

HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEM—MATLAB

Volume Thirty Seven

Registration of Health and Demographic Events 2004



ICDDR,B: Centre for Health and Population Research
Mohakhali, Dhaka 1212, Bangladesh

Scientific Report No. 93

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Cover page: A Community Health Research Worker (CHRW) is seen visiting a household in ICDDR,B service area for collection of HDSS surveillance data (Photo by: Fakrul Alam)

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SUMMARY

This report presents the vital registration and maternal and child health data gathered from Matlab, Bangladesh, in 2004. The data were collected by the Health and Demographic Surveillance System of ICDDR,B: Centre for Health and Population Research. The surveillance area is divided into an ICDDR,B area and a Government service area which receives government services. The ICDDR,B area is sub-divided into four blocks.

In the surveillance area, as a whole, fertility declined very little in 2004 compared to 2003. The crude birth rate (CBR) was 24.7 per 1000 population and total fertility rate (TFR) was 3.0 per women in 2004, whereas in 2003 the rates were 25.7 and 3.1 respectively. In the ICDDR,B area, CBR was 24.5 and TFR was 2.9, and in the Government service area, CBR and TFR were 24.8 and 3.1 respectively. The crude death rate was 6.7 per 1,000 population in the ICDDR,B area, while in the Government service area it increased to 7.4 in 2004 compared to 7.0 in 2003.

The infant mortality rate was 39.1 per 1,000 live births in the ICDDR,B area, and in the Government service area it was 48.5. The neonatal mortality fell in ICDDR,B area and rose in Government service area, whereas post-neonatal mortality fell in both the areas. The mortality rate among children aged less than 5 years has decreased in both the areas, in the ICDDR,B area it decreased to 51.9 per 1,000 live births in 2004 compared to 55.2 per 1,000 live births in 2003, and in the Government service area it was 58.9 in 2004 compared to 62.9 in 2003.

The rate of in-migration increased to 42.1 per 1,000 population in 2004 from 40.4 in 2003, and the rate of out-migration increased to 57.9 per 1,000 in 2004 from 55.4 in 2003. The net out-migration rate was 15.8 per 1,000 population, thereby offsetting the rate of natural increase, which amounted to 17.6 per 1,000 in 2004. The overall annual population growth rate was 0.2%. The marriage rate was 13.4 per 1,000 population, and the divorce rate was 95.0 per 1,000 marriages.

CHAPTER 1

INTRODUCTION

Since 1963, the ICDDR,B: Centre for Health and Population Research, formerly Cholera Research Laboratory, has implemented a health research programme in Matlab, Bangladesh. Matlab is located about 55 km southeast of Dhaka, the capital city of Bangladesh (Fig. 1.1). The Health and Demographic Surveillance System (HDSS), formerly Demographic Surveillance System (DSS), is one of the major components of this field programme. Since 1966, the HDSS has maintained the registration of births, deaths, and migrations, in addition to carrying out periodical censuses.

Recording changes in household headship and household dissolution started in 1993. The Community Health Research Workers (CHRWs) obtain this information by visiting each household monthly in their assigned areas and fill out the event registration forms. The activities of CHRWs are supervised by Field Research Supervisors (FRSs). A detailed description of the DSS and its operation appears in the CRL Scientific Report No. 9 (1978), ICDDR,B Special Publication No. 35 (1994), and ICDDR,B Special Publication No. 72 (1998).

In October 1977, the surveillance area was reduced from 233 to 149 villages, and a Maternal and Child Health and Family Planning (ICDDR,B service) Programme was initiated in 70 villages. The remaining 79 villages were treated as a Government service area (Fig. 1.2). Since the introduction of the ICDDR,B service programme, the CHRWs have collected data on child and reproductive health. This system of collecting data is known as the Record-Keeping System (RKS). The changes have been described in the ICDDR,B Scientific Report No. 47 (1981) and ICDDR,B Special Publication No. 72 (1998). Due to river erosion, 7 villages disappeared from the Government service area in 1987, leaving 142 villages in the HDSS. In 2000, 3 of the 70 villages of ICDDR,B area were transferred to the Government service area.

This is the thirty-seven volume of a series of scientific reports of the Health and Demographic Surveillance System produced by ICDDR,B. Data obtained from the Matlab HDSS in 2004, along with brief notes and explanations of the tables, are presented in this volume.

Fig. 1.1. Map of Bangladesh showing the study area

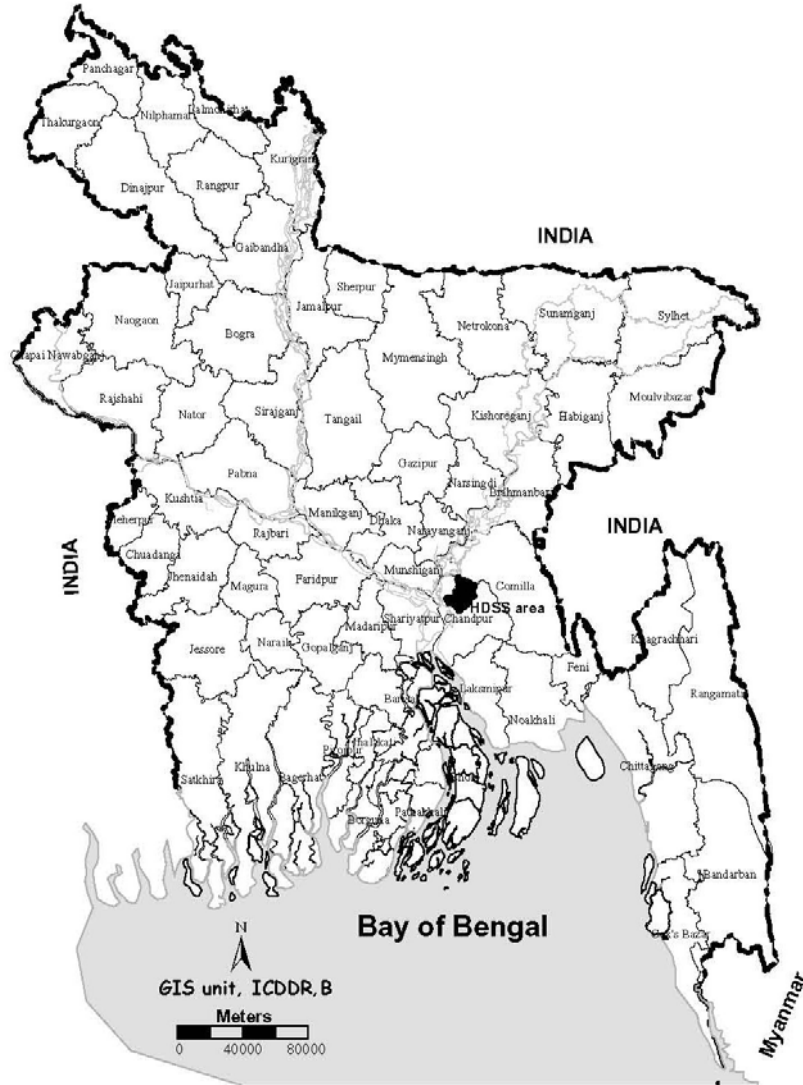
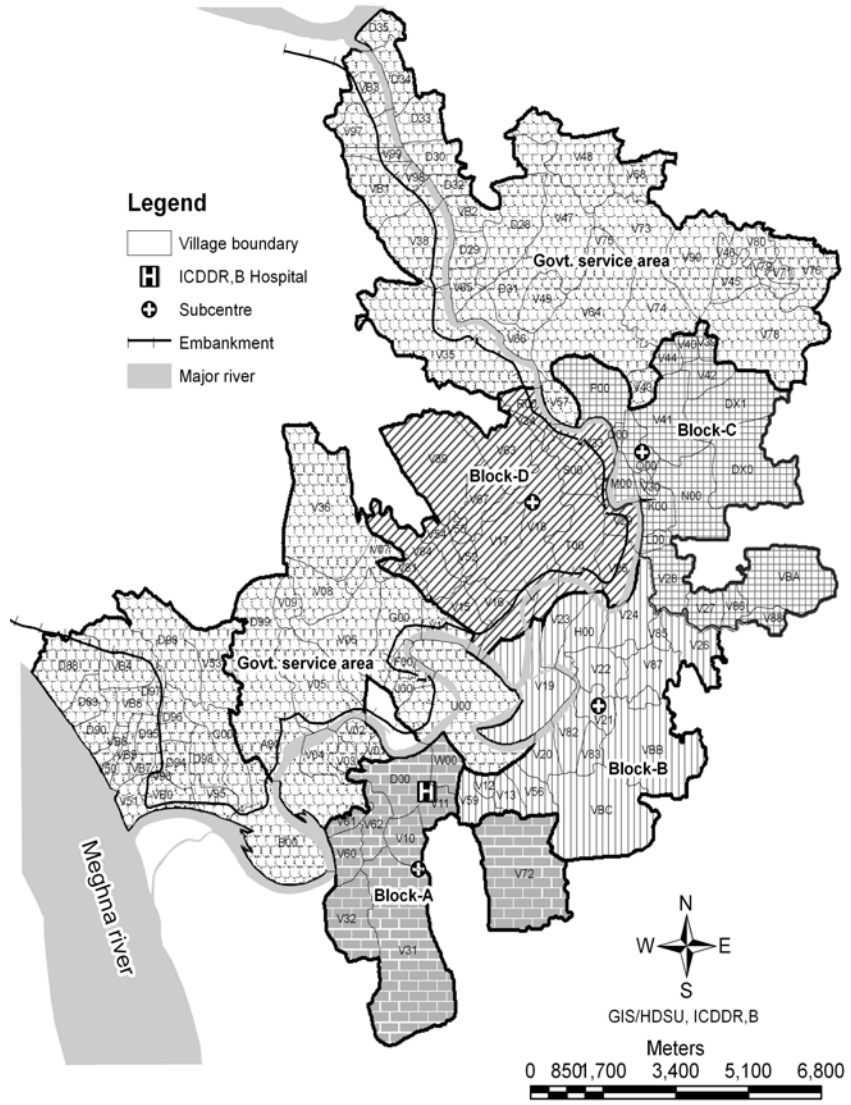


Fig. 1.2. Map of Matlab showing villages of ICDDR,B and Government service areas



CHAPTER 2

POPULATION CHANGES

The principal vital statistics of the ICDDR,B and Government service areas from 1993 through 2004 are summarized in Table 2.1. The number of mid-year population and the demographic events registered in 2004 in both ICDDR,B and Government service areas are shown in Table 2.2 for both sexes. Appendix B shows the mid-year population, number of births, and deaths by village.

In 2004, the crude birth rate decreased to 24.5 in the ICDDR,B area and also decreased to 24.8 in the Government service area from the 2003 level of 26.4 in the ICDDR,B area and 25.1 in the Government service area respectively. In the ICDDR,B area, the crude death rate decreased to 6.7 in 2004 compared to 6.8 in 2003, and in the Government service area it increased to 7.4 in 2004 compared to 7.0 in 2003. In the ICDDR,B area, the TFR fell to 2.9 in 2004 from 3.1 in 2003 and in the Government service area the rate fell to 3.1 in 2004 from 3.2 in 2003. The trends in the TFR in both areas are illustrated in Figure 2.1.

The rate of infant mortality decreased to 39.1 in 2004 from 42.1 in 2003 in the ICDDR,B area, and it increased to 48.5 in 2004 from 47.5 in 2003 in the Government service area. In the ICDDR,B area, neonatal mortality decreased to 29.6 in 2004 from 31.5 in 2003, whereas in the Government service area, it increased from 33.8 in 2003 to 35.3 in 2004. There was a slight decrease in mortality rate of children aged 1-4 years in the ICDDR,B area, but this rate was more pronounced in the Government service area which is 2.7 in 2004 compared to 4.1 in 2003. As a result of these changes, mortality of children aged less than 5 years decreased in both the areas from 55.2 in 2003 to 51.9 in 2004, and from 62.9 in 2003 to 58.9 per 1,000 live births in 2004, in the ICDDR,B and Government service area respectively. The trends in fertility and mortality of children aged less than 5 years are illustrated in Figure 2.1.

The numbers of in- and out-migrants registered in 2004 were 9,443 and 12,995 respectively, giving an in-migration rate of 42.1, out-migration rate of 57.9 and a net migration rate of 15.8 per 1,000 population leaving the area. Out-migrants continued to outnumber in-migrants, thus offsetting the rate of natural increase and reducing the overall annual population growth rate to 0.2%.

The age-sex distribution of the mid-year population of the HDSS villages is shown in Tables 2.3 and 2.4. Block-wise mid-year population in the ICDDR,B area is shown in Appendix A.1. The age-sex distribution of the mid-year population is illustrated by the population pyramid (Fig. 2.2). The fertility decline in the surveillance area in the 1978-2004 period caused a change in the age structure of the population. Children aged less than 15 years constituted 43.4% of the total population in the ICDDR,B area at the beginning of the ICDDR,B service project in 1978. By 2004, this proportion had fallen

to 33.5%. In the Government service area, the change in age distribution was less than that in the ICDDR,B area. Children aged less than 15 years in the Government service area comprised 43.3% of the total population in 1978, which decreased to 35.7% in 2004. This difference in age distribution was due to the difference in fertility decline in the two areas. On the other hand, the number of elderly population (60 years and over) has increased from 5.6% in 1978 to 8.5% in 2004 due to the decline in both fertility and mortality. The net population increase was 1.8 per 1000 in 2004 while it was 3.8 per 1000 in 2003, due to the decline in fertility and increase in the number of out-migrants.

Table 2.1. Vital statistics of ICDDR,B and Government areas*, 1993-2004

Vital rate (per 1,000)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Crude birth rate												
ICDDR,B area	25.7	25.9	25.2	22.4	23.7	25.8	24.5	24.9	26.4	25.8	26.4	24.5
Government area	29.4	29.4	27.8	26.7	26.8	28.3	25.9	27.7	27.1	25.3	25.1	24.8
Both areas	27.0	27.6	26.5	24.5	25.2	27.0	25.2	26.3	26.8	25.6	25.7	24.7
Total fertility rate**												
ICDDR,B area	2.9	3.0	2.9	2.7	2.8	3.0	2.9	2.9	3.1	3.0	3.1	2.9
Government area	3.8	3.8	3.6	3.5	3.4	3.6	3.3	3.5	3.4	3.2	3.2	3.1
Both areas	3.3	3.4	3.2	3.0	3.1	3.3	3.1	3.2	3.3	3.1	3.1	3.0
Crude death rate												
ICDDR,B area	7.7	8.0	7.3	7.6	6.6	7.0	6.4	6.8	6.5	6.9	6.8	6.7
Government area	10.2	9.2	8.4	7.9	8.0	8.1	7.4	7.2	7.0	7.3	7.0	7.4
Both areas	8.9	8.6	7.9	7.7	7.3	7.5	6.9	7.0	6.8	7.1	6.9	7.0
Neonatal mortality***												
ICDDR,B area	42.8	36.4	30.6	39.5	33.1	36.8	25.4	32.3	26.4	34.4	31.5	29.6
Government area	64.5	56.4	50.3	42.1	50.0	44.0	38.6	43.6	42.4	36.4	33.8	35.3
Both areas	54.4	46.9	40.8	40.9	41.9	40.5	32.0	38.4	34.7	35.4	32.6	32.5
Post-neonatal mortality***												
ICDDR,B area	20.3	27.3	20.6	26.6	16.4	13.8	19.1	11.8	17.2	13.5	10.6	9.5
Government area	34.8	30.8	28.3	24.8	28.6	26.0	22.2	14.4	14.5	18.1	13.7	13.2
Both areas	28.0	29.2	24.6	25.7	22.7	20.1	20.6	13.2	15.9	15.9	12.1	11.4
Infant Mortality***												
ICDDR,B area	63.1	63.7	51.1	66.2	49.5	50.6	44.5	44.0	43.7	47.9	42.1	39.1
Government area	99.3	87.2	78.6	67.0	78.6	70.0	60.8	58.0	56.9	54.5	47.5	48.5
Both areas	82.4	76.0	65.3	66.6	64.7	60.6	52.7	51.6	50.5	51.2	44.8	43.9
Child mortality (1 - 4yrs) #												
ICDDR,B area	5.9	5.3	6.7	6.0	4.5	4.7	4.1	3.9	3.9	3.5	3.6	3.4
Government area	10.0	7.0	8.4	8.0	7.0	5.8	7.5	6.4	3.8	5.2	4.1	2.7
Both areas	8.1	6.2	7.6	7.1	5.8	5.2	5.8	5.2	3.9	4.4	3.9	3.1
Under five mortality***												
ICDDR,B area	86.1	83.6	76.7	87.9	66.7	68.3	60.0	58.6	58.4	61.1	55.2	51.9
Government area	135.1	113.1	109.5	96.4	104.4	91.3	88.6	81.1	71.2	73.6	62.9	58.9
Both areas	112.5	99.1	93.8	92.3	86.3	80.1	74.4	70.7	65.0	67.5	59.1	55.4
Rate of natural increase												
ICDDR,B area	17.0	17.9	17.9	14.8	17.1	18.8	18.1	18.1	19.9	18.9	19.6	17.8
Government area	19.2	20.2	19.4	18.8	18.7	20.2	18.5	20.5	20.1	18.0	18.0	17.5
Both areas	18.1	19.1	18.6	16.8	17.9	19.5	18.3	19.3	20.0	18.5	18.8	17.6
In-migration	25.5	26.5	27.0	25.1	34.6	30.3	34.8	35.1	34.0	45.7	40.4	42.1
Out-migration	36.1	41.4	37.4	35.0	41.7	36.9	48.0	48.5	46.2	52.4	55.4	57.9
Growth (%)	0.8	0.4	0.8	0.7	1.1	1.3	0.5	0.6	0.8	1.2	0.4	0.2

*ICDDR,B area refers to ICDDR,B service area and Government area refers to Government service area

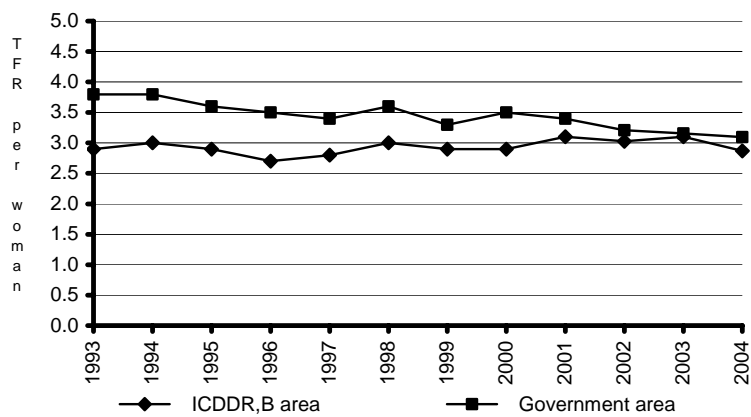
**Per woman

***Per 1,000 live births

#Per 1,000 children aged 1-4 years

Fig. 2.1. Trends in fertility and under-five mortality rate by area, 1993-2004

(a) Total fertility rate



(b) Under-five mortality rate (per 1,000 live births)

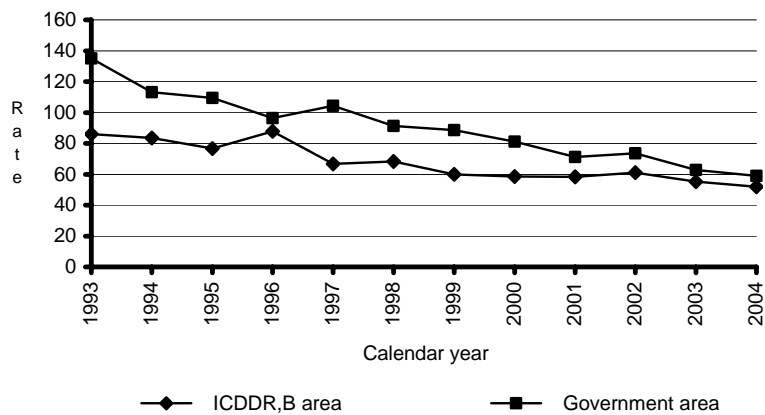


Table 2.2. Mid-year population, events registered, and population changes, 2004

Demographic indicator	Number			Rate per 1,000		
	Total	Male	Female	Total	Male	Female
Total Population (30 June 2004)						
ICDDR,B area	111651	53259	58392	-	-	-
Government area	112825	54180	58645	-	-	-
Both areas	224476	107439	117037	-	-	-
Events registered (Jan-Dec. 2004)						
Births						
ICDDR,B area	2735	1368	1367	24.5	-	-
Government area	2802	1424	1378	24.8	-	-
Both areas	5537	2792	2745	24.7	-	-
Deaths						
Infants*						
ICDDR,B area	107	58	49	39.1	42.4	35.8
Government area	136	66	70	48.5	46.3	50.8
Both areas	243	124	119	43.9	44.4	43.4
All deaths						
ICDDR,B area	751	398	353	6.7	7.5	6.0
Government area	831	460	371	7.4	8.5	6.3
Both areas	1582	858	724	7.0	8.0	6.2
In-migration	9443	4493	4950	42.1	41.8	42.3
Out-migration	12995	6690	6305	57.9	62.3	53.9
Marriage	3011	-	-	13.4	-	-
Divorce**	286	-	-	95.0	-	-
Population change (Jan-Dec. 2004)						
Net migration	-3552	-2197	-1355	-15.8	-20.4	-11.6
Natural increase						
ICDDR,B area	1984	970	1014	17.8	18.2	17.4
Government area	1971	964	1007	17.5	17.8	17.2
Both areas	3955	1934	2021	17.6	18.0	17.3
Net increase	403	-263	666	1.8	-2.4	5.7

*Rate per 1000 live births

**Rate per 1000 marriages

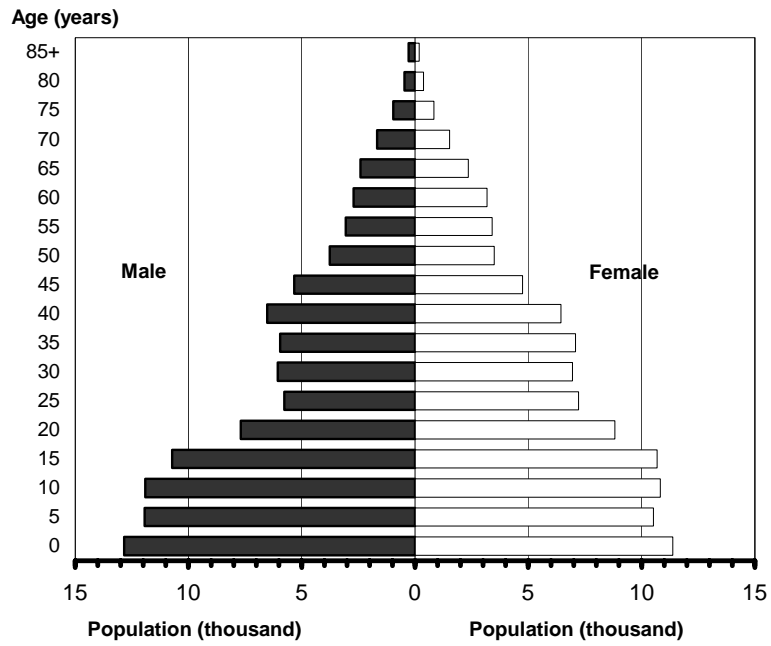
Table 2.3. Mid-year population by age and sex, 2004

Age (years)	Number			Percentage		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	224476	107439	117037	100.0	100.0	100.0
<1 year	5497	2808	2689	2.4	2.6	2.3
1 – 4	21602	10986	10616	9.6	10.2	9.1
1	5520	2806	2714	2.5	2.6	2.3
2	5580	2839	2741	2.5	2.6	2.3
3	5424	2743	2681	2.4	2.6	2.3
4	5078	2598	2480	2.3	2.4	2.1
5 – 9	25128	12820	12308	11.2	11.9	10.5
10-14	25461	12786	12675	11.3	11.9	10.8
15-19	24011	11514	12497	10.7	10.7	10.7
20-24	18584	8264	10320	8.3	7.7	8.8
25-29	14632	6194	8438	6.5	5.8	7.2
30-34	14643	6510	8133	6.5	6.1	6.9
35-39	14687	6392	8295	6.5	5.9	7.1
40-44	14545	7005	7540	6.5	6.5	6.4
45-49	11282	5728	5554	5.0	5.3	4.7
50-54	8133	4041	4092	3.6	3.8	3.5
55-59	7261	3279	3982	3.2	3.1	3.4
60-64	6623	2910	3713	3.0	2.7	3.2
65-69	5346	2586	2760	2.4	2.4	2.4
70-74	3584	1794	1790	1.6	1.7	1.5
75-79	2009	1026	983	0.9	1.0	0.8
80-84	933	497	436	0.4	0.5	0.4
85+	515	299	216	0.2	0.3	0.2

Table 2.4. Mid-year population by age, sex, and area, 2004

Age (years)	ICDDR,B area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	111651	53259	58392	112825	54180	58645
<1 year	2762	1419	1343	2735	1389	1346
1 - 4	10629	5324	5305	10973	5662	5311
1	2724	1381	1343	2796	1425	1371
2	2800	1385	1415	2780	1454	1326
3	2616	1307	1309	2808	1436	1372
4	2489	1251	1238	2589	1347	1242
5 - 9	12256	6198	6058	12872	6622	6250
10-14	11747	5897	5850	13714	6889	6825
15-19	11506	5417	6089	12505	6097	6408
20-24	9248	4055	5193	9336	4209	5127
25-29	7730	3284	4446	6902	2910	3992
30-34	7596	3392	4204	7047	3118	3929
35-39	7653	3349	4304	7034	3043	3991
40-44	7453	3607	3846	7092	3398	3694
45-49	5712	2937	2775	5570	2791	2779
50-54	4155	2079	2076	3978	1962	2016
55-59	3678	1672	2006	3583	1607	1976
60-64	3331	1483	1848	3292	1427	1865
65-69	2643	1288	1355	2703	1298	1405
70-74	1749	903	846	1835	891	944
75-79	1048	535	513	961	491	470
80-84	477	252	225	456	245	211
85+	278	168	110	237	131	106

Fig. 2.2. Age pyramid of the 2004 mid-year population



CHAPTER 3

MORTALITY

The distribution of 1,582 deaths by age at death and sex for the whole study area and for the ICDDR,B and Government service areas is shown in Tables 3.1 and 3.2 respectively. Of the 1,582 deaths, 15.4% were infants, 4.2% were of children age 1-4 years, and 58.5% were aged 60 years and above in 2004.

