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Human Resources for Health: An International Comparison of Health Occupations from Labour Force Survey Data

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Abstract:
Human resources are an essential element of a health system's inputs, and yet there is little consistency between countries in how human resource policies and strategies are developed and implemented. The analysis of the impacts of services on population health and well-being attracts more interest than analysis of the situation of the workforce in this area. The objective of this paper was to present an international comparison of the health workforce in terms of skill mix, sociodemographics and other labour force characteristics, in order to establish an evidence base for monitoring and evaluation of human resources for health. Data were drawn from LIS/LES surveys conducted between 1989 and 1997 for 18 countries with developed market and transitional economies. Considerable cross-national variations were observed in terms of the share of the health workforce in the total labour market, with little discernible pattern by geographical region or type of economy. Increases in the share were found among most countries for which time-trend data were available. The evidence further suggested that gender inequity in human resources for health remains an important shortcoming of many health systems. However, unexpected patterns of occupational distribution and educational attainment for selected countries pointed to definitional inconsistencies in the classification of health occupations across surveys.

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Introduction

The World Health Organization's *World Health Report 2000* underlined that human resources are the most important of health systems' inputs (WHO, 2000). The health sector is a major employer, and human resources account for a high proportion of national budgets assigned to health (Narine, 2000). In most countries, wage costs (salaries, bonuses and other payments) are estimated to represent between 65 and 80 percent of renewable health system expenditures (Saltman and von Otter, 1995; Kolehamainen-Aiken, 1997). Yet despite the cost of producing and maintaining human resources in the health system and the undoubted importance of human resources to its functions, there is little consistency between countries in how human resource policies and strategies are developed and implemented. Major variations occur in the numbers of health care workers per inhabitant and in the skill mix employed.

Several factors play a role in determining the numbers of health care workers and skill mix of a particular health system, including resource availability, regulatory environment, culture, and customs. The extent to which any one of these factors influences the typical mix of health care occupations in different countries remains unknown. A recent review of the literature pointed to rapidly growing interest in examining the roles and mix in medical and nursing occupations (Buchan and Dal Poz, 2002). In terms of the published literature, few studies were found offering a cross-national perspective. The most frequently used bases for comparing international health care resources are health care expenditures, measured either as a fraction of gross domestic product or on a per capita basis. Assessments of non-monetary resources, such as medical equipment or health personnel, are less widespread; working the latter into international comparisons of health care resources has been taken up only slowly (Anell and Willis, 2000).

The availability of quantitative, methodologically sound analyses of the stock and mix of health care occupations across different settings and health systems could be an important catalyst towards better understanding labour issues in health care and identifying appropriate solutions for human resources management. Data on resource profiles and investments in health systems—especially the different elements of planning, training, recruitment and retention of health personnel—are inadequate in many countries, despite the importance of such data for policy decisions. Some studies on human resources for health have relied mainly on data from national accounts gathered by agencies of the United Nations system (Wharrad and Robinson, 1999). Other research agendas have focused on using census data

(Johnston and Wilkinson, 2001; OECD, 2002), which can provide information on occupational size and distribution, educational attainment and other sociodemographic characteristics, but generally limited information on labour force activities. Administrative records can provide data on licensing and regulations of health occupations in some countries, often only with emphasis on the public sector. While each type of data source tenders at least some analytical potential, population-based surveys offer the advantage of providing nationally representative information on many aspects of labour force participation.

This paper presents a quantitative comparison of health occupations for 18 countries, drawing on information from labour force employment and income surveys conducted between 1989 and 1997. The data were derived from the Luxembourg Income Study (LIS) and Luxembourg Employment Study (LES), a compilation of cross-national microdata from representative household surveys. The surveys provided comparable statistics on areas such as occupation, income and education. Health occupations were classified according to international standards (International Labour Office, 1990) to optimize comparability. The main objective was to profile the health workforce in terms of skill mix, sociodemographics and other characteristics, with an emphasis on differences by country, gender and over time, in order to establish an evidence base for monitoring and evaluation of human resources for health. A secondary objective was to investigate the uses of cross-national survey data for identifying appropriate human resource interventions, as a step towards formulating appropriate health policy options.

Data and methods

Our main data source was the LIS/LES Project, a research and databank project of household income and employment surveys across participating countries in Europe, America, Asia and Oceania. The surveys collected nationally representative information on a range of labour force and sociodemographic indicators, including occupation, employment status, wages and earnings, industry and education and vocational training. The LIS/LES project compiled the microdata sets for sample surveys that had already been collected by the countries' Central Statistical Offices and transformed them according to a common variable structure. While the surveys themselves were diverse and the types of data not necessarily uniform in nature, a process of data harmonization was undertaken to optimize comparability for public use (Smeeding, 2002). We used information from surveys with occupational data that permitted distinction of health occupations.

Data on health occupations were available for 18 countries with surveys conducted between 1989 and 1997. Twelve of the countries were characterized with developed market economies: Austria, Canada, Denmark, Finland, France, Germany, Netherlands, Norway, Spain, Switzerland, United Kingdom and

the United States of America. Six were countries with economies in transition: Czech Republic, Hungary, Poland, Russian Federation, Slovakia and Slovenia. Moreover, 11 countries had two or more surveys over time that allowed identification of health occupations, enabling us to conduct time-trend analyses. LIS/LES surveys had been compiled for nine other countries that were not used here because the occupational data did not enable differentiation of the health workforce.

