

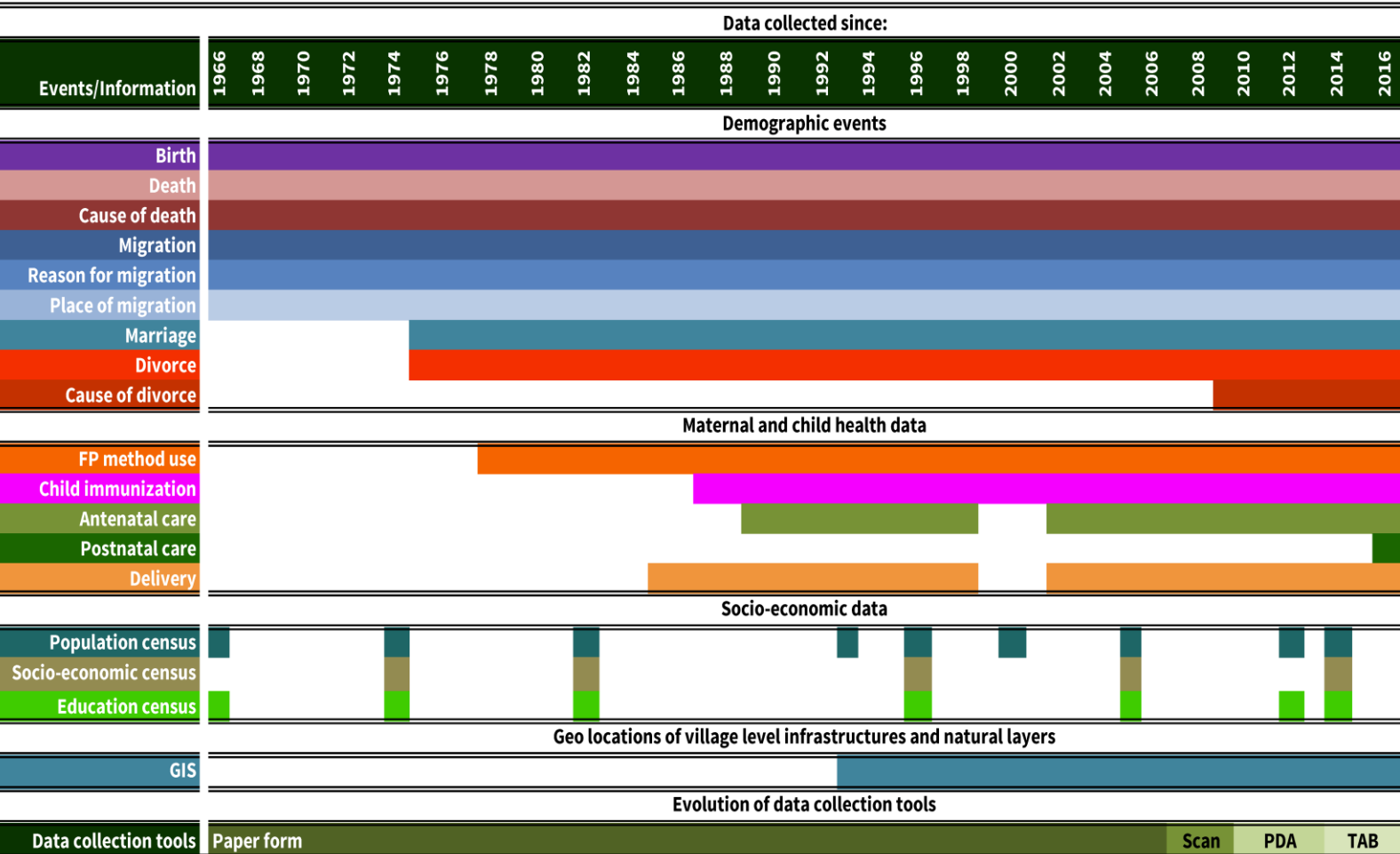
HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEM – MATLAB

Volume Fifty One

Registration of Health and Demographic Events 2016

Scientific Report No. 138 – April 2018

Generation of health, demographic and GIS data in Matlab HDSS area





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Scientific Report No. 138 – April 2018

**Initiative for Climate Change and Health
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LIST OF ABBREVIATION

BCG	Bacillus Calmette–Guérin
CBR	Crude Birth Rate
CDR	Crude Death Rate
CHRW	Community Health Research Worker
COPD	Chronic Obstructive Pulmonary Disease
CPR	Contraceptive Prevalence Rate
CRL	Cholera Research Laboratory
DPT	Diphtheria, Pertussis and Tetanus
DSS	Demographic Surveillance System
FRS	Field Research Supervisor
FWV	Family Welfare Visitor
GIS	Geographic Information System
GPS	Global Positioning System
GAC	Global Affairs Canada
HDSS	Health and Demographic Surveillance System
IMR	Infant Mortality Rate
INDEPTH	International Network of field sites with continuous Demographic Evaluation of Population and Their Health in developing countries
IUD	Intra-uterine Device
MCH-FP	Maternal and Child Health and Family Planning
NGO	Non-government Organization
RKS	Record Keeping System
Sida	Swedish International Development Cooperation
TBA	Traditional Birth Attendant
TFR	Total Fertility Rate
U5MR	Under-five Mortality Rate
UESD	Utilization of Essential Service Delivery Survey
UKAid	Department of International Development, UK
VA	Verbal Autopsy
WHO	World Health Organization

SUMMARY

This report presents the vital registration and maternal and child health statistics assembled from Health and Demographic Surveillance System (HDSS), site, Matlab, a rural area in Bangladesh, in 2016. The data were collected by the Matlab HDSS of icddr,b. The surveillance area is divided into two service area – 1) icddr,b service area and 2) Government service area where usual government health and family planning services are available. The icddr,b service area is sub-divided into four blocks, where family planning, immunization and limited curative services are provided to under-five children and women of reproductive age.

In the surveillance area as a whole, fertility rate in 2016 is similar to that in 2015. The crude birth rate (CBR) was 22.3 per 1,000 populations in 2016 whereas in 2015 the rate was 22.0. The total fertility rate (TFR) in 2016 did not change from 2.7 per woman in 2015. In the icddr,b service area, CBR was 22.8 and in the Government service area, CBR was 21.7 and TFR was 2.7 in both the services area.

The crude death rate (CDR) was 6.7 per 1,000 population in the icddr,b service area, and in Government service area it was 6.9 in 2016. The infant mortality rate was 22.1 per 1,000 live births in the icddr,b service area, and in the Government service area it was 31.5. The neonatal mortality rate decreased to 16.7 from 18.0 in the icddr,b service area and 27.5 from 27.9 in the Government service area respectively in 2016 from 2015. Post-neonatal mortality increased in the icddr,b service area (from 3.7 to 5.3) and decreased in the Government service area (from 5.7 to 4.0). Under five mortality rate has increased from 31.1 in 2015 in the icddr,b service area to 32.0 in 2016, and in the Government service area, the decrease was from 40.5 in 2015 to 40.2 in 2016. The overall rate of natural increase in population size was 15.5 per 1,000 in 2016.

The rate of in-migration increased to 59.8 per 1,000 populations in 2016 from 51.6 in 2015, and the rate of out-migration increased to 62.1 in 2016 from 54.4 in 2015. The overall annual population growth rate was 1.3%. The marriage rate was 14.2 per 1,000 people, and the divorce rate was 1.7 per 1,000 people.

CHAPTER 1

INTRODUCTION

Since 1963, the icddr,b, initiated as Cholera Research Laboratory, has implemented a health research programme in Matlab, Bangladesh. Matlab is located (Longitude= 90.72 0033 and Latitude= 23.388482) about 55 km southeast of Dhaka, the capital city of Bangladesh (Figure 1.1). The Health and Demographic Surveillance System (HDSS), formerly Demographic Surveillance System (DSS), is one of the major components of this field programme of icddr,b. Today the Matlab HDSS is recognized worldwide by population experts and health scientists as one of the longest continuing demographic surveillance sites in a developing country.

Since 1966, the HDSS has maintained the registration of births, deaths, and migrations, in addition to carrying out periodical censuses. Registration of marital unions and dissolutions began in 1975, internal movement in 1982, and household headship change as well as household dissolution in 1993. Later in 1998, the Record Keeping System (RKS) and Geographical Information System (GIS) were integrated into HDSS. The Community Health Research Workers (CHRWs) obtain vital demographic and health information by visiting each household in their assigned areas bi-monthly since 2007, monthly prior to that. HDSS data were collected using event registration forms since 2011 by using PDA (Personal Data Assistant), and since 2014 using Galaxy Tabs. The activities of CHRWs are supervised by Field Research Supervisors (FRSs), and quality of collected information is monitored through independent data verification in the field. A detailed description of the Matlab HDSS and its operation appears in the CRL Scientific Report No. 9 (1978)¹, icddr,b Special Publication No. 35 (1994), and 72 (1998)².

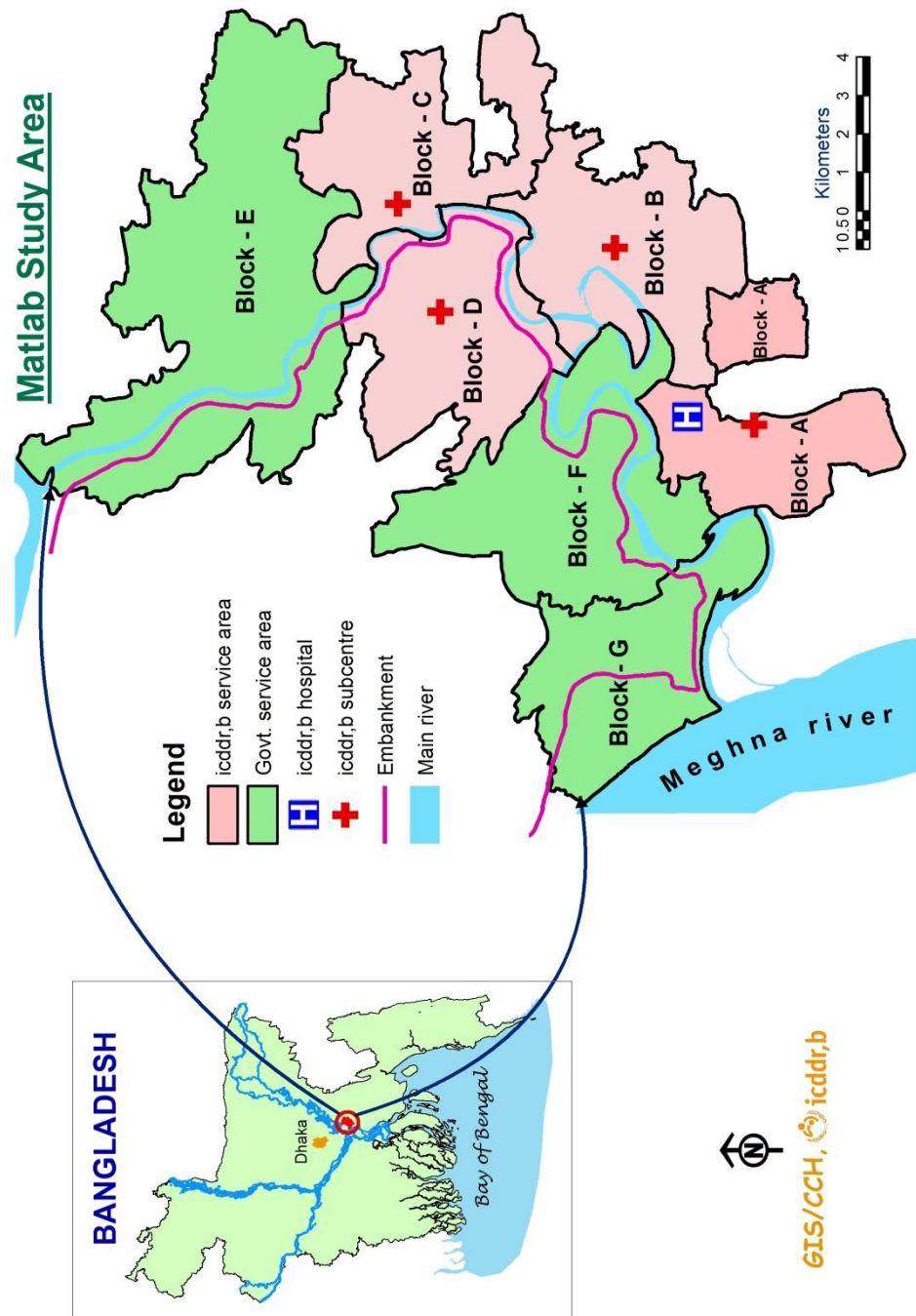
In October 1977, the surveillance area was reduced from 233 to 149 villages, and a Maternal and Child Health and Family Planning (icddr,b service) Programme was initiated in 70 villages. The remaining 79 villages were treated as a Government service area (Figure 1.1). Since the introduction of the icddr,b service programme, the CHRWs have collected data on child and reproductive health from female respondents, delivered maternal health care, provided information on contraception and contraceptives, and administered immunizations to mothers and children in the icddr,b service area. This system of collecting data on child and reproductive health services is known as the Record-Keeping System (RKS), which was later expanded to Government service area in 2001. 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 service area were transferred to the Government service area.

This is the volume fifty one of a series of scientific reports of the Matlab Health and Demographic Surveillance System produced by icddr,b. Data obtained from the Matlab HDSS area in 2016, along with brief notes and explanations of the tables, are presented in this volume.

¹ Available online at: <http://dspace.icddr.org/jspui/handle/123456789/6350>

² Available online at: <http://dspace.icddr.org/jspui/handle/123456789/6722>

Figure 1.1 Map of Matlab study area showing icddr,b and Government service areas

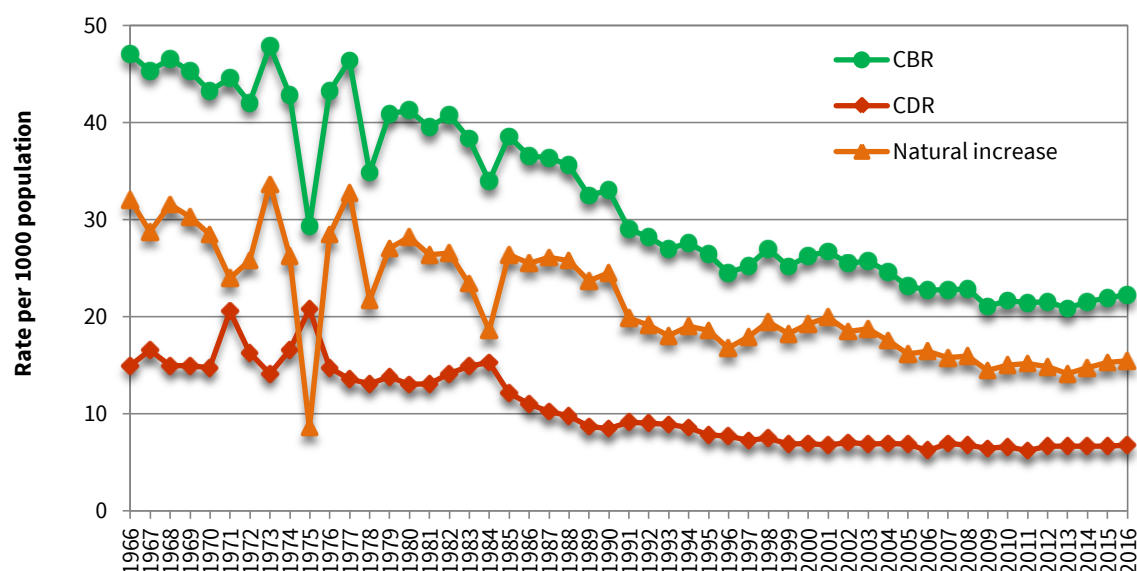


CHAPTER 2

DEMOGRAPHIC TRENDS IN MATLAB

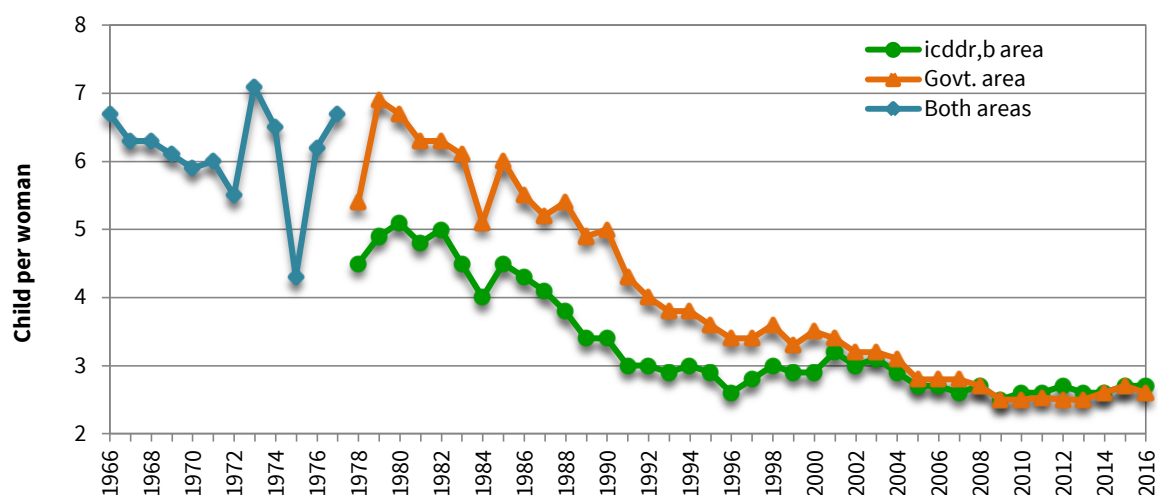
Long term Matlab HDSS data show the various transitions in the Matlab population over the period 1966-2016. In the early stages of demographic surveillance (1960s and 1970s), the Matlab population was characterized by high fertility, high mortality and high population growth. Apart from a Shigella outbreak in 1984 following the Liberation War in 1971 and the famine in 1974, there has been steady decline in natural increase, fertility and mortality to the present. Figure 2.1 shows that over the period 1966-2016, crude birth rate (CBR) has dropped by 47.35%, crude death rate (CDR) by 45.33%, and natural increase by 48.29%. Fertility in Matlab has remained at a moderate level since the early 1990s, and coupled with gradual declines in mortality, it is evident that Matlab is now at the third stage of the demographic transition.

Figure 2.1 Demographic transitions in Matlab, 1966-2016



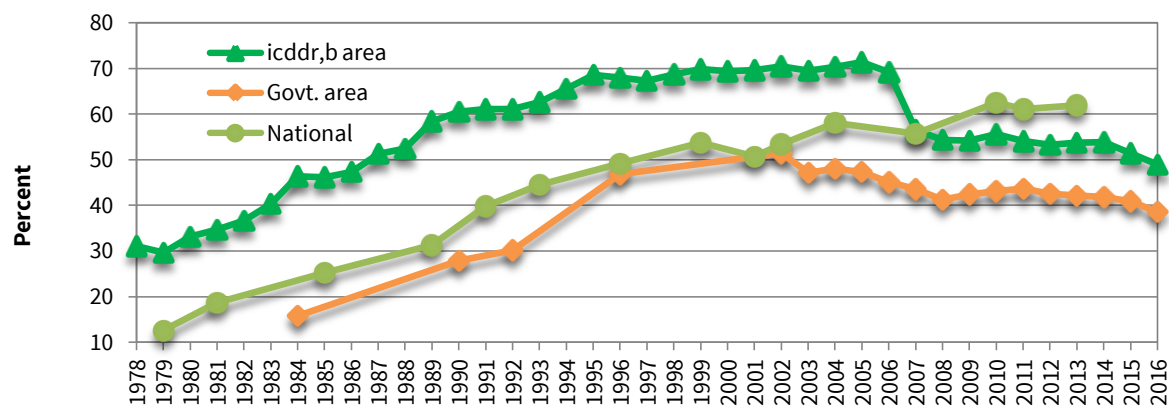
Matlab surveillance area started with a high fertility level of 6.7 children per woman in 1966. After reorganization of the surveillance area into icddr,b and Government service areas in 1978, total fertility rate (TFR) in icddr,b service area remained substantially lower than the Government service area (on average 1.1 child less per woman during 1978-2000). But from 2005, TFR in both areas converged at the level just below 3 children per woman (Figure 2.2).

Figure 2.2 Total fertility rates (TFR) in Matlab by area, 1966-2016



Provision of contraceptive supply and advice has been carried out since the inception of the program by female CHRWs. They visited all households in the icddr,b service area on a regular basis and took this opportunity to meet with women in the household to advise and provide contraception and also to monitor the continuity of the chosen method till 2000. This method of service provision has dramatically increased women's access to contraceptive services in Matlab and is associated with a high contraceptive prevalence rate (CPR). From 2001, this home service delivery system has been switched to the fixed-site system. This implementation retained till the year 2006. During this period CPR escalated in icddr,b service area ranging from 31.1 in 1978 to 68.6 in 1995 and showed little variation up to the year 2006 – lurking above national level figures or those in government service area. From 2007 onward, about two thirds of the CHRWs were assigned to provide services and another one third to carry out the surveillance work in the icddr,b service area. A sudden drop of CPR (56.6) is noticed from this year onward, although causes cannot be linked to this change in service provision. Since then CPR has been on slow decrease in the intervention area with latest rate being 49.0 in 2016 – a figure lower than that of national level. In the Government service area, however, CPR is even lower than the national level rate and steadily declining - from 43.6 in 2007 to 38.6 in 2016 (Figure 2.3).

Figure 2.3 Contraceptive prevalence rates (CPR) in Matlab and Bangladesh, 1978-2016



A large part of the decline in mortality in Matlab since the mid-1960s is a result of substantial reductions in infant and child mortality. Figure 2.4 shows that in the icddr,b service area, infant mortality rate (IMR) fell by 80.7% over the period 1978-2016. In Government service area, IMR declined by 74.9% over the same period. Figure 2.5 shows that, during the same period, under-five mortality rate (U5MR) declined by 83.0% in icddr,b service area and 79.9% in Government service area. In both areas, the famine in 1974 had the greatest influence on the infant and child mortality followed by the shigella outbreak in 1984.

