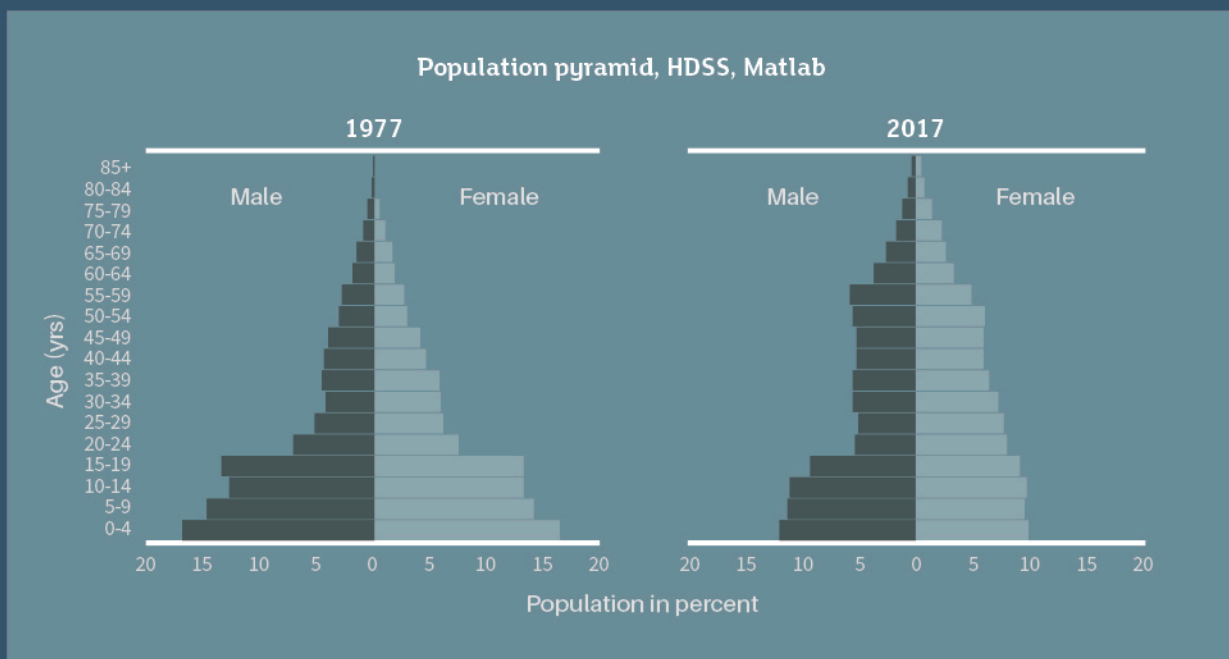


HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEM – MATLAB

Volume Fifty Two Registration of Health and Demographic Events 2017



HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEM – MATLAB

Volume Fifty Two

Registration of Health and Demographic Events 2017

Scientific Report No. 139 – April 2019

**Initiative for Climate Change and Health
Health Systems and Population Studies Division, icddr,b
68, Shaheed Tajuddin Ahmed Sarani,
Mohakhali, Dhaka 1212, Bangladesh**



HDSS Annual Reports are not copyrighted and may be freely quoted as long as the source is properly indicated. Matlab Health and Demographic Surveillance System annual reports are available free of cost from the website: <http://dSPACE.icddr.org/jspui/handle/123456789/6350> . The figures provided in Matlab HDSS annual reports are also available online in “Matlab Demographic Workbook, 1983-2017” in the same location. The following citation is suggested for this report; this form of citation is also appropriate for previous HDSS annual reports.

icddr,b (2019). Health and Demographic Surveillance System–Matlab, v. 52. Registration of health and demographic events 2017, Scientific Report No. 139. Dhaka: icddr,b.

All staff members of the Health and Demographic Surveillance System, Dhaka and Matlab have contributed to the preparation of this report.

Report prepared by:

Muhammad Zahirul Haq
Md. Moinuddin Haider
Kaiser Mahmud
Shahbaz Alam
Sajal Kumar Saha
Samiran Barua
Sayed Saidul Alam
Taslim Ali
Syed Manzoor Ahmed Hanifi
Nurul Alam
Quamrun Nahar

Cover page: Age-sex distribution of population, Matlab HDSS, 1977 and 2017

ISBN 978-984-551-377-7

Scientific Report No. 139

April 2019

Published by:

Initiative for Climate Change and Health
Health Systems and Population Studies Division
icddr,b
GPO Box 128, Dhaka 1000
Mohakhali, Dhaka 1212, Bangladesh
Telephone: 880-2-9827042, 880-2-9827001-10 (10 lines)
Email: quamrun@icddr.org
URL: <http://www.icddr.org>

Printed by:

Dina Offset Printing Press
Cell: +88 01820 508340, +88 01919508340
E-mail: dina.offset@yahoo.com

ACKNOWLEDGEMENTS

The activity of Matlab Health and Demographic Surveillance System (HDSS) was funded by core donors who provide unrestricted support to icddr,b for its operations and research. Current donors providing unrestricted support include: Government of the People's Republic of Bangladesh; Global Affairs Canada (GAC); Swedish International Development Cooperation Agency (Sida) and the Department for International Development (DfID). We gratefully acknowledge these donors for their support and commitment to icddr,b's research efforts.

Matlab HDSS is a founding member of INDEPTH Network, an international network of HDSS field sites involved in demographic and health research in developing countries since 1998. Matlab HDSS makes use of WHO/HMN/LSHTM/INDEPTH Network/USAID/MEASURE Evaluation Standardized Verbal Autopsy (VA) tools. For more information on INDEPTH Network, please refer to INDEPTH Monograph Series and visit www.indepth-network.org.

Our heartfelt gratitude to the residence of Matlab HDSS for their cooperation and support in the operation of the HDSS – they are providing information on household health and demographic events for such a long period.



CONTENTS

LIST OF ABBREVIATION	x
SUMMARY	1
CHAPTER 1: INTRODUCTION	2
CHAPTER 2: DEMOGRAPHIC TRENDS IN MATLAB	4
CHAPTER 3: POPULATION CHANGES	8
CHAPTER 4: MORTALITY	13
CHAPTER 5: FERTILITY	20
CHAPTER 6: MARRIAGE AND DIVORCE	26
CHAPTER 7: MIGRATION	31
CHAPTER 8: FERTILITY REGULATION	35
CHAPTER 9: CHILD HEALTH SERVICE USE	38
CHAPTER 10: GEOGRAPHIC INFORMATION SYSTEM (GIS)	40
CHAPTER 11: PUBLICATIONS	42
BIBLIOGRAPHY	43

LIST OF TABLES

Table 3.1. Vital statistics of icddr,b and Government service areas, 2005-2017	9
Table 3.2. Mid-year population, events registered, and population changes, 2017	10
Table 3.3. Mid-year population by age and sex, 2017	11
Table 3.4. Mid-year population by age, sex, and area, 2017	12
Table 4.1. Deaths by age and sex in both areas, 2017	14
Table 4.2. Deaths by area, age, and sex, 2017	15
Table 4.3. Death rates per 1000 mid-year population by age and sex in both areas, 2017	16
Table 4.4. Death rates by area, age and sex, 2017 (per 1,000 population)	17
Table 4.5. Abridged life table by sex, 2017	18
Table 4.6. Deaths by month and age, 2017	18
Table 5.1. Numbers and rates of pregnancy outcomes by type and area, 2017	22
Table 5.2. Pregnancy outcomes by month, 2017	22
Table 5.3. Age-specific fertility rates (per 1,000 women) and indices by area, 2017	23
Table 5.4. Distribution of pregnancies that ended with live birth by place of delivery by area, 2017	23
Table 5.5. Distribution of pregnancies that ended with live birth by attendant and area, 2017	24
Table 5.6. Distribution of mode of delivery of live birth by area, 2017	24
Table 5.7. Percent distribution of different indicator for ANC visits, 2017	25
Table 6.1. Groom's age at marriage by previous marital status, 2017	27
Table 6.2. Bride's age at marriage by previous marital status, 2017	28
Table 6.3. Marriage rates by age and sex, 2017	28
Table 6.4. Distribution of current marital status (%) by age and sex, 2017	29
Table 6.5. Duration (months) of all marriages at divorce by age and sex, 2017	29
Table 6.6. Marriages by type of gifts received by grooms party from bridal party, 2008-2017	29
Table 6.7. Registration status of Muslim marriages and divorces, 2000-2017	30

Table 6.8. Cause of divorces by area, Matlab, 2017 -----	30
Table 7.1. Age and sex-specific migration rates (per 1,000 population) by direction, 2017-----	32
Table 7.2. Number of in- and out-migrations by sex and month, 2017 -----	32
Table 8.1. Contraceptive use rate (%) of currently married women aged 15-49 years by area, 1987-2017 -36	
Table 8.2. Contraceptive method mix (%) in different surveys and areas -----	36
Table 8.3. Contraceptive method mix (%) in the icddr,b service area, 2001-2017 -----	37
Table 8.4. Method specific contraceptive use rate among currently married women by age in icddr,b service area, 2017 -----	37
Table 8.5. Method specific contraceptive use rate among currently married women by age in Government service area, 2017 -----	37
Table 9.1. Immunization coverage (%) among children aged 12-23 months in icddr,b service area, 1987-2017 and Government service area, 2000-2017 -----	39
Table 10.1. Existing Geo-spatial database in different layer within Matlab HDSS area -----	41

LIST OF FIGURES

Figure 1.1. Map of Matlab study area showing icddr,b and Government service areas -----	3
Figure 2.1. Demographic transitions in Matlab 1966-2017-----	4
Figure 2.2. Total fertility rates (TFR) in Matlab by area, 1966-2017 -----	5
Figure 2.3. Contraceptive prevalence rates (CPR) in Matlab and Bangladesh, 1978-2017 -----	5
Figure 2.4. Infant mortality rates (IMR) in Matlab by area, 1966-2017 -----	6
Figure 2.5. Under-five mortality rates (U5MR) in Matlab by area, 1966-2017 -----	6
Figure 2.6. Life expectancy at birth (e^0) in Matlab, 1966-2017 -----	7
Figure 2.7. Mean age at first marriage in Matlab, 1975-2017 -----	7
Figure 3.1. Age pyramid of the 2017 mid-year population -----	11
Figure 4.1. Distribution of age -standardized death rates by cause of deaths, 1986-2017 -----	19
Figure 4.2. Probability of survival from birth to age(x) by sex, 2017-----	19
Figure 5.1. Number of births and deaths by month, 2017-----	21
Figure 5.2. Age-specific fertility rates by area, 2017 -----	24
Figure 6.1. Number of marriages and divorces by month, 2017-----	27
Figure 7.1. In- and out-migration rates by sex and age in Matlab, 2017-----	33
Figure 7.2. Number of in- and out-migrations by sex and month in Matlab, 2017-----	34
Figure 11.1 Number of articles published in peer reviewed journals based on Matlab HDSS and studies nested with the HDSS, 1998-2017 -----	42

LIST OF APPENDICES

Appendix A-1a Mid-year population in icddr,b service area by age, sex, and block, 2017-----	45
Appendix A-1b Mid-year population in Government service area by age, sex, and block, 2017 -----	46
Appendix A-2a Deaths in icddr,b service area by age, sex, and block, 2017-----	47
Appendix A-2b Deaths in Government service area by age, sex, and block, 2017 -----	48
Appendix A-3 Abridged life table for icddr,b service area by sex, 2017 -----	49
Appendix A-4 Abridged life table for Government service area by sex, 2017-----	49
Appendix A-5 Male deaths by cause and age, 2017 -----	50
Appendix A-6 Female deaths by cause and age, 2017-----	51
Appendix A-7 Male deaths by cause, age, and area, 2017 -----	52
Appendix A-8 Female deaths by cause, age, and area, 2017-----	53
Appendix A-9a Age-specific fertility rate and indices for icddr,b service area by block, 2017 -----	54
Appendix A-9b Age-specific fertility rate and indices for Government service area by block, 2017 -----	54
Appendix A-10 Marriages and divorces by month, 2017-----	55
Appendix A-11 In- and out-migrations by age and sex, 2017-----	55
Appendix A-12 In-migrations by age, sex, and area, 2017-----	56
Appendix A-13 Out-migrations by age, sex, and area, 2017 -----	56
Appendix A-14 Male out-migration by cause of movement and age, 2017 -----	57
Appendix A-15 Female out-migration by cause of movement and age, 2017 -----	58
Appendix A-16 Male in-migration by cause of movement and age, 2017 -----	59
Appendix A-17 Female in-migration by cause of movement and age, 2017 -----	60
Appendix A-18 Male migration by destination or origin, 2017 -----	61
Appendix A-19 Female migration by destination or origin, 2017-----	62
Appendix B POPULATION, BIRTHS, AND DEATHS BY VILLAGE, 2017 -----	63
Appendix C LIFE TABLE EQUATIONS -----	66
Appendix D WHO STANDARD WORLD POPULATION -----	67
Appendix E HEALTH INTERVENTIONS IN icddr,b SERVICE AREA -----	68
Appendix F STAFF OF HDSS, 2017-----	69

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 2017. The data were collected by the Matlab HDSS maintained by icddr,b. The surveillance area is divided into two service area – 1) icddr,b service area and 2) Government service area. Usual government health and family planning services are available in Government service area. 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. Usual Government services are also available in icddr,b service area.

In the surveillance area as a whole, fertility rate in 2017 is similar to that in 2016. The crude birth rate (CBR) was 22.0 per 1,000 populations in 2017 whereas in 2016 the rate was 22.3. The total fertility rate (TFR) was 2.6 per woman in 2017 and 2.7 in 2016. In the icddr,b service area, CBR was 22.1 and in the Government service area, CBR was 21.8 and TFR was 2.6 in both the services area.

The crude death rate (CDR) was 7 per 1,000 population in the icddr,b service area, and in Government service area it was 7.2 in 2017. The infant mortality rate was 18 per 1,000 live births in the icddr,b service area, and in the Government service area it was 26.2. The neonatal mortality rate decreased to 14 from 16.7 in the icddr,b service area and 20.7 from 27.5 in the Government service area respectively in 2017 from 2016. Post-neonatal mortality decreased in the icddr,b service area (from 5.3 to 4) and increased in the Government service area (from 4 to 5.6). Under five mortality rate has significantly decreased from 32 in 2016 in the icddr,b service area to 25.9 in 2017, and in the Government service area, the decrease was from 40.2 in 2016 to 37 in 2017. The overall rate of natural increase in population size was 14.9 per 1,000 in 2017.

The rate of in-migration decreased to 51.9 per 1,000 populations in 2017 from 59.8 in 2016, and the rate of out-migration increased to 63.7 in 2017 from 62.1 in 2016. The overall annual population growth rate was 1.3%. The marriage rate was 13.3 per 1,000 people, and the divorce rate was 1.9 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 = 90.720033 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.

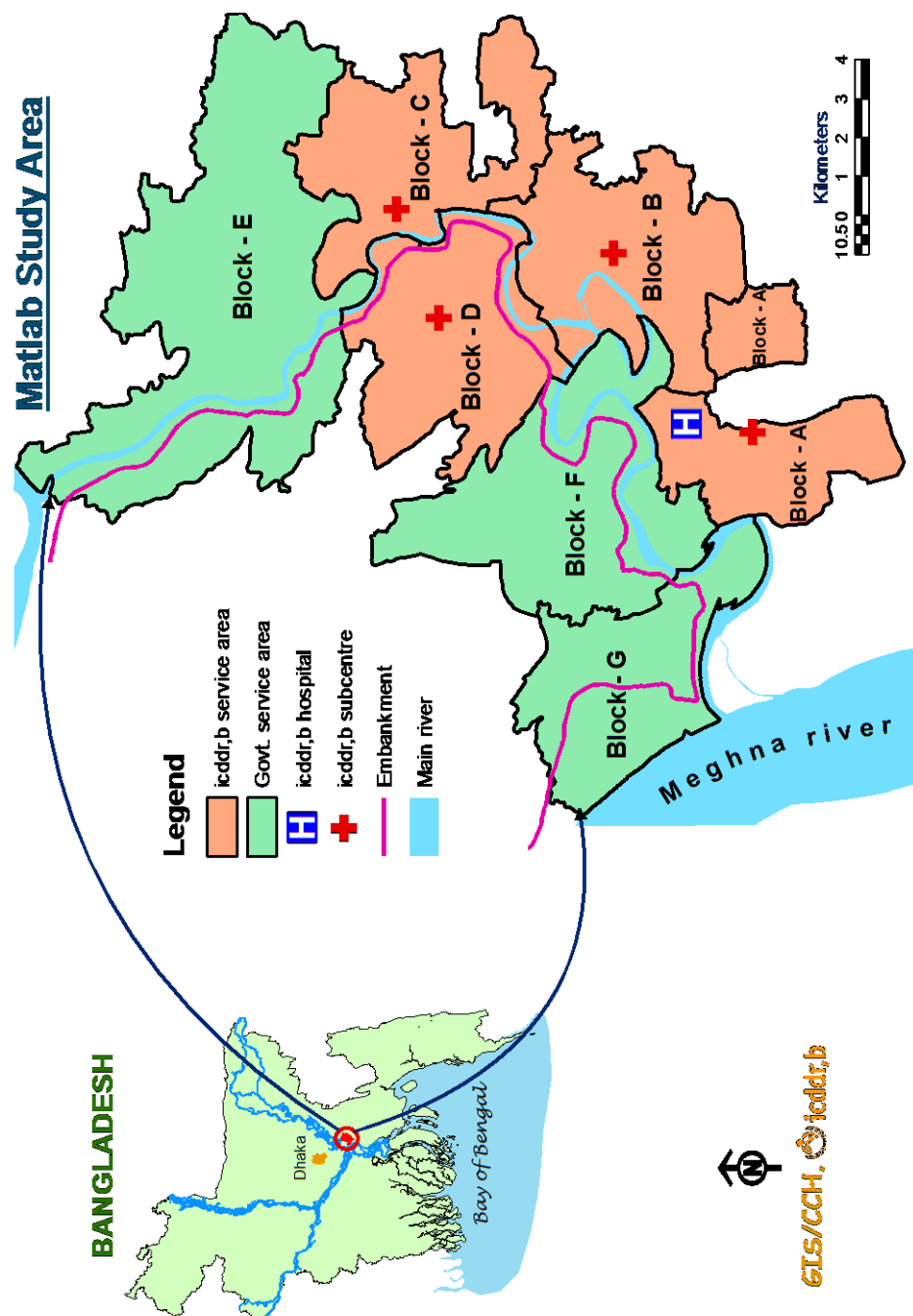
In October 1977, the surveillance area was reduced from 233 to 149 villages, and a Maternal and Child Health and Family Planning (icddr,b service) Programme was initiated in 70 villages. The remaining 79 villages were treated as a Government service area (Figure 1.1). Since the introduction of the icddr,b 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. River erosion devoured 7 villages 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 two 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 2017, 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