The standardization of classification of health occupations was facilitated through the International Labour Office's latest revision, in 1988, of the International Standard Classification of Occupations (ISCO88). This internationally comparable classification pools occupational titles into a hierarchical four-digit system, which can be aggregated to progressively broader groups, representing a value set describing the different tasks and duties of jobs (ILO, 1990). ISCO88 is essentially organized according to two dimensions: skill level and skill specialization (Hoffmann, 1999). The former refers to the nature of skills required for the job (but not necessarily the way the skills were acquired). Skill specialization is related more to areas such as subject matter, products and services produced or types of equipment used. Different user areas may have different degrees of interest in the various elements, so classification structures may vary nationally. Many national statistical agencies participating in the LIS/LES project mapped their occupational classifications to ISCO88. Otherwise, where possible, the project provided ISCO88 classification codes by reconciling national classifications through standardized mapping techniques of occupational status scales (for example, techniques cited in Ganzeboom and Treiman, 1996).

Among the 10 major ISCO88 occupational groups, two were of interest here: group 2 "professionals" (generally well-trained workers requiring a university or advanced-level degree) and group 3 "technicians and associate professionals" (generally requiring skills at a non-university qualification level). Identification of the health workforce is possible when the classification is detailed minimally at the three-digit level, and preferably at the four-digit level for distinction of health specializations. The professional group includes physicians, nursing and midwifery professionals and other health professionals, such as dentists, pharmacists, ophthalmologists and veterinarians. Classified as associate professionals are modern health associate professionals (except in nursing), nursing and midwifery associate professionals and traditional medicine practitioners. The former encompass medical assistants, dental assistants, pharmaceutical assistants, opticians, veterinary assistants, physiotherapists, sanitarians and others. Traditional medicine practitioners include herbalists and faith healers (see Table A1 in annex).

We performed basic analyses on characteristics of the health workforce where occupational data was standardized at the three-digit ISCO88 level or equivalent. Further in-depth analyses were conducted

where identification of health occupations was possible at the four-digit ISCO88 level or equivalent. It should be noted that despite efforts to standardize, the definition of certain categories of health occupations may have varied across surveys; for example, in some cases the classification of nurses and midwives did not distinguish between professionals and associate professionals.

The surveys' sampling designs and sizes were not homogeneous; while the LES samples were generally derived from stratified random selections of households, LIS datasets may have been based on income tax or other administrative records of government agencies. Coverage and completeness of information sometimes varied. To maintain comparability, in the present analysis all samples were limited to the population aged 15 and over declaring an occupation. The sample sizes of health occupations ranged from 60 (1994 Hungary) to 12,248 (1997 United States). Our study included profiles of the health workforce by selected sociodemographic characteristics, including sex, age and migration status, as well as labour force indicators such as education and income. Standardization of indicators was ensured to the extent the available data permitted.

In terms of migration of health workers, an audit of human resources can show movement between posts (e.g. rural to urban), between sectors (public to private), or between countries. We relied on the LIS/LES survey questions on immigration status and defined migrants as native-born versus non-native. Education was assessed by university-level attainment versus secondary schooling at most, as a gauge of the skill distribution of health care personnel. The indicator for income—information of value when discussing countries' health care financing options—was measured through net or gross occupational wages, depending on the source.

Gender issues were emphasized as being important not only for assessing equity in human resources, but also for health services planning. Studies have shown that increased participation of women in the medical field may be accompanied by differences in working patterns; in particular, female physicians are likely to work fewer hours than their male counterparts (Hojat et al., 1995; Reamy and Pong, 1998) and to present different styles of care provision that may be reflected in the levels of patient participation (Higginbotham, 1998).

The statistical methods used were primarily descriptive. First we sketched a general profile of the health workforce for 18 countries based on LIS/LES surveys. Next, where data were available, we compared trends over time in the profile of health occupations; in particular, an overview of the share, mix and demographics of health occupations was drawn. We then undertook an in-depth study of the demographic and labour force characteristics for five countries for which time-trend data were available at the four-digit ISCO88 occupational classification level or equivalent. All results presented here were

compiled using remote submission procedures for microdata-processing programmed in the SPSS statistical software package (SPSS Inc., 2002), and have been weighted to account for survey sampling designs.

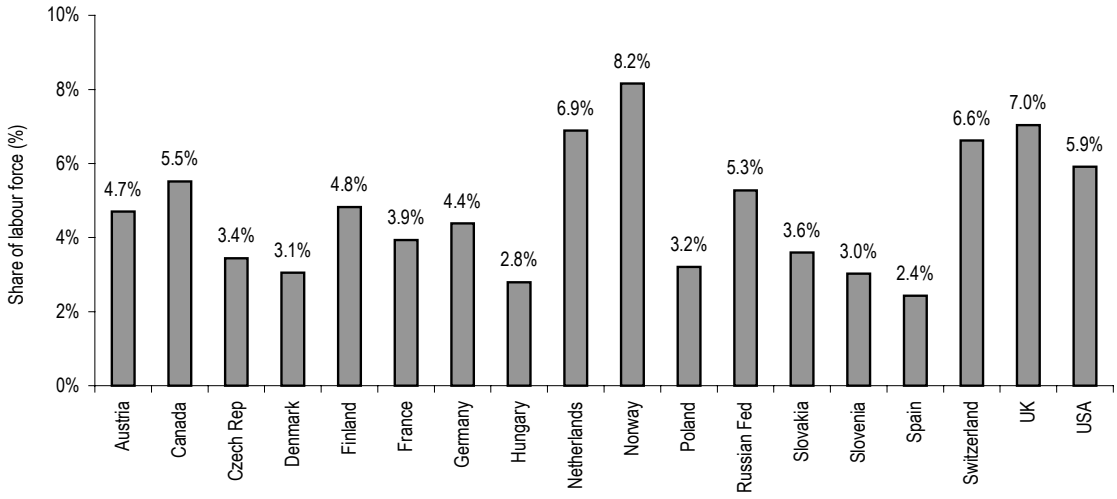
Results

Share and mix of the health workforce

Of central interest in assessing the production of human resources for health is the planning of the size and composition of the health workforce. As seen in Figure 1, important variations were found in the share of health occupations among the total labour force across countries. According to the most recent survey findings, the share ranged between 2.4 percent of those declaring an occupation in Spain and 8.2 percent in Norway. There was little discernible pattern by geographical region or type of economy. For example, a share of around 5 percent was found in countries of Western Europe (Austria, Finland), Eastern Europe (Russian Federation) and North America (Canada) alike. While most of the countries with the largest health workforces had developed market economies, the Russian Federation stood out as a country with an economy in transition with a relatively large share (5.3 percent).