Figure 2.4 Infant mortality rates (IMR) in Matlab by area, 1966-2016

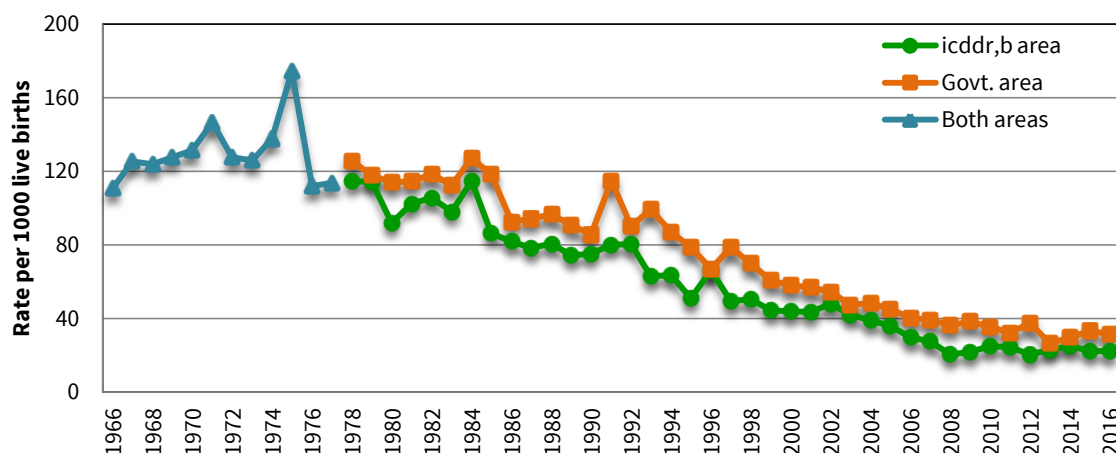
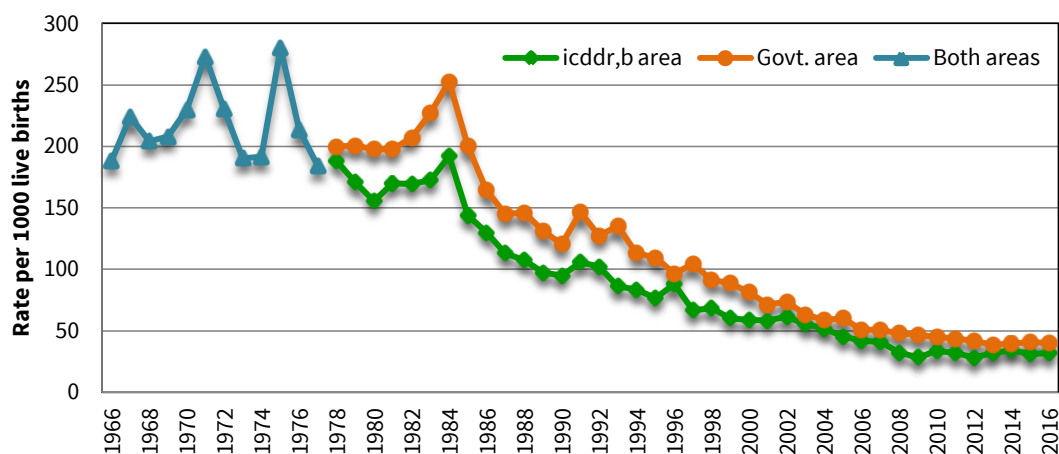
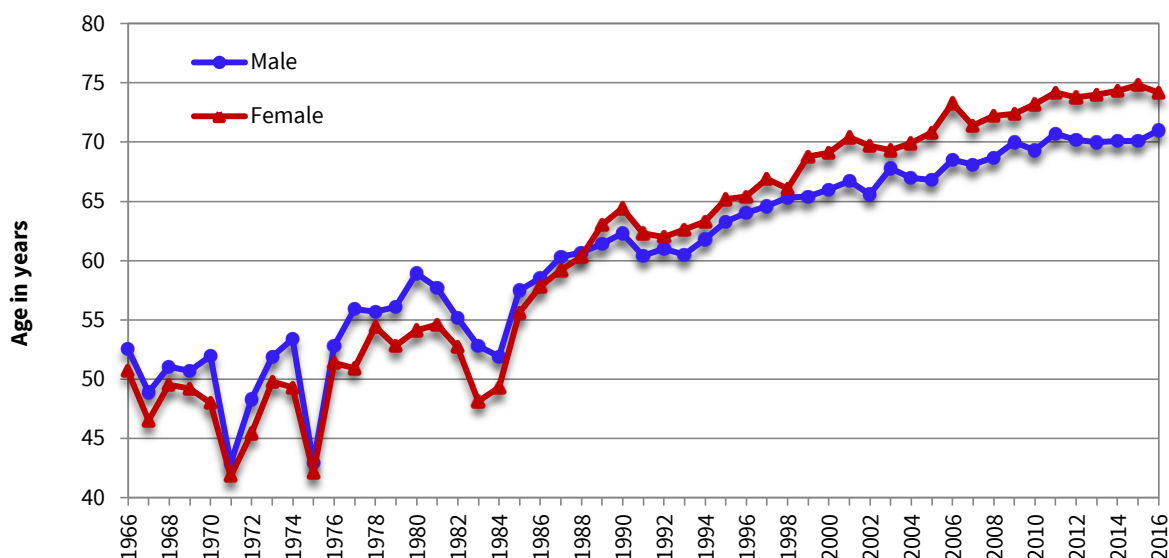


Figure 2.5 Under-five mortality rates (U5MR) in Matlab by area, 1966-2016



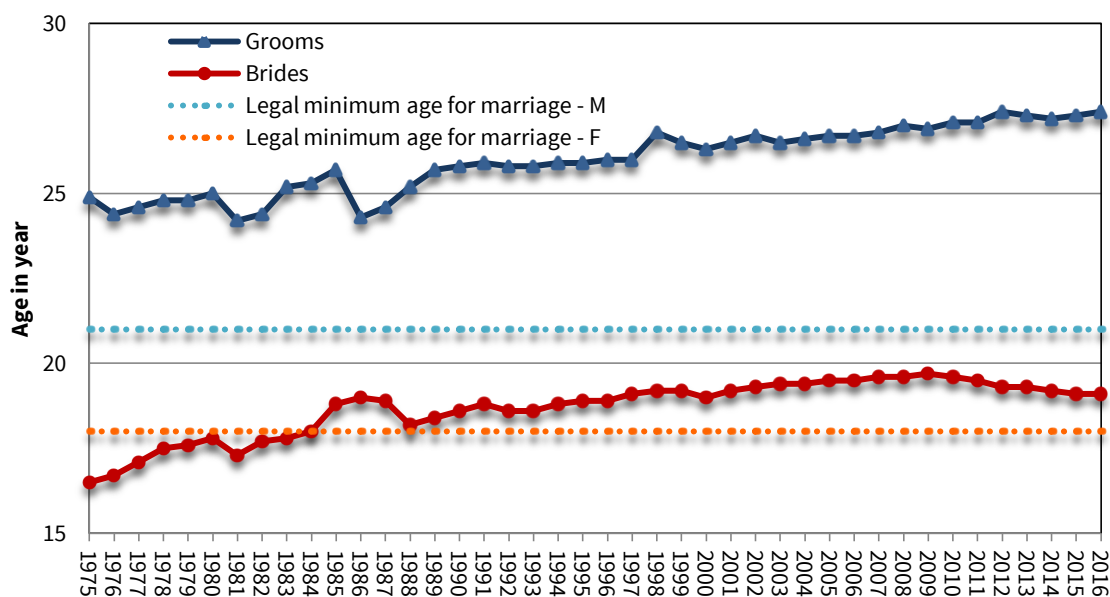
Massive reductions of infant and child mortality have resulted in a remarkable improvement in life expectancy at birth over the last 50 years. The life expectancy at birth for males rose from 52.7 years in 1966 to 71.0 in 2016, a gain of 18.41 years and for females, the improvement is even more evident, from 50.7 to 74.2, a gain of nearly 23.53 years for diminishing gender difference in childhood mortality and maternal mortality (Figure 2.6).

Figure 2.6 Expectation of life at birth (e^0) in Matlab, 1966-2016



The Figure 2.7 shows the trends in mean age at first marriage for brides and grooms in Matlab. Mean age at first marriage has increased in both areas during 1975-2016. During this period, brides' mean age at marriage increased by 2.6 years and for grooms, it increased by 2.5 years. Currently, mean age at first marriage for male is 27.4 years and for female it is 19.1 years.

Figure 2.7 Mean age at first marriage in Matlab, 1975-2016



CHAPTER 3

POPULATION CHANGES

The principal vital statistics of icddr,b and Government service areas from 2004 through 2016 are summarized in Table 3.1. The mid-year population and the demographic events registered in 2016 for both icddr,b and Government service areas are shown in Table 3.2. Appendix B shows the mid-year population, births, and deaths by village.

In 2016, the crude birth rate slightly increased in icddr,b service area and in Government service area (22.8 and 21.7 respectively) compared to figures from previous year. In icddr,b service area, crude death rate increased slightly from 6.5 in 2015 to 6.7 in 2016. The corresponding figure for government service area is same as that of previous year, 6.9. Over the decade, trend of TFR in Matlab HDSS displayed little fluctuations. In 2005, TFR for icddr,b and government service areas had been respectively 2.7 and 2.8 with an overall rate of 2.8 for both areas combined. Slight decrease in this rate is noted till 2009 (TFR: 2.5). According to latest data, TFR for Government service area and icddr,b service area are 2.6 and 2.7 respectively. The trends in the TFR in both areas are illustrated in Figure 2.2 of Chapter 2.

The infant mortality rate decreased to 22.1 in 2016 from 22.5 in 2015 in the icddr,b service area, and 31.5 in 2016 from 33.6 in 2015 in the Government service area. In the icddr,b service area, neonatal mortality also decreased to 16.7 in 2016 from 18.8 in 2015, and in the Government service area it was also reduces to 27.5 in 2016 from 27.9 in 2015. The mortality rate of children aged 1-4 years in the icddr,b service area was 2.2 in 2015 and 2.5 in 2016, and in the Government service area it increased from 1.8 to 2.3. Under-five mortality slightly increased in the icddr,b service area from 31.1 per 1,000 live births in 2015 to 32.0 in 2016, and in the Government service area it was decreased slightly from 40.5 in 2015 to 40.2 in 2016. The trends in mortality of children aged less than 5 years are illustrated in Figures 2.4 and 2.5 in Chapter 2.

The numbers of in- and out-migrants registered in 2016 were 14,189 and 14,736 respectively, giving an in-migration rate of 59.8 per 1,000 population, out-migration rate of 62.1 and a net migration rate of 2.3 per 1,000 populations leaving the area. Out-migrants continued to outnumber in-migrants, thus offsetting the rate of natural increase and keeping the overall annual population growth rate to 1.3%.

The age-sex distribution of the mid-year population of the Matlab HDSS area is shown in Tables 3.3 and 3.4. Block-wise mid-year population in the icddr,b service area and government service area are shown in Appendix A.1a and A.1b respectively. The age-sex distribution of the mid-year population is illustrated by the population pyramid (Figure 3.1). The fertility decline in the surveillance area in the 1978-2016 periods 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 service area at the beginning of the icddr,b service project in 1978. By 2016, this proportion had fallen to 31.8%. In the Government service area, the change in age structure was almost same in the icddr,b service area, children aged less than 15 years in the Government service area decreased from 43.3% of the total population in 1978 to 31.8%

in 2016. On the other hand, the percent of elderly population (60 years and over) in the surveillance area has increased from 5.6% in 1978 to 10.6% in 2016 due to the decline in both fertility and mortality.

Table 3.1. Vital statistics of icddr,b and Government service areas*, 2005-2016

Vital rate (per 1,000)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Crude birth rate												
ICDDR,B area	23.2	22.9	22.6	23.5	21.6	22.0	21.8	22.6	21.7	22.0	22.3	22.8
Government area	23.1	22.7	23.0	22.1	20.5	21.4	21.1	20.5	20.2	21.1	21.6	21.7
Both areas	23.2	22.8	22.8	22.9	21.1	21.7	21.5	21.6	20.9	21.6	22.0	22.3
Total fertility rate**												
ICDDR,B area	2.7	2.7	2.6	2.7	2.5	2.6	2.6	2.7	2.6	2.6	2.7	2.7
Government area	2.8	2.8	2.8	2.7	2.5	2.5	2.5	2.5	2.5	2.6	2.7	2.6
Both areas	2.8	2.7	2.7	2.7	2.5	2.6	2.6	2.6	2.5	2.6	2.7	2.7
Crude death rate												
ICDDR,B area	6.9	6.3	6.8	6.4	6.2	6.7	6.1	6.6	6.7	6.8	6.5	6.7
Government area	7.0	6.4	7.1	7.2	6.9	6.7	6.4	6.7	6.7	6.7	6.9	6.9
Both areas	6.9	6.3	7.0	6.8	6.5	6.7	6.2	6.7	6.7	6.7	6.7	6.8
Neonatal mortality***												
ICDDR,B area	26.5	23.5	20.3	15.8	16.2	18.5	18.2	15.6	17.3	19.5	18.0	16.7
Government area	35.4	30.1	29.9	26.1	33.5	27.3	25.5	30.3	21.2	25.1	27.9	27.5
Both areas	30.9	26.8	25.1	20.7	24.4	22.7	21.7	22.4	19.1	22.1	23.1	21.8
Post-neonatal mortality***												
ICDDR,B area	9.6	6.2	7.4	4.9	5.7	6.7	6.3	4.9	5.9	5.7	3.7	5.3
Government area	9.6	10.3	9.4	10.4	4.9	8.1	6.9	7.1	5.4	4.7	5.7	4.0
Both areas	9.6	8.2	8.4	7.5	5.3	7.4	6.6	5.9	5.7	5.2	4.7	4.7
Infant mortality***												
ICDDR,B area	36.0	29.7	27.7	20.6	21.9	25.1	24.6	20.5	23.1	25.2	22.5	22.1
Government area	45.0	40.4	39.3	36.4	38.4	35.4	32.4	37.4	26.6	29.8	33.6	31.5
Both areas	40.5	35.0	33.5	28.1	29.8	30.1	28.3	28.3	24.7	27.4	27.8	26.5
Child mortality (1 - 4yrs) #												
ICDDR,B area	2.4	3.2	3.4	3.0	1.7	2.1	1.8	1.9	2.2	2.3	2.2	2.5
Government area	4.0	2.6	2.8	2.9	2.1	2.5	2.9	1.1	3.1	2.5	1.8	2.3
Both areas	3.2	2.9	3.1	3.0	1.9	2.3	2.3	1.5	2.6	2.4	2.0	2.4
Under five mortality***												
ICDDR,B area	45.3	41.9	41.0	32.3	28.6	33.4	31.6	28.0	31.6	34.0	31.1	32.0
Government area	60.2	50.7	50.3	47.9	46.4	45.0	43.6	41.7	38.3	39.6	40.5	40.2
Both areas	52.8	46.2	45.7	39.7	37.1	39.0	37.4	34.2	34.7	36.6	35.6	35.8
Rate of natural increase												
ICDDR,B area	16.3	16.6	15.8	17.1	15.4	15.3	15.7	16.0	15.0	15.3	15.9	16.1
Government area	16.1	16.3	15.9	14.9	13.7	14.7	14.8	13.8	13.5	14.4	14.7	14.9
Both areas	16.2	16.5	15.8	16.0	14.5	15.1	15.2	14.9	14.2	14.8	15.3	15.5
Migration												
In-migration	35.7	43.5	40.0	44.0	54.1	48.5	41.5	44.6	45.0	47.4	51.6	59.8
Out-migration	53.3	57.3	63.5	65.7	58.0	59.5	57.6	53.5	47.3	54.2	54.4	62.1
Growth (%)	-0.1	0.3	-0.8	-0.6	1.1	0.4	-0.1	0.6	1.2	0.8	1.2	1.3

*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

The net population increase is 12.7 per 1,000 in 2016 while it was 12.4 per 1,000 in 2015 - may be due to the increase in crude birth rate. A major cause for men being fewer than women in age group 15-49, as shown in the population pyramid, could be higher out-migration rate among the men in that age group.

Table 3.2. Mid-year population, events registered, and population changes, 2016

Demographic indicator	Number			Rate per 1,000		
	Total	Male	Female	Total	Male	Female
Total Population (30 June 2016)						
ICDDR,B area	123264	56750	66514	-	-	-
Government area	113855	52079	61776	-	-	-
Both areas	237119	108829	128290	-	-	-
Events registered (Jan-Dec 2016)						
Births						
ICDDR,B area	2807	1448	1359	22.8	-	-
Government area	2476	1246	1230	21.7	-	-
Both areas	5283	2694	2589	22.3	-	-
Deaths						
Infants*						
ICDDR,B area	62	41	21	22.1	28.3	15.5
Government area	78	49	29	31.5	39.3	23.6
Both areas	140	90	50	26.5	33.4	19.3
All deaths						
icddr,b area	823	440	383	6.7	7.8	5.8
Government area	781	401	380	6.9	7.7	6.2
Both areas	1604	841	763	6.8	7.7	5.9
In-migration	14189	6690	7499	59.8	61.5	58.5
Out-migration	14736	8005	6731	62.1	73.6	52.5
Marriage**	3360	-	-	14.2	-	-
Divorce**	409	-	-	1.7	-	-
Population change (Jan-Dec 2016)						
Net migration	-547	-1315	768	-2.3	-12.1	6.0
Natural increase						
ICDDR,B area	1984	1008	976	16.1	17.8	14.7
Government area	1695	845	850	14.9	16.2	13.8
Both areas	3679	1853	1826	15.5	17.0	14.2
Net increase	3132	538	2594	13.2	4.9	20.2

*Rate per 1000 live births

**Rate per 1000 population

Table 3.3. Mid-year population by age and sex, 2016

Age (years)	Number			Percentage		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	237119	108829	128290	100.0	100.0	100.0
<1 year	5301	2680	2621	2.2	2.5	2.0
1 - 4	20289	10326	9963	8.6	9.5	7.8
1	5207	2690	2517	2.2	2.5	2.0
2	5016	2575	2441	2.1	2.4	1.9
3	4879	2443	2436	2.1	2.2	1.9
4	5187	2618	2569	2.2	2.4	2.0
5 - 9	24477	12327	12150	10.3	11.3	9.5
10-14	25224	12449	12775	10.6	11.4	10.0
15-19	21606	10165	11441	9.1	9.3	8.9
20-24	16404	6300	10104	6.9	5.8	7.9
25-29	16258	6238	10020	6.9	5.7	7.8
30-34	15217	6135	9082	6.4	5.6	7.1
35-39	14687	6414	8273	6.2	5.9	6.4
40-44	13010	5663	7347	5.5	5.2	5.7
45-49	13748	5999	7749	5.8	5.5	6.0
50-54	13848	6294	7554	5.8	5.8	5.9
55-59	11983	6076	5907	5.1	5.6	4.6
60-64	8000	3992	4008	3.4	3.7	3.1
65-69	5985	2773	3212	2.5	2.5	2.5
70-74	5138	2167	2971	2.2	2.0	2.3
75-79	3093	1405	1688	1.3	1.3	1.3
80-84	1826	908	918	0.8	0.8	0.7
85+	1025	518	507	0.4	0.5	0.4

Figure 3.1. Age pyramid of the 2016 mid-year population

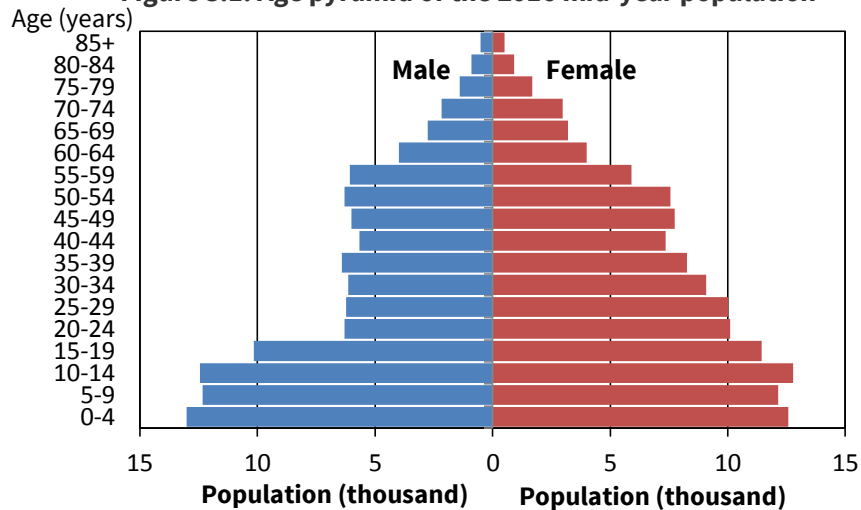


Table 3.4. Mid-year population by age, sex, and area, 2016

Age (years)	icddr,b service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	123264	56750	66514	113855	52079	61776
<1 year	2856	1484	1372	2445	1196	1249
1 - 4	10624	5361	5263	9665	4965	4700
1	2675	1373	1302	2532	1317	1215
2	2600	1315	1285	2416	1260	1156
3	2586	1275	1311	2293	1168	1125
4	2763	1398	1365	2424	1220	1204
5 - 9	12670	6467	6203	11807	5860	5947
10-14	12956	6361	6595	12268	6088	6180
15-19	10841	5012	5829	10765	5153	5612
20-24	8640	3286	5354	7764	3014	4750
25-29	8466	3224	5242	7792	3014	4778
30-34	8075	3244	4831	7142	2891	4251
35-39	7753	3446	4307	6934	2968	3966
40-44	7092	3140	3952	5918	2523	3395
45-49	7193	3163	4030	6555	2836	3719
50-54	7314	3358	3956	6534	2936	3598
55-59	6140	3174	2966	5843	2902	2941
60-64	4090	2058	2032	3910	1934	1976
65-69	3013	1401	1612	2972	1372	1600
70-74	2579	1103	1476	2559	1064	1495
75-79	1515	704	811	1578	701	877
80-84	898	475	423	928	433	495
85+	549	289	260	476	229	247

CHAPTER 4

MORTALITY

The age and sex specific distribution of death cases is shown in Tables 4.1 and 4.2 respectively. Of the 1,604 deaths, 8.7% were infants, 3.0% were children aged 1-4 years, and 64.3% were aged 60 years and above.

Table 4.3 shows difference in mortality rates per 1000 mid-year population and per 1000 person-years. Except for infant mortality the age-specific death rates did not differ for changing units from mid-year population to person-years. Henceforth, subsequent tables provide death rates per 1000 mid-year population. Table 4.4 shows the corresponding age-sex-specific mortality rates by icddr,b service area. In 2016, the overall death rates for males and females were 7.8 and 5.8 respectively. Infant mortality rate was 33.4 per 1,000 live births for males and 19.3 for females. It was lower in the icddr,b service area (28.3 and 15.5, respectively) than in the Government service area (39.3 and 23.6, respectively), a result of improvements in the neonatal mortality in the icddr,b service area. Block-wise deaths in the icddr,b and government service areas by age and sex are shown in Appendix A.2a and A.2b respectively.

Table 4.5 shows the abridged life tables for males and females derived from age-sex specific death rates, and the survival (l_x) times are plotted in Figure 4.1 (for Life Table Equations see Appendix C). The expectation of life at birth was 71.0 years for males and 74.2 for females in 2016 and 70.1 for males and 74.8 for females in 2015. The level of adult (15-59 years) mortality decreased in 2016 compared to 2015. The probability of dying for males aged 15-59 years ($45q_{15}$) was 144.4, and for females it was 101.5 per 1,000 populations in 2016 and in 2015 it was 164.5 and 89.3 for males and females respectively. In most of the age-groups, expectation of life is longer for females than males.

The expectation of life at birth was higher for females than males in both areas. In 2016, the gender difference in expectation of life was higher in the icddr,b service area (3.7 years) than in the Government service area (2.8 years). Expectation of life at most of the age-groups in each area was higher for females than for males (Appendices A.3 and A.4).

Table 4.6 shows the distribution of deaths by age and month of occurrence. Deaths of those aged 5-64 years tend to peak in the months October-December, May and June. Neonatal deaths were most frequent in January, June and October. Post-neonatal deaths and child deaths, on the other hand, does not show any seasonal pattern. Figure 4.1 shows that the probability of survival for males and females started to differ from age 15 with females having a higher probability of survival in later age-groups.

Deaths by underlying causes, sex, age, and by areas are shown in Appendix A.5 – A.8. Table 4.7 gives the age-standardized mortality rates by cause of death (obtained using Verbal Autopsy) 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 led by hepatitis and tuberculosis occurred more in males than females in both service areas. Septicaemia occurred more in females than males in both service areas.

Birth asphyxia was also an important cause of death, particularly of neonates, irrespective of sex and area. Among non-communicable diseases, death rates due to the circulatory system (stroke, ischaemic heart disease and other cardiovascular diseases), neoplasm, COPD and digestive diseases were more prominent in both sexes and in both the areas. Accidents, drowning and suicide were the major causes of death in the injury category, irrespective of sex and area.

