

First Draft



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**Demographic Implications for Health
Human Resources for Bangladesh.**

By

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1.0 Introduction:

Health is an important labour intensive sector of the economy. Since people like to remain healthy and live a long life, there is always a demand for health services. It is also in the citizen's charter of rights that the state should provide to them all types of health services with quality care. The state also feels that it is its essential obligation to its citizens to do so; and hence, the government as egalitarian, on behalf of the State, employs a large fleet of workforce of different varieties such as doctors, nurses, dentists, field workers and so on to provide services to its citizens. In making decision for employing 'X' number of workforce for services, state needs to keep in view 'Y' number of population. Regardless of resource constraints, population factor has always been central in making decision about the provision of services and service- providers. Like any country, Bangladesh's efforts to produce workforce in Health Sector has been unabated. In 2002, there were 28537 doctors, 17056 nurses and 1386 dental surgeons for an estimated population of 132.4 million which yielded doctor-population ratio of 1:4600; doctor-nurse ratio of 1:.6 and dental Surgeon-Population 1:98500 respectively. There are other categories of providers, such as medical technologists of different varieties as well as vast number of field workers like Family Welfare Assistant (FWA, Health Assistant (HA)etc. The FWA -population density is currently estimated to be 1:5651. Apparently, the number of providers looks staggering. When you consider the large size of Bangladesh's population, one can immediately see some poverty syndromes in the human capital. As population is growing, adding almost 2.2 million people annually, and this trend is most likely to continue in the next two decades aggravating further providers-population density. The demographic momentum will accentuate Bangladesh's population so much that it is likely to increase anywhere between 172 to 174 million by the year 2020. Against this backdrop, three central questions raised in this paper are:

(1) If the current trend in health human resources development (HRD) continues, would there be any significant improvement in providers-population density?

(!1) To what extent, workforce in different categories will be required to reduce the current imbalance in provider-population density? and,

(111)What should be the appropriate institutional mechanism to maximize outputs of the human resources?

In seeking answers to above questions, this investigator has utilized his projected population estimates (CHPD, IUB: Mabud, 2004) and the data on five distinct categories of providers such as, (1) doctors (2) nurses (3) dental surgeons (4) public health professionals/managers and (5) female field workers (eg. Female Welfare Assistants (FWAs)). Data on the number of doctors and dental surgeons were collected from the Bangladesh Medical and Dental Council (BMDC); and the data on the nurses were collected from the Bangladesh Nursing Council; Data on pharmacists were collected from Bangladesh Pharmacy Council; while data on FWAs were collected from the Directorate of Family Planning. Data on other workforce have been obtained from the HRD-Unit of the Ministry of Health and Family Welfare Government of Bangladesh (MOHFWs: HRD- Data Sheet, 2003).

This paper is mainly intended to show the demographic implications for Bangladesh's Health-human resources production in the next two decades as absolute increase in Population is still too high that the economy can cope with. The extent of any future HRH-Production is going to be determined by this demographic compulsion. Keeping this broad purpose in view, the paper has been structured into the five sections. Section 1 presents the context and data source. Section 2 presents the health human resources scenario. In Section 3, we examine the extent to which human resources development (HRD) in Health Sector is not keeping pace with the growing population and also, the degree to which poverty syndromes exist particularly in the production of key health workforce like doctors, nurses, dental surgeons, public health management professionals and field workers like FWAs. This was followed by discussion in section 4 on the role of institutions and quality control in HR production In section 5, gender dimensions in Health Sector has been discussed. In section 6, Public-Private partnership has been proposed as a viable working mechanism to maximize HR outputs against the backdrop of slow pace of progress in decentralization and devaluation of power to the local level. In section 7, based on the analyses of these issues, some specific recommendations have been made for

the overall improvement in human resources production strategy in Bangladesh's Health Sector.

2.0 Health Human Resources Scenario:

2.1 It is indeed very difficult to give a precise estimate of different categories of workforce of the Health Sector in Bangladesh as data gathering institutions themselves have difficulties in getting full range of information in each category of workforce engaged in both private and public sector health activities. Nevertheless, due to coordinated and systematic efforts, data gathering on human resources (HR) and human resources development (HRD) has improved considerably in recent years. Bangladesh Medical and Dental Council (BMDC), Bangladesh Nursing Council (BNC), State Registration Council for Medical Technologists, Unified MIS Unit of the Health Directorate, Directorate of Family Planning and several HRD-institutions are important sources of data on human resources (HR). Data on HR in the public sector are collected in straightforward manner from these sources and made available in the relevant organizations and institutions, but data gathering on both HR and HRD of the private sector is rendered very difficult.