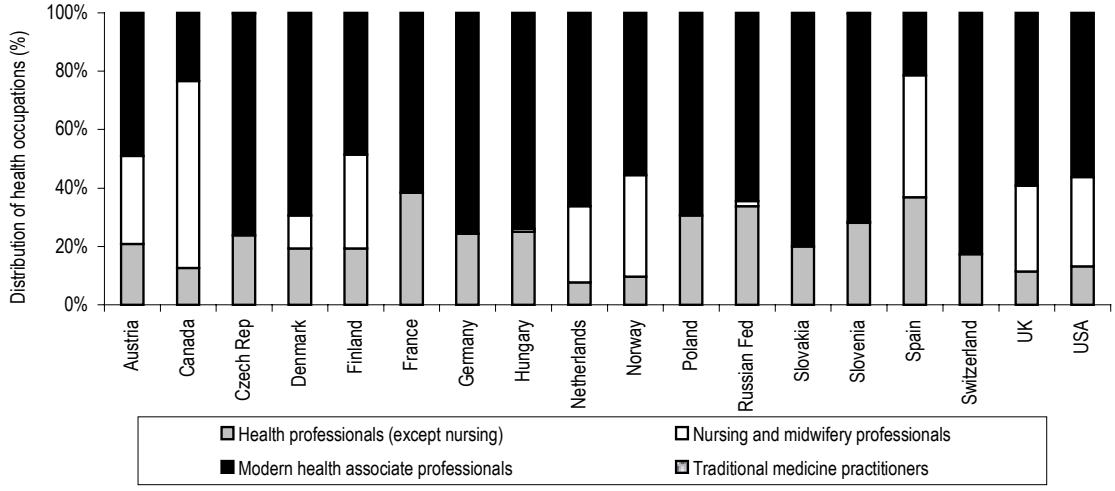
At the same time, the distribution of the health workforce varied markedly by occupation (Figure 2). Health professionals (except in nursing) accounted for between 8 percent (Netherlands) and 38 percent (France) of all health care workers. Again, no immediate cross-national pattern emerged with respect to type of economy; countries with large proportions of health professionals were as likely to have developed economies (France and Spain) as transitional ones (Poland and Russian Federation). The

Figure 1. Share of health occupations in the labour force, 18 LIS/LES countries, 1990s



number of nursing and midwifery professionals reached at least 30 percent of the health workforce in Austria, Canada, Finland, Norway, Spain and the United States. However, some definitional problems evidently emerged. In Canada, where the proportion was highest (64 percent), comparability may have been hampered, as the national classification of nursing professionals included therapists and other related occupations. There were no cases or only a handful of nursing and midwifery professionals in the samples for the Czech Republic, France, Germany, Hungary, Poland, Slovakia, Slovenia and Switzerland. Conversely, in these same countries, the proportion of associate professionals tended to be relatively higher. Small numbers of traditional medicine practitioners were found in the Czech Republic and Slovenia (less than 0.5 percent), both countries with economies in transition.

Figure 2. Occupational mix of the health workforce, 18 LIS/LES countries, 1990s



Trends in the profile of the health workforce

Consideration of changes over time in the health labour market is important for the assessment of human resource generation. In most of the countries where time-trend data were available, increases were found in the share of health occupations among the total labour force (Table 1). Only Hungary and Spain experienced declines in the share of the health workforce. At the same time, certain discrepancies in the classification of health occupations should be noted. Despite the mapping of national classifications according to an internationally standardized classification, in some countries (notably Hungary and Spain, as well as Germany and Switzerland) the distinction of professional nurses and midwives was problematic. It is likely that in these cases the occupations were classified under health associates instead.

In general, there was little discernible pattern in terms of changes in the occupational distribution of the health workforce across countries. The proportion of health professionals (except in nursing) was about

as likely to have increased as to have decreased across survey rounds. Likewise, where information appeared comparable over time, the proportion of professional nurses and midwives may have decreased in some countries, increased in others, or remained stable.

Aside from share and mix, a number of sociodemographic indicators can be used related to efficiency, imbalances and equity for assessment of human resources for health. For one, the age structure of the health workforce holds a number of employment policy implications, chief of which is replacement of losses in the labour force due to retirement. Among the countries under observation, certain cross-national variations in the age distribution of the health workforce were found. According to the most recent survey findings, the proportion aged 30 to 59 years was between 61 and 79 percent (Germany and Canada, respectively). Generally, the proportion of younger health workers exceeded that of older persons, following the expected pattern for renewal of the workforce. Few countries showed large proportions of older workers, and little trend toward workforce ageing appeared. A notable exception was Denmark, where the proportion aged 60 years or over increased over time, to the extent that the

Table 1. Trends in the profile of the health workforce, 11 LIS/LES countries, 1989-1997

