ECONOMIC ASPECTS OF HUMAN RESOURCE DEVELOPMENT IN HEALTH & FAMILY PLANNING IN BANGLADESH:

Flow Of Funds In Human Resources In Government Health And Family Planning Services

Research Paper No. 12
Health Economics Unit
Ministry of Health and Family Welfare
Government of the People's Republic of Bangladesh
September 1998

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Acknowledgements

The Economics of health care human resources project is a collaborative effort of the Health Economics Unit and the Human resource development project of the MOHFW.
The project was funded by the British DFID and managed by Maxwell Stamp Plc. London. Part of the empirical work was carried out by Data International, Dhaka (Managing Director : Dr Najmul Hossain). We are grateful to Ms Tahmina Begum research associate Data International, and her colleagues for co-ordinating data collection and field work which took place between August 1997 and June 1998. Valuable support was provided by members of the HRD project team, Dr Khairun Nahar, Dr Khaleda Begum, Mr Mohammad Abdus Shahid and Prof. Gilles Dussault, Canada.

The authors also gratefully acknowledge the support and encouragement received from various institutions and individuals who provided insight to the understanding of the economics of health care human resources development in Bangladesh. Valuable inputs were provided by Dr Heide I Richter, GTZ, Mr Simon Shenton-Tan, Maxwell Stamp, Dr CHW Bullough, Further Improvement of Medical Colleges Project, Dr Patricia Robson, Queen Mary College Edinburgh, Professor AK Azad Khan and Dr Liaquat Ali , BIRDEM, Dr Martinus Desmet , ICDDR,B, Dr William L Aldis WHO , Dhaka, Dr Zafrullah Chowdhury, Gonoshathaya Kendra, Professor Schah Monir Hossain, Director Medical Education & Health Manpower Development.

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Acronyms

AHI	Assistant health inspector
ARI	Acute respiratory Infection
BCPS	Bangladesh College of Physicians and Surgeons
BIRDEM	Bangladesh Institute of Research & Rehabilitation in Diabetes, Endocrine and Metabolic Disorders
BMA	Bangladesh Medical Association
BMDC	Bangladesh Medical and Dental Council
BRAC	Bangladesh Rural Advancement Committee
CHW	Community Health Worker
CMC	Chittagong Medical College
CME	Continuing Medical Education
DFID	Department for International Development
DGFP	Director General Family Planning
DGHS	Director General Health Services
DMC	Dhaka Medical College
EPI	Expanded Programme of Immunization
ESP	Essential Service Package
FCPS	Fellow of the College of Physicians and Surgeons
FP	Family Planning
FPI	Family Planning Inspector
FWA	Family Welfare Assistant
FWC	Family Welfare Visitor
FWVTI	Family Welfare Visitor Training Institute
GoB	Government of Bangladesh
GP	General Practitioner
HA	Health Assistant
HPSP	Health and Population Sector Programme
HEU	Health Economics Unit
HRD	Human Resource Development
ICDDR, B	International Centre for Diarrhoeal Disease Research, Bangladesh
IPGMR	Institute of Postgraduate Medicine and Research
IRR	Internal Rate of Return
LIP	Local Initiatives Programme
MA	Medical Assistant
MBBS	Bachelor of Medicine, Bachelor of Surgery
MC	Medical College
MCH-FP	Maternal and Child Health and Family Planning
MCPS	Member of the College of Physicians and Surgeons
MMCH	Mymensingh Medical College Hospital
MO	Medical Officer
MOHFW	Ministry of Health and Family Welfare
NGO	Non-governmental Organization
NIPORT	National Institute of Population Research and Training
NIPSOM	National Institute of Preventive and Social Medicine
NPV	Net Present Value
ODA	Overseas Development Assistance
PHC	Primary Health Care
PhD	Doctor of Philosophy

RCT	Regional Training Centre
SSMC	Sir Salihmullah Medical College
STD	Sexually Transmitted Disease
TBA	Traditional Birth Attendant
TFPO	Thana Family Planning officer
THC	Thana Health Complex
THFPO	Thana Health and Family Planning Officer
Tk	Taka
UNICEF	United Nations Children's Fund
USC	Union Sub-centre
WDR	World Development Report
WHO	World Health Organization

Executive Summary

The Government of Bangladesh has committed itself in its Health and Population Sector Programme (HPSP) to institutionalise a needs based approach to Human Resources Development (HRD). Expenditure on human resources by public and private health care providers represents the largest part of total health sector resources. Obtaining value for money on this expenditure is a high priority. Under the current financial pressures it is increasingly important to look carefully at the roles and contributions of different health care professionals and to adapt the skills of each to service needs so that needs are met in a more efficient way.

The HRD-project of the MOHFW has carried out valuable work on the present situation and developed a strategy for change of human resource development in Bangladesh (HRD 1997). The aim of this series of reports (HEU Research Papers Nos. 12, 13 and 14), of which this paper is a part, is to complement this work by analyses on the cost of staff supply, on economic incentives and on the organisation and financing of training.

The reports address key economic aspects of the HRD process by exploring ways of

- Providing staff in a way which ensures a better match between service needs and professional skills,
- Improving performance management through appropriate incentives to staff to provide services efficiently and to high quality standards.
- Improving efficiency in education, training and continuing staff development

The different components of the project are presented in three Research Papers.

Research Paper 12 focuses on the flow of funds in health care human resources under the current arrangements in the government health sector. Based on preliminary work by the HRD project we developed a cost model that provides expenditure estimates by professional categories, geographical areas, function and level of service, civil service class and mode of financing. The study also provides data for the modelling of the consequences of a unified service structure between DGFP and DGHS.

Research Paper 13 uses a framework of quantitative and qualitative research to study earnings profiles of medical doctors and to investigate the current structure of economic incentives for the medical profession. Emphasis is being placed on exploring strategies to improve medical staff supply in rural areas

Research Paper 14 evaluates the cost of education and training for health professionals in Bangladesh. Based on the assessment of annual equivalent cost the study models the economic consequences of staff attrition and explores options to improve efficiency of training. It addresses also the question of who should pay for education and training and evaluates options of cost recovery from private sector providers.

The following provides short summary of this Research Paper.

Objectives:

- To analyse the financial consequences of staff imbalances and exploring ways to ensure the adequate number and composition of staff
- to assess mismatches between tasks and skills
- to explore options to substitute existing skills mixes by more appropriate ones.

Design:

A database model linking staff information from the HRD database with information on staff cost.

Subjects:

Information on 71, 377 positions of government health workers under DGHS and 50,131 under DGFP.

Main outcome measures:

Estimates of staff costs by staff category, geographical area, level of care and function of service; nurse/doctor ratios and population /staff ratios

Main results:

Total spending on 121,541 staff positions under MOHFW is estimated Tk4.5 billion per year (equivalent to US$102.4 m). The largest part (36%) is being spent on PHC staff followed by support staff (25%), and 17% each on medical and nursing services. 20 % of the total staff expenditure flows into urban districts, which account for 14% of the population. Nearly one third of total expenditure in urban areas is dedicated to support staff. In THCs the largest part of expenditure is incurred for PHC staff (41%), followed by support staff (20%) medical staff (16), and nurses (13%). In district hospitals the major part of funding is dedicated to nursing (34%) followed by support staff (30%) and medical and dental services (28%). The overall nurse/doctor ratio is 0.96 is low, but it is higher in district hospitals (2.34) and in medical college hospitals (1.73). Population/staff ratios in PHC (Thana Health Complexes and Union-Subcentres) are 4600 for FWAs 5,900 for HAs. In PHC each FWV serves a population of 20,000, each nurse of 48,000 respectively and each doctor a population of 38, 000. Comparing staffing patterns between DGHS and DGFP shows that a unified service structure at PHC level will not automatically compensate for staffing imbalances between districts.

Conclusions:

The analysis reveals a number of imbalances in resource allocation related to level of care, geographical areas and staff functions. It is difficult for most people to gain access to medical and nursing services in rural areas. Overall nurse/doctor ratios are relatively low indicating that doctors perform tasks, which in other countries are normally done by other health professions. Substituting staff functions by more appropriate ones is being discussed as a way to achieve a better match between tasks and skills and to achieve further efficiency gains at service delivery level. The data also provide evidence that resource allocation should be based on a zero-based budgeting approach, rather than an incremental approach that accentuates historically grown imbalances. This approach would also provide an opportunity to reassess the input of Class III and IV support staff which is currently tying up an inappropriate amount of spending..