According to BMDC, 33573 doctors had been registered in the country during 1972-2002. If 15% is discounted on account of death, retirement and migration for jobs outside Bangladesh, total number of doctors available in the country as of 2002 were 28,537 of whom 48% were reportedly working under the Ministry of Health and other Ministries (HRD-Data Sheet, 2003, MOHFW). Thus, we can assume that remaining 52% of the registered doctors who are likely to be available in the country work in the private sector and other agencies. According to Bangladesh Nursing Council (BNC), there were 17233 registered nurses in 2002 of whom 14200 were available for work under the Directorates of Health and Family Planning as well as other agencies. In 2002, there were 1492 registered dental surgeons of whom only 1286 were available. About a half of them, work for the Government and the rest work in the private sector.

The estimated available stock of human capital of different types up to 2002 is shown in Table-1 below.

Table 1: Human Resources in Health Sector, 2002

1.	Total number of registered doctors (1972-2002)	33,573
2.	Total number of registered doctors likely to be available in the country	28,537
3. (a)	Percentage of doctors working under the MOHFW (including under the Directorate of Health Services, Directorate of Family Planning and Government Officers' Hospital in Dhaka and other Ministries	48%
(b)	Percentage of doctors working in the Private Sector	52%
4.	Total number of registered nurses	17233
5.	Total number of nurses likely to be available in the country	14,200
6.	Total number of nurses working under the Directorates of Health Services and Family Planning and other Ministries/Agencies	12,792
7.	Total number of dental surgeons	1386
8.	Total number of Medical Assistants of the Directorate of Health Services and Directorate of Family Planning	5598
9.	Total number of laboratory technicians	2220
10.	Total number of Radiographers	1054
11.	Total number of Pharmacists	7622
12.	Total number of Health Inspectors	1401
13.	Total number of Health Assistants (Sanctioned)	21016
14.	Total number of Union Family Planning Inspectors	4110
15.	Total number of Family Welfare Assistants	23,350
16.	Total number of Family Welfare Visitors	5248

Sources: HRD-Data Sheet, MOHFW, 2003.

2.2 The figures cited above look staggering. But they are too small, if we relate them to the population who are the consumers of their services as evident from the data in Table 2 below.

Table 2: Providers-Population Ratio in the Health and Population Sector, 2002.

1.	Doctor - Population Ratio	1:4645
2.	Nurse- Population Ratio (including Private Sector Nurses)	1:7786
3.	Dental Surgeons - Population Ratio	1:98500
4.	Doctor- Nurse Ratio	1:0.6
5.	Medical Assistant - Population Ratio	1:28443
6.	Health Inspector - Population Ratio	1:23714
7.	Family Planning Inspector- Population Ratio	1:29511
8.	Family Welfare Assistant - Population Ratio	1:5651
9.	Family Welfare Visitor-Reproductive Women Ratio	1:4706

Source: Mabud. M. A: CHPD, Independent University, Bangladesh, 2004.

Except for items 8 and 9 in Table 2, there is still a considerable imbalance in the providers-population density. Bangladesh, in fact, needs more doctors, nurses, dental surgeons and other categories of health providers. The present workforce scenario is far from satisfactory.

2.3 Urban-Rural Differences in HR Distribution:

What is worrying is the most uneven distribution of health work force in Bangladesh. About 75.0 percent people live in the rural area, but their share of the Health human resources is less than 20.0 percent. All key health providers like doctors; dental surgeons, nurses and public health professionals are heavily concentrated in the urban area where doctor-population ratio is 1:1500 as against 1:15000 in the rural area. There are 1386 dental surgeons in the country in 2002; and almost all of them work in the urban area. Same is the scenario of nurses and some medical technologists like dentists, laboratory technicians etc. It is, therefore, no wonder why urban-rural differences in both mortality and morbidity are so vivid and perceptible irrespective of age and sex. This differential treatment will continue

unless there is determined incremental deployment of health providers in the rural area from both public and private sectors, along with supportive facilities for them.

3.0 Poverty Syndromes in Health-HRD

Apart from the problem of uneven urban-rural distribution of workforce, slow pace of progress of the production of some key providers like doctors, dental surgeons, nurses and Public Health Professionals unmatched with the country's requirement is still a major problem which deserves serious attention of the health planners and policy makers. The annual production of these key providers of health services is quite low. Data in Table 3 bear this out.

Table 3: Estimated Annual Production of Some Key Health Providers, 2003.

Key providers	Annual Production level	Minimum expected level of production per year
1. Doctor*	2000*	3000
2. Dental Surgeons	190	300
3. Nurses	800-900	2000
4. Public Health Professionals with managerial skills	100	300

(Including doctors from the Private Medical Colleges and Public Health Professionals mean the trained public health graduates for supervisory works at district and sub-district level)*

One of the ways to measure the poverty syndromes in health human resources development (HRD) is to look at the providers-population density and also, to see how long the sector will take time to reach the minimum acceptable threshold level under different production assumptions so as to reduce current providers - population density. For a fair analysis of this issue, a few words about Bangladesh's demographic prospects seem to be in order as the Population is a major factor for generating the demand for health services.