Country and Year of Survey		Share of the labour force	Occupational distribution*			Age distribution			Sex distribution	
			Health professionals (exc. nursing)	Nursing and midwifery professionals	Modern health associate professionals	29 years or under	30 to 59 years	60 years or over	Female	Male
Austria	1991	4.0%	25%	30%	45%	33%	64%	3%	73%	27%
	1995	4.7%	21%	30%	49%	34%	64%	2%	76%	24%
Canada	1994	4.6%	9%	68%	23%	21%	73%	6%	80%	20%
	1997	5.5%	13%	64%	23%	18%	79%	3%	79%	21%
Denmark	1992	2.9%	22%	10%	68%	19%	66%	15%	81%	19%
	1997	3.1%	19%	12%	69%	11%	72%	17%	83%	17%
Germany	1989	3.2%	32%	..	68%	28%	61%	11%	62%	38%
	1994	4.4%	24%	..	76%	33%	61%	6%	75%	25%
Hungary	1991	4.4%	12%	53%	35%	31%	66%	3%	87%	13%
	1994	2.8%	25%	1%	74%	21%	76%	3%	82%	18%
Netherlands	1991	6.2%	10%	32%	58%	37%	62%	1%	78%	22%
	1994	6.9%	8%	26%	66%	35%	64%	1%	80%	20%
Russian Fed.	1992	4.7%	26%	2%	72%	29%	66%	5%	83%	17%
	1995	5.3%	34%	2%	64%	35%	63%	2%	85%	15%
Spain	1990	3.1%	33%	..	67%	27%	67%	6%	67%	33%
	1993	2.4%	37%	42%	21%	19%	74%	7%	62%	38%
Switzerland	1992	5.9%	48%	52%	0%	32%	62%	6%	75%	25%
	1997	6.6%	17%	..	83%	26%	70%	4%	77%	23%
United Kingdom	1991	5.5%	10%	34%	56%	30%	63%	7%	81%	19%
	1997	7.0%	12%	29%	59%	24%	71%	5%	82%	18%
United States	1991	5.4%	16%	31%	53%	26%	67%	7%	78%	22%
	1997	5.9%	13%	31%	56%	23%	71%	6%	78%	22%

** Note: Classification at the 3-digit ISCO88 level or equivalent (categories aggregated to reflect national classifications and sample size limitations for some surveys.).* *.. = No observations in survey sample.*

number of older workers was greater than younger workers at the time of the later survey. The Danish population is an ageing one overall, with 24 percent of the total workforce being in the oldest bracket in 1997.

Among the distinctive features of human resources for health is the notably high proportion of women employed in the sector. Results indicated that, across countries, at least 62 percent—and as high as 85 percent—of health workers were women. A certain trend toward greater feminization was seen in Germany, where the proportion female increased by 13 percentage points across survey rounds. Otherwise, any observed differences in the sex ratio over time tended to have been less important. It has been suggested that certain female-dominated occupations, notably in nursing, are not often given a high market value commensurate with their skill level, as the work is seen simply as "women's work" (Salvage and Heijnen, 1997). Further analysis of gender imbalances in the health workforce may reveal the extent to which women and men have equal opportunities in career choice.

Sociodemographic and labour force characteristics in selected countries

In this part, we present an in-depth study on the sociodemographic and labour force characteristics of the health workforce for five countries: Denmark, Netherlands, Russian Federation, United Kingdom and the United States. These were the countries for which time-trend data on occupation were available at the four-digit ISCO88 level or equivalent. In particular, we considered trends and differentials in the status of the health workforce in terms of education, migration, income and gender equity.

The availability of four-digit occupational classification information allowed breakdown of the health workforce according to areas of specialization. As indicated in Table 2, according to the most recent survey results, physicians tended to be more numerous in terms of the distribution of health professionals (except in nursing) compared to other specializations. In the Russian Federation in

Table 2. Trends in the occupational distribution of the health workforce, five LIS/LES countries, 1991-1997

	Denmark		Netherlands		Russian Fed.		United Kingdom		United States	
	1992	1997	1991	1994	1992	1995	1991	1997	1991	1997
Physicians	12%	12%	7%	5%	20%	28%	6%	8%	7%	8%
Nursing and midwifery professionals	10%	12%	32%	26%	2%	2%	34%	29%	31%	31%
Other health professionals	10%	7%	3%	3%	6%	6%	4%	4%	9%	5%
Nursing and midwifery associate professionals	46%	44%	31%	37%	32%	44%	23%	19%	25%	24%
Modern health associate professionals	22%	25%	27%	29%	40%	20%	33%	40%	28%	32%
(Sample size-unweighted)	*(N=627)*	*(660)*	*(292)*	*(374)*	*(380)*	*(237)*	*(441)*	*(4536)*	*(1165)*	*(12,248)*

Note: Classification at the 4-digit ISCO88 level or equivalent.

particular, the ratio of other health professionals was relatively small, about one for every four physicians. In most countries, among the health associate professionals, those in the nursing and midwifery specializations outnumbered those in other occupational groups. Again the Russia Federation stood out from the other countries, having experienced a somewhat divergent trend.

❖ *Education*

Assessing the education levels of the health workforce is a key element for policy-makers. The advance of complex health system organisations and medical knowledge, as well as the introduction of sophisticated technology, mean that improvements in welfare increasingly depend on the degree of educational attainment of the health workforce. Furthermore, the knowledge and skills acquired in initial vocational education affect health workers' ability to deliver high-quality performance. It is expected that, given the ISCO88 hierarchical nature, professional-level occupations should be universally characterized with a tertiary educational attainment. Survey findings revealed that, in each country, physicians and other health professionals (except in nursing) had higher levels of schooling. Virtually all physicians had reached university or college in the Russian Federation and the United States, and the proportion of other health professionals with higher education was seen to have increased over time in all countries (Table 3). However, important variations were observed for nursing and midwifery professionals: the percentage with tertiary education was 94 percent according to the later survey in the United States, but only 35 percent in the Netherlands. In most countries, except Denmark, an increase was seen over time.