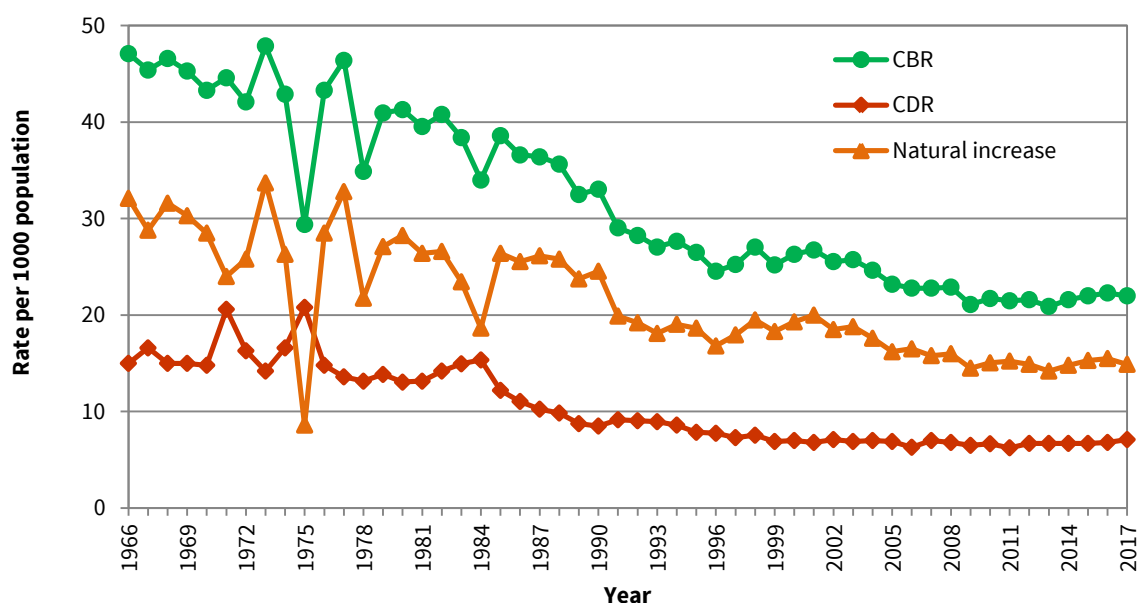


CHAPTER 2

DEMOGRAPHIC TRENDS IN MATLAB

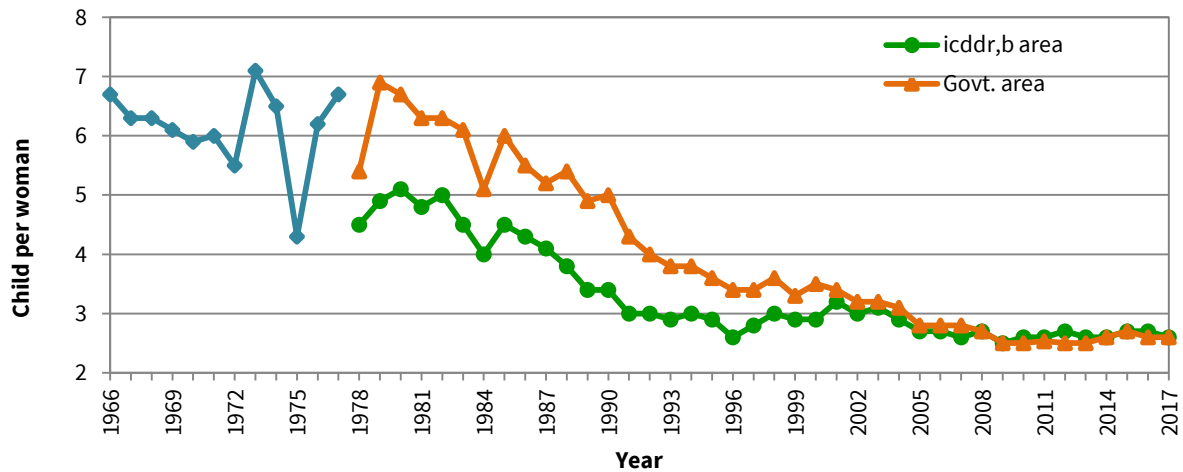
Long term Matlab HDSS data show the various transitions in the Matlab population over the period 1966-2017. In the early stages of demographic surveillance (1960s and 1970s), the Matlab population was characterized by high fertility, high mortality and high population growth. Apart from a Shigella outbreak 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 1966-2017, crude birth rate (CBR) has dropped by 53.29%, crude death rate (CDR) by 52.67%, and natural increase by 53.58%. 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, 1966-2017



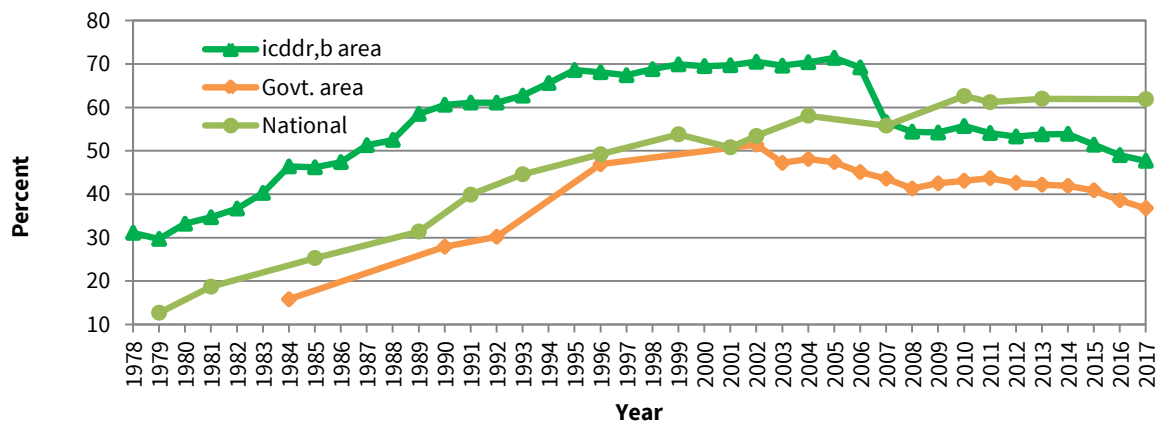
Matlab surveillance area started with a high fertility level of 6.7 children per woman in 1966. After reorganization of the surveillance area into icddr,b and Government service areas in 1978, total fertility rate (TFR) in icddr,b service area remained substantially lower than the Government service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

Figure 2.2 Total fertility rates (TFR) in Matlab by area, 1966-2017



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 the period between 1978 to 1995, CPR escalated in icddr,b service area ranging from 31.1 to 68.6 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 47.7 in 2017 – 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 36.8 in 2017 (Figure 2.3). Further study can be carried out to investigate whether absence of husband of married women due to migration is associated with this decline.

Figure 2.3 Contraceptive prevalence rates (CPR) in Matlab and Bangladesh, 1978-2017



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 84.1% over the period 1978-2017. In Government service area, IMR declined by 79.2% over the same period. Figure 2.5 shows that, during the same period, under-five mortality rate (U5MR) declined by 85.9% in icddr,b service area and 89.0% 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, 1966-2017

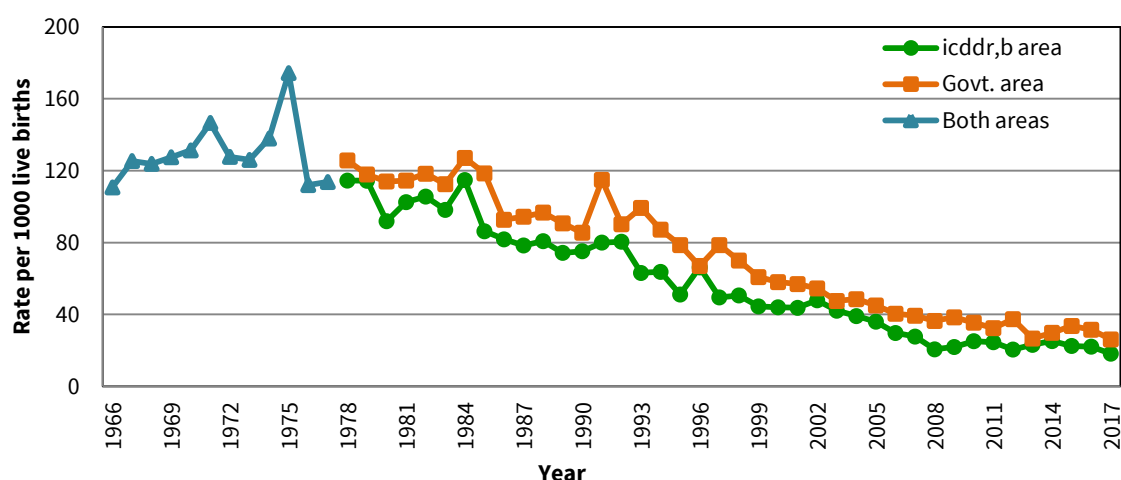
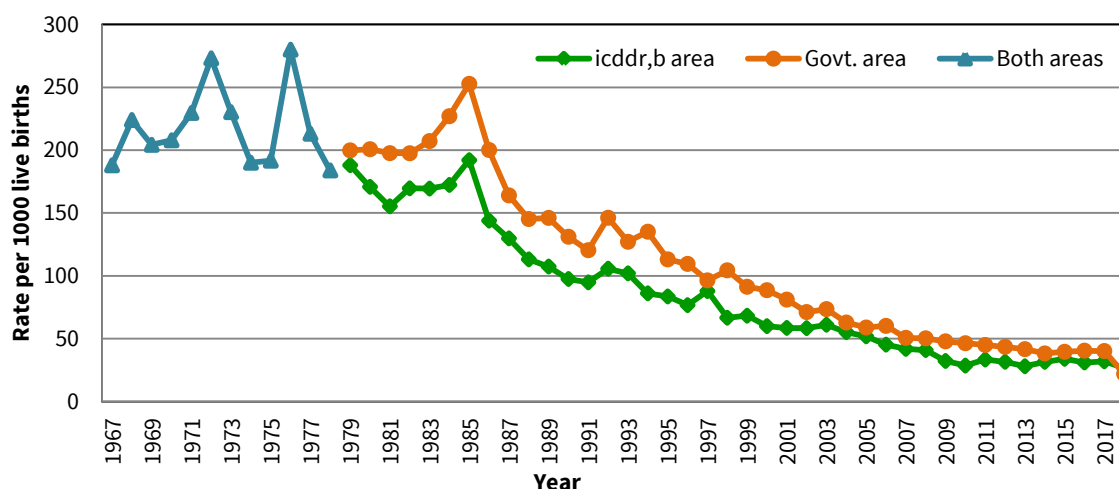
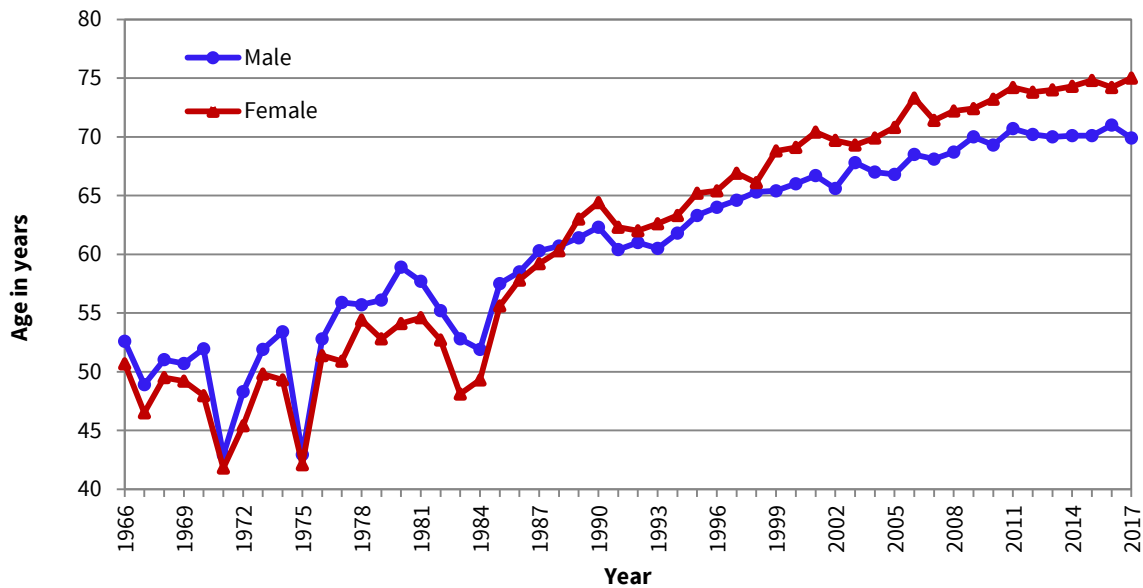


Figure 2.5 Under-five mortality rates (U5MR) in Matlab by area, 1966-2017



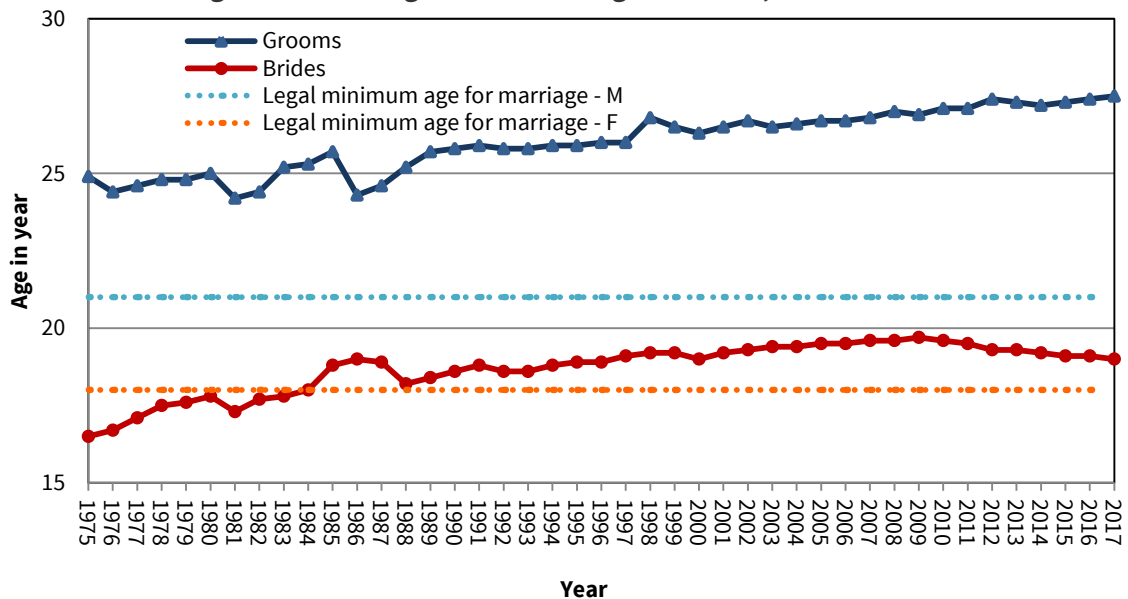
Massive reductions of infant and child mortality have resulted in a remarkable improvement in life expectancy at birth over the last 50 years. The life expectancy at birth for males rose from 52.6 years in 1966 to 69.9 in 2017, a gain of 17.3 years and for females, the improvement is even more evident, from 50.7 to 75.0, a gain of nearly 24.3 years for diminishing gender difference in childhood mortality and maternal mortality (Figure 2.6).

Figure 2.6 Life expectancy at birth (e^0) in Matlab, 1966-2017



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 1975-2017. During this period, brides' mean age at marriage increased by 3.6 years and for grooms, it increased by 3.9 years. Currently, mean age at first marriage for male is 28.8 years and for female it is 20.1 years.

Figure 2.7 Mean age at first marriage in Matlab, 1975-2017



CHAPTER 3

POPULATION CHANGES

The principal vital statistics of icddr,b and Government service areas from 2005 through 2017 are summarized in Table 3.1. The mid-year population and the demographic events registered in 2017 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 2017, the crude birth rate slightly decreased in icddr,b service area and in Government service area (22.1 and 21.8 respectively) compared to figures from previous year. In icddr,b service area, crude death rate increased slightly from 6.7 in 2016 to 7.0 in 2017. The corresponding figure for government service area is also increased from 6.9 in 2016 to 7.2 in 2017. 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). Currently the TFR is 2.6 in both areas. Trends in the TFR in both areas are illustrated in Figure 2.2 of Chapter 2.

The infant mortality rate (deaths per 1000 live births) decreased to 18.0 in 2017 from 22.1 in 2016 in the icddr,b service area, and 26.2 in 2017 from 31.5 in 2016 in the Government service area. In the icddr,b service area, neonatal mortality also decreased to 14.0 in 2017 from 16.7 in 2016, and in the Government service area it was also reduced to 20.7 in 2017 from 27.5 in 2016. The mortality rate of children aged 1-4 years remains unchanged in 2017 compared to previous year in both areas; the rate is 2.5 and 2.3 in icddr,b and Government service areas, respectively. Under-five mortality has decreased in the icddr,b service area from 32.0 per 1,000 live births in 2016 to 25.9 in 2017, and in the Government service area it was decreased from 40.2 in 2016 to 37.0 in 2017. The trends in mortality of under-5 years children are illustrated in Figures 2.4 and 2.5 in Chapter 2.

The numbers of in- and out-migrants registered in 2017 were 12,395 and 15,230 respectively, giving an in-migration rate of 51.9 per 1,000 populations, out-migration rate of 63.7. It results a net migration rate of -11.9 per 1,000 populations meaning that 12 persons/1000 more left the area compare to people came in 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 1978-2017 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 2017, this proportion had fallen to 31.6%. 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 31.6%

in 2017. 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 10.8% in 2017 due to the decline in both fertility and mortality.

The net population increase is 3.2 per 1,000 in 2017 while it was 12.7 per 1,000 in 2016 - may be due to the decrease 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 3.1. Vital statistics of icddr,b and Government service areas*, 2005-2017

Vital rate (per 1,000)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
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	22.1
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	21.8
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	22.0
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	2.6
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	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	2.6
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	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	7.2
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	7.1
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	14.0
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	20.7
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	17.2
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	4.0
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	5.6
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	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	18.2
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	26.1
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	22.1
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	2.0
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	3.0
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	2.5
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	25.9
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	37.0
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	31.1
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	15.1
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	14.6
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	14.9
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	51.9
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	63.7
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	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

Table 3.2. Mid-year population, events registered, and population changes, 2017

Demographic indicator	Number			Rate per 1,000		
	Total	Male	Female	Total	Male	Female
Total Population (30 June 2017)						
ICDDR,B area	124,635	56,843	67,792	-	-	-
Government area	114,395	51,787	62,608	-	-	-
Both areas	239,030	108,630	130,400	-	-	-
Events registered (Jan-Dec 2017)						
Births**						
ICDDR,B area	2,783	1,437	1,346	22.3	-	-
Government area	2,515	1,257	1,258	22.0	-	-
Both areas	5,298	2,694	2,604	22.2	-	-
Deaths						
Infants*						
ICDDR,B area	50	31	19	18.0	21.6	14.1
Government area	66	45	21	26.2	35.8	16.7
Both areas	116	76	40	21.9	28.2	15.4
All deaths**						
icddr,b area	868	490	378	7.0	8.6	5.6
Government area	819	456	363	7.2	8.8	5.8
Both areas	1687	946	741	7.1	8.7	5.7
In-migration**	12,395	6,023	6,372	51.9	55.4	48.9
Out-migration**	15,230	8,532	6,698	63.7	78.5	51.4
Marriage**	3,188	-	-	13.3	-	-
Divorce**	465	-	-	1.9	-	-
Population change (Jan-Dec 2017)						
Net migration**	-2,835	-2,509	-326	-11.9	-23.1	-2.5
Natural increase**						
ICDDR,B area	1,915	947	968	15.4	16.7	14.3
Government area	1,696	801	895	14.8	15.5	14.3
Both areas	3,611	1,748	1,863	15.1	16.1	14.3
Net increase**	776	-761	1,537	3.2	-7.0	11.8

