| 610 | Government administration of health | NACE 4-digit | NL, |
| | | NACE 5-digit | FIN, I, ICE, N, |
| 620 | Social security funds | NACE 4-digit | D, NL, |
| | | NACE 5-digit | DK+, FIN, ICE, N, |
| 640 | Other (private) insurance | NACE 4-digit | FIN*, NL, |
| | | NACE 5-digit | |
| 690 | All other providers of health administration | NACE 4-digit | |
| | | NACE 5-digit | FIN, ICE, N, |

+ 6-digit level * 3-digit level

In general, all countries provide data according to NACE classification at 4-digit level. Some countries for some ICHA-HP-Codes have added 5-digit level. For ICHA-HP-Code 110 to 130 three (Germany, Spain and the Netherlands and UK for ICHA-HP 110) out of ten countries provide data according to NACE classification at 4-digit level, whereas Finland, Italy, Iceland and Norway supply data according to NACE classification at 5-digit level. The only country which provides data at 6-digit level is Denmark.

For nursing care facilities the statistics for Germany and the Netherlands follow the NACE classification at 4-digit level and for Iceland only for the ICHA-HP-code 230. Finland, Italy, Iceland and Norway provide data for ICHA-HP-code 210 at 5-digit level. For ICHA-HP-Codes 220 and 230 Italy and Finland supply data at 5-digit level.

For providers of ambulatory health care, statistics are available at 5-digit level for ICHA-HP-Code 310 and 320 in Finland, Italy, Iceland and Norway. The Netherlands provide statistics at the 4-digit level for ICHA-HP-Codes 310 to 390. An uniform application of the NACE classification for the ICHA-HP-Codes 310 and 320 are given for seven out of ten countries (Denmark, Finland, Germany, Iceland, Italy, Netherlands, Norway, and UK) at 4-digit and 5-digit level. For the remaining ICHA-HP-Codes the picture given is more diversified.

For retail sale and other providers of medical goods the NACE classification is adopted by most of these countries. Germany, Iceland and the Netherlands provide statistics at the 4-digit level for ICHA-HP-Code 410 and 420 (UK provides data at 4-digit level for ICHA-HP-Code 410). Finland, Italy, Iceland and Norway supply the numbers at the 5-digit level.

Germany and the Netherlands provide statistics on the 4-digit level, Italy and Norway on the 5-digit level for provision and administration of public health programmes.

The Netherlands provide data on 4-digit level throughout ICHA-HP-Code HP 6, Finland, Iceland and Norway on NACE 5-digit except for ICHA-HP-Code 640. Germany provides data at the 4-digit level for ICHA-HP-Code 620. For other private insurance (ICHA-HP-Code 640) Finland has statistics only at the 3-digit level.

### 3.4.3 Occupational classification (ISCO)

For the classification of health personnel only a part of the countries are able to provide data following the ISCO classification. The questionnaire examined the codification at the various digit levels (3-digit, 4-digit), its results are presented and described below (see table 16).

For ICHA-HP-Code 110 and 120 five out of ten countries provide data according to ISCO 88 classification at the 4-digit level except for Spain and Germany. For ICHA-HP-Code 130 Germany has data on the 4-digit level.

Nursing care facilities ICHA-HP-Code 210 statistics of about half of the countries are available at the 4-digit level. For all ICHA-HP-Codes only the Netherlands can provide statistics at the 4-digit level. For the item community care facilities for the elderly four countries (Denmark, Finland, Iceland and Netherlands) can provide statistics at the 4-digit level.

For providers of ambulatory health care, statistics are available at 4-digit level for ICHA-HP-Code 320, 330 and 340 in Finland and Iceland. Denmark, Finland, Germany, Spain and UK provide statistics at the 4-digit level for ICHA-HP-Codes 310 and 320.

For retail sale and other provider of medical goods only Denmark adopted the ISCO-88 classification at the 4-digit level for all ICHA-HP-Codes. Other Nordic countries, e.g. Finland, Norway and Iceland provide data at the 4-digit level for some of the ICHA-HP-Codes of this sector, however, the picture is less uniform. No information was provided on ICHA-HP-Code 430.

Norway and the Netherlands provide statistics on the 4-digit level, Germany at the 3-digit level for provision and administration of public health programmes.

Only Finland adopted the ISCO-88 classification at the 4-digit level for all ICHA-HP-Codes. The Netherlands adopted the ISCO-88 classification at the 4-digit level for social security funds and other private insurance. All other countries seem not to use ISCO-88 for statistics regarding this sector. No information was provided on ICHA-HP-Code 630.

Table 16: Classification of data on human resources according to ISCO

| ICHA-HP | Description | Items | Countries |
|---|---|---|---|
| 110 | General hospital | ISCO 88 3-digit | D, E, |
| | | ISCO 88 4-digit | FIN, ICE, N, NL, UK |
| 120 | Mental health and substance abuse hospitals | ISCO 88 3-digit | D, E, |
| | | ISCO 88 4-digit | DK, FIN, ICE, N, NL |
| 130 | Speciality (other than mental health and substance abuse) hospitals | ISCO 88 3-digit | E |
| | | ISCO 88 4-digit | D, DK, FIN, ICE, N, NL |
| 210 | Nursing care facilities | ISCO 88 3-digit | E |
| | | ISCO 88 4-digit | D, FIN, ICE, N, NL |
| 220 | Residential mental retardation, mental health and substance abuse facilities | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | FIN, NL |
| 230 | Community care facilities for the elderly | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | DK, FIN, ICE, NL |
| 290 | All other residential care facilities | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | D, NL |
| 310 | Offices of physicians | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | D, DK, E, FIN, N, UK |
| 320 | Offices of dentists | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | D, DK, E, FIN, ICE, UK |
| 330 | Offices of other health practitioners | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | DK, FIN, ICE, NL |
| 340 | Out-patient care centres | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | FIN, ICE, N, NL |
| 350 | Medical and diagnostic laboratories | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | FIN, NL |
| 360 | Providers of home health care services | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | D, DK, N, NL |
| 390 | Other providers of ambulatory health care | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | FIN, NL, UK |
| 410 | Dispensing chemists | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | D, DK, FIN, ICE, N, UK |
| 420 | Retail sale and other suppliers of optical glasses and other vision products | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | DK, FIN, NL |
| 440 | Retail sale and other suppliers of medical appliances (other than optical glasses and hearing aids) | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | DK, FIN, N, NL |
| 490 | All other miscellaneous sale and other suppliers of pharmaceuticals and medical goods | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | D, DK, NL |
| 500 | Provision and administration of public health programmes | ISCO 88 3-digit | D |
| | | ISCO 88 4-digit | N, NL |
| 610 | Government administration of health | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | FIN |
| 620 | Social security funds | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | FIN, NL |
| 640 | Other (private) insurance | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | FIN, NL |
| 690 | All other providers of health administration | ISCO 88 3-digit | |
| | | ISCO 88 4-digit | FIN |