Tables 3.3 and 3.4 show the corresponding age-sex-specific mortality rates for the study area and for the ICDDR,B and Government service areas. Block-wise deaths in the ICDDR,B area by age and sex are shown in Appendix A.2. In 2004, the male infant mortality rate was 44.4 and the female infant mortality rate was 43.4 per 1,000 live births, whereas in 2003, the male infant mortality rate was 46.9 and the female infant mortality rate was 42.6. This decrease in the ICDDR,B area and increase in the Government service area are a result of compensating movements in the neonatal and post-neonatal mortality rates. The maternal mortality ratio was 1.8 per 1000 live births in the ICDDR,B area and 2.9 per 1000 live birth in the Government service area. In 2004, the overall death rate for males and females was 8.0 and 6.2 respectively. In most age groups, the death rates were higher in the Government service area than in the ICDDR,B area.

Table 3.5 shows the abridged life tables for males and females derived from these rates, and the l_x values are plotted in Figure 3.1 (for Life Table Equations see Appendix C). The expectation of life at birth is almost the same as a whole compared to the 2003 level. The expectation of life at birth was 67.0 years for males and 69.9 for females. The difference in the expectation of life between the two areas was more pronounced for males (2.8 yrs) than for females (1.2 yrs). Expectation of life at each age in each area was higher for females than for males (Appendices A.3 and A.4), except for a few age groups.

The levels of adult (15-59 years) mortality decreased in the surveillance area as a whole in 2004 compared to 2003. The probability of dying for males aged 15-60 years (${}_{45}q_{15}$) was 164, and for females it was 99 per 1,000 population in 2004. In the age group of 60-74 years, expectation of life is longer for females than males but after 75 years, expectation of life is longer for males than females in 2004.

Table 3.6 and Figure 4.1 show the distribution of deaths by age and month of occurrence. Deaths of those aged 5 years and above tend to peak in the winter months. Neonatal deaths were also most frequent in winter months. Post-neonatal deaths were higher in May and child deaths, on the other hand, were highest in August.

Deaths by underlying causes, sex, age, and by areas are shown in Tables A.5 - A.8. A special supplement is appended for causes of deaths for 2003-2004 based on structured Verbal Autopsy (VA) in Chapter 9. Table 3.7 gives the age-standardized mortality rates

by cause of death and sex and by area, using the WHO-standard world population age structure as shown in Appendix D (WHO, 2000). Deaths due to communicable diseases were prominent led by tuberculosis (among males), then diarrhoea and respiratory infections. Deaths due to tuberculosis occurred more among males than females. Prematurity and low birth weight were also important causes of death irrespective of sex and area. Among non-communicable diseases, death rates due to the circulatory system (hypertensive disease, ischaemic heart disease and stroke), neoplasm, asthma, diabetes, and digestive disease were more prominent in both sexes and in both the areas. Accidents and drowning were the major causes of death in the injury category irrespective of sex and areas. Among the miscellaneous causes, senility followed by fever of unknown origin were more prominent in both sexes and in both the areas. Maternal mortality rate (8.53 and 13.53 per 100000 population in ICDDR,B area and Government service area respectively) was lower in the ICDDR,B area than the Government service area; this may be due to the maternal and child health intervention (MCH-FP) program in the area since 1978. Other differences between the two areas varied by sex, especially in Chronic Obstructive Pulmonary Disease (COPD) and other respiratory diseases.

Table 3.1. Deaths by age and sex, 2004

Age	Both sexes		Male		Female	
	Number	Cumulative percentage	Number	Cumulative percentage	Number	Cumulative percentage
All ages	1582	-	858	-	724	-
<1 year	243	-	124	-	119	-
<i><1 month</i>	180	11.4	95	11.1	85	11.7
<i>1- 5 months</i>	43	14.1	21	13.5	22	14.8
<i>6-11 months</i>	20	15.4	8	14.5	12	16.4
1 - 4 years	66	-	38	-	28	-
<i>1</i>	35	17.6	15	16.2	20	19.2
<i>2</i>	12	18.3	10	17.4	2	19.5
<i>3</i>	7	18.8	5	17.9	2	19.8
<i>4</i>	12	19.5	8	18.9	4	20.3
5 – 9	23	21.0	11	20.2	12	22.0
10-14	18	22.1	7	21.0	11	23.5
15-19	23	23.6	8	21.9	15	25.6
20-24	20	24.8	9	23.0	11	27.1
25-29	12	25.6	6	23.7	6	27.9
30-34	19	26.8	10	24.8	9	29.1
35-39	32	28.8	16	26.7	16	31.4
40-44	44	31.6	30	30.2	14	33.3
45-49	48	34.6	28	33.4	20	36.0
50-54	46	37.5	34	37.4	12	37.7
55-59	63	41.5	37	41.7	26	41.3
60-64	124	49.4	78	50.8	46	47.7
65-69	190	61.4	98	62.2	92	60.4
70-74	192	73.5	105	74.5	87	72.4
75-79	198	86.0	106	86.8	92	85.1
80-84	120	93.6	57	93.5	63	93.8
85+	101	100.0	56	100.0	45	100.0

Table 3.2. Deaths by area, age, and sex, 2004

Age	ICDDR,B area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	751	398	353	831	460	371
<1 year	107	58	49	136	66	70
<1 month	81	44	37	99	51	48
1- 5 months	16	8	8	27	13	14
6-11 months	10	6	4	10	2	8
1 – 4 years	36	20	16	30	18	12
1	18	8	10	17	7	10
2	7	5	2	5	5	0
3	5	3	2	2	2	0
4	6	4	2	6	4	2
5 - 9	13	5	8	10	6	4
10-14	7	3	4	11	4	7
15-19	9	4	5	14	4	10
20-24	5	4	1	15	5	10
25-29	5	3	2	7	3	4
30-34	10	5	5	9	5	4
35-39	14	6	8	18	10	8
40-44	21	15	6	23	15	8
45-49	25	16	9	23	12	11
50-54	20	12	8	26	22	4
55-59	27	14	13	36	23	13
60-64	55	32	23	69	46	23
65-69	91	42	49	99	56	43
70-74	92	56	36	100	49	51
75-79	97	42	55	101	64	37
80-84	68	32	36	52	25	27
85+	49	29	20	52	27	25

**Table 3.3. Death rates by age and sex, 2004
(per 1,000 population)**

Age	Both sexes	Male	Female
All ages	7.0	8.0	6.2
<1 year*	43.9	44.4	43.4
<1 month*	32.5	34.0	31.0
1- 5 months*	7.8	7.5	8.0
6-11 months*	3.6	2.9	4.4
1 - 4 years	3.1	3.5	2.6
1	6.3	5.3	7.4
2	2.2	3.5	0.7
3	1.3	1.8	0.7
4	2.4	3.1	1.6
5 - 9	0.9	0.9	1.0
10-14	0.7	0.5	0.9
15-19	1.0	0.7	1.2
20-24	1.1	1.1	1.1
25-29	0.8	1.0	0.7
30-34	1.3	1.5	1.1
35-39	2.2	2.5	1.9
40-44	3.0	4.3	1.9
45-49	4.3	4.9	3.6
50-54	5.7	8.4	2.9
55-59	8.7	11.3	6.5
60-64	18.7	26.8	12.4
65-69	35.5	37.9	33.3
70-74	53.6	58.5	48.6
75-79	98.6	103.3	93.6
80-84	128.6	114.7	144.5
85+	196.1	187.3	208.3

*Rate per 1,000 live births

**Table 3.4. Death rates by area, age, and sex, 2004
(per 1,000 population)**

Age	ICDDR,B area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	6.7	7.5	6.0	7.4	8.5	6.3
<1 year*	39.1	42.4	35.8	48.5	46.3	50.8
<1 month*	29.6	32.2	27.1	35.3	35.8	34.8
1- 5 months*	5.9	5.8	5.9	9.6	9.1	10.2
6-11 months*	3.7	4.4	2.9	3.6	1.4	5.8
1 - 4 years	3.4	3.8	3.0	2.7	3.2	2.3
1	6.6	5.8	7.4	6.1	4.9	7.3
2	2.5	3.6	1.4	1.8	3.4	0.0
3	1.9	2.3	1.5	0.7	1.4	0.0
4	2.4	3.2	1.6	2.3	3.0	1.6
5 - 9	1.1	0.8	1.3	0.8	0.9	0.6
10-14	0.6	0.5	0.7	0.8	0.6	1.0
15-19	0.8	0.7	0.8	1.1	0.7	1.6
20-24	0.5	1.0	0.2	1.6	1.2	2.0
25-29	0.6	0.9	0.4	1.0	1.0	1.0
30-34	1.3	1.5	1.2	1.3	1.6	1.0
35-39	1.8	1.8	1.9	2.6	3.3	2.0
40-44	2.8	4.2	1.6	3.2	4.4	2.2
45-49	4.4	5.4	3.2	4.1	4.3	4.0
50-54	4.8	5.8	3.9	6.5	11.2	2.0
55-59	7.3	8.4	6.5	10.0	14.3	6.6
60-64	16.5	21.6	12.4	21.0	32.2	12.3
65-69	34.4	32.6	36.2	36.6	43.1	30.6
70-74	52.6	62.0	42.6	54.5	55.0	54.0
75-79	92.6	78.5	107.2	105.1	130.3	78.7
80-84	142.6	127.0	160.0	114.0	102.0	128.0
85+	176.3	172.6	181.8	219.4	206.1	235.8

*Rate per 1,000 live births

Table 3.5. Abridged life table by sex, 2004

Age (years)	Male				Female			
	nq_x	l_x	L_x	e^0_x	nq_x	l_x	L_x	e^0_x
0	44.4	100000	96447	67.0	43.4	100000	96532	69.9
1	5.3	95559	95258	69.1	7.3	95665	95250	72.0
2	3.5	95049	94882	68.5	0.7	94962	94928	71.6
3	1.8	94715	94629	67.8	0.7	94893	94858	70.6
4	3.1	94543	94397	66.9	1.6	94822	94746	69.7
5	4.3	94252	470330	66.1	4.9	94670	472287	68.8
10	2.7	93848	468651	61.4	4.3	94209	470106	64.1
15	3.5	93592	467211	56.5	6.0	93801	467712	59.4
20	5.4	93267	465168	51.7	5.3	93240	465056	54.7
15	4.8	92761	462770	47.0	3.5	92744	462962	50.0
30	7.7	92312	459932	42.2	5.5	92415	460899	45.2
35	12.4	91606	455399	37.5	9.6	91905	457489	40.4
40	21.2	90466	447896	32.9	9.2	91022	453172	35.8
45	24.2	88548	437790	28.6	17.9	90181	447186	31.1
50	41.3	86408	423767	24.2	14.6	88571	439876	26.6
55	55.0	82842	403619	20.2	32.2	87281	429903	21.9
60	126.1	78288	368169	16.2	60.2	84474	410529	17.6
65	173.8	68419	313783	13.1	154.5	79388	367859	13.5
70	256.3	56528	247523	10.3	217.6	67126	300524	10.5
75	410.0	42041	166819	8.0	379.3	52519	212852	7.7
80	444.0	24806	96042	6.8	525.0	32598	118441	5.9
85+	1000.0	13791	73636	5.3	1000.0	15484	74323	4.8

**Fig. 3.1. Probability of survival from birth to age(x)
by sex, 2004**

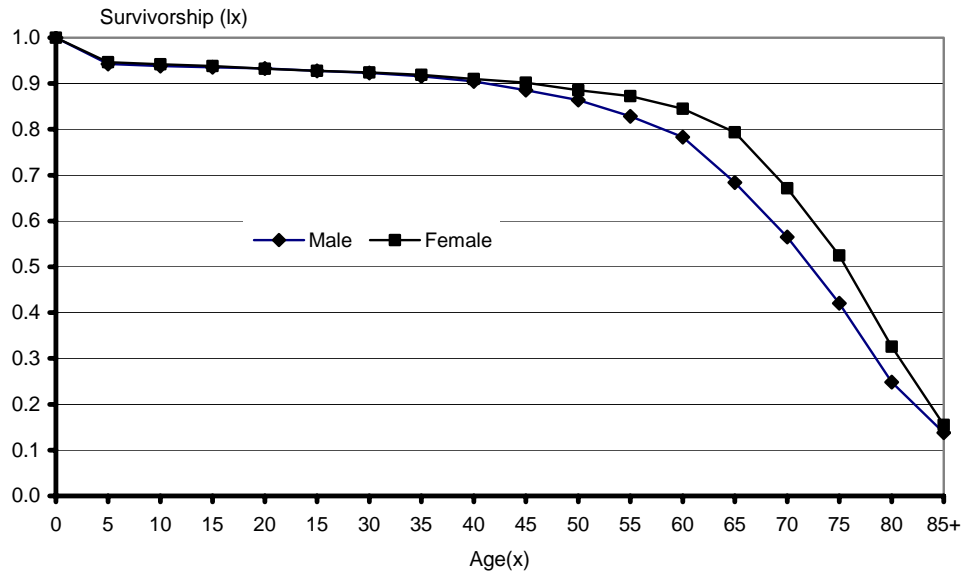


Table 3.6. Deaths by month and age, 2004

Month	All ages	Age at death			
		Under 1 month	1-11 months	1-4 years	5 years and above
January	159	21	5	4	129
February	141	14	6	3	118
March	124	12	3	2	107
April	113	13	6	9	85
May	139	17	6	10	106
June	116	12	6	7	91
July	108	15	6	6	81
August	113	14	7	7	85
September	127	17	3	6	101
October	127	20	6	4	97
November	149	15	5	6	123
December	166	10	4	2	150
Total	1582	180	63	66	1273

**Table 3.7. Age-standardized mortality rates by cause of death, 2004
(per 100,000 population)***

Cause of death	Male		Female	
	ICDDR,B area	Government service area	ICDDR,B area	Government service area
Communicable diseases				
Diarrhoeal	20.34	18.93	22.41	11.41
Dysentery	(3.70)	(2.59)	(2.60)	(6.25)
Tuberculosis	24.07	56.71	(4.60)	(8.58)
EPI related death	0.00	(1.24)	0.00	(1.32)
Meningitis	0.00	0.00	0.00	(3.93)
Hepatitis	(8.43)	(7.44)	0.00	(2.14)
Chicken pox	(2.49)	0.00	0.00	0.00
Rabies	0.00	0.00	(1.44)	0.00
Respiratory infections	21.03	36.52	17.42	21.46
Other communicable	0.00	(1.30)	0.00	0.00
Maternal and neonatal conditions				
Maternal death	-	-	8.53	13.53
Neonatal condition				
-Premature and LBW	17.76	20.73	21.44	26.75
-Birth asphyxia	(1.27)	(3.89)	(5.36)	(4.01)
-Other neonatal	34.25	31.10	17.42	25.41
Nutritional	(4.97)	(6.24)	27.86	16.79
Non-communicable diseases				
Malignant neoplasm				
-Neoplasm	94.28	85.19	43.48	22.87
-Neoplasm in female organ	0.00	0.00	9.65	(4.48)
-Neoplasm other kinds	(9.86)	(6.85)	(3.63)	9.23
Endocrine disorder				
-Diabetes	55.57	76.39	44.53	40.41
Neuro-psychiatric	11.16	29.53	13.92	23.21
Diseases of circulatory system				
-Rheumatic heart disease	0.00	0.00	(3.20)	(1.39)
-Hypertension disease	149.89	77.39	136.99	96.94
-Ischaemic heart disease	54.43	72.85	22.88	23.42
-Stroke	78.92	92.92	153.51	126.90
-Other cardiovascular	39.43	60.80	29.62	76.43

(continued)

Table 3.7 (contd.). Age-standardized mortality rates by cause of death, 2004 (per 100,000 population)*

Cause of death	Male		Female	
	ICDDR,B area	Government service area	ICDDR,B area	Government service area
Respiratory disease				
-COPD**	(13.52)	34.14	(9.32)	20.16
-Asthma	60.17	46.07	24.92	(12.06)
-Other respiratory	23.35	47.11	14.83	15.99
Digestive disease	58.45	89.56	38.87	81.04
Genito-urinary disease				
-Renal failure	(3.61)	(8.95)	13.20	(13.12)
-Nephritic syndrome	0.00	(1.31)	(1.44)	(7.32)
-Other urinary	(10.80)	16.43	(6.28)	(1.60)
Other non-communicable	(4.37)	9.17	13.78	9.97
Injuries				
Unintentional injuries				
-Accident	20.04	34.21	34.99	24.21
-Drowning	24.11	15.06	21.27	17.92
Intentional injuries				
-Suicide	(4.43)	9.54	0.00	9.61
-Homicide	0.00	0.00	0.00	0.00
Miscellaneous causes				
-Senility	34.18	62.97	65.89	53.14
-Fever of unknown origin	20.37	26.17	(7.74)	14.49
-Septicaemia	(7.17)	13.17	(4.73)	(7.20)
-Other miscellaneous	16.34	15.16	23.91	10.73
Unknown/missing	(3.70)	24.34	(9.47)	27.83
Total	936.48	1142.00	881.13	893.24

*Age distribution of standard population is given in Appendix D

**Chronic obstructive pulmonary disease

() Less than 5 deaths

CHAPTER 4

FERTILITY

In 2004, there were 5,537 live births in the HDSS as the outcome of 6,437 pregnancies recorded. Table 4.1 shows the number of pregnancies and their outcomes in 2004. The number of live births increased overall by 227, or 3.9 %, in 2004 compared to 2003. In the study area as a whole, 85% of pregnancies resulted in a live birth, a proportion that remains almost the same from year to year; pregnancies resulting in fetal wastages have no definite trend. Among the pregnancies resulting in live births, 60 were multiple births.

Table 4.2 and Figure 4.1 show the distribution of pregnancies by outcome, and live births by sex and month of occurrence. The data show the usual marked seasonal variation of births, peaking in September-January. The sex ratio of live births was 102 males per 100 females; there is no definite trend over the period.

Table 4.3 shows the age-specific fertility rates for the study area, together with the total fertility rate, general fertility rate, and gross and net reproduction rates. Figure 4.2 shows the age-specific fertility rates for both ICDDR,B and Government service areas. In most of the age groups, the fertility rates were higher in the Government service area compared to the ICDDR,B area. The age-specific fertility rates and indices for the ICDDR,B area by blocks are shown in Appendix A.9.

Table 4.4 shows the distribution of place of delivery by area. In the Government service area, about 90 percent deliveries were at home, whereas in ICDDR,B area this percentage was 60 followed by ICDDR,B hospital (21%) and ICDDR,B sub-centres (12%). Table 4.5 shows the distribution of birth attendants by area. TBAs are more (79%) prominent in the Government service area; 36% births were attended by TBAs and Trained TBAs (18%) in ICDDR,B area followed by FWVs/SHAs (33%). Table 4.6 illustrates the mode of delivery by area.

The breakdown by birth order facilitates a more detailed and sensitive analysis of fertility trends and differentials. Thus the totals of the order-specific rates represent the components by birth order of the TFR. In the same way TFR represents the average number of children that would be borne by a woman if she goes through life having children at the current rates, so the total for birth order N represents the proportion of women who would have at least N children. Thus, the tables (Appendices A.10 and A.11) highlight the differences between the ICDDR,B area and the Government service area. There is comparatively little difference between the two areas for birth orders 1, 2 and 3 but thereafter they widen dramatically.

Table 4.1. Numbers and rates of pregnancy outcomes by type and area, 2004

Type of pregnancy Outcome	Both areas		ICDDR,B area		Government service area	
	Number	Rate	Number	Rate	Number	Rate
Total pregnancies*	6436	105.9	3121	101.1	3315	110.8
Live birth preg.**	5487	852.5	2714	869.6	2773	836.5
Foetal wastage**	949	147.5	407	130.4	542	163.5
Early (miscarriage)***	781	121.3	335	107.3	446	134.5
<i>Induced</i>	323	50.2	104	33.3	219	66.1
<i>Spontaneous</i>	458	71.2	231	74.0	227	68.5
Late (stillbirth)	168	26.1	72	23.1	96	29.0
Multiple birth preg.	60		26		34	
Multiple live birth preg.	56		24		32	
<i>Three live births</i>	1		0		1	
<i>Two live births</i>	48		22		26	
<i>One live birth</i>	7		2		5	
Stillbirth pregnancies	0		0		0	
Two stillbirths	0		0		0	
Miscarriage pregnancies	4		2		2	

*Rate per 1,000 women of age 15-49 years (GFR)

**Rate per 1,000 total pregnancies

***Less than 28 weeks

Table 4.2. Pregnancy outcomes by month, 2004

Month	Pregnancy outcome					No. of live born children			
	Miscarriage			Still Birth	Live birth ^a	Both sexes	Male	Female	Ratio
	All	Induced	Spon.						
All months	6436	323	458	168	5487	5537	2792	2745	1.02
January	568	31	34	8	495	504	266	238	1.12
February	486	24	46	10	406	409	218	191	1.14
March	481	21	47	18	395	396	197	199	0.99
April	520	40	60	14	406	409	202	207	0.98
May	468	30	48	16	374	376	190	186	1.02
June	450	36	35	14	365	368	187	181	1.03
July	429	28	41	13	347	350	172	178	0.97
August	525	25	33	13	454	463	241	222	1.09
September	552	28	34	14	476	481	246	235	1.05
October	691	21	26	17	627	635	323	312	1.04
November	663	14	26	14	609	612	308	304	1.01
December	603	25	28	17	533	534	242	292	0.83

^aFor any multiple birth pregnancy, the outcome is recorded as live birth, if at least one of the issue is live born

Fig. 4.1. Number of births and deaths by month, 2004

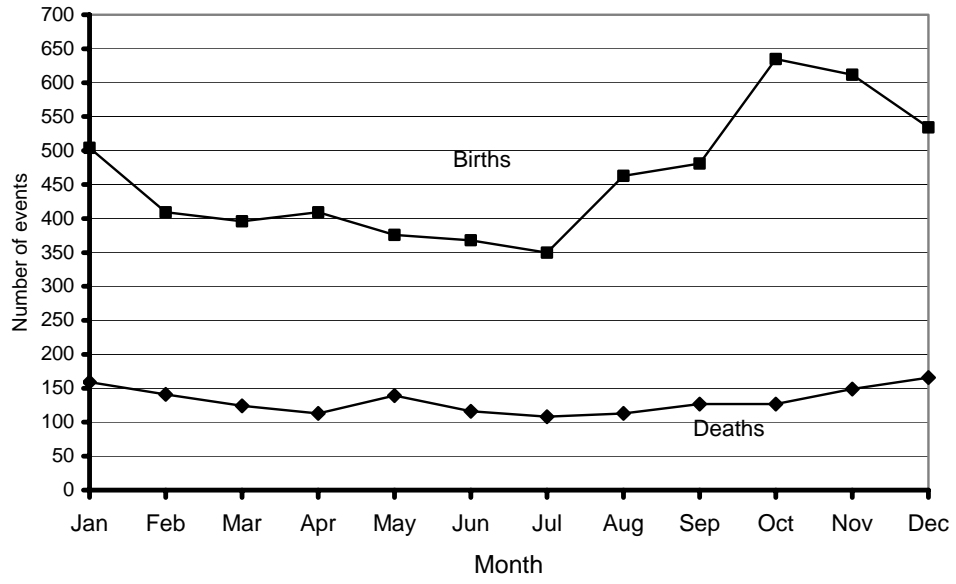


Table 4.3. Age-specific fertility rates (per 1,000 women) and indices by area, 2004

Age (years)	Both areas		ICDDR,B area		Government service area	
	Births	Rate	Births	Rate	Births	Rate
All ages	5537	91.1	2735	88.63	2802	93.6
15-19*	746	59.7	402	66.02	344	53.7
20-24	1787	173.2	824	158.68	963	187.8
25-29	1484	175.9	740	166.44	744	186.4
30-34	984	121.0	491	116.79	493	125.5
35-39	445	53.6	233	54.14	212	53.1
40-44	86	11.4	42	10.92	44	11.9
45-49**	5	0.9	3	1.08	2	0.7
Total fertility rate		2978		2870		3096
General fertility rate		91		89		94
Gross reproduction rate		1477		1435		1522
Net reproduction rate		1367		1343		1394

