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Urban FP/MCH Working Paper No. 2

**Urban
Surveillance
System-
Dhaka
Methods and
Procedure**

Abdullah Hel Baqui
Kanta Jamil
NM Jahangir
Quamrun Nahar
Ngudup Paljor
Diana R. Silimperi



CENTRE
FOR HEALTH AND
POPULATION RESEARCH

International Centre for Diarrhoeal
Disease Research, Bangladesh

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THE INTERNATIONAL CENTRE FOR DIARRHOEAL DISEASE RESEARCH, BANGLADESH (ICDDR,B) is an autonomous, non-profit organization for research, education, training and clinical services. It was established in December 1978 as the successor to the Cholera Research Laboratory which began in 1960 in response to the cholera pandemic in southeast Asia.

The mandate of ICDDR,B is to undertake and promote research on diarrhoeal diseases and related subjects of acute respiratory infections, nutrition and fertility, with the aim of preventing and controlling diarrhoeal diseases and improving health care. ICDDR,B has also been given the mandate to disseminate knowledge in these fields of research, to provide training to people of all nationalities, and to collaborate with other institutions in its fields of research.

The Centre, as it is known, has its headquarter in Dhaka, the capital of Bangladesh, and operates a field station in and around Matlab thana of Chandpur District which has a large rural area under regular surveillance. A smaller rural and a large surveyed urban population also provide targets for research activities. The Centre is organized into four scientific divisions: Population & Family Planning; Clinical Sciences; Community Health; and Laboratory Sciences. At the head of each Division is a Divisional Director; the Divisional Directors are responsible to the Director who in turn answers to an international Board of Trustees consisting of eminent scientists and physicians and representatives of the Government of Bangladesh.

The Urban Health Extension Project (UHEP) is a follow-on activity of the Urban Volunteer Program (UVP). In 1981, the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) began training women volunteers in urban Dhaka in the use of oral rehydration therapy (ORT) for diarrhoeal disease on the assumption that community women could play an important role in teaching others about the home treatment of diarrhoea with ORT. The United States Agency for International Development (USAID) began funding the project in 1986 with a mandate to provide maternal and child health and family planning (MCH-FP) services to the urban slums and to conduct research on issues related to child survival. UHEP continues to focus on MCH and family planning issues of the urban slums with an overall goal to strengthen the ability of the government and non-governmental agencies to provide effective and affordable family planning and selected MCH services to the urban poor through research, technical assistance, and dissemination of its research findings.

Urban Health Extension Project

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Ngudup Paljor
Diana R. Silimperi



International Centre for Diarrhoeal Disease Research, Bangladesh
Mohakhali, Dhaka 1212, Bangladesh.

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Foreword

I am pleased to release these reports on urban health and family planning issues which are based on the activities of the Urban Health Extension Project (UHEP). UHEP is a follow-on activity of the former Urban Volunteer Program, a pilot project funded by the United States Agency for International Development (USAID).

The poor health status and the health needs of the urban poor continues to be an important emerging public health issue in the Developing World. Bangladesh is no exception. Despite the constraints of poverty and illiteracy, there are proven strategies to provide basic health and family planning services to the urban poor. In Dhaka alone, aside from the Government health care facilities, there are numerous NGOs and private sector providers giving needed services to the urban population. The Centre's own Urban Health Extension Project continues to focus on the urban poor, especially the slum populations, in providing basic family planning and health services through outreach activities (viz. health education, ORS distribution and referral services to service points).

However, enormous challenges remain in providing an optimum level of services to the urban poor. The UHEP, with the support of the USAID, will focus on health and family planning services delivery strategies in reaching the needed services to the urban poor. We certainly look forward to learning more about the health and family planning needs of the urban poor, testing sustainable strategies and applying these proven strategies in collaboration with other partners in government, NGOs and the private sector.



Demissie Habte, MD
Director

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We would like to acknowledge the valuable contributions of Mr. Alan Sunter of A.B. Sunter Research Design & Analysis Inc., Canada in the overall design of the USS. We would also like to acknowledge the contributions of Mr. David Leon of The Population Council, Thailand and Mr. Detlef Pieper of A.B. Sunter Inc. in designing the USS database.

Numerous project staffs are involved in the functioning and maintenance of the USS. Sincere acknowledgement is extended to the hard work and dedication of the USS staff, both the field-based staff and the data management, and the project management support side of the USS. We would like to extend special thanks to the following individuals of the Urban Health Extension Project (Formerly UVP):

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Ms. Laila B. Banu	Ms. Sufia Nurani
Ms. Nazma Begum	Mr. Zahidul Quayyum
Mr. Abu Eusuf	Ms. Sarah Salway
Mr. Rafiqul Islam	Dr. Mizan Siddiqui
Ms. Raquiba A. Jahan	Mr. Jatindra N. Sarker
Dr. Charles Lerman	

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Summary

The Urban Health Extension Project (UHEP), formerly the Urban Volunteer Program (UVP), of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) established an Urban Surveillance System (USS) in 1990 in selected slum areas of Dhaka city. The USS involves baseline census and surveys of a probability sample of the population living in the slums with periodic updates of demographic events, selected family planning and health status indicators, and socioeconomic information. The data collected by this system are valuable to estimate demographic rates and trends, to analyze the family planning and health problems and needs of the Dhaka urban poor, and to develop appropriate service delivery mechanisms for this population. Apart from this, the system provides an infrastructure for conducting community-based epidemiologic, social science, and operations research in the areas of family planning, diarrhoeal diseases, and nutrition.

This working paper provides the objectives and rationale of the USS and describes how the system functions, including the procedures followed both in the field and in the data management, along with the definitions of key events as they are used in the USS.