3.1 Demographic Prospects:

Bangladesh's population is estimated to be 139.5 million in 2005, growing at the rate of 1.7 percent per year. According to medium variant projection which assumes NRR=1 by the year 2015, this population will grow up to 173 million in 2020, adding almost 2.2 million people per year (CHPD, IUB: Mabud, 2004). Such an

increase in population should be taken into account, while producing health manpower, not to speak of the key providers like doctors and nurses only. Table 4 below reveals the projected estimates of population by the year 2020.

Table 4: Projected Population Increase up to 2020 Under the Assumption of NRR=1 by the year 2015.

Year	Population (in million)
2002	132.4
2005	139.4
2010	150.9
2015	161.8
2020	173.0

(Source: Mabud M.A.; CHPD, Independent University, Bangladesh, 2004)

3.2 Projected Estimates of Selected Work Force up to 2020:

Among the economic sectors, Health is the most technical one. It has as many as 16 distinct categories of providers of different varieties with different skill-mix(see table-1). Keeping in view the objective of this paper, this investigator will confine his projection on human resources on four selected workforce, namely (i) doctors; (ii) nurses; (iii) dental surgeons and (iv) Family Welfare Assistants (FWA). In projecting these workforces up to 2020, the following basic parameters for HR projections are kept in view.

- (i) Number of providers in base year;
- (ii) Survival ratio at the beginning of the year;
- (iii) Annual production in absolute number;
- (iv) Projected population estimate up to 2020; and
- (v) Net availability at the end of the year.

Survival ratio at the beginning of the year is estimated by the factor of $(1-D_1/P_1)$ where 'D₁' is the number of dropouts of all categories up to the end of the year and 'P₁' is the total number of workforce at the beginning of the year 'X'. Net availability is estimated by the factor: $[(1-D_1/P_1) * P_o] + P_n$, Where P_o is the previous year survivors and P_n is the new production of the year. Fortunately, we have data on items (i) and (iii). Survival ratio is to be estimated on the basis of expert opinion about the annual dropout from existing stock of workforce after adjusting it for

death, disability due to old age and migration or deputation for employments/study abroad. First, we are considering the projection of doctors, as they are by far the most crucial factor for providing health services. The number of doctors and coverage of population are important. Any projection has to be based on certain assumptions. In this paper, we are presenting three projected estimates of doctors up to 2020 based on three different sets of assumptions., which are called 'Variants'- Variant 1 (high), Variant-2 (medium) and Variant-3 (low).

3.3 Projection Assumptions: In each variant, both production and survival assumptions are built-in. For example:

- (i) Production-assumption will show the progression in production of doctors gradually up to the year 2020;
- (ii) While survival assumption of workforce is held constant all through the projection period.

Implicit in these assumptions is that out of 100 surviving doctors, three are most likely to be dropped out by the end of the year from the surviving doctors due to retirement from active life, death, migration, deputation from jobs, and long study leaves plus the foreign born-trained medical graduates going out of the country after completion of their education in Bangladesh.

3.4 Population-Health HRD Interaction Model:

Before we proceed to discuss the extent of interaction between Population and human resources in health (HRH), some discussion on the following Population-Health HR interaction Model (Mabud; CHPD, IUB, 2004) seems to be in order.

$$P_t / [(1 - d_i/P_i) * P_i + P_{ni}]$$

Where,

$$P_t = (1 + n) \text{Pop } t - 1 + P_{t-1}$$

n = annual rate of growth in Population

P_{t-1} = Population of the year "t" i.e. at the beginning of the year

D_i = dropout rate due to death, migration, study abroad etc of the 'i th' group of workforce,

P_i = number of workforce at the end of the year of the "ith" group of workforce

P_{ni} = new workforce available at the end of the year of the "ith" group from the HRD institutions.

P_o = net available workforce i.e. $(1 - d_i/P_i) P_i + P_{ni}$

Above Population – HR interaction model is quite practical and user friendly and provide a reasonable basis for estimating the extent of interaction. In this paper, of this model has been extensively used to estimate different population- health providers density as one may see in the discussion that follows.

3.5 Doctor-Population Density:

Due to enhanced investment in health by public and private sectors, there shall be gradual progression in the net availability of doctors in the country for which doctor-population ratio will improve, but at different level under different production - assumptions. Three projections of doctors made by this investigator under three different production assumptions, namely (i) optimistic (variant-1); (ii) medium (variant-2) and (iii) constant (variant-3) yield three different scenarios of net availability of doctors in 2020 which may be seen from Table 5 below. In variant-3, it is assumed that production of 2000 doctors (i.e. 1200 From Government + 800 from Private Medical College), which refers to the figure in 2002, will continue up to 2020, and that there may not be any change in the admission policy of the Government and private colleges. Though it may be unlikely, it is, however, important to see what may be the prospects of net availability of doctors by the year 2020 under some circumstances. The details of the three projections may be seen in annexures—A and B.