### 3.4.4 Educational classification (ISCED)

The International Standard Classification of Education is the most relevant source to obtain internationally compatible data to define education and health care occupation. An overview of the results regarding the adaptation of ISCED is shown in Table 17.

For ICHA-HP-Code 110 through 130 only Finland and Norway provide data according to ISCED classification. Italy follows the ISCED classification regarding ICHA-HP-Code 110 and 130.

Regarding ICHA-HP-Code HP 2 only Finland follows this classification consistently.

For providers of ambulatory health care Finland adopted the ISCED classification for all ICHA-HP-Codes. In Denmark and Norway this classification had been applied for some of the ICHA-HP-Codes. For the other countries a less uniform picture is given.

For retail sale and other provider of medical goods the Nordic countries Denmark, Finland and Norway adopted this classification for different ICHA-HP-Codes.

For the provision and administration of public health programmes Italy and Norway provide statistics which follow this classification.

For statistics on health administration and insurance only Finland adopted the ISCED classification.

Table 17: Classification of data on human resources according to ISCED

| ICHA-HP | Description | Items | Countries |
|---|---|---|---|
| 110 | General hospital | ISCED | FIN, I, N |
| 120 | Mental health and substance abuse hospitals | ISCED | FIN, N |
| 130 | Speciality (other than mental health and substance abuse) hospitals | ISCED | FIN, I, N |
| 210 | Nursing care facilities | ISCED | FIN, N |
| 220 | Residential mental retardation, mental health and substance abuse facilities | ISCED | FIN |
| 230 | Community care facilities for the elderly | ISCED | FIN |
| 290 | All other residential care facilities | ISCED | |
| 310 | Offices of physicians | ISCED | D, DK, E, FIN, N |
| 320 | Offices of dentists | ISCED | DK, E, FIN, |
| 330 | Offices of other health practitioners | ISCED | DK, FIN, N, NL |
| 340 | Out-patient care centres | ISCED | FIN, N |
| 350 | Medical and diagnostic laboratories | ISCED | FIN |
| 360 | Providers of home health care services | ISCED | D, DK, N |
| 390 | Other providers of ambulatory health care | ISCED | FIN |
| 410 | Dispensing chemists | ISCED | FIN, N |
| 420 | Retail sale and other suppliers of optical glasses and other vision products | ISCED | DK, FIN |
| 430 | Retail sale and other suppliers of hearing aids | ISCED | |
| 440 | Retail sale and other suppliers of medical appliances (other than optical glasses and hearing aids) | ISCED | DK, FIN, N |
| 490 | All other miscellaneous sale and other suppliers of pharmaceuticals and medical goods | ISCED | D |
| 500 | Provision and administration of public health programmes | ISCED | I, N |
| 610 | Government administration of health | ISCED | FIN, I |
| 620 | Social security funds | ISCED | FIN |
| 640 | Other (private) insurance | ISCED | FIN |

690 All other providers of health administration ISCED FIN

## 3.5 Outlook

This part summarizes some of the problems described by the national experts to be relevant for the evaluation of possibilities of future improvements of labour accounting in Europe. Although most of the remarks and contributions given in this context refer to methodological and availability shortcomings, the problems vary among the countries.

*Austria*

At present, there is no comprehensive approach on labour accounting in the health sector applied. Austria is planning to develop a system of register statistics. This aims at a better exploitation of similar data available from labour force service records (data from the Social Security System, the Tax System and information on the volume of work, and data from the Medical Professional Associations).

*Belgium*

Satellite accounts on the regional level due to regional responsibility for the health sector are published in June 2001. For the manpower planning (1995 – 2000 – 2010 – 2020) supply of labour force (education, diplomas, profession), assessment of health, and projection cohorts according to age, sex and diploma are necessary. The following aspects shall be taken into consideration:

- Regional dimension
- Demographic development
- Working-time on average
- Labour market participation of men and women according to age
- Details of different services
- Profession available
- Inflow of nurses, confronted with demand

*Iceland*

There are some problems regarding the current data collection in Iceland:

§ Lacking in certain areas, i.e. private sector outside institutions.

§ Chance of double counting when individuals are employed by two or more institutions

§ Timelines

§ Demographic factors – age, gender

§ Projections

*Luxembourg*

In Luxembourg the following problems regarding the statistics provided occur:

- § Most of the data are based on acute care hospitals
- § Long term care activities data are missing

In 2000, long term care insurance will provide data from social insurance data base. Future efforts will have to focus on the harmonization for demand on basic data (OECD, Eurostat, ILO) in order to allow international comparisons.

*Netherlands*

During the last decades of the last century, especially since 1995, the amount of data to be supplied by all economic units was high. By a large number of people and institutions it was seen as too high. Reductions in the number of enquiries were requested. In Statistics Netherlands the ideas of lowering the burden of enquiries were put high on the agenda. So a lot of statistics were reduced, some even deleted completely. In some of the cases the lack of own data were supplemented by the use of additional data from other external sources.