*Rate per 1000 live births

**Rate per 1000 population

Table 3.3. Mid-year population by age and sex, 2017

Age (years)	Number			Percentage		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	239,030	108,630	130,400	100.0	100.0	100.0
<1 year	5,273	2,646	2,627	2.2	2.4	2.0
1-4	20,609	10,479	10,130	8.6	9.6	7.8
1	5,333	2,707	2,626	2.2	2.5	2.0
2	5,246	2,696	2,550	2.2	2.5	2.0
3	5,084	2,596	2,488	2.1	2.4	1.9
4	4,946	2,480	2,466	2.1	2.3	1.9
5-9	24,793	12,440	12,353	10.4	11.5	9.5
10-14	24,788	12,155	12,633	10.4	11.2	9.7
15-19	22,018	10,178	11,840	9.2	9.4	9.1
20-24	16,240	5,963	10,277	6.8	5.5	7.9
25-29	15,739	5,739	10,000	6.6	5.3	7.7
30-34	15,577	6,267	9,310	6.5	5.8	7.1
35-39	14,461	6,163	8,298	6.0	5.7	6.4
40-44	13,522	5,887	7,635	5.7	5.4	5.9
45-49	13,449	5,863	7,586	5.6	5.4	5.8
50-54	13,988	6,246	7,742	5.9	5.7	5.9
55-59	12,684	6,450	6,234	5.3	5.9	4.8
60-64	8,452	4,188	4,264	3.5	3.9	3.3
65-69	6,262	2,959	3,303	2.6	2.7	2.5
70-74	5,098	2,154	2,944	2.1	2.0	2.3
75-79	3,259	1,442	1,817	1.4	1.3	1.4
80-84	1,800	890	910	0.8	0.8	0.7
85+	1,018	521	497	0.4	0.5	0.4

Figure 3.1. Age pyramid of the 2017 mid-year population

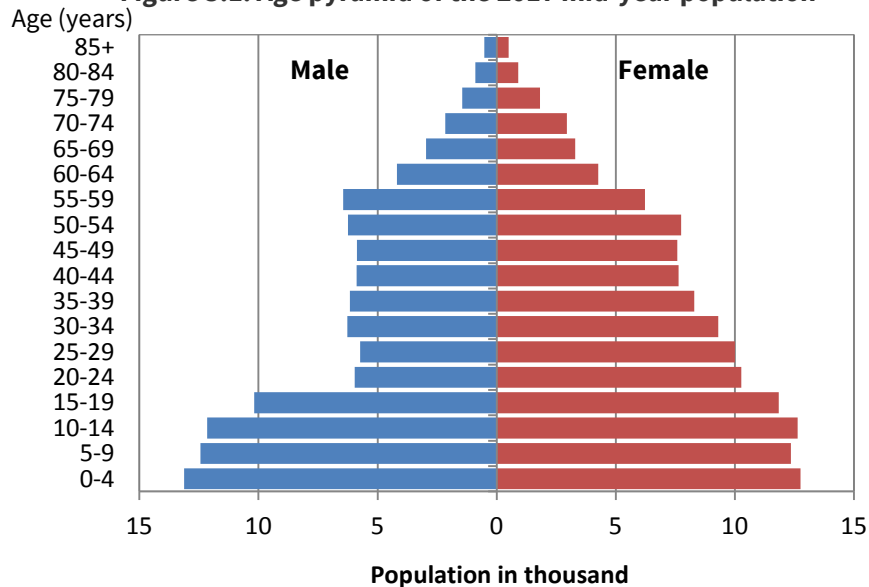


Table 3.4. Mid-year population by age, sex, and area, 2017

Age (years)	icddr,b service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	124,635	56,843	67,792	114,395	51,787	62,608
<1 year	2,741	1,361	1,380	2,532	1,285	1,247
1-4	10,835	5,522	5,313	9,774	4,957	4,817
1	2,849	1,495	1,354	2,484	1,212	1,272
2	2,707	1,384	1,323	2,539	1,312	1,227
3	2,648	1,336	1,312	2,436	1,260	1,176
4	2,631	1,307	1,324	2,315	1,173	1,142
5-9	12,969	6,596	6,373	11,824	5,844	5,980
10-14	12,757	6,236	6,521	12,031	5,919	6,112
15-19	11,141	5,032	6,109	10,877	5,146	5,731
20-24	8,614	3,159	5,455	7,626	2,804	4,822
25-29	8,293	2,988	5,305	7,446	2,751	4,695
30-34	8,209	3,294	4,915	7,368	2,973	4,395
35-39	7,641	3,323	4,318	6,820	2,840	3,980
40-44	7,382	3,246	4,136	6,140	2,641	3,499
45-49	7,062	3,117	3,945	6,387	2,746	3,641
50-54	7,403	3,372	4,031	6,585	2,874	3,711
55-59	6,511	3,359	3,152	6,173	3,091	3,082
60-64	4,296	2,150	2,146	4,156	2,038	2,118
65-69	3,159	1,504	1,655	3,103	1,455	1,648
70-74	2,574	1,092	1,482	2,524	1,062	1,462
75-79	1,647	744	903	1,612	698	914
80-84	866	464	402	934	426	508
85+	535	284	251	483	237	246

CHAPTER 4

MORTALITY

The age and sex specific distribution of death cases is shown in Tables 4.1 and 4.2 respectively. Of the 1,687 deaths, 6.9% were infants, 3.0% were children aged 1-4 years, and 68.6% were aged 60 years and above.

Table 4.3 shows difference in mortality rates per 1000 population Table 4.4 shows the corresponding age-sex-specific mortality rates by icddr,b service area. In 2017, the overall death rates for males and females were 8.6 and 5.6 respectively. Infant mortality rate was 28.2 per 1,000 live births for males and 15.4 for females. It was lower in the icddr,b service area (22.8 and 13.8, respectively) than in the Government service area (35.0 and 16.8, 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 69.9 years for males and 75.0 for females in 2017 and 71.0 for males and 74.2 for females in 2016. 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 2017, the gender difference in expectation of life was higher in the icddr,b service area (4.8 years) than in the Government service area (5.4 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 May, and October to December. Neonatal deaths were most frequent in January, June and August to October. Post-neonatal deaths and child deaths, on the other hand, does not show any seasonal pattern. Figure 4.2 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. Figure 4.1 gives distribution of age-standardized mortality rates by broad category of cause of death (obtained using Verbal Autopsy). The WHO-standard world population age structure is shown in Appendix D (WHO, 2000).

Table 4.1. Deaths by age and sex in both areas, 2017

Age (years)	Both sexes		Male		Female	
	Number	Cumulative percentage	Number	Cumulative percentage	Number	Cumulative percentage
All ages	1687	-	946	-	741	-
<1 year	116	-	76	-	57	-
< 7 days	70	4.1	48	5.1	22	3.0
7 - 29 days	21	5.4	15	6.7	6	3.8
1- 5 months	17	6.4	9	7.6	8	4.9
6-11 months	8	6.9	4	8.0	4	5.4
1 - 4 years	51	-	30	-	21	-
1	24	4.1	14	9.5	10	6.7
2	7	5.4	3	9.8	4	7.3
3	7	6.4	4	10.3	3	7.7
4	13	6.9	9	11.2	4	8.2
5-9	19	11.0	10	12.3	9	9.4
10-14	10	11.6	2	12.5	8	10.5
15-19	11	12.3	7	13.2	4	11.1
20-24	10	12.9	3	13.5	7	12.0
25-29	11	13.5	6	14.2	5	12.7
30-34	22	14.8	11	15.3	11	14.2
35-39	17	15.8	7	16.1	10	15.5
40-44	27	17.4	17	17.9	10	16.9
45-49	47	20.2	21	20.1	26	20.4
50-54	77	24.8	53	25.7	24	23.6
55-59	111	31.4	74	33.5	37	28.6
60-64	128	38.9	85	42.5	43	34.4
65-69	187	50.0	108	53.9	79	45.1
70-74	211	62.5	114	66.0	97	58.2
75-79	251	77.4	130	79.7	121	74.5
80-84	200	89.3	101	90.4	99	87.9
85+	181	100.0	91	100.0	90	100.0

Table 4.2. Deaths by area, age and sex, 2017

Age (years)	icddr,b service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	868	490	378	819	456	363
<1 year	50	31	19	66	45	21
< 7days	29	18	11	41	30	11
7 - 29 days	10	8	2	11	7	4
1- 5 months	5	2	3	12	7	5
6-11 months	6	3	3	2	1	1
1 - 4 years	22	13	9	29	17	12
1	10	5	5	14	9	5
2	2	1	1	5	2	3
3	3	1	2	4	3	1
4	7	6	1	6	3	3
5-9	7	5	2	12	5	7
10-14	7	2	5	3	0	3
15-19	8	5	3	3	2	1
20-24	3	1	2	7	2	5
25-29	8	4	4	3	2	1
30-34	15	7	8	7	4	3
35-39	9	2	7	8	5	3
40-44	13	9	4	14	8	6
45-49	26	13	13	21	8	13
50-54	43	25	18	34	28	6
55-59	55	40	15	56	34	22
60-64	69	44	25	59	41	18
65-69	97	63	34	90	45	45
70-74	114	64	50	97	50	47
75-79	124	66	58	127	64	63
80-84	102	43	59	98	58	40
85+	96	53	43	85	38	47

Table 4.3. Death rates per 1,000 mid-year population by age and sex in both areas, 2017

Age (years)	Both sexes	Male	Female
All ages	7.1	8.7	5.7
<1 year*	22.0	28.7	15.2
< 7days*	13.3	18.1	8.4
7- 29 days*	4.0	5.7	2.3
1- 5 months*	3.2	3.4	3.0
6-11 months*	1.5	1.5	1.5
1 - 4 years	2.5	2.9	2.1
1	4.5	5.2	3.8
2	1.3	1.1	1.6
3	1.4	1.5	1.2
4	2.6	3.6	1.6
5-9	0.8	0.8	0.7
10-14	0.4	0.2	0.6
15-19	0.5	0.7	0.3
20-24	0.6	0.5	0.7
25-29	0.7	1.0	0.5
30-34	1.4	1.8	1.2
35-39	1.2	1.1	1.2
40-44	2.0	2.9	1.3
45-49	3.5	3.6	3.4
50-54	5.5	8.5	3.1
55-59	8.8	11.5	5.9
60-64	15.1	20.3	10.1
65-69	29.9	36.5	23.9
70-74	41.4	52.9	32.9
75-79	77.0	90.2	66.6
80-84	111.1	113.5	108.8
85+	177.8	174.7	181.1
* Rate per 1,000 live births			

Table 4.4. Death rates by area, age and sex, 2017 (per 1,000 population)

Age (years)	icddr,b area			Government area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	7.0	8.6	5.6	7.2	8.8	5.8
<1 year*	18.2	22.8	13.8	26.1	35.0	16.8
< 7days*	10.6	13.2	8.0	16.2	23.3	8.8
7 -29 days*	3.6	5.9	1.4	4.3	5.4	3.2
1- 5 months*	1.8	1.5	2.2	4.7	5.4	4.0
6-11 months*	2.2	2.2	2.2	0.8	0.8	0.8
1 - 4 years	2.0	2.4	1.7	3.0	3.4	2.5
1	3.5	3.3	3.7	5.6	7.4	3.9
2	0.7	0.7	0.8	2.0	1.5	2.4
3	1.1	0.7	1.5	1.6	2.4	0.9
4	2.7	4.6	0.8	2.6	2.6	2.6
5-9	0.5	0.8	0.3	1.0	0.9	1.2
10-14	0.5	0.3	0.8	0.2	0.0	0.5
15-19	0.7	1.0	0.5	0.3	0.4	0.2
20-24	0.3	0.3	0.4	0.9	0.7	1.0
25-29	1.0	1.3	0.8	0.4	0.7	0.2
30-34	1.8	2.1	1.6	1.0	1.3	0.7
35-39	1.2	0.6	1.6	1.2	1.8	0.8
40-44	1.8	2.8	1.0	2.3	3.0	1.7
45-49	3.7	4.2	3.3	3.3	2.9	3.6
50-54	5.8	7.4	4.5	5.2	9.7	1.6
55-59	8.4	11.9	4.8	9.1	11.0	7.1
60-64	16.1	20.5	11.6	14.2	20.1	8.5
65-69	30.7	41.9	20.5	29.0	30.9	27.3
70-74	44.3	58.6	33.7	38.4	47.1	32.1
75-79	75.3	88.7	64.2	78.8	91.7	68.9
80-84	117.8	92.7	146.8	104.9	136.2	78.7
85+	179.4	186.6	171.3	176.0	160.3	191.1
* Rate per 1,000 live births						

Table 4.5. Abridged life table by sex, 2017

Age (years)	Male				Female			
	nq_x	l_x	L_x	$e0_x$	nq_x	l_x	L_x	$e0_x$
0	28.7	100000	97559	69.9	15.2	100000	98706	75.0
1	5.2	97128	96832	70.9	3.8	98477	98257	75.2
2	1.1	96627	96573	70.3	1.6	98103	98026	74.5
3	1.5	96519	96445	69.4	1.2	97949	97890	73.6
4	3.6	96371	96196	68.5	1.6	97831	97752	72.7
5	4.0	96022	479220	67.7	3.6	97673	487545	71.8
10	0.8	95636	478000	63.0	3.2	97317	485879	67.0
15	3.4	95558	477032	58.0	1.7	97010	484672	62.2
20	2.5	95230	475597	53.2	3.4	96846	483472	57.3
25	5.2	94990	473810	48.4	2.5	96517	482029	52.5
30	8.7	94495	470570	43.6	5.9	96276	480071	47.6
35	5.7	93669	467122	39.0	6.0	95708	477217	42.9
40	14.3	93138	462609	34.2	6.5	95133	474235	38.2
45	17.8	91803	455247	29.6	17.0	94512	468851	33.4
50	41.6	90172	442156	25.1	15.4	92905	461226	28.9
55	55.9	86420	420869	21.1	29.3	91476	451180	24.3
60	96.9	81591	389428	17.2	49.3	88798	433825	20.0
65	167.9	73688	339012	13.7	113.2	84423	399634	15.9
70	234.7	61314	271861	11.0	152.8	74865	347202	12.6
75	368.1	46926	191617	8.6	286.4	63425	272785	9.4
80	440.5	29651	115098	7.1	426.6	45259	177472	7.1
85+	1000.0	16589	94979	5.7	1000.0	25952	143311	5.5

Table 4.6. Deaths by month and age, 2017

Month	Age at Death					
	All	Under	1-11	1-4	5-64	65 years
	ages	1 month	months	years	years	and above
January	176	9	2	2	43	120
February	125	2	2	3	42	76
March	130	10	0	3	31	86
April	132	6	1	5	43	77
May	128	6	3	3	33	83
June	145	5	3	9	51	77
July	112	6	0	6	28	72
August	128	6	1	2	42	77
September	133	9	4	4	37	79
October	136	11	2	7	41	75
November	149	9	3	4	36	97
December	193	12	4	3	63	111
Total	1687	91	25	51	490	1030

Figure 4.1. Distribution of age -standardized death rates by cause of deaths, 1986-2017

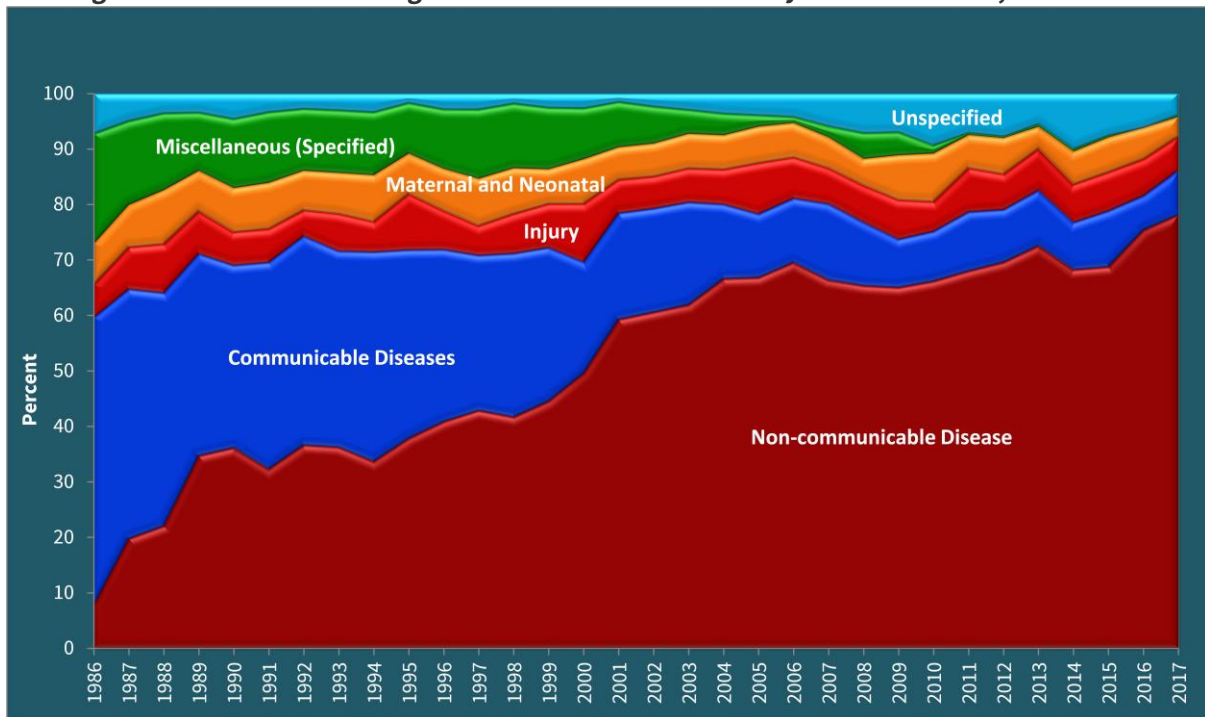
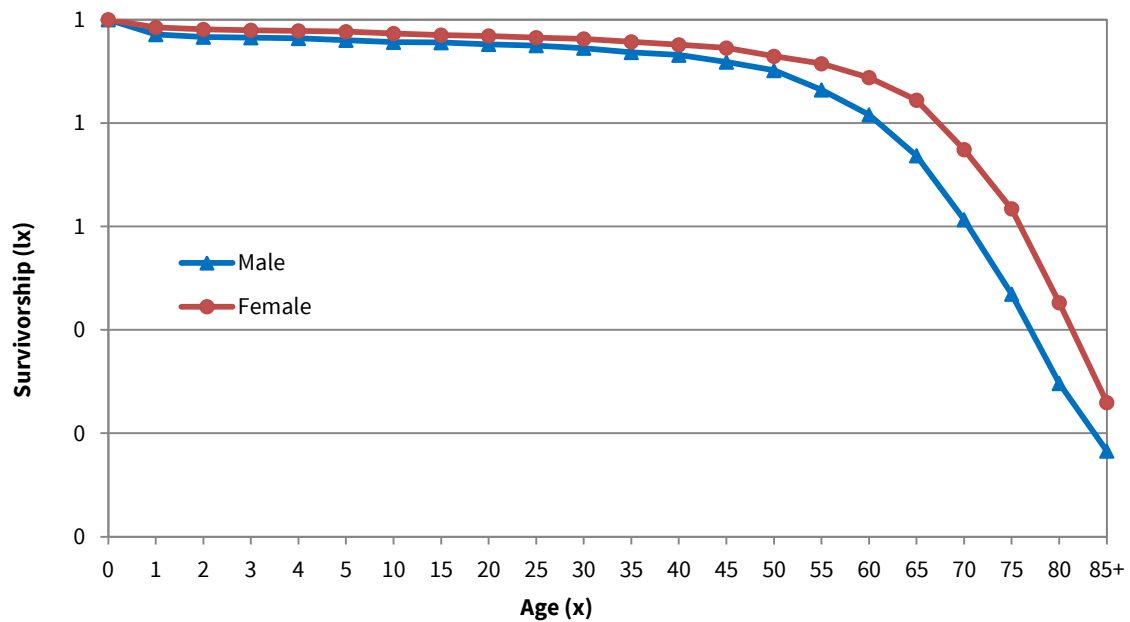


Figure 4.2. Probability of survival from birth to age(x) by sex, 2017



CHAPTER 5

FERTILITY

In 2017, there were 5,247 live births in the Matlab HDSS area as outcomes of 6,101 pregnancies. Table 5.1 shows the number of pregnancies and their outcomes in 2017. Of the pregnancies, 85.8% ended with at least a live birth, a proportion that remains almost the same from year to year; pregnancies' resulting in fetal wastage is also similar to previous year. Among the pregnancies resulting in live births, 46 were multiple births. Among these 39 had two live births, one 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 August, 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 August, October, November and December.