1. Introduction

The Government of Bangladesh has stressed in its Health and Population Sector Programme (HPSP) the implementation of a need-based Human Resource Development (HRD) strategy for the health and family planning personnel. The main goals of this policy refer to ensuring an adequate supply of staff to achieve sectoral objectives within the resource constraints of the health and family planning sector. The main areas of action which were identified are related to ensuring the required numbers and mix of staff the implementation of training for community needs and improvement of management and personnel administration.

Within the framework of HPSP government has initiated a process of gradual rationalisation of staffing patterns to optimally support the delivery of the Essential Service Package (ESP). This involves unifying the staff of the health and family planning wings of the Ministry of Health and Family Welfare (MOHFW) at Thana level and below and decentralisation of management responsibilities. However the appropriate staffing pattern for delivery of the ESP has not yet been identified.

In recognition of the need for a comprehensive approach to HRD the GOB has developed a master plan to address the identified problems and device appropriate strategies and actions in accordance with the national health policy. In preparation of this document the HRD project has performed a number of studies to investigate the current problems and issues. It is the aim of this report to complement this work by evaluating the costs of human resources and exploring options of a more efficient resource use.

2. Background

Expenditure on human resources is the largest part of public spending on health care and family planning services. Salaries, allowances and training make up 52% in the health sector and 63% in the population sector (HEU 1996a). Staff costs are the largest part of recurrent expenditure of the health system, which makes human resources a critical issue to address in the implementation of HPSP.

2.1. Pay-scale, allowances and promotion schemes:

The pay package consists of two components, salary and allowances. Currently, salaries are based on a national pay-scale with 20 grades, ranging from Tk900 to Tk10,000 per month. (HRD, 1997). In 1997, the GOB decided a pay scale rise, which will be phased in over 2 years and eventually lead to a 33% average rise of the basic pay. The allowances have remained unchanged and are as follows:

1. Housing allowance:

The pay package includes housing allowance according to a scaled scheme, which takes account of higher rental costs in major cities. Under this scheme, basic salaries are increased between 45 and 55 percent for the lower pay-scales and between 35 and 40 percent for the upper grades

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Civil servants' salaries and housing allowances		
Basic salary Tk per month	**Housing allowance in percent of the basic salary**	
	In major cities*	In other places
900-1200	55%	50%
1201-2500	50%, not less than Tk 660	45% not less than Tk 600.
2501-6000	45%, not less than Tk1250	40%, not less than Tk1125.
6000-10000	40%, not less than Tk2700	35%, not less than Tk2400
Source: Data International, *Major cities: Dhaka, Narayangnji, Chittagong, Rajshahi, Khulna		

2. *Medical allowance:*
Medical allowance is currently 150 Taka per month equally for all staff. A conversion of this allowance into a social health insurance contribution for Government employees is under consideration

3. *Pay rise and promotion:*
Promotion schemes entitle civil servant to the following forms of pay rise:

a) The starting basic salary is increased in annual increments varying between 80 and 200 Taka, depending on the position,
b) Posts below Tk2850 starting basic pay receive also promotion after efficiency bar in annual increments between 45 and 130 Taka.
c) In addition, most positions are entitled to 'time scale' promotion, which means that staff receives pay of the next upper scale after 8, 12 and 15 years of service. Only few posts are entitled to 'selection grade' promotion. These positions without scope of automatic career promotion are entitled only to 'efficiency bar' pay increases.

2.2. Number and mix of staff

The Human Resources Development (HRD) project has established a database with information on the current workforce under the Bangladesh Ministry of Health and Family Welfare (MOHFW). The database includes information on 83,000 sanctioned positions (71,400 occupied) under the Directorate General of Health Services (DGHS) and 53,000 and (50,200 occupied positions) under the Directorate of Family Planning services (DGFP). The data provide information on professional categories, level of care, pay-scale-grade, geographic distribution and source of funding. Recent work has analysed the data and identified a number of problems related to vacancies of sanctioned positions, the appropriate mix of staff, imbalances of gender and unequal distribution of personnel between rural and urban areas (HRD, 1996).

However the economic implications of these imbalances are not well understood as detailed information on costs by institution and professional category is not available. This study aims to close this gap by linking the available data with cost information. This approach allows cost estimation at a more detailed level than the currently available

budget information. It provides a tool to analyse flow of funds between functional service categories and levels of care and it informs on more efficient resource use and projections of future costs.

3. Conceptual framework

HRD has several core functions at strategic and operational level of health services, which are related to staff supply, performance management, and education and training (Martineau and Martinez 1997, HRD 1997). The overall goal of HRD is to ensure that staff is used in a cost-effective way providing an equitable distribution of health workers to the priority areas of the sector. In economic terms human resources can be considered as an investment, which like any other type of investment, needs to be determined by its expected returns. In case of health care this is ultimately the improvement of health status, which is attributable to input of staff.

However there are a variety of factors which may affect efficient use of human resources. First, the process of HRD is shaped by various interest groups, e.g. unions and professional organisations, which develop their own strategies to influence resource allocation decisions and which may interfere with planned strategies. Second imbalances between inputs (for example between staff and equipment and drugs) or between the required mix of staff and skills are common and lead to technical inefficiencies and waste of resources. Thirdly government HRD strategies may include social objectives other than health, eg. maintaining a unified civil service structure, or employment goals, which may interfere with health services performance. In this case, it needs to be assessed carefully whether these policies provide sufficient positive externalities to justify their support.

The economic approach to HRD means essentially that staff should be employed in a way that provides maximum health gains at minimum costs. It involves careful consideration of planning staffing levels, skills mix, education and training and design of incentive systems.

A central function of HRD is to provide a steady supply of staff within the agreed resource limitations. The economic constraints and the difficulties to attract staff to the priority areas of care have led to development of a number of new HRD strategies. These include changing staff profiles to better match skills with tasks, amalgamating functions from different staff categories and substituting qualified staff with less expensive but specifically trained staff. S*ubstitution* has been recognised as a key policy instrument in HRD in recent health care reforms (Saltman and Figueras 1997). It involves for example employment of nurse practitioners instead of trained doctors or specially trained medical assistants instead of anaesthetists. Several studies have shown that substitution is safe and offers economic advantages, if the staff have received adequate training (Warner M 1996).

From Bangladesh a number of innovative projects changing the staffing patterns at PHC level and substituting more qualified by less qualified but specially trained health workers

have been reported (Perry 1998). These involve for example increased utilisation of Community Health Workers (CHWs) for diagnosis and treatment of ARI, instead of or complementary to PHC personnel. In most cases the cost implications of transferring these models to publicly funded health services have not been evaluated. It is often unclear whether the new function is considered complementary or substitutive, or whether a new policy extends, maintains or reduces current spending levels. The opportunities of these strategies are related to better access to services and to efficiency gains through better staff utilisation. On the other hand these policies may face resistance from established professions and innovations that worked successfully in a small region or in a NGO context may fail when repeated on a larger scale.

4. Aims and Objectives of the study

This paper focuses mainly on the economic dimensions of staff supply by investigating the following aspects:

1. Analysis of the financial consequences of staff imbalances and exploring ways to ensure the adequate number and composition of staff
2. Analysis of the mismatches between tasks and skills and exploration of options to substitute existing skills mixes by more appropriate ones.

The information of the HRD database is linked with cost data to estimate staffing expenditure and assess the costs of different HRD strategies.

The objectives of this study are to:

- obtain estimates of current staff expenditure and model the consequences of changes in pay scale
- analyse distribution of funds between staffing categories, geographical areas and level of care,
- identify existing staffing patterns and related costs of health care institutions
- model staff costs of a unified delivery structure for health and family planning services

5. Methodology

Estimates of expenditure were obtained by attaching a variable with staff costs to the staff positions of the HRD database. These costs were determined as follows:

5.1. Assumptions of the model

To reflect the major components of the payment schemes described above, the following assumptions were made:

1. The arithmetic mean between minimum and maximum pay of each grade of the scale was taken as the basic salary,
2. Tk 150 were added for medical allowance
3. 45% of the basic salary were added for housing allowance in the middle ranges of the pay-scale, and for the salaries of the upper and lower grades of the scale. 35% and 55% respectively.