Another item linked to the reductiuon of data enquiries, was the one-number-philosophy, meaning that for every statistic item published by Statisticvs Netherands ideally only one number should be published and available for the public. This idea was launched to diminish the uncertainty for the users of the various statistics on which data ti use. Of course it is still the case that different uses and diffderent users having different goals need different data on the same topic.

Following the one-umber-philosophy the data resulting from the labour accounts were completely integrated in the national accounts. If seperate number on labour statistics are presented theses data have to be in accordance with the data presented in national accounts.

In the area of health care Statistics Netherlands the department of health and social care statistics is using the manpower data available from various sources, both internal and external. It is aimed for in the next few years to include all the manpowr data into the framework of Care Statistics (including health care) using the methodology of the System of Health Accounts, presenteed by the OECD.

In the framework of Care Statistics the starting points are the health care providers. For every provider the internal manpower data available are going to be linked to the actor and supplemented by data from other sources. The resulting data by actor will be divided into information by occupation as well as information by education.

In the next years discussion will be held on the reduction in the burden of inquiries in relation with the quality of the information as well as the infortmation needs. At the same time discussions will take place on the one-number-philosophy. In a lot of cases it is not possible to serve all purposes and questions with only one set of data.

*Norway*

In Norway using registers implies advantages as well as problems. Some of the advantages of using registers are:

- § lower the response burden
- § collect data in an unique way for all institutions (ex. same definition of man year/hours worked etc)

- § registers/administrative records can also give consistent data on wages and compensation of employees
- § possible to link different registers
- § cover all industries, thus possible to answer the question "Where have all the nurses gone"?

Problems related to using the registers:

- § Difficult to have the information related to functions (curative care, prevention, psychiatry etc)
- § Give data by institutions, which again is coded to the NACE-classification
  - the institutions often use a wrong establishment/enterprise number, thus, making it difficult to have the correct NACE-classification
- § Timeliness (updating of the register)

*Portugal*

Data obtained from Portugal are not directly comparable with those concerning the registered health staff, because the inquired professions are not the same, and especially because a great part of the health staff working in hospitals and official centers can do it in both establishment, and in private cabinets. Data concerning the number of health staff registered are available since the sixteen'; data relating health staff working in hospitals and official centers, collected by national surveys, are available since 1995. These data can be analyzed with others of economic and financier character already available or to be obtained by the National Institute of Statistics/Ministry of Health in the health sector.

*Spain*

No exact numbers of physicians can be provided in Spain (50 regional professional councils!). This is illustrated by the fact that there is a 15% difference between two register regarding the number of physicians. Time series provided by the Instituto Nacional de estadistica (INE) are about certified persons, not professionals with practice and do not provide possibilities to get further information (females, general practitioners, specialists, private practice). Surveys on active population do not permit to split:

- General - specialist practice
- General - specialist dentists
- Age – gender
- Specialities

*Sweden*

Sweden is presently reviewing the statistical system on institutions and employment. Therefore, no metadata are presented in this project except *Lindroth* 2001.

*Switzerland*

At present, there is no comprehensive approach on labour accounting in the health sector applied in Switzerland. However, the framework of health accounting (OECD methodology) already in use could be adequately developed as a module of human resources or labour forces statistics in the health sector, starting from the classification of the providers.

In the SHA the expenditures for provisions are often estimated with a combination of employment statistics and financial data, either from loss-profit accounting from a sample of providers or aggregated administrative statistics/accounting data from financing agencies, especially social insurance. The same principles could be applied in a module of manpower statistics linked to health accounting, mostly for small categories of providers where representative data are not available.

Some of the problems of current data collection on human resources are:

- The availability of data is different for each category of provider and may also not be stable over the years;
- Physicians and dentists: the number of active professionals doesn't give sufficient information on active labour forces in health care (FTE ,numbers of staff employees);
- Hospital statistics provide only poor information on occupation and education;
- Business surveys remain the best general source of data, especially for small categories of providers, however with some weaknesses (no annual data, no information on individual employees);
- Insufficient breakdown of providers in the data of labour force surveys due to the size of the sample; a planned extension of the sample could provide more detail information;
- Measurement of manpower within production of medical goods (estimation of human resources in intermediate production).

# 4. Indicators

## 4.1 Selection and definition of indicators

The growing health labour market, which is characterised by increasing specialisation, new qualifications, intensive work-sharing and a highly qualified labour force form an important section for employment in the Union. Indicators on human resources resulting from the project will support not only international and national analysis of health labour market developments, but also health accounts as about 70 per cent of health expenditures are spent on human resources. Together with other on-going efforts, the Member States will receive an instrument to analyse the efficiency and effectiveness of the health care production.

The expected results of this project will fit in class 4 “Health system” of the health indicator set of the ECHI-project (European Community Health Indicators). One part of class 4 is 4.2 “Health care resources” of which the subclass is 4.2.2 “Manpower”.

For discussing the selection and definition of manpower indicators in the health sector, it is prerequisite to have a clear understanding of the objectives of indicators on human resources in the health sector. The logic derives from four strands

a) The role of manpower in the production of health services

b) The role of manpower as cost driver of health expenditures

c) The role of manpower to secure quality of health services and

d) The value of employment as basis for income and economic growth.

The System of Health Accounts SHA (Manual, Version 1.0, July 2000) forms the conceptual framework for the compilation of production and financial flows in the health sector. The structure and boundaries of the health sector are outlined in detail in the System of Health Accounts, which provides a framework of interrelated tables for standard reporting on health expenditure and the financing sources. As consequence, the SHA is organised around a tri-axial system for the recording of health expenditure, by means of a newly proposed International Classification for Health Accounts (ICHA). The linkage between the health accounts and human resources in health care is the ICHA-HP classifications of health care service provider industries including the following providers

- HP.1 Hospitals
- HP.2 Nursing and residential care facilities
- HP.3 Providers of ambulatory health care
- HP.4 Retail sale and other providers of medical goods
- HP.5 Provision and administration of public health programs
- HP.6 General health administration

In this context, the EUCOMP Provider classification is used as practical guideline to produce truly comparable health care data. Advantages of using provider classifications of health accounts is based on the same definition of health as well as on the amount of health accounts compared with the development of the human resources in health care. Furthermore, one factor for the calculation of the productivity is to have a linkage between the health accounts and manpower. Principally, the Labour Force Survey can be used as source for the evaluation of the persons employed in the health care sector. But, national studies on human resources in health care have shown, that the Labour Force Survey as a source for manpower indicators in the health sector is not precisely enough.