Table 4.1. Deaths by age and sex in both areas, 2016

Age (years)	Both sexes		Male		Female	
	Number	Cumulative percentage	Number	Cumulative percentage	Number	Cumulative percentage
All ages	1604	-	841	-	763	-
<1 year	140	-	90	-	50	-
< 7 days	96	6.0	60	7.1	36	4.7
7 - 29 days	19	7.2	13	8.7	6	5.5
1- 5 months	16	8.2	12	10.1	4	6.0
6-11 months	9	8.7	5	10.7	4	6.6
1 - 4 years	49	-	26	-	23	-
1	24	10.2	15	12.5	9	7.7
2	12	11.0	7	13.3	5	8.4
3	6	11.3	3	13.7	3	8.8
4	7	11.8	1	13.8	6	9.6
5 - 9	15	12.7	10	15.0	5	10.2
10-14	16	13.7	6	15.7	10	11.5
15-19	13	14.5	4	16.2	9	12.7
20-24	15	15.5	5	16.8	10	14.0
25-29	19	16.6	10	18.0	9	15.2
30-34	9	17.2	6	18.7	3	15.6
35-39	24	18.7	8	19.6	16	17.7
40-44	30	20.6	16	21.5	14	19.5
45-49	39	23.0	17	23.5	22	22.4
50-54	82	28.1	46	29.0	36	27.1
55-59	121	35.7	80	38.5	41	32.5
60-64	118	43.0	77	47.7	41	37.9
65-69	134	51.4	74	56.5	60	45.7
70-74	206	64.2	99	68.3	107	59.8
75-79	194	76.3	94	79.4	100	72.9
80-84	195	88.5	85	89.5	110	87.3
85+	185	100.0	88	100.0	97	100.0

Table 4.2. Deaths by area, age and sex, 2016

Age (years)	icddr,b service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	823	440	383	781.001	401.001	380
<1 year	62	41	21	78	49	29
< 7days	39	23	16	57	37	20
7 - 29 days	8	6	2	11	7	4
1- 5 months	10	9	1	6	3	3
6-11 months	5	3	2	4	2	2
1 - 4 years	27	17	10	22	9	13
1	15	9	6	9	6	3
2	8	6	2	4	1	3
3	2	2	0	4	1	3
4	2	0	2	5	1	4
5 - 9	4	3	1	11	7	4
10-14	7	2	5	9	4	5
15-19	7	3	4	6	1	5
20-24	12	5	7	3	0	3
25-29	10	6	4	9	4	5
30-34	2	2	0	7	4	3
35-39	13	4	9	11	4	7
40-44	23	14	9	7	2	5
45-49	23	12	11	16	5	11
50-54	41	22	19	41	24	17
55-59	72	45	27	49	35	14
60-64	54	37	17	64	40	24
65-69	69	39	30	65	35	30
70-74	101	50	51	105	49	56
75-79	102	48	54	92	46	46
80-84	106	42	64	89	43	46
85+	88	48	40	97	40	57

Table 4.3. Death rates per 1,000 mid-year population and per 1,000 person-years by age and sex in both areas, 2016

Age (years)	Rate per 1,000 mid-year population			Rate per 1,000 person-years		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	6.8	7.7	5.9	6.8	7.7	6.0
<1 year*	26.5	33.4	19.3	26.6	33.8	19.2
< 7 days*	18.2	22.3	13.9	18.2	22.6	13.8
7 - 29 days*	3.6	4.8	2.3	3.6	4.9	2.3
1- 5 months*	3.0	4.5	1.5	3.0	4.5	1.5
6-11 months*	1.7	1.9	1.5	1.7	1.9	1.5
1 - 4 years	2.4	2.5	2.3	2.4	2.5	2.3
1	4.6	5.6	3.6	4.7	5.6	3.6
2	2.4	2.7	2.0	2.4	2.7	2.0
3	1.2	1.2	1.2	1.2	1.2	1.2
4	1.3	0.4	2.3	1.4	0.4	2.4
5 - 9	0.6	0.8	0.4	0.6	0.8	0.4
10-14	0.6	0.5	0.8	0.6	0.5	0.8
15-19	0.6	0.4	0.8	0.6	0.4	0.8
20-24	0.9	0.8	1.0	0.9	0.8	1.0
25-29	1.2	1.6	0.9	1.2	1.6	0.9
30-34	0.6	1.0	0.3	0.6	1.0	0.3
35-39	1.6	1.2	1.9	1.6	1.3	1.9
40-44	2.3	2.8	1.9	2.3	2.8	1.9
45-49	2.8	2.8	2.8	2.9	2.9	2.9
50-54	5.9	7.3	4.8	5.9	7.3	4.8
55-59	10.1	13.2	6.9	10.1	13.1	6.9
60-64	14.8	19.3	10.2	14.6	19.2	10.2
65-69	22.4	26.7	18.7	22.5	26.9	18.7
70-74	40.1	45.7	36.0	39.7	45.1	35.7
75-79	62.7	66.9	59.2	62.8	67.2	59.2
80-84	106.8	93.6	119.8	105.1	92.4	117.7
85+	180.5	169.9	191.3	180.2	169.0	191.6
* Rate per 1,000 live births						

Table 4.4. Death rates by area, age and sex, 2016 (per 1,000 population)

Age (years)	icddr,b area			Government area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	6.7	7.8	5.8	6.9	7.7	6.2
<1 year*	22.1	28.3	15.5	31.5	39.3	23.6
< 7days*	13.9	15.9	11.8	23.0	29.7	16.3
7 -29 days*	2.9	4.1	1.5	4.4	5.6	3.3
1- 5 months*	3.6	6.2	0.7	2.4	2.4	2.4
6-11 months*	1.8	2.1	1.5	1.6	1.6	1.6
1 - 4 years	2.5	3.2	1.9	2.3	1.8	2.8
1	5.6	6.6	4.6	3.6	4.6	2.5
2	3.1	4.6	1.6	1.7	0.8	2.6
3	0.8	1.6	0.0	1.7	0.9	2.7
4	0.7	0.0	1.5	2.1	0.8	3.3
5 - 9	0.3	0.5	0.2	0.9	1.2	0.7
10-14	0.5	0.3	0.8	0.7	0.7	0.8
15-19	0.6	0.6	0.7	0.6	0.2	0.9
20-24	1.4	1.5	1.3	0.4	0.0	0.6
25-29	1.2	1.9	0.8	1.2	1.3	1.0
30-34	0.2	0.6	0.0	1.0	1.4	0.7
35-39	1.7	1.2	2.1	1.6	1.3	1.8
40-44	3.2	4.5	2.3	1.2	0.8	1.5
45-49	3.2	3.8	2.7	2.4	1.8	3.0
50-54	5.6	6.6	4.8	6.3	8.2	4.7
55-59	11.7	14.2	9.1	8.4	12.1	4.8
60-64	13.2	18.0	8.4	16.4	20.7	12.1
65-69	22.9	27.8	18.6	21.9	25.5	18.8
70-74	39.2	45.3	34.6	41.0	46.1	37.5
75-79	67.3	68.2	66.6	58.3	65.6	52.5
80-84	118.0	88.4	151.3	95.9	99.3	92.9
85+	160.3	166.1	153.8	203.8	174.7	230.8
* Rate per 1,000 live births						

Table 4.5. Abridged life table by sex, 2016

Age (years)	Male				Female			
	nq_x	l_x	L_x	$e0_x$	nq_x	l_x	L_x	$e0_x$
0	33.4	100000	97160	71.0	19.3	100000	98358	74.2
1	5.6	96659	96342	72.4	3.6	98069	97862	74.7
2	2.7	96122	95991	71.8	2.0	97719	97619	74.0
3	1.2	95861	95802	71.0	1.2	97519	97459	73.1
4	0.4	95743	95725	70.1	2.3	97399	97285	72.2
5	4.0	95707	477640	69.1	2.1	97172	485398	71.4
10	2.4	95319	476067	64.4	3.9	96972	483986	66.5
15	2.0	95090	475018	59.5	3.9	96593	482091	61.8
20	4.0	94903	473647	54.7	4.9	96214	479974	57.0
25	8.0	94527	470893	49.9	4.5	95739	477705	52.3
30	4.9	93772	467805	45.2	1.7	95310	476185	47.5
35	6.2	93314	465234	40.4	9.6	95152	473649	42.6
40	14.0	92734	460666	35.7	9.5	94236	469119	38.0
45	14.1	91433	454192	31.2	14.1	93342	463673	33.3
50	35.9	90145	443221	26.6	23.6	92026	455115	28.7
55	63.9	86906	421599	22.5	34.2	89857	442175	24.4
60	92.3	81355	389192	18.8	50.0	86788	423865	20.1
65	125.5	73848	347384	15.4	89.5	82452	394987	16.1
70	205.9	64578	291017	12.3	165.9	75074	345766	12.4
75	287.6	51283	220411	9.8	259.0	62621	273766	9.3
80	379.4	36536	148069	7.7	458.8	46402	177683	6.7
85+	1000.0	22675	133475	5.9	1000.0	25111	131252	5.2

Table 4.6. Deaths by month and age, 2016

Month	Age at death					
	All ages	Under 1 month	1-11 months	1-4 years	5-64 years	65 years and above
January	172	16	3	2	40	111
February	136	7	3	0	42	84
March	111	7	0	3	36	65
April	141	7	3	5	35	91
May	140	7	2	3	53	75
June	138	17	3	9	46	63
July	108	4	2	4	43	55
August	111	11	0	3	29	68
September	102	10	1	6	22	63
October	130	14	1	5	49	61
November	148	7	3	4	48	86
December	167	8	4	5	58	92
Total	1604	115	25	49	501	914

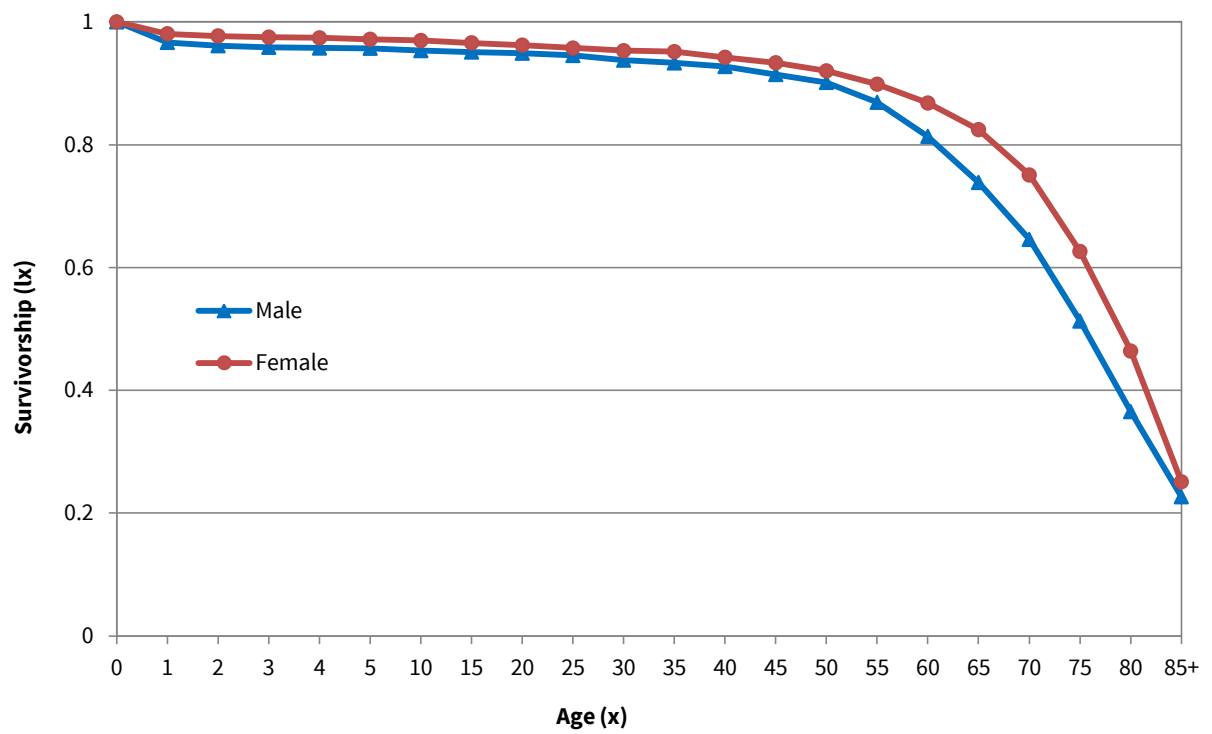
Table 4.7. Age-standardized mortality rates by cause of death, 2016 (per 100,000 population)*

Cause of Death	icddr,b area		Government area	
	Male	Female	Male	Female
Communicable diseases				
Diarrhoea	1.99	3.98	2.62	4.30
Dysentery	0.00	0.00	0.00	0.00
Tuberculosis	11.81	7.70	14.79	1.71
EPI preventable disease	0.00	0.00	0.00	0.00
Meningitis	1.21	0.00	0.00	0.00
Hepatitis	11.64	8.58	11.64	1.87
Chicken pox	0.00	0.00	0.00	0.00
Rabies	0.00	0.00	0.00	0.00
Septicaemia	4.07	19.21	6.81	15.37
Respiratory infections	11.57	3.43	7.16	9.09
Other communicable	1.21	2.73	2.43	0.00
Maternal and neonatal				
Maternity related	0.00	2.99	0.00	7.07
Premature and low birth weight	0.00	0.00	0.00	0.00
Birth asphyxia	9.70	5.25	19.57	11.53
Other neonatal	21.83	14.43	39.13	17.29
Nutritional	0.00	6.26	5.06	11.31
Non-Communicable diseases				
Neoplasm	97.47	40.29	74.72	35.56
Neoplasm in female organ	0.00	7.63	0.00	16.42
Congenital malformation	11.10	3.94	9.03	5.81
Diabetes	35.04	44.34	24.40	31.69
Other endocrine	0.00	1.30	0.00	6.59
Neuro-psychiatric	12.46	7.17	5.45	6.31
Rheumatic heart disease	0.00	0.00	0.00	1.94
Hypertensive disease	1.89	2.13	0.00	1.87
Ischaemic heart disease	140.64	118.79	121.55	71.82
Stroke	192.32	203.60	195.86	202.96
Other cardiovascular	40.33	38.08	49.52	42.43
COPD**	52.96	37.47	36.01	24.75
Asthma	1.99	2.13	0.00	5.30
Other respiratory	2.45	2.31	10.01	0.00
Digestive disease	25.21	13.95	31.77	13.89
Renal failure	21.39	11.02	14.39	14.58
Nephritic syndrome	0.00	0.00	0.00	0.00
Other urinary	0.00	0.00	0.00	0.00
Other non-communicable	1.99	1.86	4.25	0.00
Accident/Injury				
Accident	30.54	14.42	39.77	26.81
Drowning	19.36	9.83	11.43	13.38
Suicide	8.14	10.12	2.63	10.55
Homicide	0.00	0.00	0.00	3.17
Miscellaneous causes				
Senility	0.00	0.00	0.00	0.00
Fever of unknown origin	2.14	1.49	0.00	0.00
Edema of unspecified origin	0.00	0.00	0.00	0.00
Sudden infant death	0.00	1.31	0.00	0.00
Other miscellaneous	0.00	0.00	0.00	0.00
Unknown/missing/unspecified	35.54	29.03	57.24	56.91
Total	808.03	676.78	797.24	672.31

*Age distribution of standard population is given in Appendix D

**Chronic obstructive pulmonary disease (less than 5 deaths?)

Figure 4.1. Probability of survival from birth to age(x) by sex, 2016



CHAPTER 5

FERTILITY

In 2016, there were 5,233 live births in the Matlab HDSS area as outcomes of 6,174 pregnancies are recorded. Table 5.1 shows the number of pregnancies and their outcomes in 2016. In the Matlab HDSS area as a whole, 84.8% of pregnancies resulted in a live birth, a proportion that remains almost the same from year to year; pregnancies resulting in fetal wastage show no definite trend. Among the pregnancies resulting in live births, 56 were multiple births. Among these 46 had two live births, two had three live births and others had single live births.

Table 5.2 shows 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, October, November and December. The sex ratio of live births was 104 males per 100 females; there is no definite trend over the period. Figure 5.1 shows number of births and deaths by month of occurrence. Seasonality of births peaks in natural increase in population in September, October, November and December.

Table 5.3 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 5.3 shows the age-specific fertility rates for both icddr,b and Government service areas. In the age groups 20-34, the fertility rates were higher in both areas. The age-specific fertility rates and related fertility measures for the icddr,b service area by blocks are shown in Appendix A.9.

The breakdown of age-specific fertility rate 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 to a woman if she goes through life having children at the current age-specific 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 service area and the Government service area. There is very little difference between the two areas for every birth order.

Table 5.4 shows marked variation in the distribution of live birth pregnancies by place of delivery and area. Institutional delivery accounts for 87.3% in the icddr,b service area and 59.5% in the Government service area. More commonly used places for institutional delivery in the Government service area were private clinic/nursing home (49.3%) and Upazila Health Complex (5.5%), and in icddr,b service area, private clinic/nursing home, icddr,b hospital, and sub-centre are 46.7%, 31.2% and 3.5% respectively. Table 5.5 shows the distribution of live birth pregnancies by birth attendants and area. In the icddr,b service area, deliveries assisted by MBBS doctor were the highest (48.8%) followed by nurse (31.5%) and Family Welfare Visitor (FWV) (8.1%) of the live-birth deliveries as opposed to TBAs (23.5%), and MBBS doctor (48.1%) in the Government service area. The respective figures for trained TBAs were

3.1% and 12.3% in the icddr,b service area and Government service area, respectively. Medically trained birth attendants (doctors, nurses or midwives, female family planning visitors or family welfare visitors) assisted 88.4% of the live birth deliveries in the icddr,b service area and 63.5% in the Government service area.

Table 5.6 illustrates the mode of delivery of live births by area. Normal vaginal delivery (including use of drug and saline and/or Episiotomy) accounted for 53.6% in the icddr,b service area and 54.7% in the Government service area. Instrumental deliveries, especially caesarean were 46.4% and 45.3% respectively in the icddr,b service area and Government service area.

Till 2015 Matlab HDSS used to record place of antenatal care (ANC) received by expectant women during different trimesters of pregnancy. For WHO recommendation for at least 4 ANC visits: 1st visit around 12 weeks, 2nd visit between 24-28 weeks, 3rd visit at 32 weeks and 4th visit at 36 weeks, HDSS starts recording information on providers and gestational ages of each ANC visit during pregnancy since 2016. Table 5.7 shows the percentage distribution of different indicators of ANC coverage by area and overall. In icddr,b service area, 3.6% of the women didn't receive any ANC care during pregnancy as oppose to 9.6% in Government service area. Over 81 percent of the women received recommended number of ANC (at least 4 visits) at any time of their pregnancy compared to 29% in Government service area. The table also shows that, in icddr,b service area, 88.2% of the expectant mothers sought pregnancy care for the first time within 6 months of pregnancy (47.5% during 1st trimester and another 40.7% during 2nd trimester). In Government service area, only 21.9% of the women received 1st ANC care within 1st trimester and another 26.1% within 2nd trimester.

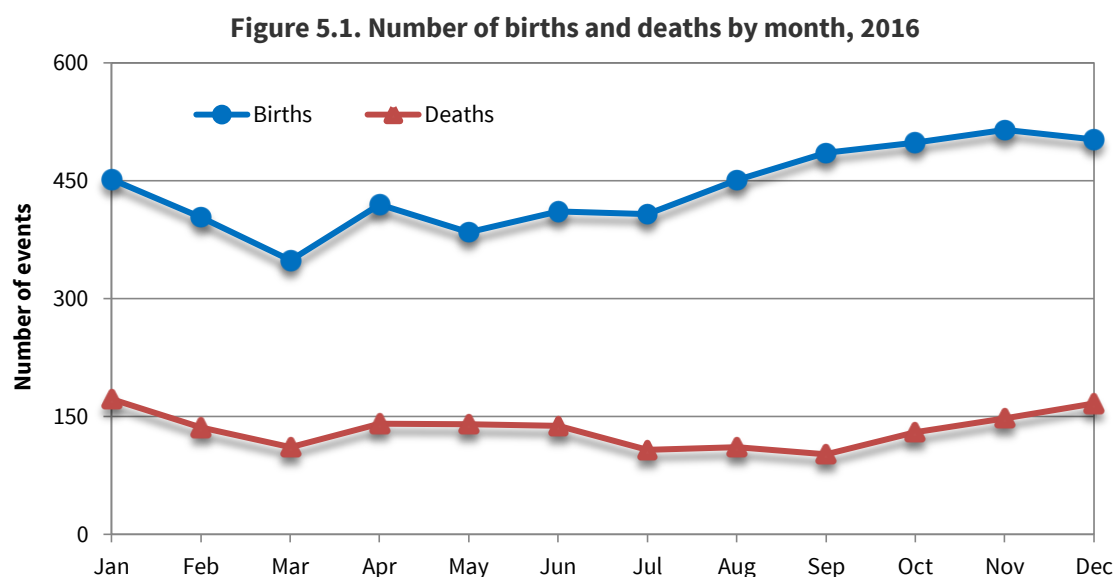


Table 5.1. Numbers and rates of pregnancy outcomes by type and area, 2016

Type of pregnancy outcome	Both areas		icddr,b area		Government area	
	Number	Rate	Number	Rate	Number	Rate
Total pregnancies*	6174	96.4	3225	96.1	2949	96.8
Live birth pregnancies**	5233	847.6	2782	862.6	2451	831.1
Fetal wastage**	941	152.4	443	137.4	498	168.9
Early(miscarriage)***	858	139.0	407	126.2	451	152.9
Induced	227	36.8	74	22.9	153	51.9
Spontaneous	631	102.2	333	103.3	298	101.1
Late (still birth)	83	13.4	36	11.2	47	15.9
Multiple birth preg.	56		28		28	
Multiple live birth preg.	51		24		27	
Three live births	2		2		0	
Two live births	46		21		25	
One live birth	3		1		2	
Still birth pregnancies	1		1		0	
Three still births	0		0		0	
Two still births	1		1		0	
Miscarriage pregnancies	4		3		1	
*Rate per 1000 women of age 15-49 years (GFR)						
**Rate per 1000 total pregnancies						
***Less than 28 weeks						

Table 5.2. Pregnancy outcomes by month, 2016

Months	Pregnancy outcome					No. of live born children			
	All	Miscarriage Induced	Spon	Still birth	Live birth ^a	Both sexes	Male	Female	Ratio
All months	6174	227	631	83	5233	5283	2694	2589	1.04
Jan	518	18	43	6	451	452	225	227	0.99
Feb	482	23	54	9	396	404	194	210	0.92
Mar	447	27	69	6	345	349	171	178	0.96
Apr	494	14	58	3	419	420	217	203	1.07
May	446	16	43	7	380	385	199	186	1.07
Jun	495	14	64	8	409	411	230	181	1.27
Jul	480	22	46	5	407	408	192	216	0.89
Aug	533	23	52	11	447	451	221	230	0.96
Sep	562	16	56	9	481	486	269	217	1.24
Oct	573	19	55	7	492	499	253	246	1.03
Nov	572	17	40	4	511	515	257	258	1.00
Dec	572	18	51	8	495	503	266	237	1.12
^a For any multiple birth pregnancy, the outcome is recorded as live birth, if at least one of the issue is live born									

Table 5.3. Age-specific fertility rates (per 1,000 women) and indices by area, 2016

Age (years)	Both areas		icddr,b area		Government area	
	Births	Rate	Births	Rate	Births	Rate
All ages	5283	82.5	2807	83.7	2476	81.3
15-19	895	78.2	477	81.8	418	74.5
20-24	1663	164.6	903	168.7	760	160.0
25-29	1403	140.0	746	142.3	657	137.5
30-34	880	96.9	463	95.8	417	98.1
35-39	366	44.2	181	42.0	185	46.6
40-44	69	9.4	36	9.1	33	9.7
45-49	7	0.9	1	0.2	6	1.6
Total fertility rate		2671		2700		2640
General fertility rate		83		84		81
Gross reproduction rate		1309		1307		1312
Net reproduction rate		1252		1259		1245
*Births to mothers under age 15 were included in this group						
**Births to mothers age 50 and above were included in this group						

Table 5.4. Distribution of pregnancies that ended with live birth by place of delivery by area, 2016

Place of Delivery	Both areas		icddr,b area		Government service area	
	Number	percent	Number	percent	Number	percent
Home	1342	25.6	352	12.7	990	40.4
ICDDR,B sub-centre	99	1.9	97	3.5	2	0.1
ICDDR,B hospital	871	16.6	869	31.2	2	0.1
Upazila health complex	181	3.5	45	1.6	136	5.5
District hospital	185	3.5	115	4.1	70	2.9
Clinic/nursing home	2508	47.9	1299	46.7	1209	49.3
UH & FWC	42	0.8	3	0.1	39	1.6
Others	5	0.1	2	0.1	3	0.1
No. of live birth	5233	100.0	2782	100.0	2451	100.0
<i>Source: Birth registration form</i>						