Introduction

Since 1981, the Urban Health Extension Project (UHEP), formerly the Urban Volunteer Program (UVP), of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) was involved in developing a volunteer-based maternal and child health and family planning (MCH-FP) service delivery system in the slums of Dhaka. During 1986-1991, the project further refined the volunteer service delivery system and tested the feasibility and effectiveness of using the services of women volunteer from slum communities to provide preventive health care and referral services (1).

To collect reliable slum specific data necessary for programme planning and to evaluate the effectiveness of the volunteer-based service delivery system, the project developed an Urban Surveillance System (USS) in 1990. The USS is a health, family planning and demographic surveillance system in a sample of the project's catchment population. The system is based on a multi-stage areal sampling; the sampling units are clusters of average size of 33 households. The system comprises baseline census and surveys, records of vital demographic events and selected health and family planning indicators collected in 3-monthly cycles, and annual socio-economic surveys. In addition, the system has the flexibility to accommodate a short questionnaire in each three monthly round to explore selected issues in-depth.

The USS is comparable to the ICDDR,B's Matlab Demographic Surveillance System (DSS) and the Rural MCH-FP Extension Project's Sample Registration System (SRS). The USS serves as an urban population laboratory for ongoing demographic, epidemiologic, operational, and other social science research and is considered one of the most valuable resources of the ICDDR,B. Apart from providing demographic rates and trends, the USS provides sampling and baseline information to conduct relevant quantitative and qualitative field studies in the areas of family planning, diarrhoeal diseases, nutrition, population, etc.

The longitudinal nature of the data set allows prospective research design, including documentation of time trends. The demographic trends and patterns will provide an indication of rapidly growing urban population tendencies, as well as an assessment of the determinants and consequences of various changes. Thus, the data will be useful to the national policy-makers.

The USS also provides research training opportunities to Bangladeshi and other nationals in the areas of demography, epidemiology, and operations research.

The specific objectives of the USS are:

- a. to provide reliable estimates of population parameters (such as fertility, mortality, morbidity, and migration rates) of a probability sample of the population in the slums of urban Dhaka;
- b. to describe and analyze family planning and health needs of the urban poor;
- c. to provide a population base for evaluating the effectiveness of family planning and MCH interventions;
- d. to provide a mechanism for testing of hypotheses on population parameter rates and trends;
- e. to provide a sampling framework and baseline data for health/family planning and related studies;
- f. to use the USS research findings and training capabilities in providing technical assistance to the Government of Bangladesh (GoB) and other non-government organizations (NGOs) working in the area of urban health and family planning.

The background work for the USS, such as mapping of the Dhaka city slums and sampling, started in 1989; the system was introduced in 1990 and was updated in 1991. Over the past four years, the USS has generated

a rich demographic, health, and family planning data-base on the population living in the slums of Dhaka. This report describes the urban surveillance system, the procedures employed in the field and in the data management and the definitions of the key events followed. More detailed documentation of the system is available with the project.

Study Area and Population

Dhaka metropolitan area comprises 14 administrative units, called *thana*. The UHEP provides education, motivation and referral services in the areas of family planning, diarrhoea, nutrition and immunization through a network of volunteers to the slum residents of five of the 14 *thana* (2). The selected *thana* are Mohammadpur, Kotwali, Lalbagh, Sutrapur and Demra and are shown as shaded areas on the map (Appendix I).

To locate and characterize the project's target population, the UVP appointed a private organization to conduct a survey of Dhaka city slums in 1989. This survey identified 132 slums comprising about 30,000 households in the above mentioned five *thana*. A review conducted in early 1991 revealed that the slum survey of 1989 had several problems. The survey not only under-counted the number of slums, but also produced erroneous estimates of the size and population of the slums. The review also indicated the possibility of the emergence of new slums since the survey made in 1989. These factors contributed to the decision to update the 1989 slum survey information. The Centre for Urban Studies (CUS) of Dhaka University was commissioned to undertake another survey of Dhaka city slums in 1991.

The 1991 survey of Dhaka city slums identified 809 slums and squatter settlements in the five *thana* comprising about 68,000 households. The total population in these slums was estimated to be about 3,76,000 (3). About 75% of the slums were located in privately owned land and the

remaining 25% located in lands owned by the government and semi-government organizations (public land). Although only a quarter of the slums were located in public land, these slums housed about half of the slum population.

The slum areas are characterized by high population density, poor housing (generally bamboo-structured dwellings), multi-family latrines and water sources, poor sewerage and drainage facilities and irregular garbage collection. The average population density in the slums (910 persons per acre) is ten times higher than that of the overall population density in Dhaka city. Although located within municipal boundaries, slums and squatters have limited access to facilities. The lack of facilities is more pronounced in those settlements that are located in the public land. More than half of the slums in the public land and about a third in private land do not have electricity. About 93% of the slums located in public land and 59% of the slums located in private land do not have access to gas. About 15% of the slums located in public land do not have access to any latrine as opposed 2% of the private slums (3).

Houses on public land are more likely to be owned by the residents of the dwellings (54.3%) than those on private land (18.8%). However, only 6% of the households own the land of their dwelling units. Most (81.7%) of these houses consist of only one room (4).

The population in the slums have a young age structure with about 46% below the age of 15 years, and only 3.6% above the age of 60 years. Among the adults, only about 13% of the women and about 33% of the males have had any formal education. Slums are characterized by its highly mobile population. More than half of the slum residents were born outside of Dhaka city. About one-fifth of the population moved in the last one year to the slums they are living in (4).