5.2. Estimation of staff expenditure

These figures were linked with the database and used for calculation of average staff expenditure of health and family planning services. Monthly payments were extrapolated to one year where appropriate. Aggregate expenditure was calculated as a product of the number occupied (or sanctioned) positions times the average pay per position. This cost information was further analysed by function of staff, level of care, civil service class and type of facility and other categories to analyse flow of funds in health care human resources.

5.3. Indicators of structural quality:

Indicators of structural quality such as nurse doctor ratios and staff/bed ratios were calculated for different levels of care and compared with data from the literature. The average population/staff ratios were calculated both separately for DGFP and DGHS and for a joint service delivery structure. To analyse the variation of staff density between districts, the geographical divisions with the largest difference in population/staff ratios were identified and compared by use of independent sample t-tests (SPSS).

6. Results

6.1. Pay-scale and pay package :

The estimates of the pay packages, consisting of basic pay plus allowances, range between Tk2,033 and Tk13,650 for the old pay scale and between Tk3,173 and Tk20,400 for the new pay scale, which has been phased in since 1997 (Table 1).

Table 1: Civil service pay-scale, average basic salary, housing allowance (%) and total pay packages in Tk/month

Payscale	Average basic salary	Housing allowance (%)	Pay costs incl. allowances	
			old	new
10000	10000	35	13650	20400
8600-9500	9050	35	12368	18510
7800-9000	8400	40	11910	17790
7100-8700	7900	40	11210	16810
6300-8050	7175	45	10554	15810
4800-7250	6025	45	8886	13229
4100-6500	5300	45	7835	11678
3200-5440	4320	45	6414	9546
2850-5155	4003	45	5954	8879
2300-4480	3390	45	5066	7418
1725-3725	2725	45	4101	5990
1550-3405	2478	45	3743	5591
1475-3150	2313	45	3504	5214
1375-2870	2123	45	3228	4801
1300-2615	1958	45	2989	4424
1200-2335	1768	45	2714	4123
1125-2170	1648	50	2622	3938
1050-1915	1483	50	2375	3548
0975-1750	1363	55	2263	3448
0900-1530	1215	55	2033	3173

6.2. Salaries by professional categories

Table 2 presents the professional categories and average/range of payments in Tk. per month and US$ per year. In absolute terms, payments to individual members of staff may be higher, as the model does not reflect time scale promotion.

The staff costs ratio of doctors and nurses and doctors and health assistants is 1:0.53:0.35, suggesting that average salaries for doctors are approximately twice that of nurses and three times that of public health personnel services, differences are less prominent. Under DGFP doctors earn 1.95 the salary of nurses and 2.6 times the salary of FWAs.

The differences in career structure and skills mix result in higher average pay levels for doctors and nurses, under DGHS as compared to the corresponding staff categories under DGFP. Payment differences are less salient between PHC personnel employed by the two directorates.

Table 2: Average and range of salaries inclusive allowances

Position	*Taka per month*			*US $ per year*
	Average	*Minimum*	*Maximum*	*Average*
DGHS				
Medical Doctor	7,546	5,070	12,370	2,058
Dentist/Dental Surgeon	6,410	6,410	6,410	1,748
Non-Medics	6,392	4,100	10,550	1,743
Class-I Support Personnel	6,187	5,950	8,887	1,687
Pharmacist	4,854	2,990	6,410	1,324
Class-II Support Personnel	4,852	3,740	5,070	1,323
Medical Assistant	4,099	3,740	4,100	1,118
Sanitary Inspector	4,086	2,710	4,100	1,114
Nurse/Lady Health Visitor	3,966	2,710	11,210	1,082
Technician	3,841	2,260	5,950	1,048
Health Inspector	3,230	3,230	3,230	881
Class-III Support Personnel	3,086	2,260	5,070	842
Assistant Health Inspector	2,990	2,990	2,990	815
Health Asstt (Ha)	2,710	2,710	2,710	739
Class-IV Support Personnel	2,093	2,030	2,620	571
DGFP				
Doctor	6785	5950	8887	1850
FPI	2990	2990	2990	815
FWA	2380	2380	2380	649
FWV/Midwife/Nurse	3089	2260	4100	842
Instructor/Trainer	5827	4100	10550	1589
Medical Assistant	4100	4100	4100	1118
Pharmacist	4100	4100	4100	1118
Programme Manager	7864	5070	11910	2145
Sr. FWV	5070	5070	5070	1383
Support Staff (class I)	5950	5950	5950	1623
Support Staff (Class II)	5273	5070	5950	1438
Support Staff (Class III)	3154	2710	3230	860
Support Staff (Class IV)	2038	2030	3230	556

6.3. Pay-scale range as an indicator of career structure

The range of pay-scale grades varies between professions and indicates scope for career opportunities. Lack of a multi-level career structure has been identified as a general problem of HRD in developing countries (Martineau and Martinez 1997) and it can also

be observed in Bangladesh health services. Though a multi-level career structure is provided for doctors and nurses, only few members of staff reach higher positions, and promotion opportunities are unequally distributed between professional categories. Payment for both professions is organised along 9 different pay-scale grades. Nine percent of the medical doctors were found in the 5 highest pay-scale grades, whereas only 0.2% of the nurses had achieved the 5 highest pay-scale grades available to them. The large majority of the nurses (86%) are grouped in two pay categories, indicating a poor opportunity for professional development. The career structure for other health cadres, is even more restricted: for example, most technicians occupy only one pay scale grade, leaving these staff with no scope for career progression.

Similar discrepancies emerge when career opportunities are assessed by level of care. The academic career structure for doctors in teaching hospitals is highly differentiated stretching across 7 pay categories, whereas doctors in primary care occupy only three payment levels. Most of them are Medical Officers who are grouped in the lowest pay category. This underpins findings from our study on economic incentives for medical staff, which showed that the absence of career opportunities in primary care facilities, including continuing medical education, academic work and specialisation, is a major impediment of attracting doctors to rural areas (HEU 1998).

6.4. Total expenditure on health care human resources and distribution of funds between staff categories.

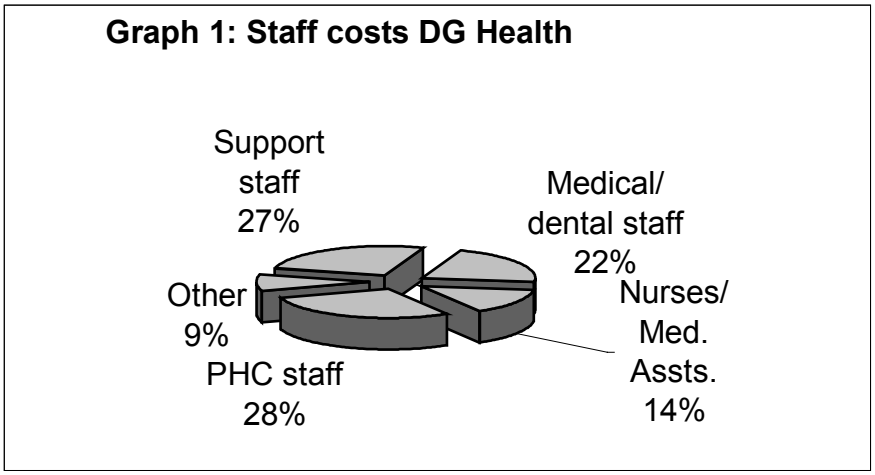
The total spending on 121,541 staff positions, under DGHS and DGFP, is estimated to be Tk4.5 billion per year (equivalent to US$102.4 m). This estimate is based on occupied positions and the old pay-scale.