Table 5: Prospects of Net Availability of Doctors under three Variants of Production.

Year	Variant-1	Variant-2	Variant-3
2002	28537	28537	28537
2005	31965	31866	31866
2010	39889	37724	36782
2015	49528	45109	41004
2020	60896	51450	44629

Under three variants of production, Bangladesh may have three sets of additional number of doctors on top of 28537 doctors in 2002. Under Variant 1, 32359 additional doctors will be needed by the year 2020; while under variants-2 and 3, additional 22913 and 16092 doctors respectively will be needed.

Table 6: Doctor-Population Density in 2020 under three variants of Production-Assumptions

Variants	Doctor-Population Density
Variant - 1	1:2840
Variant - 2	1:3362
Variant - 3	1:3840

Provider-Population density is estimated on the basis of projected population estimate of 173.0 million in 2020 based on the assumption of NRR=1 by 2015 and life expectancy at birth at the base year 2002 in 62 years. Table 6 reveals that under Variants 1, 2 and 3, doctor-population density shall be 1:2840, 1:3362 and 1:3840 respectively. This shows that there will be some improvement over the current doctor-population ratio of 1:4645 in 2002, but still Bangladesh will not reach the internationally accepted threshold level of 1:2500 population in 2020. Due to current admission policy and weak intake capacity, particularly in the private medical colleges, it will not reach the desired level.

3.6 Doctor-Nurse Ratio:

Nurses are important human resources for providing health services. They have an extended role ranging from hospitals services to the community. Their utilization largely depends upon the state policy on the design and structure of the health services and the manner in which Government would like to utilize the services of the nurses. In 2002, there were 17056 nurses in the country and doctor-nurse ratio was 1:0.6. Again, annual turnout of nurses from the existing 44 nursing institutions is, on average, 800-900 per year. Given the current situation, two questions may be raised.

(a) First, keeping in view the medium variant projection of the doctors, how many nurses are necessary under the assumptions of:

- i. maintaining current status (i.e. 1:0.6); and
- ii. achieving the target of doctor-nurse ratio 1:1?

(b) Secondly, how many nurses can really be produced in view of the current limitations?

In the discussion that follows, each of these questions has been examined to provide some answers.

Table 7: Number of Nurses Necessary to Improve Doctor-Nurse Ratio under Different Assumptions.

Assumption 1: Constant Doctor-Nurse Ratio (1:0.6)

Year	Estimated number of Doctors of medium variant production	Estimated number of Nurses	Increase in absolute number	% Increase
2002	28537	17514	-	-
2005	31866	18514	1000	12.09
2010	37724	21001	3487	32.70
2015	45109	24558	7044	58.68
2020	51450	28152	10638	79.21

Assumption 2: Doctor-Nurse Ratio of (1:1)

Year	Estimated number of Doctors of medium variant production	Estimated number of Nurses	Increase in absolute number	% Increase
2002	28537	17056	-	-
2005	31866	31866	14810	86.8
2010	37324	37324	20268	118.8
2015	45109	45109	28053	164.5
2020	51450	51450	34394	201.6

Source: Mabud.M.A.:CHPD,IUB,2004.

From the data in table 7, it is clear that in order to keep up existing doctor-nurse ratio of 1:0.6, Bangladesh has to increase production of nurses by 12.09% in 2005 and 79.21% in 2020 under assumption (i.e. doctor-nurse of 1:0.6); While under the assumption of doctor-nurse ratio of 1:1, comparable figures will be 86.8% and 201.6% in 2005 and 2020 respectively over the base-figure of 17056. Given the realities, it is meaningless at this stage to assume the production of nurses to achieve the doctor-nurse ratio of 1:2 and 1:3 in some distant future from the mere base-figure of 17056 nurses in 2002. However, the issue of doctor-nurse ratio in Bangladesh context requires some comments. According one estimate based on the data of the BNC (MOHFW: HRD-data sheet 2002), doctor-nurse ratio was found to be 1:1.5. This ratio was estimated keeping in view the figures on doctors and nurses who were working under the Ministry of Health. This ratio will gradually improve further, if the projection exercise is confined to those who are working under the

Ministry of Health, and working in the hospital and clinics alone. But if we take the total number of doctors and total number of nurses in the country as a whole, then we find a different scenario. Again, if we relate the number of nurses and number of doctors working in the hospitals, we find that doctor-nurse ratio is already 1:2 and may improve up to 1:3 in 2020. Therefore, a lot of factors need to be taken into consideration, while making projected estimates of doctor-nurse ratios. Let us now turn to the question in which we ask ourselves about the prospects of availability of nurses in 2020 under the assumption of gradual increase in annual production rate as assumed in the following Table.