The pattern of slum land ownership and the migratory characteristics of the population are the two most important factors that conditioned the sampling design, the procedures, and the definitions incorporated in the USS.

Sampling Procedure

The USS comprises a probability sample of the UHEP's target population. It is based on a multi-stage areal sampling; the sampling units are small areas called 'clusters' with well-defined boundaries. Using the slums identified in the 1989 slum survey as the sampling frame, the original USS sample, hereafter called the 'Old Clusters' were selected. In late 1991 an additional sample was selected from the newly identified slums, hereafter referred to as the 'Update-1 Clusters'.

The sampling scheme applied for the selection of old clusters was a stratified two-stage sampling (5). In the first stage, the slums were divided into the primary sampling units (PSUs). A PSU was a slum community, a group of more or less adjacent slums, or a segment of a large slum, in the size range of 20 to 200 households. Slums below the size of 20 households were grouped and slums above the size of 200 households were segmented in a preliminary mapping phase. The PSUs were stratified into eight socioeconomic strata of approximately equal size. The stratification was based on some aggregate water and sanitation information collected from a random sample of households from each PSU. The sample size was calculated to detect a 2% difference in infant mortality rates between intervention and comparison clusters with a 95% confidence limit over a three-year period.

An estimated 168 clusters having a total of 7,500 households was determined as the required sample size. The total first stage sample of 168 PSUs was allocated to strata approximately proportionally to their population, subject to the provision that the number of PSUs in a given stratum must be

a multiple of 4, but must not exceed one quarter of the total number of PSUs in the stratum. Each PSU was assigned a "measure of size" equal to the number of nominal clusters it contained. This number being determined as the smallest integer that divided the PSU's total number of households into clusters of 20 to 55 households. The PSUs were then selected with probability proportional to their size using Sunter's 'PPS sequential method' (5). This method has the advantages of simplicity, unbiased variance estimation (6) and capability of being updated (7). In the second stage, all the selected PSUs that had a measure of size >1 were divided on the ground by the mapping teams into the exact number of clusters assigned prior to PSU selection. Finally, one of these clusters was randomly selected from within each selected PSU giving 168 sample clusters. Although the desired sample size was 7,500 households, the sampling resulted in 4,558 households, mainly due to population overestimates in the slums identified in the slum survey of 1989.

In 1991, a total of 92 additional clusters, known as 'Update-1 Clusters', were selected. The rationale for this update were: a) the sampled households in the 'Old Clusters' were considerably lower than the sample size required, and b) the 1989 slum survey missed many slums; to make the sample representative of 5 *thana* slums, a sample of the newly identified slums in the slum survey of 1991 had to be included. The methodology used in the original sampling offered ways to avoid re-sampling. A sample was added by creating another similar sampling frame and by application of PPS-systematic sampling method with the same sampling interval.

The USS Components

Update of Cluster Maps and the Sample

The project's mapping team prepared detailed maps of selected clusters and prepared a list of eligible households. By definition, any household residing within a sampled cluster for two months or more is considered eligible for registration. The cluster maps have well defined boundaries with land marks, the housing structures, and the households. The locations, numbers, sizes, and boundaries of slums all tend to be unstable. The problems that have arisen from this instability include:

- a. changes in the within-cluster population of sampled clusters, including the disappearance of clusters (or even the entire slum that contained it) through demolition, land use reallocation, etc.;
- b. changes in the outer boundaries of slums constituting or containing a sample cluster; and
- c. the appearance of new, or previously undetected slums within the overall sample area (*5 thana*).

The following rules have been formulated to handle the above-mentioned problems:

a. Within-slum changes

- i. **Changes in the population of an unambiguously identified cluster:** An example is a sample cluster whose boundaries were, and remain, clearly demarcated, but whose population has changed significantly in either direction. These may present an operational problem, in that the enumeration workload has changed considerably, but does not pose a statistical problem. The fact of moving into and out of the defined cluster area wholly determines the selection

probabilities of the individuals/households involved. This is the rationale for using area sampling in the first place. However, for logistical reasons, clusters with less than 10 households are discontinued from follow-up, and is assumed to be demolished.

- ii. **Clusters with ambiguous internal boundaries:** An example is the case in which the boundary between the sample cluster and its neighbouring clusters in a multi-cluster slum is ambiguous, either because the original mapping was poorly done or because of changes on the ground have created ambiguities. For example, if a boundary of a cluster was originally shown as the border of a swamp that has now been inhabited by new dwellers, then those dwellings must somehow be allocated to one or more of the original clusters. Those allocated to the sample cluster are then drawn into the USS sample.

The problem, of course, is how to allocate the dwellings in the new or ambiguous area to the surrounding clusters. This problem, or a class of problem, is handled by the 'deterministic allocation by closeness' approach, i.e. by allocating the dwellings or segment of the dwellings, to the cluster(s) to which they are closest (8).

- b. **Changes in the outer boundaries of previously existing clusters**
 - i. **Incremental changes of less than cluster size:** Accretions of households to the boundaries of less the cluster size (say 50 households) at any one accretion node is again dealt with by the 'deterministic allocation by closeness' approach (8).

- ii. **Quantum changes:** Expansion of more than cluster size, from any one node, should be subject to mapping and subsequent sampling under the technique discussed in the next section.

- c. **New slums (including expansion of type b.ii):** Create an open-ended list of new slums, together with their sizes, the measure of size being the number of 50 household clusters that they are estimated to contain. Large slums should be segmented and small ones combined. This list of new slums and the type (b.ii) expansions of existing slums may be considered as a single new slum stratum. Sample from this list periodically, or whenever enough PSUs have been added since the last sample update.