*Births to mothers under age 15 were included in this group

**Births to mothers age 50 and above were included in this group

Fig. 4.2. Age-specific fertility rates by area, 2004

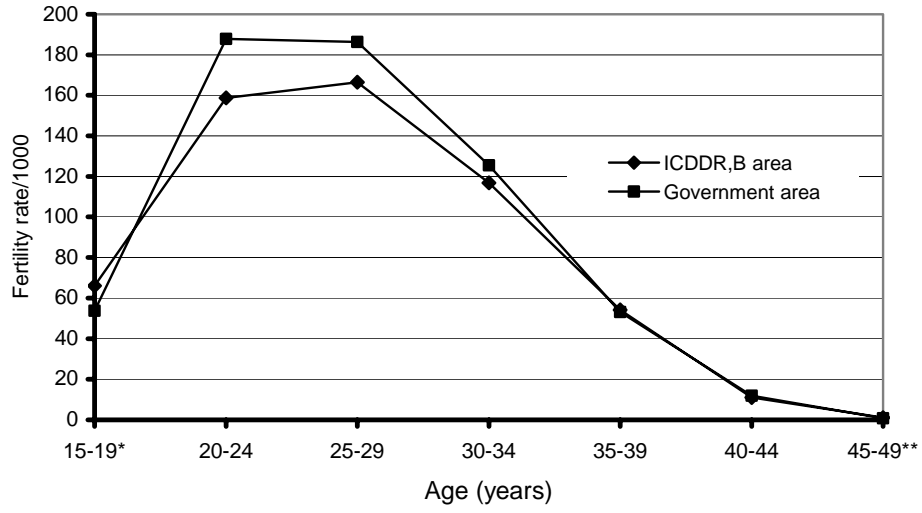


Table 4.4. Distribution of place of delivery by area, 2004

Place of Delivery	ICDDR,B area		Government service area		Both areas	
	Number	Percent	Number	Percent	Number	Percent
Home	1566	57.7	2475	89.3	4041	73.6
ICDDR,B sub-centre	322	11.9	6	0.2	328	6.0
ICDDR,B hospital	566	20.9	5	0.2	571	10.4
Upazila health complex	59	2.2	98	3.5	157	2.9
District hospital	75	2.8	78	2.8	153	2.8
Clinic/nursing home	117	4.3	67	2.4	184	3.4
UH&FWC	1	0.0	37	1.3	38	0.7
Others	8	0.3	7	0.3	15	0.3
Total	2714	100.0	2773	100.0	5487	100.0

Data source: Birth registration form

Table 4.5. Distribution of birth attendant by area, 2004

Birth Attendant	ICDDR,B area		Government service area		Both areas	
	Number	Percent	Number	Percent	Number	Percent
TBA	986	36.3	2184	78.8	3170	57.8
Trained TBA	497	18.3	227	8.2	724	13.2
FWV/SHA	881	32.5	77	2.8	958	17.5
Nurse	57	2.1	135	4.9	192	3.5
MBBS doctor	227	8.4	98	3.5	325	5.9
Other attendant	64	2.4	50	1.8	114	2.0
None	2	0.1	2	0.1	4	0.1
Total	2714	100.0	2773	100.0	5487	100.0

FWV = Female Welfare Visitor
SHA = Senior Health Assistant

Table 4.6. Distribution of mode of delivery by area, 2004

Mode of Delivery	ICDDR,B area		Government service area		Both areas	
	Number	Percent	Number	Percent	Number	Percent
Normal vaginal	2539	93.6	2668	96.2	5207	94.9
Operation (C/S)	166	6.1	93	3.4	259	4.7
Instrumental (forcep & ventose)	9	0.3	12	0.4	21	0.4
Total	2714	100.0	2773	100.0	5487	100.0

CHAPTER 5

MARRIAGE AND DIVORCE

The definitions adopted by the HDSS specify that if either partner in a marriage is resident in the study area, the marriage should be registered. The number of marriages registered in 2004 was 3,012, giving a crude marriage rate of 13.4 per 1,000 population. This figure shows a decrease over that of 2003, which was 14.1.

Tables 5.1 and 5.2 show the distribution of grooms and brides by age at marriage and previous marital status. The mean ages at marriage—27.4 and 20.0 for all grooms and brides respectively; 26.6 and 19.4 for those marrying for the first time—are almost the same as those of 2003. In general there would appear to have been a long-term rise in age at marriage of female in Matlab: the mean age for females has been over 18 years for every year since 1985, while prior to that date it was consistently below that age (Figure 5.2).

Table 5.3 shows the marriage rates by age and sex. Among males, the marriage rate was 37.3 per 1,000 persons and for females, the rate was 32.9 per 1,000 aged 10 years and above. For females, the highest rate is 125.7 per 1,000 in the 15-19 year age group, while for males the highest rate is 169.4 in the age group of 25-29 years. Table 5.4 shows distribution of current marital status of the study population by age and sex, 2004. Among the population 44 percent were currently married and higher for females than males (46% vs 42%). Widows were 9% for females which is much higher than males (0.7%). This may be due to the difference in remarriage, which is more common among males than females.

Table 5.6 shows the percentage distribution of dowry and type of payments during the period 2002-2004. Percentage of dowry is declining slightly from 65.2 in 2002 to 63.5 in 2004.

The number of divorces was 286 in 2004 (Appendix A.12). The number of divorces was more than 500 each year during 1978-1981. Since 1981, this figure has been less than 500. In general, the incidence of divorce in Matlab has fallen. Table 5.5 shows the mean and median durations in months of marriage at divorce by age and sex. The average duration of marriage of all divorcing husbands at the time of divorce was 38.2 months. Figure 5.1 shows the distribution of marriages and divorces by month. There has been no strong seasonal pattern for marriages or divorces in 2004 but marriages were high in month of February and March and low in August.

The Figure 5.2 shows the trends in age at marriage and age at first birth in Matlab and the national level. Age at marriage increased about 3 years over the period (1978-2004). In the ICDDR,B area the mean age at marriage increased from 16.8 years in 1978 to 19.5 years in 2004 and in the Government area the mean age at marriage increased from 16.7 years in 1978 to 19.3 years in 2004. But the interval between marriage and first birth has not increased likewise even though the intensive MCH-FP services available in ICDDR,B area. In comparison with the national level, age at first marriage and age at first birth were much higher in Matlab than national level (BDHS, 2004) but trends in interval between marriage and first birth is similar to Matlab.

Table 5.1. Groom's age at marriage by previous marital status, 2004

Age (years)	Previous marital status (%)				
	All grooms	Single	Married	Divorced	Widowed
	100.0	87.8	2.8	7.2	2.1
All ages	100.0 (n=3011)	100.0 (n=2645)	100.0 (n=84)	100.0 (n=218)	100.0 (n=64)
10-14	0.0	0.0	0.0	0.0	0.0
15-19	5.3	5.7	3.6	3.2	0.0
20-24	29.1	30.9	17.9	17.4	6.3
25-29	34.8	36.8	16.7	26.6	6.3
30-34	22.0	21.6	25.0	28.9	12.5
35-39	4.8	4.0	7.1	11.0	17.2
40-44	2.1	0.8	16.7	7.3	18.8
45-49	0.9	0.1	6.0	3.7	17.2
50-54	0.1	0.0	1.2	0.5	1.6
55-59	0.1	0.0	1.2	0.0	4.7
60-64	0.2	0.0	2.4	0.0	6.3
65+	0.3	0.0	2.4	0.9	9.4
Unknown	0.0	0.0	0.0	0.5	0.0
Median age*	27	26	31	30	43
Mean age*	27.4	26.6	33.7	30.7	43.0
Standard deviation*	6.3	4.8	11.2	8.2	12.8

*Mean and median ages and standard deviation were calculated from ungrouped age data

Table 5.2. Bride's age at marriage by previous marital status, 2004

Age (years)	Previous marital status (%)			
	All brides	Single	Divorced	Widowed
	100.0	91.5	7.5	1.0
All ages	100.0 (n=3011)	100.0 (n=2755)	100.0 (n=226)	100.0 (n=30)
10 - 14	3.2	3.4	0.4	0.0
15 - 19	52.2	55.2	22.1	3.3
20 - 24	32.5	32.8	31.4	13.3
25 - 29	8.4	6.9	23.0	30.0
30 - 34	2.6	1.4	13.3	26.7
35 - 39	0.6	0.1	4.9	6.7
40 - 44	0.4	0.0	3.5	13.3
45 - 49	0.1	0.0	0.9	3.3
50 - 54	0.0	0.0	0.4	0.0
55 - 59	0.0	0.0	0.0	0.0
60 - 64	0.0	0.0	0.0	3.3
65+	0.0	0.0	0.0	0.0
Median age*	19	19	24	30
Mean age*	20.0	19.4	25.1	31.9
Standard deviation*	4.5	3.6	7.1	8.8

*Mean and median ages and standard deviation were calculated from ungrouped age data

Table 5.3. Marriage rates by age and sex, 2004

Age (years)	Male			Female		
	Marriages	Population	Rate*	Marriages	Population	Rate*
All ages (10+ yrs)	3011	80825	37.3	3011	91424	32.9
10-14	1	12786	0.1	96	12675	7.6
15	3	2577	1.2	182	2817	64.6
16	10	2433	4.1	278	2539	109.5
17	23	2351	9.8	371	2461	150.8
18	59	2301	25.6	384	2465	155.8
19	66	1852	35.6	357	2215	161.2
20-24	875	8264	105.9	979	10320	94.9
25-29	1049	6194	169.4	252	8438	29.9
30-34	663	6510	101.8	77	8133	9.5
35-39	146	6392	22.8	17	8295	2.0
40-44	64	7005	9.1	13	7540	1.7
45+	51	22160	2.3	5	23526	0.2
Unknown	1	-	-	0	-	-

*Rates per 1,000 population irrespective of previous marital status

Table 5.4. Distribution of current marital status (%) of the study population by age and sex, 2004

Age (years)	Male					Female				
	NM	PM	WID	DIV	Total	NM	PM	WID	DIV	Total
0-4	100.0	0.0	0.0	0.0	13794	100.0	0.0	0.0	0.0	13305
5-9	100.0	0.0	0.0	0.0	12820	100.0	0.0	0.0	0.0	12308
10-14	100.0	0.0	0.0	0.0	12786	99.4	0.6	0.0	0.0	12675
15-19	98.6	1.3	0.0	0.0	11514	77.3	21.9	0.0	0.8	12498
20-24	79.7	19.8	0.0	0.4	8264	25.6	72.9	0.1	1.3	10320
25-29	43.2	55.9	0.0	0.9	6194	6.9	91.3	0.6	1.2	8438
30-34	14.5	84.7	0.0	0.7	6510	1.8	95.7	1.3	1.2	8133
35-39	3.5	95.9	0.0	0.6	6392	0.5	95.3	2.8	1.4	8295
40-44	1.0	98.6	0.1	0.3	7005	0.3	91.2	6.4	2.1	7540
45-49	0.5	98.8	0.3	0.3	5728	0.2	84.5	13.2	2.2	5554
50-54	0.2	98.8	0.5	0.5	4041	0.0	75.6	22.6	1.8	4092
55-59	0.3	98.2	1.2	0.3	3279	0.1	62.6	36.0	1.4	3982
60-64	0.1	97.5	2.0	0.3	2910	0.1	46.4	52.5	1.1	3713
65-69	0.1	94.8	4.6	0.5	2586	0.1	30.5	68.9	0.5	2760
70-74	0.1	91.8	7.7	0.5	1794	0.1	16.1	83.2	0.6	1790
75-79	0.0	85.7	13.8	0.5	1026	0.0	10.7	88.8	0.5	983
80-84	0.2	78.9	19.5	1.4	497	0.0	4.8	94.5	0.7	436
85+	0.0	61.5	37.8	0.7	299	0.0	0.9	99.1	0.0	215
All (%)	57.1	42.0	0.7	0.3	100.0	43.9	46.0	9.2	0.9	100.0
Total population	61313	45075	757	294	107439	51325	53860	10816	1036	117037

NM=Never married, PM=Presently married, WID=Widowed, DIV=Divorced

Table 5.5. Mean and median duration (months) of all marriages at divorce by age and sex, 2004

Age (years) at divorce	Male				Female			
	No.	Mean	Median	SD	No.	Mean	Median	SD
< 20	14	17.6	8.5	22.0	101	14.3	12	10.5
20 – 24	54	19.0	12.5	17.2	95	28.3	23	23.2
25 – 29	86	30.6	20	34.1	44	48.8	40.5	43.0
30 – 34	70	42.1	24	46.4	23	65.7	72	58.8
35 – 39	27	55.2	34	61.3	13	109.2	108	86.1
40 – 49	24	92.4	63	82.2	8	156.9	146.5	143.7
50+	11	12.2	9	12.8	2	250.0	250	155.6
All ages	286	38.3	20.0	54.0	286	38.3	20.0	54.0

Table 5.6. Percentage distribution of dowry and type of payment, 2002-2004

Characteristics	Year		
	2002	2003	2004
Dowry	65.2	64.8	63.5
Payment type:			
Full	NA	NA	20.2
Partially overtime	NA	NA	39.7
No payment*	NA	NA	3.6

NA = Not available

*Was agreed at the time of marriage but not paid as yet

Fig. 5.1. Marriages and divorces by month, 2004

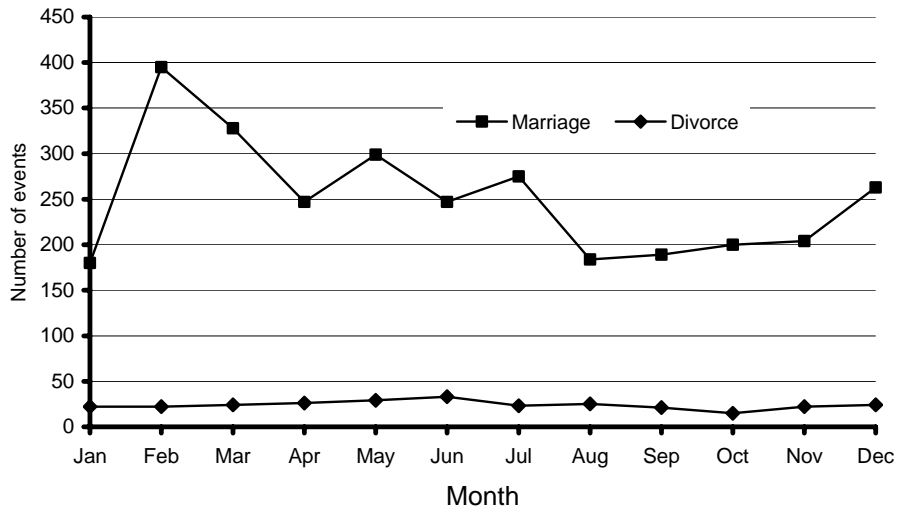
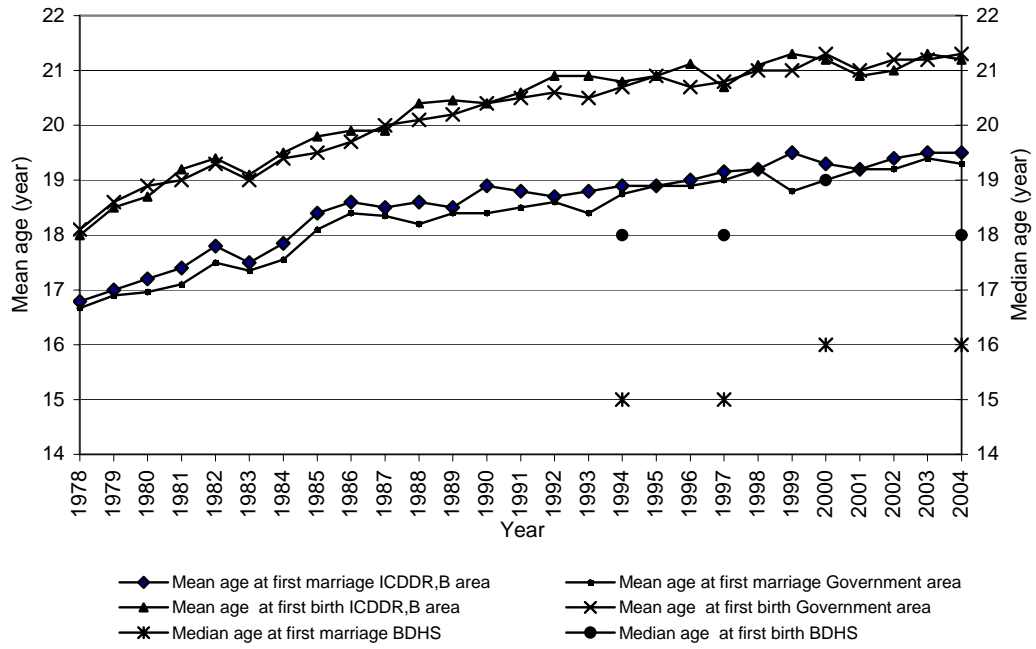


Fig. 5.2. Trends in age at first marriage and first birth in Matlab (1978-2004) and Bangladesh



CHAPTER 6

MIGRATION

An out-migrant is defined as a person originally listed on a HDSS census as a resident, or a person who became a resident by birth or immigration, who subsequently moved out of the surveillance (HDSS) area permanently. Likewise, an in-migrant is an individual neither recorded in the last census nor born or lived in the HDSS area after the census who has permanently moved into the surveillance area. Those who stay in the area continuously for at least 6 months in a year, or come home at least once a month to stay overnight, are treated as permanent residents. These definitions are used in the surveillance area as a whole.

During 2004, 9443 persons (4493 males and 4950 females) moved into the HDSS area, which represented an annual average in-migration of 4.2 percent both for males and females of the mid-year population. On the other hand 12995 persons (6690 males and 6305 females) left the HDSS area or on an average 6 percent for both males and females of the mid-year population (Appendix A.13), giving a crude rate of in-migration of 42.1 per 1000 population, and out-migration rate of 57.9 per 1000 population. The highest incidence of in-migration for males was about 10 percent in the age group 25-29 and for females was 10 percent in the age group 20-24. More males were out-migrated than females in the age group (25-59). The consequence of the out migration of males than females, particularly to urban areas⁷ is that the sex ratio of the population of the area has decreased from 103 in 1982 to 92 males per 100 females in 2004. More out migration of working age (15-59) group males to females (60 per 100 females in 1982 to 112 per 100 females in 2004) also caused a decline in the sex ratio over the period.

Both in-migration and out-migration rates increased over those of 2003. The net loss of migrants was 15.8 per 1,000 in 2004, whereas it was 15.0 per 1,000 in 2003. Table 6.1 presents the age-specific migration rates, which are illustrated in Figure 6.1. The tables and figures show the bi-modal distribution of age commonly found for migrant populations, with a primary peak of young adults and a secondary peak of young children moving with their parents. Male out-migrants were rather younger than male in-migrants, while for females the pattern of age distribution was more similar. Table 6.2 and Figure 6.2 show the numbers moving in and out by month. January and February are the preferred months for migration. Numbers of in- and out-migration by age, sex, and cause of movement are shown in Appendix A.16 through A.19. Roughly, an equal number of men and women move into and out of rural areas, females for marriage and males for seeking jobs. There is a net loss of both men and women to urban Dhaka, primarily of young adults. Migration to the Middle East and other Asian locations is heavily concentrated among out-migrating males aged 15-44 years (Appendices A.20 and A.21).

**Table 6.1. Age and sex-specific migration rates by direction, 2004
(per 1,000 population)**

Age (years)	Both sexes		Male		Female	
	In	Out	In	Out	In	Out
All ages	42.1	57.9	41.8	62.3	42.3	53.9
0 – 4	57.0	57.4	55.2	57.6	58.9	57.3
5 – 9	33.2	36.6	33.6	34.6	32.7	38.7
10-14	25.1	45.4	24.2	44.8	26.0	45.9
15-19	57.6	116.1	34.5	110.1	78.8	121.5
20-24	86.6	132.0	64.4	145.8	104.4	120.9
25-29	77.8	98.1	95.9	126.7	64.6	77.0
30-34	56.5	63.6	80.3	89.1	37.5	43.2
35-39	31.7	41.2	52.7	61.5	15.6	25.6
40-44	22.9	28.5	31.3	41.0	15.1	16.8
45-49	18.3	18.5	27.1	23.9	9.2	13.0
50-54	16.2	16.0	22.5	19.5	10.0	12.5
55-59	12.8	12.4	14.0	13.1	11.8	11.8
60-64	11.0	14.8	13.1	11.0	9.4	17.8
65+	30.9	39.8	22.8	27.5	38.4	51.4

Table 6.2. In- and out-migration by sex and month, 2004

Month	In-migration			Out-migration		
	Both sexes	Male	Female	Both sexes	Male	Female
All months	9443	4493	4950	12995	6690	6305
January	1296	639	657	1392	705	687
February	918	419	499	1577	752	825
March	729	351	378	1009	472	537
April	730	361	369	987	522	465
May	668	289	379	1008	507	501
June	700	327	373	1096	592	504
July	737	352	385	1182	619	563
August	948	444	504	1100	627	473
September	659	319	340	999	503	496
October	830	395	435	907	480	427
November	726	356	370	947	514	433
December	502	241	261	791	397	394

Fig. 6.1. Rates of in- and out-migration by sex and age, 2004

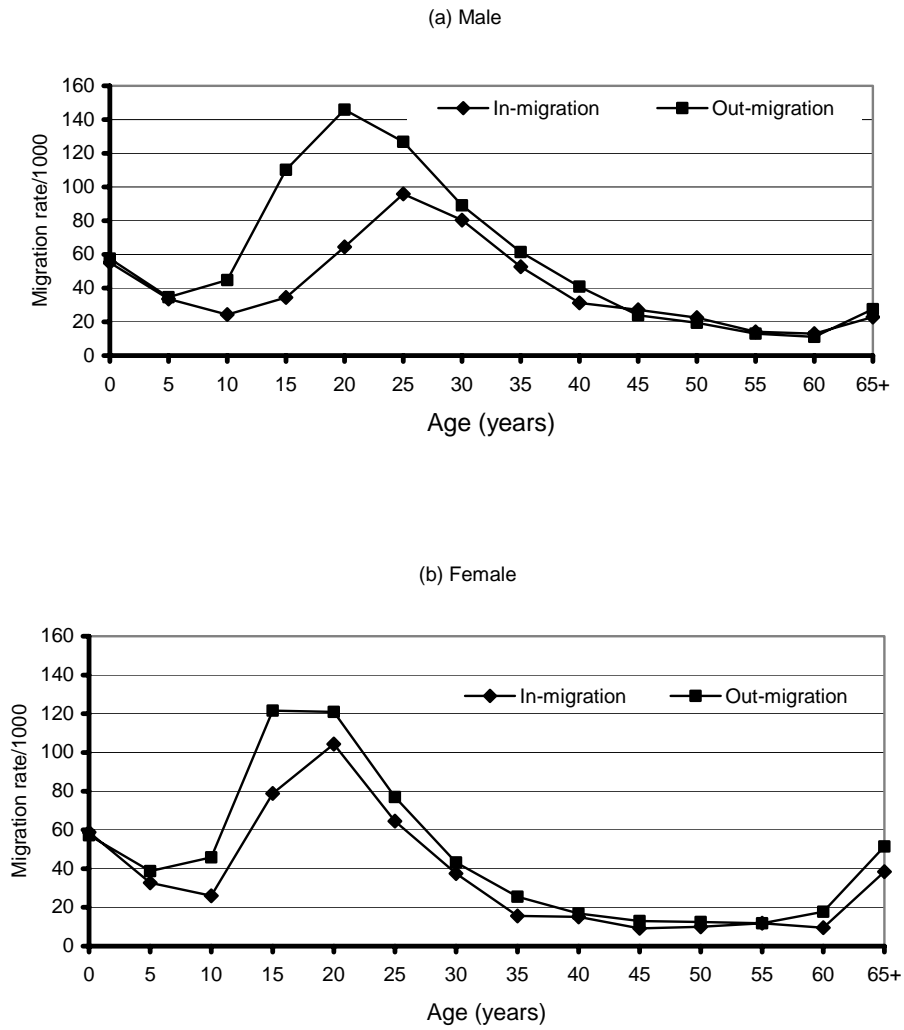
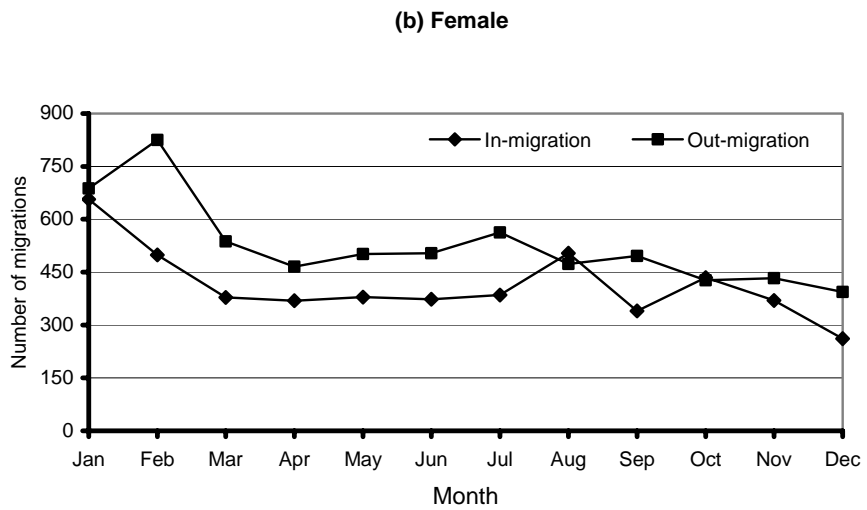
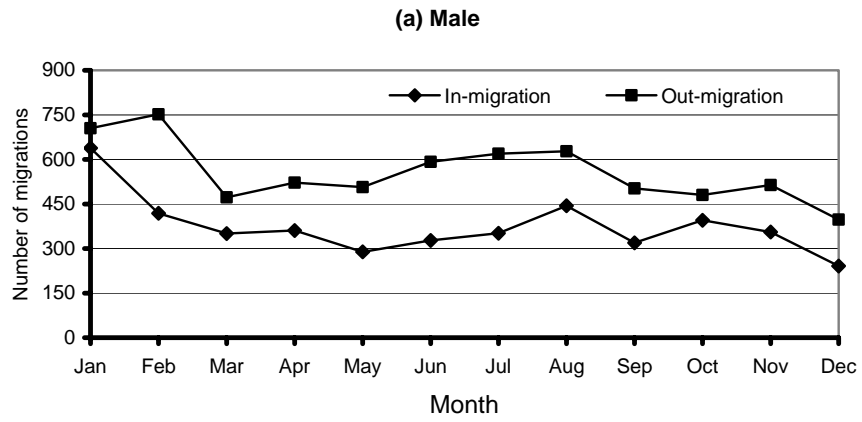


Fig. 6.2. Number of in- and out-migrations by sex and month, 2004



CHAPTER 7

FERTILITY REGULATION

In the ICDDR,B area, the CHRWs have been providing maternal and child health and family planning (MCH-FP) services including EPI from fixed-sites (usually in one room of their houses) since 2001 and maintain records of MCH-FP services they provide. They also refer the patients to ICDDR,B sub-centres. In the Government service area, services are provided from the Union Health and Family Welfare Centre and 8 Satellite Clinics monthly, and from 24 EPI Centres for vaccinations (children, adolescent, and women of reproductive ages).