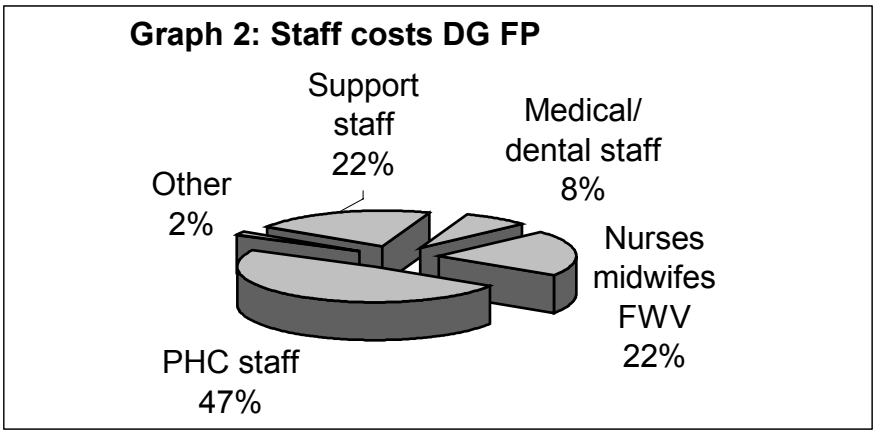
The percentage distribution of expenditure across professional categories is shown in Table 3. The largest part (36%) is spent on PHC staff, who make up 42% of the total workforce. This is followed by expenditure for support staff (25% of the expenditure and 32% of the workforce). In relation to support staff, expenditure spending on nursing is relatively low and accounts for only 17 % of the total expenditure.

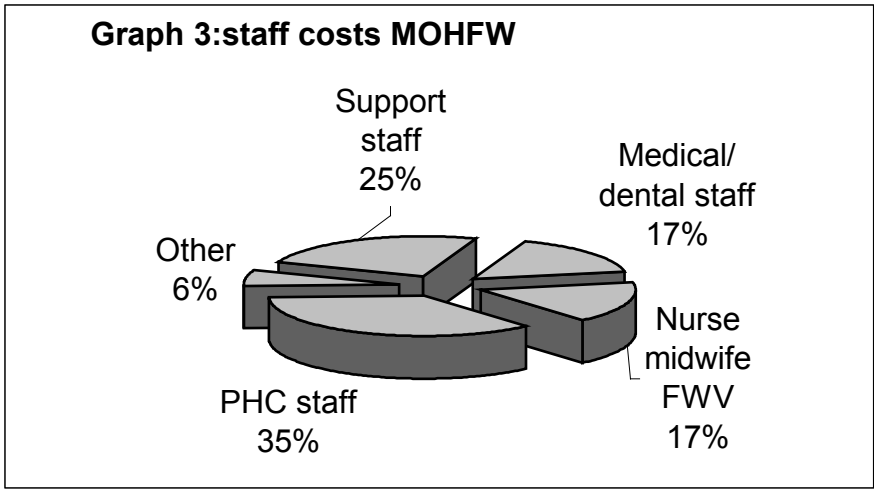
Table 3: Percentage distribution of staff numbers and expenditure by professional categories

	DG Health		DG FP		Total	
	N	Tk	N	Tk	N	Tk
Medical/dental	10%	22%	3%	8%	7%	17%
Nurse/midwife/FWV	12%	14%	16%	21%	14%	17%
PHC staff	34%	29%	54%	48%	42%	36%
Other	8%	9%	1%	2%	5%	6%
Support staff	37%	27%	25%	22%	32%	25%

Diagram 1-3 : Staff costs of DGHS, DGFP and consolidated costs







If staff costs under DG Health are considered separately (Graph1), this imbalance becomes even more pronounced. Support personnel make up the largest group of staff (37%) accounting for 27% of the expenditure. The second largest staff group is PHC personnel (health assistants, health inspectors and assistant health inspectors) which is related to 29% of spending. Only 14% of the total expenditure is related to nurses and related professions who occupy 12% of the positions.

The staff composition of the family planning services is different to that under DG Health as a much larger proportion of staff are PHC personnel (Graph 2). This group consists mainly of FWAs and family planning inspectors, which account for 48% of expenditure. Again, the second largest group, in terms of expenditure, is support staff, followed by nurses (including midwifes and Family Welfare Visitors), who make up 22 % and 21 % of total expenditure respectively.

6.5. Distribution of funds between rural and urban areas:

Costs estimates were broken down into rural and urban districts and analysed by function of service and level of care. Urban regions include the Dhaka, Chittagong, Rajshahi and Khulna districts with a total of 15.9 million inhabitants in 1991. All other districts were defined as rural with a population of 93.9 million (population of Bangladesh in 1991:109.9 million).

Twenty percent of the total staff expenditure flows into urban districts, which account for 14% of the population. This is due to the concentration of tertiary care facilities with a more expensive staff mix in urban areas.

6.6. Spending by function of staff

Table 4 presents the total costs of health care human resources disaggregated by function and geographical area. The cost estimates are based on occupied positions, applying the new pay scale. Overall, 71% of the spending on human resources under the MOHFW is related to health service delivery, 22% to support personnel, 4 % to management and 4 % to teaching, training and research. The service component is more pronounced in the FP workforce with the majority of field staff being employed in rural areas.

When expenditure is stratified by geographical regions, nearly one third of total expenditure in urban areas is dedicated to support staff. This pattern can also be observed when health and family planning services are analysed separately: Most support staff of both FP and health services are employed in urban districts. This agglomeration of support staff in urban areas and in particular in tertiary care facilities may be due to factors not related to service needs. HEU (1996b) has investigated aspects of the involvement of support staff in collection of unofficial user fees. The prospect of such additional earnings may provide an incentive to attract support staff to urban regions and particularly to tertiary care facilities. In contrast, in rural areas, the major part of expenditure is dedicated to service delivery (72%), with only 20% being spent on support services

Table 4:Expenditure on health care human resource by function and geographical area (occupied positions, new payscale)

DG Health						
	Urban		Rural		Subtotal	
Function	N	Tk/m	N	Tk/m	N	Tk/m
ADMIN./MANAGMENT/ PLANNING	308	3,746,168	719	8,105,227	1,027	11,851,395
SERVICE DELIVERY	6,390	39,138,229	36,376	192,674,852	42,766	231,813,081
SUPPORT PERSONNEL/OTHERS	7,876	28,260,933	18,261	64,756,598	26,137	93,017,531
TEACHING/TRAINING/ RESEARCH	983	12,584,673	464	5,493,722	1,447	18,078,395
subtotal	*15,557*	*83,730,003*	*55,820*	*271,030,399*	*71,377*	*354,760,402*
DG Family Planning						
	Urban		Rural		Subtotal	
Function	N	Tk/m	N	Tk/m	N	Tk/m
ADMIN./MANAGMENT/ PLANNING	141	1,678,307	726	6,446,147	867	8124454
SERVICE DELIVERY	4,165	17,330,570	36,770	149,932,908	40,935	167263478
SUPPORT PERSONNEL/OTHERS	1,750	7,307,242	6,343	23,628,661	8,093	30935903
TEACHING/TRAINING/ RESEARCH	69	604,524	167	1,287,060	236	1891584
subtotal	*6,125*	*26,920,643*	*44,006*	*181,294,776*	*50,131*	*208,215,419*
Consolidated funds MOHFW						
	Urban		Rural		Total	
Function	N	Tk/m	N	Tk/m	N	Tk/m
ADMIN./MANAGMENT/ PLANNING	449	5,424,475	1,445	14,551,374	1,894	19,975,849
SERVICE DELIVERY	10,555	56,468,799	73,146	342,607,760	83,701	399,076,559
SUPPORT PERSONNEL/OTHERS	9,626	35,568,175	24,604	88,385,259	34,230	123,953,434
TEACHING/TRAINING/ RESEARCH	1,052	13,189,197	631	6,780,782	1,683	19,969,979
total	*21,682*	*110,650,646*	*99,826*	*452,325,175*	*121,508*	*562,975,821*

Percent distribution of funds by function									
	DGHS			DGFP			MOHFW		
Function	*Urban*	*Rural*	*subtotal*	*Urban*	*Rural*	*subtotal*	*Urban*	*Rural*	*Total*
ADMIN./MANAGMENT/ PLANNING	4%	3%	3%	6%	4%	4%	5%	3%	4%
SERVICE DELIVERY	47%	71%	65%	64%	83%	80%	51%	76%	71%
SUPPORT PERSONNEL/OTHERS	34%	24%	26%	27%	13%	15%	32%	20%	22%
TEACHING/TRAINING/RESEARCH	15%	2%	5%	2%	1%	1%	12%	1%	4%
	100%	100%	100%	100%	100%	100%	100%	100%	100%

6.7. Spending per capita of staff

To further analyse the cost differences between rural and urban settings, cost per capita of staff were calculated for the different functional categories. As Table 5 demonstrates, the highest costs per member of staff are incurred in training, teaching and research, followed by administration and management. Average salaries are considerably lower in rural health services ($881/y in rural vs. $977 per year in urban districts).