Table 5.3 shows the age-specific fertility rates, 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.9a.

Table 5.4 shows marked variation in the distribution of live birth pregnancies by place of delivery and area. Institutional delivery accounts for 89.0% in the icddr,b service area and 62.4% in the Government service area. More commonly used places for institutional delivery in the Government service area were private clinic/nursing home (48.5%) and Upazila Health Complex (9.7%), and in icddr,b service area, private clinic/nursing home, icddr,b hospital, and sub-centre are 49.5%, 28.1% 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 (53.1%) followed by nurse (29.1%) and Family Welfare Visitor (FWV) (7.2%) of the live-birth deliveries as opposed to TBAs (20.0%), and MBBS doctor (49.6%) in the Government service area. The respective figures for trained TBAs were 2.2% and 10.8% 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 89.4% of the live birth deliveries in the icddr,b service area and 67.8% 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 48.8% in the icddr,b service area and 51.9% in the Government service area. Instrumental deliveries, especially caesarean were 51.1% and 48.1% 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, 0.7% of the women didn't receive any ANC care during pregnancy as oppose to 6.3% in Government service area. Over 81.2 percent of the women received recommended number of ANC (at least 4 visits) at any time of their pregnancy compared to 27.5% in Government service area. The table also shows that, in icddr,b service area, 87.0% of the expectant mothers sought pregnancy care for the first time within 6 months of pregnancy (48.6% during 1st trimester and another 38.5% during 2nd trimester). In Government service area, only 20.7% of the women received 1st ANC care within 1st trimester and another 27.3% within 2nd trimester.

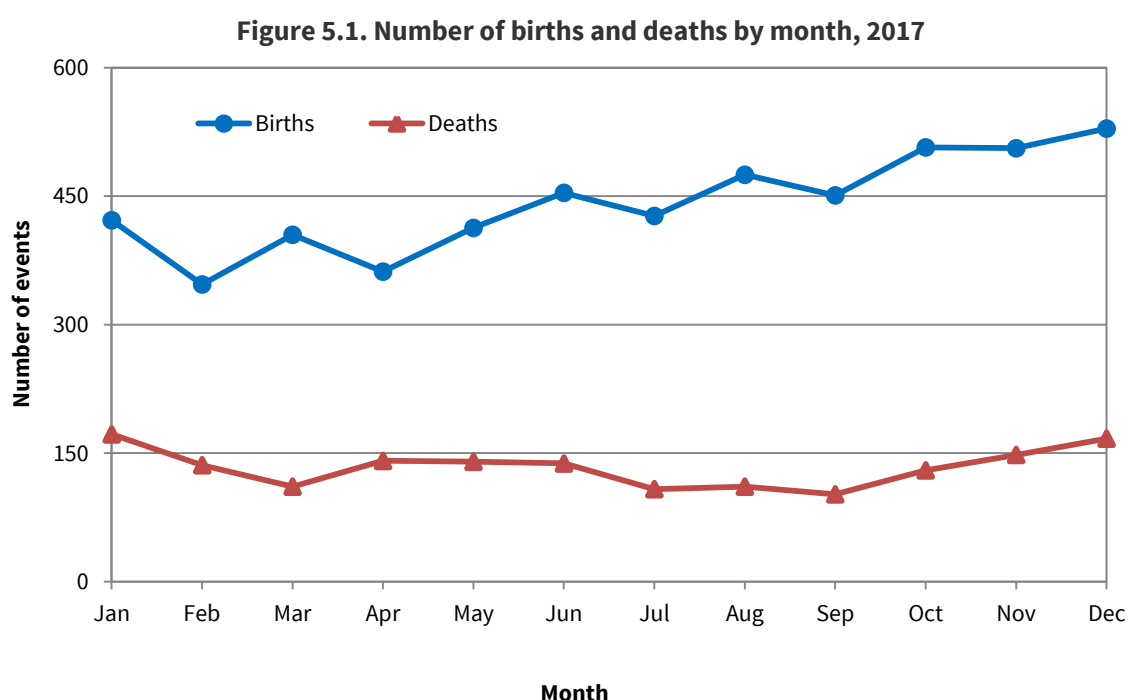


Table 5.1. Numbers and rates of pregnancy outcomes by type and area, 2017

Type of pregnancy outcome	Both areas		icddr,b area		Government area	
	Number	Rate	Number	Rate	Number	Rate
Total pregnancies*	6101	93.9	3174	92.9	2927	95.1
Live birth pregnancy**	5247	858.3	2754	866.3	2493	849.7
Fetal wastage**	854	139.7	420	132.1	434	147.9
Early(miscarriage)***	788	128.9	398	125.2	390	132.9
<i>Induced</i>	185	30.3	60	18.9	125	42.6
<i>Spontaneous</i>	603	98.6	338	106.3	265	90.3
Late (still birth)	66	10.8	22	6.9	44	15.0
Multiple birth pregnancy	46		27		19	
Multiple live birth pregnancy	43		25		18	
<i>Three live births</i>	1		0		1	
<i>Two live births</i>	39		24		15	
<i>One live birth</i>	3		1		2	
Still birth pregnancies						
<i>Three still births</i>	0		0		0	
<i>Two still births</i>	0		0		0	
Miscarriage pregnancies						
<i>Three miscarriages</i>	0		0		0	
<i>Two miscarriages</i>	3		2		1	
*Rate per 1000 women of age 15-49 years (GFR)						
**Rate per 1000 total pregnancies						
***Less than 28 weeks						
****Births to mothers under age 15 years (11 counts) & age above 49 years (1 count) were excluded from this statistics						

Table 5.2. Pregnancy outcomes by month, 2017

Months	Pregnancy outcome					No. of live born children			
	All	Miscarriage		Still birth	Live birth ^a	Both sexes	Male	Female	Ratio
		Induced	Spon.						
All months	6101	185	603	66	5247	5298	2694	2604	1.03
Jan	494	17	51	6	420	422	211	211	1.00
Feb	420	25	48	3	344	347	181	166	1.09
Mar	492	20	64	5	403	405	218	187	1.17
Apr	445	18	58	9	360	362	190	172	1.10
May	505	16	75	6	408	413	185	228	0.81
Jun	522	14	52	7	449	454	226	228	0.99
Jul	486	9	54	3	420	427	224	203	1.10
Aug	535	19	39	4	473	475	253	222	1.14
Sep	517	12	49	8	448	451	251	200	1.26
Oct	563	17	40	5	501	507	240	267	0.90
Nov	555	7	43	4	501	506	242	264	0.92
Dec	567	11	30	6	520	529	273	256	1.07
^a For any multiple birth pregnancy, the outcome is recorded as live birth, if at least one of the issue is live born									
*Births to mothers under age 15 years (11 counts) & age above 49 years (1 count) were excluded from this statistics									
**9 live born children had been found for births to mothers under age 15									

Table 5.3. Age-specific fertility rates (per 1,000 women) and indices by area, 2017

Age (years)	Both areas		icddr,b area		Government service area	
	Births	Rate	Births	Rate	Births	Rate
All ages	5298	81.6	2783	81.4	2515	81.8
15-19	903	76.3	480	78.6	423	73.8
20-24	1,691	164.5	872	159.9	819	169.8
25-29	1,411	141.1	728	137.2	683	145.5
30-34	846	90.9	475	96.6	371	84.4
35-39	361	43.5	180	41.7	181	45.5
40-44	75	9.8	42	10.2	33	9.4
45-49	11	1.5	6	1.5	5	1.4
Total fertility rate		2638		2628		2649
General fertility rate		82		81		82
Gross reproduction rate		1296		1271		1325
Net reproduction rate		1252		1232		1274
<i>*Births to mothers under age 15 & age above 49 were excluded from this statistics</i>						
<i>**9 live births had been occurred for births to mothers under age 15</i>						

Table 5.4. Distribution of pregnancies that ended with live birth by place of delivery by area, 2017

Place of Delivery	Both areas		icddr,b area		Government service area	
	Number	percent	Number	percent	Number	percent
Home	1,241	23.7	303	11.0	938	37.6
ICDDR,B sub-centre	96	1.8	96	3.5	0	0.0
ICDDR,B hospital	773	14.7	773	28.1	0	0.0
Upazila health complex	365	7.0	122	4.4	243	9.7
District hospital	143	2.7	85	3.1	58	2.3
Clinic/nursing home	2,570	49.0	1,362	49.5	1208	48.5
UH & FWC	47	0.9	8	0.3	39	1.6
Others	12	0.2	5	0.2	7	0.3
No. of live births	5,247	100	2,754	100	2,493	100
<i>Source: Birth registration form</i>						
<i>Births to mothers under age 15 & age above 49 were excluded from this statistics</i>						

Figure 5.2. Age-specific fertility rates by area, 2017

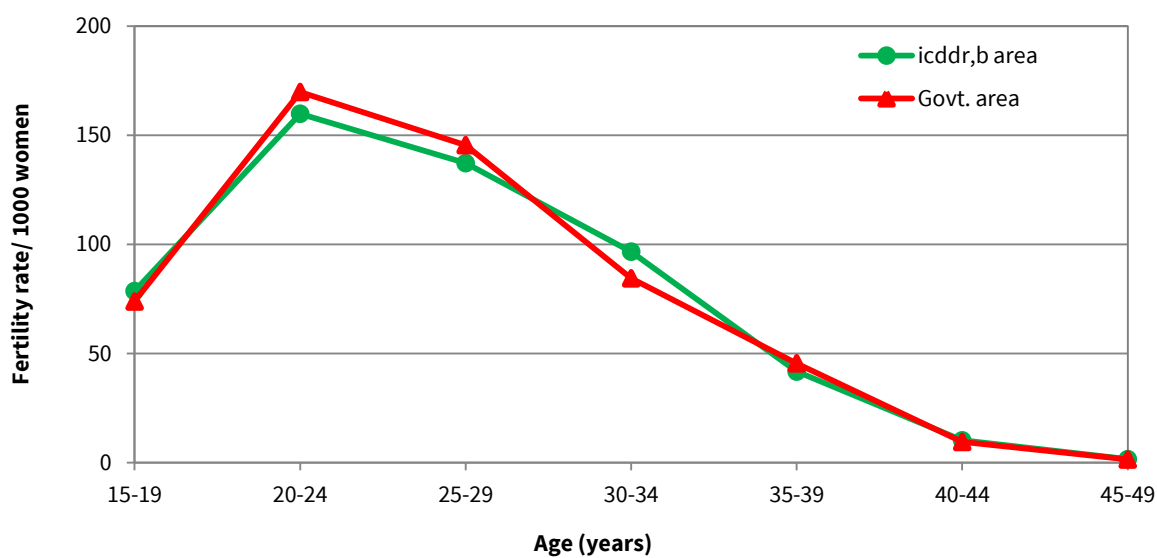


Table 5.5. Distribution of pregnancies that ended with live birth by attendant and area, 2017

Birth attendant	Both areas		icddr,b service area		Govt. service area	
	Number	percent	Number	percent	Number	percent
TBA	699	13.3	200	7.3	499	20.0
Trained TBA	330	6.3	61	2.2	269	10.8
FWV	368	7.0	198	7.2	170	6.8
Nurse	1,085	20.7	801	29.1	284	11.4
MBBS doctor	2,699	51.4	1463	53.1	1236	49.6
Others	27	0.5	10	0.4	17	0.7
None	39	0.7	21	0.8	18	0.7
No. of live birth	5247	100	2754	100	2493	100
<i>TBA=Traditional birth attendant</i>						
<i>FWV= Family welfare visitor</i>						

Table 5.6. Distribution of mode of delivery of live birth by area, 2017

Mode of Delivery	Both areas		icddr,b service area		Govt. service area	
	Number	percent	Number	percent	Number	percent
Normal vaginal	2638	50.3	1345	48.8	1293	51.9
Operation (C/S)	2607	49.7	1407	51.1	1200	48.1
Instrumental (forcep & ventose)	2	0.0	2	0.1	0	0.0
No. of live birth	5247	100	2754	100	2493	100

Table 5.7. Percent distribution of different indicator for ANC visits, 2017
(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	0.7	6.3	3.4
1	2.9	20.9	11.4
2	5.4	26.4	15.4
3	9.7	18.9	14.1
4+	81.2	27.5	55.7
Total	100	100	100
median	5	2	4
Number of months pregnant at the time of the first ANC visits			
No ANC	0.7	6.3	3.4
< 4 months	48.6	20.7	35.3
4 - 5 months	38.5	27.3	33.1
6 - 7 months	9.5	30.1	19.3
8 + months	2.7	15.6	8.8
Total	100	100	100
Median	4	5	4
Number of women giving live births	2754	2493	5247

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 2017 was 3,188, giving a crude marriage rate of 13.3 per 1,000 populations. This rate was 14.2 in 2016.

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 28.8 and 20.1 years for all grooms and brides respectively; 27.5 and 19.0 years for those marrying for the first time—which are similar to those of 2016. One-third (36.6%) of the brides, who are married for the first time aged below 18 years and 5.9% 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 38.4 per 1,000 males aged 10 years and above, and for females the rate was 30.3 per 1,000 females aged 10 years and above. For females, the highest rate was 199.4 per 1,000 at the age of 18 years, while for males the highest rate was 289.0 per 1,000 at the age of 27 years. The highest rate of marriage for males decreased to age 27 years in 2017 from 28 years in 2016, but the highest rate of marriage for female was the same to age 18 years in 2017 that of in 2016. Table 6.4 shows distribution of current marital status of the study population by age and sex in 2017. Of the total population 50.6 % were currently married and it was higher for females than males (52.9% vs 47.7%). Widows also constituted a higher proportion for females (9.6%) 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 2008-2017. Groom's party received marriage gifts from the bride's family 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 34.0% in 2017. Incidence of giving dowry shows a declining trend over time from 2008-2017 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 78.5% in 2017 with a decreasing trend in recent years. Highest registration was 94.6% in 2009. 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 465 divorces in 2017 (Appendix A.10) and of them, 280 were divorce of Muslim marriages. 60.2% 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 40.0 months. Figure 6.1 shows the distribution of marriages and divorces by month. In 2017 marriages were high in March 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 (25.6%) followed by wife's affairs with other man (18.3%) and husband's affairs with other woman (12.3%).

Figure 6.1. Number of marriages and divorces by month, 2017

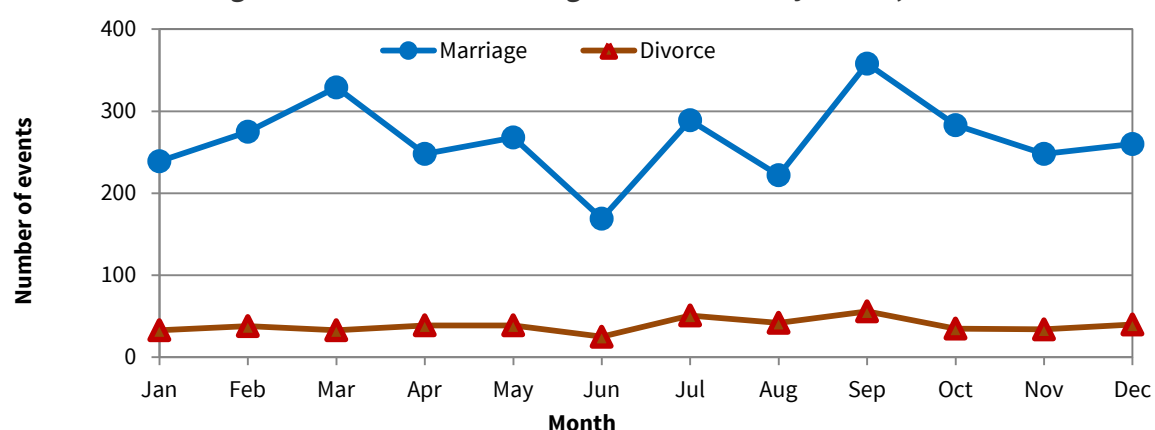


Table 6.1 Groom's age at marriage by previous marital status, 2017

Age (years)	All grooms	Previous marital status (%)			
		Single	Married	Divorced	Widowed
	0.0	0.0	0.0	0.0	0.0
All ages	100.0 (n=3188)	100.0 (n=2682)	100.0 (n=57)	100.0 (n=344)	100.0 (n=104)
10-14	0.0	0.0	0.0	0.0	0.0
15-17	0.8	0.9	0.0	0.6	0.0
18	1.0	1.2	0.0	0.3	0.0
19	1.5	1.7	0.0	0.6	0.0
20	2.2	2.2	1.8	2.9	0.0
21	2.1	2.3	0.0	1.5	0.0
22-24	13.1	14.8	7.0	4.1	1.9
25-29	43.8	47.5	19.3	29.1	10.6
30-34	24.0	23.8	21.1	30.5	9.6
35-39	6.5	5.0	12.3	15.7	13.5
40-44	2.0	0.5	17.5	9.0	9.6
45-49	0.8	0.0	10.5	3.8	6.7
50-54	0.8	0.0	1.8	0.6	20.2
55-59	0.6	0.0	7.0	0.9	11.5
60-64	0.2	0.0	0.0	0.3	5.8
65+	0.4	0.0	1.8	0.3	10.6
Unknown	0.03	0.0	0.0	0.0	0.0
Median age*	28.0	27.0	35.0	31.0	46.0
Mean age*	28.8	27.5	36.9	32.2	46.6
Standard dev.*	6.6	4.4	10.5	7.3	13.5
*One groom had been found with age missing and no information regarding on marital status					
**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, 2017

Age (years)	All brides	Single	Divorced	Widowed
	0.0	0.0	0.0	0.0
All ages	100.0 (n=3188)	100.0 (n=2746)	100.0 (n=408)	100.0 (n=34)
10-14	3.1	3.6	0.0	0.0
15	5.8	6.7	0.0	0.0
16	10.1	11.3	2.7	0.0
17	13.1	14.9	2.2	0.0
18	14.4	16.2	3.9	0.0
19	12.0	12.8	7.8	0.0
20 - 24	27.7	26.8	35.0	8.8
25 - 29	8.4	6.1	24.3	5.9
30 - 34	3.3	1.2	15.0	35.3
35 - 39	1.1	0.3	5.6	8.8
40 - 44	0.3	0.0	1.0	17.6
45 - 49	0.4	0.0	1.5	17.6
50 - 54	0.1	0.0	0.0	5.9
55 - 59	0.1	0.0	0.7	0.0
60 - 64	0.03	0.0	0.2	0.0
65+	0.0	0.0	0.0	0.0
Unknown	0	0	0	0
Median age*	19.0	18.0	24.0	34.5
Mean age*	20.1	19.0	25.8	36.9
Standard dev.*	5.0	3.5	6.9	8.3
*Mean and median ages and standard deviation were calculated from ungrouped age data				

Table 6.3 Marriage rates by age and sex, 2017

Age(years)	Male			Female			
	Marriages	Population	Rate*	Age(years)	Marriages	Population	Rate*
All ages(10+ yrs)	3188	83065	38.4	All ages(10+ yrs)	3188	105290	30.3
10-14	0	12155	0.0	10-14	100	12633	7.9
15-19	105	10178	10.3	15	185	2574	71.9
20-24	555	5963	93.1	16	321	2485	129.2
25	194	973	199.4	17	419	2279	183.9
26	252	1129	223.2	18	460	2307	199.4
27	343	1187	289.0	19	384	2195	174.9
28	303	1247	243.0	20-24	883	10277	85.9
29	305	1203	253.5	25-29	268	10000	26.8
30-34	766	6267	122.2	30-34	106	9310	11.4
35-39	208	6163	33.7	35-39	34	8298	4.1
40-44	65	5887	11.0	40-44	10	7635	1.3
45+	91	30713	3.0	45+	18	35297	0.5
Unknown	1	-	-	Unknown	0	-	-
*Rates per 1000 population irrespective of previous marital status							