As expected, the level of education tended to be lower among nursing and midwifery associate professionals and other health associate professionals. Denmark was again an exception, where education levels among the former remained as high as or higher than their professionally-classified counterparts. Cross-national differences in educational attainment by occupational grouping might be explained in part by differences in education systems, but also likely to a certain extent in definitions of occupational classifications.

Table 3. Trends in the proportion of health workers with university-level education, according to occupation, five LIS/LES countries, 1991-1997

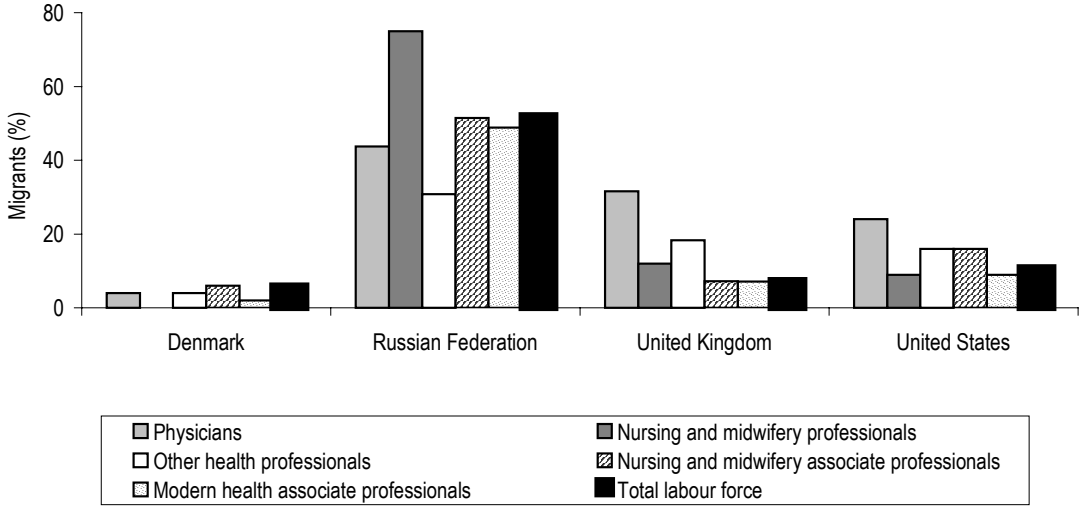
	Denmark		Netherlands		Russian Fed.		United Kingdom		United States	
	1992	1997	1991	1994	1992	1995	1991	1997	1991	1997
Physicians	82%	96%	79%	85%	100%	100%	93%	98%	99%	100%
Nursing and midwifery professionals	80%	65%	25%	35%	(57%)	(75%)	58%	65%	85%	94%
Other health professionals	91%	94%	(76%)	(100%)	85%	100%	84%	97%	98%	99%
Nursing and midwifery associate professionals	80%	82%	12%	5%	59%	57%	37%	37%	32%	37%
Modern health associate professionals	54%	30%	24%	33%	50%	60%	35%	36%	72%	74%

Note: Occupational classification at the 4-digit ISCO88 level or equivalent.
Figures in parentheses refer to sample size of fewer than 10 cases.

❖ *Migration*

External migration of health workers has long been recognized as a problem for ensuring appropriate coverage of essential services. It is impossible to objectively assess the impact of international migration on health systems without clear evidence, of which little is currently available. Some evidence has been provided by the LIS/LES surveys. The results depicted in Figure 3 show that, among the four countries for which information was available, the proportion of physicians who were foreign-born was highest in the Russian Federation (44 percent). This was not surprising, as the same country had the highest proportion of foreigners in the total labour force (largely having arrived from the former republics of the ex-Soviet Union). In contrast, Denmark had a low proportion of physicians who were non-natives (4 percent), which reflects the low proportion of foreigners overall. In between lay the United Kingdom and the United States, though it is worth pointing out that in both countries the proportion of foreign-born physicians was much greater than for any other health occupation or for the total labour force. Also noteworthy was that while the proportions of non-natives tended to be higher among physicians and other health professionals (except in nursing), the migration phenomenon might in fact have been more important in absolute terms for nursing and midwifery professionals, who were numerically a more important group.

Figure 3. Proportion of health workers as international migrants, according to occupation, four LIS/LES countries, 1990s



❖ *Income*

In terms of earnings, comparisons were made for the average annual salary income by occupational group, among those health workers reporting positive income. The LIS/LES data on earnings referred to either the gross or net income, depending on the original source. The former included all forms of

cash wage and salary income, including employer and annual bonuses, gross of employee social insurance contributions and taxes. If that information was not available, net income was supplied. Since the variable for earnings varied across countries and was always reported in national currency amounts, average earnings of each occupation are expressed here relative to those of a reference group, namely nursing and midwifery professionals. This approach was adopted to facilitate comparisons between occupations and countries. A ratio equal to one signifies that the earnings of the group of interest are similar to the earnings of nursing and midwifery professionals. A ratio above one means that the given group tends to earn more, whereas a ratio less than one suggests lower average earnings.

In most countries, the average income among physicians was superior to the average income among other health professionals and especially among nursing and midwifery professionals (Table 4). The largest difference was found in the United States, where physicians' average wages were, in 1997, more than four times as high as wages for nursing and midwifery professionals and nearly twice as high as for other health professionals. Similar trends were observed in Denmark and the United Kingdom, though to a lesser extent. In the Russian Federation, the gaps between the wages according to professional group were less marked. A large inter-survey increase in wage differentials among categories of health professionals was found in the United States and also in the Netherlands, while in most other cases the gap had diminished.