Table 5: average costs per capita of staff by area and function

	rural	**urban**	
Function	*US$/year*	*US$/year*	*Difference*
ADMIN./MANAGMENT	2086	2273	8%
SERVICE DELIVERY	968	1127	14%
SUPPORT PERSONNEL/OTHERS	630	635	1%
TEACHING/TRAINING/RESEARCH	2155	2340	8%
Total	881	977	10%

In urban districts, the staff costs of service delivery are 14% higher than in rural areas, and costs of administration/management and training/teaching lay 8% above the rural average. The real cost differences might be higher, since the model does not take account of the variation of housing allowances between major cities and the rest of the country.

6.8. Staff costs by level of care

The HRD database has categorised levels of care as follows: Primary care encompasses health and family planning services delivered at the Thana level and below, secondary care includes district hospitals and tertiary care facilities include mainly medical college hospitals and postgraduate training institutions (HRD 1996).

As shown in Table 6, 75% of the overall spending on human resources under the MOHFW is related to primary care. This high proportion is a result of the large FP component, as 95% of human resources under DGFP are allocated to primary care. The staff of FP services consists mainly of FWAs and comprises a smaller range of professional categories than health services. As a result average staff costs at PHC level is 13 % lower in FP services than under DGHS.

The staffing pattern and the relative distribution of funds look different when staff under DGHS is considered alone. 63% of funds for human resources are directed to the primary care level, 15% to secondary care and 22% to tertiary care. These data show an imbalance of funding between secondary and tertiary care, which may explain why many patients tend to by pass the first referral level and seek care in tertiary care facilities.

Table 6: Expenditure on health care human resource by level of care and geographical area (occupied positions, new payscale)

DG Health						
	Urban		Rural		Subtotal	
level	N	Tk/m	N	Tk/m	N	Tk/m
n.a.			62	296,087	62	296,087
Tertiary	9,819	54,894,217	4,428	23,230,774	14,247	78,124,991
Secondary	1,641	8,680,166	8,150	42,857,549	9,791	51,537,715
Primary	4,097	20,155,620	43,180	204,645,989	47,277	224,801,609
subtotal	*15,557*	*83,730,003*	*55,820*	*271,030,399*	*71,377*	*354,760,402*
DG Family Planning						
	Urban		Rural		Subtotal	
level	N	Tk/m	N	Tk/m	N	Tk/m
n.a.						
Tertiary	1,381	7,229,508	0		1,381	7229508
Secondary	90	412,916	448	2,039,065	538	2451981
Primary	4,654	19,278,219	43,558	179,255,711	48,212	198,533,930
subtotal	*6,125*	*26,920,643*	*44,006*	*181,294,776*	*50,131*	*208,215,419*
Consolidated funds MOHFW						
	Urban		Rural		Total	
Level	N	Tk/m	N	Tk/m	N	Tk/m
n.a.			62		62	296,087
Tertiary	11,200	62,123,725	4,428	23,230,774	15,628	85,354,499
Secondary	1,731	9,093,082	8,598	44,896,614	10,329	53,989,696
Primary	8,751	39,433,839	86,738	383,901,700	95,489	423,335,539
total	*21,682*	*110,650,646*	*99,826*	*452,325,175*	*121,508*	*562,975,821*

Percent distribution of funds by level of care									
	DG Health			DG FP			Consolidated MHOFW		
level	*Urban*	*Rural*	*subtotal*	*Urban*	*Rural*	*subtotal*	*Urban*	*Rural*	*Total*
n.a.		0%	0%	0%		0%	0%	0%	0%
Tertiary	66%	9%	22%	27%	0%	3%	56%	5%	15%
Secondary	10%	16%	15%	2%	1%	1%	8%	10%	10%
Primary	24%	76%	63%	72%	99%	95%	36%	85%	75%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

The distribution of funds shows also that tertiary care is based mainly in or near the large conurbations of the country. In urban districts 66% of staff expenditure is spent in the tertiary sector, and only 10 % in the secondary sector, indicating a concentration of tertiary care facilities in the large cities. In rural areas 75% of the staff costs are incurred in primary care and only 16 and 9% are spend on secondary and tertiary care respectively.

6.9. Spending by civil service class

Staff expenditure by civil service class is shown in Table 7. Overall the largest share of expenditure is incurred for salaries of Class III employees. DGFP has a higher number of Class IV civil servants and relatively low expenditure on Class I and II employees.

Table 7: Expenditure on health care human resource by civil service class and geographical area (occupied positions, new payscale)

DG Health						
	Urban		Rural		Subtotal	
Civil Service Class	N	Tk/m	N	Tk/m	N	Tk/m
I	2,469	28,567,566	4,682	50,464,281	7,151	79,031,847
II	414	2,702,817	2,122	13,030,811	2,536	15,733,628
III	6,727	33,443,934	35,243	163,481,968	41,970	196,925,902
IV	5,947	19,015,686	13,773	44,053,339	19,720	63,069,025
subtotal	*15,557*	*83,730,003*	*55,820*	*271,030,399*	*71,377*	*354,760,402*
DG Family Planning						
	Urban		Rural		Subtotal	
Civil Service Class	N	Tk/m	N	Tk/m	N	Tk/m
I	338	3,628,612	1,265	11,960,101	1,603	15588713
II	146	1,043,522	771	5,605,038	917	6648560
III	2,101	10,188,589	13,408	65,306,011	15,509	75494600
IV	3,540	12,059,920	28,562	98,423,626	32,102	110483546
subtotal	*6,125*	*26,920,643*	*44,006*	*181,294,776*	*50,131*	*208,215,419*
Consolidated funds MOHFW						
	Urban		Rural		Total	
Civil Service Class	N	Tk/m	N	Tk/m	N	Tk/m
I	2,807	32,196,178	5,947	62,424,382	8,754	94,620,560
II	560	3,746,339	2,893	18,635,849	3,453	22,382,188
III	8,828	43,632,523	48,651	228,787,979	57,479	272,420,502
IV	9,487	31,075,606	42,335	142,476,965	51,822	173,552,571
Total	*21,682*	*110,650,646*	*99,826*	*452,325,175*	*121,508*	*562,975,821*

6.10. Financing through revenue or development budget

Table 8 demonstrates the expenditure on human resources by mode of finance. While most staff under DGHS is financed through the revenue budget, FP services are mainly paid from the development budget. Considering the efficiency of this expenditure it needs to be taken into account that the service delivery structure is still separated and that staff is not comprehensively trained for the delivery of all interventions of an essential package of care as envisaged by HPSP. It has been argued that financing through the development budget, leaves FP staff in a less privileged position with greater uncertainty and less social benefits than their counterparts under DG health (Khuda B et al 1997). Government has itself committed to transfer annually 10% of staff from the development to the revenue budget.