Table 6.4. Distribution of current marital status (%) by age and sex, 2017

Age (years)	Male					Female				
	NM	PM	WID	DIV	Total	NM	PM	WID	DIV	Total
0-4	100.0	0.0	0.0	0.0	13,125	100.0	0.0	0.0	0.0	12,757
5-9	100.0	0.0	0.0	0.0	12,440	100.0	0.0	0.0	0.0	12,353
10-14	100.0	0.0	0.0	0.0	12,155	99.2	0.8	0.0	0.0	12,633
15-19	98.3	1.6	0.0	0.0	10,178	64.3	34.8	0.0	0.9	11,840
20-24	77.6	22.2	0.0	0.2	5,963	15.2	82.7	0.1	1.9	10,277
25-29	36.0	63.2	0.0	0.8	5,739	4.3	93.7	0.4	1.6	10,000
30-34	10.9	88.4	0.0	0.7	6,267	1.4	96.2	0.8	1.5	9,310
35-39	3.1	95.9	0.0	0.9	6,163	0.8	96.4	1.8	1.0	8,298
40-44	1.4	98.0	0.0	0.6	5,887	0.4	94.2	4.2	1.3	7,635
45-49	0.7	98.5	0.2	0.6	5,863	0.2	91.2	7.4	1.1	7,586
50-54	0.5	98.9	0.3	0.4	6,246	0.4	82.8	15.1	1.7	7,742
55-59	0.4	98.2	1.1	0.4	6,450	0.2	72.4	25.6	1.9	6,234
60-64	0.4	97.0	2.1	0.5	4,188	0.1	58.3	39.9	1.6	4,264
65-69	0.1	95.4	4.3	0.2	2,959	0.0	41.2	57.6	1.2	3,303
70-74	0.3	92.5	7.0	0.2	2,154	0.0	26.1	72.8	1.1	2,944
75-79	0.2	88.8	10.7	0.2	1,442	0.1	13.6	85.7	0.6	1,817
80-84	0.2	82.2	17.3	0.2	890	0.1	5.2	94.1	0.7	910
85+	0.0	62.0	38.0	0.0	521	0.0	2.8	96.6	0.6	497
Total	51.1	47.7	0.9	0.3	108630	36.5	52.9	9.6	1.0	130400

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

Table 6.5. Duration (months) of all marriages at divorce by age and sex, 2017

Age at divorce (years)	Male				Female			
	Count	Mean	Median	SD	Count	Mean	Median	SD
< 20	11	10.4	8.0	6.5	132	16.3	13.0	14.8
20 - 24	55	19.2	14.0	18.9	163	30.0	24.0	26.0
25 - 29	132	26.2	17.0	27.2	81	53.3	42.0	42.5
30 - 34	142	37.4	25.0	37.2	40	98.5	96.0	62.5
35 - 39	63	61.1	38.0	60.5	15	90.5	57.0	91.9
40 - 49	36	83.4	61.5	72.5	13	101.6	62.0	88.0
50+	26	69.8	40.5	75.4	21	30.1	10.0	57.6
All ages	465	40.0	24.0	47.4	465	40.0	24.0	47.4

Table 6.6. Marriages by type of gifts received by grooms party from bridal party, 2008-2017

Type of gift received	Year									
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
None	40.9	40.1	43.2	57.6	48.5	48.5	53.6	57.5	61.8	64.2
Gift without prior negotiation	1.3	0.6	0.6	0.9	1.1	0.9	1.4	2.2	2.1	1.8
Gift after prior negotiation	57.9	59.3	56.2	41.5	50.3	50.6	45	40.3	36	34.0
Gift payment										
Full	15.8	19.1	18.8	13.2	16.7	18.8	16.1	16.9	15.5	15.7
Partial	34.6	33.7	31.1	22.4	26.8	25.9	24.4	19	16.3	14.8
Not yet paid*	7.5	6.5	6.3	5.8	6.8	5.9	4.5	4.3	4.2	3.5

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

Table 6.7. Registration status of Muslim marriages and divorces, 2000-2017

Year	Marriage Registered by Kazi		Divorce Registered by Kazi	
	Count	Percent	Count	Percent
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
2017	2449	86.2	280	80.0

Table 6.8. Cause of divorces by area, Matlab, 2017

Cause of Divorce	Both areas		icddr,b area		Government area	
	Count	Percent	Count	Percent	Count	Percent
Dowry	10	2.2	5	2.5	5	1.9
Domestic violence	32	6.9	11	5.4	21	8.0
Husbands affairs with other woman	57	12.3	24	11.8	33	12.6
Wife affairs with other man	85	18.3	39	19.1	46	17.6
Wife maladjustment with husband/family	119	25.6	63	30.9	56	21.5
Husband addicted to drug or gambling	38	8.2	18	8.8	20	7.7
No trace of husband	15	3.2	5	2.5	10	3.8
Husband/wife not good looking	24	5.2	7	3.4	17	6.5
Husband mentally/physically disable	35	7.5	13	6.4	22	8.4
Wife mentally/physically disable	20	4.3	9	4.4	11	4.2
Others/unspecified	30	6.5	10	4.9	20	7.7
Total	465	100.0	204	100.0	261	100.0

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.

In 2017, a total of 12,395 persons (6,023 males and 6,372 females) moved into the HDSS area, which represented an annual average in-migration of 55.4 and 48.9 per 1000 mid-year population for males and females respectively. On the other hand, 15,230 persons (8,532 males and 6,698 females) left the HDSS area or on an average 63.7 per 1000 mid-year population for both males and females (Table 7.1 and Appendix A.11). In 2017 the highest incidence of in-migration for males was 14.0% in the age group 25-29 and for females was 11.5% in the age group 20-24. The highest out-migration was in the age group 20-24 for both sex, 24.0% for males and 13.0% for females. More males out-migrated than females in the age group (35-44). The higher out migration of males affected sex ratio of the population in the area – as the sex ratio decreased from 103 to 83 males per 100 females between 1982 and 2017. 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 2017 than those of 2016. The net loss of population due to migration was 11.9 per 1,000 population in 2017; it, was 2.3 per 1,000 population in 2016. Table 7.1 presents the age-specific migration rates, which are illustrated in Figure 7.1. The tables and figures show age specific in- and out-migration. Migration among young children mainly indicates that they are 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.14 through A.17. 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.18).

Table 7.1. Age and sex-specific migration rates (per 1,000 population) by direction, 2017

Age (years)	Both sexes		Male		Female	
	In	Out	In	Out	In	Out
All ages	51.9	63.7	55.4	78.5	48.9	51.4
0 - 4	66.2	62.1	65.4	65.0	67.0	59.0
5-9	40.5	45.0	40.8	49.9	40.2	40.0
10-14	30.5	43.8	30.7	52.5	30.2	35.4
15-19	77.0	124.9	37.0	130.3	111.4	120.3
20-24	109.9	170.6	100.6	239.8	115.3	130.5
25-29	99.9	117.3	139.9	179.3	76.9	81.7
30-34	81.4	80.3	128.0	132.1	50.1	45.4
35-39	54.3	66.6	88.1	112.4	29.2	32.5
40-44	37.3	41.6	62.0	72.4	18.3	17.8
45-49	29.7	30.0	48.1	46.2	15.4	17.4
50-54	22.4	15.7	32.7	23.1	14.2	9.8
55-59	17.2	15.8	21.9	18.4	12.4	13.2
60-64	15.3	14.2	19.3	12.4	11.3	15.9
65+	14.3	19.3	10.7	12.8	17.4	24.8
Correction note for previous years' report: Migration rates for 65+ years of age group were mistakenly reported for 65-69 years.						

Table 7.2. Number of in- and out-migrations by sex and month, 2017

Month	In-migration			Out-migration		
	Both sexes	Male	Female	Both sexes	Male	Female
All months	12,395	6,023	6,372	15,230	8,532	6,698
Jan	1,576	757	819	1,857	1,030	827
Feb	1,064	491	573	1,254	708	546
Mar	1,181	561	620	1,330	771	559
Apr	938	472	466	1,244	749	495
May	1,176	580	596	1,348	764	584
Jun	1,029	527	502	1,053	597	456
Jul	839	374	465	1,392	811	581
Aug	1,059	547	512	1,158	644	514
Sep	997	480	517	1,362	711	651
Oct	856	429	427	1,162	636	526
Nov	842	412	430	1,013	557	456
Dec	838	393	445	1,057	554	503

Figure 7.1. In- and out-migrations rates by sex and age in Matlab, 2017

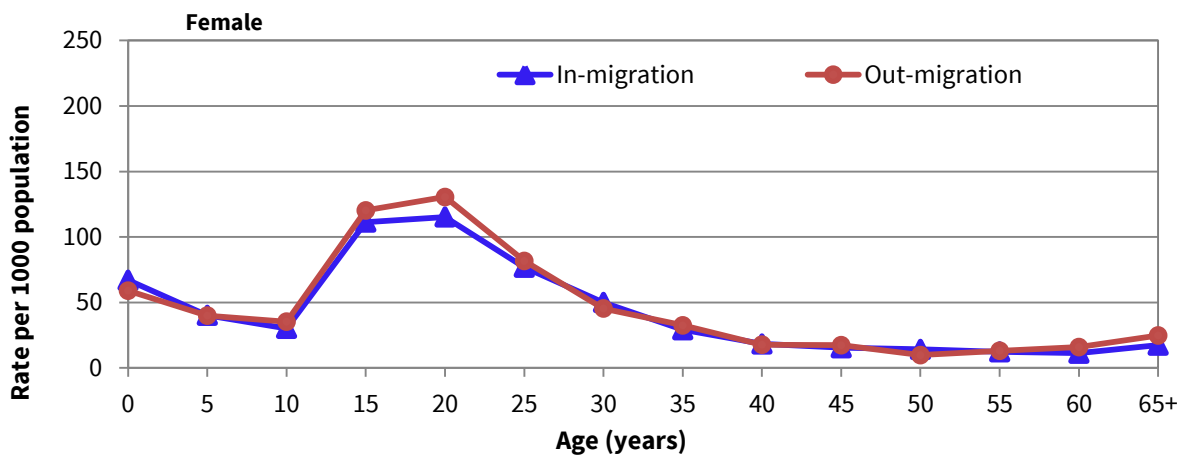
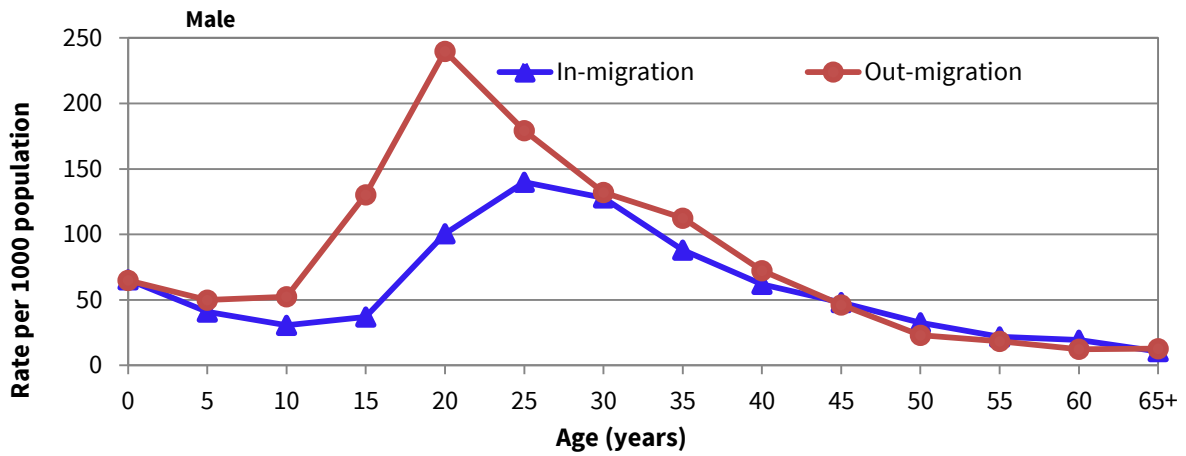
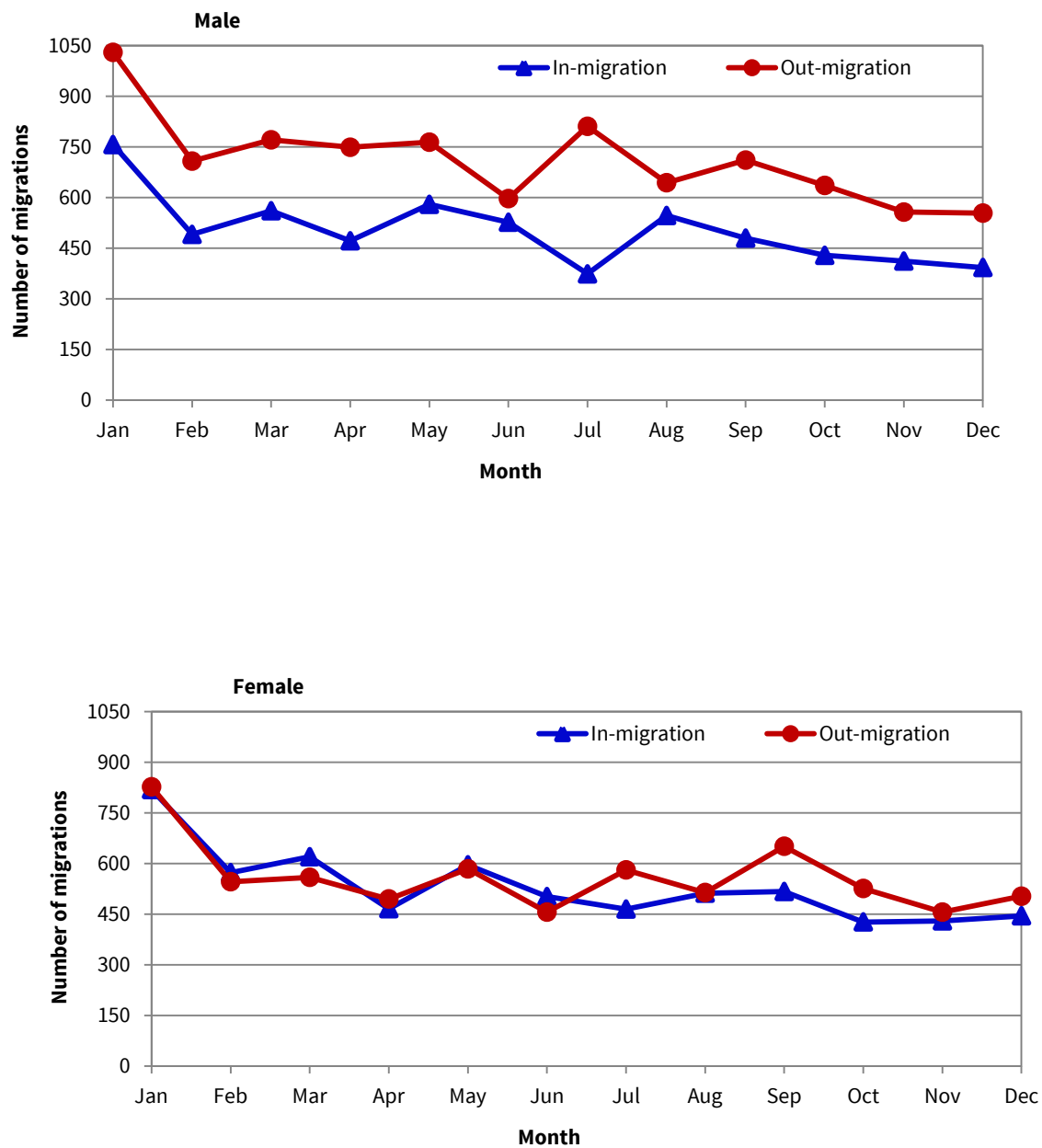


Figure 7.2. Number of in- and out-migrations by sex and month in Matlab, 2017



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 horizontal 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 40 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 2017, the contraceptive use rate was 47.7% in the icddr,b service area and 36.8% in the Government service area (Table 8.1). Table 8.2 shows the difference in contraceptive method-mix between the icddr,b and Government service areas in 2017 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 2001-2017 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). It declines in late 40's of women's life. 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, 1987-2017

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	-	-
2017	47.7	36.8	-	61.9

*Sources: In-depth and KAP surveys, 1984 & 1990; MDHS 1992; HDSS census 1996 and HDSS 2002-2017.

**Sources: Contraceptive prevalence survey, Bangladesh fertility survey 1989; Bangladesh demographic and health survey 1993-94, 1996-97, 1999-2000, 2004, 2007, 2011, 2014, 2017; 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 2017-18)
	icddr,b service area, 2017	Government service area, 2017		
Pill	29.3	38.1	43.0	41.0
Condom	10.2	8.5	7.2	11.6
Injectables	36.8	25.2	25.7	17.3
IUD	0.8	1.0	1.3	1.0
Tubectomy	13.3	15.5	5.9	7.8
Vasectomy	1.9	1.0	0.8	1.8
Norplant/Implant	5.2	3.9	2.2	3.4
Others*	2.5	6.9	13.8	16.2
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, 2001-2017

Method	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
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	34.4
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	9.9
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	33.5
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	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	14.8
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	1.6
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	4.9
All	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

*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, 2017

Age (years)	Not using	Any method used	Method used								Missing information	No. of eligible women
			Pill	IUD	Injectables	Condom	Tubectomy	Vasectomy	Others*	Norplant		
<20	73.3	26.4	7.9	0.1	13.0	2.5	0.0	0.0	0.3	2.6	0.3	1171
20 - 24	64.3	35.4	12.3	0.4	15.3	4.3	0.1	0.0	0.4	2.5	0.3	3664
25 - 29	56.8	42.9	14.9	0.5	17.7	5.1	1.4	0.1	0.3	2.9	0.3	4330
30 - 34	52.4	47.4	15.0	0.4	18.7	4.6	4.4	0.5	0.9	2.8	0.3	4320
35 - 39	43.8	56.1	16.6	0.3	19.0	5.1	9.9	1.2	1.2	2.7	0.1	3921
40 - 44	40.5	59.4	14.4	0.4	19.4	5.8	13.3	1.6	2.5	1.9	0.1	3657
45 - 49	46.4	53.4	11.9	0.3	17.0	5.2	12.1	2.6	2.3	2.0	0.2	2610
Total	52.2	47.6	14.0	0.4	17.7	4.9	6.1	0.8	1.2	2.5	0.2	23673

*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, 2017

Age (years)	Not using	Any method used	Method used								Missing information	No. of eligible women
			Pill	IUD	Injectables	Condom	Tubectomy	Vasectomy	Others*	Norplant		
<20	83.9	15.9	6.9	0.1	3.9	3.2	0.0	0.0	1.3	0.5	0.2	1017
20 - 24	75.0	24.7	12.4	0.2	6.3	3.6	0.1	0.0	1.1	1.0	0.3	3170
25 - 29	68.0	31.8	15.2	0.3	8.5	3.6	1.3	0.1	1.4	1.4	0.2	3885
30 - 34	60.6	39.2	15.6	0.4	10.3	3.7	5.0	0.3	1.9	1.9	0.2	3920
35 - 39	52.4	47.5	17.5	0.4	11.8	2.9	8.8	0.6	3.3	2.2	0.1	3614
40 - 44	53.5	46.4	14.3	0.6	11.7	2.8	11.0	0.7	3.8	1.6	0.1	3103
45 - 49	61.3	38.7	10.0	0.3	8.5	1.9	11.3	0.8	5.2	0.6	0.0	2422
Total	62.9	37.0	14.1	0.4	9.3	3.1	5.6	0.4	2.5	1.5	0.2	21131

*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 2017 and the Government service area from 2000 to 2017. In 2017, 96.1% received BCG, 93.8% received three doses of pentavalent and polio and 81.4% received measles rubella vaccines in icddr,b area and 96.6% received BCG, 91.6% received three doses of pentavalent and polio and 80.6% received measles rubella (MR) vaccine in Government service area.