The CHRWs in both ICDDR,B and Government service areas record family planning methods used by couples in the previous month by asking eligible women about family planning during their monthly home visits. They also motivate couples for adopting family planning; advise pregnant women for antenatal care, safe delivery, and use of safe-delivery kit; advise parents for immunization of children timely; make them aware of symptoms of common childhood morbidity; and advise them to treat sick children by formally trained providers. The motivation activities are more intensive in the ICDDR,B area than in the Government services area.

Contraceptive-use rate (Table 7.1) was 70.4 in 2004 which is almost the same as 2003 in the ICDDR,B area; in the Government service area it was 48.2 which is much less than the national level of 58.1. Table 7.2 shows the difference in contraceptive method-mix between the ICDDR,B and Government service areas in 2004 and the national-level estimates for selected years. At the national level and in the Government service area, the pill is the most widely-used method, followed by injectables and tubectomy, while in the ICDDR,B area, injectables are the most widely-used method, followed by pill, condom, and tubectomy. Changes in the method-mix in the ICDDR,B area during 1990-2004 are shown in Table 7.3. The use of pill, condom and vasectomy has increased at the expense of tubectomy and injectables over the years. The contraceptive-use rate increases with the increase in women's age in the ICDDR,B area (Table 7.4). In the ICDDR,B area, women aged 25 years and over are more likely to use injectables, undergo tubectomy, and adopt traditional methods than women aged less than 25 years, whereas in the Government service area (Table 7.5), the pill is the most popular method in all age groups except age group 45 years and over. Tubectomy and traditional methods are more popular in the age group 40 years and over.

Table 7.1. Contraceptive use rate (%) of currently married women aged 15-49 years by area, 1982-2004

Year	Matlab		
	ICDDR,B area	Government service area*	National**
1982	36.7	-	-
1983	40.3	-	19.1
1984	46.4	15.8	-
1985	46.2	-	-
1986	47.4	-	25.3
1987	51.3	-	-
1988	52.5	-	-
1989	58.8	-	31.4
1990	60.6	27.9	-
1991	61.1	-	39.9
1992	61.1	30.2	-
1993	62.7	-	44.6
1994	65.6	-	-
1995	68.6	-	-
1996	68.1	46.9	49.2
1997	67.4	-	-
1998	68.8	-	-
1999	69.9	-	53.8
2000	69.5	-	-
2001	69.7	-	50.8
2002	70.5	51.4	53.4
2003	69.6	47.2	-
2004	70.4	48.1	58.1

*Sources: In-depth and KAP surveys, 1984 and 1990 respectively; MDHS 1992; HDSS census 1996; and HDSS 2002, 2003 and 2004

**Sources: Contraceptive prevalence survey (CPS), Bangladesh fertility survey (BFS: 1989), Bangladesh demographic and health survey (BDHS: 1993/94, 1996/97, 1999/2000, 2004), Bangladesh maternal health services and maternal mortality survey (BMMS: 2001), and Bangladesh Bureau of Statistics (BBS)

Table 7.2. Contraceptive method mix (%) in different surveys and surveillance areas

Method	Matlab		BMMS 2001	BDHS 2004
	ICDDR,B area 2004	Government service area 2004		
Pill	31.5	48.2	51.2	45.1
Condom	10.5	3.7	6.4	7.2
Injectables	43.6	24.5	15.7	16.7
IUD	2.3	0.5	1.6	1.0
Tubectomy	7.2	11.8	10.6	9.0
Vasectomy	1.4	0.3	1.0	1.0
Norplant	0.1	1.3	1.0	1.4
Others*	3.5	9.7	12.5	18.6
Total	100.0	100.0	100.0	100.0

BDHS=Bangladesh demographic and health survey

BMMS=Bangladesh maternal health services and maternal mortality survey

*Others include periodic abstinence, withdrawal, and other traditional methods

Table 7.3. Contraceptive method mix* (%) in ICDDR,B area, 1990-2004

Method	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Pill	25.4	26.1	27.3	28.1	25.7	25.8	25.4	26.0	29.7	28.7	30.6	31.9	33.3	33.9	32.6
Condom	2.3	2.4	2.7	3.2	3.9	4.7	6.2	7.7	7.1	7.7	9.5	10.8	11.1	11.0	10.9
Injectables	50.8	51.3	51.4	50.2	52.9	54.3	54.4	53.1	50.0	50.4	47.8	45.7	44.5	44.4	45.2
IUD	5.2	4.2	3.6	3.6	3.1	2.7	2.2	1.8	2.3	3.3	2.4	1.9	1.8	1.9	2.4
Tubectomy	15.3	15.1	14.5	14.5	14.0	12.2	11.5	11.1	10.6	9.8	9.1	8.6	7.7	7.2	7.4
Vasectomy	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.1	0.6	1.1	1.5	1.5	1.4
Foam	0.5	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Norplant	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.1
All	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

*Currently married women using any modern method

Table 7.4. Method specific contraceptive use rate among currently married women by age in ICDDR,B area, 2004

Age (years)	Not using	Any method used	Method used								No. of eligible women
			Pill	IUD	Injectables	Condom	Tubectomy	Vasectomy	Others*	Norplant	
Less 20	54.6	45.4	21.7	2.4	14.3	6.7	0.0	0.0	0.3	0.1	1360
20 - 24	43.3	56.7	22.7	3.2	24.8	5.5	0.0	0.1	0.3	0.0	3658
25 - 29	36.7	63.3	22.9	2.3	29.9	7.1	0.3	0.1	0.5	0.1	3896
30 - 34	29.2	70.8	22.4	1.3	35.7	7.2	2.4	0.8	1.0	0.0	4024
35 - 39	21.2	78.8	22.3	0.9	37.3	8.7	5.5	1.7	2.2	0.1	3915
40 - 44	16.7	83.3	22.0	0.8	32.4	8.4	11.3	2.4	5.9	0.1	3423
45 - 49	13.3	86.7	19.1	0.7	28.0	7.7	20.8	1.5	8.9	0.0	1979
Total	29.6	70.4	22.1	1.6	30.7	7.4	5.0	1.0	2.4	0.1	22255

*Others include periodic abstinence, withdrawal, and other traditional methods

Table 7.5. Method specific contraceptive use rate among currently married women by age in Government service area, 2004

Age (years)	Not using	Any method used	Method used								No. of eligible women
			Pill	IUD	Injectables	Condom	Tubectomy	Vasectomy	Others*	Norplant	
Less 20	76.9	23.1	14.9	0.2	3.3	3.2	0.0	0.0	1.5	0.0	1286
20 - 24	64.8	35.2	23.3	0.2	7.8	2.2	0.0	0.0	1.3	0.0	3672
25 - 29	58.1	41.9	26.0	0.3	11.1	1.6	0.5	0.0	1.6	0.0	3593
30 - 34	48.7	51.3	27.8	0.2	15.4	1.5	2.4	0.1	3.0	0.0	3807
35 - 39	39.0	61.0	27.5	0.2	17.6	1.7	6.9	0.1	5.9	0.0	3649
40 - 44	39.5	60.5	20.2	0.2	12.6	1.9	13.5	0.6	11.3	0.0	3224
45 - 49	49.9	50.1	9.5	0.1	6.8	0.7	22.8	0.5	9.4	0.0	1749
Total	51.9	48.1	23.2	0.2	11.8	1.8	5.7	0.2	4.7	0.0	20980

*Others include periodic abstinence, withdrawal, and other traditional methods

CHAPTER 8

USE OF MATERNAL AND CHILD HEALTH SERVICES

Immunization

The Community Health Research Workers (CHRWs) started providing tetanus toxoid (TT) vaccination to all women of reproductive age in blocks A&C in 1981 and in blocks B&D in 1985 of the ICDDR,B area (see Fig. 1.2 for map of Matlab ICDDR,B and Government services areas). Measles vaccination to all children started in blocks A&C and blocks B&D in 1982 and 1985, respectively. Vaccinations for DPT and polio started in 1986 in all four blocks (Appendix E). From the beginning of these interventions, vaccination records have been maintained by CHRWs in the ICDDR,B area. The Record Keeping System (RKS) was started in ICDDR,B and Government services areas in 1977 and 2000, respectively. In contrast, the CHRWs in the Government service area record only vaccination status either by checking the vaccination card or by asking mothers about vaccination of children if the vaccination card was missing. For full protection of newborns against tetanus, it is recommended that pregnant women receive two doses of tetanus toxoid (TT). However, if a woman has been vaccinated during her previous pregnancy, she may require only one booster dose during her subsequent pregnancy. A woman requires 5 doses of TT for life-long protection. The rate of TT coverage is presented in Table 8.1 for women whose latest pregnancies terminated in live births.

The World Health Organization recommends that all children receive a BCG vaccination against tuberculosis; three doses of DPT vaccine for the prevention of diphtheria, pertussis (whooping cough), and tetanus; three doses of polio vaccine; and a vaccination against measles before their first birthday. Therefore, vaccination of children aged 12-23 months is presented to allow comparison of results across the area.

Table 8.1 shows the rates of coverage of different vaccines among women who produced a live birth and among children aged 12-23 months by area in ICDDR,B from 1987 to 2004 and in the Government service area from 2000 to 2004. In 2004, the coverage of TT with at least two doses was 98% in the ICDDR,B area and 89% in the Government service area. According to the Bangladesh Demographic and Health Survey (BDHS) the national coverage of TT with two or more doses in 2004 was 64%. In the ICDDR,B area, in 2004, immunization of children was universal: 99% received BCG, 98% received three doses of DPT and polio, and 97% received measles vaccines. These rates are higher than the estimates of 98% for BCG, 93% for DPT and polio and 86% for measles in the Government service area. The BDHS estimates of immunization coverage were 93% for BCG, 81% for DPT, 82% for polio, and 76% for measles in 2004.

Child Morbidity and Health Service Use

The CHRWs in the ICDDR,B area have long experience in recording child health information. For example, they asked mothers if their children had symptoms of

diarrhoea, i.e. three or more loose stools per 24 hours with or without mucus or blood in 24 hours preceding the date of monthly visit. An episode was termed bloody diarrhoea if blood was present in the stool, otherwise it was termed watery diarrhoea. For recording pneumonia, they asked mothers if their children had symptoms of pneumonia, such as rapid breathing or breathing difficulty and chest indrawing (or inability to suck the breast if child is aged less than 2 months) in the preceding one week. An episode of pneumonia was termed severe if chest indrawing was present in addition to other symptoms, otherwise it was termed simply pneumonia.

Oral rehydration solution (ORS) is the most simple and inexpensive tool to combat dehydration caused by diarrhoea. The CHRWs in the ICDDR,B area, during their home visits, provide ORS packets free of charge if they encounter any diarrhoea patients, provide treatment for minor illnesses of women and children, and refer severe illnesses to the ICDDR,B sub-centres or hospital in Matlab. In the Government service area, CHRWs deliver ORS packets as needed during their routine household visits. If a child had diarrhoea in the preceding 24 hours, the mother was asked whether ORS (either packets or home-made sugar, salt and water solution) or IV fluids were administered to prevent dehydration. It may be mentioned that use of ORS or IV for diarrhoea episode includes episodes still continuing on the visit date. For the still-continuing episodes, the CHRWs may have made home visits before ORS or IV was administered (i.e. right-censoring) and thus, ORS or IV use may be under-estimated. However, they do not record additional fluids given from a green coconut or rice water to combat dehydration. Similarly, if a child had pneumonia in the past month, the CHRWs asked mothers about health actions taken to combat pneumonia. They record most recent treatment taken, particularly type of medicine used and type of health providers consulted. As mentioned before, treatment taken against pneumonia may also be under-estimated because of right-censoring (home visit before use of health service).

(a) Prevalence of Diarrhoea and Use of ORS and Health Providers

Table 8.3 shows the prevalence of diarrhoea in the past 24 hours per 100 children in the ICDDR,B and Government service areas. The overall prevalence of diarrhoea was 3.1% and 2.9% in the ICDDR,B area and in the Government service area respectively. The prevalence of diarrhoea was highest in the age group of 6-11 months and higher for boys than for girls in both areas.

Table 8.4 shows that overall use of ORS for children having watery or bloody diarrhoea in the preceding 24 hours is higher in the ICDDR,B area than in the Government service area. The longer the duration of episodes, the higher the use of ORS in both the areas. Younger children (aged less than 6 months) were given ORS less often than older children. Neither sex of the child nor mother's education is highly related to the use of ORS to manage diarrhoea.

There is a marked difference in use of health providers for treating diarrhoea between the ICDDR,B and the Government service areas (Table 8.5). In both areas, parents adopt home-treatment at a higher rate for watery diarrhoea than for bloody diarrhoea, and

consult untrained village doctors more often for bloody diarrhoea than for watery diarrhoea for treatment. They consult traditional healers and untrained village doctors, who are available in most villages around the clock, less frequently for both watery and bloody diarrhoea in the ICDDR,B area than in the Government service area. They consult ICDDR,B field workers more frequently for watery diarrhoea than for bloody diarrhoea and they do so even more frequently in the ICDDR,B area than in the Government service area. Young children are taken to health providers at a higher rate than older children in the Government service area, but not in the ICDDR,B area. The difference in management of diarrhoea may be the impact of the provision of the better quality health services in the ICDDR,B area compared with the Government service area.

(b) Prevalence of Pneumonia and Service Uptake

Table 8.6 shows the weekly prevalence of pneumonia per 100 children by illness and child's characteristics in 2004 in the ICDDR,B and the Government service areas. The prevalence was 1.7% in the ICDDR,B area and 3% in the Government service area.

The prevalence was higher for children aged 6-23 months than for children aged 24-59 months. Also it was higher for boys than for girls, and for children of mothers with less than at least secondary education in both the areas and prominent in the Government service area.

Table 8.7 shows the type of medicine used to combat pneumonia in the ICDDR,B and the Government service areas by illness and child's characteristics. Antibiotics are more frequently used in the ICDDR,B area than in the Government service area, and they are more frequently used for younger children than older children in the ICDDR,B area only. Boys with pneumonia are treated by antibiotics at a higher rate than girls with pneumonia in both the areas. Mothers' with secondary level education more frequently use antibiotic in both the areas.

Table 8.8 shows the treatment pattern of pneumonia by illness and child's characteristics in the ICDDR,B and the Government service areas. The provision of high quality services and severity of illness trigger choice of health providers. In the ICDDR,B area, pneumonia episodes are treated more often by field workers (mostly ICDDR,B CHRWs) themselves and in the Government service area treated by village doctors followed by home treatment. Severe pneumonia episodes are particularly treated in hospitals and by untrained village doctors in the ICDDR,B area while in the Government service area, hospital and traditional healers. The results suggest that parents bypassed field workers for well trained providers for severe pneumonia.

Age of the child also influences choice of treatment provider to combat pneumonia, but not for severe pneumonia. Infants with pneumonia are more likely to be taken to hospitals or health centres than their older counterparts. Sex of the child and mothers' education are not highly related to choice of treatment providers for children with pneumonia.

Table 8.1. Immunization coverage (%) among pregnant mothers and children aged 12-23 months in ICDDR,B area, 1987-2004 and Government service area, 2000-2004

Year	TT* coverage during last pregnancy of women giving live birth		Vaccination coverage rate of children aged 12-23 months							
	ICDDR,B area	Government area	BCG (1 dose)		DPT and Polio (3 doses)		Measles (1 dose)		All**	
			ICDDR,B area	Government area	ICDDR,B area	Government area	ICDDR,B Area	Government area	ICDDR,B area	Government area
1987	86.1	-	88.4	-	76.1	-	85.2	-	69.3	-
1988	89.7	-	93.3	-	82.8	-	87.9	-	77.2	-
1989	91.3	-	94.6	-	88.4	-	92.0	-	84.0	-
1990	95.3	-	98.7	-	95.7	-	96.4	-	93.8	-
1991	97.1	-	98.6	-	95.6	-	97.0	-	94.1	-
1992	98.6	-	99.1	-	96.9	-	97.8	-	96.0	-
1993	98.8	-	99.5	-	97.6	-	98.1	-	96.6	-
1994	99.3	-	99.5	-	97.7	-	97.0	-	95.7	-
1995	98.8	-	99.3	-	96.8	-	97.0	-	95.0	-
1996	99.3	-	99.5	-	98.0	-	97.9	-	96.7	-
1997	98.6	-	99.3	-	98.5	-	98.0	-	97.3	-
1998	98.3	-	99.2	-	97.7	-	96.1	-	95.4	-
1999	97.7	-	99.0	-	97.7	-	94.8	-	94.1	-
2000***	97.0	-	99.2	73.6	97.7	67.8	95.9	50.2	95.1	48.5
2001	98.1	-	99.1	89.8	98.2	80.0	96.0	74.1	95.4	71.0
2002	97.1	60.7	99.3	96.7	98.5	90.6	95.7	84.5	95.4	83.1
2003	98.6	78.1	99.2	97.4	98.5	92.0	95.9	84.3	95.6	83.2
2004	98.4	88.8	99.3	97.6	98.2	93.1	96.6	86.2	95.9	85.3

*At least two doses received during the last pregnancy that terminated in live birth

**Children fully vaccinated (i.e. those who received BCG, measles and three doses of DPT and Polio)

***Immunization coverage rate is about 20% under reported in the Government service area due to not checking of vaccination cards

Table 8.2. Prevalence* (%) of childhood diarrhoea in past 24 hours by child's characteristics and area, 2004

Characteristics	Watery diarrhoea		Bloody diarrhoea		Either		BDHS** 2004
	ICDDR,B area	Government area	ICDDR,B area	Government area	ICDDR,B area	Government area	
Child's age (months)							
<6	2.0	1.6	0.1	0.1	2.2	1.7	3.9
6-11	4.7	4.1	0.2	0.4	5.0	4.5	12.1
12-23	3.7	3.5	0.3	0.4	4.0	3.9	12.5
24-35	2.8	2.7	0.4	0.5	3.2	3.2	7.7
36-47	2.5	2.3	0.3	0.3	2.7	2.6	4.9
48-59	1.8	1.7	0.1	0.2	1.9	1.9	4.8
Sex							
Male	3.0	2.7	0.3	0.3	3.3	3.0	7.7
Female	2.7	2.5	0.2	0.3	2.9	2.9	7.3
Mother's education							
No education	2.9	2.6	0.3	0.4	3.2	3.0	7.6
Primary incomplete	3.0	2.7	0.3	0.3	3.2	2.9	9.0
Primary complete	3.1	2.8	0.3	0.3	3.4	3.2	6.6
Secondary+	2.7	2.5	0.2	0.3	2.9	2.8	6.5
All (%)	2.9	2.6	0.3	0.3	3.1	2.9	7.5
#diarrhoea episodes***	4620	4279	424	535	5044	4814	486

*Whether or not diarrhoea episodes started or ended within 24 hours

**Percentage of children experiencing diarrhoea in past two weeks irrespective of date of onset

***Equivalent to number of 24-hour periods of observation in which children had had diarrhoea

BDHS=Bangladesh demographic and health survey

Table 8.3. Distribution (%) of under five children who had diarrhoea in last 24 hours by use of ORS* and IV-saline, child's characteristics, and area, 2004

Illness and child's characteristics	ICDDR,B area				Government area			
	No ORS	Home made ORS	Packet ORS	IV-saline	No ORS	Home made ORS	Packet ORS	IV-saline
Types of diarrhoea								
Watery	57.0	0.5	42.3	0.2	63.8	4.5	31.6	0.1
Bloody	57.8	0.9	40.8	0.5	64.5	7.7	27.3	0.6
Duration of diarrhoea (days)								
1-3	64.0	0.5	35.3	0.1	66.4	4.5	29.0	0.1
4-6	51.9	0.7	47.1	0.3	58.0	6.2	35.5	0.2
7+	43.5	0.3	55.7	0.5	59.0	4.5	36.3	0.2
Child's age (months)								
<6	79.1	0.0	20.9	0.0	81.2	1.5	17.3	0.0
6-11	55.6	0.7	43.3	0.4	63.3	3.5	33.2	0.0
12-23	58.0	0.2	41.5	0.2	60.8	3.5	35.4	0.2
24-35	55.7	0.7	43.3	0.2	63.5	5.5	30.7	0.2
36-47	52.7	0.5	46.8	0.1	63.5	6.1	30.3	0.1
48-59	53.3	0.9	45.4	0.5	64.8	7.6	27.7	0.0
Sex								
Male	56.7	0.4	42.7	0.2	62.3	3.9	33.6	0.1
Female	57.4	0.7	41.6	0.3	65.7	5.8	28.4	0.1
Mother's education								
No education	56.3	0.4	43.1	0.3	60.8	5.1	33.9	0.1
Primary incomplete	54.9	0.7	44.2	0.2	62.7	4.0	33.3	0.0
Primary complete	57.7	0.4	41.8	0.1	66.9	4.5	28.4	0.2
Secondary+	58.6	0.6	40.5	0.3	65.9	5.2	28.8	0.1
All (%)	57.1	0.5	42.2	0.2	63.9	4.8	31.2	0.1
#diarrhoea episodes**	2878	26	2128	12	3076	232	1500	6

*Oral rehydration solution (ORS) used during illness

**Equivalent to number of 24-hour periods of observation in which children had had diarrhoea

Table 8.4. Distribution (%) of treatment of diarrhoea episodes among under five children by type of treatment providers, illness and child's characteristics, and area, 2004

Illness and characteristics	ICDDR,B area					Government service area				
	Home treatment	Traditional healer	Village doctor	Hospital	CHRW	Home treatment	Traditional healer	Village doctor	Hospital	Govt. Health Worker
Types of diarrhoea										
Watery	47.6	2.7	17.9	1.4	30.4	47.8	3.8	25.5	1.7	21.1
Bloody	36.6	2.8	39.4	2.6	18.6	28.6	6.2	47.3	2.4	15.5
Child's age (months)										
<6	58.7	9.4	16.5	0.9	14.5	43.6	16.2	29.7	1.5	9.0
6-11	41.6	4.3	22.8	2.3	29.0	36.7	6.2	36.7	2.3	18.0
12-23	47.8	2.5	18.9	1.7	29.2	42.7	3.7	30.5	1.9	21.4
24-35	47.0	2.0	19.7	1.2	30.1	46.3	3.4	26.9	1.4	22.0
36-47	44.4	1.0	21.6	1.2	31.7	52.1	1.4	22.3	1.8	22.4
48-59	46.9	1.2	16.3	1.4	34.2	54.0	2.0	21.1	1.7	21.2
Sex										
Male	45.6	2.4	20.6	1.6	29.8	45.1	3.8	29.9	1.9	20.5
Female	47.8	3.2	18.7	1.4	29.0	49.5	4.4	25.8	1.6	20.4
Mother's education										
No education	46.3	2.8	18.0	1.4	31.5	49.1	3.6	25.1	1.6	25.3
Primary incomplete	45.2	1.9	20.5	1.2	31.2	45.0	4.1	28.6	2.3	20.2
Primary complete	50.4	2.2	16.3	1.1	30.1	50.0	3.9	27.0	1.4	18.4
Secondary+	45.8	3.4	22.6	2.0	26.3	44.1	4.5	30.9	2.0	17.2
All (%)	46.6	2.7	19.7	1.5	29.4	47.1	4.1	28.0	1.8	20.5
#diarrhoea episodes*	2352	138	995	76	1483	2200	196	1346	86	986