Sampling of PSUs should be made by using 'PPS systematic' method with a sampling interval equal to N/n , where 'N' is the total number of nominal clusters (over all strata) in the original sample selection and n is the total number of clusters selected.

Data Collection Schedule

Household registration, information on household socioeconomic status (SES) and a phase-I baseline survey which included information on mothers' knowledge about immunization and immunization coverage were administered in the old clusters between January and April 1990. A phase-II baseline survey which included information on knowledge, attitude and practice (KAP) in the areas of diarrhoea, nutrition, and contraception was carried out between August and December 1990. Although the plan was to set up a system of 3-monthly data collection of demographic events and selected health/FP status indicators, this did not become operational until 1991. Demographic event information from the old clusters was collected on an ad-hoc basis once during August 1990 and again between December 1990 and January 1991. Using these information, a baseline of the old

cluster population was created in the computer as of January 1, 1991. Three-monthly data collection began in the old clusters as of April 1, 1991, and since then the quarterly data collection rounds have been followed on a regular basis.

In the Update-1 Clusters, household registration, information on SES, and the phase-I baseline survey were carried out between October and December 1991. The phase-II baseline survey was carried out between January and April 1992. However, the 3-monthly data collection began in all 243 clusters (Old as well as Update-1 Clusters) as of January 1, 1992. Appendix II provides a comprehensive presentation of the USS data collection calendar.

The USS data collection schedules and definitions have been reviewed and revised. The field procedures and visitation schedules have also been refined. Detailed documentation of the baseline surveys and round-wise data collected are available on request. The descriptions of the field operations and the computer system of the USS in the following sections reflect the most recent status.

The Data

The USS has the following data collection systems:

- a. Demographic Events Schedule, updated in 3-monthly cycles;
- b. Family Planning and Health Indicator Schedule, updated in 3-monthly cycles;
- c. Verbal Autopsy Schedule, updated in 3-monthly cycles;
- d. Socioeconomic Survey Schedule, updated yearly;
- e. Special Surveys.

Most of the USS information (demographic events, family planning and health indicators) is collected using a specially designed demographic event record book containing the data collection forms and code plans (Appendix III). A single form, and the same visitation cycle is used to collect information on demographic, health and family planning variables. The data collection form is structured, pre-coded, and contains four segments: pre-printed household identification segment, pre-printed baseline information segment, pre-printed history of events, and four spaces for four rounds of data collection. The schedule is printed by the USS computer system, a new version being printed after four visitation rounds.

Registration criterion for new entrants (households or individuals) is a minimum of two months residency in the surveillance clusters. The new entrants are registered with their baseline demographic data. The 'book' also contains separate sheets for tracking probable in-migrants who have not fulfilled the two months registration criterion during the time of household visit by the interviewer.

Verbal autopsy information in case of deaths, information on household socioeconomic status and special survey data are collected using separate forms.

Demographic Events Schedule:

This is used to record vital demographic events of the surveillance population including the registration of new entrants to the sampled clusters.

For those who have been in the system, data on all events that occurred between the last household visit and the current visit along with their dates of occurrences are recorded. The vital demographic events that are updated in each round are:

- changes in marital status (i.e. marriage, divorce, widowhood, separation, etc.);
- changes in the relationship to the head of household;
- additions to household, either by birth or by moving in from within or outside the cluster;
- formation of new households either by movement of new households into a sampled cluster or by splitting of existing households;
- deactivations of individual either by death or by exit from a registered household;
- deactivations of households by exit from sampled clusters;
- date of last menses for females;
- changes in pregnancy status for females (i.e. pregnancy occurrence, pregnancy outcome);
- current breast-feeding status for under-five children (i.e. exclusive breast-feeding, breast-feeding with other supplementary food);
- education in completed years and occupational status are updated yearly.

Additional information on i) pregnancy outcome event (result, type of attendant, etc.), and ii) death event (cause of death ascertained through verbal autopsy, type of health care-provider attending death, etc.) are also collected.

The baseline demographic data collected for new entrants are: birth date, marital status, education, occupation, birth place, religion, relationship to household head, entry date, entry type, and the source of the entrants. In addition, data on reproductive history and date of migration to Dhaka are collected for females aged 13-49 years. Information on all events occurring between the date of registration and the date of household visit is also recorded for the new entrants.

Family Planning and Health Indicator Schedule:

This includes the following information:

- current contraceptive status, method used, reasons for non-use/drop-out/switching for currently married women aged 13-49 years;
- tetanus toxoid immunization information for mothers who had a live/still-birth in last 12 months;
- selected morbidity and treatment information, e.g. prevalence of diarrhoea in the last two weeks, type and treatment of diarrhoea, and incidence of measles in the last three months, in children aged less than 5 years;
- vitamin A coverage for children aged less than 5 years;
- immunization coverage for children aged less than 2 years;
- information on health/family planning inputs, if any, provided by a family planning/health worker or a UHEP volunteer.

Verbal Autopsy Schedule:

To ascertain cause of death, the USS interviewers have been trained to collect relevant information, as precisely as possible, by interviewing the immediate relatives of the deceased. This information is collected in separate forms. Although these interviews are largely open-ended, the interviewers have been taught to collect information on the time, duration, and gradation of each of the symptoms preceding deaths. There are also specific questions for certain age/sex groups, such as neonates and mothers of child bearing age.

Completed death forms are independently reviewed by three Bangladeshi physicians. Each of them makes a diagnosis based on available information. If a physician considers the available information as inadequate to make a diagnosis, s/he returns the form to the field for additional information. Medical diagnoses of the three physicians are compared and if

the three or at least two agree to a diagnosis, then that diagnosis is retained. If the three disagreed, the form is returned to the field for additional information and reinserted into the review process.