We observe a drop of approximately ten percentage points in all vaccine coverage in 2017 compared to 2016. The decline, mainly due to the drop in coverage of DPT/Pentavalent and MR, needs further investigation to be explained.

Table 9.1. Immunization coverage (%) among children aged 12-23 months in icddr,b service area, 1987-2017 and Government service area, 2000-2017

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
2017	96.1	96.6	93.8	91.6	81.4	80.6	78.7	78.7

*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)

Scope of Geographic Information System (GIS) of Matlab HDSS

Geographic information system (GIS) has been a very important and powerful tool in any field of research and planning in recent decades. It is also a strong and useful in social and public health research and policy. GIS information is widely available in developed countries. 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 any 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 also 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. However, using GIS information in developing and under developed countries like Bangladesh is a challenge till date due to its limited availability.

To enrich the research findings, a Geographic Information System (GIS) was established in 1994 under the Public Health Sciences Division, icddr, to record selected geo-locations. It was a great inclusion to produce cartographic, thematic and analytic maps to enrich public health studies and results. 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 other research areas as an essential tool. This chapter describes the GIS based on Matlab HDSS.

Trained Field Research Supervisors and GPS surveyors collected spatial data using handheld Global Positioning System (GPS) device under the supervision of a GIS expert. The geo-locations are periodically updated according to necessity. One of the very important features of GIS based on Matlab HDSS is that the locations can be linked with all *baris* in the HDSS. As households in a *bari* are very closed to each other, the *bari* locations can be used as proxy of household locations in it. Table 10.1. shows different object oriented structural layers that Matlab HDSS created for spatial analysis.

Table 10.1. Existing Geo-spatial database in different layer within Matlab HDSS area

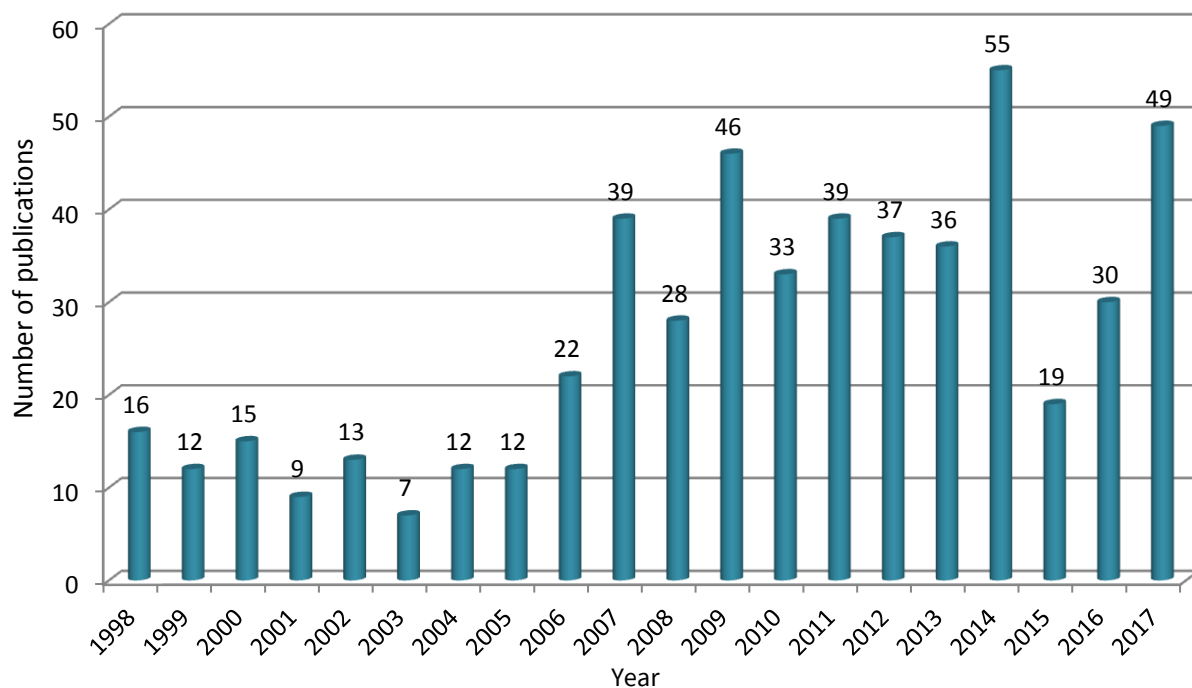
	Points	Lines	Polygons
Community	Bari (group of household) Community clinics Family Welfare Centers FWC) Government hospital icddr,b hospital icddr,b sub-centres Pharmacies Tubewells	Road network: -Concretes -Non-concrete Water network: -Main river -River and Channels	Block area Comparison area Intervention area Mauza boundary Union boundary Village boundary
Infrastructures	Mosque Educational institute: -Primary school -Secondary school -College -Madrasah	Embankment	Embankment
Others	Bazaar Bridge Ditches Ponds		Main river

CHAPTER 11

PUBLICATIONS

The Matlab HDSS has been a global resource in the field of health research for its tremendous contribution in development of health solutions. The HDSS itself and other nested observational and intervention projects have been instrumental in knowledge generation and evidence creation in social and health science. Publication of peer reviewed articles in journals is an important platform for spread the knowledge and evidence throughout the world to enhance research and to improve lives by reducing mortality and morbidity. The following graph shows the number of articles published in different peer reviewed journal based on Matlab HDSS and studies nested with the HDSS since 1998 to 2017. An average of 26.45 articles has been published in last twenty years based on Matlab HDSS. This average increases to 37.2 for last ten years. This is snap shot that speaks about the HDSS's contribution in science.

Figure 11.1 Number of articles published in peer reviewed journals based on Matlab HDSS and studies nested with the HDSS, 1998-2017



Note: No system is on board to list the articles based on Matlab HDSS or other studies nested with the HDSS published by researchers from organizations other than icddr. icddr library had an attempt to list all those through their standard searching mechanism to summarize the number of the articles. So, the numbers showed here have chance of being under reported.

BIBLIOGRAPHY

Ahmed OB, Boschi-Pinto C, Lopez AD, Murray CJL, Lozano R, Inoue M (2000) Age standardization of rates: A new WHO standard, GPE Discussion Paper Series, No. 31, Geneva: WHO.

Bangladesh Bureau of Statistics (2015) Bangladesh Population Census 2011, Zila: Chandpur, Analytical Series Vol. 2, Dhaka: Government of Bangladesh, Ministry of Planning.

D'Souza S (1981) A population laboratory for studying disease process and mortality - the demographic surveillance system, Matlab, Bangladesh", Special Publication, No. 13, Dhaka: icddr,b .

icddr,b (2006) Health and Demographic Surveillance System-Matlab, volume 36, Registration of health and demographic events 2003, Scientific Report No. 92, Dhaka: icddr,b .

Millennium Development Goals: Bangladesh Progress Report 2012. General Economics Division, Bangladesh Planning Commission, Government of the People's Republic of Bangladesh June 2013. Available with www.bd.undp.org/content/bangladesh/en/home/.../mdg/publication_1

Mitra SN, MN Ali, S Islam, AR Cross and T Saha (1994) Bangladesh Demographic and Health Survey, 1993~94, Dhaka, Bangladesh and Calverton, Maryland: NIPORT, Mitra and Associates and Macro International Inc.

National Institute of Population Research and Training (NIPORT), Mitra and Associates, and ICF International. 2016. BDHS (2014) - Bangladesh Demographic and Health Survey 2014. Dhaka, Bangladesh, and Rockville, Maryland, USA: NIPORT, Mitra and Associates, and ICF International.

National Institute of Population Research and Training (NIPORT), Mitra and Associates, and ICF International. 2011. BDHS (2011) - Bangladesh Demographic and Health Survey 2011. Dhaka, Bangladesh, and Calverton, Maryland, USA: NIPORT, Mitra and Associates, and ICF International.

National Institute of Population Research and Training, Mitra and Associates, and ORC Macro (2008) Bangladesh Demographic and Health Survey 2007: Preliminary Findings, Dhaka, Bangladesh and Calverton, Maryland: NIPORT, Mitra and Associates and ORC Macro.

National Institute of Population Research and Training, Mitra and Associates, and ORC Macro (2006) Bangladesh Demographic and Health Survey 2004, Dhaka, Bangladesh and Calverton, Maryland: NIPORT, Mitra and Associates and ORC Macro.

Ruzicka LT and AKMA Chowdhury (1978) Demographic Surveillance System-Matlab: Volume Two, Census 1974, Scientific Report No. 10, Dhaka: Cholera Research Laboratory.

Shryock HS, Seigel JS, et al. (1975) The methods and materials of demography (revised), v. II. Washington DC: Bureau of the Census: 414, 444-5.

APPENDIX A

Appendix A-1a Mid-year population in icddr,b service area by age, sex and block, 2017

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	41741	19031	22710	34762	15753	19009	25401	11740	13661	22731	10319	12412
Under 1	937	456	481	813	395	418	543	283	260	448	227	221
1 - 4	3664	1894	1770	3136	1550	1586	2231	1153	1078	1804	925	879
1	916	477	439	885	440	445	581	324	257	467	254	213
2	957	493	464	753	373	380	553	283	270	444	235	209
3	920	479	441	759	368	391	538	274	264	431	215	216
4	871	445	426	739	369	370	559	272	287	462	221	241
5 - 9	4534	2,284	2,250	3648	1,890	1,758	2548	1,306	1,242	2239	1,116	1,123
10-14	4306	2,119	2,187	3551	1,747	1,804	2545	1,218	1,327	2355	1,152	1,203
15-19	3636	1,622	2,014	3293	1,441	1,852	2154	1,031	1,123	2058	938	1,120
20-24	2922	1,036	1,886	2481	895	1,586	1740	639	1,101	1471	589	882
25-29	2889	1,011	1,878	2366	896	1,470	1661	600	1,061	1377	481	896
30-34	2858	1,095	1,763	2272	982	1,290	1708	705	1,003	1371	512	859
35-39	2645	1,203	1,442	2089	868	1,221	1574	717	857	1333	535	798
40-44	2568	1,122	1,446	1936	833	1,103	1489	675	814	1389	616	773
45-49	2344	1,076	1,268	1887	836	1,051	1532	654	878	1299	551	748
50-54	2430	1,128	1,302	1987	860	1,127	1501	695	806	1485	689	796
55-59	2011	1,044	967	1738	906	832	1376	706	670	1386	703	683
60-64	1341	673	668	1130	555	575	931	452	479	894	470	424
65-69	971	469	502	872	412	460	668	330	338	648	293	355
70-74	806	348	458	688	274	414	572	254	318	508	216	292
75-79	473	235	238	452	191	261	363	168	195	359	150	209
80-84	235	128	107	258	135	123	173	98	75	200	103	97
85+	171	88	83	165	87	78	92	56	36	107	53	54

Appendix A-1b: Mid-year population in Government service area by age, sex and block, 2017

Age	Block-E			Block-F			Block-G		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	41212	18666	22546	37539	17072	20467	35644	16049	19595
Under 1	898	469	429	841	429	412	793	387	406
1 - 4	3543	1783	1760	3157	1557	1600	3074	1617	1457
1	894	440	454	827	375	452	763	397	366
2	916	476	440	778	380	398	845	456	389
3	897	453	444	808	430	378	731	377	354
4	836	414	422	744	372	372	735	387	348
5 - 9	4339	2,126	2,213	3787	1,898	1,889	3698	1,820	1,878
10-14	4460	2,198	2,262	3780	1,870	1,910	3791	1,851	1,940
15-19	3900	1,855	2,045	3572	1,720	1,852	3405	1,571	1,834
20-24	2736	972	1,764	2535	990	1,545	2355	842	1,513
25-29	2612	959	1,653	2534	948	1,586	2300	844	1,456
30-34	2653	1,035	1,618	2420	1,023	1,397	2295	915	1,380
35-39	2452	1,027	1,425	2231	906	1,325	2137	907	1,230
40-44	2234	936	1,298	1980	878	1,102	1926	827	1,099
45-49	2354	1,023	1,331	2119	901	1,218	1914	822	1,092
50-54	2385	1,097	1,288	2169	886	1,283	2031	891	1,140
55-59	2228	1,119	1,109	2062	1,034	1,028	1883	938	945
60-64	1464	737	727	1375	705	670	1317	596	721
65-69	1130	507	623	1002	508	494	971	440	531
70-74	877	382	495	849	349	500	798	331	467
75-79	515	223	292	574	242	332	523	233	290
80-84	305	155	150	346	134	212	283	137	146
85+	127	63	64	206	94	112	150	80	70

Appendix A-2a Deaths in icddr,b service area by age, sex and block, 2017

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	239	138	101	246	130	116	208	127	81	175	95	80
Under 1 year	11	8	3	23	13	10	8	5	3	8	5	3
< 7 days	5	5	0	13	7	6	6	3	3	5	3	2
7-29 days	4	2	2	5	5	0	1	1	0	0	0	0
1- 5 months	0	0	0	3	1	2	0	0	0	2	1	1
6-11 months	2	1	1	2	0	2	1	1	0	1	1	0
1 - 4 years	4	3	1	5	2	3	8	5	3	5	3	2
1	2	2	0	4	2	2	4	1	3	0	0	0
2	2	1	1	0	0	0	0	0	0	0	0	0
3	0	0	0	1	0	1	0	0	0	2	1	1
4	0	0	0	0	0	0	4	4	0	3	2	1
5 - 9	2	1	1	2	1	1	3	3	0	0	0	0
10-14	3	1	2	1	0	1	2	0	2	1	1	0
15-19	4	3	1	1	1	0	2	0	2	1	1	0
20-24	0	0	0	0	0	0	3	1	2	0	0	0
25-29	3	2	1	3	1	2	1	1	0	1	0	1
30-34	6	3	3	3	2	1	0	0	0	6	2	4
35-39	4	1	3	4	0	4	1	1	0	0	0	0
40-44	1	1	0	4	3	1	3	3	0	5	2	3
45-49	9	6	3	10	5	5	4	1	3	3	1	2
50-54	7	4	3	9	7	2	14	8	6	13	6	7
55-59	12	6	6	8	8	0	22	18	4	13	8	5
60-64	18	13	5	21	15	6	18	9	9	12	7	5
65-69	32	19	13	21	12	9	23	17	6	21	15	6
70-74	40	23	17	29	12	17	25	17	8	20	12	8
75-79	28	16	12	38	17	21	31	17	14	27	16	11
80-84	27	11	16	34	13	21	22	10	12	19	9	10
85+	28	17	11	30	18	12	18	11	7	20	7	13

Appendix A-2b Deaths in Government service area by age, sex and block, 2017

Age	BLOCK E			BLOCK F			BLOCK G		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	300	171	129	267	148	119	252	137	115
Under 1 year	19	17	2	20	12	8	27	16	11
< 7 days	10	10	0	12	9	3	19	11	8
7 -29 days	2	2	0	6	2	4	3	3	0
1- 5 months	7	5	2	1	1	0	4	1	3
6-11 months	0	0	0	1	0	1	1	1	0
1 - 4 years	9	7	2	13	6	7	7	4	3
1	5	4	1	6	3	3	3	2	1
2	1	1	0	2	0	2	2	1	1
3	1	1	0	3	2	1	0	0	0
4	2	1	1	2	1	1	2	1	1
5 - 9	5	1	4	4	3	1	3	1	2
10-14	1	0	1	1	0	1	1	0	1
15-19	1	0	1	0	0	0	2	2	0
20-24	3	1	2	2	1	1	2	0	2
25-29	0	0	0	2	2	0	1	0	1
30-34	2	1	1	4	2	2	1	1	0
35-39	4	2	2	3	3	0	1	0	1
40-44	4	2	2	6	3	3	4	3	1
45-49	10	4	6	8	3	5	3	1	2
50-54	14	12	2	11	8	3	9	8	1
55-59	24	14	10	17	12	5	15	8	7
60-64	18	11	7	24	18	6	17	12	5
65-69	38	20	18	22	12	10	30	13	17
70-74	35	20	15	26	12	14	36	18	18
75-79	47	25	22	42	22	20	38	17	21
80-84	42	26	16	30	15	15	26	17	9
85+	24	8	16	32	14	18	29	16	13

Appendix A-3 Abridged life table for icddr,b service area by sex, 2017

Age (years)	Male				Female			
	nQ _x	l _x	L _x	e0 _x	nQ _x	l _x	L _x	e0 _x
0	22.8	100000	98064	70.1	13.8	100000	98830	74.9
1	3.3	97722	97530	70.7	3.7	98623	98409	75.0
2	0.7	97396	97361	69.9	0.8	98260	98223	74.2
3	0.7	97326	97289	69.0	1.5	98185	98111	73.3
4	4.6	97253	97030	68.1	0.8	98036	97999	72.4
5	3.8	96807	483193	67.4	1.6	97962	489455	71.5
10	1.6	96441	481850	62.6	3.8	97808	488179	66.6
15	5.0	96287	480333	57.7	2.5	97434	486619	61.8
20	1.6	95809	478697	53.0	1.8	97195	485565	57.0
25	6.7	95658	476817	48.1	3.8	97017	484244	52.1
30	10.6	95019	472780	43.4	8.1	96652	481452	47.2
35	3.0	94015	469423	38.8	8.1	95868	477556	42.6
40	13.8	93732	465681	33.9	4.8	95094	474413	37.9
45	20.7	92441	457793	29.3	16.4	94635	469603	33.1
50	36.4	90532	445012	24.9	22.1	93088	460684	28.6
55	57.9	87232	424402	20.7	23.5	91031	450199	24.2
60	97.6	82178	392079	16.9	56.7	88888	432714	19.7
65	190.4	74155	337040	13.4	98.0	83847	399968	15.7
70	256.6	60037	262839	10.9	156.2	75630	350127	12.2
75	363.4	44632	182826	8.8	277.7	63818	275918	8.9
80	376.3	28414	115387	7.4	530.7	46095	166681	6.4
85+	1000.0	17720	94955	5.4	1000.0	21632	126272	5.8

Appendix A-4 Abridged life table for Government service area by sex, 2017

Age (years)	Male				Female			
	nQ _x	l _x	L _x	e0 _x	nQ _x	l _x	L _x	e0 _x
0	35.0	100000	97023	69.6	16.8	100000	98569	75.0
1	7.4	96498	96077	71.2	3.9	98316	98088	75.3
2	1.5	95784	95711	70.7	2.4	97930	97811	74.6
3	2.4	95638	95524	69.8	0.8	97691	97650	73.8
4	2.6	95411	95289	69.0	2.6	97608	97480	72.9
5	4.3	95167	474899	68.1	5.8	97352	485450	72.0
10	0.0	94761	474899	63.4	2.5	96784	483372	67.5
15	1.9	94761	473380	58.4	0.9	96546	482538	62.6
20	3.6	94577	472108	53.5	5.2	96462	481162	57.7
25	3.6	94240	470412	48.7	1.1	95963	479582	53.0
30	6.7	93898	468039	43.9	3.4	95861	478554	48.0
35	8.8	93268	464456	39.1	3.8	95535	476845	43.2
40	15.0	92451	459043	34.5	8.5	95175	474001	38.3
45	14.5	91060	452259	29.9	17.7	94362	467953	33.6
50	47.6	89742	438785	25.3	8.1	92692	461736	29.2
55	53.6	85468	416682	21.5	35.1	91945	452245	24.4
60	96.1	80884	386209	17.5	41.7	88717	435008	20.2
65	144.1	73115	340641	14.1	128.3	85020	399374	15.9
70	211.5	62579	281128	11.1	149.4	74115	344347	12.9
75	373.2	49344	200813	8.3	294.9	63045	269750	9.7
80	503.5	30931	114385	6.8	329.7	44451	186116	7.7
85+	1000.0	15357	95781	6.2	1000.0	29797	155956	5.2