Figure 5.2. Age-specific fertility rates by area, 2016

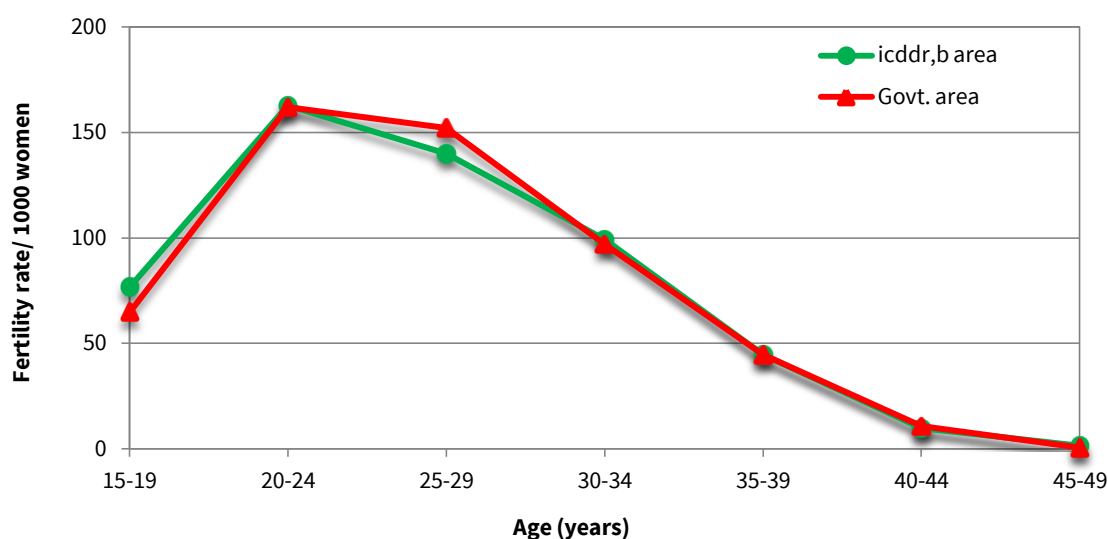


Table 5.5. Distribution of pregnancies that ended with live birth by attendant and area, 2016

Birth attendant	Both areas		icddr,b area		Govt. service area	
	Number	percent	Number	percent	Number	percent
TBA	801	15.3	224	8.1	577	23.5
Trained TBA	388	7.4	87	3.1	301	12.3
FWV	345	6.6	224	8.1	121	4.9
Nurse	1132	21.6	876	31.5	256	10.4
MBBS doctor	2539	48.5	1359	48.8	1180	48.1
Others	15	0.3	7	0.3	8	0.3
None	13	0.2	5	0.2	8	0.3
No. of live birth	5233	100.0	2782	100.0	2451	100.0
TBA=Traditional birth attendant						
FWV= Family welfare visitor						

Table 5.6. Distribution of mode of delivery of live birth by area, 2016

Mode of Delivery	Both areas		icddr,b area		Govt. service area	
	Number	percent	Number	percent	Number	percent
Normal vaginal	2830	54.1	1490	53.6	1340	54.7
Operation (C/S)	2400	45.9	1290	46.4	1110	45.3
Instrumental (forceps & ventouse)	3	0.1	2	0.1	1	0.0
No. of live birth	5233	100.0	2782	100.0	2451	100.0

Table 5.7. Percent distribution of different indicator for ANC visits, 2016

(number of visit, time of first visit and visit to health facilities at least once in different trimester of pregnancy)

	icddr,b service area	Government service area	Both areas
Number of ANC visits:			
None	3.6	9.6	6.4
1	2.1	17.1	9.1
2	4.0	23.7	13.2
3	8.4	20.7	14.1
4+	81.9	28.9	57.2
Total	100.0	100.0	100.0
Median	5.0	3.0	4.0
First ANC visits by month			
No ANC	3.8	10.1	6.8
< 4 months	47.3	21.3	35.1
4 - 5 months	40.7	26.2	33.9
6 - 7 months	6.4	26.6	15.8
8 + months	1.9	15.9	8.4
Total	100.0	100.0	100.0
Median	3.0	5.0	4.0
Number of women giving live births	2782	2451	5233

CHAPTER 6

MARRIAGE AND DIVORCE

The procedures adopted by the HDSS specify that if either partner in a marriage is resident in the HDSS area, the marriage should be registered. The number of marriages registered in 2016 was 3,360, giving a crude marriage rate of 14.2 per 1,000 populations. This rate was 14.0 in 2015.

Tables 6.1 and 6.2 show the percentage distribution of grooms and brides by age at marriage and previous marital status. The mean ages at marriage were 28.6 and 20.0 years for all grooms and brides respectively; 27.4 and 19.1 years for those marrying for the first time—which are near similar to those of 2015. One-third (36.9%) of the brides, who are married for the first time aged below 18 years and 7.5% of the grooms who are married the first time aged below 21 years. In general there has been a long-term gradual rise in age at first marriage of female in Matlab over 18 years for every year since 1985, while prior to that date it was consistently below that age.

Table 6.3 shows the marriage rates by age and sex. Among males, the marriage rate was 40.2 per 1,000 males aged 10 years and above, and for females the rate was 32.4 per 1,000 females aged 10 years and above. For females, the highest rate was 206.0 per 1,000 at the age of 18 years, while for males the highest rate was 277.2 per 1,000 at the age of 28 years. The highest rate of marriage for males increased to age 28 years in 2016 from 26 years in 2015, but the highest rate of marriage for female was the same to age 18 years in 2016 that of in 2015. Table 6.4 shows distribution of current marital status of the study population by age and sex in 2016. Of the total population 49.6% were currently married and it was higher for females than males (51.8% vs 47.3%). Widows also constituted a higher proportion for females (9.7%) than males (0.9%) - this difference, along with age-difference at marriage and life expectancy, maybe due to remarriage, which is more common for men than women.

Table 6.6 shows the distribution of marriages by type of gifts received from bridal party at the time of marriage in 2008-2016. Groom's party received marriage gifts from the bride's father in half of all marriages. Gifts were received under two different contracts: there was a clear negotiation with the bridal party about the gift prior to the marriage or there was no such negotiation, but a gift was given for daughter's happiness. The first contract can be regarded as dowry and its incidence was 36.0% in 2016. Incidence of giving dowry shows a declining trend over time from 2008-2016 which indicates the improvement of social awareness. Dowry was paid in full at the time of marriage for about one-sixth of the marriages and partially for one-sixth of all marriages.

The state law requires legal registration of marriages and divorces of Muslims and Christians (no such law exists for Hindus in Bangladesh). Table 6.7 shows trend in registration of Muslim marriage and divorce. Marriage registration was 87.3% in 2016 with a decreasing trend in recent years. Highest registration was 94.2% in 2013. The number of divorces was less than 300 each year during 1998-2001. Since 2002, this figure has been more than 300. In general, the incidence of divorce in Matlab has fallen. HDSS recorded 409 divorces in 2016 (Appendix A.12) and of them, 400 were divorce of Muslim marriages. 79.5% were registered with Kazi. Table 6.5 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 40.8 months. Figure 6.1 shows the distribution of marriages and

divorces by month. In 2016 marriages were high in March, July and September. Table 6.8 shows the distribution of causes of divorce by area. CHRWs interviewed male and female partners (if available) and neighbors to determine the cause of the divorce. Most common cause was wife maladjustment with husband or husband's family (23.2%) followed by wife's affairs with other man (21.5%) and husband's affairs with other woman (14.2%).

Figure 6.1. Number of marriages and divorces by month, 2016

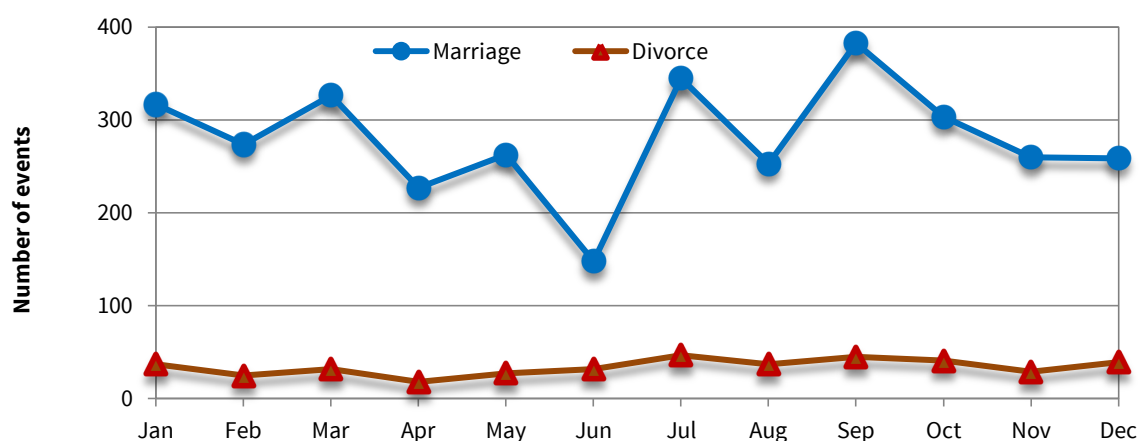


Table 6.1 Groom's age at marriage by previous marital status, 2016

Age (years)	Previous marital status (%)				
	All grooms	Single	Married	Divorced	Widowed
	0.0	0.0	0.0	0.0	0.0
All ages	100.0	100.0	100.0	100.0	100.0
	(n=3360)	(n=2868)	(n=75)	(n=331)	(n=86)
10-14	0.0	0.0	0.0	0.0	0.0
15-17	0.7	0.9	0.0	0.0	0.0
18	1.0	1.0	1.3	0.6	0.0
19	1.3	1.5	0.0	0.3	0.0
20	2.2	2.5	0.0	1.2	0.0
21	3.2	3.6	0.0	0.9	0.0
22-24	12.2	13.2	13.3	5.1	3.5
25-29	45.1	49.1	24.0	26.0	2.3
30-34	22.6	22.1	20.0	30.8	10.5
35-39	7.2	5.4	14.7	18.1	17.4
40-44	1.6	0.5	9.3	7.9	10.5
45-49	1.1	0.1	5.3	3.9	18.6
50-54	0.7	0.0	6.7	2.7	10.5
55-59	0.7	0.0	2.7	1.8	18.6
60-64	0.1	0.0	2.7	0.0	3.5
65+	0.2	0.0	0.0	0.6	4.7
Unknown	0.0	0.0	0.0	0.0	0.0
Median age*	28.0	27.0	32.0	32.0	45.5
Mean age*	28.6	27.4	34.8	33.3	45.8
Standard dev.*	6.3	4.4	10.5	8.0	11.1

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

Table 6.2 Bride's age at marriage by previous marital status, 2016

Age (years)	All brides	Single	Divorced	Widowed
	0.0	0.0	0.0	0.0
All ages	100.0 (n=3360)	100.0 (n=2929)	100.0 (n=404)	100.0 (n=27)
10 – 14	4.2	4.7	0.7	0.0
15	6.4	7.1	1.7	0.0
16	10.0	11.1	2.5	0.0
17	12.1	13.3	4.2	0.0
18	14.2	15.7	4.5	0.0
19	10.7	11.2	8.2	0.0
20 – 24	28.6	28.4	31.2	7.4
25 – 29	9.3	6.8	26.5	18.5
30 – 34	2.4	1.1	11.1	18.5
35 – 39	1.3	0.4	5.9	18.5
40 – 44	0.3	0.1	1.5	7.4
45 – 49	0.3	0.0	1.5	18.5
50 – 54	0.1	0.0	0.2	7.4
55 – 59	0.0	0.0	0.2	0.0
60 – 64	0.0	0.0	0.0	0.0
65+	0.0	0.0	0.0	3.7
Unknown	0.0	0.0	0.0	0.0
Median age*	19.0	18.0	24.0	36.0
Mean age*	20.0	19.1	25.1	37.2
Standard dev.*	5.0	3.7	6.8	10.6
*Mean and median ages and standard deviation were calculated from ungrouped age data				

Table 6.3 Marriage rates by age and sex, 2016

Age(years)	Male			Age(years)	Female		
	Marriages	Population	Rate*		Marriages	Population	Rate*
All ages(10+ yrs)	3360	83496	40.2	All ages(10+ yrs)	3360	103556	32.4
10-14	0	12449	0.0	10-14	141	12775	11.0
15-19	102	10165	10.0	15	216	2518	85.8
20-24	591	6300	93.8	16	336	2274	147.8
25	232	1228	188.9	17	407	2272	179.1
26	325	1237	262.7	18	477	2208	216.0
27	350	1266	276.5	19	360	2169	166.0
28	334	1205	277.2	20-24	961	10104	95.1
29	274	1302	210.4	25-29	311	10020	31.0
30-34	761	6135	124.0	30-34	82	9082	9.0
35-39	241	6414	37.6	35-39	42	8273	5.1
40-44	55	5663	9.7	40-44	11	7347	1.5
45+	95	30132	3.2	45+	16	34514	0.5
Unknown	0	-	-	Unknown	0	-	-
*Rates per 1000 population irrespective of previous marital status							

Table 6.4. Distribution of current marital status (%) by age and sex, 2016

Age (years)	Male					Female				
	NM	PM	WID	DIV	Total	NM	PM	WID	DIV	Total
0-4	100.0	0.0	0.0	0.0	13006	100.0	0.0	0.0	0.0	12584
5-9	100.0	0.0	0.0	0.0	12327	100.0	0.0	0.0	0.0	12150
10-14	100.0	0.0	0.0	0.0	12449	99.4	0.6	0.0	0.0	12775
15-19	98.2	1.7	0.0	0.0	10165	70.2	29.4	0.0	0.4	11441
20-24	78.1	21.6	0.0	0.3	6300	20.1	78.8	0.1	0.9	10104
25-29	37.3	61.8	0.0	0.8	6238	5.6	92.8	0.4	1.2	10020
30-34	11.7	87.5	0.1	0.7	6135	1.8	96.2	0.8	1.2	9082
35-39	2.8	96.3	0.0	0.9	6414	0.9	96.2	1.9	1.0	8273
40-44	1.3	97.8	0.1	0.8	5663	0.4	94.2	4.3	1.1	7347
45-49	0.7	98.6	0.1	0.6	5999	0.3	90.6	7.9	1.1	7749
50-54	0.5	98.8	0.3	0.4	6294	0.4	82.5	15.5	1.6	7554
55-59	0.4	98.1	1.1	0.3	6076	0.2	71.9	26.1	1.9	5907
60-64	0.2	97.0	2.3	0.5	3992	0.1	57.5	41.0	1.4	4008
65-69	0.2	95.7	4.0	0.2	2773	0.1	41.2	57.4	1.4	3212
70-74	0.4	92.8	6.6	0.2	2167	0.0	26.4	72.7	0.9	2971
75-79	0.1	89.4	10.4	0.1	1405	0.1	13.3	86.3	0.4	1688
80-84	0.1	81.4	18.2	0.3	908	0.1	5.1	93.9	0.9	918
85+	0.4	64.1	35.5	0.0	518	0.2	2.4	96.6	0.8	507
Total	51.6	47.3	0.9	0.3	108829	37.7	51.8	9.7	0.8	128290

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

Table 6.5. Duration (months) of all marriages at divorce by age and sex, 2016

Age at divorce (years)	Male				Female			
	No.	Mean	Median	SD	No.	Mean	Median	SD
< 20	7	13.7	8.0	15.6	139	16.9	12.0	21.1
20 - 24	44	22.0	12.0	27.0	139	31.3	25.0	25.3
25 - 29	143	27.8	18.0	28.3	75	63.8	56.0	47.7
30 - 34	118	39.0	28.0	37.8	30	87.0	84.5	62.1
35 - 39	56	60.1	40.0	50.4	19	79.6	50.0	66.7
40 - 49	34	94.8	73.5	87.0	5	81.0	77.0	64.9
50+	9	63.7	21.0	84.0	4	185.5	183.5	168.1
All ages	411	40.8	24.0	47.6	411	40.8	24.0	47.6

Table 6.6. Marriages by type of gifts received by grooms party from bridal party, 2008-2016

Type of gift received	Year									
	2008	2009	2010	2011	2012	2013	2014	2015	2016	
None	40.9	40.1	43.2	57.6	48.5	48.5	53.6	57.5	61.8	
Gift without prior negotiation	1.3	0.6	0.6	0.9	1.1	0.9	1.4	2.2	2.1	
Gift after prior negotiation	57.9	59.3	56.2	41.5	50.3	50.6	45.0	40.3	36.0	
Gift payment										
Full	15.8	19.1	18.8	13.2	16.7	18.8	16.1	16.9	15.5	
Partial	34.6	33.7	31.1	22.4	26.8	25.9	24.4	19.0	16.3	
Not yet paid*	7.5	6.5	6.3	5.8	6.8	5.9	4.5	4.3	4.2	

NA=Not available
*Was agreed at the time of marriage but did not pay as yet

Table 6.7. Registration status of Muslim marriages and divorces, 2000-2016

Year	Marriage registered by Kazi		Divorce registered by Kazi	
	Number	Percent	Number	Percent
2000	2457	85.0	195	67.2
2001	2486	87.7	179	67.8
2002	2620	87.4	243	74.8
2003	2469	87.3	239	76.1
2004	2483	91.7	230	82.4
2005	2563	91.1	243	80.7
2006	2521	92.5	270	88.2
2007	2726	94.0	278	83.2
2008	2442	92.6	223	83.2
2009	2760	94.6	239	77.1
2010	2643	92.3	319	82.6
2011	2620	93.2	302	84.4
2012	2666	93.4	299	82.4
2013	2687	94.2	239	76.6
2014	2716	91.5	303	79.9
2015	2604	89.6	363	82.7
2016	2619	87.3	318	79.5

Table 6.8. Cause of divorces by area, Matlab, 2016

Cause of Divorce	Both areas		icddr,b area		Government area	
	Number	percent	Number	percent	Number	percent
Dowry	5	1.2	3	1.5	2	1.0
Domestic violence	24	5.9	9	4.4	15	7.4
Husbands affairs with other woman	58	14.2	35	17.1	23	11.3
Wife affairs with other man	88	21.5	44	21.5	44	21.6
Wife maladjustment with husband/family	95	23.2	42	20.5	53	26.0
Husband addicted to drug or gambling	22	5.4	14	6.8	8	3.9
No trace of husband	17	4.2	12	5.9	5	2.5
Husband/wife not good looking	19	4.6	10	4.9	9	4.4
Husband mentally/physically disable	40	9.8	14	6.8	26	12.7
Wife mentally/physically disable	10	2.4	3	1.5	7	3.4
Others/unspecified	31	7.6	19	9.3	12	5.9
Total	409	100.0	205	100.0	204	100.0

CHAPTER 7

MIGRATION

An out-migrant is defined as a person originally listed on a Matlab HDSS census as a resident, or a person who became a resident by birth or immigration, who subsequently moved out of the Matlab surveillance area and did not come back to the HDSS area within six months of the departure or came in the area but never stayed overnight. Likewise, an in-migrant is an individual neither recorded in the last census nor born or lived in the Matlab 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. Exceptions are made if someone moves into the area due to marriage, divorce, schooling, jobs or settlement. These definitions are used in the surveillance area as a whole.

During 2016, a total of 14,189 persons (6,690 males and 7,499 females) moved into the HDSS area, which represented an annual average in-migration of 59.8 per 1000 mid-year population for both males and females. On the other hand, 14,736 persons (8,005 males and 6,731 females) left the HDSS area or on an average 62.1 per 1000 mid-year population for both males and females (Table 7.1 and Appendix A.13). In 2015 the highest incidence of in-migration for males was 13.3% in the age group 25-29 and for females was 18.9% in the age group 15-19. The highest out-migration was in the age group 20-24 for both sex, 17.9% for males and 21.2% for females. More males out-migrated than females in the age group (0-14) and in the age group (25-59). The higher out migration of males affected sex ratio of the population in the area – as the sex ratio decreased from 103 in 1982 to 86 males per 100 females in 2016. More out-migration of working age (15-59) group males compared to females caused a decline in the sex ratio over the period.

In- and out-migration rates are higher in 2016 over those of 2015. The net loss of migrants was 2.3 per 1,000 population in 2016, whereas in 2015 net loss of migrants was 2.9 per 1,000 population. Table 7.1 presents the age-specific migration rates, which are illustrated in Figure 7.1. The tables and figures show the distribution of age commonly found for migrant populations, with a primary peak of young children moving with their parents. Male out-migrants were younger than male in-migrants. For females the pattern of age distribution was similar. Table 7.2 and Figure 7.2 show the numbers moving in and out by month. January is the preferred month for migration for both men and women. 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 the rural area, females predominantly for marriage and males predominantly for seeking jobs. There is a net loss of both men and women to urban area, primarily of young adults. Migration to the Middle East and other Asian countries is heavily concentrated among out-migrating males aged 15-44 years (Appendices A.20).

Table 7.1. Age and sex-specific migration rates (per 1,000 population) by direction, 2016

Age (years)	Both sexes		Male		Female	
	In	Out	In	Out	In	Out
All ages	59.8	62.1	61.5	73.6	58.5	52.5
0 - 4	84.2	62.8	85.6	62.6	82.7	63.0
5 - 9	52.4	43.2	49.7	47.1	55.1	39.3
10-14	35.6	43.3	35.7	53.7	35.6	33.2
15-19	84.7	124.9	40.4	130.0	124.0	120.4
20-24	124.3	173.9	103.7	226.8	137.2	140.9
25-29	112.8	106.7	143.0	151.7	94.0	78.6
30-34	89.5	76.0	135.5	114.3	58.5	50.1
35-39	59.4	53.6	92.9	85.9	33.5	28.5
40-44	39.8	36.8	65.5	59.2	20.0	19.6
45-49	32.4	24.5	46.7	37.5	21.4	14.5
50-54	20.1	19.6	26.7	27.2	14.6	13.4
55-59	18.9	16.4	24.2	18.4	13.4	14.2
60-64	18.1	16.5	20.3	15.5	16.0	17.5
65+	50.6	55.8	32.5	32.1	66.3	76.3

Table 7.2. Number of in- and out-migrations by sex and month, 2016

Month	In-migration			Out-migration		
	Both sexes	Male	Female	Both sexes	Male	Female
All months	14189	6690	7499	14736	8005	6731
Jan	1856	851	1005	1863	1001	862
Feb	1396	638	758	1280	678	602
Mar	1367	632	735	1325	720	605
Apr	1186	571	615	1180	679	501
May	888	441	447	1084	573	511
Jun	1104	528	576	912	535	377
Jul	1182	548	634	1437	784	653
Aug	940	433	507	1009	532	477
Sep	1342	657	685	1369	706	663
Oct	1014	494	520	1145	624	521
Nov	893	432	461	1046	596	450
Dec	1021	465	556	1086	577	509