Table 8: Expenditure on health care human resource by mode of finance and geographical area (occupied positions, new payscale)

DG Health						
	Urban		Rural		Subtotal	
Finance	N	Tk/m	N	Tk/m	N	Tk/m
DEVELOPMENT BUDGET	276	1,654,942	848	4,137,185	1,124	5,792,127
REVENUE BUDGET	15,281	82,075,061	54,972	266,893,214	70,253	348,968,275
subtotal	*15,557*	*83,730,003*	*55,820*	*271,030,399*	*71,377*	*354,760,402*
DG Family Planning						
	Urban		Rural		Subtotal	
Finance	N	Tk/m	N	Tk/m	N	Tk/m
DEVELOPMENT BUDGET	5,041	21,221,521	38,288	152,122,466	43,329	173,343,987
REVENUE BUDGET	1,084	5,699,122	5,718	29,172,310	6,802	34,871,432
subtotal	*6,125*	*26,920,643*	*44,006*	*181,294,776*	*50,131*	*208,215,419*
Consolidated funds MOHFW						
	Urban		Rural		Total	
Finance	N	Tk/m	N	Tk/m	N	Tk/m
DEVELOPMENT BUDGET	5,317	22,876,463	39,136	156,259,651	44,453	179,136,114
REVENUE BUDGET	16,365	87,774,183	60,690	296,065,524	77,055	383,839,707
Total	*21,682*	*110,650,646*	*99,826*	*452,325,175*	*121,508*	*562,975,821*

6.11. Sensitivity analysis on total staff expenditure

Sensitivity analysis was carried out on a series of assumptions, which are presented in Table 9. The spending on existing staff at 1995 payment levels was taken as a baseline. Filling up all sanctioned positions would increase expenditure by 15%, extending the new pay scale to filled staff positions by 33%, filling all vacancies and implementing the new pay scale would rise spending by 49%. An annual take-over of 10% of the workforce from development to revenue budget would raise the revenue budget expenditure by 4.4%.

Table 9: Sensitivity analysis on total staff expenditure (baseline: occupied positions in 1995)

Asumption	***Factor of increase***
Staffing levels and pay-scale	
Filling of all positions sanctioned in 1995	1.15
Implementing the new pay-scale	1.33
Filling all sanctioned positions and implementing the new pay-scale	1.49
Transition from development to revenue budget	
Transfer of annually 10% of staff to revenue budget	1.044
2 % annual staff increase as compensation for population growth	
PHC staff increase	1.015
Secondary staff (District Hospitals)	1.002
Tertiary staff	1.003

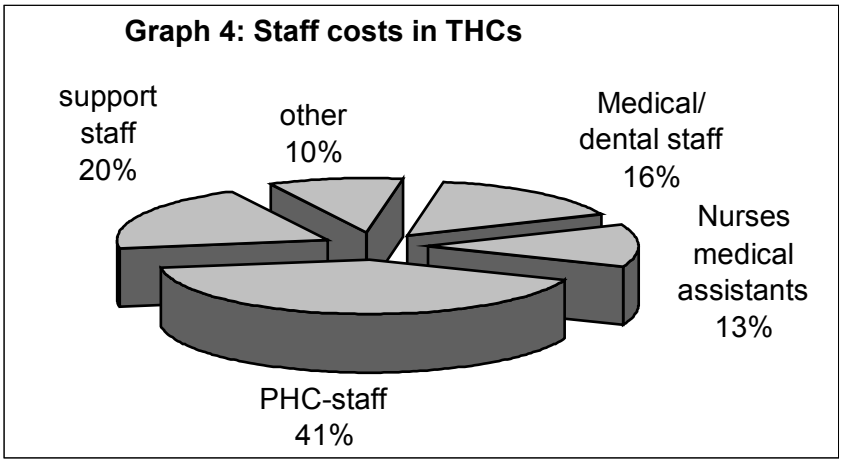
A staff increase to compensate for population growth would affect spending in different ways, depending on the staff mix at each level of care. An isolated growth of PHC staff of 2% would lead to a 1.5% increase of overall spending. The figures for isolated growth of secondary and tertiary level staff are 0.2 and 0.3 % respectively, reflecting the smaller numbers of staff as compared to PHC personnel.

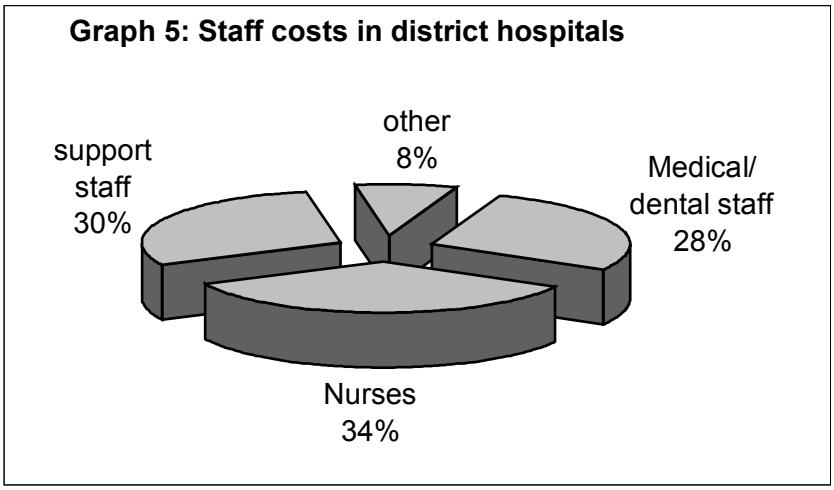
6.12. Staffing costs of health care facilities

1. Thana Health Complexes

The cost structure of human resources of THCs is shown in Graph 4. Staff expenditure makes up 74% of the total costs of a Thana health centre (UNICEF 1996). The largest part of expenditure is incurred for PHC staff (41%), followed by support staff (20%), medical staff (16%) and nurses (13%).

Diagram 4 and 5: Staff costs in THCs and district hospitals





The inability of the system to attract staff to rural areas and to fill vacant positions, despite staff availability on the labour market have been described as a major problems (HRD 1997).

The data show that tertiary care facilities appear to be more fully staffed than Thana Health Complexes and that the difference between sanctioned and occupied positions exceeds the level of normal staff fluctuation. The largest gap between sanctioned and occupied positions were found in rural areas. It is the aim under HPSP to keep the number of staff vacancies under 10% and MOHFW has recently increased efforts to employ additional staff. On basis of occupied positions average staff costs per THC were estimated to be US$75,500 in 1995. This expenditure varies across regions of the country. The highest costs per THC are incurred in Dhaka division (US$82,800 / THC) and the lowest in Sylhet division (US$71,400), reflecting the difficulties to attract staff to rural areas (Table 10). If all positions were filled, additional funds of $ 8 million would be required, with the highest funding needs in Rajshahi division (2.1 m US dollar) and the lowest in Barisal ($0.7 m).

Table 10: Staff costs of occupied and sanctioned positions of 460 Thana health complexes, by division (in US$ per year)

Position	BARISAL	CHITTAG.	DHAKA	KHULNA	RAJSHAHI	SYLHET	TOTAL
Number of THCs	37	87	119	60	122	35	460
Total staff costs	**2,728,000**	**7,018,000**	**9,857,000**	**4,344,000**	**8,936,000**	**2,500,000**	**35,384,000**
Costs/THC	73,700	80,700	82,800	72,400	73,200	71,400	75,700
Costs/THC, if all positions were filled:	91,400	101,300	98,500	85,100	90,800	93,500	
Gap to fill per Thana	17,700	20,700	15,700	12,800	17,600	22,200	
Gap to fill per division	655,000	1,799,000	1,865,000	766,000	2,142,000	775,000	8,002,000

The patterns of sanctioned positions vary also across divisions with the highest costs per THC in Chittagong division and the lowest in Khulna division. It is not known whether this reflects regional health care needs or historically grown funding policy. The Annex, Table A1 contains more detailed staff cost information on 6 THCs in the Faridpur district.

2. District Hospitals

The information on 56 district hospitals was used to estimate the composition of staff costs: As Graph 5 indicates, the major part of funding is dedicated to nursing (34%) followed by support staff (30%) and medical and dental services (28%).

6.13. Staff indicators –nurse doctor ratios, nurse bed ratios.

Despite the technical difficulties of international comparison of staffing indicators it appears that the overall nurse/doctor ratio in Bangladesh health services compares unfavourably with other countries. Earlier values reported were with 0.43 considerably lower than in other Asian countries, eg Thailand 6.94. (HRD1996). Though several types of staff as for example medical Assistants or FWVs have nursing tasks as part of their job description, it has been concluded that physicians take over tasks, which are elsewhere performed by nurses.