To compare and understand the basic parameters behind differences in health accounts and productivity, it is necessary to develop indicators on health care resources. The following table shows the proposed indicators in the field of human resources of health care. These indicators are stratified into head counts and, if possible, as full time equivalents (FTE). The next step is to distinguish by gender.

This following classification of indicators is preliminary, which has to be discussed with the other project members. The table of indicators on human resources of the health sector includes four sections:

- Manpower,
- Health professions,
- Income and productivity, and
- Labour market.

The indicator “Manpower” gives information on the total employment according to the provider classification of the System of Health Accounts. An important factor is education and qualification of the employed persons in the health care sector for the indicators in the field of health professions. The indicators of 4.2.4. “Income and productivity” made the linkage between health accounts and manpower in the health care sector. Based on our experiences, we have learned, that in order to analyse the situation within the countries, it is essential to have information on the indicators of the labour market. In most of the countries, there are different data sources for human resources in health care. Furthermore, summarized tables for some parts of the health care sector do exist at Eurostat (see Key data on health 2000). In order to obtain comparable data, it is necessary to check the sources and availability of the data.

Table 18: Proposed indicators in the field of human resources of health care

| Indicator | Definition | Stratify by: Head counts | FTE | Gen-der | Data Availabi-lity and sources |
|---|---|---|---|---|---|
| **1st priority** | | | | | |
| **4.2.2 Manpower** | | | | | |
| - Health service employment | Number of persons; per 1,000 population; % of total employment | X | X | X | |
| - HP.1 Hospitals | Total employment in general hospitals, mental health and substance abuse hospitals, specialty (other than mental health and substance abuse) hospitals | X | X | X | National registers/ Hospital statistics |
| - HP.2 Nursing and residential care facilities | Total employment in nursing care facilities, residential mental retardation, mental health and substance abuse facilities, community care facilities for the elderly and in all other residential care facilities | X | X | X | |
| - HP.3 Providers of ambulatory health care | Total employment in offices of physicians, offices of dentists, offices of paramedical practitioners, out patient care centres, medical and diagnostic laboratories, providers of home health care services and other providers of ambulatory care. | X | X | X | |
| - HP.4 Retail sale and other providers of medical goods | Total employment in dispensing chemists, retail sale and other suppliers of optical glasses and other vision products, retail sale and other suppliers of hearing aids, retail sale and other suppliers of medical appliances (other than optical glasses and hearing aids), and all other miscellaneous sale and other suppliers of pharmaceuticals and medical goods | X | X | X | |
| - HP.5 Provision and administration and insurance | Provision and administration of public health programmes | X | X | X | |
| - HP.6 General health administration | Government administration of health, social security funds, Other social insurance, other (private) insurance, and other providers of health administration | | | | |
| - Hospital staff ratio (HP1): | Hospital staff/number of beds | X | | | |
| - Nurses staff ratio (HP1): | Nurses staff/ number of beds | X | | | |
| **2nd priority** | | | | | |
| **4.2.3 Health professions** | | | | | |
| - Physicians employed | Number of persons; per 100,000 population | X | X | X | |
| - Nurses employed | Number of persons; per 100,000 population | X | X | X | |
| - Midwives employed | Number of persons; per 100,000 population | X | X | X | |
| - Dentists employed | Number of persons; per 100,000 population | X | X | X | |
| - Pharmacists | Number of persons; per 100,000 population | X | X | X | |
| - Paramedical professions | Number of persons; per 100,000 population | X | X | X | |
| **3rd priority** | | | | | |
| **4.2.4 Income and productivity** | | | | | |
| - Income of doctors, nurses, etc. | Yearly gross income | X | | X | |
| **2nd Priority** | | | | | |
| **4.2.5 Labour market** | | | | | |
| - Unemployment rate | Unemployed/employment | X | | X | Labour |

| | | | | | |
|---|---|---|---|---|---|
| of doctors, nurses, etc. | | | | | market statistics |

## 4.2 Linkage to Health Accounts

The OECD System of Health Accounts is based on a three dimensional approach: defining health care by function (ICHA-HC), by health care service provider industries (ICHA-HP) and source of funding (ICHA-HF). The first dimension (funding) refers to public households, health insurance, private insurance and private households (out of pocket payments). The second dimension (provider) includes statistics of the various providers of health care services, e.g. physicians, dentists, hospitals, etc..

The provider classification is based on the statistical separation of health care production and form therefore the structure of health labour by production units. To distinguish from the provider classification is the classification of health professions. A detailed identification of health professions allows to determine the indicators mentioned for health professions (point 4.2.3, see Table 18). These indicators must also be considered within the realisation of the indicators for manpower (point 4.2.2, see Table 18). As mentioned earlier it is useful to link HLA to the System of Health Accounts (SHA). The connection between both is required in order to calculate the net product and productivity. At the same time this connection gives the possibility to check the number of human resources. The unemployment rate according to professional groups in the health care sector is another specific indicator to be considered as there is growing concern of manpower oversupply on the one hand, and shortages of selected health professions on the other hand.

In the SHA the expenditures for provisions are often estimated with a combination of employment statistics and financial data, either from loss-profit accounting from a sample of providers or aggregated administrative statistics/accounting data from financing agencies, especially social insurance. The same principles could be applied in a module of manpower statistics linked to health accounting, mostly for small categories of providers where representative data are not available.