Figure 7.1. In- and out-migration rates by sex and age in Matlab, 2016

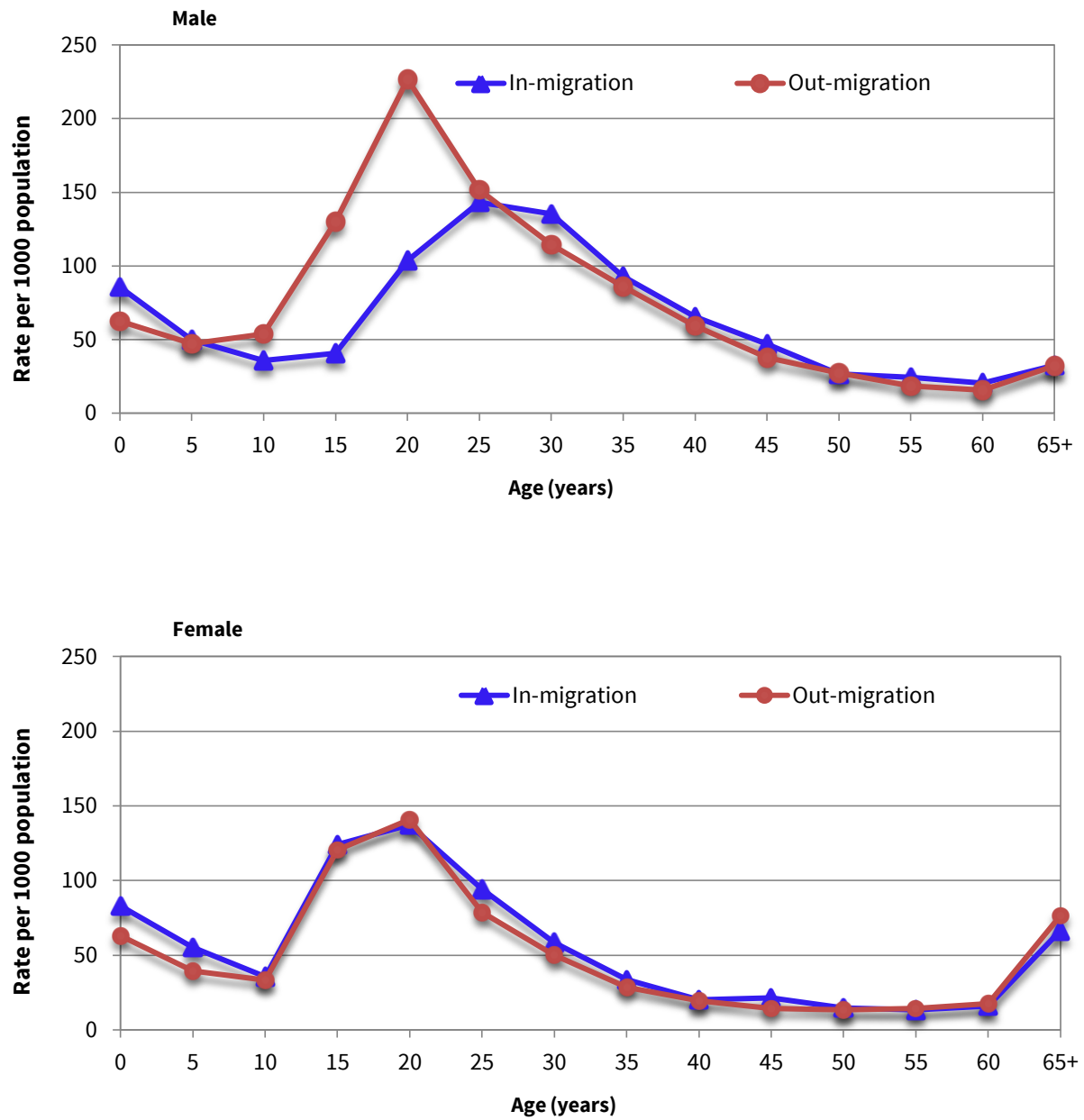
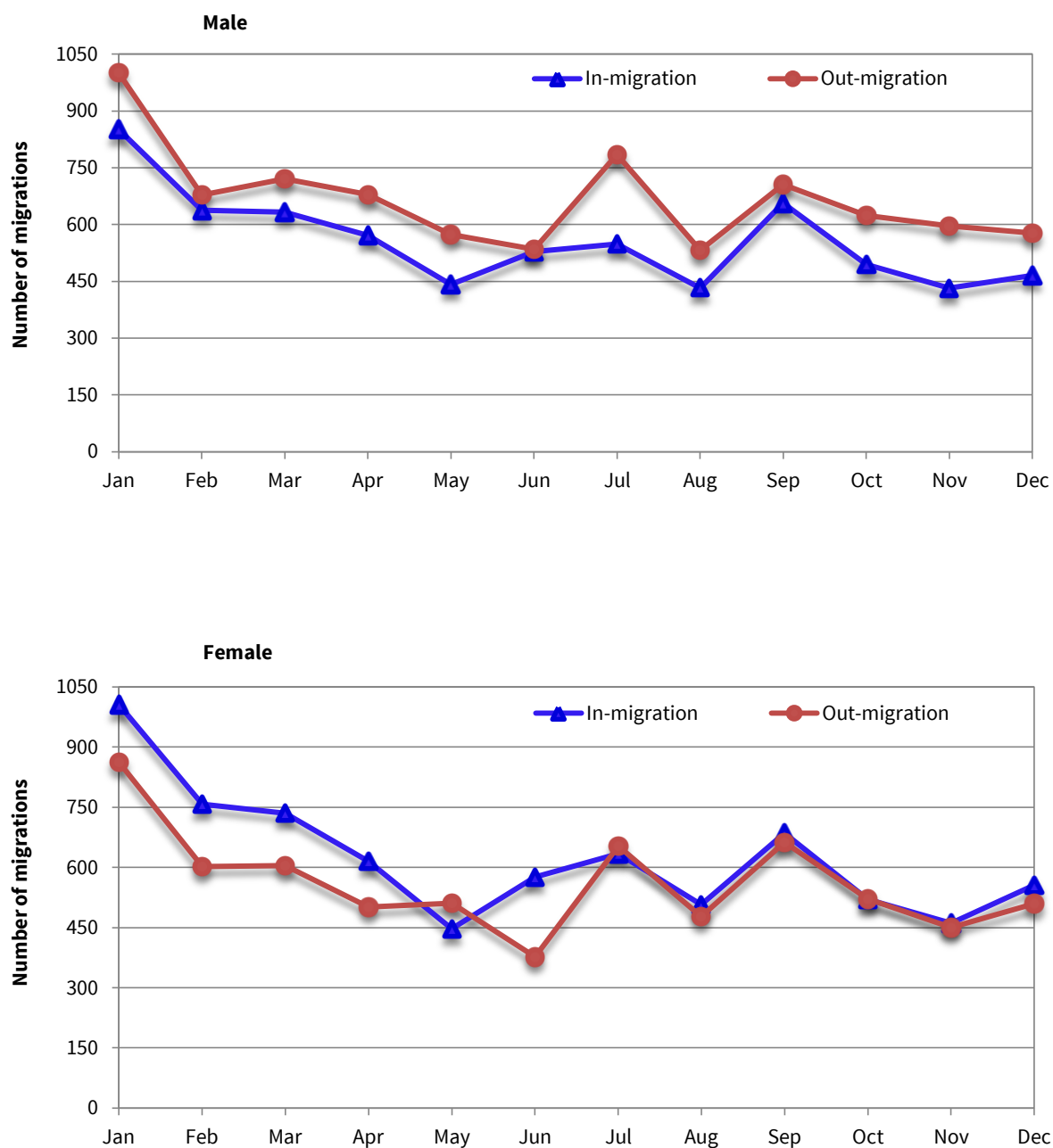


Figure 7.2. Number of in- and out-migrations by sex and month in Matlab, 2016



CHAPTER 8

FERTILITY REGULATION

In the icddr,b service area, maternal and child health services including immunization and, family planning (MCH-FP) services have been being provided through a vertical health care system with government health service system since 1978. icddr,b's maternal health services include pregnancy test, counseling and care providing for ANC, safe delivery, PNC, contraception, motivating eligible couples for family planning method adoption, and refer mothers and children for complications. Raising awareness of parents about symptoms of common childhood morbidity; and advise them to treat sick children by medically trained providers are also included in icddr,b's service package. Other private and NGO health care facilities and NGO domiciliary health service providers also provide health services in icddr,b service area. In the Government service area, services are provided by Government health system and other private and NGO service system.

The 42 surveillance 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 bimonthly home visits. During home visits they sometimes give advice to oral pill users to procure pills in timely manner, pregnant women to seek antenatal care and have safe delivery; and parents to immunize children and treat sick children by formally trained providers. In 2016 the contraceptive use rate was 49.0% in the icddr,b service area and 38.6% in the Government service area (Table 8.1). Contraceptive use rate in the Government service area is lower than the use rate of 47.8% recorded in rural Chittagong division in 2014. Table 8.2 shows the difference in contraceptive method-mix between the icddr,b and Government service areas in 2016 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 -service area, injectables is the most widely-used method, followed by pill, tubectomy and condom. Changes in the method-mix in the icddr,b service area during 2001-2016 are shown in Table 8.3. The contraceptive-use rate increases with the increase in women's age in the icddr,b and government service areas (Tables 8.4 and 8.5). In the icddr,b service area, women aged 20 years and over are more likely to use injectables, followed by pill, undergo tubectomy and their husbands to use vasectomy whereas in the Government service area (Table 8.5), the pill, followed by injectables are the most popular methods in all age groups except age group 45 years and over. Tubectomy is more popular in the age group 40 years and over.

Table 8.1. Contraceptive use rate (%) of currently married women aged 15-49 years by area, 1987-2016

Year	Matlab		Rural Chittagong (BDHS)	National**
	icddr,b area	Government area*		
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	-	26.1	44.6
1994	65.6	-	-	-
1995	68.6	-	-	-
1996	68.1	46.9	32.8	49.2
1997	67.4	-	-	-
1998	68.8	-	-	-
1999	69.9	-	-	53.8
2000	69.5	-	38.0	-
2001	69.7	-	-	50.8
2002	70.5	51.4	-	53.4
2003	69.6	47.2	-	-
2004	70.4	48.1	41.0	58.1
2005	71.4	47.4	-	-
2006	69.2	45.1	-	58.1
2007	56.6	43.6	37.4	55.8
2008	54.4	41.3	-	59.5
2009	54.2	42.5	-	-
2010	55.7	43.1	-	62.6
2011	54.1	43.7	45.2	61.2
2012	53.3	42.6	-	-
2013	53.8	42.2	-	62.0
2014	53.9	41.9	47.8	62.4
2015	51.4	40.9	-	-
2016	49.0	38.6	-	-

*Sources: In-depth and KAP surveys, 1984 & 1990; MDHS 1992; HDSS census 1996 and HDSS 2002-2015.

**Sources: Contraceptive prevalence survey, Bangladesh fertility survey 1989; Bangladesh demographic and health survey 1993-94, 1996-97, 1999-2000, 2004, 2007, 2011, 2014; Bangladesh maternal health services and maternal mortality survey 2010; Utilization of Essential Service Delivery Survey 2006, 2008, 2013.

Table 8.2. Contraceptive method mix (%) in different surveys and areas

Method	Matlab		Rural Chittagong (BDHS 2014)	National (BDHS 2014)
	icddr,b service area, 2016	Government service area, 2016		
Pill	29.3	40.0	43.0	43.3
Condom	10.7	8.5	7.2	10.3
Injectables	37.9	27.1	25.7	19.9
IUD	0.9	0.8	1.3	1.0
Tubectomy	12.3	13.9	5.9	7.4
Vasectomy	1.9	0.9	0.8	1.9
Norplant/Implant	4.4	3.1	2.2	2.7
Others*	2.5	5.6	13.8	13.5
Total	100.0	100.0	100.0	100.0

BDHS=Bangladesh demographic and health survey

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

Table 8.3. Contraceptive method mix* (%) in the icddr,b service area, 2001-2016

Method	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Pill	31.9	33.3	33.9	32.6	34.1	35.8	34.6	30.6	30.3	30.1	29.0	29.4	30.9	32.3	31.0	30.1
Condom	10.8	11.1	11.0	10.9	11.2	10.8	8.6	9.0	9.5	9.2	9.4	9.9	10.0	10.3	10.9	11.0
Injectables	45.7	44.5	44.4	45.2	42.7	41.3	43.6	47.4	46.6	46.8	46.4	45.2	41.8	40.1	38.7	38.9
IUD	1.9	1.8	1.9	2.4	2.6	2.4	1.9	1.8	1.7	1.8	1.7	1.5	1.4	1.1	1.0	0.9
Tubectomy	8.6	7.7	7.2	7.4	7.6	7.9	9.2	9.0	9.4	9.3	10.3	10.5	11.4	11.6	12.3	12.6
Vasectomy	1.1	1.5	1.5	1.4	1.4	1.5	1.6	1.7	1.9	1.9	2.1	2.1	2.0	2.0	2.0	1.9
Norplant	-	-	0.0	0.1	0.3	0.3	0.5	0.5	0.6	0.9	1.1	1.4	2.5	2.7	4.1	4.6
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	100.0

*Currently married women using any modern method.

Table 8.4. Method specific contraceptive use rate among currently married women by age in icddr,b service area, 2016

Age (years)	Not using	Any method used	Method used								Missing information	No. of eligible women
			Pill	IUD	Injectables	Condom	Tubectomy	Vasectomy	Others*	Norplant		
<20	7.8	24.9	8.2	0.2	10.6	3.7	0.1	0.0	0.4	1.7	1.3	1580
20 - 24	60.3	39.21	13.5	0.5	17.5	4.7	0.1	0.1	0.3	2.6	0.5	3934
25 - 29	55.5	44.3	15.0	0.5	19.2	5.1	1.2	0.1	0.6	2.6	0.3	4562
30 - 34	50.0	49.8	15.9	0.5	19.1	5.2	5.1	0.6	1.0	2.4	0.2	4515
35 - 39	42.6	57.2	16.8	0.3	19.9	5.7	9.8	1.3	1.5	1.9	0.2	3854
40 - 44	38.4	61.3	14.3	0.6	20.9	5.9	13.3	1.9	2.7	1.9	0.3	3584
45 - 49	43.7	56.1	12.1	0.4	18.1	5.6	12.8	3.0	2.6	1.5	0.2	2583
Total	50.7	49.0	14.4	0.4	18.6	5.2	6.0	0.9	1.2	2.2	0.3	24612

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

Table 8.5. Method specific contraceptive use rate among currently married women by age in Government service area, 2016

Age (years)	Not using	Any method used	Method used								Missing information	No. of eligible women
			Pill	IUD	Injectables	Condom	Tubectomy	Vasectomy	Others*	Norplant		
<20	81.4	17.1	7.7	0.0	3.4	4.5	0.0	0.0	1.1	0.3	1.5	1397
20 - 24	73.2	26.5	13.4	0.2	6.9	3.8	0.2	0.0	1.2	0.7	0.3	3466
25 - 29	64.9	34.7	16.7	0.2	10.3	3.2	1.5	0.2	1.1	1.5	0.4	4065
30 - 34	58.0	41.9	18.10	0.2	12.0	3.6	4.8	0.3	1.4	1.4	0.1	4047
35 - 39	50.6	49.2	18.2	0.4	13.2	3.2	9.0	0.5	2.9	1.8	0.2	3537
40 - 44	50.4	49.5	15.7	0.6	13.6	3.0	11.1	0.7	3.6	1.3	0.1	3037
45 - 49	59.8	40.0	11.7	0.2	9.5	2.0	10.9	0.6	4.6	0.6	0.1	2350
Total	61.1	38.6	15.4	0.3	10.5	3.3	5.4	0.3	2.2	1.2	0.3	21899

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

CHAPTER 9

CHILD HEALTH SERVICE USE

Immunization

The Community Health Research Workers (CHRWs) started measles vaccination to all children in blocks A&C and blocks B&D in 1982 and 1985 respectively. Vaccination 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 service 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 Government service area record only vaccination status either by checking vaccination cards or by asking mothers about vaccination of children if the vaccination card was missed.

The World Health Organization recommends that all children receive a BCG vaccination against tuberculosis; three doses of DPT for the prevention of diphtheria, pertussis and tetanus; hepatitis B; three doses of polio vaccine; and a vaccination against measles before their first birthday. In January 2009, the Bangladesh EPI program introduced hemophilus influenza type B (Hib) vaccine in the form of pentavalent vaccine that included the DPT and hepatitis B and the new Hib vaccine. By June 2009, the pentavalent vaccine had replaced the DPT and hepatitis B, and by 2012 measles rubella replaced measles in the EPI program. Therefore, vaccination of children aged 12-23 months is presented to allow comparison of results across the areas.

Table 9.1 shows the rates of coverage of different vaccines among children aged 12-23 months in icddr,b service area from 1987 to 2016 and the Government service area from 2000 to 2016. In 2016, immunization of children was almost universal: 97.5% received BCG, 96.4% received three doses of pentavalent and polio and 88.0% received measles rubella vaccines in icddr,b area and 98.3% received BCG, 96.9% received three doses of pentavalent and polio and 89.4% received measles rubella vaccine in Government service area. The BDHS 2014 estimates of immunization coverage were 97.9% for BCG, 91.3% for DPT/pentavalent, 91.4% for polio, and 86.1% for measles.

Table 9.1. Immunization coverage (%) among children aged 12-23 months in icddr,b service area, 1987-2016 and Government service area, 2000-2016

Vaccination coverage rate of children aged 12 - 23 months								
Year	BCG (1 dose)		DPT/Pentavalent (3 doses)		Measles-Rubela (1 dose)		All*	
	icddr,b area	Government Area	icddr,b area	Government area	icddr,b area	Government area	icddr,b area	Government area
1987	88.4	-	76.1	-	85.2	-	69.3	-
1988	93.3	-	82.8	-	87.9	-	77.2	-
1989	94.6	-	88.4	-	92.0	-	84.0	-
1990	98.7	-	95.7	-	96.4	-	93.8	-
1991	98.6	-	95.6	-	97.0	-	94.1	-
1992	99.1	-	96.9	-	97.8	-	96.0	-
1993	99.5	-	97.6	-	98.1	-	96.6	-
1994	99.5	-	97.7	-	97.0	-	95.7	-
1995	99.3	-	96.8	-	97.0	-	95.0	-
1996	99.5	-	98.0	-	97.9	-	96.7	-
1997	99.3	-	98.5	-	98.0	-	97.3	-
1998	99.2	-	97.7	-	96.1	-	95.4	-
1999	99.0	-	97.7	-	94.8	-	94.1	-
2000 ^a	99.2	73.6	97.7	67.8	95.9	50.2	95.1	48.5
2001	99.1	89.8	98.2	80.0	96.0	74.1	95.4	71.0
2002	99.3	96.7	98.5	90.6	95.7	84.5	95.4	83.1
2003	99.2	97.4	98.5	92.0	95.9	84.3	95.6	83.2
2004	99.3	97.6	98.2	93.1	96.6	86.2	95.9	85.3
2005	99.6	97.9	99.0	94.6	97.8	86.0	97.3	84.9
2006	99.0	97.3	97.6	93.7	95.2	81.7	94.3	80.4
2007 ^b	99.8	99.8	98.8	99.0	96.3	95.1	96.1	94.7
2008 ^b	97.8	96.3	97.3	95.9	95.1	93.6	94.8	93.6
2009 ^b	97.4	97.8	96.7	97.5	95.0	95.6	94.6	95.6
2010	96.6	95.8	93.7	92.4	92.3	91.3	88.6	87.4
2011	95.9	95.1	93.2	92.1	87.0	84.0	86.0	83.1
2012	97.4	95.3	94.2	89.9	86.1	88.0	83.0	82.5
2013	98.1	97.6	94.7	88.5	86.1	81.8	88.3	81.7
2014	98.5	96.6	97.7	93.6	89.0	79.3	88.8	79.2
2015	97.1	97.6	95.1	95.5	86.9	87.9	86.7	87.7
2016	97.5	98.3	96.4	96.9	88.0	89.4	87.6	88.6

*Children fully vaccinated (i.e those who received BCG, measles-rubela and three doses of pentavalent and polio).
^aImmunization coverage rate is about 20% under reported in the Government area due to not checking of vaccination cards during the initial months of 2000.
^bChild immunization data are collected on sample basis in 2007-2009

GEOGRAPHIC INFORMATION SYSTEM (GIS)

Spatial Analysis of ANC by Block

Geographic Information System of Matlab HDSS in brief

Advanced spatial data namely Geographic Information System (GIS) was established in 1994 under the Public Health Sciences Division to produce cartographic, thematic and analytic maps as per requirements of the investigators of icddr,b. Initially, geo-spatial efforts were limited within the area covered by the Matlab Health and Demographic Surveillance System (HDSS); later its' activities were gradually expanded to all essential research areas. In 1998, the GIS unit and the Record Keeping System of MCH-FP services were integrated into the HDSS.

Within the surveillance area, trained Field Research Supervisors and GPS surveyor's collected spatial data using handheld Global Positioning System (GPS) device. These spatial data include geo-coordinates³ of *baris*⁴, tube-wells, ditches, ponds, health facilities, educational institutes, mosques, markets, etc. These spatial databases are periodically updated, adding geo-coordinates of new *baris*, tube-wells, roads, health facilities, educational institutes, etc. Information of HDSS residents is linkable to the geo-reference objects (i.e. *baris*, hospitals, schools, tube-wells, etc.) within the Matlab HDSS area.

The rapid and enormous development of the GIS software and the increasing availability of free high resolution satellite images have expanded the scope of geospatial analysis in research areas.

The modern GIS components generate thematic maps, create spatial variables, and perform spatial and temporal analyses with geo-referenced data. Any kind of spatial information can be extracted from high-resolution imagery. The facilities have widened the GIS application in the research of public health. Now researchers use spatial and temporal analyses for explaining temporal and geographical variations of morbidity, mortality and other public health issues, for targeting interventions to the high-risk areas and for ensuring efficient use of scarce resources.

Spatial difference in ANC coverage

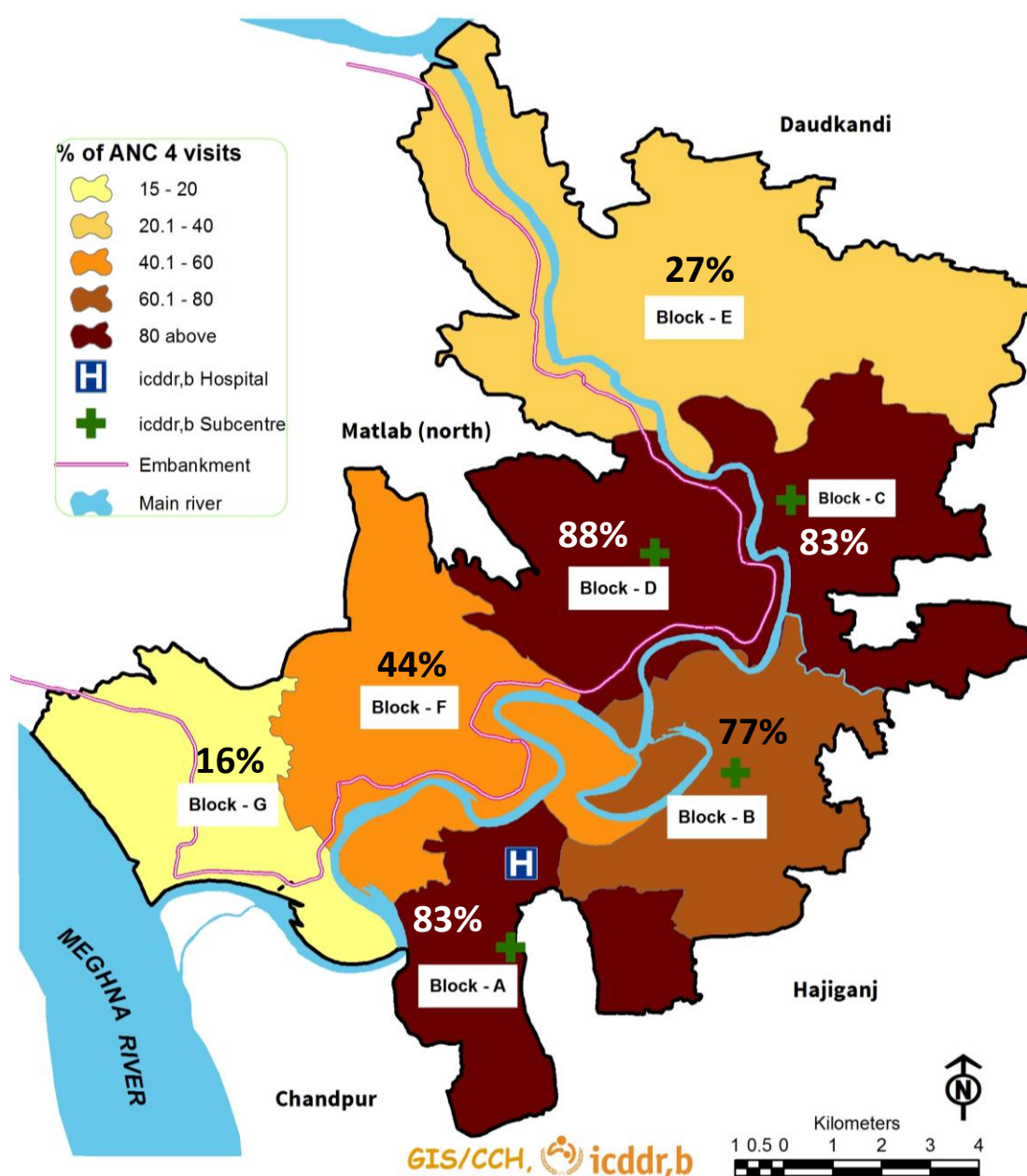
According to “Standards for Maternal and Neonatal Care” by World Health Organization (WHO) 2007, every expectant woman should receive at least 4 antenatal care (ANC) services from a skilled health-care professional over the span of her pregnancy period. Matlab HDSS has been recording information on place of receiving ANC care in each trimester since 1986 using “Birth Registration Form”. From 2016 a revised form is being administered that records both place of seeking ANC service and gestation age (in weeks) for each visit. This revised form allows count number of ANC visits. The 4+ ANC visit rate varies widely between icddr,b service area and Government service area (81.9% and 28.9% respectively) as depicted in Table 5.7 of Chapter 5. Figure 10.1 displays further segregation of this rate across the seven blocks of Matlab HDSS for 2016. The spatial distribution clearly depicts that coverage of

³ Geo-coordinate is used to specify location of a place on the earth by latitude and longitude.