Since occupational classification by ISCO88 can indirectly serve as a measure of socioeconomic status (Hoffmann, 1999), it is expected that health associate professionals will generally earn less than professionals; this tendency was confirmed according to the LIS/LES data. Nursing and midwifery associate professionals earned the least in many cases, with by far the biggest discrepancy seen in the United States.

An examination of the health labour market should also be placed in a broader perspective that takes into account other sectors and the impact of global trends. We compared the average wages of health workers with those for other non-health occupational groups. In particular, two groups were selected for comparative purposes based on their similar skill levels according to the ISCO88 classification: science professionals (that is, group 2 professionals in the physical, mathematical and engineering science fields) and teaching associate professionals (group 3 associates in the teaching field). Science professionals tended to earn less than physicians, but often more than other health professionals. Only in Russia were health professionals consistently earning less than their counterparts in the non-health sciences. At the same time, average earnings for nursing and midwifery professionals remained systematically lower than for other science professionals in each country.

Cross-national variations were found in terms of relative wages among associate professionals. In Denmark and the Russian Federation, associate professionals in nursing/midwifery and other modern health occupations earned about the same as those in teaching. These results contrasted with the situation found in the Netherlands, United Kingdom and United States, where teaching associate professionals tended to earn relatively more. For example, in the United Kingdom those in teaching averaged twice the income as those in health, a trend that remained stable over time.

Table 4. Trends in the ratio of average earnings for selected occupations compared to average earnings for nursing and midwifery professionals, five LIS/LES countries, 1991-1997

	Denmark		Netherlands		Russian Fed.		United Kingdom		United States	
	1992	1997	1991	1994	1992	1995	1991	1997	1991	1997
Physicians	1.9	1.7	2.3	2.6	1.9	1.0	2.1	2.0	2.3	4.1
Nursing and midwifery professionals (ref.)	1.0	1.0	1.0	1.0	(1.0)	(1.0)	1.0	1.0	1.0	1.0
Other health professionals	1.4	1.3	(2.8)	(3.7)	1.5	0.8	1.2	1.5	1.5	1.9
Nursing and midwifery associate professionals	0.9	0.8	0.7	0.8	1.2	0.6	0.6	0.6	0.4	0.4
Modern health associate professionals	0.9	0.7	0.8	0.9	1.4	0.5	0.6	0.6	0.7	0.8
Physical and engineering science professionals	1.7	1.4	1.7	1.8	2.3	1.2	1.6	1.6	1.6	1.6
Teaching associate professionals	0.9	0.7	1.3	1.2	1.2	0.6	1.2	1.2	0.8	0.8

Note: Occupational classification at the 4-digit ISCO88 level or equivalent.
Figures in parentheses refer to sample size of fewer than 10 cases.

❖ *Gender imbalance*

Given the predominance of women in the health workforce, an analysis of gender differences is especially important. In describing a framework for the study of gender equality in the labour force, Gornick (1997) included three employment dimensions for subject of analysis: occupation, working time and earnings. Occupational segregation by gender can correspond to either vertical clustering (differentials in the sex ratio according to relative job status) or horizontal clustering (sex differentials according to specialization). Working time can affect workers' economic position, especially when it results in lower monetary and non-monetary compensation among part-time workers compared to their full-time counterparts, as well as less job security and fewer opportunities for promotion. Because the labour conditions and opportunities vary markedly across occupations and countries, gender equity can be referred to as the absence of observed gender differences. Table 5 offers a series of survey results for describing gender imbalances in the health field for five countries. The emphasis here is on trends in status in the nursing and midwifery specializations, which have traditionally been characterized as female-dominated.

Health occupations were found to be subject to both vertical and horizontal gender imbalances. As previously noted, women comprised the majority of health workers overall. However, closer examination revealed that the proportion of women was considerably higher for occupations at the associate professional level compared to the professional level, and also for nursing and midwifery professionals compared to physicians and other health professionals, a pattern that was observed in all countries. Except in the Netherlands, the proportion of women in nursing and midwifery associate professions was likewise higher than the proportion in other associate health professions. Across countries, at least four-fifths of the workforce in the nursing and midwifery specializations were women. For the most part, trends in the sex ratio for these specializations were quite stable over time.

Working time was captured in the LIS/LES surveys, when available, in terms of the usual number of hours worked per week, including overtime and second jobs. Important gender differences in working time were observed in the Netherlands and the United Kingdom, with women averaging fewer hours. According to the latest survey in the United Kingdom, for example, women tended to work 80 percent of the hours men worked, across occupations. Differences were less consistent in the Russian Federation and the United States, where women sometimes averaged longer hours than men.

Marked differences were found in average wages by gender. In general, earnings of women were inferior to men's earnings. Exceptions were found for certain occupations in the Russian Federation, but the findings here should be treated with caution due to sample size limitations. Among physicians, women tended to earn considerably less than their male counterparts; however, the results also showed that, over time, the gap tended to decrease. In the United Kingdom in particular, the gender gap in average earnings essentially dissipated between the earlier versus later survey.

Although males were the minority in nursing and midwifery specializations, they tended to earn much more. It is possible that higher male wages might be explained by higher levels of seniority within the positions occupied, although this is difficult to assess from the available survey data. Moreover, there was no distinctive time-trend. Whereas the gender gap in earnings increased in some countries (notably Denmark and the United States), it decreased elsewhere (Netherlands). Interestingly, in the United Kingdom, gender inequity was found to have increased among nursing and midwifery professionals but to have decreased among associate professionals.