Table 8: Net Available Nurses Under Different Production-Assumptions in 2020.

Year	Production Per Year	Survivors	Net available nurse
2002	800	16714.88	17514.88
2003	800	16989.43	17789.43
2004	800	17255.75	18055.75
2005	1000	17514.07	18514.07
2006	1000	17958.65	18958.65
2007	1000	18389.89	19389.89
2008	1000	18808.20	19808.20
2009	1200	19213.95	20413.95
2010	1200	19801.53	21001.53
2011	1200	20371.48	21571.48
2012	1200	20924.34	22124.34
2013	1500	21460.61	22960.61
2014	1500	22271.79	23771.79
2015	1500	23058.63	24558.63
2016	1500	23821.87	25321.87
2017	1500	24562.22	26062.22
2018	1500	25280.35	26780.35
2019	1500	25976.94	27476.94
2020	1500	26652.63	28152.63

Estimates presented in Table 8 show that there will be 32080 nurses in 2020. This is exactly what we need even to maintain the current doctor-nurse ratio of 1:0.6. Thus there will be no improvement at all even we increase the production level up to 1500 from 2013 onward.

3.7 Dental Education:

Worse than anything else is Health-HRD is the neglect in dental education. At present, there is one Dental College and three dental units attached three Medical Colleges of the Government in addition to six small units in the Private Medical Colleges. There is one Dental Department for postgraduate teaching at the Bangabandhu Sheik Mujib Medical University in Dhaka. All these institutions produce about 170-180 dental graduates a year. As of 2002, there were reportedly 1286 dental surgeons in the country and a half of them were working in the public sector. One may note that drop out rate among the dental graduates is much higher than the doctors. It is estimated that 5 out 100 go out of the country every year. At present, there is Dental Surgeon-Population ratio is 1:98500. *With the current rate of production in our dental institutions and surviving ratio of 0.95, this dental surgeon-population ratio will not improve, rather it will deteriorate further as population is growing. One may note that the minimum threshold level is one dental surgeon per 20000 Population.*

3.8 Shortage of Public Health Professionals:

In Health-HRD, more emphasis and investment have been made traditionally for curative care rather than preventive care. Hence, many specialized institutions have been established to create a core of professionals of specialized categories (see the list in annex-5); but for preventive care-related professional education and training, there is only one National Institute of Preventive Health and Social Medicine (NIPSOM). Since its establishment in 1978, about 1700 DPH/M.P.H graduates were produced. Annual intake capacity is 100 only, but success rate is 85%. On the other hand, in public sector alone, about 4000 doctors and 1500 non-doctors need to be trained in health education with different focus. If we include the requirement of private sector, total requirements of the public Health graduates in the country in my view, will be 7500. Unfortunately, private sector investment for this type of training and education has been limited which is why overall supply of trained health managers has been deplorably low. Of late, 2-3 private universities including BRAC University and Independent University, Bangladesh have come forward, but its programme is yet to start. Health activities in both private and public sectors are being managed without trained health managers.

In Family Planning Directorate, there are hardly 30-35 trained graduates with foreign training in health and family planning against the requirement of 1100 (including Upazila Officers).

In recent years, donors' assistance for human resources development through fellowship and overseas training has been virtually dried up. In this backdrop, the only alternative is to produce professionally qualified trained Public Health Managers within the country. Since private universities have come forward, Government should consider training more of their Public Health Managers in the private universities. Such a policy strategy shall be cost effective in the sense that with the cost of producing one M.P.H. degree holder in U.S.A. or U.K., Government or private agencies can produce 15 M.P.H. graduates within the country. Furthermore, M.P.H. is a health problem related education and training. Every country has its specific health problems and the skills to help solve those public health problems can be best learnt or taught in the context of one's country.

It is, therefore, high time that both private and public sector should give due attention to produce trained public health managers within the country.

3.9 Female worker-population density:

Female workers play an important role in Health and Family Welfare activities. At present, there are 23500 Family Welfare Assistants (FWA). Assuming that this number shall remain constant, the FWA - population density is likely to be as follows under the medium variant population projection as noted earlier.

Table 9: FWA-Population Densities under the Medium Variant Population Projection

Year	Population	FWA-Pop. Density
2002	132.4	1:5634
2005	139.4	1:5932
2010	150.9	1:6421
2015	161.8	1:6885
2020	173.0	1:7361

Data show that one FWA of 2002, if she would remain alive up to 2020, shall have to serve 1.5 times larger population. This means that FWA-population density will

deteriorate. If Government wants to maintain the current worker-population density, it shall have to employ additional 12000 FWAs in 2020.