Socioeconomic Survey Schedule:

A separate form is used to collect data on household socioeconomic status (SES), which includes information on:

- ownership of house/land;
- construction material used to built the house;
- ownership of household assets;
- household water sources, latrine type, and availability of electricity; and
- household income and expenditure.

The SES data is collected for newly registered households at the time of registration. The information is updated annually.

Special Surveys:

The system has the flexibility to accommodate a special module in each round to explore issues in-depth.

For details on the information collected and the instruments used, refer to the UHEP document "Urban Surveillance System: Data Collection Instruments" (9).

The USS: Field Operations

Field Resources

The data is collected through household visits in the sampled clusters by professional female interviewers with a minimum of twelfth grade education. Field operations are carried out from three field offices located in Mohammadpur, Lalbagh, and Sutrapur. Eighty four of the clusters are covered by the Mohammadpur field office, 69 by the Sutrapur field office and the remaining 75 clusters by the Lalbagh field office (there were a total of 228 active clusters in July-September 1993 round of data collection). The number of regular interviewers assigned to work in each of the field offices are 5, 4 and 3 respectively. In addition, 3 interviewers serve as stand-bys to cover the work of the regular interviewers when they are on leave. On the average, the interviewers conduct 15 household interviews a day.

The activities of the interviewers are directly supervised by the Senior Field Research Officers (SFROs) and the Field Research Officers (FROs). One SFRO and one FRO is assigned in each field offices. The SFRO assisted by FRO is responsible for the day-to-day supervision, maintaining schedules, preliminary editing of data, solving field problems, supervising interviewers, conducting random spot checks and re-interviews, liaising with the Data Management Section, and correcting interview errors discovered by the Section.

In addition, to facilitate the work of the interviewers, two Mappers update the cluster maps in each round to their current status.

Field Procedures

The field visitation schedule is computer programmed to aid in achieving a 90-day visitation cycle. The interviewers must visit the households within two days of the schedule. The data collection forms are bound in books, each containing forms for 25-35 households depending on the size of the clusters; the clusters beyond this size are divided into books of this size.

The work of each round is divided into six batches -- each batch comprising a two-week work. When an interviewer completes her one batch field visitation work, she submits it to a SFRO/FRO who edits the work in two subsequent weeks. The books are sent to the Data Management Section at the end of the fourth week. Another two weeks are required for data entry and verification. Data errors detected during entry and verification that can not be solved locally are sent to the field offices as feedbacks. These error reports are checked and corrected through additional field visits, if necessary.

Field Monitoring and Data Quality Control

The field operations are monitored at three levels: 1) the SFRO and FRO assigned in each field office are directly responsible for the work in their area; 2) there is one Research Investigator who visits each field sites at least once a week and maintains liaison between field and central office; 3) a Demographer assisted by a USS Team comprising Research Investigators, Analyst Programmer, Data Management Coordinator, and Head of Research and Evaluation is responsible for overall planning and implementation of the USS field activities.

The SFROs/FROs report daily to the Research Investigator and fortnightly in the USS Field Coordination Meeting (attended by members from the field offices, the Data Management Section, and the USS Team). The Research Investigator supervises the field operations on a daily basis and

coordinates closely with the Analyst Programmer, the Data Management Coordinator and the Demographer. She reports to the Demographer. The Demographer reports to the Head of Research and Evaluation (Appendix IV).

Data quality is maintained through spot checks by the FROs, SFROs, the Research Investigator, the Demographer, and the Head of Research and Evaluation. The FROs supervise 5% of the interviews and conduct re-interviews in a 10% randomly selected clusters in each round. The interviewers conduct initial editing of the data forms soon after the field visits. The final editing is done by SFROs/FROs at the end of the interviewers' two weeks job. During the fortnightly meetings with the USS Field Coordination Team, the field problems and progresses are discussed and resolved. The USS Team meets once in two weeks to review and resolve the problems that can not be resolved in the Field Coordination meeting, and plan the overall development of the system.

Training was provided before the start of the April-June 1991 quarter to the interviewers, FROs, the Data Management Assistants. A three-day refresher training is given to the interviewers at the beginning of each quarterly round.

The USS: Computer System

The computer system that supports the USS data collection, processing, and reporting functions comprises two functionally distinct subsystems: Data Capture and Update Subsystem, and Data Retrieval and Reporting Subsystem.

The Data Capture Subsystem is aimed at meeting operational needs of the USS. It performs the functions of data entry and validation. It is also used to produce eligibility lists for the data collection of ongoing surveillance and other special studies within the USS sample. These operations are

tightly coupled with the field operations component of the USS in maintaining the 90-day visitation cycles and in ensuring timely generation and handling of feedbacks for data verification.

In contrast, the Data Retrieval and Reporting Subsystem is aimed at meeting the research needs by way of linking various data collected at different times and producing flat files or SAS/SPSS system files to be used for data analysis. The database contains all the available USS data and implements a comprehensive and global data model for all the components of the USS. The data model is relational with controlled degree of redundancy, which ensures efficient data storage and retrieval, and easier linkage of the datasets and pieces. The data model also allows application of relational algebra to create subsets of population satisfying specific characteristics. Relational data model has distinct advantages: a) it minimizes the use of computer time, b) reduces the complexity of programme designs, and c) optimizes the use of the programming resources.

Data capture and update subsystem for the demographic and FP/health components are fully interactive. The subsystem for SES is non-interactive; the development of an interactive subsystems for this component is being planned. All data are validated against their demographic counterpart.