While appreciable gender imbalances were found in the health occupations, the question remains whether the health field is more unequal than other fields. In terms of occupational segregation, the evidence was inconclusive. Among professional categories, greater gender imbalances were found in the physical science field, where the proportion of females was even lower than for physicians and other

health professionals across countries, and with little sign of change over time. On the other hand, while women were overrepresented among teaching associate professionals, the imbalance was less pronounced than among nursing and midwifery associate professionals.

With regard to working times, women in non-health science professions tended to average somewhat less than or about the same as their male counterparts; gender differences were minimal compared to those sometimes seen for nursing and midwifery professionals. In most cases, the gender gap for teaching associate professionals roughly paralleled that for nursing and midwifery associate professionals.

Gender differences in average earnings tended to be less pronounced among science professionals than among nursing and midwifery professionals, according to the most recent survey findings for which

Table 5. Trends in labour force indicators for assessing gender imbalances, according to selected occupations, five LIS/LES countries, 1991-1997

	Denmark		Netherlands		Russian Fed.		United Kingdom		United States	
	1992	1997	1991	1994	1992	1995	1991	1997	1991	1997
Proportion female										
Physicians	23%	31%	21%	30%	70%	67%	43%	35%	20%	23%
Nursing and midwifery professionals	97%	96%	84%	79%	(100%)	(100%)	88%	91%	93%	94%
Other health professionals	41%	46%	(13%)	(33%)	52%	67%	44%	39%	24%	32%
Nursing and midwifery associate professionals	97%	97%	85%	86%	98%	97%	93%	94%	91%	88%
Modern health associate professionals	91%	88%	85%	88%	83%	87%	76%	85%	81%	77%
Physical and engineering science professionals	12%	13%	9%	4%	48%	49%	10%	10%	12%	12%
Teaching associate professionals	77%	82%	61%	72%	97%	94%	79%	82%	75%	76%
Ratio of women's/men's average hours worked										
Physicians	NA	NA	(0.4)	(0.7)	0.8	0.9	0.9	0.8	1.1	1.0
Nursing and midwifery professionals	NA	NA	0.6	0.7	..	..	0.8	0.8	0.9	0.9
Other health professionals	NA	NA	(1.5)	(0.4)	1.1	(1.1)	(1.8)	0.8	0.9	0.9
Nursing and midwifery associate professionals	NA	NA	0.8	0.8	0.8	1.1	0.7	0.8	1.2	1.0
Modern health associate professionals	NA	NA	0.6	0.7	0.9	1.1	0.8	0.8	0.9	0.9
Physical and engineering science professionals	NA	NA	0.9	0.9	0.9	0.9	0.9	1.0	1.0	0.9
Teaching associate professionals	NA	NA	0.8	0.8	0.8	1.0	0.8	0.9	0.9	0.9
Ratio of women's/men's average earnings										
Physicians	0.7	0.8	(0.7)	(0.6)	0.6	0.7	0.7	1.0	0.6	0.7
Nursing and midwifery professionals	(0.8)	(0.7)	0.5	0.7	..	..	0.8	0.7	1.1	0.8
Other health professionals	0.7	0.9	..	..	0.6	(1.1)	(1.0)	0.6	0.6	0.6
Nursing and midwifery associate professionals	(0.9)	0.7	0.6	0.8	(1.0)	(2.6)	0.5	0.8	0.9	0.7
Modern health associate professionals	1.0	0.9	0.6	0.5	1.0	(0.9)	0.5	0.5	0.8	0.7
Physical and engineering science professionals	0.7	0.8	0.9	1.0	0.7	0.8	0.6	0.8	0.9	0.8
Teaching associate professionals	0.9	0.9	0.6	0.7	0.8	0.5	0.8	0.7	0.8	0.8

NA = Not available due to questionnaire design.
Figures in parentheses refer to sample sizes of fewer than 10 cases. *..= No observations in survey sample.*

data were available. No clear cross-national pattern was seen for the associate professional categories: differences for teaching compared to those for the nursing and midwifery specialization were lower in Denmark and the United States, but higher in the Netherlands and the United Kingdom.

Discussion

This study examined trends and differentials in the profile of health occupations for selected countries with developed market and transitional economies participating in the Luxembourg Income/Employment Study. While considerable cross-national variations were observed in the share and occupational distribution of the health workforce, certain common tendencies emerged. In particular, increases in the share were found among most countries for which time-trend data were available. Due to demographic and epidemiological conditions, demands on health care services have been growing rapidly in many societies; it is thus reasonable to expect the same to have held for employment opportunities in this field.

Our analysis included descriptions of the health workforce for a number of demographic and socioeconomic indicators. Notably, an examination of the sex distribution revealed a health labour market characterized by a large presence of women. Further assessment of data from five countries helped to reveal the extent to which women and men may have equal opportunities in career choice. The evidence suggested that gender inequity in human resources for health remains an important shortcoming of many health systems. Large imbalances were seen in terms of occupational segregation and wage gap. It is difficult to establish the causal links of such imbalances, as the influences may be dynamic and multidirectional, related to both demand and supply factors. But it is important to point out that the gender inequity observed in the health field may be even more pronounced in some respects than for workers in other fields: there were greater wage gaps in some countries compared to other occupations in physical and engineering sciences or in teaching. Assuming that monetary incentives are important in labour participation decisions, such results suggest that recruitment and retention in health occupations, especially nursing and midwifery, might suffer in comparison with other non-health occupations that propose better earnings for a similar skill level.

The household-based survey data on labour force activities and occupational wages available through the LIS/LES project presented both advantages and constraints in conducting international comparisons. Because of the discontinuous nature of the data collection procedures, performed by the various national statistical agencies with differing targets and interests, the LIS/LES project undergoes a process of variable harmonization to facilitate public use. In assessing the existing data, we found certain strengths and weaknesses. In many ways our analyses were guided as much by the character of the data as by the base required for formulating policy decisions.