4.0 Role of Institutions and Quality Assurance:

HRD-Institutions can play a vital role in alleviating HR-poverty syndromes in Health Sector. In recent years, Bangladesh has made considerable progress in establishing various HRD-institutions, particularly with regard to medical colleges and nursing institutions. There are, at present, 13 government medical colleges and 21 private medical colleges. Among the private medical colleges, only nine are functional and remaining 12 medical colleges are still at the budding stage. Our analyses of the data on faculties, physical space, and library facilities of these medical colleges, particularly those of the private medical colleges suggest that they must improve their current education standard by augmenting their faculty strength with qualified teachers, library facilities, and modern teaching aids, as well as computer and infra structural facilities. The private medical colleges must improve in order to maintain uniform standard of medical education. In order to use both public and private resources more meaningfully, establishment of new medical colleges in the country should be strictly restricted unless they fully meet the criteria of registration. In the case of HRD in nursing, existing 44 (38 Govt.+6 private) institutions should suffice. These institutions are badly suffering from shortage of teaching staff, lack of proper classroom and library facilities. These have to be improved. There is one nursing college in the country. In fact, there should be at least, 3 more nursing colleges with proper facilities including teaching staff. A somewhat worse scenario also exists in respect of dental education. Baring one Dental College and Dental Department in Bangabandhu Sheik Mujib Medical University (BSMMU), Dhaka no fully equipped Dental Department has been established in other medical colleges. Government should give due attention to this problem. For the field workers' training (e.g. FWA, FPI, etc.) there are 20 Regional Training Institutes. These are sufficient to provide both pre and in-service training to the field workers on regular basis. However, the scope of training of the field

workers should be broadened to encompass reproductive health, primary health care and nutrition components.

5.0 Gender Dimensions in Health Sector:

5.1 "Health" is one of the most labour intensive sectors in Bangladesh. About 1.6 lakh health workforce of different varieties are working in the public sector alone. There are some exclusive categories of workforce who are overwhelmingly female such as (i) nurses and (ii) Female Welfare Assistants (FWA). Among the nurses, about 95 percent are females. All of the 23500 FWAs of the Directorate of Family Planning who work at the ward level in rural area are females. It is also the policy of the Government to recruit all Health Assistants (HAs) under the Directorate of Health Services from the females. Total number of such category of workforce is over 21016 (MOHFW: Data Sheet, 2003). The existing male HAs will be gradually replaced by the females. There is another category of workforce, i.e. Traditional Birth Attendants (TBA) who work in the rural area. They are all females. Though they are not on the pay roll, Government had trained about 25000 TBAs under the "Safe Delivery Programme" in nineties. Apart from these grass root workers, female representation in other categories of workforce is still less than 10.0 percent. Among all the available registered doctors, hardly 10.0 percent are females. So is the case with the Health technologists of different varieties. The number of female dental surgeons is also few relative to male dental surgeons. It is, however, gratifying to observe that in all professional categories and specialized field of activities there are females who are making their presence felt and providing useful leadership in their respective field.

5.2 While in the lower ladder, the female workforce will outnumber their male counterparts, male workforce is dominating in the upper level because of their education and specialization. Historically, medical field could attract fewer women than men in the past. However, this trend is being reversed gradually; because,

Government's admission policy is quite favourable for girls. In all medical colleges, more and more girls are being admitted now. As a result, gender difference in medical college enrolment is being reduced. According to one estimate male-female enrolment ratio in the medical college is 55:45. In the private medical colleges, the trend in students' enrolment is about the same. It has also been observed that in medical technological fields, such as (i) Sanitary Inspectorships, (ii) Laboratory Technicians, (iii) Dentistry, (iv) Medical Assistant's training, females are especially encouraged.

The Ministry of Health and Family Welfare of the Government of the People's Republic of Bangladesh has "Gender Equity Policy". In order to ensure female participation and involvement in various health activities, consideration for gender equity is not only being emphasized, but also articulated in all annual operational plans (AOP) of the Health Sector. Thus, a clear trend has been set to ensure gender balance in all strata of Health Sector. Explicit in this policy strategy is that women's interest, female employments, involvement and other opportunities are to be ensured in course of implementation of the annual operational plans.

6.0 Public-Private Partnership for HRH management:

Mere production of workforce of different varieties does not mean that they will work unless enabling environment is created through accommodation facilities, rental allowance, joint posting of spouses etc. Even if these are ensured, still there is no guarantee that HRH shall work optimally unless there is a system of dual accountability, that is –accountability to the hierarchy and the community. In order to ensure this to happen, existing bureaucratization process should be reduced through the mechanism of decentralization and devolution of power between the lower strata and immediate higher strata of "Health System Management." This has been a long debated issue, and very little progress is seen in many third world countries including Bangladesh for which (1) community awareness creation, (ii) community participation and (iii) community involvement could not be achieved. This is largely due to lack of political will and non-cooperation of elitist bureaucrats. While efforts to achieve this objective shall continue, one alternative viable approach is to maximize the benefits of HRH through public – private partnership approach. Such

collaboration at the district, sub-district and lower level may help HRH work more responsibly and closely with the people. NGO/Private health agencies strength lies in the community. Both in creating awareness of and demand for services, they are expected to make significant contribution. The Government, as "Health Egalitarian" is the biggest stakeholder in "Health". Hence, collaboration of the private sector with the government is essential to achieve the health- objectives. Government will also be benefited by collaborating with the private sector as it will make the health workforce more functional, responsive, accountable and result oriented.