Certain comparisons between countries, or between industries or sectors within the same economy, become meaningful only when the aggregates in the national accounts (for example, gross domestic product, the final consumption of households, the value added of an industry, compensation of employees) are considered in relation to the number of inhabitants and labour input variables. It is therefore necessary to have definitions of the total population, employment, jobs, total hours worked, full-time equivalence and employee labour input at constant compensation, which are closely linked to the concepts used in the national accounts.

These titles are defined in the System on the basis of the concepts of economic territory and centre of interest. Labour inputs must be classified on the basis of the same statistical units as used for the analysis of production, namely the local kind-of-activity unit and the institutional unit. The aggregates to which the figures for population and labour inputs are related are annual totals. Therefore, average population and labour inputs during the year should be used.

When inquiries are conducted at several times during the course of the year, the figure taken is the average of the results obtained on these various dates. When a single inquiry is made, it is important to examine if the period used is fully representative; the last available information an variations throughout the year should be used in estimating data for the year as a whole. For example, when estimating the mean employment, some allowance should be made for the fact that certain people do not work throughout the whole year (casual and/or seasonal workers).

# 5. Recommendations

Regarding the question of how to make the data basis used for the calculation of human resources more compatible in the future one has to take into consideration the current diversity of sources used in EU countries. The following issues have to be clarified:

- Methodology
- Definitions and classifications
- Selection of variables for future compilations
- Statistics
- Indicators

*Methodology*

In order to establish a more comprehensive and more compatible data base for human resource data in health care we suggest to implement an integrative statistical tool, so called Health Labour Accounts (HLA) for the collection and consistent evaluation of existing manpower data in MS. HLA form an integral part of health accounts. There are several reasons to link manpower data with financial data. One of the most relevant reasons is the fact that personal costs are the biggest part of health expenditures across countries. Therefore, it seems to be inevitable to have a coherent system for monitoring stocks and flows of health care personnel on national level and to integrate these into a system which is capable of showing the links to the education of health care personnel as well as to health accounts. The establishment of statistical links between data on personnel and health accounts is indispensable to track the employment effects of health care industries and productivity trends in care provision. Productivity ratios are one of the most important links between labour accounts and health accounts.

While National Labour Accounting Systems (LAS) are intended to be a comprehensive framework for looking at labour markets in the context of SNA, HLA form an integral part of SHA. We suggest to develop and implement a system of Health Labour Accounts (HLA) at least at the 1-digit level which is compatible to SHA. HLA allows to handle the various data sources for manpower. Numbers of doctors, nurses, etc. are reported in national health information systems in many cases according to concepts of registers or other administrative records which result in data that are methodically quite different from labour force survey. However, their information is invaluable for health policy and their reliability sometimes often higher than LFS. For health policy a complete coverage of all actors is desirable, therefore we suggest a concept which follows an approach which is using the best available statistics, registers, LFS, and surveys and combining all in a consistent way.

In this case the next step must be to analyse the best statistical source to be considered as the basis for health manpower accounts. Therefore we propose to examine how the data provided for a limited sector (e.g. ICHA-HP-code 1) differ from each other. Using LFS in addition to registers can provide supplementary benefits, e.g.:

1. Filling the gaps where other sources are not available;
2. Gathering structure information on age and gender; and
3. Balancing data with the total population and other economic sectors.

*Definitions and classifications*

Beside compatibility of classifications, the variation of actual data in LFS and registers exhibit need for further research on the causes of differences and the best use of available data. This requires the comparison of data, definitions and classification systems for each sector on which registers (actors-classification of EUCOMP, ICHA-HP-classification) and LFS (NACE) are based upon. By comparing the data, definitions and classifications of each of the concepts the assignment and the correspondence between these two concepts can be shown for each of the sectors.

As definitions and classifications of the two concepts in question (ICHA-HP-classification and NACE) do not correspond with each other for all sectors we recommend to focus on limited sections for the collection of data on manpower first, e.g. hospital sector for which there is a correspondence of 100% between the classification and definitions of these two concepts. In the long-term this will result in the collection of more comparable data sets on manpower which will allow to complete the table 10 “Total employment in health care industries” of SHA for an increasing number of countries.

*Selection of variables for future compilations*

As the notes on sources received from the questionnaires and the methods which are provided from the countries show, the majority of countries is able to provide employment data on head counts, however, only some provide data on a FTE-basis. Due to various reasons, e.g. amount of over-time actually worked, and the size of part-time labour force it seems desirable to develop a strategy for estimating FTE numbers for all actors and all countries. There are two possible concepts, the concept according to ESA 95 which is based on the actual work time and the LFS concept which is based on FTEs (LFS-concept vs. ESA 95-concept). As national definitions of part-time and full-time work differ between the countries, the question which definition should be used for international comparisons of health care labour force remains to be decided in the future by elaborating full-time and part-time concept for all Member States. In case of missing data we propose to make estimations based on LFS and business surveys. As a result one of the first priorities following from this project should be to complete the estimation of data regarding FTEs (and head counts) by the Member States in order to receive a comprehensive and detailed data set on employment.

Considering the results of the evaluation of metadata information collected another priority should be to include age and gender into future data collections in all countries. This approach would allow to collect data by using the microcensus as a comprehensive source of labour force data. However, this approach depends on the extent the microcensus as a source of health labour data is reliable and valid links to the ICHA-HP can be established in the various countries.

*Statistics*

A complete data set covering all of the actors as listed according to the ICHA-HP classifications (see Tables of Annex 1) is not available in some countries. For these cases we suggest a further examination of the data available (contacting of associations and other relevant institutions) for a limited section of ICHA-HP-Codes, e.g. 110 to 130. If this inquiry does not provide any additional results one of the priorities of the countries must be to focus on filling these gaps. This is important in order to accomplish Health Labour Accounts (HLA) with regard to establishing more comprehensive and comparable data sets for each actor in the long-term.