Appendix A-5 Male deaths by cause and age, 2017

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	6	0	0	1	0	0	0	0	0	0	0	0	0	1	0	3	0	1	0	
Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Tuberculosis	14	0	0	0	0	0	0	0	0	0	0	0	1	1	4	2	2	3	1	
EPI related death	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	
Hepatitis	5	0	0	0	0	0	0	0	1	0	0	2	0	1	1	0	0	0	0	
Chicken pox	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Rabies	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Septicaemia	17	4	1	2	0	0	0	0	0	0	0	0	0	0	1	2	1	2	4	
Respiratory infections	27	3	2	1	0	0	0	0	0	1	0	0	0	0	1	1	0	8	2	
Other communicable	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	
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	
Neonatal condition																				
-Premature and LBW	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-Birth asphyxia	15	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-Other neonatal	39	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Nutritional	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
Non-communicable diseases																				
Malignant neoplasm																				
-Neoplasm	136	0	1	1	0	1	1	0	2	0	5	4	7	23	19	23	17	14	5	
-Neoplasm in female organ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Congenital malformation	9	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Endocrine disorder																				
-Diabetes	13	0	0	0	0	0	0	0	0	1	0	0	2	1	1	3	2	3	0	
-Other endocrine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Neuro-psychiatric	6	1	2	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	
Diseases of circulatory sestem																				
-Rheumatic heart disease	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
-Hypertensive disease	4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	1	
-Ischaemic heart disease	160	0	0	0	0	0	2	0	2	0	4	7	11	16	22	22	24	26	7	
-Pulmonary heart disease	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
-Stroke	191	0	0	0	0	1	0	1	2	1	3	3	10	12	14	19	24	36	32	
-Other forms of heart disease	83	0	0	0	0	1	0	0	1	0	2	0	10	7	9	5	7	18	15	
-All Other Circulatory System	31	0	0	0	0	0	0	1	0	0	0	2	1	3	3	4	5	2	4	
Diseases																				
Respiartory disease																				
-COPD	52	0	0	0	0	0	0	0	0	0	0	0	3	6	6	9	13	7	1	
-Asthma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-Other respiratory	12	0	0	0	0	0	0	1	0	0	0	1	1	1	1	4	2	1	0	
Digestive disease	20	0	0	0	0	0	0	0	0	1	0	0	2	1	3	6	1	3	0	
Gentio-urinary disease																				
-Renal failure	5	0	0	0	0	0	0	0	0	0	2	0	0	1	1	0	0	1	0	
-Nephritic syndrome	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-Diseases of male genital organs	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	
Other non-communicable	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
Injuries																				
Unintentional injuries																				
-Accident	14	0	2	0	0	2	0	0	0	1	0	1	2	0	0	1	3	0	2	
-Falls	3	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	
-Drowning	28	0	19	3	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	
-All Other External Causes of Accid.	4	0	1	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	
Injury																				
Intentional injuries																				
-Suicide	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	
-Homicide	5	0	0	0	0	2	0	0	0	0	0	0	0	1	0	1	0	0	1	
-All Other External Causes of Mortality	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	
Miscellaneous																				
-Senility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-Fever of unknown origin	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	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	
-Sudden infant death	3	3	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	
Unknown/missing	26	2	0	0	0	0	0	0	0	1	0	3	0	0	1	0	4	5	7	
Total	946	76	30	10	2	7	3	6	11	7	17	21	53	74	85	108	114	130	101	
COPD=Chronic Obstructive Pulmonary Disease.																				

COPD=Chronic Obstructive Pulmonary Disease.

Appendix A-6 Female deaths by cause and age, 2017

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	2	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	6	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	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	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
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	33	2	0	2	0	0	0	0	0	0	0	1	0	1	1	0	2	7	11	6
Respiratory infections	15	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	6	3
Other communicable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maternal and neonatal conditions																				
Maternal death	3	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Neonatal condition																				
-Premature and LBW	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Birth asphyxia	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Other neonatal	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nutritional	4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2	0	0
Non-communicable diseases																				
Malignant neoplasm																				
-Neoplasm	51	0	0	0	0	1	2	0	1	2	2	5	3	7	7	8	6	2	4	1
-Neoplasm in female organ	8	0	0	0	0	0	0	0	0	1	0	1	0	1	1	2	1	1	0	0
Congenital malformation	8	6	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Endocrine disorder																				
-Diabetes	18	0	0	0	0	0	0	0	1	1	0	0	0	0	3	7	3	0	1	2
-Other endocrine	0																			
Neuro-psychiatric	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
Diseases of circulatory system																				
-Rheumatic heart disease	2	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
-Hypertensive disease	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	2
-Ischaemic heart disease	107	0	0	0	0	0	1	1	2	1	1	8	5	7	8	15	13	24	13	8
-Pulmonary heart disease	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0
-Stroke	177	0	0	0	0	0	1	1	1	0	1	4	8	10	11	19	34	35	24	28
-Other forms of heart disease	66	1	1	0	0	0	0	0	1	0	0	2	2	2	1	5	11	13	11	16
-All Other Circulatory System Diseases	40	0	0	0	0	0	0	0	0	0	0	0	0	0	2	8	6	9	8	7
Respiratory disease																				
-COPD	35	0	0	0	0	0	0	0	0	0	1	1	0	3	1	5	6	6	8	4
-Asthma	2	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
-Other respiratory	3	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0
Digestive disease	15	1	0	0	1	0	0	0	0	1	1	0	2	0	3	0	1	2	2	1
Gentio-urinary disease																				
-Renal failure	12	0	0	0	1	0	0	0	0	0	1	1	0	2	1	0	2	1	3	0
-Nephritic syndrome	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Other urinary	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Other non-communicable	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
Injuries																				
Unintentional injuries																				
-Accident	5	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	1	0	0
-Falls	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	3	2
-Drowning	28	0	17	6	0	0	1	0	0	0	0	0	0	0	0	0	2	2	0	0
-All Other External Causes of Accid.	2	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
Injury																				
Intentional injuries																				
-Suicide	8	0	0	0	4	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
-Homicide	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-All Other External Causes of Mortality	4	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	1
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	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	1	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	28	0	0	0	1	0	0	0	0	2	1	2	1	0	0	5	1	4	4	7
Unknown/missing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	741	40	21	9	8	4	7	5	11	10	10	26	24	37	43	79	97	121	99	90
COPD=Chronic obstructive pulmonary disease.																				

COPD=Chronic obstructive pulmonary disease.

Appendix A-7 Male deaths by cause, age and area, 2017

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	3	3	0	0	0	0	1	0	0	0	0	1	2	2	0	0
Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tuberculosis	9	5	0	0	0	0	0	0	0	0	1	1	7	4	1	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	2	3	0	0	0	0	0	0	0	1	2	1	0	1	0	0
Chicken pox	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rabies	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Septicaemia	15	12	1	2	2	0	1	0	0	1	0	1	6	5	5	3
Respiratory infections	5	12	1	3	0	1	0	2	0	0	0	0	2	4	2	2
Other communicable	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	1
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	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
-Birth asphyxia	5	10	5	10	0	0	0	0	0	0	0	0	0	0	0	0
-Other neonatal	16	23	16	23	0	0	0	0	0	0	0	0	0	0	0	0
Nutritional	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Non-communicable diseases																
Malignant neoplasm																
-Neoplasm	70	66	0	0	1	0	0	1	5	4	30	23	34	33	0	5
-Neoplasm in female organ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Congenital malformation	4	5	4	4	0	1	0	0	0	0	0	0	0	0	0	0
Endocrine disorder																
-Diabetes	6	7	0	0	0	0	0	0	1	0	1	3	4	4	0	0
-Other endocrine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neuro-psychiatric	5	1	1	0	1	1	1	1	1	0	0	0	1	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
-Hypertensive disease	2	2	0	0	0	0	0	0	1	0	0	0	0	2	1	0
-Ischaemic heart disease	95	65	0	0	0	0	0	0	5	3	30	26	57	32	3	4
-Pulmonary heart disease	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
-Stroke	92	99	0	0	0	0	0	0	5	3	15	24	52	60	20	12
-Other forms of heart disease	52	31	0	0	0	0	0	0	3	1	18	8	21	17	10	5
-All Other Circulatory Sys. Diseases	16	15	0	0	0	0	0	0	0	1	5	4	8	9	3	1
Respiratory disease																
-COPD	32	20	0	0	0	0	0	0	0	0	10	5	22	14	0	1
-Asthma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Other respiratory	4	8	0	0	0	0	0	0	0	1	2	2	2	5	0	0
Digestive disease	4	16	0	0	0	0	0	0	0	1	2	4	2	11	0	0
Gentio-urinary disease																
-Renal failure	2	3	0	0	0	0	0	0	0	2	1	1	1	0	0	0
-Nephritic syndrome	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
-Other urinary	0	1	0	0	0	0	0	0	0	0	0	0	0	1	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	6	8	0	0	0	2	0	0	1	2	2	1	3	1	0	2
-Falls	2	1	0	0	0	0	0	0	1	0	1	0	0	1	0	0
-Drowning	14	14	0	0	8	11	2	2	0	0	0	0	3	1	1	0
-All Other External Causes of Accid. Inj	3	1	0	0	1	0	0	0	2	1	0	0	0	0	0	0
Intentional injuries																
-Suicide	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
-Homicide	3	2	0	0	0	0	0	0	1	1	0	1	1	0	1	0
-All Other External Causes of Mortality	1	2	0	0	0	0	1	0	0	0	0	0	0	2	0	0
Miscellaneous																
-Senility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Fever of unknown origin	2	0	0	0	0	0	0	0	0	0	0	0	2	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	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0
-Other miscellaneous	12	14	1	1	0	0	0	0	0	1	1	3	4	8	6	1
Unknown/missing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	490	456	31	45	13	17	7	5	28	23	122	111	236	217	53	38
COPD=Chronic obstructive pulmonary disease.																

Appendix A-8 Female deaths by cause, age, and area, 2017

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	3	0	0	1	1	0	0	0	0	0	0	0	1	0	1
Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tuberculosis	2	4	0	0	0	0	0	0	1	1	0	1	1	2	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	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1
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	14	19	1	1	0	0	0	2	0	0	1	2	9	11	3	3
Respiratory infections	8	7	2	1	0	1	0	0	0	0	0	0	5	3	1	2
Other communicable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maternal and neonatal conditions																
Maternal death	1	2	0	0	0	0	0	0	1	2	0	0	0	0	0	0
Neonatal condition	0	0														
-Premature and LBW	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
-Birth asphyxia	3	8	3	8	0	0	0	0	0	0	0	0	0	0	0	0
-Other neonatal	8	6	8	6	0	0	0	0	0	0	0	0	0	0	0	0
Nutritional	1	3	0	0	0	0	0	0	0	1	0	0	1	2	0	0
Non-communicable diseases																
Malignant neoplasm																
-Neoplasm	21	30	0	0	0	0	0	0	6	2	7	15	8	12	0	1
-Neoplasm in female organ	3	5	0	0	0	0	0	0	1	0	0	3	2	2	0	0
Congenital malformation	3	5	2	4	0	0	1	1	0	0	0	0	0	0	0	0
Endocrine disorder																
-Diabetes	12	6	0	0	0	0	0	0	1	1	3	0	6	5	2	0
-Other endocrine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neuro-psychiatric	1	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0
Diseases of circulatory system																
-Rheumatic heart disease	2	1	0	0	0	0	0	0	2	0	0	0	0	1	0	0
-Hypertensive disease	5	45	0	0	0	0	0	0	0	2	0	7	3	34	2	2
-Ischaemic heart disease	62	1	0	0	0	0	0	0	4	0	21	1	31	0	6	0
-Pulmonary heart disease	2	78	0	0	0	0	0	0	0	2	0	10	2	50	0	16
-Stroke	99	35	0	0	0	1	0	0	2	1	23	1	62	22	12	10
-Other forms of heart disease	31	23	1	0	0	0	0	0	0	0	6	1	18	18	6	4
-All Other Circulatory System Diseases	17	12	0	0	0	0	0	0	0	0	1	3	13	8	3	1
Respiratory disease																
-COPD	23	1	0	0	0	0	0	0	1	0	2	1	17	0	3	0
-Asthma	1	2	0	0	0	0	0	0	1	0	0	1	0	1	0	0
-Other respiratory	1	7	0	0	0	0	0	0	1	1	0	4	0	1	0	1
Digestive disease	8	11	1	0	0	0	1	1	1	1	1	4	4	5	0	0
Gentio-urinary disease																
-Renal failure	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0
-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	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0
Injuries																
Unintentional injuries																
-Accident	2	3	0	0	0	0	0	0	0	1	0	1	2	1	0	0
-Falls	6	4	0	0	0	0	0	0	0	0	0	0	5	3	1	1
-Drowning	11	17	0	0	8	9	2	4	0	1	0	0	1	3	0	0
-All Other External Causes of Accid. Injury	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0
Intentional injuries																
-Suicide	5	3	0	0	0	0	3	1	2	2	0	0	0	0	0	0
-Homicide	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-All Other External Causes of Mortality	3	1	0	0	0	0	0	0	0	0	2	1	0	0	1	0
Miscellaneous																
-Senility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Fever of unknown origin	1	3	0	0	0	0	0	0	0	0	0	1	1	2	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	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
-Other miscellaneous	16	12	0	0	0	1	0	0	2	1	2	1	9	5	3	4
Unknown/missing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	378	363	19	21	9	13	7	9	28	19	71	59	201	195	43	47

COPD=Chronic obstructive pulmonary disease.

Appendix A-9a Age-specific fertility rate and indices for icddr,b service area by block, 2017

Age (years)	Block A		Block B		Block C		Block D	
	Births	Rate	Births	Rate	Births	Rate	Births	Rate
All ages	948	86.3	833	92.9	561	87.3	441	78.1
15-19*	153	97.3	171	118.6	88	99.4	68	79.5
20-24	305	161.7	251	158.3	186	168.9	130	147.4
25-29	255	135.8	196	133.3	142	133.8	135	150.7
30-34	160	90.8	143	110.9	99	98.7	73	85.0
35-39	53	36.8	58	47.5	39	45.5	30	37.6
40-44	18	12.4	12	10.9	7	8.6	5	6.5
45-49**	4	4.0	2	2.3	0	0.0	0	0.0
Total fertility rate		2693.7		2908.7		2775.1		2533.2
General fertility rate		86.3		92.9		87.3		78.1
Gross reproduction rate		1295.7		1386.3		1335.6		1292.4
*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-9b Age-specific fertility rate and indices for Government service area by block, 2017

Age (years)	Block E		Block F		Block G	
	Births	Rate	Births	Rate	Births	Rate
All ages	872	83.6	834	88.6	809	89.9
15-19*	154	96.3	146	99.7	123	85.0
20-24	275	155.9	288	186.4	256	169.2
25-29	243	147.0	217	136.8	223	153.2
30-34	124	76.6	107	76.6	140	101.4
35-39	61	42.8	64	48.3	56	45.5
40-44	13	10.0	10	9.1	10	9.1
45-49**	2	1.9	2	2.0	1	1.1
Total fertility rate		2652.4		2794.7		2822.9
General fertility rate		83.6		88.6		89.9
Gross reproduction rate		1314.0		1367.2		1423.7
*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. Marriages and divorces by month, 2017

Month	Marriage		Divorce	
	No.	percentage	No.	percentage
January	239	7.5	33	7.1
February	275	8.6	38	8.2
March	329	10.3	33	7.1
April	248	7.8	39	8.4
May	268	8.4	39	8.4
June	169	5.3	25	5.4
July	289	9.1	51	11.0
August	222	7.0	42	9.0
September	358	11.2	56	12.0
October	283	8.9	35	7.5
November	248	7.8	34	7.3
December	260	8.2	40	8.6
Total	3188	100.0	465	100.0

Appendix A-11. In- and out-migrations by age and sex, 2017

Age (years)	In-migration			Out-migration		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	12,395	6,023	6,372	15,230	8,532	6,698
0-4	1,714	859	855	1,606	853	753
5 - 9	1,005	508	497	1,115	621	494
10-14	755	373	382	1,085	638	447
15-19	1,696	377	1,319	2,750	1,326	1,424
20-24	1,785	600	1,185	2,771	1,430	1,341
25-29	1,572	803	769	1,846	1,029	817
30-34	1,268	802	466	1,251	828	423
35-39	785	543	242	963	693	270
40-44	505	365	140	562	426	136
45-49	399	282	117	403	271	132
50-54	314	204	110	220	144	76
55-59	218	141	77	201	119	82
60-64	129	81	48	120	52	68
65+	250	85	165	337	102	235

Appendix A-12. In-migrations by age, sex, and area, 2017

Age (years)	lcddr,b service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	6,495	3,110	3,385	5,900	2,913	2,987
0-4	868	444	424	846	415	431
5 - 9	549	276	273	456	232	224
10-14	408	195	213	347	178	169
15-19	903	177	726	793	200	593
20-24	943	312	631	842	288	554
25-29	812	410	402	760	393	367
30-34	657	415	242	611	387	224
35-39	399	279	120	386	264	122
40-44	276	198	78	229	167	62
45-49	212	148	64	187	134	53
50-54	155	94	61	159	110	49
55-59	119	78	41	99	63	36
60-64	73	45	28	56	36	20
65+	121	39	82	129	46	83

Appendix A-13. Out-migrations by age, sex, and area, 2017

Age (years)	lcddr,b service area			Government service area		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	7,541	4,181	3,360	7,689	4,351	3,338
0-4	822	438	384	784	415	369
5 - 9	573	309	264	542	312	230
10-14	560	330	230	525	308	217
15-19	1,319	605	714	1,431	721	710
20-24	1,369	720	649	1,402	710	692
25-29	915	497	418	931	532	399
30-34	578	383	195	673	445	228
35-39	498	359	139	465	334	131
40-44	294	215	79	268	211	57
45-49	199	132	67	204	139	65
50-54	109	76	33	111	68	43
55-59	94	52	42	107	67	40
60-64	50	20	30	70	32	38
65+	161	45	116	176	57	119

Appendix A-14. Male out-migration by cause of movement and age, 2017

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	8532	853	621	638	1,326	1,430	1,029	828	693	426	271	144	119	52	102
Work/economic/educational															
-acquired/seeking job	5152	2	3	118	842	1208	889	701	582	355	219	110	73	28	22
-job completion/retirement	14	0	0	0	0	1	2	4	3	0	2	0	2	0	0
-to acquire education/student lodging	1002	11	182	280	359	132	19	5	7	2	2	2	1	0	0
-educ. completed/interrupted	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Housing/environmental															
-acquired/seeking new land/house	301	4	2	2	10	11	50	62	50	31	18	16	13	9	23
-river erosion	0	0	0	0	0	0	0	0	0	0	0	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	1759	828	429	229	107	55	23	15	14	16	7	5	10	3	18
- move or join with other relatives	13	1	0	1	0	3	1	0	1	0	0	0	1	4	1
-adoption	4	1	0	2	0	1	0	0	0	0	0	0	0	0	0
-family friction/breakdown	108	2	2	0	1	13	28	21	13	5	5	8	4	3	3
-health or old age care	11	0	1	0	0	0	0	0	0	0	0	0	2	1	7
Legal problems	60	0	0	0	1	0	0	0	1	8	9	3	5	1	6
Other and not stated															
-others n.e.c*	105	4	2	6	4	5	11	11	11	9	9	0	8	3	22
-unknown or not stated	2	0	0	0	1	0	0	0	1	0	0	0	0	0	0
*n.e.c=Not elsewhere classified															