The first challenge lay in defining health occupations themselves. In this paper, the terms "health occupations" and "health workforce" were used interchangeably. Occupational status was generally classified according to ISCO88, which broadly groups occupations according to skill levels and specializations. We focused on professionals and associate professionals with a health-related specialization. Since the survey data were nationally representative, they included those practising medicine and nursing in both public and private institutions, as well as those in administrative, research and industry positions. For example, findings from the latest surveys in Hungary and the United States revealed that 7 and 15 percent respectively of workers with health occupations were engaged outside of hospitals or other health facilities. Persons with health qualifications but not working in the public health sector are often excluded from national registries, for instance. On the other hand, our analyses did not consider those employed in the health system with non-health occupational backgrounds, such as economists, accountants, ambulance drivers and other support staff. Again in Hungary and the United States, an estimated 2 to 3 percent of those with non-health occupations were working in health facilities.

Even when occupations were classified according to ISCO88, comparability issues arose. In some cases, discrepancies were evident between mappings of national classifications with the international standard, particularly with regard to the nursing and midwifery specializations. In addition, health-related specializations under ISCO88 placed veterinary occupations in the same minor groupings as human care occupations. WHO is currently collaborating with ILO to refine the descriptions for some categories of health and personal care occupations, in order to facilitate analyses of human resources for health. Such issues may grow increasingly important, because use of or mapping to ISCO88 is expected to become more widespread across countries (Hoffmann, 1999).

Other constraints included the sometimes small sample sizes of surveys (from which, for example, census data do not suffer) as well as occasional definitional inconsistencies among the selected indicators. Availability and comparability of certain types of information were dependent on the source, such as the more extensive data on earnings provided in LIS surveys but on working time in LES surveys. Education was a variable that posed problems, as the categories and details varied across countries. While in a few cases the variable captured the level of attainment, in others it was years of schooling and in yet others, age of completion. Some discrepancies might be related to the structure of national educational systems. To the extent possible, information was recoded for the present analysis to approximate education at the tertiary level. We recommend the use in future data collection and processing of a cross-nationally comparable instrument for definitions of levels and fields of education, such as the International Standard Classification of Education (UNESCO, 1997).

Migration of skilled health workers has become a cause for global concern, as mass emigration of health professionals from less-developed countries puts great pressure on the health systems and workers remaining (Bundred, 2000). We found, for instance, that health professionals—and especially physicians—were overrepresented among the foreign-born, compared to the total labour force in the United Kingdom and the United States. But migration was an area covered somewhat inadequately in the surveys. There was generally no information on period of international migration, other aspects of mobility (such as rural exodus), or time-trends in the countries under observation. Moreover, data on emigration were notably lacking. WHO advocates better cooperation between the many agencies supporting processes for strengthening national health systems, with equitable geographical distribution as one of the core policy areas. Human resources for health are a constraint to achieving the Millennium Development Goals[1] and to scaling up interventions on major health problems, in particular the diseases of poverty. Assessing the determinants and impacts of international migration across countries at different stages of development remains an important research domain.

Data collection systems are crucial tools for improving all aspects of health care, including health care workforce policy. A necessary prerequisite to the development of policy that is meaningful, realistic and effective is a solid foundation of accurate data about the numbers, distribution and service capacity of human resources in health (Pew Health Professions Commission, 1995). Without information about these professions, policy-makers cannot effectively address issues of access, supply, cost and barriers to care. Availability of different types of data sources can also serve as a control for the common information they collect, offering means for triangulation (Galin, 2000). The survey data used in this analysis allowed the measurement of a certain number of sociodemographic and labour force indicators useful for profiling the health workforce and monitoring changes. What remains to be developed is a minimum set of indicators related to the level of achievement, distribution of achievement and efficiency of human resources for assessing health systems performance. The LIS/LES project presents one valuable source that, in combination with other complementary information, can help provide the evidence base required for monitoring and evaluation of human resources for health.

[1] The Millennium Development Goals, adopted at the Millennium Summit of the United Nations, in September 2000, are to: (1) eradicate extreme poverty and hunger; (2) achieve universal primary education; (3) promote gender equality and empower women; (4) reduce child mortality; (5) improve maternal health; (6) combat HIV/AIDS, malaria and other diseases; (7) ensure environmental sustainability; and (8) develop a global partnership for development (United Nations, 2000).

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Annex A

Table A1: Health occupations in the International Standard Classification of Occupations (ISCO88)

Major group 2: Professionals
- Sub-major group 22: Life sciences and health professionals
  - 222 Health professionals (except nursing)
    - 2221 Medical doctors
    - 2222 Dentists
    - 2223 Veterinarians
    - 2224 Pharmacists
    - 2229 Health professionals (except nursing) not elsewhere classified
  - 223 Nursing and midwifery professionals
    - 2230 Nursing and midwifery professionals

Major group 3: Technicians and associate professionals
- Sub-major group 32: Life sciences and health associate professionals
  - 322 Modern health associate professionals (except nursing)
    - 3221 Medical assistants
    - 3222 Sanitarians
    - 3223 Dieticians and nutritionists
    - 3224 Optometrists and opticians
    - 3225 Dental assistants
    - 3226 Physiotherapists and related associate professionals
    - 3227 Veterinary associate professionals
    - 3228 Pharmaceutical assistants
    - 3229 Modern health associate professionals (except nursing) n.e.c.
  - 323 Nursing and midwifery associate professionals
    - 3231 Nursing associate professionals
    - 3232 Midwifery associate professionals
  - 324 Traditional medicine practitioners and faith healers
    - 3241 Traditional medicine practitioners
    - 3242 Faith healers

Source: ILO, 1990