Following assessments of the *OECD* 2001 one option for an uniform and consistent basis of data collection on manpower and the establishment of a Labour Accounting System would be to use Labour Force Surveys in the standardized way since all countries ascertain LFS. In contrast to the OECD an alternative option is to refer to registers and other sources as well. This approach follows a strategy which includes the following steps:

1. A systematical comparison and compilation of data deriving from registers and Labour Force Surveys as well as selection of best statistical source of information;
2. The total sums resulting from registers and LFS should be compared and balanced with System of Health Accounts (SHA) on the one hand and the Health Labour Accounts(HLA) on the other hand. This includes filling the gaps by providing estimation and comparison and balancing between head counts and FTEs.
3. Provision of additional classifications for certain groups according to age, gender and professions.

By using and combining a broad variety of already existing data in HLA this approach will provide added value for health policy information in all European countries.

As an intermediate step the involvement of umbrella organisations, such as the medical associations of the various countries, which show a strong and thorough organisational structure might help to improve the lack of harmonization by establishing common registers. This, however, will require certain clarifications of the legal and organisational possibilities of the institutions affected.

*Indicators*

With respect to the ECHI project the design of manpower indicators should be linked to the indicators derived from the Health Labour Accounts (HLA) proposed within this project. By using this approach consistency with the System of Health Accounts (SHA) can be gained. At the same time this will be the basis for the calculation of other indicators, such as productivity in the health sector.

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# List of Abbreviations

| | |
|---|---|
| A | Austria |
| ABDA | Bundesvereinigung Deutscher Apothekerverbände (D) |
| AMS | Arbeitsmarktinformationsstelle (D) |
| ATECO | Classificazione delle attività economiche (I) |
| BÄK | Bundesärztekammer (D) |
| BASYS | Beratungsgesellschaft für angewandte Systemforschung (D) |
| BZÄK | Bundeszahnärztekammer (D) |
| CAER | Classifcação Portuguesa de Actividades Económicas-Revisão (P) |
| CBS | Central Bureau of Statistics (NL) |
| CCP1 | Project on „International Comparison of Health Care Data“ |
| CCP2 | Project on „Health Care Resources“ |
| CEN/TC251 | Commission Européenne de Normalisation/Technical Committee 251 |
| CH | Switzerland |
| CNAE | Clasificación National de Actividades Económicas (E) |
| CNAMTS | Caisse Nationale d’Assurance Maladie des Travailleurs Salariés (F) |
| CPF | Classification des Produits Français (F) |
| CREDES | Centre de Recherche d’Etude et de Documentation en Economie de la Santé (F) |
| CSMF | Confédération des Syndicats Médicaux Français (F) |
| CSO | Central Statistical Office |
| D | Germany |
| DK | Denmark |
| DG | Directorate General |
| DREES | Direction de la Recherche, des Etudes, de l’Evaluation et des Statistiques (F) |
| DRGs | Diagnosis Related Groups |
| EC | European Commission |
| ECHI | European Community Health Indicators |
| ESA | European system of National Accounts |
| ESSPROS | European System of Social PROtection Statistics |
| EU | European Union |
| EUCOMP | Towards Comparable Health Care Data in the European Union |
| EUROSTAT | Statistical Office of the European Communities |
| FIN | Finland |
| FTE | Full-time equivalent |
| GALEN | Generalised Architecture for Languages, Encyclopaedias and Nomenclatures in medicine |
| GGZ | Geestelijke Gezondheidszorg (NL) |
| GP | General Practitioner |
| HIEMS | Health Indicators Exchange and Monitoring System |

| | |
|---|---|
| HLA | Labour accounting systems for the health sector |
| HMP | Health Monitoring Programme |
| I | Italy |
| ICD | International Classification of Disease |
| ICE | Iceland |
| ICHA | International Classification for Health Accounts |
| ICHA-HC | Functional Classification of Health Care |
| ICHA-HF | Classification Sources of Funding |
| ICHA-HP | Health Care Provider Classification |
| ICIDH | International Classification of Impairment, Disability and Handicaps |
| ICN | International Council for Nurses |
| IDA | Interchange of Data between Administrations |
| ILO | International Labour Organisation |
| IMF | International Monetary Fund |
| INE | Instituto Nacional de Estadistica (E) |
| INE | Instituto Nacional de Estatística (P) |
| INPS | Istituto Nazionale della Previdenza Sociale (I) |
| INS | Institut national de Statistique (B) |
| INSEE | Institut National de la Statistique et des Etudes Economiques (F) |
| ÍSAT | Íslensk atvinnugreinaflokkun (FIN) |
| ISCED | International Standard Classification of Education |
| ISCO | International Standard Classification of Occupations |
| ISIC | International Standard Industrial Classification of All Economic Activities |
| ÍSTARF | Íslensk starfaflokkun (FIN) |
| ISTAT | Istituto Centrale di Statistica (I) |
| ISTI | Industrial Short-Term Indicators (B) |
| KBV | Kassenärztliche Bundesvereinigung (D) |
| KZBV | Kassenzahnärztliche Bundesvereinigung (D) |
| LAS | Labour Accounting Systems |
| LEGs | Leadership Groups |
| LFS | Labour Force Survey |
| LMA | Labour Market Accounts |
| MISSOC | Community Information System on Social Protection |
| MS | Member of States |
| NACE | General Industrial Classification of Economic Activities within the European Communities |
| NAF | Nomenclature d'Activité Française (F) |
| NHA | National Health Accounts |
| NHS | National Health Service |
| NIVEL | Nederlands instituut voor onderzoek van de gezondheidszorg (NL) |
| NL | Netherlands |