*Equivalent to number of 24-hour periods of observation in which children had had diarrhoea

Table 8.5. Prevalence* (%) of pneumonia among under five children by child's characteristics and area, 2004

Characteristics	Pneumonia		Severe pneumonia		Either		BDHS** 2004
	ICDDR,B area	Government area	ICDDR,B area	Government area	ICDDR,B area	Government area	
Child's age (months)							
<6	1.1	4.7	0.1	3.4	1.2	8.2	28.3
6-11	2.3	5.0	0.1	0.6	2.5	5.6	29.5
12-23	2.4	3.1	0.3	0.4	2.6	3.5	24.9
24-35	1.7	2.0	0.2	0.3	1.9	2.3	20.0
36-47	1.0	1.2	0.1	0.2	1.2	1.4	15.7
48-59	0.7	0.8	0.1	0.1	0.9	0.9	14.9
Sex							
Male	1.7	2.6	0.2	0.7	1.9	3.3	22.0
Female	1.4	2.2	0.1	0.5	1.5	2.7	19.6
Mother's education							
No education	1.8	2.3	0.2	0.5	1.9	2.9	21.0
Primary incomplete	1.6	2.7	0.2	0.7	1.8	3.4	25.2
Primary complete	1.6	2.4	0.3	0.6	1.9	3.0	18.9
Secondary+	1.2	2.3	0.1	0.6	1.4	2.9	18.0
All (%)	1.5	2.4	0.2	0.6	1.7	3.0	20.8
#pneumonia episodes***	2457	3914	283	963	2740	4877	1350

*Percentage of child-months with reported pneumonia irrespective of date of onset

**Prevalence in previous two-weeks

***Prevalence in previous one-week

BDHS=Bangladesh demographic and health survey

Table 8.6. Distribution (%) of childhood pneumonia by type of medicine used, illness and child's characteristics, and area, 2004

Illness and characteristics	ICDDR,B area			Government service area		
	Antibiotics	Other drugs	No drugs	Antibiotics	Other drugs	No drug
Types of pneumonia						
Mild	82.6	4.2	13.3	44.1	17.8	38.2
Severe	79.9	4.6	15.5	64.9	17.2	17.9
Child's age (months)						
<6	91.9	3.2	4.8	51.9	20.8	27.3
6-11	91.2	2.6	6.2	53.2	17.0	29.7
12-23	86.9	2.9	10.3	49.4	16.8	33.9
24-35	78.4	5.5	16.1	47.0	15.3	37.8
36-47	76.3	4.7	19.0	35.9	15.5	48.6
48-59	63.7	8.1	28.2	33.0	18.6	48.4
Sex						
Male	84.2	4.3	11.5	51.5	17.1	31.3
Female	79.9	4.1	16.0	43.8	18.3	37.8
Mother's education						
No education	81.1	4.5	14.4	45.8	15.0	39.1
Primary incomplete	80.9	4.5	14.6	45.5	18.3	36.2
Primary complete	80.2	4.4	15.4	47.9	17.9	34.2
Secondary+	85.7	3.6	10.7	52.3	19.5	28.2
All (%)	82.3	4.2	13.5	48.2	17.7	34.2
#pneumonia episodes*	2255	115	370	2350	861	1666

*Prevalence in previous one-week

Table 8.7. Distribution (%) of pneumonia episodes among under five children by type of treatment providers, illness and child's characteristics, and area, 2004

Illness and characteristics	ICDDR,B area					Government service area				
	Home treatment	Traditional healer	Village doctor	Hospital	CHRW	Home treatment	Traditional healer	Village doctor	Hospital	Govt. Health Worker
Types of pneumonia										
Mild	10.5	2.0	22.8	1.8	63.0	32.7	8.3	51.0	3.0	4.9
Severe	12.4	3.2	45.9	29.3	9.2	12.7	16.1	57.4	8.4	5.4
Child's age (months)										
<6	1.6	2.2	21.5	5.9	68.8	19.3	21.6	50.9	5.0	3.3
6-11	4.3	2.4	23.9	5.3	64.2	25.1	8.3	55.1	4.6	6.9
12-23	8.3	1.1	23.6	6.4	60.5	29.0	5.0	55.7	3.5	6.8
24-35	12.6	3.2	26.7	3.1	54.4	34.1	4.0	52.6	4.1	5.1
36-47	15.8	2.1	29.0	3.2	49.9	45.1	4.2	44.0	3.3	3.5
48-59	23.9	1.9	25.5	2.3	46.3	42.1	6.3	47.7	2.1	1.8
Sex										
Male	8.8	2.0	26.7	5.1	57.5	26.1	9.4	54.8	4.6	5.1
Female	13.2	2.2	23.2	4.0	57.4	32.3	10.5	48.9	3.5	4.9
Mother's education										
No education	11.8	2.2	20.2	3.8	61.9	32.9	8.6	50.1	3.6	4.8
Primary incomplete	11.6	2.2	23.3	5.1	57.8	32.4	10.0	46.6	4.8	6.2
Primary complete	11.9	2.7	27.1	5.2	53.0	28.7	9.6	53.7	3.9	4.0
Secondary+	8.2	1.5	30.8	4.9	54.5	22.4	11.1	57.4	4.2	4.9
All (%)	10.7	2.1	25.1	4.6	57.4	28.7	9.9	52.3	4.1	5.0
#pneumonia episodes*	294	57	689	126	1574	1402	481	2549	200	245

*Prevalence in previous one-week

CHAPTER 9

SPECIAL SUPPLEMENT ON VERBAL AUTOPSY AND CAUSE OF DEATH

by

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Introduction

In Bangladesh, most births and deaths occur at home rather than in a hospital, inhibiting assessment of cause of death by physicians. Since most illnesses and events leading to death are not recorded in a health care system, verbal autopsy (VA) is a low-cost option to generate population-based data on cause of death. VA utilizes retrospective reports provided by caregivers on sequence of signs and symptoms of the deceased person prior to death. It is either open-ended description of illnesses that led to death or modular questions leading to disease symptoms that led to death or combination of both.

HDSS VA with open-ended death history was found to be inadequate to assign a specific cause to a large number of adult and elderly deaths. To improve the quality of cause of death data, HDSS introduced modular VA questionnaires (for neonatal, child, and adolescent and adult deaths) in 2003. These questionnaires were developed by WHO and modified by INDEPTH for its member demographic surveillance sites. The new VA operated parallel to the old VA in 2003. The old VA has stopped since 2004. A trained paramedic reviewed independently the old and new VA questionnaires of 2003 and 2004 to assign cause of death and ICD-10 code. Each new VA was also reviewed by physicians independently to assign cause of death. This chapter presents cause of death in paramedic's review of old and new VA, and cause of death in paramedic's and the physician's review of new VA.

Methods and Materials

VA Team

In 2003, a VA team was formed with six field interviewers (3 men and 3 women to conduct VA interview) of non-medical background, one paramedic (medical assistant with three years training in medicine), a public health physician and a medical demographer. A public health physician and a medical demographer were involved in providing a weeklong training to VA interviewers on new modular VA questionnaires in Matlab office. The training was followed by piloting the VA questionnaires in the field to finalize them. The paramedic and the physician were available to provide technical support and clarification of VA questions when required to VA interviewers.

Modular VA Questionnaires

New modular VA questionnaires in Bangla were introduced in 2003. VA questionnaires developed by WHO and modified by the INDEPTH were customized to adapt to the local conditions. The customized VA questionnaires were translated from English to Bangla and back translation was used to ensure right translation into Bangla. The new VA questionnaires contain open-ended death history; history of chronic illness; leading questions on symptoms and signs of the illnesses that led to death; life style and the risk behavior of adults; pregnancy and cause of death in view of caregivers and delivery related information for maternal and neonatal death; details on medical care seeking during terminal illness; etc. The VA team reviewed the 2003 VA questionnaires and modified the VA questionnaires of 2004. The VA interviewers were given two-day orientation training on the revised 2004 VA questionnaires.

Field Operation of VA

CHWRs in their monthly household visits detect vital events (including death) and fill out specific vital event registration forms. They recorded open-ended death history till 2003. In their fortnightly meetings they provide the identification of the deceased to the VA team members to conduct interview with new VA questionnaires. Average duration of interview with new VA form was around 30 minutes for neonatal death cases and 45 minutes for child, adolescent and adult death cases. However, it was short for accident, injury or sudden death. Mean days between VA interview and date of death was 128 days and median was 116 days.

The paramedic supervised the fieldwork of the VA interviewers and a public health physician of the Matlab Field Research Unit supervised the paramedic's work. The work of paramedic is also supervised by the head of the HDSS project. At regular intervals, VA are randomly drawn and checked, and difficult cases are reviewed and provided feedback.

VA Review and Cause of Death Assignment

The paramedic first reviewed old VA sheets of 2003 and assigned possible underlying causes of death from the list of three character categories of ICD-10 codes. Then he reviewed the new VA to complete the "Diagnosis Sheet". The diagnosis sheet contains three rows to record (a) disease or condition directly leading to death (immediate cause or direct cause), (b) morbidity conditions, if any, giving rise to the above cause (underlying or originating cause), and (c) other significant conditions contributing to the death. Two physicians at Matlab reviewed new VA and assigned cause of death onto the separate 'Diagnosis Sheet'. One physician reviewed VA for neonatal deaths and another reviewed VA for child and adolescent and adult deaths. The VA reviewers were given a short training and guidelines for assessing cause of death. There was no written standard algorithm for VA reviewers to diagnose cause of death. They used their brain algorithms (thought process) evolved from experience and training to make the diagnosis. They also noted down the symptoms in favour of their diagnoses of cause of death.

Analysis of Causes of Deaths

The underlying causes of death assigned by paramedic and physician to old and new VA were grouped into broad categories. These broad cause categories were distributed by VA system and VA reviewer to examine their effects on patterns of cause of death. Sensitivity and specificity¹ (in percent) of major cause categories were computed for old VA system with reference to new VA system and for paramedic's review with reference to physician's review in new VA system. The references (new VA and physician's review) are expected to provide better estimates of cause of death than the comparisons (old VA and paramedic's review). The positive predictive value² (PPV expressed in percent) was estimated for broad cause categories to show percent identified by new VA was also identified by old VA. Agreement between broad cause categories in the old and new VA systems, and that in the paramedic's and physician's review were indicated by Kappa (κ) score. Agreement is rated slight if κ score ranges from 0 to 0.2; fair if κ score ranges from 0.21-0.40, moderate if κ score ranges from 0.41 to 0.6; substantial if κ score ranges from 0.61 to 0.8; and almost perfect if κ score ranges from 0.81-1.00.

Results

Place of Deaths and Treatment Seeking Prior to Death

The distribution of the deceased by place of death differed significantly by sex, age and area of residence of the deceased persons (Table 1). Most deaths (76.2%) occurred at home. More males than females (13.4% compared to 7.7%) died in a health facility. Neonates followed by children and adults were more likely to die in a health facility than elderly, who died mostly (88.2%) at home. For children, place of injury was the most common place of death (32.4%) followed by adults (7.2%). In ICDDR,B area, 13.9% of the deceased died in health facilities compared to 7.9% in the Government service area, where access to health services is less easy.

No one was consulted for 14.4% of deaths due to terminal illness. The least consultations were made for the neonatal deaths (Table 2). Little more than half (50.9%) of all who died made 3 or more visits. Average number of visits was a little higher for males than for females, and for child, adult and elderly deaths than for neonatal deaths. It was also slightly higher in the ICDDR,B area than in the Government service area.

¹ Sensitivity refers to percent of deaths from the specific cause in old VA (or paramedic's review) among deaths from a specific cause in new VA (or physician's review), and specificity refers to percent of deaths from all other causes in old VA (or paramedic's review) among deaths from all other causes in new VA (or physician's review).

² PPV refers to percent of deaths from the specific cause in new VA (or physician's review) among deaths from a specific cause in old VA (or paramedic's review).

Table 1. Percent distribution of deceased persons by sex, age, area, and place of death, 2003-2004

Variable's name	No. of deaths	Home	Health facility	On the way	Place of injury
Sex of the deceased:					
Male	1670	73.8	13.4	7.2	5.5
Female	1459	79.2	7.7	7.3	5.8
Age at death:					
0-28 days	368	60.6	36.4	2.7	0.3
29 days-14 years	364	46.4	13.2	8.0	32.4
15-59 years	613	68.8	13.7	10.3	7.2
60+ years	1784	88.2	4.0	7.0	0.8
Area of residence:					
ICDDR,B area	1501	73.3	13.9	7.3	5.5
Government area	1628	79.1	7.9	7.2	5.8
All	3129	76.2	10.8	7.2	5.7

Table 2. Percent distribution of deceased persons by sex, age, area, and number of visits made for treatment during terminal illness^a, 2003-2004

Variable	% made treatment visits				Average visits made (no. of deaths)
	0	1	2	3+	
Sex of deceased:					
Male	12.3	18.8	17.2	51.7	2.51 (1576)
Female	16.9	19.7	13.3	50.0	2.40 (1373)
Age at death:					
0-28 days	37.3	40.3	17.0	5.5	0.91 (365)
29 days-14 years	7.7	8.1	13.0	71.1	3.04 (246)
15-59 years	11.4	8.4	13.4	66.8	2.91 (569)
60+ years	11.6	19.9	16.0	52.4	2.55 (1769)
Area of residence:					
ICDDR,B area	12.4	20.7	15.1	51.8	2.51 (1417)
Government area	16.3	17.9	15.7	50.1	2.41 (1555)
All	14.4	19.2	15.4	50.9	2.46 (2949)

^aExcludes 180 deceased (177 died on the place of injury and 3 died outside HDSS area)

Table 3. Percent distribution of deceased by sex, age, area and type of healthcare providers consulted last during terminal illness, 2003-2004

Variable's name	None	Doctors	Paramedics	Quack	Homeopath	Kabiraj	Spiritual healer	No. of deaths*
Sex of deceased:								
Male	12.4	31.7	2.1	47.7	1.8	3.7	0.6	1578
Female	17.0	22.1	1.9	51.1	2.9	4.1	0.9	1374
Age at death:								
0-28 days	37.6	32.7	4.4	8.7	5.7	7.9	3.0	367
29 days-14 years	7.7	28.9	1.6	37.4	10.2	12.6	1.6	246
15-59 years	11.4	30.9	1.4	49.9	1.8	4.2	0.3	569
60+ years	11.7	24.7	1.8	59.1	0.7	1.7	0.2	1770
Area of residence:								
ICDDR,B area	12.5	31.9	2.5	47.5	1.6	3.5	0.4	1418
Government area	16.4	22.9	1.6	50.8	2.9	4.2	1.0	1534
All	14.5	27.2	2.0	49.2	2.3	3.9	0.9	2952

*Excluded 177 deceased who died on the place of accident or injury

Though 85.5% of the deceased made a visit to a health provider during terminal illness, village quacks (including drug sellers) were consulted most (49.2%) followed by medical doctors (27.2%) (Table 3). Paramedics, homeopaths and spiritual healers were consulted seldom. Consultation with medical doctors was higher for males than for females (31.7% versus 22.1%), and it was also higher in the ICDDR,B area than in the Government service area.

Mode and Place of Delivery of Deceased Neonates in 2003-2004

The mode of delivery and place of delivery of 365 deceased neonates varied substantially between the two areas (Table 4). Instrumental deliveries, mainly caesarean were more common in the ICDDR,B area than in the Government service area (9.3% and 1.6% respectively). Health facility-based deliveries for neonatal deaths accounted for 48% in the ICDDR,B area and 15.1% in the Government service area.

Table 4. Percent distribution of neonatal deaths by mode of delivery and place of delivery by areas, 2003-2004

Variable	ICDDR,B area (No. of deaths=173)	Government service area (No. of deaths=192)
Mode of delivery:		
Normal vaginal	57.2	69.3
Vaginal with saline and drug	23.1	25.0
Episiotomy	2.3	1.0
Episiotomy with saline and drug	8.1	3.1
Ventose/forcep	0.6	0.0
Caesarean	8.7	1.6
Place of delivery:		
Home	51.4	84.3
Health facility	48.0	15.1
On the way	0.6	0.5

*Relatives/mothers of 3 deceased neonates could not be interviewed

Table 5. Percent of facility-based deliveries by maternal complications of deceased neonates and area, 2003-2004

Maternal complications during pregnancy, labour and after delivery	ICDDR,B area		Government area	
	NND (N=173)	Facility delivery (%)	NND (N=192)	Facility delivery (%)
No complication	32	25.0	26	0.0
Any complication	141	53.2	166	17.5
Specific complications:				
Convulsions	10	50.0	8	25.0
Antenatal bleeding	25	56.0	14	35.6
Less fetal movement before labour	40	70.0	60	23.3
Fever or febrile illness during pregnancy	56	50.0	76	19.7
Excessive bleeding during delivery	37	56.8	34	23.5
Water broke earlier (1 day or more)	29	58.6	33	24.2
Broke water had bad smell or colour	35	71.4	45	31.1
Difficult (obstructed) labour	58	77.6	77	23.4
Prolong labour (12 hours or more)	46	63.0	47	23.4
Delivered feet/hand/shoulder first	8	62.5	7	0.0
Umbilical cord out before/encircled neck	28	57.1	27	22.2
Swelling (legs or face)	7	85.7	16	12.5
Jaundice	23	60.9	35	17.1
Other complications	10	40.0	20	10.0

NND = Number of neonatal deaths

Mothers of 365 deceased neonates were asked about health related complications during pregnancy, labour and after delivery and 84.1% of them reported some complications they had experienced (Table 5). Those who experienced any complication were more likely to deliver in a health facility than those who did not in each area. Facility-based delivery for any complications was more common in the ICDDR,B area than in the Government service area (53.2% vs. 17.5%). Some complications, particularly less fetal movement before labour, bad smell of ruptured membrane's fluid and difficult labour triggered facility-based delivery, particularly in ICDDR,B area, compared to the other complications.

Similarity of Cause of Death between VA Systems and VA Reviewers

Table 6 shows the percent of causes of deaths that were similar between VA systems and VA reviewers. Percent of causes of deaths similar between VA reviewers in the new VA was higher than percent of causes of deaths similar between VA systems (56.3% and 44.8% respectively). Percent of similar causes of deaths was lower for elderly than for children, adults and neonates. In the elderly group, 35.9% of causes of deaths were similar between VA systems compared to 52.7% of causes of deaths were similar between VA reviewers with the new VA form. This may suggest usefulness of the new VA system. Subsequent analyses included major cause categories of death in specific age groups.

Table 6. Percent of cause of death similar between VA systems and VA reviewers in different age groups, 2003-2004

VA system and reviewers	Neonatal deaths	Child deaths	Adult deaths	Elderly deaths	All ages*
Causes similar in old and new VA systems in paramedic's review for 2003	53.5 (n=187)	62.4 (n=194)	53.3 (n=306)	35.9 (n=859)	44.8 (n=1546)
Causes similar in paramedic's and physician's review in new VA, 2003-2004	56.3 (n=366)	66.1 (n=363)	60.8 (n=613)	52.7 (n=1783)	56.3 (n=3125)

n=death cases reviewed in specific age group

*VA could not be obtained for 4 death cases

Cause of Neonatal Deaths in 2003-2004

Comparison between old and new VA in 2003: As we mentioned the old and new VA systems ran parallel in 2003. This allowed us to compare the underlying causes of deaths in paramedic's review by VA system. Table 7 shows a marked difference in pattern of cause of neonatal deaths between old and new VA systems. For example, pregnancy and delivery complications and septicaemia were diagnosed more frequently as causes of deaths in the new system than in the old system. The old system diagnosed consequences of prematurity and low birth weight more frequently. Birth asphyxia and ARI were diagnosed at similar rates in both VA systems, but sensitivities ranged 50%-54.6%. The agreement in cause of death between old and new VA systems was found to be slight for septicaemia; fair for pregnancy and delivery complications; and moderate for birth asphyxia, ARI and prematurity and low birth weight.

Comparison between VA reviewers: Comparison of underlying cause of 366 neonatal deaths occurred in 2003-2004 between VA reviewers reveals that the paramedic less frequently diagnosed birth asphyxia and prematurity and low birth weight as causes of death than the physician, who diagnosed pregnancy and delivery complications less frequently (Table 8). Sensitivity was relatively high for prematurity and low birth weight (70.6%), pregnancy and delivery complications (64.2%), and ARI (55.6%). Agreement between physician and paramedic was fair for birth asphyxia, septicaemia and pregnancy and delivery complications; moderate for ARI; and substantial for prematurity and low birth weight. A misclassification matrix of underlying cause of death between VA reviewers (paramedic and physician) is shown in Table 22 in Appendix A to highlight the extent and nature of the differences.

Table 7. Sensitivity and specificity of major underlying causes of neonatal death in paramedic's review: comparison of old VA with reference to new VA, 2003 (cases reviewed = 187)

Underlying cause of death	Old VA		New VA		Sensitivity %	Specificity %	PPV %	Agreement (%)	κ score
	Cases	%	Cases	%					
Birth asphyxia	24	12.8	22	11.8	54.6	92.7	50.0	88.2	0.45
Prematurity/low birth weight	83	44.4	67	35.8	79.1	75.0	63.9	76.5	0.51
Pregnancy/delivery complication	30	16.0	55	29.4	38.2	93.2	70.0	77.0	0.36
Acute respiratory infection (ARI)	14	7.5	12	6.4	50.0	95.4	42.9	92.5	0.42
Septicaemia	4	2.1	9	4.8	11.1	98.3	25.0	94.1	0.13

*New VA could not be obtained for 1 neonatal death occurred outside HDSS area
PPV = positive predictive value

Table 8. Sensitivity and specificity of major underlying causes of neonatal death in new VA system: comparison of paramedic's review with reference to physician's review, 2003-2004 (cases reviewed* = 366)

Underlying cause of death	Paramedic's review		Physician's review		Sensitivity %	Specificity %	PPV %	Agreement (%)	κ score
	Cases	%	Cases	%					
Birth asphyxia	40	10.9	79	21.6	30.4	94.4	60.0	80.6	0.30
Prematurity and low birth weight	131	35.8	153	41.8	70.6	89.2	82.4	81.4	0.61
Septicaemia	11	3.0	15	4.1	33.3	98.3	45.5	95.6	0.36
Pregnancy/delivery complication	116	31.7	67	18.3	64.2	75.6	37.1	73.5	0.31
Acute respiratory infection (ARI)	20	5.5	18	4.9	55.6	97.1	50.0	95.1	0.50

*New VA could not be obtained for 2 neonatal deaths occurred outside the HDSS area

Cause of Child (age 29 days -<15 years) Deaths in 2003-2004

Comparison between VA systems: Table 9 shows the distribution of underlying cause of 194 child deaths of 2003 in paramedic's review in old and new systems. The pattern of cause of child death differed a little by VA system. More death cases were diagnosed as malnutrition in the old VA system than in the new VA system, in which meningitis and encephalitis was diagnosed more frequently. Number of deaths diagnosed as ARI, diarrhoea, cancer and injury in both VA systems were comparable. With reference to the new VA system, sensitivity and positive predictive value were relatively low for ARI and malnutrition, and high for diarrhoea, cancer and injury related deaths. The agreement rating between old and new VA systems was fair for ARI and malnutrition; moderate for meningitis; substantial for diarrhoea and cancer; and almost perfect for injury deaths.

Comparison between VA reviewers: Paramedic and physician reviewed new VA of 363 child deaths, which occurred in 2003-2004 (Table 10). The patterns of underlying cause of child deaths differed, but a little by VA reviewer. The paramedic attributed fewer deaths to ARI and malnutrition compared to the physician. For other causes, number of deaths diagnosed by paramedic and physician were comparable. Sensitivity and agreement rating were slight for septicaemia; moderate for ARI, liver and gallbladder diseases and malnutrition; and substantial for diarrhoea, meningitis and cancer; and almost perfect for injury. The misclassification matrix of underlying cause of child death between VA reviewers is shown in Table 23 in Appendix A.

Cause of Adult (age 15-59 years) Deaths in 2003-2004

Comparison between VA systems: Compared with the new VA system, the old VA attributed fewer deaths to tuberculosis, ischaemic heart diseases, other cardiovascular diseases and liver and gallbladder diseases; and more deaths to chronic lower respiratory diseases (Table 11). For all other causes, the difference in number of deaths between the old and the new VA was relatively small. Sensitivity was less than 50% for other cardiovascular diseases, alimentary diseases, liver and gallbladder diseases, and genitourinary diseases; between 50%-69% for tuberculosis, stroke, ischaemic heart diseases and diabetes; and above 70% for cancer, chronic lower respiratory diseases, injury and maternal causes.

Comparison between VA reviewers: The reviews of the new VA of 2003-2004 by paramedic and physician yielded a different pattern of cause of adult death (Table 12). The paramedic diagnosed cancer, stroke, ischaemic heart diseases, other cardiovascular diseases, and genitourinary diseases at higher rates than the physician, who diagnosed tuberculosis, liver and gallbladder diseases and diabetes at higher rates. The agreement rating between the paramedic and the physician was almost perfect for maternal cause; and substantial for cancer, ischaemic heart diseases, alimentary diseases, liver and gallbladder diseases and injury. The agreement was fair for other cardiovascular diseases and genitourinary diseases. The misclassification matrix of underlying cause of adult death diagnosed by the paramedic and the physician is given Table 24 in Appendix A.