Computer Resources

Six 386 personal computers are used for the interactive entry and updates of the data recorded in the demographic, contraception and health information books. These are data on new registrations, vital demographic events, change in relationships within a household, date of last menses, and related data for married women, contraceptive use and related data, breast-feeding status and selected morbidity data for children, immunization status updates, and health service inputs to a household.

The data updating is being done by six professional data management persons (DMAs). The DMAs are supervised by the Data Management Coordinator who closely coordinates with the field offices and the Programmers and reports to the Head of Research and Evaluation. The computer system is maintained by a Programmer, data extraction and assistance for data analysis are performed by another Programmer. The Programmers are supervised by an Analyst Programmer who also reports to the Head of Research and Evaluation.

Data Storage Architecture

The data is stored in rectangular data structures referred to as 'tables'. Each 'table' consists of several columns, each refers to a variable. One or more of these columns are identification variables (entities) and the others are data variables (attributes). One row of such a table contains, for example, the pregnancy status information, the date of last menses, and contraceptive status information of an eligible woman. There are nine data tables in the operational database.

Update Procedures

The data entry and update system for the demographic, contraception, and health information system is interactive. An update is initiated by entering the code assigned for that type of update. The screens display instructions and explanations which lead the user, step by step, to provide more and more detailed data for the update.

During the data entry, four types of checks are performed:

- a. whether the data is within its specified range, e.g. sex may only be male or female;

- b. whether the data is consistent for the person, e.g. a pregnancy can occur only to females between 10 years and 49 years of age, or a woman can not have two miscarriages within 42 days;
- c. whether relationships within the household are consistent, e.g. a household can not have more than one head at the same time or spouse's mother record, if ever registered in the household, contains appropriate relation to head code;
- d. whether data is consistent within the cluster, e.g. one person is a member of one household at a time.

An update process may end up in an abortive state if the input data is wrong. The system displays the error, explains with background data if necessary, why this is an error, and is optionally printed. The error is solved locally if unambiguous-related data is available, otherwise it is sent as a feedback to the field offices with explanation for resolution. If the data is correct, the data is temporarily accepted until all the updates for a household are done. The user then may opt to accept the whole data, and in this case, integrity checks are performed for the members in a household. The data is accepted if the data passes the checks. The data is rejected in case there is one or more errors; the rejection is accompanied by suggestions of the course of corrective actions. If the update is accepted, it adds and/or updates one or more rows in one or more 'tables' in the database. The type of update is stored in a log-table. The system is then ready for processing further updates.

At the end of each day or at the completion of all the updates for a cluster, whichever is done earlier after the printing of the last log, another log is printed. The log is checked with books to ensure that all the updates reported in the books have been performed in the computer system. If any update was missed, the household is accessed again to perform the update.

Resolution of Errors

Any data rejection which can not be solved immediately remains pending and the system provides a brief description of the error. These updates are made when a valid and acceptable solution is found. The course of solution depends on the type of the error. If a field verification is required, then a copy of the data form with a brief description of the type of error is sent to the relevant field office. Problems are discussed among the users every day, within the Systems & Data Management Section (S&DMS) once a week, in the USS Team meeting once a fortnight, and in the field coordination meeting once a fortnight. The solution of data problems is being done, all within a timeframe for a batch. At the end of each batch, the error log is checked to resolve all pending updates for the batch.

Software

The software which has been used for the development and implementation of the USS system is Rbase for DOS, v.2.1. This is one of the most popular PC-based relational database management software (DBMS). In this type of software, the data storage is viewed as rectangular structures with definition of columns and tables. The columns are optionally indexed. It has a good fourth-generation language (4-GL) and other tools for screen and menu designs. Many types of relationships among the tables and variables can be established dynamically for linkages of information. It has a good implementation of the SQL language; this is an object-oriented and powerful data processing and manipulation language.

The programmes were developed and tested within the project in 1991 borrowing experiences from other similar systems within the ICDDR,B. The demographic component of the system was implemented within a reasonably short time and limited resources; other components of the system were developed incrementally.

Backup

Three most recent full backups are maintained in removable disks. This corresponds to rolling of three generations. One 40-MB removable hard-disk is used for each generation; the last generation is the most recent backup and it is also kept in the respective computer. The second backup is kept in the ICDDR,B's Computer Information Services (CIS) which is located in another building of the ICDDR,B and the other two are kept in the project's S&DMS. In addition, the last full-backup after completion of each of the rounds is maintained in two copies. One copy is kept in a 100-MB removable hard-disk in the S&DMS, and the other one is kept in an identical disk in the CIS. A log of all these backups, indicating the time period, update status and location of the backup, is maintained.

The database is dynamic and is changing along with each of the updates. The updates are dated. Some changes or corrections change the database in such a way that data extracted on certain conditions at different times may provide different data. To avoid confusions and to be able to add variables to an extracted data file at a later time, the source of the extracted data is also backed up along with the documentation of the input and output data files and the programmes that create the output file. This is done in a separate removable hard-disk and is also maintained in two copies.

Printing of Books

At the end of a year, fresh USS books are printed. The books contain the most recent demographic information of the members in the 'Baseline information' column and the summary of events occurred to members in the last six months in the 'History of events' column. The printing is done in batches; printing for a batch starts just after the operational database updating is completed. The printouts are then arranged;

Other papers like household index, maps, code plans, etc. are added, and sent for binding with a hard cover.

The data entry and validation of the Socio-Economic Schedule and the Fertility intention questionnaire are done in non-interactive mode; development of systems for interactive data entry and validation are in progress.