| | |
|---|---|
| NOGA | Nomenclature Générale des Activités Économiques (CH) |
| NOR | Norway |
| NSSG | National Statistical Service of Greece (GR) |
| NUTS | Nomenclature of Territorial Units for Statistics |
| OECD | Organisation for Economic Co-operation and Development |
| ONS | Office for National Statistics (UK) |
| P | Portugal |
| PAI | Local government registers (N) |
| PSSRU | Personal Social Services Research Unit |
| SAI | Social Accident Insurance |
| SBI | Standaard Bedrijfsindeling (NL) |
| SCB | Statistical Central Bureau (S) |
| SDU | Staatsdrukkerij/Uitgeverij (NL) |
| SHA | System of Health Accounts |
| SHI | Social Health Insurance |
| SIC | Standard Industrial Classification |
| SNA | System of National Accounts |
| SPA | Spain |
| SPI | Social Pension Insurance |
| STAKES | National Research Centre for Welfare and Health (SF) |
| STAKOD | Statistical Classification of the branches of economic activity in Greece |
| STATEC | Central Service for Statistics and Economic Studies (L) |
| StBA | Statistisches Bundesamt (D) |
| TF | Task Force |
| UK | United Kingdom |
| UKCC | United Kingdom Central Council for Nursing, Midwifery and Health Visiting |
| UN | United Nations |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| VWS | Ministerie van Volksgezondheid, Welzijn en Sport (NL) |
| WGPH | Working Group on Public Health |
| WHO | World Health Organisation |
| WidO | Wissenschaftliches Institut der Ortskrankenkassen (D) |
| WZ | Klassifikation der Wirtschaftszweige (D) |
| ZI | Zentralinstitut für die kassenärztliche Versorgung in der Bundesrepublik Deutschland (D) |

# Appendix

## Cross-classification of ICHA-HP with German NACE classes

| ICHA-HP Code | | Description | NACE class |
|---|---|---|---|
| HP.1 | Hospitals | | |
| | HP.1.1 | General hospitals | 8511 |
| | HP.1.2 | Mental health and substance abuse hospitals | 8511 |
| | HP.1.3 | Speciality (other than mental health and substance abuse) hospitals | 8511 |
| | HP.2 | Nursing and residential care facilities | |
| | HP.2.1 | Nursing care facilities | 8531 |
| | HP.2.2 | Residential mental retardation, mental health and substance abuse facilities | 8531 |
| | HP.2.3 | Community care facilities for the elderly | 8531 |
| | HP.2.9 | All other residential care facilities | 8531 |
| HP.3 | Providers of ambulatory health care | | |
| | HP.3.1 | Offices of physicians | 8512 |
| | HP.3.2 | Offices of dentists | 8513 |
| | HP.3.3 | Offices of other health practitioners | 8514 |
| | HP.3.4 | Out-patient care centres | 8514 |
| | | HP.3.4.1 Family planning centres | 8514/ 8532 |
| | | HP.3.4.2 Out-patient mental health and substance abuse centres | 8532 |
| | | HP.3.4.3 Free-standing ambulatory surgery centres | 8514 |
| | | HP.3.4.4 Dialysis care centres | 8514 |
| | | HP.3.4.5 Other out-patient multi-speciality and co-operative service centres | |
| | | HP.3.4.9 All other out-patient care centres | 8514 |
| | HP.3.5 | Medical and diagnostic laboratories | 8514 |
| | HP.3.6 | Home health care services | 8532 |
| | HP.3.9 | All other ambulatory health care | 8514 |
| | | HP.3.9.1 Ambulance services | 8514 |
| | | HP.3.9.2 Blood and organ banks | 8514 |
| | | HP.3.9.9 All other ambulatory health care services | 8514 |
| HP.4 | | Retail sale and other providers of medical goods | |
| | HP.4.1 | Dispensing chemists | 5231 |
| | HP.4.2 | Retail sale and other suppliers of optical glasses and other vision products | 5232 |
| | HP.4.3 | Retail sale and other suppliers of hearing aids | 5232 |
| | HP.4.9 | All other miscellaneous sale and other suppliers of pharmaceuticals and medical goods | 5232 |
| HP.5 | | Provision and administration of public health programmes | 7512 |
| HP.6 | | Health administration and insurance | |
| | HP.6.1 | Government administration of health | |
| | HP.6.2 | Social security funds | 7530 |
| | HP.6.3 | Other social insurance | 7530 |
| | HP.6.4 | Other (private) insurance | 6603/6720 |
| | HP.6.9 | All other health administration | 9112/9133 |

Source: BASYS.

## Categories related to health in ISCO 88 (COM)

2. Professionals
- 22. Life Science and health professionals
  - 221. Life Science Professionals
    - 2211. Biologists, botanists, zoologists and related professionals
    - 2212.Pharmacologists, pathologists and related professionals
    - 2213. Agronomists and related professionals
  - 222. Health professionals (except nursing)
    - 2221. Medical doctors
    - 2222. Dentists
    - 2223. Veterinarians
    - 2224. Pharmacists
    - 2225. Health professionals (except nursing) not elsewhere classified
  - 223. Nursing and midwifery professions
    - 2230. Nursing and midwifery professions
- 24. Other professionals
  - 241. Business professionals
    - 2411. Accountants
    - 2412. Personnel and careers professionals
    - 2419. Business professionals not elsewhere classified
  - 242. Legal professionals
    - 2422. Lawyers
    - 2423. Judges
    - 2429. Legal professionals not elsewhere classified
  - 243. Archivists, librarians and related information professionals
    - 2431. Archivists and curators
    - 2432. Librarians and related information professionals
  - 244. Social science and related professionals
    - 2441. Economists
    - 2442. Sociologists, anthropologists and related professionals
    - 2443. Philosophers, historians and political scientists
    - 2444. Philologists, translators and interpreters
    - 2445. Psychologists
    - 2446. Social work professionals
  - 245. Writers and creative or performing artists
    - 2451. Authors, journalists and other writers
    - 2452. Sculptors, painters and related artists
    - 2453. Composers, musicians and singers
    - 2454. Choreographs and dancers
    - 2455. Film, stage and related actors and directors
  - 246. Religious professionals
    - 2460. Religious professionals
  - 247.Public service administrative professionals
    - 2470. Public service administrative professionals