Table 9. Sensitivity and specificity of major underlying causes of child death assigned by paramedic: comparison of old VA with reference to new VA, 2003 (cases reviewed = 194)

Major underlying cause of death	Old VA		New VA		Sensitivity %	Specificity %	PPV %	Agreement %	κ score
	Cases	%	Cases	%					
Acute respiratory infection (ARI)	23	11.9	21	10.8	47.6	92.5	43.5	87.6	0.38
Diarrhoea or dysentery	21	10.8	22	10.3	68.2	96.5	71.4	93.3	0.66
Meningitis or encephalitis	4	2.1	8	4.1	37.5	99.5	75.0	96.9	0.49
Cancer	5	2.6	5	2.6	80.0	99.5	80.0	99.0	0.79
Malnutrition	23	11.9	15	7.7	53.3	91.6	34.8	88.7	0.36
Injury (including drowning)	68	35.1	70	36.1	97.1	100.0	100.0	99.0	0.98

PPV = positive predictive value

Table 10. Sensitivity and specificity of major underlying causes of child death in new system: comparison of paramedic's review with reference to physician's review, 2003-2004 (cases reviewed = 363)

Underlying cause of death	Paramedic's review		Physician's review		Sensitivity %	Specificity %	PPV %	Agreement %	κ score
	Cases	%	Cases	%					
Acute respiratory infection (ARI)	38	10.5	48	13.2	47.9	95.2	60.5	89.0	0.47
Diarrhoea or dysentery	32	8.8	28	7.7	71.4	96.4	62.5	94.5	0.64
Meningitis/encephalitis	10	2.8	8	2.2	75.0	98.9	60.0	98.4	0.66
Septicaemia	8	2.2	10	2.8	20.0	98.3	25.0	96.1	0.20
Cancer	13	3.6	12	3.3	83.3	99.2	76.9	98.6	0.79
Liver and gall bladder disease	8	2.2	9	2.5	55.6	99.2	62.5	98.1	0.58
Malnutrition	30	8.3	43	11.9	41.9	96.3	60.0	89.8	0.44
Injury (including drowning)	129	35.5	125	34.4	98.4	97.5	95.4	97.8	0.95

*New VA could not be obtained for 1 child death occurred outside HDSS area

Table 11. Sensitivity and specificity of major underlying causes of adult death assigned by paramedic: comparison of old VA with reference to new VA, 2003 (cases reviewed = 306)

Underlying cause of death	Old VA		New VA		Sensitivity %	Specificity %	PPV %	Agreement %	κ score
	Cases	%	Cases	%					
Tuberculosis	16	5.2	24	7.8	50.0	98.6	75.0	94.8	0.57
Cancer	39	12.8	37	12.1	83.8	97.0	79.5	95.4	0.79
Stroke	33	10.8	27	8.8	66.7	94.6	54.6	92.2	0.56
Ischaemic heart disease	18	5.9	23	7.5	52.2	97.9	66.7	94.4	0.56
Other cardiovascular disease	11	3.6	17	5.6	23.5	97.6	36.4	93.5	0.25
Chronic lower respiratory disease	24	7.8	13	4.3	76.9	95.2	41.7	94.4	0.51
Alimentary disease	10	3.3	9	2.9	44.4	98.0	40.0	96.4	0.40
Liver and gall bladder disease	12	3.9	27	8.8	37.0	99.3	83.3	93.8	0.48
Genitourinary disease	10	3.3	9	2.9	44.4	98.0	40.0	96.4	0.40
Diabetes/endocrine disorder	7	2.3	8	2.6	50.0	99.0	57.1	97.7	0.52
Injury	26	8.5	29	9.5	82.8	99.3	92.3	97.7	0.86
Maternal cause	11	3.6	12	3.9	91.7	100.0	100.0	99.7	0.95
Respiratory Disease	8	2.6	7	2.3	57.1	98.7	50.0	97.7	0.52

PPV = positive predictive value

Table 12. Sensitivity and specificity of major underlying causes of adult death in new VA system: comparison of paramedic's review with reference to physician's review, 2003-2004 (cases reviewed = 613)

Underlying cause of death	Paramedic's review		Physician's review		Sensitivity %	Specificity %	PPV %	Agreement %	κ score
	Cases	%	Cases	%					
Tuberculosis	33	5.4	41	6.7	56.1	98.3	69.7	95.4	0.60
Cancer	89	14.5	76	12.4	86.8	95.7	74.2	94.6	0.77
Stroke	44	7.2	30	4.9	56.7	95.4	38.6	93.5	0.43
Ischaemic heart disease	52	8.5	41	6.7	80.5	96.7	63.5	95.6	0.69
Other cardiovascular disease	33	5.4	17	2.8	35.3	95.5	18.2	93.8	0.21
Chronic lower respiratory disease	21	3.4	24	3.9	54.2	98.6	61.9	96.9	0.56
Alimentary disease	22	3.6	23	3.8	60.9	98.6	63.6	97.2	0.61
Liver and gall bladder disease	52	8.5	61	10.0	65.8	97.8	76.9	94.6	0.68
Genitourinary disease	26	4.2	11	1.8	45.5	96.5	19.2	95.6	0.25
Diabetes/endocrine disorder	13	2.1	27	4.4	37.0	99.5	76.9	96.7	0.49
Neurological disease	11	1.8	13	2.1	38.5	99.0	45.5	97.7	0.41
Injury	55	9.0	52	8.5	82.7	97.9	78.2	96.6	0.79
Maternal cause	24	3.9	24	3.9	87.5	99.5	87.5	99.0	0.87

Cause of Elderly (age 60 years and above) Deaths in 2003-2004

Comparison between VA systems: The underlying cause of elderly death in paramedic's review by VA systems shows a marked difference in pattern of cause of death (Table 13). Diarrhoea and malnutrition were reported more frequently in the old VA than in the new VA, which reported more frequently other respiratory diseases, cancer, stroke, ischaemic heart diseases, other cardiovascular diseases, alimentary diseases, liver and gallbladder diseases, diabetes and injury. Sensitivity (with reference to the new VA) and agreement rating were very low (slight) for diarrhoea, other respiratory diseases, other cardiovascular diseases and malnutrition; and fair for ARI, liver and gallbladder diseases and diabetes; moderate for stroke, ischaemic heart diseases, alimentary diseases and injury; and substantial for tuberculosis and cancer.

Comparison between VA reviewers: In the new VA system, the underlying cause of elderly deaths occurred in 2003-2004 diagnosed by paramedic and physician revealed different patterns of cause of death (Table 14). The Physician diagnosed more deaths caused by ARI, tuberculosis, other cardiovascular diseases, chronic lower respiratory diseases, liver and gallbladder diseases and diabetes than the paramedic, who diagnosed more deaths due to other respiratory diseases, cancer, ischaemic heart diseases, alimentary diseases and genitourinary diseases. Sensitivity was above 60% for cancer, stroke, ischaemic heart diseases, alimentary diseases and injury; and between 50%-60% for diarrhoea, chronic lower respiratory diseases, liver and gallbladder diseases, genitourinary diseases and diabetes. The agreement rating between paramedic and physician was substantial for tuberculosis, cancer, stroke, ischaemic heart disease, and alimentary disease; and moderate for diarrhoeal disease, liver and gallbladder disease and injury. A misclassification matrix of underlying cause of elderly death in paramedic's and physician's review is given Table 25 in Appendix A.

Summary

This chapter presents population-based data on underlying cause of death recorded by Verbal autopsy (VA) in HDSS area during 2003-2004. The old (open-ended health history) and the new VA (combination of open-ended death history and modular questions) ran parallel in 2003. Experienced VA interviewers (of non-medical background) were retrained on the new VA to conduct retrospective caregiver interviews. A trained paramedic reviewed independently each of 1546 old and new VA sheets of 2003 and a physician reviewed each of 3125 new VA sheets of 2003-2004 to assign underlying cause of death. Sensitivity and specificity were estimated for major broad cause categories in the old VA with reference to the new VA, and in the paramedic's review with reference to the physician's review. Agreement in cause of death was measured between the old and the new VA, and between the paramedic and the physician by Kappa (κ) score.

The results reveal that the patterns of broad cause of death depended considerably on VA tool used and on VA reviewer deployed. The broad cause of death was found to be similar between the old and the new VA systems in paramedic's review for 44.8% of

deaths in 2003, and similar between the paramedic's and the physician's review of the new VA of 2003-2004 for 56.3%. Sensitivity and agreement rating between paramedic's and physician's diagnosis of cause of death were substantial (κ score is above 0.6) for prematurity and low birth weight, childhood diarrhoea, stroke of adults, cancer, liver and gallbladder diseases, injury and maternal cause. Between the old and the new VA, agreement was substantial for childhood diarrhoea, tuberculosis of elderly, cancer, injury and maternal causes. The physician's diagnosed more frequently septicaemia, meningitis, birth asphyxia, tuberculosis, other cardiovascular diseases, liver and gallbladder diseases and diabetes than the paramedic. In conclusion, additional information in the new VA and review of the new VA by the physician resulted in a different and better estimate of the pattern of cause of death than the pattern of cause of death in paramedic's review of the new VA or the old VA. Use of high-quality VA interviewers may result in even a better estimate of the pattern of cause of death.

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Table 13. Sensitivity and specificity of major underlying causes of elderly death assigned by paramedic: comparison of old VA with reference to new VA, 2003 (cases reviewed = 859)

Underlying cause of death	Old VA		New VA		Sensitivity %	Specificity %	PPV %	Agreement %	κ score
	Cases	%	Cases	%					
Diarrhoea or dysentery	42	4.9	28	3.3	28.6	95.9	19.1	93.7	0.20
Acute respiratory infection (ARI)	24	2.8	18	2.1	33.3	97.9	25.0	96.5	0.27
Other respiratory disease	14	1.6	23	2.7	13.0	98.7	21.4	96.4	0.14
Tuberculosis	19	2.2	26	3.0	57.7	99.5	79.0	98.3	0.66
Cancer	61	7.1	72	8.4	69.4	98.6	82.0	96.2	0.73
Stroke	152	17.7	169	19.8	49.1	90.0	54.6	82.0	0.41
Ischaemic heart disease	27	3.1	44	5.1	38.6	98.8	63.0	95.7	0.46
Other cardiovascular disease	16	1.9	61	7.1	6.6	98.5	25.0	92.0	0.08
Alimentary disease	26	3.0	40	4.7	37.5	98.7	57.7	95.8	0.43
Liver and gall bladder disease	11	1.3	23	2.7	26.1	99.4	54.6	97.4	0.34
Diabetes or endocrine disorder	19	2.2	43	5.0	23.3	98.9	52.6	95.1	0.30
Malnutrition	42	4.9	8	0.9	25.0	95.3	4.8	94.6	0.07
Injury	28	3.3	37	4.3	48.7	98.8	64.3	96.6	0.54

PPV = positive predictive value

Table 14. Sensitivity and specificity of major underlying causes of elderly death in new VA system: comparison of paramedic's review with reference to physician's review, 2003-2004 (cases reviewed = 1,783)

Underlying cause of death	Paramedic's review		Physician's review		Sensitivity %	Specificity %	PPV %	Agreement %	κ score
	Cases	%	Cases	%					
Diarrhoea or dysentery	50	2.8	57	3.2	52.6	98.8	60.0	97.4	0.55
Acute respiratory infection (ARI)	39	2.2	62	3.5	24.2	98.6	38.5	96.0	0.28
Other respiratory disease	55	3.1	20	1.1	35.0	97.3	12.7	96.6	0.17
Tuberculosis	52	2.9	77	4.3	48.1	99.1	71.2	96.9	0.56
Cancer	139	7.8	101	5.7	88.1	97.0	64.0	96.5	0.72
Stroke	299	16.8	281	15.8	61.2	91.5	57.5	86.8	0.51
Ischaemic heart disease	82	4.6	41	2.3	65.9	96.8	32.9	96.1	0.42
Other cardiovascular disease	113	6.3	126	7.1	29.4	95.4	32.7	90.8	0.26
Chronic lower respiratory diseases	146	8.2	166	9.3	59.0	97.0	67.1	93.5	0.59
Alimentary disease	74	4.2	63	3.5	60.3	97.9	51.4	96.6	0.54
Liver and gall bladder disease	50	2.8	69	3.9	55.1	99.3	76.0	97.6	0.63
Genitourinary disease	38	2.1	22	1.2	50.0	98.5	29.0	97.9	0.36
Diabetes or endocrine disorder	115	6.5	133	7.5	51.1	97.2	59.1	93.7	0.51
Injury	61	3.4	50	2.8	64.0	98.3	52.5	97.4	0.56

*New VA could not be obtained for 1 elderly death for non availability of informed family members

APPENDICES

Appendix A-1. Mid-year population in ICDDR,B area by age, sex, and block, 2004

Age	Block A			Block B		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	34077	15959	18118	30595	14458	16137
<1 year	846	447	399	800	418	382
1 – 4	3257	1607	1650	3038	1490	1548
1	813	393	420	751	357	394
2	838	414	424	855	409	446
3	831	418	413	724	362	362
4	775	382	393	708	362	346
5 – 9	3919	1978	1941	3464	1707	1757
10-14	3672	1808	1864	3321	1664	1657
15-19	3428	1478	1950	3196	1578	1618
20-24	2743	1115	1628	2544	1115	1429
25-29	2353	934	1419	2045	846	1199
30-34	2358	1005	1353	2014	889	1125
35-39	2445	1082	1363	2012	846	1166
40-44	2267	1083	1184	1959	932	1027
45-49	1751	903	848	1447	747	700
50-54	1232	645	587	1131	531	600
55-59	1162	544	618	953	405	548
60-64	923	420	503	919	398	521
65-69	731	398	333	711	337	374
70-74	463	234	229	521	280	241
75-79	311	162	149	315	155	160
80-84	132	65	67	122	67	55
85+	84	51	33	83	53	30

(continued)

**Appendix A-1 (contd.). Mid-year population in ICDDR,B area by
age, sex, and block, 2004**

Age	Block C			Block D		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	24371	11912	12459	22608	10930	11678
<1 year	563	265	298	553	289	264
1 – 4	2189	1130	1059	2145	1097	1048
1	602	325	277	558	306	252
2	562	301	261	545	261	284
3	529	268	261	532	259	273
4	496	236	260	510	271	239
5 – 9	2513	1286	1227	2360	1227	1133
10-14	2433	1242	1191	2321	1183	1138
15-19	2633	1306	1327	2249	1055	1194
20-24	2182	1026	1156	1779	799	980
25-29	1780	830	950	1552	674	878
30-34	1691	793	898	1533	705	828
35-39	1637	724	913	1559	697	862
40-44	1618	802	816	1609	790	819
45-49	1321	667	654	1193	620	573
50-54	916	458	458	876	445	431
55-59	813	390	423	750	333	417
60-64	749	337	412	740	328	412
65-69	586	271	315	615	282	333
70-74	368	191	177	397	198	199
75-79	193	100	93	229	118	111
80-84	130	60	70	93	60	33
85+	56	34	22	55	30	25

Appendix A-2. Deaths in ICDDR,B area by age, sex, and block, 2004

Age	Block A			Block B		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	214	121	93	222	112	110
<1 year	35	18	17	27	15	12
<1 month	27	13	14	18	12	6
1- 5 months	4	2	2	6	2	4
6-11 months	4	3	1	3	1	2
1 - 4 years	14	6	8	11	5	6
1	8	2	6	6	3	3
2	3	2	1	2	1	1
3	1	1	0	1	0	1
4	2	1	1	2	1	1
5 - 9	5	3	2	3	2	1
10-14	0	0	0	5	2	3
15-19	0	0	0	4	2	2
20-24	1	0	1	3	3	0
25-29	1	0	1	2	1	1
30-34	4	3	1	3	1	2
35-39	4	3	1	2	1	1
40-44	8	4	4	4	4	0
45-49	8	5	3	7	5	2
50-54	8	6	2	7	3	4
55-59	4	3	1	11	6	5
60-64	11	8	3	9	5	4
65-69	30	20	10	23	9	14
70-74	23	16	7	30	16	14
75-79	21	9	12	41	18	23
80-84	19	6	13	20	9	11
85+	18	11	7	10	5	5

(continued)

**Appendix A-2 (contd.). Death in ICDDR,B area by age, sex,
and block, 2004**

Age	Block C			Block D		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	144	84	60	171	81	90
<1 year	21	12	9	24	13	11
<1 month	20	12	8	16	7	9
1- 5 months	0	0	0	6	4	2
6-11 months	1	0	1	2	2	0
1 - 4 years	7	6	1	4	3	1
1	1	1	0	3	2	1
2	2	2	0	0	0	0
3	3	2	1	0	0	0
4	1	1	0	1	1	0
5 - 9	3	0	3	2	0	2
10-14	1	1	0	1	0	1
15-19	3	1	2	2	1	1
20-24	1	1	0	0	0	0
25-29	1	1	0	1	1	0
30-34	1	1	0	2	0	2
35-39	3	1	2	5	1	4
40-44	2	2	0	7	5	2
45-49	8	5	3	2	1	1
50-54	2	1	1	3	2	1
55-59	7	4	3	5	1	4
60-64	15	10	5	20	9	11
65-69	11	2	9	27	11	16
70-74	19	11	8	20	13	7
75-79	14	7	7	21	8	13
80-84	14	8	6	15	9	6
85+	11	10	1	10	3	7

Appendix A-3. Abridged life table for ICDDR,B area by sex, 2004

Age (years)	Male				Female			
	nq_x	l_x	L_x	e^0_x	nq_x	l_x	L_x	e^0_x
0	42.4	100000	96608	68.5	35.8	100000	97132	70.5
1	5.8	95760	95434	70.5	7.4	96416	95993	72.1
2	3.6	95207	95036	69.9	1.4	95700	95633	71.6
3	2.3	94864	94755	69.1	1.5	95565	95492	70.7
4	3.2	94646	94495	68.3	1.6	95419	95342	69.8
5	4.0	94344	470847	67.5	6.6	95265	474880	68.9
10	2.5	93964	469273	62.8	3.4	94638	472446	64.4
15	3.7	93726	467833	57.9	4.1	94315	470684	59.6
20	4.9	93380	465843	53.1	1.0	93928	469434	54.8
15	4.6	92921	463628	48.4	2.2	93838	468705	49.9
30	7.3	92497	460920	43.6	5.9	93627	466857	45.0
35	8.9	91818	457200	38.9	9.3	93072	463374	40.2
40	20.6	90999	450663	34.2	7.8	92211	459401	35.6
45	26.9	89125	440077	29.9	16.1	91494	454070	30.8
50	28.5	86727	427920	25.6	19.1	90021	446135	26.3
55	41.1	84257	413260	21.3	31.9	88302	434983	21.8
60	102.7	80797	384511	17.1	60.5	85483	415381	17.4
65	151.3	72500	336494	13.8	166.5	80313	369776	13.3
70	269.5	61527	267329	10.7	193.1	66941	303800	10.5
75	328.9	44949	188296	8.7	421.8	54014	212526	7.4
80	478.9	30167	113757	6.8	562.7	31228	109830	5.9
85+	1000.0	15721	91075	5.8	1000.0	13656	75105	5.5

**Appendix A-4. Abridged life table for Government service area
by sex, 2004**

Age (years)	Male				Female			
	nq_x	l_x	L_x	e^0_x	nq_x	l_x	L_x	e^0_x
0	46.3	100000	96292	65.7	50.8	100000	95936	69.3
1	4.9	95365	95089	67.9	7.3	94920	94513	72.0
2	3.4	94898	94735	67.2	0.0	94230	94230	71.6
3	1.4	94572	94506	66.4	0.0	94230	94230	70.6
4	3.0	94440	94300	65.5	1.6	94230	94155	69.6
5	4.5	94160	469821	64.7	3.2	94079	469701	68.7
10	2.9	93735	468048	60.0	5.1	93778	467785	63.9
15	3.3	93463	466610	55.2	7.8	93298	464819	59.2
20	5.9	93157	464512	50.3	9.7	92573	460792	54.6
15	5.1	92605	461928	45.6	5.0	91674	457315	50.2
30	8.0	92129	458947	40.8	5.1	91216	455012	45.4
35	16.3	91393	453523	36.1	10.0	90753	451675	40.6
40	21.8	89902	444972	31.7	10.8	89847	447004	36.0
45	21.3	87938	435365	27.4	19.6	88879	440369	31.4
50	54.6	86066	419396	22.9	9.9	87136	433696	26.9
55	69.3	81364	393679	19.1	32.4	86276	424905	22.2
60	149.7	75729	351779	15.3	59.9	83480	405753	17.8
65	195.5	64389	291831	12.5	142.7	78476	365889	13.8
70	242.7	51799	228611	9.9	239.0	67278	297573	10.7
75	488.0	39226	146865	7.3	329.6	51202	214388	8.2
80	406.0	20083	79911	6.9	481.5	34324	129166	6.0
85+	1000.0	11929	57878	4.9	1000.0	17796	75455	4.2

Appendix A-5. Male deaths by cause and age, 2004

Cause	All ages	Age at death (years)																		
		<1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
Communicable diseases																				
Diarrhoea	15	1	1	1	0	0	0	0	0	0	0	0	1	0	0	1	4	3	1	2
Dysentery	3	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
Tuberculosis	30	0	0	0	0	0	0	0	1	0	1	0	3	2	6	8	3	2	3	1
EPI related death	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Meningitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hepatitis	7	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	2	1	0	0
Chicken pox	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Unspecified viral encephalitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rabies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Respiratory infections	29	12	3	0	0	0	0	0	0	0	0	0	0	0	0	6	2	3	0	3
Other communicable	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maternal and neonatal conditions																				
Maternal death	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neonatal condition																				
-premature and LBW	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-birth asphyxia	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-other neonatal	51	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nutritional	7	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Non-communicable diseases																				
Malignant neoplasm																				
-neoplasm	75	0	1	1	2	2	0	0	1	1	7	7	5	7	12	12	11	3	2	1
-neoplasm in female organ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-neoplasm other kinds	7	0	0	0	0	1	0	1	0	0	0	0	0	2	0	3	0	0	0	0
Endocrine disorder																				
-diabetes	47	0	0	0	0	0	0	0	0	0	1	1	0	12	5	8	11	5	4	4
-other endocrine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neuro-psychiatric	16	0	0	0	2	0	1	0	0	1	1	0	0	0	1	5	3	1	1	1

(continued)

Appendix A-5 (contd.). Male deaths by cause and age, 2004

Cause	All ages	Age at death (years)																		
		<1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
Diseases of circulatory system																				
-rheumatic heart disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-hypertensive disease	83	0	0	0	0	0	0	0	0	1	5	2	7	7	5	18	11	11	10	6
-ischaemic heart disease	50	0	0	0	0	0	0	0	0	2	6	5	5	3	4	7	7	8	2	1
-stroke	61	0	1	0	0	0	0	0	1	2	3	2	1	1	4	8	10	13	7	8
-other cardiovascular	38	1	0	0	0	1	0	0	3	0	0	3	0	2	6	4	5	10	1	2
Respiratory disease																				
-COPD*	15	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	2	5	2	3
-asthma	38	0	0	0	0	0	0	0	0	0	0	0	1	3	5	5	12	4	3	5
-other respiratory	25	0	0	0	0	0	0	0	0	0	0	0	1	3	4	3	6	5	1	2
Digestive disease																				
Digestive disease	59	2	1	0	0	0	1	1	1	3	2	5	3	4	11	9	5	7	4	0
Gentio-urinary disease																				
-renal failure	6	1	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	0	0	0
-nephri	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-other urinary	10	0	0	1	0	0	0	0	0	0	1	0	1	1	0	2	0	2	1	1
Other communicable																				
Other communicable	9	4	2	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Injuries																				
Unintentional injuries																				
-accident	22	1	2	0	1	0	1	2	0	2	2	0	1	0	0	3	1	2	3	1
-drowning	29	1	21	4	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Intentional injuries																				
-suicide	7	0	0	0	0	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0
-homicide	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous																				
-senility	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	7	13
-fever of unknown origin	18	0	1	0	0	0	2	0	0	1	1	1	2	0	1	1	0	6	2	0
-septicaemia	8	2	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	2
-other miscellaneous	16	5	1	1	0	1	0	0	0	0	0	1	1	1	1	2	1	0	1	0
Unknown																				
Unknown	13	4	1	0	0	0	0	1	0	0	0	0	0	1	1	0	3	2	0	0
Total	858	124	38	11	7	8	9	6	10	16	30	28	34	37	78	98	105	106	57	56