7.0 Concluding Remarks:

The foregoing discussion has made it clear that in order to achieve the different production targets of potential Health service providers, existing admission policies have to be reviewed and that Government needs to give necessary policy direction to the HRD-institutions. A somewhat greater attention is also necessary in the case of dental education where annual production level is as low as 180-190 per year and Dental Surgeon-population ratio is 1:98500 which is perhaps the severest in the world. Again, neither number of doctors nor nurses, not to speak of other categories of providers can be called sufficient. All these hard realities must set the Government in the Ministry of Health in thinking to review the existing HRD-policy strategies and come out with a concrete HRD-policy for the next twenty years or so focusing attention to achieve appropriate HRD production target with concomitant qualitative improvement of HRD-institutions. This also calls for a hard planning exercise to augment HRD-budget through intra-components-adjustment or additional resources to the Health sector. Thus, improving HRD in Health Sector will reduce the providers-population density and may contribute significantly to improve the health service delivery in Bangladesh. Besides, current imbalance in workforce deployment between urban and rural area needs to be reduced. In reshaping the future Policies, plan and programmes, Population growth and its consequent increase in population size has to be kept in view to ensure meaningful interaction between Population and Health sector development. So far, our review reveals that both programme implementation plan (PIP) 2003-2008 and Health, Nutrition and Population (HNP) Strategic investment plan (2003—2010) of the GOB'S Ministry of

Health and Family Welfare (MOHFW) have no serious reflection of the need for Health – HRD development issues with clear analyses neither in the context of population nor in the context of reducing HRD – Poverty syndromes within a definite Timeframe. One may also note that mere production of workforce an efficient and workable management without a viable mechanism for working arrangement through private-public partnership at the district level, sub-district level and below, while effort to decentralize health health administration shall continue.

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Annex-I

Table 1 Projected Estimates of Doctors up to 2020 Under High Production Assumption.

Year	Production of doctors in Govt. Medical Colleges	Production of doctors in Private Medical Colleges	Total Production	Survivors at the beginning of the year	Net availability in doctor at the year end
2002	1200	800	2000	26537.00	28537.00
2003	1200	800	2000	27680.89	29680.89
2004	1200	850	2050	28790.46	30840.46
2005	1200	850	2050	29915.24	31965.24
2006	1200	850	2050	31006.28	33056.28
2007	1200	1000	2200	32064.45	34264.45
2008	1500	1000	2500	33236.65	35736.65
2009	1500	1680	3180	34664.5	37844.55
2010	1500	1680	3180	36709.22	39889.22
2011	1500	1680	3180	38692.52	41872.53
2012	1500	1680	3180	40616.36	43796.36
2013	1500	1680	3180	42482.47	45662.47
2014	1500	1680	3180	44292.59	47472.59
2015	1800	1680	3480	46048.47	49528.41
2016	1800	2100	3900	48042.56	51942.56
2017	1800	2100	3900	50384.28	54284.28
2018	1800	2100	3900	52655.75	56555.75
2019	1800	2100	3900	54859.08	58759.08
2020	1800	2100	3900	56996.31	60896.31

Doc-Pop Ratio is 1:3876

Annex-2

Table 2: Projected Estimates of Doctors up to 2020 Under the Medium Production Assumption.

Year	Production of doctors in Govt. Medical Colleges	Production of doctors in Private Medical Colleges	Total Production	Survivors at the end of the year	Net available doctors
2002	1200	800	2000	26537.00	28537.00
2003	1200	800	2000	27680.89	29680.89
2004	1200	800	2000	28790.46	30790.46
2005	1200	800	2000	29866.75	31866.75
2006	1200	800	2000	30910.74	33110.74
2007	1200	1000	2200	32117.42	34317.41
2008	1200	1000	2200	33287.89	35487.88
2009	1200	1000	2200	34423.25	36623.25
2010	1200	1000	2200	35524.55	37724.55
2011	1500	1200	2700	36592.81	39292.80
2012	1500	1200	2700	38114.03	40814.03
2013	1500	1200	2700	39589.61	42289.61
2014	1500	1200	2700	41020.92	43720.92
2015	1500	1200	2700	42409.29	45109.29
2016	1500	1200	2700	43756.01	46456.01
2017	1500	1200	2700	45062.33	47762.33
2018	1500	1200	2700	46329.46	49029.46
2019	1500	1200	2700	47558.58	50258.58
2020	1500	1200	2700	48750.82	51450.82

Doc-Pop Ratio is 1:3362

Annex-3

Table 3: Projected Estimates of Doctors up to 2020 Under the Constant Production Assumption.