⁴ Bari is a Bengali word meaning a cluster/group of households sharing common yard

recommended 4+ ANC visits is high among women residing in four blocks of icddr,b service area Than it is the three blocks of Government service area. Coverage is lowest in Block G 16%), followed by Block E and Block F.

Figure 10.1 Percentage of women who had a live birth in 2016 and received at least 4 ANC by Block, Matlab-HDSS, 2016



CHAPTER 11

SUMMARY OF CHILD MORBIDITY SURVEY

Background

Bangladesh has achieved remarkable success in reducing under-five mortality. Still episodes of diarrheal diseases, pneumonia and other communicable diseases, and injuries including drowning are very common. Four in ten deaths among 1-4 years children occurs due to drowning. We get similar statistics from Matlab HDSS records. It reflects how common and fetal drowning is. Childhood morbidities and injuries have as severe consequences on their growth and future life as the health system. Health Bulletin 2016 shows that 22% of admitted patients in public health facilities in 2015 were under-five children. Matlab HDSS records deaths and its causes of all the population covered by the surveillance system through household visits on every alternative month. But morbidity and injury data are not collected. A survey was conducted in 2016 to explore the prevalence of the common morbidities and injuries among under-five children.

Methods

A structured questionnaire was administered to collect data in half of the HDSS area in August 2016. HDSS area is divided into 1266 segments (working unit) of each of 50-55 households. CHRWs cover their working units in two months. The survey was conducted over one month in August 2016 which means that half of the working units of the CHRWs were covered in the survey, which means, CHRWs did not have any role in selection process. Selected households having any under-five children were interviewed by CHRWs with morbidity questionnaire. Figure 11.1 shows the spread of the household locations over the HDSS area.

Results

Morbidity: Diarrhoea and pneumonia

Death due to diarrhoea among under-five children is very low in Matlab – only 31 (1.5%) of 2032 under-five deaths in last ten years (2005-2014) were due to diarrhea. Still episodes of diarrhoea among these children are high. In the survey we found that one in ten under-five children suffer from diarrhoea in a two weeks period (Table 11.1). This incident is most frequent among children of age 6-11 months (17.3%). Male and female under-five children are more or less equal in terms of diarrhoea prevalence within last two weeks preceding the survey (9.4% and 9.8% respectively). This disease is most prevalent in highest quintile (10.5%) and least prevalent in fourth quintile (9.0%). In Government service area, occurrence of diarrhoea among under five children is more frequent (10.6%) compared to icddr,b service area (8.6%).

Figure 11.1: Distribution of Baris included in child morbidity survey across Matlab HDSS

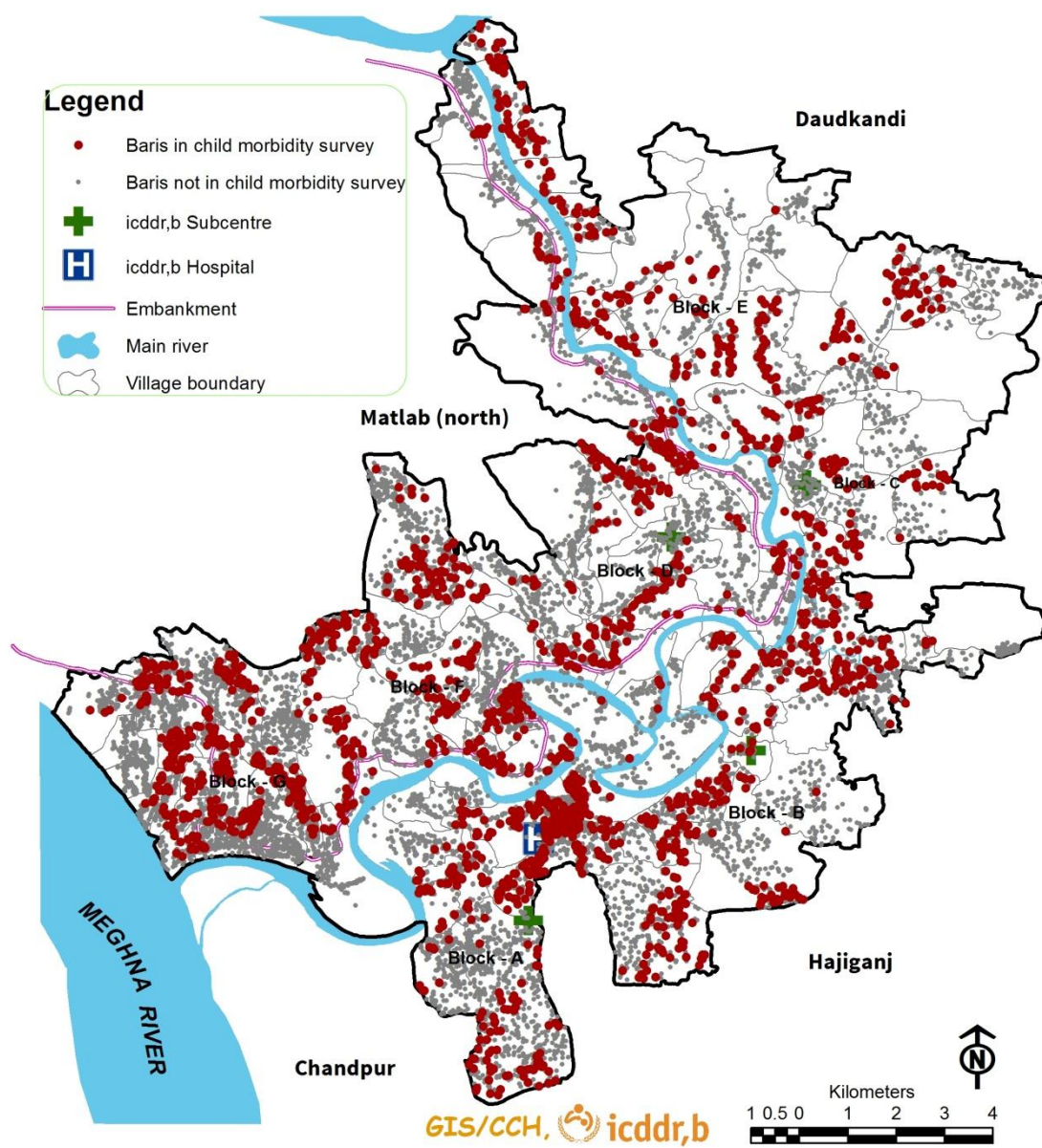


Table 11.1: Percentage of under-five children who suffered from diarrhoea and pneumonia in two weeks preceding the survey, and other illness in one month preceding the survey, Matlab, 2016

Background Characteristics	Diarrhoea (2 weeks)	Pneumonia (2weeks)	Fever	Cold/cough	Stomach ache	Skin infection	Ear infection	Urinary problem	Eye problem	Asthma	Measles/Rash	Any illness (within 1 month)*	Number
Age of child (in months)													
<6	10.1	1.6	49.9	64.6	7.2	6.5	0.5	2.6	7.2	8.3	10.1	77.8	387
6-11	17.3	5.3	69.0	78.5	4.9	18.3	1.7	2.9	4.4	10.8	7.0	87.5	526
12-35	10.6	2.1	60.0	70.4	6.2	19.6	2.4	3.4	4.6	6.6	7.3	81.6	1,962
36+	5.6	0.9	50.1	59.9	14.7	17.3	2.3	4.9	4.1	4.3	5.8	75.8	1,555
Sex of child													
Male	9.4	2.3	59.3	67.4	9.0	17.6	2.2	3.1	4.9	7.9	6.8	80.0	2,301
Female	9.8	1.7	54.0	66.8	9.3	17.4	2.0	4.6	4.4	4.9	7.1	79.8	2,129
Wealth quintile													
Lowest	9.2	2.0	60.0	68.0	9.1	17.4	2.9	3.8	4.5	5.8	9.1	80.9	685
Second	9.4	1.6	58.6	68.8	9.9	18.3	2.1	3.7	4.8	7.0	7.3	79.8	756
Middle	9.5	2.5	57.0	66.6	8.1	16.3	2.2	2.6	4.4	6.5	7.3	80.0	872
Fourth	9.0	1.5	55.5	67.1	9.3	18.0	1.5	3.9	4.6	6.3	7.2	78.6	986
Highest	10.5	2.5	53.7	65.6	8.9	16.9	1.8	4.3	4.9	6.8	5.3	79.6	945
Missing	10.8	1.1	58.1	67.7	10.8	20.4	3.8	6.5	5.4	5.4	3.8	84.9	186
Service area													
icddr,b	8.6	2.6	53.4	64.1	8.9	18.2	2.2	4.5	4.9	6.8	7.1	78.9	2,223
Government	10.6	1.4	60.0	70.2	9.3	16.7	2.0	3.1	4.4	6.1	6.9	81.0	2,207
Total	9.6	2.0	56.7	67.2	9.1	17.5	2.1	3.8	4.7	6.5	7.0	79.9	4,430

* Excluding cases of diarrhea and pneumonia

Table 11.2: Percentage of under-five children who have had some injuries one month preceding the survey, Matlab, 2016

Background characteristics	Cut injury	Bone injury	Burn injury	Fall injury	Near drowning	Animal injury	Electrocution	Other injury/morbidity	Any injury	Number
Age of child (in months)										
<6	0.5	0.3	0.0	3.6	0.3	0.3	0.0	2.1	6.7	387
6-11	2.3	0.2	1.9	19.8	0.8	1.1	0.0	2.5	24.1	526
12-35	6.2	0.8	1.7	13.8	3.5	1.4	0.3	1.9	24.4	1,962
36+	6.0	0.5	0.9	11.6	3.9	1.4	0.2	1.8	21.1	1,555
Sex of child										
Male	5.6	0.3	1.6	13.4	3.2	1.4	0.2	2.0	22.2	2,301
Female	4.7	0.8	1.0	12.3	2.9	1.1	0.1	1.9	21.0	2,129
Wealth quintile										
Lowest	4.4	0.1	1.3	12.8	4.4	1.2	0.3	2.2	22.5	685
Second	5.4	1.2	1.6	13.4	2.9	1.7	0.0	1.2	22.4	756
Middle	5.0	0.1	0.6	11.9	3.7	1.0	0.2	1.6	20.5	872
Fourth	5.5	0.6	1.7	14.6	2.8	0.8	0.2	2.0	22.8	986
Highest	5.1	1.0	1.3	12.3	2.1	1.7	0.2	2.5	21.4	945
Missing	6.5	0.0	1.1	8.6	1.1	0.5	0.0	2.2	16.1	186
Service area										
icddr,b	4.1	0.3	1.4	10.8	2.4	1.3	0.2	2.2	19.1	2,223
Government	6.3	0.9	1.1	15.0	3.6	1.2	0.2	1.6	24.2	2,207
Total	5.2	0.6	1.3	12.8	3.0	1.2	0.2	1.9	21.6	4,430

Of mentioned 2032 under five deaths in Matlab, 183 resulted from respiratory disease (case fatality around 9%) – a figure quite high compared to deaths due to diarrhea. However, the occurrence of pneumonia is not as frequent as diarrhea – every 2 out of 100 under five children showed symptoms of acute respiratory infection (cough accompanied by short, rapid breathing that was chest-related and/or by difficult breathing that was chest-related) in the two weeks preceding the survey. These symptoms are more frequent among children of age 6-11 months compared to other age groups (Table 11.1). According to the survey, the prevalence of pneumonia is higher among male children compared to female ones (2.3% and 1.7% respectively). Small variation in the prevalence rate is noticed between the wealth quintile groups, ranging from 1.1% to 2.5%.

*Morbidity: **Other diseases***

Children of under-five years of age more frequently suffer from fever and/or cold-cough than any other type of illness. The prevalence rate, within one month before the survey, for fever is 56.7% and for cold-cough is 67.2%. Skin infection is third most frequent sickness among the children surveyed, having overall prevalence of 17.5%. There is large variation in %ages of stomach ache between children across different age group – may be due to fact that many of these occurrences among younger children go unidentified. The prevalence rates for other illnesses are also listed in table 11.1 with breakdown of age, sex, wealth-quintile, and service area. Nearly 8 out of 10 children were unwell at least once within one month preceding the survey. Children aged 6-11 months fell sick more frequently than the other age groups.

*Morbidity: **Near drowning and other injuries***

In Matlab, of the 512 children aged 1-4 years who died in 2005-2014, 301 died from drowning accounting for 59% of the deaths in this age group and 15% of all under-five deaths. While we have national level statistics of under-five deaths due to drowning, no report shows prevalence of near drowning. The survey shows that every 3 out of 100 children have experienced near drowning within one month preceding the survey. This prevalence is highest for children aged 36 months and above (3.9%). Occurrence rates among male and female children are 3.2% and 2.9% respectively. Also, this incident is most frequent in lowest quintile (4.4%) and least in highest quintile (2.1%). Among other type of injuries - fall or cut are more prevalent (12.8% and 5.2% respectively) – listed in table 11.2. Male children sustain any type of injury more frequently than female children – only exception is bone injury for which female children has higher prevalence compared to their counterpart. Within one month before survey, every 2 in 10 children sustained unintentional injury of any kind at least once.

*Treatment seeking behavior and expense: **Diarrhea and Pneumonia***

Among the children who suffered from diarrhea within the specified time frame, 38.4% were treated with oral rehydration solution (ORS), either bought or made at home. This %age varies a little across the two service areas (Table 11.3). The most popular treatment for diarrhea, according to the data, is pill/syrup/capsule with use rate of 46.1%. Their use rate is little higher in the Government service area than in the icddr,b service area. A large proportion of sick children were also treated with rendering enough water (32.9%). Nearly 36% of the children were left untreated

for their diarrheal disease. With regard to treatment seeking behavior (Table 11.4), most were taken to MA/SACMO/Nurse (21.9%). The second frequent place for seeking treatment is unqualified practitioners (16.9%). Over 50% of the sick children were treated at home rather than taken to any type of providers.

Table 11.4 depicts that a majority of the children showing pneumonia symptoms were not taken to provider (41.6%) at all. Unqualified practitioners are the first choice as a care giver to the parents of these sick children (24.7%). Service area wise variation in the %age distributions are also noticed from the table 11.4.

In terms of cost, mean and median of overall treatment cost for diarrhoea are highest for private practitioners and lowest for unqualified practitioners (Table 11.5). Provider's fee and transport are the major source of these expenses. For pneumonia, treatment from private providers is most expensive. Median wise unqualified doctors are least expensive, however mean wise their treatment cost a lot (over 2000 tk.). This is mainly due to one particular observation in which medicine cost was shown as 12000 tk.

Table 11.3: Percentage distribution of different treatments given to children suffering from diarrhoea

Type of treatment	icddr,b area (n = 191)	Government area (n = 234)	Total (n=425)
Packet ORS	35.1	35.5	35.3
Recommended home fluids (RHF)	6.3	4.3	5.2
Either ORS or RHF	37.7	38.9	38.4
Flatten rice water/rice gruel/homemade food	7.3	2.6	4.7
Coconut water	4.2	10.7	7.8
Water	29.8	35.5	32.9
Intra-venous saline	0.0	0.4	0.2
Pill/ capsule/syrup	39.3	51.7	46.1
Zinc tablet	6.8	7.3	7.1
Herbal medicine	4.2	7.7	6.1
Homeopathy	2.6	0.9	1.6
Others	4.7	3.4	4.0
Not given any of the mentioned treatments	41.4	32.5	36.5

Table 11.4: Percentage distribution of different health care facilities/providers to who treated sick children

Type of facility /provider	Diarrhea			Pneumonia		
	icddr,b area (n = 191)	Government area (n = 234)	Overall (n=425)	icddr,b area (n = 57)	Government area (n = 32)	Overall (n=89)
Government health facilities	0.5	4.3	2.6	0.0	12.5	4.5
icddr,b / NGO facility	0.5	3.4	2.1	19.3	0.0	12.4
Private care givers	2.1	3.0	2.6	5.3	9.4	6.7
MA/SACMO/Nurse	16.2	26.5	21.9	7.0	15.6	10.1
Unqualified practitioners	18.3	15.8	16.9	22.8	28.1	24.7
Treated at home	62.3	47.0	53.9	45.6	34.4	41.6

Table 11.5: Median (min,max) cost for treatment by type of facilities/providers

Type of facility /provider	Provider's fee	Diagnostic	Medicine/ ORS	Transport	Snacks/ other	Total expense	Mean of overall expense	Number
Diarrhea								
Government health facilities	140 (0,600)	0 (0,300)	0 (0,0)	30 (0,150)	0 (0,200)	190 (0,855)	284.1	11
icddr,b / NGO facility	100 (0,1000)	0 (0,900)	0 (0,0)	15 (0,1500)	0 (0,0)	120 (60,3900)	638.2	9
Private care givers	200 (100,2500)	200 (0,500)	0 (0,3000)	200 (80,2000)	0 (0,250)	1000 (280,8000)	1484.1	11
MA/SACMO/Nurse	100 (5,1000)	0 (0,500)	0 (0,0)	0 (0,200)	0 (0,50)	130 (5,1410)	192.5	93
Unqualified practitioners	100 (0,500)	0 (0,200)	0 (0,0)	0 (0,400)	0 (0,100)	100 (0,900)	158.5	72
Pneumonia								
Government health facilities	590 (130,2000)	200 (5,700)	0 (0,1500)	20 (0,450)	0 (0,200)	1315 (175,3800)	1651.3	4
icddr,b / NGO facility	50 (0,960)	0 (0,500)	0 (0,0)	140 (0,600)	0 (0,200)	370 (50,1600)	534.5	11
Private care givers	300 (200,1500)	175 (0,500)	0 (0,2500)	175 (0,5000)	25 (0,250)	1950 (350,6850)	2516.7	6
MA/SACMO/Nurse	500 (200,2000)	0 (0,700)	0 (0,0)	40 (0,1000)	0 (0,300)	500 (200,4000)	928.3	9
Unqualified practitioners	290 (20,1000)	0 (0,1000)	0 (0,12000)	55 (0,4000)	0 (0,7000)	355 (20,3400)	2156.1	22

Note: cost calculated in BDT

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APPENDIX A

Appendix A-1a Mid-year population in icddr,b service area by age, sex and block, 2016

Age	Block A			Block B			Block C			Block D		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	40553	18549	22004	34429	15792	18637	25424	11892	13532	22858	10517	12341
Under 1	905	468	437	894	439	455	586	323	263	471	254	217
1 - 4	3629	1857	1772	2980	1478	1502	2171	1100	1071	1844	926	918
1	928	485	443	755	377	378	556	283	273	436	228	208
2	889	458	431	746	371	375	528	272	256	437	214	223
3	844	428	416	724	352	372	557	266	291	461	229	232
4	968	486	482	755	378	377	530	279	251	510	255	255
5 - 9	4312	2210	2102	3595	1885	1710	2547	1270	1277	2216	1102	1114
10-14	4288	2093	2195	3696	1808	1888	2541	1270	1271	2431	1190	1241
15-19	3502	1571	1931	3172	1431	1741	2178	1054	1124	1989	956	1033
20-24	2853	996	1857	2462	948	1514	1804	725	1079	1521	617	904
25-29	2866	1038	1828	2393	952	1441	1769	687	1082	1438	547	891
30-34	2760	1066	1694	2225	951	1274	1698	710	988	1392	517	875
35-39	2645	1173	1472	2094	899	1195	1597	752	845	1417	622	795
40-44	2409	1094	1315	1905	818	1087	1455	650	805	1323	578	745
45-49	2379	1087	1292	1909	838	1071	1512	629	883	1393	609	784
50-54	2342	1070	1272	1970	882	1088	1515	719	796	1487	687	800
55-59	1895	989	906	1625	833	792	1325	685	640	1295	667	628
60-64	1219	618	601	1117	555	562	881	434	447	873	451	422
65-69	927	434	493	837	398	439	649	305	344	600	264	336
70-74	784	350	434	680	254	426	577	262	315	538	237	301
75-79	429	221	208	440	193	247	319	154	165	327	136	191
80-84	243	126	117	258	136	122	201	107	94	196	106	90
85+	166	88	78	177	94	83	99	56	43	107	51	56

Appendix A-1b: Mid-year population in Government service area by age, sex and block, 2016

Age	Block E			Block F			Block G		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	41089	18826	22263	37281	17127	20154	35485	16126	19359
Under 1	883	427	456	811	375	436	751	394	357
1 - 4	3506	1777	1729	3083	1570	1513	3076	1618	1458
1	891	463	428	775	389	386	866	465	401
2	893	453	440	795	424	371	728	383	345
3	833	420	413	732	359	373	728	389	339
4	889	441	448	781	398	383	754	381	373
5 - 9	4365	2178	2187	3764	1889	1875	3678	1793	1885
10-14	4545	2253	2292	3847	1910	1937	3876	1925	1951
15-19	3858	1868	1990	3529	1724	1805	3378	1561	1817
20-24	2777	1053	1724	2641	1076	1565	2346	885	1461
25-29	2670	1025	1645	2628	1038	1590	2494	951	1543
30-34	2616	1045	1571	2363	987	1376	2163	859	1304
35-39	2486	1058	1428	2261	968	1293	2187	942	1245
40-44	2175	906	1269	1922	834	1088	1821	783	1038
45-49	2419	1084	1335	2141	910	1231	1995	842	1153
50-54	2372	1107	1265	2155	912	1243	2007	917	1090
55-59	2077	1024	1053	1953	998	955	1813	880	933
60-64	1406	708	698	1298	674	624	1206	552	654
65-69	1090	487	603	945	452	493	937	433	504
70-74	887	367	520	838	351	487	834	346	488
75-79	521	242	279	560	231	329	497	228	269
80-84	306	156	150	338	137	201	284	140	144
85+	130	61	69	204	91	113	142	77	65

Appendix A-2a Deaths in icddr,b service area by age, sex and block, 2016

Age	BLOCK -A			BLOCK- B			BLOCK- C			BLOCK- D		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	228	121	107	219	119	100	183	101	82	193	99	94
Under 1 year	22	13	9	20	12	8	10	8	2	10	8	2
< 7 days	11	6	5	15	8	7	7	5	2	6	4	2
7 -29 days	3	1	2	1	1	0	1	1	0	3	3	0
1- 5 months	4	3	1	3	3	0	2	2	0	1	1	0
6-11 months	4	3	1	1	0	1	0	0	0	0	0	0
1 - 4 years	8	4	4	8	5	3	7	5	2	4	3	1
1	2	1	1	8	5	3	2	1	1	3	2	1
2	2	1	1	0	0	0	5	4	1	1	1	0
3	2	2	0	0	0	0	0	0	0	0	0	0
4	2	0	2	0	0	0	0	0	0	0	0	0
5 - 9	3	3	0	0	0	0	1	0	1	0	0	0
10-14	1	0	1	2	0	2	2	1	1	2	1	1
15-19	2	1	1	2	2	0	3	0	3	0	0	0
20-24	3	1	2	3	1	2	6	3	3	0	0	0
25-29	5	4	1	2	1	1	1	0	1	2	1	1
30-34	0	0	0	1	1	0	1	1	0	0	0	0
35-39	5	2	3	1	1	0	3	1	2	4	0	4
40-44	8	6	2	4	2	2	5	2	3	6	4	2
45-49	4	2	2	6	5	1	6	3	3	7	2	5
50-54	10	4	6	12	9	3	12	7	5	7	2	5
55-59	28	18	10	11	9	2	14	9	5	19	9	10
60-64	10	8	2	17	10	7	11	11	0	16	8	8
65-69	15	6	9	22	11	11	17	11	6	15	11	4
70-74	31	15	16	21	9	12	23	12	11	26	14	12
75-79	24	13	11	32	13	19	18	9	9	28	13	15
80-84	27	9	18	33	15	18	19	6	13	27	12	15
85+	22	12	10	22	13	9	24	12	12	20	11	9