Appendix A-15. Female out-migration by cause of movement and age, 2017

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	6698	753	494	447	1,424	1,341	817	423	270	136	132	76	82	68	235
Work/economic/educational															
-acquired/seeking job	456	2	2	24	82	95	96	55	45	31	11	7	2	0	4
-job completion/retirement	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
-to acquire education/student lodging	541	12	112	135	166	50	25	15	17	5	2	1	0	0	1
-educ. completed/interrupted	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Housing/environmental															
-acquired/seeking new land/house	752	6	4	15	115	179	154	95	52	21	29	15	22	16	29
-river erosion	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marriage / familial															
-marriage	1,024	0	0	29	513	328	103	31	13	2	4	1	0	0	0
-separation/divorce/widow	36	0	0	0	7	18	5	2	2	1	0	0	0	0	1
-move or join with spouse/parents	3,211	721	370	231	410	519	326	183	122	67	69	38	38	33	84
- move or join with other relatives	22	3	0	2	2	1	2	1	0	0	0	1	3	0	7
-adoption	10	6	4	0	0	0	0	0	0	0	0	0	0	0	0
-family friction/breakdown	246	0	2	1	53	77	52	21	13	7	5	2	2	1	10
-health or old age care	40	0	0	0	1	1	3	0	0	0	1	2	2	2	28
Legal problems	20	0	0	0	0	1	2	6	1	2	6	0	1	1	0
Other and not stated															
-others n.e.c*	338	3	0	10	75	72	49	14	5	0	5	8	12	14	71
-unknown or not stated	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
*n.e.c=Not elsewhere classified															

Appendix A-16 Male in-migration by cause of movement and age, 2017

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	6023	859	508	373	377	600	803	802	543	365	282	204	141	81	85
Work/economic/educational															
-acquired/seeking job	1,209	0	0	15	76	171	241	254	162	129	67	42	32	16	4
-job completion/retirement	895	0	0	0	7	87	139	183	148	104	84	69	37	24	13
-to acquire education/student lodging	337	10	90	113	74	37	5	2	2	1	1	1	0	1	0
-educ. completed/interrupted	9	1	0	1	3	4	0	0	0	0	0	0	0	0	0
Housing/environmental															
-acquired/seeking new land/house	1,277	0	0	7	42	159	298	267	166	100	82	54	44	26	32
-river erosion	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Marriage / familial															
-marriage	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0
-separation/divorce/widow															
-move or join with spouse/parents	1,717	828	406	204	108	51	48	21	21	4	10	3	6	0	7
- move or join with other relatives	19	8	1	0	1	3	1	1	0	0	2	1	0	0	1
-adoption	12	5	5	1	0	1	0	0	0	0	0	0	0	0	0
-family friction/breakdown	55	0	1	1	3	7	13	18	5	2	1	2	1	1	0
-health or old age care	55	0	0	1	0	3	4	4	2	3	9	9	4	4	12
Legal problems	72	0	0	0	0	7	8	17	19	6	9	5	1	0	0
Other and not stated															
-others n.e.c*	362	7	5	30	63	70	44	34	18	15	17	18	16	9	16
-unknown or not stated	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*n.e.c=Not elsewhere classified															

Appendix A-17 Female in-migration by cause of movement and age, 2017

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	6372	855	497	382	1,319	1,185	769	466	242	140	117	110	77	48	165
Work/economic/educational															
-acquired/seeking job	188	0	0	4	6	34	52	45	15	15	4	4	5	1	3
-job completion/retirement	53	0	0	1	1	7	9	12	5	9	5	2	2	0	0
-to acquire education/student lodging	360	7	96	116	70	21	27	16	5	2	0	0	0	0	0
-educ. completed/interrupted	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Housing/environmental															
-acquired/seeking new land/house	805	0	0	7	166	227	124	73	42	32	28	34	20	15	37
-river erosion	2	0	0	0	0	0	1	0	0	0	0	0	0	1	0
Marriage / familial															
-marriage	822	0	0	16	536	183	49	20	7	5	3	0	2	1	0
-separation/divorce/widow	80	0	0	0	18	29	15	11	4	0	1	1	1	0	0
-move or join with spouse/parents	3,280	821	389	220	380	487	348	224	129	64	66	60	32	21	39
- move or join with other relatives	30	5	2	1	5	5	3	1	2	0	0	1	3	2	0
-adoption	14	10	3	0	0	0	0	1	0	0	0	0	0	0	0
-family friction/breakdown	249	0	3	5	53	67	64	29	9	5	3	4	1	1	5
-health or old age care	46	0	0	0	4	3	2	2	1	0	1	1	2	0	30
Legal problems	3	0	0	0	1	1	0	0	0	1	0	0	0	0	0
Other and not stated															
-others n.e.c*	437	12	4	11	77	121	75	32	23	7	6	3	9	6	51
-unknown or not stated	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
*n.e.c=Not elsewhere classified															

Appendix A-18 Male migration by destination or origin, 2017

Destination/Origin	Rural/urban	Out-migration						In-migration					
		Age (years)						Age (years)					
		0-14	15-24	25-34	35-44	45+	Total	0-14	15-24	25-34	35-44	45+	Total
Barisal	Rural	19	4	4	7	1	35	13	3	10	2	1	29
	Urban	3	6	4	1	2	16	5	3	3	1	2	14
Chittagong	Rural	757	148	164	89	86	1,244	765	152	200	113	72	1,302
	Urban	310	238	128	90	67	833	196	117	157	76	76	622
Dhaka	Rural	36	16	8	5	8	73	47	7	15	7	6	82
	Urban	904	1351	612	370	354	3,591	648	564	680	300	323	2,515
Khulna	Rural	6	1	3	2	1	13	5	3	1	1	3	13
	Urban	3	5	2	0	2	12	4	1	1	5	2	13
Mymensingh	Rural	6	0	1	2	1	10	9	1	4	2	2	18
	Urban	2	1	5	1	1	10	3	1	1	3	3	11
Rajshahi	Rural	12	3	4	2	1	22	10	1	3	2	1	17
	Urban	6	7	3	1	3	20	5	2	4	4	1	16
Rangpur	Rural	6	0	1	2	0	9	4	0	2	1	0	7
	Urban	0	4	0	0	0	4	2	2	2	0	1	7
Sylhet	Rural	5	2	2	1	0	10	7	1	2	0	0	10
	Urban	17	10	10	10	6	53	12	6	10	4	13	45
India		8	11	4	3	2	28	0	2	1	0	1	4
Asia		1	218	186	128	19	552	0	56	187	122	77	442
Middle-east		8	698	671	394	126	1,897	5	53	305	250	195	808
Others		3	33	45	11	8	100	0	1	16	15	13	45
Unknown		0	0	0	0	0	0	0	1	1	0	1	3
Total		2112	2756	1857	1119	688	8532	1740	977	1605	908	793	6023

Appendix A-19 Female migration by destination or origin, 2017

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+	
Barisal	Rural	8	10	8	3	0	29	16	15	10	2	2	45
	Urban	4	1	4	1	1	11	5	9	3	0	1	18
Chittagong	Rural	656	1265	469	103	141	2,634	775	1504	542	127	135	3,083
	Urban	237	263	156	61	78	795	185	209	149	51	60	654
Dhaka	Rural	30	64	16	8	6	124	41	57	18	12	4	132
	Urban	698	1071	521	202	340	2,832	642	640	449	159	290	2,180
Khulna	Rural	3	12	5	1	1	22	4	8	4	3	1	20
	Urban	0	4	0	1	0	5	3	6	3	0	1	13
Mymensingh	Rural	5	5	6	0	0	16	9	4	6	1	1	21
	Urban	4	2	2	1	1	10	3	6	3	0	1	13
Rajshahi	Rural	6	9	8	0	1	24	6	4	4	1	1	16
	Urban	0	2	3	1	2	8	11	5	6	1	0	23
Rangpur	Rural	6	4	5	2	0	17	7	5	3	0	0	15
	Urban	2	0	1	0	0	3	2	3	3	1	1	10
Sylhet	Rural	7	13	2	0	2	24	7	5	2	2	2	18
	Urban	16	16	9	3	6	50	14	15	4	6	3	42
India		6	6	4	2	6	24	0	2	0	0	3	5
Asia		2	3	3	0	3	11	0	0	4	3	2	9
Middle-east		2	11	17	12	3	45	4	5	20	11	7	47
Other		2	4	1	5	2	14	0	0	2	2	2	6
Unknown		0	0	0	0	0	0	0	2	0	0	0	2
Total		1694	2765	1240	406	593	6698	1734	2504	1235	382	517	6372

APPENDIX B

POPULATION, BIRTHS, AND DEATHS BY VILLAGE, 2017

Village code	Village name	Population (mid-year)	Live births	Deaths	Birth rate	Death rate
icddr,b service area						
D00	Charmukundi	3,008	69	24	22.9	8.0
W00	Kaladi	9,341	198	33	21.2	3.5
V10	Dhakirgaon	2,303	45	14	19.5	6.1
V11	Nabakalash	3,334	77	17	23.1	5.1
V31	Dighaldi	10,534	241	66	22.9	6.3
V32	Mobarakdi	3,891	93	17	23.9	4.4
V60	Suvankardi	1,009	29	9	28.7	8.9
V61	Munsabdi	731	21	5	28.7	6.8
V62	Shilmondi	1,048	30	7	28.6	6.7
V72	Upadi	6,542	149	47	22.8	7.2
Block A Total		41741	952	239	22.8	5.7
H00	Lamchari	1,182	18	14	15.2	11.8
V12	Bhangerpar	921	21	5	22.8	5.4
V13	Baburpara	759	16	7	21.1	9.2
V19	Lakshmipur	2,844	58	18	20.4	6.3
V20	Dagorpur	1,568	41	8	26.1	5.1
V21	Khadergaon	565	11	5	19.5	8.8
V22	Beloti	614	15	3	24.4	4.9
V23	Baluchar	689	10	6	14.5	8.7
V24	Machuakhal	3,186	79	25	24.8	7.8
V26	Narayanpur	4,083	94	30	23.0	7.3
V56	Pailpara	1,724	46	17	26.7	9.9
V59	Doshpara	2,508	59	15	23.5	6.0
V82	Dhanarpar	1,912	46	11	24.1	5.8
V83	Padmapal	627	15	1	23.9	1.6
V85	Bhanurpara	558	12	4	21.5	7.2
V87	Hurmaisha	735	15	3	20.4	4.1
VBB	Nagda	5,114	130	41	25.4	8.0
VBC	Naogaon	5,173	147	33	28.4	6.4
Block B Total		34762	833	246	24.0	7.1
K00	Shahpur	1,045	23	7	22.0	6.7
L00	Tatkhana	563	22	5	39.1	8.9
M00	Char Nayergaon	177	3	0	16.9	0.0
N00	Aswinpur	2,360	60	15	25.4	6.4
O00	Nayergaon	2,440	44	16	18.0	6.6
P00	Titerkandi	2,003	38	26	19.0	13.0
Q00	Char Shibpur	247	5	2	20.2	8.1
V27	Panchghoria	1,039	30	9	28.9	8.7
V28	Khidirpur	1,586	40	13	25.2	8.2
V30	Harion	634	24	9	37.9	14.2
V39	Gobindapur	301	4	2	13.3	6.6
V40	Masunda	817	13	6	15.9	7.3
V41	Paton	2,092	41	14	19.6	6.7
V42	Adhara (South)	771	24	6	31.1	7.8
V44	Panchdona	629	11	3	17.5	4.8
V86	Adhara	1,095	24	10	21.9	9.1
V88	Datikara	564	11	7	19.5	12.4
VBA	Mehron	2,090	28	21	13.4	10.0
DX0	Barogaon	3,497	77	28	22.0	8.0
DX1	Naojan	1,451	39	9	26.9	6.2
Block C Total		25401	561	208	22.1	8.2

Village code	Village name	Population (mid-year)	Live births	Deaths	Birth rate	Death rate
R00	Nandalalpur	1,562	34	12	21.8	21.8
S00	Tatua	931	18	5	19.3	19.3
T00	Amuakanda	1,700	34	7	20.0	20.0
V15	Bhati Rasulpur	927	18	4	19.4	19.4
V16	Binandapur	876	12	7	13.7	13.7
V17	Hatighata	1,029	16	12	15.5	15.5
V18	Torkey	3,957	79	30	20.0	20.0
V25	Char Pathalia	1,318	19	10	14.4	14.4
V29	Shibpur (South)	559	6	5	10.7	10.7
V33	Shibpur (North)	412	10	6	24.3	24.3
V34	Satparia	877	21	5	23.9	23.9
V52	Nayakandi	237	3	1	12.7	12.7
V54	Balairkandi	576	11	3	19.1	19.1
V55	Induria	527	10	4	19.0	19.0
V63	Islamabad (East)	1,966	39	15	19.8	19.8
V67	Majlishpur	632	19	6	30.1	30.1
V81	Sonaterkandi	671	22	8	32.8	32.8
V84	Shahbajkandi	2,359	43	21	18.2	18.2
V89	Islamabad (Middle)	1,615	27	14	16.7	16.7
Block D Total		22731	441	175	19.4	19.4
icddr,b service area: Total		124635	2787	868	22.4	22.4
Government service area						
V35	Durgapur	3,528	61	18	17.3	17.3
V38	Galimkha	1,520	27	8	17.8	17.8
V43	Kanachak	1,241	19	5	15.3	15.3
V45	Bakchar	1,112	28	5	25.2	25.2
V46	Silinda	409	7	3	17.1	17.1
V47	Tulatali	1,851	35	19	18.9	18.9
V48	Gangkanda	509	5	5	9.8	9.8
V49	Harina Bhabanipur	1,317	33	10	25.1	25.1
V57	Baluchar	1,053	27	9	25.6	25.6
V64	Kawadi	5,078	95	44	18.7	18.7
V65	Nayachar	768	25	6	32.6	32.6
V66	Thatalia	758	25	3	33.0	33.0
V68	Sobahan	994	28	7	28.2	28.2
V71	Khamarpara	513	12	6	23.4	23.4
V73	Sadardia	793	15	10	18.9	18.9
V74	Ketundi	1,406	37	10	26.3	26.3
V75	Mukundi	347	10	3	28.8	28.8
V76	Chosoi	1,772	30	19	16.9	16.9
V78	Soladana	274	2	1	7.3	7.3
V79	Pitambordi	403	11	2	27.3	27.3
V80	Daribond	1,363	28	9	20.5	20.5
V90	Narinda	1,248	28	11	22.4	22.4
V97	Dhanagoda	334	9	1	26.9	26.9
V98	Santoshpur	96	0	1	0.0	0.0
V99	Baluakandi	537	9	1	16.8	16.8
VB1	Taltoli	966	16	4	16.6	16.6
VB2	Sree Rayerchar	1,245	28	10	22.5	22.5
VB3	Rayerkandi	3,030	69	15	22.8	22.8
D28	Bazarkhola	1,046	21	9	20.1	20.1
D29	Kirtonkhola	220	5	2	22.7	22.7
D30	Banuakandi	741	18	9	24.3	24.3
D31	Harina Bazarkhola	980	26	9	26.5	26.5
D32	Khalisha	801	8	6	10.0	10.0
D33	Nayanagar	1,062	24	10	22.6	22.6
D34	Saidkharkandi	1,365	39	8	28.6	28.6
D35	Mollah Kandi	532	15	2	28.2	28.2
Block E Total		41212	875	300	21.2	21.2

Village code	Village name	Population (mid-year)	Live births	Deaths	Birth rate	Death rate
A00	Uddamdi	3,256	74	25	22.7	7.7
F00	Sepoykandi	1,595	42	12	26.3	7.5
G00	Thatalia	3,237	70	35	21.6	10.8
J00	Char Harigope	904	17	4	18.8	4.4
U00	Baispur	9,687	234	51	24.2	5.3
V01	Kadamtali	399	3	1	7.5	2.5
V02	Nilokhi	457	6	6	13.1	13.1
V03	Char Nilokhi	597	9	2	15.1	3.4
V04	Char Pathalia	411	13	2	31.6	4.9
V05	Gazipur	3,331	81	14	24.3	4.2
V06	Fatepur	2,608	58	24	22.2	9.2
V07	Nayakandi	283	4	3	14.1	10.6
V08	Goalbhar	1,248	25	12	20.0	9.6
V09	Naburkandi	1,223	33	9	27.0	7.4
V14	Enayetnagar	635	13	8	20.5	12.6
V36	Ludhua	5,572	100	39	17.9	7.0
D99	Mandertoli	2,096	54	20	25.8	9.5
Block F Total		37539	836	267	22.3	7.1
B00	Charmasua	1,918	58	9	30.2	4.7
C00	Sarderkandi	4,044	88	36	21.8	8.9
V37**	Charputia	-	-	-	-	-
V50	Bakharpur	51	2	1	39.2	19.6
V51	Induriakandi	855	25	4	29.2	4.7
V53	Chhoto Haldia	2,932	69	30	23.5	10.2
V58**	Mohishmari	-	-	-	-	-
V69**	Naobangha	-	-	-	-	-
V70**	South Joypur	-	-	-	-	-
V95	Baluchar	2,538	52	17	20.5	6.7
V96	Rampur	535	13	3	24.3	5.6
VB4	Ramdaspur	3,759	73	27	19.4	7.2
VB5	Thakurpara	838	18	8	21.5	9.5
VB6	Sarkerpara	564	11	6	19.5	10.6
VB7	Mirpur	298	4	1	13.4	3.4
VB8	Farazikandi	1,265	29	9	22.9	7.1
VB9**	Ramanathgonj	-	-	-	-	-
VB0	South Rampur	3,631	82	22	22.6	6.1
D88	Sankibhanga	1,443	29	14	20.1	9.7
	Sankibhanga					
D89	Namapara	1,027	21	6	20.4	5.8
D90	Zahirabad	825	18	5	21.8	6.1
D91**	North Joypur	-	-	-	-	-
D92**	West Joypur	-	-	-	-	-
D93	Maizkandi	1,385	27	3	19.5	2.2
D94	Hazipur	1,701	43	15	25.3	8.8
D95	Tapaderpara	646	18	5	27.9	7.7
D96	Sakharipara	1,194	30	7	25.1	5.9
D97	Nayakandi	755	22	6	29.1	7.9
D98	Bara Haldia	3,440	77	18	22.4	5.2
Block G Total		35644	809	252	22.7	7.1
Government service area: Total		114395	2520	819	22.0	7.2
*Division by block applies						
**Lost due to river erosion in 1987						

APPENDIX C

LIFE TABLE EQUATIONS

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

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

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

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

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

$$L_1 = 0.410 l_1 + 0.590 l_2$$

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

$${}_nL_x = \frac{{}_nd_x}{{}_nm_x}, \text{ for } 5 \leq x \leq 84$$

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

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

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
March 2017	MR	X	X	X	X
October 2017	HEV	X	X	X	X

APPENDIX F

STAFF OF HDSS, 2017

Quamrun Nahar *Ph.D.*

Head, Initiative for Climate Change and Health and Acting Senior Director, Health Systems and Population Studies Division (HSPSD)

HDSS-Matlab

Field Supervisory Team

Md. Taslim Ali, Senior Manager
M. Munirul Alam Bhuiyan, FRO
Mahmud Hasan, FRO
Monowara Begum, FRO
Md. Bashiruddin Ahmed, FRO

Md. Monirul Hoque, FRS
Sheikh Abdul Jabber, FRS
Dilara Akhter, FRS
Zakia Parveen, FRS
Farzana Haque, FRS
Md. Kamruzzaman, FRS
Md. Shoriful Islam, FRS

Programming & Data Management

Samiran Barua, Data Manager
Meherun Nessa, DMA
Nazma Akhter, DMA

Administration

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

NOTE: 40 Community Health Research Workers (CHRWs) collect routine HDSS data.

HDSS-Dhaka

Research

Md. Nurul Alam, *Ph.D.* Head, HDSS
Md. Moinuddin Haider, R.I.

Administration

Md. Emdadul Haque, D.S. Coordinator
Kiron Chandra Bala, Admin. Assistant
Md. Saidul Islam, Doc. Scan. Assistant

Programming & Data Management

Sajal K. Saha, Sr. Programmer
Sayed Saidul Alam, Sr. Programmer
Rahima Mazhar, DMO
Md. Mahfuzur Rahman, DMO

Geographic Information System

Muhammad Zahirul Haq, DMS-GIS