Year	Production of doctors in Govt. Medical Colleges	Production of doctors in Private Medical Colleges	Total Production	Survivors at the end of the year	Net available doctors
2002	1200	800	2000	26537.00	28537.00
2003	1200	800	2000	27680.89	29680.89
2004	1200	800	2000	28790.46	30790.46
2005	1200	800	2000	29866.75	31866.75
2006	1200	800	2000	30910.74	32910.74
2007	1200	800	2000	31923.42	33923.42
2008	1200	800	2000	32905.72	34905.72
2009	1200	800	2000	33868.55	35858.55
2010	1200	800	2000	34782.79	36782.79
2011	1200	800	2000	35679.30	37679.30
2012	1200	800	2000	36548.93	38548.93
2013	1200	800	2000	37392.46	39392.46
2014	1200	800	2000	38210.68	40210.68
2015	1200	800	2000	39004.36	41004.36
2016	1200	800	2000	39774.23	41774.23
2017	1200	800	2000	40521.00	42521.00
2018	1200	800	2000	41245.37	43254.37
2019	1200	800	2000	41948.02	43948.02
2020	1200	800	2000	42629.57	44629.57

Doc-Pop Ratio is 1:3876

Annex-4

Table 4: Total Number of HRD Institutions in Health and Population Sector

Sl.	Number of Workforce	Total
1.	Number of Medical University	1
2.	Number of Government Medical Colleges	13
3.	Institute of Child & Mother Health	1
4.	National Institute of Population Research and Training	1
5.	Number of Medical Assistant Institutes	5
6.	National Institute Preventive Health and Social Medicine	1
7.	Number of Institute of Cardiovascular Diseases	1
8.	Number of Institute of Chest Disease Control	1
9.	Number of Institute of Public Health	1
10.	Center for Medical Education	1
11.	National Institute for Cancer Research & Hospital	1
12.	National Institute of Kidney disease & Urology	1
13.	National Institute of Mental health & Rehabilitation Centre	1
14.	Institute of Health Economics, Dhaka University	1
15.	Department Population Sciences, Dhaka University	1
16.	Institute of Nutrition and food science, Dhaka University	1
17.	National Institute of Ophthalmology	14
18.	Number of College of Nursing	1
19.	(a) Number of Dental Colleges/Units at the Medical Colleges (Gov)	3
	(b) Number of Dental Colleges/Units at the Medical Colleges (Private)	6
20.	Number of Medical Colleges in private Sector	20
21.	Number on Nursing Institutions in Public sector (including one in the Arm forces)	39
22.	Number of Nursing Schools in the Private Sector	5
23.	Number of Institutes of Medical Technology (including 2 of the Government)	7
24.	Number of institute of Public Health Nutrition	1

25.	Number of Regional Training Centers (RTC)	20
26.	Number of Family Welfare Visitors' Training Institutes	12

Annex 5

Table 5: Projected Population Estimates up to 2050 under the Assumptions of Net Reproduction Rate (NRR) = 1 by the year 2015 and life expectancy at birth up to 68.6 years in 2015 from 61.8 years of the base year of 2001.

Year	Projected Population Estimates (in million)	Rate Population Growth (%)
2001	130.0	1.85
2002	132.39	1.81
2003	134.77	1.77
2004	137.10	1.70
2005	139.45	1.68
2006	141.78	1.65
2007	144.10	1.61
2008	146.42	1.58
2009	148.69	1.53
2010	150.95	1.50
2011	153.16	1.44
2012	155.35	1.41
2013	157.51	1.37
2014	159.67	1.35
2015	161.79	1.32
2016	163.96	1.34
2017	166.18	1.34
2018	168.44	1.34
2019	170.72	1.34
2020	173.10	1.33
2021	175.32	1.31
2022	177.62	1.29

2023	179.92	1.28
2024	182.21	1.26
2025	184.50	1.24
2026	186.78	1.22
2027	189.04	1.19
2028	191.28	1.17
2029	193.48	1.14
2030	195.66	1.11
2031	197.81	1.08
2032	199.93	1.06
2033	202.01	1.03
2034	204.05	1.00
2035	206.05	0.97
2036	208.02	0.95
2037	209.94	0.91
2038	211.82	0.89
2039	213.67	0.87
2040	215.49	0.84
2041	217.28	0.82
2042	219.04	0.80
2043	220.77	0.78
2044	222.47	0.76
2045	224.13	0.74
2046	225.77	0.72
2047	227.36	0.70
2048	228.92	0.68
2049	230.45	0.66
2050	231.93	0.64
2051	233.24	0.56