3. Technicians and associate professionals

32. Life Science and health associate professionals
    321. Life Science technicians and related associate professionals.
        3211. Life science technicians
        3212. Agronomy and forestry technicians
        3213. Framing and forestry advisers
    322. Health associate professionals (except nursing)
        3221. Medical assistants
        3222. Hygienists, health and environmental officers
        3223.Dietiticians and nutritionists
        3224. Optometrists and opticians
        3225.Dental assistants
        3226. Physiotherapists and related associate professionals
        3227. Veterinary assistants
        3228. Pharmaceutical assistants
        3229. Health associate professionals (except nursing) not elsewhere classified
    323. Nursing and midwifery associate professionals.
        3231. Nursing associate professionals
        3232. Midwifery associate professionals
33. Teaching associate professionals
    331. Primary education teaching associate professionals
        3310. Primary education teaching associate professionals
    332. Pre-primary education teaching associate professionals
        3320. Pre-primary education teaching associate professionals
    333. Special education teaching associate professionals
        3330. Special education teaching associate professionals
    334. Other teaching associate professionals
        3340. Other teaching associate professionals
34. Other associated professionals
    341. Finance, sales and associate professionals
        3411. Securities and finance dealers and brokers
        3412. Insurance representatives
        3413. Estate agents
        3414.Travel consultants and organisers
        3415. Technical and commercial sales representatives
        3416. Buyers
        3417. Appraisers, valuers and auctioneers
        3419. Finance and sales associate professionals not elsewhere classified
    342. Business services agents and trade brokers
        3412. Trade brokers
        3422. Clearing and forwarding agents
        3423. Employment agents and labour contractors
        3429. Business services agents and trade brokers not elsewhere classified
    343. Administrative associate professionals
        3431. Administrative secretaries and related associated professionals
        3432. Legal and related business associate professionals
        3433. Bookkeepers
        3434. Statistical, mathematical and related associate professionals

4. Office clerks

41. Office clerks
    411. Secretaries and keyboard-operating clerks
        4111. Stenographers and typists
        4112. Word-processor and related operators
        4113. Data entry operators
        4114. Calculating-machine operators
        4115. Secretaries
    412. Numerical clerks
        4121. Accounting and book-keeping clerks
        4122. Statistical and finance clerks
    413. Material-recording and transport clerks
        4131. Stock clerks
        4132. Production clerks
        4133. Transport clerks
    414. Library, mail and related clerks
        4141. Library and filing clerks
        4142. Mail carriers and sorting clerks
        4143. Coding, proof-reading and related clerks
        4144. Scribes and related workers
    419. Other office clerks
        4190. Other office clerks
42. Customer service clerks
    421. Cashiers, tellers and related clerks
        4212. Tellers and other counter clerks
        4213. Bookmakers and croupiers
        4214. Pawnbrokers and money-lenders
        4215. Debt-collectors and related workers
    422. Client information clerks
        4221. Travel agency and related workers
        4222. Receptionists and information clerks
        4223. Telephone switchboard operators

5. Service workers and shop and market sales workers
    51. Personal and protective services workers
        511. Travel attendants and related workers
            5111. Travel attendants and travel stewards
            5112. Transport conductors
            5113. Travel guides

512. Housekeeping and restaurant service workers
    5121. Housekeepers and related workers
    5122. Cooks
    5123. Waiters, waitresses and bartenders
513. Personal care and related workers
    5131. Child-care workers
    5132. Institution-based personal care workers
    5133. Home-based personal care workers
    5139. Personal care and related workers not elsewhere classified
514. Other personal service workers
    5141. Hairdressers, barbers, beauticians and related workers
    5142. Companions and valets
    5143. Undertakers and embalmers
    5149. Other personal services workers not elsewhere classified
516. Protective services workers
    5161. Fire-fighters
    5162. Police officers
    5163. Prison guards
    5169. Protective services workers not elsewhere classified

## Design for a set of community health indicators (4.2.2 Manpower)

| Indicator (group) | Source type | Present in: | | | Stratify by: | | | Availability | HMP Proj. | Operationalisation. remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | WHO | OECD | Commission | Gender/ age | Region | SES | Code | | |
| 4.2.2 Manpower | | | | | | | | | 24, 25 | Not only no. of persons is relevant, also working time. This may be best approached by fte. |
| • Health services employment | Reg. | - | + | + | g | + | | b | | No of persons (fte?); per 1000 population; % of total employment; total, hospital only; Eurostat: persons |
| • Physicians employed | Reg. | + | + | + | g/a | + | | b | | No. of persons (fte?); per 100.000 population; differentiate by category, at least GP/specialist; by work place. Eurostat: 23 specialties |
| • Nurses employed | Reg. | + | + | + | g/a | + | | b | | No. of persons (fte?); per 100.000 population; Eurostat: nurses and midwives together |
| • Midwives employed | Reg. | + | - | + | g | + | | b | | No. of persons (fte?); per 100.000 population |
| • Dentists employed | Reg. | + | + | + | g | + | | b | | No. of persons (fte?); per 100.000 population |
| • Pharmacists employed | Reg. | + | + | + | g | + | | b | | No. of persons (fte?); per 100.000 population |
| • Paramedical professions | Reg. | - | - | - | g | + | | b | | No. of persons (fte?); per 100.000 population; define by specialty |
| • Hospital staff ratio: acute care | Reg. | + | + | - | | + | | b | | Hospital staff/no. of beds |
| • Nurses staff ratio: acute care | Reg. | + | + | - | | + | | b | | Nurses staff/no. of beds |
| 4.2.3 Education | Reg. | | | | | | | | | |
| • No. physicians graduated | | + | + | - | g | | | b | | No. of persons, per 100.000 population |
| • No. nurses & midwives graduated | | + | + | - | g | | | b | | No. of persons, per 100.000 population |
| • No. pharmacists graduated | | + | + | - | g | | | b | | No. of persons, per 100.000 population |
| • No. dentists graduated | | + | + | - | g | | | b | | No. of persons, per 100.000 population |

Source: National Institute of Public health and the Environment (RIVM) (Project coordination), Design for a set of European Community Health Indicators, Final Report by the ECHI Project, February 15, 2001.