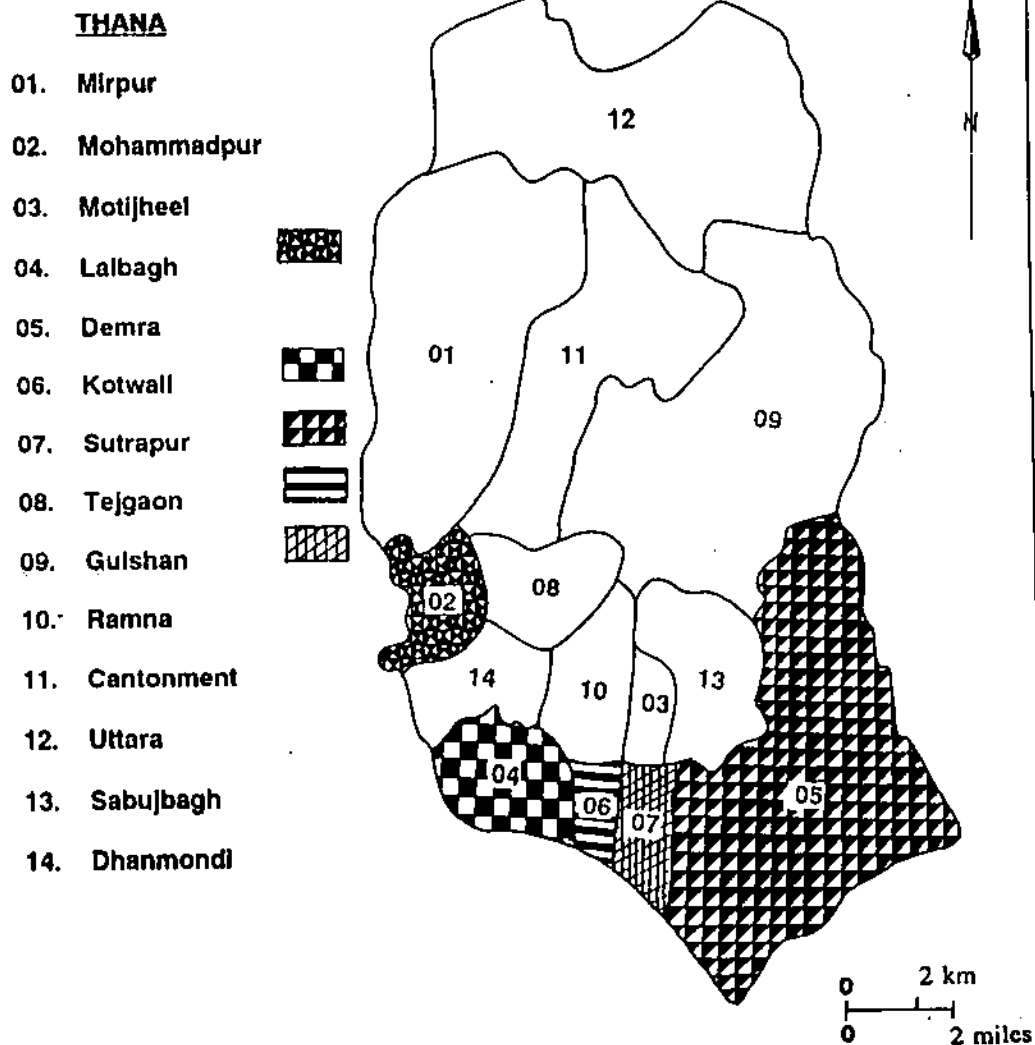
Apart from management of USS data and extraction of data for analyses, the USS computer system produces regular quarterly and annual reports. These reports are sent as feedbacks to the project's service delivery team for management purposes, including identification of low performing areas.

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Appendix I. Sketch Map of Dhaka Metropolitan Area

SHADED THANAS ARE UHEP'S TARGET THANAS



Appendix-II

Urban Surveillance System Data Collection Calendar

Time of data collection	Type of data	
	Routine data	Special surveys
Jan-Apr 1990	<u>Old clusters:</u> ·Household Registration ·SES	<u>Old clusters:</u> ·Phase-I
Aug-Sep 1990	<u>Old clusters:</u> ·Demographic events	
Aug-Dec 1990		<u>Old clusters:</u> ·Phase-II
Dec 1990-Jan 1991	<u>Old clusters:</u> ·Demographic events	
Round 1 Apr-Jun 1991	<u>Old clusters:</u> ·Demographic events ·HSIS ·SES	
Round 2 Jul-Sep 1991	<u>Old clusters:</u> ·Demographic events ·HSIS	

Note:

Phase-I: Baseline information on mothers' knowledge and practice in the area of immunization.

Phase-II: Baseline information on mothers' knowledge and practice in the areas of nutrition, diarrhoea, breastfeeding and contraception.

SES: Socioeconomic status information is collected at the time of registration of a new household (HH) in any round, and when there is a formation of new household through changes in household head.

SES information of all active households were updated in Rounds 1, 8 and 12.

HSIS: Health Service Indicator Surveillance includes information on pregnancy, contraceptive status and TT immunization from eligible women, 2 weeks diarrhoea, 3 months measles, 3 months vitamin A and DPT, BCG and measles immunization from eligible children.

Data Collection Calendar (Cont.)