The overall nurse/doctor ratio of 0.96 for DGHS is highly influenced by the primary care level where nurses are less prevalent than in other levels of care. The nurse doctor ratio was found to be more favourable when hospitals were considered separately. Based on occupied positions we found a ratio of 2.34 for district hospitals (n=57) and of 1.73 for Medical College Hospitals (n=8). This is still below values reported for other developing countries. Staffing indicator form hospitals in Zimbabwe, Tanzania and Ghana showed nurse doctors ratios of 15 and higher, though an absolute lack of medical staff may explain these figures (Gilson et al 1997). A study on Thai hospitals reported nurse/doctor ratios of 5.0 for public hospitals and between 1.9 and 5.4 for private hospitals (Pannarunothai and Mills 1997).

The bed/nurse ratio we found in district hospitals was 3.14 and the bed doctor ratio 6.71. The figures from the Thai hospital sample are 0.9-3.1 for the bed/nurse ratio and 5.3-15 for the bed/doctors ratio, the higher values being found in public hospitals. This indicates that in district hospitals the nurses/bed ratio is within the range of regional comparison data. The low overall doctor/ nurse ratios are mainly due to low numbers of nurses in other sectors of care.

Apparently in Bangladesh hospitals the number of support staff is relatively high. We found 1.7 support staff per nurse in district hospitals and 2.7 in medical college hospitals, which make support staff the largest group among hospital personnel.

6.14. How will the population/staff ratio change in a unified service delivery structure?

Though a unified service structure will improve overall functioning of primary care it may not automatically compensate for undesirable trends in the workforce composition. In an earlier study, based on the HRD data, population/staff ratios have been reported to vary largely between the 64 districts of Bangladesh (HRD 1996). This included staff at all levels of care. We restricted the analysis to the PHC level, for which population/ staff ratios indicate more clearly equity of access to basic services and to prevent distortion of the results by tertiary services, which need not be equally distributed across districts.

For each district, population/staff ratios were calculated separately for the key professions of health and family planning services and for a unified service structure. The geographical variation of staff density was then analysed by divisions (Table 11). Overall staff densities between regions were not found to be significantly different in the

one way ANOVA test (p-values between 0.310 and 0.786). In particular FWA's and HA's are homogeneously distributed across districts, though the figures do not reach the target set by the MOHFW of 4000 population per staff.

Table 11: Population/staff ratios of PHC personnel under a joint service delivery structure for health and family planning services.

PHC staff						
	DGFP	*DGHS*	*MOHFW*	*DGFP*	*DGHS*	*MOHFW*
DIVISION (Districts)	*FWA*	*HA*	*unified*	*FPI*	*HI*	*unified*
RAJSHAHI (N=16)	4,593	6,196	2,623	24,295	96,221	11,772
KHULNA (N=10)	4,306	5,638	2,429	21,603	84,535	10,607
BARISAL (N=6)	4,433	4,857	2,279	25,817	77,024	10,617
DHAKA (N=17)	4,917	6,734	2,793	25,937	99,822	12,826
SYLHET (N=4)	4,564	5,422	2,453	24,554	100,197	11,013
CHITTAGONG (N=11)	4,458	5,018	2,319	23,236	69,577	9,945
BANGLADESH (N=64)	4,597	5,875	2,547	24,263	89,221	11,413
FWVs, nurses and doctors						
	DGFP	*DGHS*	*MOHFW*	*DGFP*	*DGHS*	*MOHFW*
DIVISION (Districts)	*FWV*	*NURSE*	*unified*	*Doctors FP*	*Doctors HS*	*unified*
RAJSHAHI (N=16)	20,026	42,405	12,740	126,004	35,059	27,128
KHULNA (N=10)	20,557	46,735	12,809	112,026	39,435	27,908
BARISAL (N=6)	19,086	39,227	12,174	144,939	43,751	32,888
DHAKA (N=17)	21,508	53,068	14,326	139,652	41,783	31,538
SYLHET (N=4)	18,393	64,292	13,249	121,183	31,675	24,971
CHITTAGONG (N=11)	18,123	48,767	12,215	148,860	34,701	27,814
BANGLADESH (N=64)	20,000	48,077	13,075	132,656	38,071	28,882

A different picture emerged, when divisions with the largest staffing differences were analysed separately. Depending on the distribution of staff, differences between regions may be mitigated or reinforced under a unified health and FP service structure. For example, significantly more health inspectors are employed in Chittagong than in Sylhet ($p=0.03$) but a unified service structure will mitigate this effect. The resulting populaton/ staff ratios for a unified profession of HI and FPIs were not found to be different between both divisions ($p=0.628$). On the other hand, the differences in population per nurse between districts of Barisal and Sylhet ($p=0.016$) will not be compensated for by a merger with FWVs. Differences in staffing densities will remain significant at the 5% level ($p=0.48$). This example shows that a merger of personnel cadres will not automatically compensate for existing imbalances between districts. These results underpin the importance of a needs based approach of identifying the staffing pattern for the EPS under a joined service structure rather than a merger of historically grown workforces which may lead to undesirable effects.

Table 12 compares the population/staff ratios between urban and rural districts. As expected, there is a highly significant difference in PHC staff density between rural and urban districts, which demonstrates that government services focus on rural areas rather than on conurbations, where people have access to larger range of services offered by the private sector.

Table 12: Comparison of population/staff ratios between urban and rural districts of Bangladesh. (p-values for the differences of the means)

		DGFP	DGHS	Unified	DGFP	DGHS	Unified
		FWA	HA	FWA/HA	FPI	HI	FPI/HI
RURAL	Mean	4,427	5,442	2,417	23,457	83,487	10,817
	Std. Deviation	614	1,201	401	5,364	23,233	2,045
URBAN	Mean	7,108	12,379	4,461	36,151	175,229	20,198
	Std. Deviation	2,782	8,481	2,211	18,137	139,990	13,528
	P Value	0.000	0.000	0.000	0.000	0.000	0.000
		DGFP	DGHS	Unified	DGFP	DGHS	Unified
		FWV	Nurse	FWV/Nurse	Doctors		
RURAL	Mean	19,546	46,596	12,732	130,768	37,260	28,322
	Std. Deviation	5,934	16,580	3,458	48,673	10,556	7,631
URBAN	Mean	26,693	70,293	18,129	160,494	50,229	37,129
	Std. Deviation	8,339	50,721	7,830	55,600	36,321	22,339
	P Value	0.026	0.023	0.008	0.245	0.059	0.061

6.15. Comparing staffing patterns internationally

As Table 11 shows, the most favourable staff provider ratio in PHC care (Thana Health Complexes and Union Sub-centres) are achieved by FWAs (4,600) and HAs (5,900). The average population served by FWVs and Nurses is 20,000 and 48,000, respectively. Each doctor, in primary health care, serves a population of 38,000. These figures underline that medical and nursing services are virtually inaccessible for most people in rural areas.

Comparing these staffing levels to other countries is difficult, as most studies have not been designed for international comparison. International comparison of staffing patterns needs to take account of the different organisation of health care delivery and the role the private sector plays in the countries concerned. As far as government services are concerned, Thailand has overall a higher densities of health care providers but population/staff ratios differ greatly between the capital and other provinces. Shortages are most prominent in the north eastern regions of the country, with 10,000 people per doctor. Howeve r, therates of 1,400 per nurse are better than rates for the allied PHC personnel in Bangladesh (2,500). (Mongkolsmai 1997).

The population served by government doctors in India varies largely between states ranging between 900 and 61,000 per doctor. Average values are between 2,000 and 11,000. Indicating a higher overall physician density than in Bangladesh, where one doctor serves 16,000 people on average (Bhat R 1997, HRD 1996). Indonesia has a reportedly high density of PHC staff (including CHWs) of approximately 166 per staff.

The population served by doctors and nurses is 6,000 and 2,000 respectively (Brotowastiko et al 1988).

Nepal and Vietnam have a provider density similar to Bangladesh, though figures are likely to have improved recently. A study from 1990, reported that health centres in Vietnam serve a population of 20,000 with one administrator, one doctor, two midwifes and community health workers (Birt 1990). In Nepal, health posts are the nucleus of the PHC programme, with 1 Health Assistant, 2 Community Health Workers, 2 Assistant/ Auxiliary Nurses/ midwives, 1 Peon and 2-6 village health workers serving communities between 10,000 and 30,000 people (Bentley 1995).