*COPD=Chronic obstructive pulmonary disease

Appendix A-6. Female deaths by cause and age, 2004

Cause	All ages	Age at death (years)																		
		<1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
Communicable diseases																				
Diarrhoea	13	4	0	0	1	0	0	0	0	0	0	0	0	0	0	3	1	1	1	2
Dysentery	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0
Tuberculosis	6	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	2	0	0	0
EPI related death	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Meningitis	3	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hepatitis	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Chicken pox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unspecified viral encephalitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rabies	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Respiratory infections	20	10	1	0	0	0	0	0	0	0	0	0	0	0	0	3	2	3	1	0
Other communicable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maternal and neonatal conditions																				
Maternal death	13	0	0	0	0	3	3	2	1	1	2	1	0	0	0	0	0	0	0	0
Neonatal condition																				
-premature and LBW	36	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-birth asphyxia	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-other neonatal	32	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nutritional	20	7	1	0	1	0	0	0	0	1	0	0	0	0	0	1	5	2	0	2
Non-communicable diseases																				
Malignant neoplasm																				
-neoplasm	32	0	0	3	0	1	0	0	2	0	1	2	3	1	10	5	4	0	0	0
-neoplasm in female organ	7	0	0	0	0	0	0	0	1	2	1	1	1	1	0	0	0	0	0	0
-neoplasm other kinds	7	0	0	0	1	1	0	0	0	1	0	1	0	0	2	1	0	0	0	0
Endocrine disorder																				
-diabetes	29	0	0	0	0	0	1	0	0	0	0	0	1	1	1	3	8	8	5	1
-other endocrine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neuro-psychiatric	13	0	0	0	1	1	1	0	0	2	0	1	0	0	0	0	1	3	1	2

(continued)

Appendix A-6 (contd.). Female deaths by cause and age, 2004

Cause	All ages	Age at death (years)																		
		<1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
Diseases of circulatory system																				
-rheumatic heart disease	3	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
-hypertensive disease	85	0	0	0	0	0	0	0	0	1	1	7	1	5	6	21	17	11	10	5
-ischaemic heart disease	19	0	0	0	0	1	0	0	0	1	2	1	1	3	3	3	1	1	1	1
-stroke	91	0	0	0	0	0	1	1	0	0	2	0	1	2	6	15	15	24	15	9
-Other cardiovascular	36	1	0	0	1	0	0	0	0	1	1	0	3	1	0	8	6	6	4	4
Respiratory disease																				
-COPD*	12	0	0	0	1	0	0	0	0	0	0	0	0	2	1	4	3	0	0	1
-asthma	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	2	3
-other respiratory	12	2	0	0	0	0	0	0	0	0	1	0	0	1	2	2	2	3	0	1
Digestive disease																				
Digestive disease	51	2	1	1	3	2	2	1	0	2	2	2	0	6	6	7	3	4	6	1
Gentio-urinary disease																				
-renal failure	9	0	0	0	0	0	0	1	0	1	0	0	1	1	2	0	1	0	2	0
-nephritic syndrome	4	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0
-other urinary	4	0	0	0	0	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0
Other non-communicable																				
Other non-communicable	12	3	1	1	0	2	0	0	0	1	0	0	0	0	0	0	1	2	1	0
Injuries																				
Unintentional injuries																				
-accident	23	0	1	1	0	0	0	1	2	0	1	0	0	0	1	3	4	5	4	0
-drowning	27	2	20	2	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Intentional injuries																				
-suicide	6	0	0	0	1	2	1	0	1	0	0	1	0	0	0	0	0	0	0	0
-homicide	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous																				
-senility	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	9	11
-fever of unknown origin	10	2	0	0	0	0	0	0	0	0	0	0	0	1	2	1	2	2	0	0
-septicaemia	6	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0
-other miscellaneous	17	3	2	1	0	0	1	0	0	0	2	0	0	1	4	0	2	2	1	0
Unknown/missing	16	3	0	0	0	0	0	0	0	0	0	0	0	1	2	6	4	4	0	0
Total	724	119	28	12	11	15	11	6	9	16	14	20	12	26	46	92	87	92	63	45

*COPD=Chronic obstructive pulmonary disease

Appendix A-7. Male deaths by cause, age and area, 2004

Cause	All ages		<1		1-4		5-14		15-44		45-64		65-84		85+	
	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.
Communicable diseases																
Diarrhoea	8	7	0	1	1	0	1	0	0	0	0	1	5	4	1	1
Dysentery	2	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0
Tuberculosis	9	21	0	0	0	0	0	0	1	1	3	8	5	11	0	1
EPI related death	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Meningitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hepatitis	4	3	0	0	0	0	1	0	1	2	0	0	2	1	0	0
Chicken pox	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Unspecified viral encephalitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rabies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Respiratory infections	9	20	4	8	0	3	0	0	0	0	0	0	2	9	3	0
Other communicable	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Maternal and neonatal conditions																
Maternal death	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neonatal condition																
-premature and LBW	14	16	14	16	0	0	0	0	0	0	0	0	0	0	0	0
-birth asphyxia	1	3	1	3	0	0	0	0	0	0	0	0	0	0	0	0
-other neonatal	27	24	27	24	0	0	0	0	0	0	0	0	0	0	0	0
Nutritional	3	4	2	1	0	2	0	0	0	0	0	0	1	1	0	0
Non-communicable diseases																
Malignant neoplasm																
-neoplasm	41	34	0	0	1	0	2	1	7	4	14	17	16	12	1	0
-neoplasm in female organ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-neoplasm other kind	4	3	0	0	0	0	0	0	0	2	2	0	2	1	0	0
Endocrine disorder																
-diabetes	19	28	0	0	0	0	0	0	0	0	4	10	11	18	4	0
-other endocrine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neuro-psychiatric	5	11	0	0	0	0	0	2	2	1	0	0	3	7	0	1

(continued)

Appendix A-7 (contd.). Male deaths by cause, age and area, 2004

Cause	All ages		<1		1-4		5-14		15-44		45-64		65-84		85+	
	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.
Diseases of circulatory system																
-rheumatic heart disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-hypertensive disease	55	28	0	0	0	0	0	0	3	3	14	7	35	15	3	3
-ischaemic heart disease	23	27	0	0	0	0	0	0	3	5	8	9	12	12	0	1
-stroke	29	32	0	0	1	0	0	0	2	4	3	5	18	20	5	3
-other cardiovascular	15	23	0	1	0	0	0	0	2	2	4	7	8	12	1	1
Respiratory disease																
-COPD*	4	11	0	0	0	0	0	0	0	1	0	2	3	6	1	2
-asthma	21	17	0	0	0	0	0	0	0	0	3	6	14	10	4	1
-other respiratory	9	16	0	0	0	0	0	0	0	0	3	5	6	9	0	2
Digestive disease	25	34	1	1	1	0	0	0	4	4	9	14	10	15	0	0
Gentio-urinary disease																
-renal failure	2	4	0	1	0	0	0	0	1	0	1	2	0	1	0	0
-nephritic syndrome	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
-other urinary	4	6	0	0	0	0	0	1	1	0	1	1	2	3	0	1
Other non-communicable	3	6	2	2	0	2	0	0	1	2	0	0	0	0	0	0
Injuries																
Unintentional injuries																
-accident	10	12	1	0	2	0	0	1	5	2	0	1	2	7	0	1
-drowning	17	12	0	1	13	8	3	3	0	0	1	0	0	0	0	0
Intentional injuries																
-suicide	2	5	0	0	0	0	0	0	2	5	0	0	0	0	0	0
-homicide	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous																
-senility	10	16	0	0	0	0	0	0	0	0	0	0	5	8	5	8
-fever of unknown origin	8	10	0	0	1	0	0	0	1	3	1	3	5	4	0	0
-septicaemia	3	5	1	1	0	0	0	1	0	0	0	0	1	2	1	1
-other miscellaneous	9	7	3	2	0	1	1	0	1	0	2	2	2	2	0	0
Unknown/missing	2	11	1	3	0	1	0	0	0	1	0	2	1	4	0	0
Total	398	460	58	66	20	18	8	10	37	42	74	103	172	194	29	27

*COPD=Chronic obstructive pulmonary disease

Appendix A-8. Female deaths by cause, age and area, 2004

Cause	All ages		<1		1-4		5-14		15-44		45-64		65-84		85+	
	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.
Communicable diseases																
Diarrhoea	8	5	2	2	0	0	1	0	0	0	0	0	3	3	2	0
Dysentery	1	2	0	0	0	0	0	0	0	0	0	1	1	1	0	0
Tuberculosis	2	4	0	0	0	0	0	0	0	1	1	1	1	2	0	0
EPI related death	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Meningitis	0	3	0	2	0	0	0	1	0	0	0	0	0	0	0	0
Hepatitis	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Chicken pox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unspecified viral encephalitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rabies	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Respiratory infections	8	12	4	6	0	1	0	0	0	0	0	0	4	5	0	0
Other communicable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maternal and neonatal conditions																
Maternal death	5	8	0	0	0	0	0	0	4	8	1	0	0	0	0	0
Neonatal condition																
-premature and LBW	16	20	16	20	0	0	0	0	0	0	0	0	0	0	0	0
-birth asphyxia	4	3	4	3	0	0	0	0	0	0	0	0	0	0	0	0
-other neonatal	13	19	13	19	0	0	0	0	0	0	0	0	0	0	0	0
Nutritional	11	9	4	3	0	1	1	0	1	0	0	0	3	5	2	0
Non-communicable diseases																
Malignant neoplasm																
-neoplasm	21	11	0	0	0	0	3	0	2	2	12	4	4	5	0	0
-neoplasm in female organ	5	2	0	0	0	0	0	0	3	1	2	1	0	0	0	0
-neoplasm other kinds	2	5	0	0	0	0	1	0	0	2	1	2	0	1	0	0
Endocrine disorder																
-diabetes	15	14	0	0	0	0	0	0	0	1	2	1	13	11	0	1
-other endocrine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neuro-psychiatric	5	8	0	0	0	0	1	0	0	4	0	1	4	1	0	2

(continued)

Appendix A-8 (contd.). Female deaths by cause, age and area, 2004

Cause	All ages		<1		1-4		5-14		15-44		45-64		65-84		85+	
	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.	ICDDR,B	Govt.
Diseases of circulatory system																
-rheumatic heart disease	2	1	0	0	0	0	0	1	2	0	0	0	0	0	0	0
-hypertensive disease	49	36	0	0	0	0	0	0	1	1	9	10	36	23	3	2
-ischaemic heart disease	10	9	0	0	0	0	0	0	2	2	4	4	4	2	0	1
-stroke	50	41	0	0	0	0	0	0	0	4	4	5	41	28	5	4
-other cardiovascular	12	24	1	0	0	0	0	1	1	1	2	2	8	16	0	4
Respiratory disease																
-COPD*	4	8	0	0	0	0	0	1	0	0	1	2	3	4	0	1
-asthma	7	3	0	0	0	0	0	0	0	0	0	0	5	2	2	1
-other respiratory	6	6	0	2	0	0	0	0	0	0	2	0	4	3	0	1
Digestive disease	17	34	0	2	1	0	0	4	3	6	6	8	7	13	0	1
Gentio-urinary disease																
-renal failure	5	4	0	0	0	0	0	0	2	0	2	0	0	3	1	1
-nephritic syndrome	1	3	0	0	0	0	1	0	0	1	0	1	0	1	0	0
-other urinary	3	1	0	0	0	0	0	0	1	1	2	0	0	0	0	0
Other non-communicable	7	5	3	0	0	1	1	0	1	2	0	0	2	2	0	0
Injuries																
Unintentional injuries																
-accident	13	10	0	0	1	0	0	1	3	1	1	0	8	8	0	0
-drowning	14	13	0	2	12	8	1	1	0	1	0	1	1	0	0	0
Intentional injuries																
-suicide	0	6	0	0	0	0	0	1	0	4	0	1	0	0	0	0
-homicide	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous																
-senility	16	11	0	0	0	0	0	0	0	0	0	0	11	5	5	6
-fever of unknown origin	3	7	0	2	0	0	0	0	0	0	0	3	3	2	0	0
-septicaemia	2	4	0	3	0	0	0	0	1	0	0	0	1	1	0	0
-other miscellaneous	11	6	1	2	2	0	1	0	0	1	1	2	6	1	0	0
Unknown/missing	4	12	1	2	0	0	0	0	0	0	0	1	3	9	0	0
Total	353	371	49	70	16	12	12	11	27	44	53	51	176	158	20	25

*COPD=Chronic obstructive pulmonary disease

**Appendix A-9. Age-specific fertility rates and indices for ICDDR,B
area by block, 2004**

Age (years)	Block A		Block B		Block C		Block D	
	Births	Rate	Births	Rate	Births	Rate	Births	Rate
All ages	846	86.8	766	92.7	557	83.0	566	92.3
15-19*	123	63.1	101	62.4	105	79.1	73	61.1
20-24	231	141.9	232	162.4	181	156.6	180	183.7
25-29	253	178.3	222	185.2	131	137.9	134	152.6
30-34	160	118.3	128	113.8	92	102.4	111	134.1
35-39	67	49.2	68	58.3	43	47.1	55	63.8
40-44	12	10.1	12	11.7	5	6.1	13	15.9
45-49**	0	0.0	3	4.3	0	0.0	0	0.0
Total fertility rate	2804		2990		2646		3056	
General fertility rate	87		93		83		92	
Gross reproduction rate	1349		1487		1397		1539	

*Births to mothers under aged <15 were included in this group

**Births to mothers aged 50 and above were included in this group

Appendix A.10. Births by mothers' age, live birth order, and area, 2004

Age (years)	Total women	Total births	Live birth order									
			1	2	3	4	5	6	7	8	9	10+
Both areas												
<15	12675	4	4	0	0	0	0	0	0	0	0	0
15-19	12497	741	674	59	8	0	0	0	0	0	0	0
20-24	10320	1784	925	710	137	11	1	0	0	0	0	0
25-29	8438	1479	237	573	464	149	49	5	1	0	1	0
30-34	8133	987	53	155	328	286	115	34	14	1	1	0
35-39	8295	451	7	22	71	123	104	70	32	13	5	4
40-44	7540	85	0	2	10	17	23	14	8	5	3	3
45-49	5554	6	1	0	0	1	1	0	1	1	0	1
Total		5537	1901	1521	1018	587	293	123	56	20	10	8
ICDDR,B area												
<15	5850	3	3	0	0	0	0	0	0	0	0	0
15-19	6089	398	366	30	2	0	0	0	0	0	0	0
20-24	5193	823	449	319	50	5	0	0	0	0	0	0
25-29	4446	738	127	307	227	61	14	1	0	0	1	0
30-34	4204	491	26	86	185	140	41	9	4	0	0	0
35-39	4304	237	5	13	45	65	56	32	16	4	1	0
40-44	3846	42	0	1	7	11	11	6	4	2	0	0
45-49	2775	3	1	0	0	1	1	0	0	0	0	0
Total		2735	977	756	516	283	123	48	24	6	2	0
Government area												
<15	6825	1	1	0	0	0	0	0	0	0	0	0
15-19	6408	343	308	29	6	0	0	0	0	0	0	0
20-24	5127	961	476	391	87	6	1	0	0	0	0	0
25-29	3992	741	110	266	237	88	35	4	1	0	0	0
30-34	3929	496	27	69	143	146	74	25	10	1	1	0
35-39	3991	214	2	9	26	58	48	38	16	9	4	4
40-44	3694	43	0	1	3	6	12	8	4	3	3	3
45-49	2779	3	0	0	0	0	0	0	1	1	0	1
Total		2802	924	765	502	304	170	75	32	14	8	8

Appendix A.11. Age-order-specific fertility rates by area, 2004

Age (years)	Live-birth order										
	Total	1	2	3	4	5	6	7	8	9	10+
Both areas											
<15	0.0003	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15-19	0.0593	0.0539	0.0047	0.0006	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20-24	0.1729	0.0896	0.0688	0.0133	0.0011	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
25-29	0.1753	0.0281	0.0679	0.0550	0.0177	0.0058	0.0006	0.0001	0.0000	0.0001	0.0000
30-34	0.1214	0.0065	0.0191	0.0403	0.0352	0.0141	0.0042	0.0017	0.0001	0.0001	0.0000
35-39	0.0544	0.0008	0.0027	0.0086	0.0148	0.0125	0.0084	0.0039	0.0016	0.0006	0.0005
40-44	0.0113	0.0000	0.0003	0.0013	0.0023	0.0031	0.0019	0.0011	0.0007	0.0004	0.0004
45-49	0.0011	0.0002	0.0000	0.0000	0.0002	0.0002	0.0000	0.0002	0.0002	0.0000	0.0002
Total	2.9792	0.8975	0.8170	0.5956	0.3558	0.1791	0.0753	0.0347	0.0127	0.0062	0.0053
ICDDR,B area											
<15	0.0005	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15-19	0.0654	0.0601	0.0049	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20-24	0.1585	0.0865	0.0614	0.0096	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25-29	0.1660	0.0286	0.0691	0.0511	0.0137	0.0031	0.0002	0.0009	0.0000	0.0002	0.0000
30-34	0.1168	0.0062	0.0205	0.0440	0.0333	0.0098	0.0021	0.0010	0.0000	0.0000	0.0000
35-39	0.0551	0.0012	0.0030	0.0105	0.0151	0.0130	0.0074	0.0037	0.0009	0.0002	0.0000
40-44	0.0109	0.0000	0.0003	0.0018	0.0029	0.0029	0.0016	0.0010	0.0005	0.0000	0.0000
45-49	0.0011	0.0004	0.0000	0.0000	0.0004	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000
Total	2.8711	0.9168	0.7957	0.5865	0.3315	0.1457	0.0568	0.0330	0.0072	0.0023	0.0000
Government area											
<15	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15-19	0.0535	0.0481	0.0045	0.0009	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20-24	0.1874	0.0928	0.0763	0.0170	0.0012	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000
25-29	0.1856	0.0276	0.0666	0.0594	0.0220	0.0088	0.0010	0.0003	0.0000	0.0000	0.0000
30-34	0.1262	0.0069	0.0176	0.0364	0.0372	0.0188	0.0064	0.0025	0.0003	0.0003	0.0000
35-39	0.0536	0.0005	0.0023	0.0065	0.0145	0.0120	0.0095	0.0040	0.0023	0.0010	0.0010
40-44	0.0116	0.0000	0.0003	0.0008	0.0016	0.0032	0.0022	0.0011	0.0008	0.0008	0.0008
45-49	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0004	0.0000	0.0004
Total	3.0966	0.8799	0.8375	0.6050	0.3827	0.2154	0.0953	0.0412	0.0184	0.0103	0.0109

Appendix A-12. Marriages and divorces by month, 2004

Month	Marriage		Divorce	
	No.	Percentage	No.	Percentage
January	180	6.0	22	7.7
February	395	13.1	22	7.7
March	328	10.9	24	8.4
April	247	8.2	26	9.1
May	299	9.9	29	10.1
June	247	8.2	33	11.5
July	275	9.1	23	8.0
August	184	6.1	25	8.7
September	189	6.3	21	7.3
October	200	6.6	15	5.2
November	204	6.8	22	7.7
December	263	8.7	24	8.4
Total	3011	100.0	286	100.0

Appendix A-13. In- and out-migrations by age and sex, 2004

Age (years)	In-migration			Out-migration		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	9443	4493	4950	12995	6690	6305
0-4	1544	761	783	1556	794	762
5 - 9	833	431	402	919	443	476
10-14	640	310	330	1155	573	582
15-19	1382	397	985	2787	1268	1519
20-24	1609	532	1077	2453	1205	1248
25-29	1139	594	545	1435	785	650
30-34	828	523	305	931	580	351
35-39	466	337	129	605	393	212
40-44	333	219	114	414	287	127
45-49	206	155	51	209	137	72
50-54	132	91	41	130	79	51
55-59	93	46	47	90	43	47
60-64	73	38	35	98	32	66
65+	165	59	106	213	71	142

Appendix A-14. In-migration by age, sex, and area, 2004

Age (years)	ICDDR,B area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	4514	2098	2416	4929	2395	2534
0-4	706	337	369	838	424	414
5 - 9	408	217	191	425	214	211
10-14	313	146	167	327	164	163
15-19	699	183	516	683	214	469
20-24	750	233	517	859	299	560
25-29	550	292	258	589	302	287
30-34	378	234	144	450	289	161
35-39	235	164	71	231	173	58
40-44	157	102	55	176	117	59
45-49	89	67	22	117	88	29
50-54	74	50	24	58	41	17
55-59	42	21	21	51	25	26
60-64	39	23	16	34	15	19
65+	74	29	45	91	30	61

Appendix A-15. Out-migration by age, sex, and area, 2004

Age (years)	ICDDR,B area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	6043	3020	3023	6952	3670	3282
0-4	766	366	400	790	428	362
5 - 9	412	198	214	507	245	262
10-14	504	250	254	651	323	328
15-19	1231	530	701	1556	738	818
20-24	1173	547	626	1280	658	622
25-29	696	363	333	739	422	317
30-34	463	289	174	468	291	177
35-39	290	193	97	315	200	115
40-44	184	123	61	230	164	66
45-49	92	59	33	117	78	39
50-54	60	35	25	70	44	26
55-59	42	23	19	48	20	28
60-64	45	18	27	53	14	39
65+	85	26	59	128	45	83

Appendix A.16. Male out-migration by cause of movement and age, 2004

Cause of movement	Age (years)														
	Total	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
All migrants	6690	794	443	573	1268	1205	785	580	393	287	137	79	43	32	71
Work/Economic/Educational															
-acquired/seeking job	3840	0	2	160	765	969	667	496	334	233	101	58	29	12	14
-job completion/retirement	19	0	0	1	1	0	2	4	2	1	3	1	0	3	1
-to acquire education	602	3	41	143	277	114	20	2	1	1	0	0	0	0	0
-educ. completed/interrupted	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0
-student lodging	9	0	0	1	2	2	2	0	1	0	0	1	0	0	0
Housing/Environmental															
-acquired/seeking new land/house	171	0	0	1	12	15	21	19	27	24	13	7	9	6	17
-river erosion	8	0	0	0	1	1	0	1	1	2	1	0	0	0	1
Move as Dependent															
-join with/ follow spouse	31	0	0	0	9	4	1	4	4	2	2	2	1	1	1
-join with/follow parents	1605	742	373	226	150	60	22	9	12	7	1	2	0	0	1
-join with son/daughter/sister/brother	146	23	15	20	30	13	9	2	0	1	2	2	1	6	22
-join with other relatives	70	20	11	13	1	0	3	4	3	5	5	0	1	1	3
Marriage/Familial															
-marriage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-separation/divorce/widow	10	0	0	0	0	3	1	2		1	2	0	0	0	1
-adoption	6	5	0	0	1	0	0	0	0	0	0	0	0	0	0
-family friction/breakdown	80	0	1	1	9	16	24	16	1	4	2	1	1	0	4
-health or old age care	9	1	0	0	0	0	1	3	0	0	1	0	0	0	3
Legal Problems	45	0	0	0	3	4	9	11	4	5	4	2	0	1	2
Other and Not Stated															
-others n.e.c.*	36	0	0	6	5	4	3	7	3	1	0	3	1	2	1
-unknown or not stated	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0

*n.e.c.=Not elsewhere classified

Appendix A.17. Female out-migration by cause of movement and age, 2004

Cause of movement	Age (years)														
	Total	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
All migrants	6305	762	476	558	1067	955	561	349	654	413	161	77	57	73	135
Work/Economic/Educational															
-acquired/seeking job	796	0	12	105	369	152	61	36	22	26	7	2	0	2	2
-job completion/retirement	6	0	0	3	2	0	1	0	0	0	0	0	0	0	0
-to acquire education	281	3	53	104	74	33	7	6	1	0	0	0	0	0	0
-educ. completed/interrupted	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
-student lodging	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Housing/Environmental															
-acquired/seeking new land/house	68	0	0	0	10	11	10	10	9	5	7	2	0	1	3
-river erosion	3	0	0	0	0	1	0	0	1	0	0	0	0	1	0
Move as Dependent															
-join with/ follow spouse	1495	0	0	0	229	461	331	193	133	62	31	19	13	13	10
-join with/follow parents	1872	712	376	273	223	148	79	30	10	3	4	4	3	2	5
-join with son/daughter/sister/brother	468	20	21	49	91	54	21	11	6	6	16	18	26	38	91
-join with other relatives	151	17	13	16	17	17	26	14	13	7	4	1	0	5	1
Marriage/Familial															
-marriage	822	0	0	0	0	0	0	24	427	261	82	18	6	3	0
-separation/divorce/widow	86	0	0	0	0	0	0	0	25	32	7	8	4	4	0
-adoption	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0
-family friction/breakdown	153	0	1	2	40	55	18	16	6	5	1	0	3	0	6
-health or old age care	30	0	0	1	0	7	1	2	0	0	0	1	1	1	16
Legal Problems	5	0	0	0	0	1	0	1	1	2	0	0	0	0	0
Other and Not Stated															
-others n.e.c.*	59	2	0	5	11	15	6	6	0	4	2	3	1	3	1
-unknown or not stated	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0