Appendix A-2b Deaths in Government service area by age, sex and block, 2016

Age	BLOCK -E			BLOCK -F			BLOCK -G		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	300	155	145	230	111	119	251	135	116
Under 1 year	26	15	11	26	17	9	26	17	9
< 7days	19	11	8	21	14	7	17	12	5
7 -29 days	3	3	0	2	1	1	6	3	3
1- 5 months	2	0	2	2	2	0	2	1	1
6-11 months	2	1	1	1	0	1	1	1	0
1 - 4 years	10	4	6	5	2	3	7	3	4
1	4	3	1	1	0	1	4	3	1
2	0	0	0	2	1	1	2	0	2
3	3	1	2	1	0	1	0	0	0
4	3	0	3	1	1	0	1	0	1
5 - 9	4	3	1	3	3	0	4	1	3
10-14	1	0	1	5	2	3	3	2	1
15-19	2	0	2	2	0	2	2	1	1
20-24	1	0	1	1	0	1	1	0	1
25-29	3	2	1	3	0	3	3	2	1
30-34	2	0	2	2	2	0	3	2	1
35-39	6	3	3	1	0	1	4	1	3
40-44	0	0	0	3	1	2	4	1	3
45-49	8	2	6	3	2	1	5	1	4
50-54	12	7	5	12	8	4	17	9	8
55-59	20	14	6	8	6	2	21	15	6
60-64	28	19	9	18	10	8	18	11	7
65-69	28	17	11	17	5	12	20	13	7
70-74	46	22	24	27	13	14	32	14	18
75-79	40	21	19	25	11	14	27	14	13
80-84	35	16	19	27	11	16	27	16	11
85+	28	10	18	42	18	24	27	12	15

Appendix A-3 Abridged life table for icddr,b service area by sex, 2016

Age (years)	Male				Female			
	nq _x	l _x	L _x	e0 _x	nq _x	l _x	L _x	e0 _x
0	28.3	100000	97593	70.8	15.5	100000	98687	74.5
1	6.5	97169	96794	71.9	4.6	98455	98188	74.7
2	4.6	96534	96314	71.4	1.6	98002	97926	74.0
3	1.6	96094	96019	70.7	0.0	97850	97850	73.1
4	0.0	95944	95944	69.8	1.5	97850	97778	72.1
5	2.3	95944	479206	68.8	0.8	97706	488351	71.2
10	1.6	95721	478260	63.9	3.8	97628	487287	66.3
15	3.0	95571	477196	59.0	3.4	97258	485524	61.5
20	7.6	95285	474761	54.2	6.5	96925	483169	56.7
25	9.3	94563	470794	49.6	3.8	96293	480622	52.1
30	3.1	93687	467769	45.0	0.0	95927	479633	47.3
35	5.8	93398	465745	40.2	10.4	95926	477332	42.3
40	22.1	92858	459552	35.4	11.3	94929	472165	37.7
45	18.8	90809	450099	31.1	13.6	93854	466331	33.1
50	32.3	89101	438847	26.7	23.8	92581	457821	28.5
55	68.6	86226	417334	22.5	44.6	90382	442560	24.1
60	86.3	80309	385338	18.9	41.0	86353	423548	20.1
65	130.6	73381	344287	15.5	89.2	82810	396765	15.9
70	204.4	63797	287728	12.4	159.7	75426	348539	12.2
75	292.2	50754	217522	9.9	286.4	63383	272610	9.0
80	362.4	35923	147245	7.9	541.9	45231	162004	6.6
85+	1000.0	22904	137899	6.0	1000.0	20720	134681	6.5

Appendix A-4 Abridged life table for Government service area by sex, 2016

Age (years)	Male				Female			
	nq _x	l _x	L _x	e0 _x	nq _x	l _x	L _x	e0 _x
0	39.3	100000	96657	71.1	23.6	100000	97996	74.0
1	4.5	96067	95810	73.0	2.5	97642	97500	74.7
2	0.8	95631	95593	72.3	2.6	97401	97275	73.9
3	0.9	95555	95514	71.4	2.7	97149	97020	73.1
4	0.8	95473	95434	70.5	3.3	96890	96730	72.3
5	6.0	95395	475665	69.5	3.4	96569	482098	71.5
10	3.3	94827	473417	64.9	4.0	96245	480328	66.8
15	1.0	94516	472367	60.1	4.4	95856	478298	62.0
20	0.0	94424	472119	55.2	3.2	95430	476456	57.3
25	6.6	94424	470679	50.2	5.2	95129	474501	52.5
30	6.9	93799	467505	45.5	3.5	94632	472394	47.7
35	6.7	93152	464319	40.8	8.8	94299	469584	42.9
40	4.0	92527	461789	36.0	7.3	93470	465770	38.2
45	8.8	92160	458937	31.2	14.7	92784	460776	33.5
50	40.1	91351	448259	26.4	23.4	91421	452168	29.0
55	58.7	87687	426466	22.4	23.5	89285	441565	24.6
60	98.6	82544	393626	18.7	59.1	87183	423931	20.1
65	120.3	74402	350928	15.4	89.8	82034	392922	16.2
70	207.4	65450	294705	12.2	172.0	74667	342774	12.6
75	282.8	51878	223607	9.7	232.8	61827	274426	9.6
80	397.5	37205	148921	7.5	377.2	47433	192516	6.8
85+	1000.0	22416	128333	5.7	1000.0	29543	128018	4.3

Appendix A-5 Male deaths by cause and age, 2016

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																				
Diarrhoeal	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tuberculosis	13	0	0	0	0	0	0	0	0	0	2	0	1	0	4	3	0	1	1	1
EPI related death	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Meningitis	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hepatitis	12	0	0	0	0	0	0	0	1	0	0	0	3	2	2	1	1	2	0	0
Chicken pox	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
Septicaemia	5	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	2
Respiratory infections	12	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	1
Other communicable	2	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Maternal and neonatal conditions																				
Maternal death	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neonatal condition																				
-Premature and LBW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Birth asphyxia	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Other neonatal	44	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nutritional	3	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Non-communicable diseases																				
Malignant neoplasm																				
-Neoplasm	93	0	0	2	0	0	0	1	0	3	4	7	10	22	16	9	9	5	5	0
-Neoplasm in female organ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Congenital malformation	15	13	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Endocrine disorder																				
-Diabetes	31	0	0	0	0	0	0	0	0	0	0	2	5	4	4	3	2	4	4	3
-Other endocrine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neuro-psychiatric	11	1	1	1	2	1	0	0	1	0	0	0	1	1	1	0	1	0	0	0
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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
-Ischaemic heart disease	134	0	0	0	0	0	0	0	0	2	2	4	8	20	19	22	20	15	13	9
-Stroke	192	1	1	0	2	0	0	0	0	2	3	1	4	19	14	23	29	31	28	34
-Other cardiovascular	43	1	0	0	0	0	2	1	0	0	0	0	3	2	3	4	3	6	7	11
Respiratory disease																				
-COPD	44	0	0	0	0	0	0	0	0	0	0	0	1	2	6	3	12	8	7	5
-Asthma	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
-Other respiratory	6	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	2	1	0
Digestive disease	29	0	0	0	0	0	0	1	1	0	1	2	6	4	1	1	4	6	1	1
Genito-urinary disease																				
-Renal failure	17	0	0	0	0	0	1	1	0	0	0	0	1	1	1	2	3	4	1	2
-Nephritic syndrome	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Other urinary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other non-communicable	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0
Injuries																				
Unintentional injuries																				
-Accident	34	0	1	3	2	2	0	5	1	0	3	0	0	2	0	0	4	1	3	7
-Drowning	22	0	18	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Intentional injuries																				
-Suicide	5	0	0	0	0	1	1	0	2	0	0	0	1	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Fever of unknown origin	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
-Edema of unspecified origin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-sudden infant death	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Other miscellaneous	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown/missing	44	1	1	0	0	0	1	0	0	0	1	0	2	0	5	1	3	9	9	11
Total	841	90	26	10	6	4	5	10	6	8	16	17	46	80	77	74	99	94	85	88
COPD=Chronic Obstructive Pulmonary Disease.																				

COPD=Chronic Obstructive Pulmonary Disease.

Appendix A-6 Female deaths by cause and age, 2016

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																				
Diarrhoeal	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1
Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tuberculosis	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	1	0
EPI related death	0	0	0	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	6	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0	0	1	0
Chicken pox	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
Septicaemia	18	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	4	4	6
Respiratory infections	8	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Other communicable	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maternal and neonatal conditions																				
Maternal death	6	0	0	0	0	1	1	2	0	1	1	0	0	0	0	0	0	0	0	0
Neonatal condition																				
-Premature and LBW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Birth asphyxia	12	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Other neonatal	23	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nutritional																				
	9	0	0	0	0	0	0	0	0	0	0	0	1	0	2	1	0	0	3	2
Non-communicable diseases																				
Malignant neoplasm																				
-Neoplasm	45	0	0	0	0	0	0	0	0	1	2	6	4	6	4	5	8	5	2	2
-Neoplasm in female organ	14	0	0	0	0	0	0	0	0	1	1	1	1	2	3	1	3	0	0	1
Congenital malformation	7	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Endocrine disorder																				
-Diabetes	44	0	0	0	0	0	1	0	0	1	1	3	5	5	2	10	5	7	2	2
-Other endocrine	5	1	1	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
Neuro-psychiatric	9	0	2	0	1	1	1	0	0	0	0	0	0	1	0	1	2	0	0	0
Diseases of circulatory system																				
-Rheumatic heart disease	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
-Hypertensive disease	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
-Ischaemic heart disease	106	0	0	0	0	0	0	3	0	3	2	1	8	7	6	8	19	16	21	12
-Stroke	219	0	0	0	0	0	0	0	0	3	2	4	8	10	11	21	41	40	38	41
-Other cardiovascular	43	0	2	1	1	0	0	0	1	1	2	1	0	2	2	1	6	5	7	11
Respiratory disease																				
-COPD	35	0	0	0	0	0	0	0	0	0	0	0	1	2	2	4	11	6	6	3
-Asthma	4	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	1	0
-Other respiratory	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Digestive disease	15	1	0	0	0	0	0	0	0	2	0	2	0	1	2	0	2	0	1	4
Gentio-urinary disease																				
-Renal failure	14	0	0	0	0	0	1	0	0	0	0	1	1	2	2	1	0	2	3	1
-Nephritic syndrome	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Other urinary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other non-communicable	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Injuries																				
Unintentional injuries																				
-Accident	23	1	1	1	0	1	0	1	0	0	0	1	2	0	0	1	2	2	6	4
-Drowning	16	0	13	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Intentional injuries																				
-Suicide	14	0	0	0	4	5	4	0	0	0	0	0	1	0	0	0	0	0	0	0
-Homicide	2	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous																				
-Senility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Fever of unknown origin	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
-Edema of unspecified origin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Sudden infant death	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Other miscellaneous	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown/missing	48	1	1	0	1	0	2	1	1	1	1	1	3	2	2	0	5	10	10	6
Total	763	50	23	5	10	9	10	9	3	16	14	22	36	41	41	60	107	100	110	97
COPD=Chronic obstructive pulmonary disease.																				

COPD=Chronic obstructive pulmonary disease.

Appendix A-7 Male deaths by cause, age and area, 2016

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																
Diarrhoeal	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tuberculosis	6	7	0	0	0	0	0	0	1	1	2	3	2	3	1	0
EPI related death	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Meningitis	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Hepatitis	6	6	0	0	0	0	0	0	0	1	2	5	4	0	0	0
Chicken pox	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
Septicaemia	2	3	0	0	0	0	0	0	0	0	0	1	1	1	1	1
Respiratory infections	8	4	3	2	2	0	1	0	0	0	0	0	1	2	1	0
Other communicable	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Maternal and neonatal conditions																
Maternal death	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neonatal condition																
-premature and LBW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-birth asphyxia	8	13	8	13	0	0	0	0	0	0	0	0	0	0	0	0
-other neonatal	18	26	18	26	0	0	0	0	0	0	0	0	0	0	0	0
Nutritional	0	3	0	1	0	0	0	1	0	0	0	0	0	1	0	0
Non-communicable diseases																
Malignant neoplasm																
-neoplasm	54	39	0	0	0	0	1	1	6	2	30	25	17	11	0	0
-neoplasm in female																
organ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Congenital malformation	9	6	7	6	2	0	0	0	0	0	0	0	0	0	0	0
Endocrine disorder																
-diabetes	19	12	0	0	0	0	0	0	0	0	10	5	7	6	2	1
-other endocrine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neuro-psychiatric	8	3	1	0	0	1	2	1	1	1	3	0	1	0	0	0
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	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
-ischaemic heart disease	73	61	0	0	0	0	0	0	3	1	26	25	37	33	7	2
-stroke	99	93	0	1	0	1	1	1	3	2	19	19	54	57	22	12
-other cardiovascular	20	23	1	0	0	0	0	0	3	0	2	6	8	12	6	5
Respiratory disease																
-COPD	27	17	0	0	0	0	0	0	0	0	7	2	17	13	3	2
-Asthma	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
-Other respiratory	1	5	0	0	0	0	0	0	1	0	0	1	0	4	0	0
Digestive disease	14	15	0	0	0	0	0	0	1	2	8	5	5	7	0	1
Gentio-urinary disease																
-Renal failure	10	7	0	0	0	0	0	0	2	0	1	2	6	4	1	1
-Nephritic syndrome	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Other urinary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other non-communicable	1	2	0	0	0	0	0	0	0	0	0	0	1	2	0	0
Injuries																
Unintentional injuries																
-accident	15	19	0	0	1	0	0	5	8	3	1	1	4	4	1	6
-drowning	14	8	0	0	12	6	0	2	0	0	1	0	1	0	0	0
Intentional injuries																
-suicide	4	1	0	0	0	0	0	0	3	1	1	0	0	0	0	0
-homicide	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous																
-senility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-fever of unknown origin	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
-edema of unspecified																
origin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-sudden infant death	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-other miscellaneous	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown/missing	18	26	1	0	0	1	0	0	2	0	3	4	9	13	3	8
TOTAL	440	401	41	49	17	9	5	11	34	15	116	104	179	173	48	40

COPD=Chronic obstructive pulmonary disease.

Appendix A-8 Female deaths by cause, age, and area, 2016

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																
Diarrhoeal	2	2	0	0	0	0	0	0	0	0	0	0	2	1	0	1
Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tuberculosis	4	1	0	0	0	0	0	0	0	0	0	0	4	1	0	0
EPI related death	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
Hepatitis	5	1	0	0	0	0	0	0	1	0	2	1	2	0	0	0
Chicken pox	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
Septicaemia	9	9	0	1	0	0	0	1	0	0	0	0	4	6	5	1
Respiratory infections	2	6	0	3	0	1	1	1	0	0	0	0	1	1	0	0
Other communicable	2	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Maternal and neonatal conditions																
Maternal death	2	4	0	0	0	0	0	0	2	4	0	0	0	0	0	0
Neonatal condition																
-premature and LBW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-birth asphyxia	4	8	4	8	0	0	0	0	0	0	0	0	0	0	0	0
-other neonatal	11	12	11	12	0	0	0	0	0	0	0	0	0	0	0	0
Nutritional	3	6	0	0	0	0	0	0	0	0	1	2	1	3	1	1
Non-communicable diseases																
Malignant neoplasm																
-neoplasm	24	21	0	0	0	0	0	0	3	0	9	11	12	8	0	2
-neoplasm in female organ	5	9	0	0	0	0	0	0	1	1	3	4	1	3	0	1
Congenital malformation	3	4	3	3	0	1	0	0	0	0	0	0	0	0	0	0
Endocrine disorder																
-diabetes	26	18	0	0	0	0	0	0	2	1	9	6	14	10	1	1
-other endocrine	1	4	0	1	0	1	1	0	0	1	0	0	0	1	0	0
Neuro-psychiatric	5	4	0	0	1	1	1	0	2	0	1	0	0	3	0	0
Diseases of circulatory system																
-rheumatic heart disease	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
-hypertensive disease	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0
-ischaemic heart disease	66	40	0	0	0	0	0	0	5	3	15	7	40	24	6	6
-stroke	109	110	0	0	0	0	0	0	2	3	18	15	71	69	18	23
-other cardiovascular	20	23	0	0	1	1	0	2	2	2	4	1	8	11	5	6
Respiratory disease																
-COPD	21	14	0	0	0	0	0	0	0	0	3	2	17	10	1	2
-asthma	1	3	0	0	0	0	0	0	0	1	0	2	1	0	0	0
-other respiratory	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Digestive disease	8	7	0	1	0	0	0	0	1	1	4	1	2	1	1	3
Gentio-urinary disease																
-renal failure	6	8	0	0	0	0	0	0	1	0	2	4	3	3	0	1
-Nephritic syndrome	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-other urinary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other non-communicable	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Injuries																
Unintentional injuries																
-accident	8	15	1	0	1	0	0	1	1	1	0	3	4	7	1	3
-drowning	7	9	0	0	5	8	0	1	2	0	0	0	0	0	0	0
Intentional injuries																
-suicide	7	7	0	0	0	0	2	2	5	4	0	1	0	0	0	0
-homicide	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Miscellaneous																
-senility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-fever of unknown origin	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
-edema of unspecified origin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-sudden infant death	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
-other miscellaneous	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown/missing	17	31	1	0	1	0	0	1	3	3	3	5	9	16	0	6
Total	383	380	21	29	10	13	6	9	33	28	74	66	199	178	40	57
COPD=Chronic obstructive pulmonary disease.																

Appendix A-9 Age-specific fertility rate and indices for icddr,b service area by block, 2016

Age (years)	Block A		Block B		Block C		Block D	
	Births	Rate	Births	Rate	Births	Rate	Births	Rate
All ages	910	79.9	862	92.5	577	84.8	458	76.0
15-19*	147	76.1	177	101.7	91	81.0	62	60.0
20-24	306	164.8	266	175.7	186	172.4	145	160.4
25-29	235	128.6	233	161.7	154	142.3	124	139.2
30-34	150	88.5	124	97.3	104	105.3	85	97.1
35-39	55	37.4	54	45.2	38	45.0	34	42.8
40-44	17	12.9	8	7.4	3	3.7	8	10.7
45-49**	0	0.0	0	0.0	1	1.1	0	0.0
Total fertility rate	2542		2945		2754		2551	
General fertility rate	80		92		85		76	
Gross reproduction rate	1271		1438		1250		1231	
*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, 2016

Age (years)	Total women	Total births	Live birth order									
			1	2	3	4	5	6	7	8	9	10+
Both areas												
<15	12775	7	7	0	0	0	0	0	0	0	0	0
15-19	11441	888	821	60	7	0	0	0	0	0	0	0
20-24	10104	1663	923	668	64	4	3	0	0	0	1	0
25-29	10020	1403	233	737	375	55	1	1	0	0	0	1
30-34	9082	880	48	223	402	171	27	7	1	0	0	1
35-39	8273	366	13	54	144	110	33	6	4	1	1	0
40-44	7347	69	6	6	17	21	9	6	0	2	1	1
45-49	7749	7	1	0	1	2	2	1	0	0	0	0
Total		5283	2052	1748	1010	363	75	21	5	3	3	3
icddr,b service area												
<15	6595	7	7	0	0	0	0	0	0	0	0	0
15-19	5829	470	440	26	4	0	0	0	0	0	0	0
20-24	5354	903	487	385	27	0	3	0	0	0	1	0
25-29	5242	746	126	404	191	24	1	0	0	0	0	0
30-34	4831	463	29	125	210	81	13	4	0	0	0	1
35-39	4307	181	4	30	73	57	15	2	0	0	0	0
40-44	3952	36	3	2	9	12	6	3	0	1	0	0
45-49	4030	1	0	0	0	0	1	0	0	0	0	0
Total		2807	1096	972	514	174	39	9	0	1	1	1
Government service area												
<15	6180	0	0	0	0	0	0	0	0	0	0	0
15-19	5612	418	381	34	3	0	0	0	0	0	0	0
20-24	4750	760	436	283	37	4	0	0	0	0	0	0
25-29	4778	657	107	333	184	31	0	1	0	0	0	1
30-34	4251	417	19	98	192	90	14	3	1	0	0	0
35-39	3966	185	9	24	71	53	18	4	4	1	1	0
40-44	3395	33	3	4	8	9	3	3	0	1	1	1
45-49	3719	6	1	0	1	2	1	1	0	0	0	0
Total		2476	956	776	496	189	36	12	5	2	2	2

Appendix A-11 Age birth order-specific fertility rates by area, 2016

Age (years)	Total	Live-birth order									
		1	2	3	4	5	6	7	8	9	10+
Both areas											
<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	0.0776	0.0718	0.0052	0.0006	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20-24	0.1646	0.0913	0.0661	0.0063	0.0004	0.0003	0.0000	0.0000	0.0000	0.0001	0.0000
25-29	0.1400	0.0233	0.0736	0.0374	0.0055	0.0001	0.0001	0.0000	0.0000	0.0000	0.0001
30-34	0.0969	0.0053	0.0246	0.0443	0.0188	0.0030	0.0008	0.0001	0.0000	0.0000	0.0001
35-39	0.0442	0.0016	0.0065	0.0174	0.0133	0.0040	0.0007	0.0005	0.0001	0.0001	0.0000
40-44	0.0094	0.0008	0.0008	0.0023	0.0029	0.0012	0.0008	0.0000	0.0003	0.0001	0.0001
45-49	0.0009	0.0001	0.0000	0.0001	0.0003	0.0003	0.0001	0.0000	0.0000	0.0000	0.0000
Total	2.6710	0.9736	0.8840	0.5424	0.2056	0.0442	0.0127	0.0030	0.0020	0.0018	0.0017
icddr,b service area											
<15	0.0011	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15-19	0.0806	0.0755	0.0045	0.0007	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20-24	0.1687	0.0910	0.0719	0.0050	0.0000	0.0006	0.0000	0.0000	0.0000	0.0002	0.0000
25-29	0.1423	0.0240	0.0771	0.0364	0.0046	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000
30-34	0.0958	0.0060	0.0259	0.0435	0.0168	0.0027	0.0008	0.0000	0.0000	0.0000	0.0002
35-39	0.0420	0.0009	0.0070	0.0169	0.0132	0.0035	0.0005	0.0000	0.0000	0.0000	0.0000
40-44	0.0091	0.0008	0.0005	0.0023	0.0030	0.0015	0.0008	0.0000	0.0003	0.0000	0.0000
45-49	0.0002	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000
Total	2.6994	0.9962	0.9339	0.5243	0.1881	0.0435	0.0103	0.0000	0.0013	0.0009	0.0010
Government service area											
<15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15-19	0.0745	0.0679	0.0061	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20-24	0.1600	0.0918	0.0596	0.0078	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
25-29	0.1375	0.0224	0.0697	0.0385	0.0065	0.0000	0.0002	0.0000	0.0000	0.0000	0.0002
30-34	0.0981	0.0045	0.0231	0.0452	0.0212	0.0033	0.0007	0.0002	0.0000	0.0000	0.0000
35-39	0.0466	0.0023	0.0061	0.0179	0.0134	0.0045	0.0010	0.0010	0.0003	0.0003	0.0000
40-44	0.0097	0.0009	0.0012	0.0024	0.0027	0.0009	0.0009	0.0000	0.0003	0.0003	0.0003
45-49	0.0016	0.0003	0.0000	0.0003	0.0005	0.0003	0.0003	0.0000	0.0000	0.0000	0.0000
Total	2.6403	0.9498	0.8281	0.5626	0.2253	0.0449	0.0154	0.0062	0.0027	0.0027	0.0025

Appendix A-12. Marriages and divorces by month, 2016

Month	Marriage		Divorce	
	No.	Percentage	No.	Percentage
January	317	9.4	37	9.0
February	274	8.2	25	6.1
March	327	9.7	32	7.8
April	227	6.8	18	4.4
May	263	7.8	27	6.6
June	148	4.4	32	7.8
July	345	10.3	47	11.5
August	253	7.5	37	9.0
September	383	11.4	45	11.0
October	304	9.0	41	10.0
November	260	7.7	29	7.1
December	259	7.7	39	9.5
Total	3360	100.0	409	100.0

Appendix A-13. In- and out-migrations by age and sex, 2016

Age (years)	In-migration			Out-migration		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	14189	6690	7499	14736	8005	6731
0-4	2154	1113	1041	1607	814	793
5 - 9	1282	613	669	1058	581	477
10-14	899	444	455	1092	668	424
15-19	1830	411	1419	2699	1321	1378
20-24	2039	653	1386	2853	1429	1424
25-29	1834	892	942	1734	946	788
30-34	1362	831	531	1156	701	455
35-39	873	596	277	787	551	236
40-44	518	371	147	479	335	144
45-49	446	280	166	337	225	112
50-54	278	168	110	272	171	101
55-59	226	147	79	196	112	84
60-64	145	81	64	132	62	70
65+	303	90	213	334	89	245