7. Discussion

7.1. Validation and robustness of the cost estimates

As the cost estimates presented in this study are based on a database model the analyses may be biased through mis-reporting in the process of data collection. To validate the model, we compared the model to information on staffing patterns and costs from different sources (Gruen R 1997). For example, a comparison with staff costs derived from account information (MOHFW 1996) showed a difference of 2%, which appears to be in a satisfactory range of consistency. It is a strength of the model that it provides a more detailed information on a range of functional categories which is not available from the government accounts. Staffing patterns, derived from the HRD database, were also compared with available information from Thana health complexes (UNICEF 1995) and district hospitals (HEU 1996). A congruence between the database information and both sources was observed.

One of the limitations of the model is that it does not take account of time scale promotion. Senior staff may have achieved higher payment levels, than being indicated by the initial payscale of the post. Vice versa, the model could over estimate the salaries of junior staff, as calculations are based on the average of each pay-scale grade. Depending on the staff mix this may lead to under or over estimation of costs at facility level. The model is more robust when larger entities are analysed.

7.2. Imbalances in allocation of human resources.

Analysis of the flow of funds in health care human resources has revealed a number of imbalances related to level of care, geographical areas and staff functions. Generally these imbalances appear to be more prominent in the health services workforce than in FP services as DGHS expenditure on human resources shows a bias towards urban areas, tertiary as opposed to secondary care and support staff. On the other hand most staff of the DGFP is financed from the development budget which has been see as cause of lower morale and job satisfaction (ICDDR,B 1997)

The model has also estimated the consequences of the various pressures which are exerted on the financing of human resources, for example, through shifting funds from

the development budget to the revenue budget, filling vacant positions, and implementing a general pay-rise for government health workers. As the results of the sensitivity analysis show, these challenges, together with the implementation of the ESP will put a considerable strain on the financial capacity during the implementation of HPSP. Coping with these pressures will require HRD strategies, which put emphasis on a more efficient use of resources, including substituting staff categories, flattening of hierarchies, rationalising service delivery and increasing productivity.

Developing a unified service structure at primary health care level has been identified as a high priority under HPSP. The data presented in this study underpin the necessity of a needs based approach to resource allocation. A pure merger of the workforces under DGHS and DGFP will not automatically change undesirable patterns of staff allocation, though it is likely to improve overall performance and strengthen the PHC function of the services. The data strongly support that staff allocations should be based on a zero based budgeting approach, rather than an incremental approach, which accentuates the historically grown imbalances. The identification of the appropriate staffing pattern for delivery of the ESP should use the interventions as a starting point and then identify the required skills and training needs, and the appropriate numbers of staff to perform the tasks.

This approach would also provide an opportunity to reassess the roles of Class III and IV support staff, who are currently tying up an inappropriate amount of spending. Further research is needed to identify the reasons for this spending behaviour and evaluate options for a more efficient use of these resources. International experience suggests that there are several possible ways of focusing support services on essential functions, achieving efficiency gains and redirecting resources to the priority areas of care. For example, contracting out of non-clinical services is increasingly used in developing countries and covers a wide range of activities. In Bangladesh BIRDEM, the National Diabetes Association, is currently gathering experience with external provision of support services in its new facilities (Azad Khan AK, 1997).

7.3. Changing staffing patterns: lessons from innovative experiments and international experience.

International comparison of staffing patterns has its pitfalls due to the differences in organisation of health care delivery, differences in curricula and in job descriptions. Although a number of papers describe the staffing patterns of primary care facilities in developing countries, none of the studies gave account of the costs involved and cost distribution across staff categories. In addition, most papers focus on health care providers without mentioning numbers of non-clinical staff. As the Bangladesh example shows, this category of staff may account for a substantial part of total expenditure. The low nurse-doctor ratios observed in Bangladesh are not uncommon and similar ratios may be found in other countries, including Southern European countries and Turkey (Saltman and Figueras 1997).

Despite the fact that doctors do tasks that are normally performed by nurses, models of substitution which have worked in other countries may prove difficult to implement in the cultural and social context of Bangladesh. In many South Asian countries there is an ongoing debate on the extent to which traditional expectations about women conflict with their role as health workers (Justice 1984, MOHFW 1997). While FWAs and female community health workers have widely been accepted by the population, the professional role of nurses in health services, in particular the collaboration between doctors and nurses needs further strengthening.

In Bangladesh a number of innovative experiments have tried to complement or replace functions of trained FWAs/Has by community health workers. This is of critical importance because spending on PHC is the single largest expenditure in health care human resources. Depending on the arrangements, these project have been reported to increase access to basic health services at costs which are lower than the extension of similar services through the government system. For example volunteers of the local initiatives programme (LIP) receive reimbursement of travel costs (avg. Tk 30 per month) only. Shastho Shebikas, the community health workers under the BRAC comminity based health and population programme, who have received a 6 week training, generate a monthly income of Tk 200 on a fee for service basis (Perry 1998). However, these experiments which were successful in the NGO setting need careful assessment before they can be repeated at a larger scale in government health services.

This study provides information on the recurrent costs of staffing and the implications of changing staffing patterns or substituting staff functions. However, any substitutive policy needs to take account of all conditions that make shifts in staffing patterns acceptable and safe. This includes also the cost of additional training and additional costs of drugs and equipment associated with these changes. Further issues to be addressed are the levels productivity of health care workers and the use of different incentives to improve productivity (HEU 1998). The next logical step is for MOHFW to develop an ideal staffing pattern for HPSP and to estimate the cost implications and potential cost savings of such a pattern.

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Annex

Table A1: Staff costs of occupied and sanctioned positions of 460 Thana health complexes, by division (Tk/m)

Position	BARISAL	CHITTAG.	DHAKA	KHULNA	RAJSHAHI	SYLHET	TOTAL
ASSISTANT HEALTH INSPECTOR	193,263	538,200	684,166	299,272	594,466	190,816	2,500,184
CLASS-II SUPPORT PERSONNEL	1,383	0	3,158	7,140		1,020	12,701
CLASS-III SUPPORT PERSONNEL	185,749	428,842	602,471	283,415	628,552	152,853	2,281,882
CLASS-IV SUPPORT PERSONNEL	390,409	910,895	1,241,708	615,886	1,236,428	357,243	4,752,570
DENTIST/DENTAL SURGEON	3,496	38,460	104,891	20,978	29,719	13,985	211,530
HEALTH ASSTT (HA)	948,254	2,319,267	3,167,744	1,349,580	2,644,467	829,260	11,258,572
HEALTH INSPECTOR	72,235	197,324	264,273	107,471	222,870	51,974	916,145
MEDICAL ASSISTANT	134,182	404,782	527,782	222,518	530,018	125,236	1,944,518
MEDICAL DOCTOR	325,193	1,024,823	1,535,092	652,212	1,380,918	424,603	5,342,841
NON-MEDICS	0	2,765	3,521	2,765	8,425		17,476
NURSE/LADY HEALTH VISITOR	207,341	489,575	663,341	337,426	668,602	119,959	2,486,245
PHARMACIST	14,536		5,591	24,600	38,018		82,745
SANITARY INSPECTOR	34,664	68,948	104,730	50,318	83,864	29,073	371,596
TECHNICIAN	217,113	594,368	949,121	370,653	869,978	204,093	3,205,325
Total	**2,727,817**	**7,018,250**	**9,857,588**	**4,344,235**	**8,936,326**	**2,500,114**	**35,384,331**
Number of Thana Health Complexes	*37*	*87*	*119*	*60*	*122*	*35*	*460*
Cost/THC occupied pos.	*73,725*	*80,670*	*82,837*	*72,404*	*73,249*	*71,432*	*75,719*
Cost/THC sanctioned pos.	*91,419*	*101,347*	*98,507*	*85,165*	*90,810*	*93,586*	*560,835*
Gap to fill per Thana	*17,694*	*20,678*	*15,671*	*12,761*	*17,561*	*22,154*	
Gap to fill per division	*654,686*	*1,798,966*	*1,864,797*	*765,660*	*2,142,482*	*775,402*	*8,001,993*