*n.e.c.=Not elsewhere classified

Appendix A.18. Male in-migration by cause of movement and age, 2004

Cause of movement	Total	Age (years)													
		<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
All migrants	4493	761	431	310	397	532	594	523	337	219	155	91	46	38	59
Work/Economic/Educational															
-acquired/seeking job	776	0	0	20	82	142	185	145	81	43	41	19	8	6	4
-job completion/retirement	745	0	0	7	52	98	142	148	96	72	50	38	15	17	10
-to acquire education	234	2	72	81	60	16	2	1	0	0	0	0	0	0	0
-educ. Completed/interrupted	14	0	0	6	3	3		1	0	1	0	0	0	0	0
-student lodging	26	0	0	4	5	6	6	1	0	1	2	1	0	0	0
Housing/Environmental															
-acquired/seeking new land/house	388	0	0	1	15	47	78	83	55	37	24	11	15	7	15
-river erosion	19	0	0	0	1	1	4	5	2	4	2	0	0	0	0
Move as Dependent															
-join with/follow spouse	266	0	0	0	3	34	56	50	52	29	21	10	3	5	3
-join with/follow parents	1465	671	320	159	115	93	53	26	17	8	3	0	0	0	0
-join with son/daughter/sister/brother	94	25	13	8	5	12	7	3	2	3	1	0	0	0	15
-join with other relatives	170	43	24	13	10	11	20	17	14	8	2	4	1	1	2
Marriage/Familial															
-marriage	4	0	0	0	0	2	0	2	0	0	0	0	0	0	0
-separation/divorce/widow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-adoption	16	12	2	1	0	0	0	0	0	1	0	0	0	0	0
-family friction/breakdown	46	1	0	2	3	14	12	9	2	1	0	2	0	0	0
-health or old age care	91	0	0	1	14	18	8	13	6	9	7	4	2	1	8
Legal Problems															
-marriage	26	0	0	0	0	3	10	5	6	0	1	1	0	0	0
Other and Not Stated															
-others n.e.c.*	113	7	0	7	29	32	11	14	4	2	1	1	2	1	2
-unknown or not stated	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*n.e.c.=Not elsewhere classified

Appendix A.19. Female in-migration by cause of movement and age, 2004

Cause of movement	Total	Age (years)													
		<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
All migrants	4950	783	402	330	985	1077	545	305	129	114	51	41	47	35	106
Work/Economic/Educational															
-acquired/seeking job	207	0	0	31	29	53	46	19	13	6	1	1	6	1	1
-job completion/retirement	106	0	0	7	32	29	17	8	5	4	2	0	1	1	0
-to acquire education	192	5	65	76	34	11	0	0	1	0	0	0	0	0	0
-educ. completed/interrupted	5	0	0	0	3	1	1	0	0	0	0	0	0	0	0
-student lodging	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0
Housing/Environmental															
-acquired/seeking new land/house	129	0	0	0	9	14	14	21	15	12	4	8	10	8	14
-river erosion	5	0	0	0	0	0	1	0	0	1	1	0	2	0	0
Move as Dependent															
-join with/ follow spouse	1253	0	0	0	261	409	255	138	60	59	27	16	15	6	7
-join with/follow parents	1826	668	300	174	244	256	108	59	8	4	1	0	1	0	3
-join with son/daughter/sister/brother	170	19	14	13	21	12	2	2	2	3	3	6	9	12	52
-join with other relatives	211	60	18	17	29	31	18	19	4	6	2	3	0	0	4
Marriage/Familial															
-marriage	447	0	0	6	253	148	28	8	2	2	0	0	0	0	0
-separation/divorce/widow	129	0	0	3	24	37	23	10	10	7	6	3	1	0	5
-adoption	26	25	1	0	0	0	0	0	0	0	0	0	0	0	0
-family friction/breakdown	89	0	0	0	18	35	10	11	4	4	1	1	0	0	5
-health or old age care	49	0	0	2	7	11	5	4	2	1	1	2	0	4	10
Legal Problems	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other and Not Stated															
-others n.e.c.*	104	6	4	1	20	30	17	5	3	5	2	1	2	3	5
-unknown or not stated	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*n.e.c.=Not elsewhere classified

Appendix A.20. Male migration by destination or origin, 2004

Destination	Rural/urban	Out-migration						In-migration					
		Age (years)						Age (years)					
		0-14	15-24	25-34	35-44	45+	Total	0-14	15-24	25-34	35-44	45+	Total
Dhaka	Rural	172	217	81	47	36	553	126	78	72	44	22	342
	Urban	730	1313	500	241	165	2949	495	457	428	198	141	1719
Chittagong	Rural	634	295	223	117	78	1347	670	199	228	107	83	1287
	Urban	144	192	79	49	32	496	119	86	95	37	39	376
Sylhet	Rural	26	21	7	8	2	64	14	11	13	7	6	51
	Urban	34	34	22	5	4	99	29	24	17	7	12	89
Khulna	Rural	1	8	5	3	1	18	12	12	6	3	8	41
	Urban	9	8	3	2	1	23	4	8	4	1	8	25
Rajshahi	Rural	4	3	4	2	0	13	9	8	6	2	2	27
	Urban	8	10	4	3	2	27	6	3	2	1	2	14
Barisal	Rural	8	0	3	2	1	14	1	3	6	0	0	10
	Urban	8	5	6	1	1	21	1	0	6	0	1	8
India		24	15	8	5	11	63	6	4	1	1	1	13
Asia		0	39	55	21	6	121	2	7	58	46	8	121
Middle-east		4	301	352	169	21	847	7	24	171	99	55	356
Others		3	9	11	4	0	27	0	0	0	1	0	1
Unknown		1	3	2	1	1	8	1	5	4	2	1	13
Total		1810	2473	1365	680	362	6690	1502	929	1117	556	389	4493

Appendix A.21. Female migration by destination or origin, 2004

Destination	Rural/ urban	Out-migration						In-migration					
		Age (years)						Age (years)					
		0-14	15-24	25-34	35-44	45+	Total	0-14	15-24	25-34	35-44	45+	Total
Dhaka	Rural	162	195	92	36	44	529	130	123	69	22	22	366
	Urban	730	1004	380	148	173	2435	481	496	297	81	111	1466
Chittagong	Rural	659	1203	384	98	97	2441	674	1249	365	102	84	2474
	Urban	153	231	74	31	31	520	117	116	64	15	30	342
Sylhet	Rural	25	24	11	4	3	67	17	9	9	3	5	43
	Urban	23	28	13	1	1	66	28	17	12	5	9	71
Khulna	Rural	5	9	3	0	4	21	6	6	5	4	5	26
	Urban	5	10	3	3	2	23	8	3	5	1	2	19
Rajshahi	Rural	5	7	3	0	0	15	9	6	4	2	1	22
	Urban	8	9	5	2	1	25	8	2	2	2	0	14
Barisal	Rural	9	6	4	1	0	20	8	6	1	0	0	15
	Urban	3	8	4	2	3	20	9	2	4	0	1	16
India		26	15	13	7	16	77	6	7	2	3	7	25
Asia		1	5	2	0	0	8	0	1	1	0	0	2
Middle-east		0	11	8	5	1	25	12	8	9	3	1	33
Other		2	1	1	1	1	6	0	0	0	0	0	0
Unknown		4	1	1	0	1	7	2	11	1	0	2	16
Total		1820	2767	1001	339	378	6305	1515	2062	850	243	280	4950

Table A.22. Misclassification of major underlying causes of death of neonates between physician's and paramedic's review, 2003-2004

Cause of death in physician's review	Cause of death in paramedic's review							Total
	ARI	Septicaemia	Pregnancy/delivery complications	Prematurity/low birth weight	Birth asphyxia	Hypothermia	All others	
ARI	10	2	2	0	0	0	2	18
Septicaemia	3	5	0	0	0	0	7	15
Pregnancy/delivery complications	1	1	43	12	9	0	1	67
Prematurity/LBW	3	1	27	108	5	1	14	153
Birth asphyxia	2	2	40	6	24	0	5	79
Hypothermia	0	0	1	5	0	0	1	8
All others	1	0	3	0	2	0	20	26
Total	20	11	116	131	40	1	50	366

Table A.23. Misclassification of major underlying causes of death of children (aged 29 days-14 years) between physician's and paramedic's review, 2003-2004

Cause of death in physician's review	Cause of death in paramedic's review									Total
	Diarrhoea/dysentery	ARI	Malnutrition	Cancer	Neurological problem	Liver/gallbladder	Congenital malformation	Injury	All others	
Diarrhoea/dysentery	20	1	4	0	0	0	1	1	1	28
ARI	2	23	5	0	1	0	3	1	13	48
Malnutrition	7	8	18	0	0	0	1	0	9	43
Cancer	0	0	0	10	0	0	2	0	0	12
Neurological problem	0	0	0	0	6	0	0	1	2	9
Liver and gallbladder Disease	0	1	0	1	0	5	0	0	2	9
Congenital malformation	0	0	0	0	0	0	10	0	5	15
Injury/accident	0	0	0	0	0	0	0	123	2	125
All others	3	5	3	2	1	3	7	3	47	74
Total	32	38	30	13	8	8	24	129	81	363

Table A.24. Misclassification of major underlying causes of death of adults (aged 15-59 years) between physician's and paramedic's review, 2003-2004

Cause of death in physician's review	Cause of death in paramedic's review												Total	
	Tuber- culosis	Maternal death	Cancer	Diabetes/ endo- crine	Stroke	Hyper- tensive disease	Ischa- emic heart	Other cardio- vascular	Chronic lower resp. disease	Alime- ntary disease	Liver/ gall- bladder disease	Injury/ accident		All others
Tuberculosis	23	0	6	0	1	1	1	2	1	0	1	0	5	41
Maternal death	0	21	0	0	0	1	0	0	0	0	0	1	1	24
Cancer	1	0	66	0	0	0	0	2	0	0	1	0	6	76
Diabetes/endocrine	1	0	0	10	3	4	2	1	0	0	0	1	5	27
Stroke	1	0	1	0	17	2	1	2	1	1	0	0	4	30
Hypertensive disease	0	1	0	0	12	42	5	2	1	0	0	0	9	72
Ischaemic heart disease	0	0	0	0	1	0	33	5	0	1	0	0	1	41
Other cardio-vascular disease	1	0	0	0	1	1	3	6	1	2	1	0	1	17
Chronic lower resp. disease	3	1	0	1	0	0	1	2	13	0	0	0	3	24
Alimentary disease	0	0	6	0	0	0	0	0	0	14	0	0	3	23
Liver/gallbladder disease	1	0	5	0	1	1	1	2	0	0	40	0	10	61
Injury/accident	0	0	1	1	1	0	0	0	0	0	1	43	5	52
All others	2	1	4	1	7	2	5	9	4	4	8	10	68	125
Total	33	24	89	13	44	54	52	33	21	22	52	55	121	613

Table A.25. Misclassification of major underlying causes of death of elderly (aged 60 or above) between physician's and paramedic's review, 2003-2004

Cause of death in physician's review	Cause of death in paramedic's review																Total
	Diarr.	Tuber- culosis	ARI	Cancer	Diabetes/ endo- crine	Stroke	Hyper- tensive disease	Ischa- emic heart	Other cardio- vascular	Chronic lower resp. disease	Other respi- ratory disease	Alime- ntary disease	Liver/ gall- bladder disease	Genito- urinary	Injury/ accident	All others	
Diarrhoea	30	0	1	0	1	0	0	2	1	0	1	2	0	0	0	19	57
Tuberculosis	0	37	2	10	1	2	0	2	4	7	5	1	0	3	1	2	77
ARI	2	0	15	0	2	2	0	1	4	6	3	0	0	1	1	25	62
Cancer	0	0	0	89	0	2	0	1	0	2	1	3	0	0	0	3	101
Diabetes/endocrine	2	4	0	3	68	17	2	4	6	0	3	3	4	4	0	13	133
Stroke	2	1	3	3	12	172	11	9	13	3	4	2	1	4	3	38	281
Hypertensive dis.	3	1	0	2	10	64	196	21	2	4	2	4	2	3	6	6	326
Ischaemic heart dis.	0	0	0	1	2	0	1	27	6	0	1	1	0	1	0	1	41
Other cardio-vascular disease	3	1	1	1	4	9	0	7	37	9	5	3	0	4	5	37	126
Chronic lower resp. Disease	1	7	11	4	3	3	1	2	7	98	13	1	0	0	2	13	166
Other respiratory Disease	2	0	1	2	0	0	0	0	3	3	7	0	0	0	0	2	20
Alimentary dis.	0	0	0	6	0	4	0	1	0	0	2	38	3	1	0	8	63
Liver/gallbladder Disease	1	0	1	9	2	2	2	0	2	2	1	4	38	2	0	3	69
Genito-urinary dis.	0	0	1	2	0	0	0	0	0	2	1	0	0	11	0	5	22
Injury/accident	1	0	0	1	1	3	0	1	2	2	0	1	1	0	36	5	54
All others	3	1	3	6	9	19	4	4	26	8	6	11	1	4	12	68	185
Total	50	52	39	139	115	299	217	82	113	146	55	74	50	38	66	248	1783

Appendix B
Mid-year population, births, and deaths by village, 2004

Village code	Village name	Population	Live births	Deaths	Birth rate	Death rate
ICDDR,B area:						
D00	Charmukundi	2367	52	22	22.0	9.3
W00	Kaladi	6040	151	29	25.0	4.8
V10	Dhakirgaon	1838	38	11	20.7	6.0
V11	Nabakalash	2580	57	17	22.1	6.6
V31	Dighaldi	9284	242	60	26.1	6.5
V32	Mobarakdi	3165	78	17	24.6	5.4
V60	Suvankardi	977	22	6	22.5	6.1
V61	Munsabdi	663	22	1	33.2	1.5
V62	Shilmondi	923	19	5	20.6	5.4
V72	Upadi	6240	165	46	26.4	7.4
Block A		34077	846	214	24.8	6.3
H00	Lamchari	1293	28	12	21.7	9.3
V12	Bhangerpar	660	20	5	30.3	7.6
V13	Baburpara	737	18	2	24.4	2.7
V19	Lakshmipur	2997	65	24	21.7	8.0
V20	Dagorpur	1328	25	14	18.8	10.5
V21	Khadergaon	570	19	9	33.3	15.8
V22	Beloti	615	16	5	26.0	8.1
V23	Baluchar	601	15	3	25.0	5.0
V24	Machuakhal	2950	73	17	24.7	5.8
V26	Narayanpur	2983	70	19	23.5	6.4
V56	Pailpara	1507	46	14	30.5	9.3
V59	Doshpara	1562	40	8	25.6	5.1
V82	Dhanarpar	1683	31	12	18.4	7.1
V83	Padmapal	588	13	4	22.1	6.8
V85	Bhanurpara	490	14	8	28.6	16.3
V87	Hurmaisha	698	14	4	20.1	5.7
VBB	Nagda	4424	117	33	26.4	7.5
VBC	Naogaon	4909	142	29	28.9	5.9
Block B		30595	766	222	25.0	7.3

(continued)

Village code	Village name	Population	Live births	Deaths	Birth rate	Death rate
K00	Shahpur	932	25	5	26.8	5.4
L00	Tatkhana	555	13	4	23.4	7.2
M00	Char Nayergaon	206	4	0	19.4	0.0
N00	Aswinpur	2097	56	6	26.7	2.9
O00	Nayergaon	1846	52	10	28.2	5.4
P00	Titerkandi	2173	47	11	21.6	5.1
Q00	Char Shibpur	278	9	2	32.4	7.2
V27	Panchghoria	971	21	7	21.6	7.2
V28	Khidirpur	1555	42	15	27.0	9.6
V30	Harion	578	13	1	22.5	1.7
V39	Gobindapur	355	8	1	22.5	2.8
V40	Masunda	776	17	4	21.9	5.2
V41	Paton	1806	36	11	19.9	6.1
V42	Adhara (South)	761	23	2	30.2	2.6
V44	Panchdona	644	5	3	7.8	4.7
V86	Adhara	893	31	3	34.7	3.4
V88	Datikara	503	10	3	19.9	6.0
VBA	Meharon	2460	30	21	12.2	8.5
DX0	Barogaon	3611	92	29	25.5	8.0
DX1	Naojan	1371	23	6	16.8	4.4
Block C		24371	557	144	22.9	5.9
R00	Nandalalpur	1471	44	13	29.9	8.8
S00	Tatua	959	18	3	18.8	3.1
T00	Amuakanda	1664	45	10	27.0	6.0
V15	Bhati Rasulpur	739	23	9	31.1	12.2
V16	Binandapur	871	26	7	29.9	8.0
V17	Hatighata	1111	22	8	19.8	7.2
V18	Torkey	4021	118	28	29.3	7.0
V25	Char Pathalia	1347	30	13	22.3	9.7
V29	Shibpur (South)	483	10	5	20.7	10.4
V33	Shibpur (North)	458	11	4	24.0	8.7
V34	Satparia	835	23	5	27.5	6.0

(continued)

Village code	Village name	Population	Live births	Deaths	Birth rate	Death rate
V52	Nayakandi	213	6	4	28.2	18.8
V54	Balairkandi	637	15	4	23.5	6.3
V55	Induria	552	15	2	27.2	3.6
V63	Islamabad (East)	2106	37	14	17.6	6.6
V67	Majlishpur	634	8	8	12.6	12.6
V81	Sonaterkandi	716	20	6	27.9	8.4
V84	Shahbajkandi	2321	56	22	24.1	9.5
V89	Islamabad (Middle)	1470	39	6	26.5	4.1
Block D		22608	566	171	25.0	7.6
ICDDR,B area: Total		111651	2735	751	24.5	6.7
Government area:						
A00	Uddamdi	3281	75	26	22.9	7.9
B00	Charmasua	2087	57	19	27.3	9.1
C00	Sarderkandi	3948	94	22	23.8	5.6
F00	Sepoykandi	1478	22	8	14.9	5.4
G00	Thatalia	2978	76	19	25.5	6.4
J00	Char Harigope	742	13	6	17.5	8.1
U00	Baispur	8879	229	60	25.8	6.8
V01	Kadamtali	383	7	1	18.3	2.6
V02	Nilokhi	503	19	6	37.8	11.9
V03	Char Nilokhi	619	15	5	24.2	8.1
V04	Char Pathalia	334	12	2	35.9	6.0
V05	Gazipur	3291	81	22	24.6	6.7
V06	Fatepur	2489	65	22	26.1	8.8
V07	Nayakandi	312	8	3	25.6	9.6
V08	Goalbhar	1192	29	4	24.3	3.4
V09	Naburkandi	1216	28	6	23.0	4.9
V14	Enayetnagar	795	17	10	21.4	12.6
V35	Durgapur	4008	80	25	20.0	6.2
V36	Ludhua	5609	126	42	22.5	7.5
V37**	Charputia	-	-	-	-	-
V38	Galimkha	1591	31	15	19.5	9.4
V43	Kanachak	977	34	11	34.8	11.3

(continued)

Village code	Village name	Population	Live births	Deaths	Birth rate	Death rate
V45	Bakchar	1094	30	10	27.4	9.1
V46	Silinda	402	10	4	24.9	10.0
V47	Tulatali	1855	42	15	22.6	8.1
V48	Gangkanda	609	16	3	26.3	4.9
V49	Harina Bhabanipur	1292	38	9	29.4	7.0
V50	Bakharpur	59	0	0	0.0	0.0
V51	Induriakandi	587	20	5	34.1	8.5
V53	Chhoto Haldia	3062	69	22	22.5	7.2
V57	Baluchar	1095	26	6	23.7	5.5
V58**	Mohishmari	-	-	-	-	-
V64	Kawadi	4620	141	47	30.5	10.2
V65	Nayachar	801	18	3	22.5	3.7
V66	Thatalia	887	19	12	21.4	13.5
V68	Sobahan	1081	31	9	28.7	8.3
V69**	Naobangha	-	-	-	-	-
V70**	South Joypur	-	-	-	-	-
V71	Khamarpara	506	11	1	21.7	2.0
V73	Sadardia	857	17	4	19.8	4.7
V74	Ketundi	1463	35	6	23.9	4.1
V75	Mukundi	347	3	2	8.6	5.8
V76	Chosoi	1849	65	22	35.2	11.9
V78	Soladana	253	6	5	23.7	19.8
V79	Pitambordi	358	13	4	36.3	11.2
V80	Daribond	1243	38	10	30.6	8.0
V90	Narinda	1229	27	11	22.0	9.0
V95	Baluchar	2209	68	13	30.8	5.9
V96	Rampur	694	16	9	23.1	13.0
V97	Dhanagoda	397	10	5	25.2	12.6
V98	Santoshpur	139	2	1	14.4	7.2
V99	Baluakandi	569	14	2	24.6	3.5
VB1	Taltoli	1089	33	11	30.3	10.1
VB2	Sree Rayerchar	1118	34	5	30.4	4.5
VB3	Rayerkandi	2953	78	16	26.4	5.4

(continued)

Village code	Village name	Population	Live births	Deaths	Birth rate	Death rate
VB4	Ramdaspur	3686	94	25	25.5	6.8
VB5	Thakurpara	888	22	6	24.8	6.8
VB6	Sarkerpara	498	9	1	18.1	2.0
VB7	Mirpur	316	15	2	47.5	6.3
VB8	Farazikandi	1367	32	9	23.4	6.6
VB9**	Ramanathgonj	-	-	-	-	-
VB0	South Rampur	2913	73	24	25.1	8.2
D28	Bazarkhola	1104	15	11	13.6	10.0
D29	Kirtonkhola	206	7	1	34.0	4.9
D30	Banuakandi	791	27	5	34.1	6.3
D31	Harina Bazarkhola	1106	17	7	15.4	6.3
D32	Khalisha	787	17	10	21.6	12.7
D33	Nayanagar	1102	25	9	22.7	8.2
D34	Saidkharkandi	1429	27	11	18.9	7.7
D35	Mollah Kandi	613	20	6	32.6	9.8
D88	Sankibhanga Sankibhanga	1504	45	14	29.9	9.3
D89	Namapara	1250	33	12	26.4	9.6
D90	Zahirabad	975	25	5	25.6	5.1
D91**	North Joypur	-	-	-	-	-
D92**	West Joypur	-	-	-	-	-
D93	Maizkandi	1324	38	4	28.7	3.0
D94	Hazipur	1502	34	13	22.6	8.7
D95	Tapaderpara	601	12	2	20.0	3.3
D96	Sakharipara	1076	28	6	26.0	5.6
D97	Nayakandi	742	19	3	25.6	4.0
D98	Bara Haldia	3466	74	28	21.4	8.1
D99	Mandertoli	2150	46	11	21.4	5.1
Government area: Total		112825	2802	831	24.8	7.4

*Division by block applies only to the ICDDR,B area

**Lost due to river erosion in 1987

Appendix C
Life table equations

$$1. \quad {}_nq_x = \frac{{}_nm_x}{\frac{1}{n} + {}_nm_x \left[\frac{1}{2} + \frac{n}{12} ({}_nm_x - \ln C) \right]}$$

$$2. \quad l_0 = 100,000$$

$$l_x = (1 - {}_nq_{x-n}) l_{x-n}$$

$$3. \quad L_0 = 0.20 l_0 + 0.80 l_1$$

$$L_1 = 0.410 l_1 + 0.590 l_2$$

$$L_i = \frac{1}{2} (l_i + l_{i+1}), \quad i = 2, 3, 4$$

$${}_nL_x = \frac{{}_nd_x}{{}_nm_x} \quad \text{for } 5 \leq x \leq 80$$

$${}_{\infty}L_{85} = \frac{l_{85}}{{}_{\infty}m_{85}} \quad \text{for the last age group 85+}$$

$$4. \quad e_x = \frac{T_x}{l_x} \quad \text{where } T_x = \sum_{y=x}^{\infty} L_y$$

Note: Greville's method, as suggested in: Shryock HS, Seigel JS, et al. The methods and materials of demography (revised), v. II. Washington DC: Bureau of the Census, 1975: 414, 444-5.

(ln C assumed to be 0.095; separation factors in Equation 3 correspond to an infant mortality rate of 50.)

Appendix D
WHO standard world population age structure

Age group (years)	World population	Percentage
0	1800	1.8
1-4	7000	7.0
5-9	8700	8.7
10-14	8600	8.6
15-19	8500	8.5
20-24	8200	8.2
25-29	7900	7.9
30-34	7600	7.6
35-39	7200	7.2
40-44	6600	6.6
45-49	6000	6.0
50-54	5400	5.4
55-59	4600	4.6
60-64	3700	3.7
65-69	3000	3.0
70-74	2200	2.2
75-79	1500	1.5
80-84	900	0.9
85+	600	0.6
Total	100000	100

Source: Age standardization of rates: a new WHO standard (2000)
(www.who.int/whosis/statistics/discussion_papers/pdf/paper31.pdf)

Appendix E

Interventions in child and reproductive health in ICDDR,B area

Date	Activity	MCH-FP Block			
		A	B	C	D
Oct 1977	Family planning	X	X	X	X
Mar 1978	Tetanus toxoid to pregnant women	X	X	X	X
Jan 1979	ORT	X	X	X	X
Dec 1981	Tetanus toxoid to all women	X		X	
Dec 1985		X	X	X	X
Mar 1982	Measles vaccine	X		X	
Dec 1985		X	X	X	X
Sep 1982	Antenatal care	X		X	
Jan 1986		X	X	X	X
Jan 1985	Iron/folic acid to pregnant women	X		X	
Jan 1986		X	X	X	X
Mar 1986	EPI immunizations (BCG, DPT, Polio)	X	X	X	X
Sep 1988	Nutritional rehabilitation	X	X	X	X
Jan 1986	Vitamin A distribution	X	X	X	X
Mar 1987	Maternity care			X	X
Apr 1988	ARI		X		X
Jul 1991		X	X	X	X
Apr-Dec 1989	Dysentery		X		X
1991	Dysentery stopped	-	-	-	-
1997	Sub-centre delivery			X	
1998					X
2000			X		
2001		X			
2000	Fixed Site Clinic			X	X
2001		X	X		

Appendix F

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