Appendix A-14. In-migrations by age, sex, and area, 2016

Age (years)	icddr,b service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	7043	3291	3752	7146	3399	3747
0-4	1077	568	509	1077	545	532
5 - 9	636	305	331	646	308	338
10-14	444	211	233	455	233	222
15-19	945	204	741	885	207	678
20-24	990	304	686	1049	349	700
25-29	889	420	469	945	472	473
30-34	673	408	265	689	423	266
35-39	438	293	145	435	303	132
40-44	276	202	74	242	169	73
45-49	228	142	86	218	138	80
50-54	138	86	52	140	82	58
55-59	105	69	36	121	78	43
60-64	67	38	29	78	43	35
65+	137	41	96	166	49	117

Appendix A-15. Out-migrations by age, sex, and area, 2016

Age (years)	icddr,b service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	7080	3768	3312	7656	4237	3419
0-4	821	426	395	786	388	398
5 - 9	520	291	229	538	290	248
10-14	557	338	219	535	330	205
15-19	1268	574	694	1431	747	684
20-24	1347	637	710	1506	792	714
25-29	784	405	379	950	541	409
30-34	542	330	212	614	371	243
35-39	382	264	118	405	287	118
40-44	254	176	78	225	159	66
45-49	169	114	55	168	111	57
50-54	144	87	57	128	84	44
55-59	103	64	39	93	48	45
60-64	60	30	30	72	32	40
65+	129	32	97	205	57	148

Appendix A-16. Male out-migration by cause of movement and age, 2016

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	8005	814	581	668	1321	1429	946	701	551	335	225	171	112	62	89
Work/economic/educational															
-acquired/seeking job	4568	0	0	130	801	1085	801	595	464	277	168	122	81	24	20
-job completion/retirement	15	0	0	0	1	3	1	4	2	0	2	0	1	1	0
-to acquire education	1138	13	179	295	369	215	45	4	4	6	4	2	2	0	0
-educ. completed/interrupted	3	0	0	1	1	1	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	273	0	0	1	5	13	42	52	39	28	30	20	13	14	16
-river erosion	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Marriage / familial															
-marriage	0	0	0	0	0	0	0	0	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
-move or join with spouse/parents	1669	795	394	224	115	47	15	14	13	7	6	7	6	9	17
- move or join with other relatives	22	2	2	5	5	1	2	1	0	0	0	1	0	0	3
-adoption	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
-family friction/breakdown	92	1	4	1	7	22	13	13	12	2	5	3	1	2	6
-health or old age care	29	2	0	0	0	1	0	1	0	0	0	2	1	4	18
Legal problems	61	0	0	0	2	5	10	12	6	10	6	6	2	1	1
Other and not stated															
-others n.e.c*	130	0	2	11	15	36	17	5	11	5	4	7	4	6	7
-unknown or not stated	3	0	0	0	0	0	0	0	0	0	0	1	1	0	1
*n.e.c=Not elsewhere classified															

Appendix A-17. Female out-migration by cause of movement and age, 2016

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	6731	793	477	424	1378	1424	788	455	236	144	112	101	84	70	245
Work/economic/educational															
-acquired/seeking job	444	0	0	22	93	106	87	57	31	19	16	4	5	2	2
-job completion/retirement	2	0	0	0	0	0	0	0	1	1	0	0	0	0	0
-to acquire education	507	6	109	124	145	70	19	13	9	7	4	0	1	0	0
-educ. completed/interrupted	4	0	0	0	2	0	1	1	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	543	0	0	6	71	148	100	85	38	25	17	10	8	11	24
-river erosion	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marriage / familial															
-marriage	1051	0	0	35	510	348	104	29	17	5	2	1	0	0	0
-separation/divorce/widow	35	0	0	2	9	11	6	4	2	1	0	0	0	0	0
-move or join with spouse/parents	3258	774	360	211	343	520	374	224	109	68	61	55	47	31	81
- move or join with other relatives	39	1	3	0	10	5	1	2	0	1	1	4	2	1	8
-adoption	8	7	1	0	0	0	0	0	0	0	0	0	0	0	0
-family friction/breakdown	272	1	2	7	61	88	50	20	10	4	5	5	5	3	11
-health or old age care	247	0	0	1	35	55	17	3	0	3	2	9	8	14	100
Legal problems	13	0	0	0	1	3	2	4	0	2	0	1	0	0	0
Other and not stated															
-others n.e.c*	304	4	2	16	97	70	27	13	18	7	3	12	8	8	19
-unknown or not stated	4	0	0	0	1	0	0	0	1	1	1	0	0	0	0
*n.e.c=Not elsewhere classified															

Appendix A-18 Male in-migration by cause of movement and age, 2016

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	6690	1113	613	444	411	653	892	831	596	371	280	168	147	81	90
Work/economic/educational															
-acquired/seeking job	1268	0	0	10	80	203	279	249	191	100	76	38	29	9	4
-job completion/retirement	719	0	0	1	7	71	139	163	107	76	57	26	31	26	15
-to acquire education/training	335	13	85	128	62	25	8	3	4	4	1	1	1	0	0
-educ. completed/interrupted	13	0	0	3	3	5	2	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	1409	0	0	5	53	171	307	270	198	132	101	58	53	29	32
-river erosion	2	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Marriage / familial															
-marriage	0	0	0	0	0	0	0	0	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
-move or join with spouse/parents	2257	1070	507	274	123	76	65	59	27	14	7	12	10	3	10
- move or join with other relatives	41	11	8	1	5	1	5	4	2	0	1	0	3	0	0
-adoption	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0
-family friction/breakdown	96	1	4	2	9	19	16	18	11	4	6	4	1	0	1
-health or old age care	151	3	0	2	8	19	17	16	12	15	11	15	12	6	15
Legal problems	87	0	0	0	3	8	15	16	20	11	10	3	1	0	0
Other and not stated															
-others n.e.c*	286	5	8	18	57	51	39	30	21	14	9	10	4	8	12
-unknown or not stated	17	1	1	0	1	4	0	3	2	1	0	1	2	0	1
*n.e.c=Not elsewhere classified															

Appendix A-19 Female in-migration by cause of movement and age, 2016

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	7499	1041	669	455	1419	1386	942	531	277	147	166	110	79	64	213
Work/economic/educational															
-acquired/seeking job	200	0	0	7	11	35	52	31	22	6	16	13	5	2	0
-job completion/retirement	44	0	0	1	6	8	4	5	8	5	4	1	0	0	2
-to acquire education	361	15	103	117	53	22	26	15	9	1	0	0	0	0	0
-educ. completed/interrupted	4	0	1	0	0	2	0	0	1	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	753	0	0	9	109	202	129	87	40	32	31	32	21	16	45
-river erosion	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marriage / familial															
-marriage	788	0	0	35	488	185	49	14	9	4	3	1	0	0	0
-separation/divorce/widow	101	0	0	0	30	33	18	5	3	2	3	1	3	1	2
-move or join with spouse/parents	4361	995	552	268	576	691	494	286	142	81	96	51	37	31	61
- move or join with other relatives	50	9	5	3	11	6	1	2	1	0	1	2	1	2	6
-adoption	15	14	1	0	0	0	0	0	0	0	0	0	0	0	0
-family friction/breakdown	291	0	1	0	51	80	78	36	24	8	5	2	4	2	0
-health or old age care	291	0	1	2	51	80	51	22	10	3	4	2	3	4	58
Legal problems	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Other and not stated															
-others n.e.c*	217	7	3	11	29	39	38	25	6	5	2	5	5	6	36
-unknown or not stated	22	1	2	2	4	3	2	3	2	0	0	0	0	0	3
*n.e.c=Not elsewhere classified															

Appendix A-20 Male migration by destination or origin, 2016

Destination/ Origin	Rural/urban	Out-migration						In-migration					
		Age (years)					Total	Age (years)					Total
		0-14	15-24	25-34	35-44	45+		0-14	15-24	25-34	35-44	45+	
Dhaka	Rural	30	27	10	8	10	85	36	9	20	6	7	78
	Urban	973	1595	674	352	366	3960	890	625	818	392	354	3079
Chittagong	Rural	725	166	113	92	79	1175	937	176	258	151	103	1625
	Urban	268	256	134	82	74	814	212	112	128	104	101	657
Sylhet	Rural	1	0	2	1	3	7	4	3	2	0	2	11
	Urban	8	20	12	5	8	53	17	8	13	5	16	59
Khulna	Rural	7	2	1	1	7	18	10	1	9	0	1	21
	Urban	4	6	3	4	4	21	3	4	1	0	3	11
Rajshahi	Rural	4	1	4	1	0	10	6	2	5	1	0	14
	Urban	3	3	1	1	1	9	8	0	3	2	3	16
Rangpur	Rural	3	0	1	0	0	4	7	0	4	0	0	11
	Urban	2	1	1	1	1	6	5	0	1	0	1	7
Barisal	Rural	10	3	4	1	3	21	21	4	10	5	1	41
	Urban	3	4	3	2	2	14	3	5	4	1	0	13
India		4	10	5	2	3	24	2	2	2	3	2	11
Asia		3	174	162	72	21	432	1	40	158	90	47	336
Middle-east		9	457	485	242	67	1260	7	72	264	191	115	649
Others		6	25	32	19	10	92	1	1	23	16	10	51
Unknown		0	0	0	0	0	0	0	0	0	0	0	0
Total		2063	2750	1647	886	659	8005	2170	1064	1723	967	766	6690

Appendix A-21 Female migration by destination or origin, 2016

Destination/ Origin	Rural/urban	Out-migration						In-migration					
		Age (years)					Total	Age (years)					Total
		0-14	15-24	25-34	35-44	45+		0-14	15-24	25-34	35-44	45+	
Dhaka	Rural	33	50	25	9	7	124	52	62	28	5	13	160
	Urban	742	1070	524	185	361	2882	836	712	605	208	358	2719
Chittagong	Rural	653	1329	472	96	125	2675	973	1706	597	127	159	3562
	Urban	203	261	156	59	87	766	227	228	163	58	80	756
Sylhet	Rural	2	5	1	0	0	8	5	10	3	0	2	20
	Urban	12	11	7	1	6	37	23	16	15	7	4	65
Khulna	Rural	9	7	5	2	2	25	6	15	6	0	2	29
	Urban	3	4	1	1	6	15	5	3	2	1	2	13
Rajshahi	Rural	1	9	3	2	1	16	5	6	5	2	0	18
	Urban	4	3	1	0	0	8	3	4	3	1	4	15
Rangpur	Rural	1	3	3	0	0	7	2	5	5	0	0	12
	Urban	0	4	1	0	1	6	1	2	2	0	0	5
Barisal	Rural	11	9	8	1	0	29	14	16	13	4	1	48
	Urban	7	5	4	1	1	18	3	5	2	0	1	11
India		4	7	2	4	5	22	2	1	1	1	3	8
Asia		1	5	5	0	0	11	0	4	1	2	0	7
Middle-east		6	17	24	14	7	68	2	10	16	7	2	37
Other		2	3	1	5	3	14	6	0	6	1	1	14
Unknown		0	0	0	0	0	0	0	0	0	0	0	0
Total		1694	2802	1243	380	612	6731	2165	2805	1473	424	632	7499

APPENDIX B

POPULATION, BIRTHS, AND DEATHS BY VILLAGE, 2016

Village code	Village name	Population (mid-year)	Live births	Deaths	Birth rate	Death rate
icddr,b service area						
D00	Charmukundi	2895	67	22	23.1	7.6
W00	Kaladi	9051	174	38	19.2	4.2
V10	Dhakirgaon	2139	41	13	19.2	6.1
V11	Nabakalash	3207	84	15	26.2	4.7
V31	Dighaldi	10175	244	59	24.0	5.8
V32	Mobarakdi	3876	91	27	23.5	7.0
V60	Suvankardi	986	19	2	19.3	2.0
V61	Munsabdi	742	16	3	21.6	4.0
V62	Shilmondi	1016	14	7	13.8	6.9
V72	Upadi	6466	160	42	24.7	6.5
Block A Total		40553	910	228	22.4	5.6
H00	Lamchari	1189	25	7	21.0	5.9
V12	Bhangerpar	896	19	4	21.2	4.5
V13	Baburpara	756	11	6	14.6	7.9
V19	Lakshmipur	2880	75	22	26.0	7.6
V20	Dagorpur	1527	34	7	22.3	4.6
V21	Khadergaon	576	15	2	26.0	3.5
V22	Beloti	612	6	6	9.8	9.8
V23	Baluchar	705	16	6	22.7	8.5
V24	Machuakhal	3140	73	15	23.2	4.8
V26	Narayanpur	3878	108	24	27.8	6.2
V56	Pailpara	1716	39	14	22.7	8.2
V59	Doshpara	2510	67	9	26.7	3.6
V82	Dhanarpar	1877	40	16	21.3	8.5
V83	Padmapal	617	8	1	13.0	1.6
V85	Bhanurpara	549	14	3	25.5	5.5
V87	Hurmaisha	742	19	5	25.6	6.7
VBB	Nagda	5068	148	26	29.2	5.1
VBC	Naogaon	5191	145	46	27.9	8.9
Block B Total		34429	862	219	25.0	6.4
K00	Shahpur	1047	28	7	26.7	6.7
L00	Tatkhana	562	14	3	24.9	5.3
M00	Char Nayergaon	182	4	1	22.0	5.5
N00	Aswinpur	2360	63	15	26.7	6.4
O00	Nayergaon	2354	57	20	24.2	8.5
P00	Titerkandi	2026	28	10	13.8	4.9
Q00	Char Shibpur	253	4	3	15.8	11.9
V27	Panchghoria	1009	28	4	27.8	4.0
V28	Khidirpur	1604	35	12	21.8	7.5
V30	Harion	628	12	8	19.1	12.7
V39	Gobindapur	299	9	1	30.1	3.3
V40	Masunda	821	20	3	24.4	3.7
V41	Paton	2048	47	17	22.9	8.3
V42	Adhara (South)	788	15	8	19.0	10.2
V44	Panchdona	638	16	5	25.1	7.8
V86	Adhara	1072	33	7	30.8	6.5
V88	Datikara	568	16	2	28.2	3.5
VBA	Mehron	2108	53	15	25.1	7.1

Village code	Village name	Population (mid-year)	Live births	Deaths	Birth rate	Death rate
DX0	Barogaon	3556	73	34	20.5	9.6
DX1	Naojan	1501	22	8	14.7	5.3
Block C Total		25424	577	183	22.7	7.2
R00	Nandalalpur	1570	31	12	19.7	7.6
S00	Tatua	932	24	6	25.8	6.4
T00	Amuakanda	1658	41	13	24.7	7.8
V15	Bhati Rasulpur	911	14	4	15.4	4.4
V16	Binandapur	893	24	5	26.9	5.6
V17	Hatighata	1063	13	9	12.2	8.5
V18	Torkey	3987	87	38	21.8	9.5
V25	Char Pathalia	1311	22	12	16.8	9.2
V29	Shibpur (South)	556	18	4	32.4	7.2
V33	Shibpur (North)	436	8	6	18.3	13.8
V34	Satparia	900	11	13	12.2	14.4
V52	Nayakandi	241	9	2	37.3	8.3
V54	Balairkandi	545	15	13	27.5	23.9
V55	Induria	542	9	8	16.6	14.8
V63	Islamabad (East)	1973	27	16	13.7	8.1
V67	Majlishpur	630	12	4	19.0	6.3
V81	Sonaterkandi	668	13	6	19.5	9.0
V84	Shahbajkandi	2400	53	10	22.1	4.2
V89	Islamabad (Middle)	1642	27	12	16.4	7.3
Block D Total		22858	458	193	20.0	8.4
icddr,b area: Total		123264	2807	823	22.8	6.7
Government service area						
V35	Durgapur	3497	71	26	20.3	7.4
V38	Galimkha	1500	34	13	22.7	8.7
V43 (comp. since 1999)	Kanachak	1223	23	13	18.8	10.6
V45	Bakchar	1086	28	5	25.8	4.6
V46	Silinda	406	9	2	22.2	4.9
V47	Tulatali	1891	42	11	22.2	5.8
V48	Gangkanda	509	10	3	19.6	5.9
V49	Harina Bhabanipur	1301	27	7	20.8	5.4
V57 (comp. since 1999)	Baluchar	1069	19	9	17.8	8.4
V64 (comp. since 1999)	Kawadi	5006	114	42	22.8	8.4
V65	Nayachar	774	18	5	23.3	6.5
V66	Thatalia	748	17	6	22.7	8.0
V68	Sobahan	981	25	5	25.5	5.1
V71	Khamarpara	507	12	1	23.7	2.0
V73	Sadardia	825	15	6	18.2	7.3
V74	Ketundi	1398	29	14	20.7	10.0
V75	Mukundi	333	9	4	27.0	12.0
V76	Chosoi	1774	28	11	15.8	6.2
V78	Soladana	261	7	4	26.8	15.3
V79	Pitambordi	389	8	2	20.6	5.1
V80	Daribond	1334	39	6	29.2	4.5
V90	Narinda	1256	33	12	26.3	9.6
V97	Dhanagoda	357	13	2	36.4	5.6
V98	Santoshpur	96	2	0	20.8	0.0
V99	Baluakandi	527	16	7	30.4	13.3
VB1	Taltoli	986	23	5	23.3	5.1
VB2	Sree Rayerchar	1255	26	10	20.7	8.0
VB3	Rayerkandi	3046	60	22	19.7	7.2
D28	Bazarkhola	1052	16	11	15.2	10.5
D29	Kirtonkhola	213	2	0	9.4	0.0
D30	Banuakandi	738	16	5	21.7	6.8
D31	Harina Bazarkhola	990	26	6	26.3	6.1

Village code	Village name	Population (mid-year)	Live births	Deaths	Birth rate	Death rate
D32	Khalisha	788	15	3	19.0	3.8
D33	Nayanagar	1053	23	9	21.8	8.5
D34	Saidkharkandi	1399	28	11	20.0	7.9
D35	Mollah Kandi	521	8	2	15.4	3.8
Block E Total		41089	891	300	21.7	7.3
A00	Uddamdi	3267	66	16	20.2	4.9
F00	Sepoykandi	1577	39	16	24.7	10.1
G00	Thatalia	3222	74	22	23.0	6.8
J00	Char Harigope	878	23	4	26.2	4.6
U00	Baispur	9569	234	60	24.5	6.3
V01	Kadamtali	401	11	3	27.4	7.5
V02	Nilokhi	443	9	5	20.3	11.3
V03	Char Nilokhi	608	9	5	14.8	8.2
V04	Char Pathalia	399	7	2	17.5	5.0
V05	Gazipur	3327	69	17	20.7	5.1
V06	Fatepur	2561	52	13	20.3	5.1
V07	Nayakandi	302	10	3	33.1	9.9
V08	Goalbhar	1234	29	8	23.5	6.5
V09	Naburkandi	1201	18	7	15.0	5.8
V14	Enayetnagar	652	17	7	26.1	10.7
V36	Ludhua	5579	122	32	21.9	5.7
D99	Mandertoli	2061	27	10	13.1	4.9
Block F Total		37281	816	230	21.9	6.2
B00	Charmasua	1870	41	11	21.9	5.9
C00	Sarderbandi	4101	97	27	23.7	6.6
V37**	Charputia	-	-	-	-	-
V50	Bakharpur	44	4	1	90.9	22.7
V51	Induriakandi	883	19	8	21.5	9.1
V53	Chhoto Haldia	2968	51	20	17.2	6.7
V58**	Mohishmari	-	-	-	-	-
V69**	Naobangha	-	-	-	-	-
V70**	South Joypur	-	-	-	-	-
V95	Baluchar	2481	70	12	28.2	4.8
V96	Rampur	543	13	5	23.9	9.2
VB4	Ramdaspur	3705	64	29	17.3	7.8
VB5	Thakurpara	815	16	4	19.6	4.9
VB6	Sarkerpara	564	19	0	33.7	0.0
VB7	Mirpur	311	5	2	16.1	6.4
VB8	Farazikandi	1231	31	10	25.2	8.1
VB9**	Ramanathgonj	-	-	-	-	-
VB0	South Rampur	3634	59	27	16.2	7.4
D88	Sankibhanga	1477	26	10	17.6	6.8
	Sankibhanga	1024	21	8		
D89	Namapara				20.5	7.8
D90	Zahirabad	819	24	6	29.3	7.3
D91**	North Joypur	-	-	-	-	-
D92**	West Joypur	-	-	-	-	-
D93	Maizkandi	1367	39	8	28.5	5.9
D94	Hazipur	1710	37	10	21.6	5.8
D95	Tapaderpara	640	15	3	23.4	4.7
D96	Sakharipara	1170	29	11	24.8	9.4
D97	Nayakandi	716	21	4	29.3	5.6
D98	Bara Haldia	3412	68	35	19.9	10.3
Block G Total		35485	769	251	21.7	7.1
Government service area: Total		113855	2476	781	21.7	6.9
*Division by block applies						
**Lost due to river erosion in 1987						

APPENDIX C

LIFE TABLE EQUATIONS

$$1. \quad {}_nq_x = \frac{{}_nm_x}{1 + {}_nm_x \left[\frac{1}{2} + \frac{{}_nm_x}{12} + ({}_nm_x - \ln C) \right]} \quad \text{if } X > 0$$

q_0 = Infant death rate per 1,000 live births.

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

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

$$3. \quad L_0 = 0.15 l_0 + 0.85 l_1$$

$$L_1 = 0.410 l_1 + 0.590 l_2$$

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

$${}_nL_x = \frac{{}_nq_x}{{}_nm_x}, \text{ for } 5 \leq x \leq 80$$

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

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

NOTE: Computed using Greville's method, as suggested in: Shryock HS, Seigel JS, et al. (1975).

NOTE: $\ln C$ assumed to be 0.095; separation factors in equation 3 correspond to an infant mortality rate of 50 per 1,000 livebirths

APPENDIX D

WHO STANDARD WORLD POPULATION

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

NOTE: Source: Ahmed OB, Boschi-Pinto, Lopez AD et al. (2000)

Available online at: <http://www.who.int/healthinfo/paper31.pdf>

APPENDIX E

HEALTH INTERVENTIONS IN icddr,b SERVICE AREA

Date	Activity	Blocks			
		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 treatment to children		X		X
Jul 1991		X	X	X	X
Apr-Dec 1989	Dysentery treatment project		X		X
1997	Sub-centre delivery			X	
1998					X
2000			X		
2001		X			
2000	Fixed Site Clinics for delivering on MCH-FP services			X	X
2001		X	X		
2001	Maternal and infant Nutrition intervention (MINIMAT)	X	X	X	X
2002	Arsenic in Tub-well water and mitigation (AS-MAT)	X	X	X	X
2005	Introduction of Hepatitis B	X	X	X	X
2006	Vitamin E and Selenium trial	X	X	X	X
2007	Maternal, newborn and child health intervention	X	X	X	X
2007	Rota Teq vaccine trial to infant	X	X	X	X
2008	Rota Rix vaccine trial to infant	X	X	X	X
2009	Hemophilus influenza type B(Hib) vaccine in the form of pentavalent vaccine	X	X	X	X
2011	Flu Q-QIV (Phase III)	X			
May 2012	JE (Japanese encephalitis) vaccine trial	X	X	X	X
Apr 2012	FLU D_QIV (Phase III)	X	X		
May 2012	OPV vaccine trial	X	X	X	X
January 2013	Measles-Rubella and Rotavirus Vaccine	X	X	X	X
March 2013	LAIV Study			X	X
March 2013	FLU D_QIV (Phase III) Cohort -4	X	X		
March 2014	FLU D_QIV (Phase III) Cohort-6	X	X		
January 2015	FLU-15 Trail	X			
April 2015	OPV Gates Study	X	X	X	X
July 2015	JEV 07	X	X	X	X
October 2016	b BIOOPV trail	X	X	X	X

APPENDIX F

STAFF OF HDSS, 2016

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Administration

Md. Anisur Rahman, Admin. Officer
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Masud Miah, Attendant
Md. Ahsan Ullah, Attendant

NOTE: 42 Community Health Research Workers (CHRWs) collect routine HDSS data.

HDSS-Dhaka

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