Time of data collection	Type of data	
	Routine data	Special surveys
Round 3 Oct-Dec 1991	<u>Old Clusters:</u> ·Demographic events ·HSIS <u>Update-I Clusters:</u> ·HH Registration ·SES	<u>Update-I Clusters:</u> ·Phase-I
Round 4 Jan-Mar 1992	<u>Old Clusters:</u> ·Demographic events ·HSIS <u>Update-I Clusters:</u> ·Demographic events	<u>Update-I Clusters:</u> ·Phase-II
Round 5 Apr-Jun 1992	<u>Updated Clusters:*</u> ·Demographic events ·HSIS	<u>Updated Clusters:</u> ·RHQ ·MIG Q
Round 6 Jul-Sep 1992	<u>Updated Clusters:</u> ·Demographic events (with revised contraception component)** ·HSIS	<u>Updated Clusters:</u> ·FIQ

Note:

RHQ: Reproductive History Questionnaire was introduced in April-June 1992. In all subsequent rounds, this questionnaire is applicable for newly registered eligible women.

MIG Q: Migration History

Questionnaire is eligible for <50 years old female, born outside of Dhaka. It was introduced in April-June 1992. In subsequent rounds, this questionnaire is applicable for newly registered eligible women.

FIQ: Fertility Intention Questionnaire is updated yearly.

* Updated clusters : Old clusters + Update-I Clusters

** Effective from Round 6, a revised contraception component was added to the demographic book.

Data Collection Calendar (Cont.)

Time of data collection	Type of data	
	Routine data	Special surveys
Round 7 Oct-Dec 1992	<u>Updated Clusters:</u> ·Demographic events ·HSIS*	<u>Updated Clusters:</u> ·Water & Sanitation Questionnaire ·PPQ
Round 8 Jan-Mar 1993	<u>Updated Clusters:</u> ·Demographic events (HSIS information restructured & included in the demography book) ·SES	<u>Updated Clusters:</u> ·PPQ
Round 9 Apr-Jun 1993	<u>Updated Clusters:</u> ·Demographic events	<u>Updated Clusters:</u> ·Miking Q. ·PPQ
Round 10 Jul-Sep 1993	<u>Updated Clusters:</u> ·Demographic events	<u>Updated Clusters:</u> ·FIQ ·PPQ
Round 11 Oct-Dec 1993	<u>Updated Clusters:</u> ·Demographic events	<u>Updated Clusters:</u> ·Women's Mobility Questionnaire ·PPQ
Round 12 Jan-Mar 1994	<u>Updated Clusters:</u> ·Demographic events ·SES	<u>Updated Clusters:</u> ·PPQ

Note:

Water and Sanitation Questionnaire was administered in Round 7 only.

PPQ: Postpartum Questionnaire was introduced in October-December 1992 and continued in subsequent rounds.

Miking Q: Miking Questionnaire was administered in April-June 1993.

Women's Mobility Questionnaire was administered in October-December 1993.

* The information collected through HSIS form was restructured and included in the demography book from the January-March 1993 round.

Appendix - III

Urban Surveillance System Event Record Book

Stratum#:
Struct# :
HHH_SNo:
Religion :
HDPNO :

Cluster #:
Household#:
HHH Name :
LV_date :
Hen_Date :

Baseline Demographic Information Updated Upto Last DOV	History of Events	Resp.S No: _____ Rnd.# :12 DOV: _____			Resp.S No: _____ Rnd.#:13 DOV: _____			Resp.S No: _____ Rnd.#:14 DOV: _____			Resp.S No: _____ Rnd.#:15 DOV: _____														
		HDPNO: _____ DATE: _____			HDPNO: _____ DATE: _____			HDPNO: _____ DATE: _____			HDPNO: _____ DATE: _____														
		P	EV	EV_Date	#1	#2	#3	P	EV	EV_Date	#1	#2	#3	P	EV	EV_Date	#1	#2	#3	P	EV	EV_Date	#1	#2	#3
S_No: P_No: Name: DOB : Sex: Rel_HH: M_S_No: F_S_No: H_S_No: M_stat: B_Plc : Educ : Occup: W_plc:																									
S_No: P_No: Name: DOB : Sex: Rel_HH: M_S_No: F_S_No: H_S_No: M_stat: B_Plc : Educ : Occup: W_plc:																									

Urban Surveillance System
 Probable immigrants
 (Not fulfilling the registration criterion)

Stratum #: Cluster #: Struct #: Household #: HHH_SNo : HHH_Name : Religion : ____

Sl #	Rnd #	Visit date	Date of Innig.	Name	DOB	Age	Sex	Rel HH	M S No	F S No	H S No	M SE	P BF date	B. Pic	Educ	Occup	Remarks

Stratum #: Cluster #: Struct #: Household #: HHH_SNo : HHH_Name : Religion : ____

Sl #	Rnd #	Visit date	Date of Innig.	Name	DOB	Age	Sex	Rel HH	M S No	F S No	H S No	M SE	P BF date	B. Pic	Educ	Occup	Remarks

Urban Surveillance System Event Coding Structure

P = Presence of individual : 0 = No, 1 = Yes

Event Type(EV)	Date	# 1	# 2	# 3
1. AMENDMENTS				
Member correction	12	-	-	-
2. NEW ENTRIES INTO HOUSEHOLD				
Enumeration	20	DOV	-	-
Inclusion	21	DOV	-	-
Birth	22	DEV	-	-
Inmigration	23	DEV	Source(#6)	-
Internal migration in	24	DEV	-	-
Split-in	25	DEV	-	-
Last migration to Dhaka	28	DEV	Source(#6)	-
* Enter before(01-01-91)	29	-	-	-
3. MARITAL STATUS CHANGE				
* Never married	30	-	-	-
Married	31	DEV	-	-
Divorced	32	DEV	-	-
Widowed	33	DEV	-	-
Separated	34	DEV	-	-
Deserted	35	DEV	-	-
Reunion	36	DEV	-	-
* Polygamously married	37	DEV	-	-
Married, husband absent	38	DEV	-	-
4. PREGNANCY STATUS CHANGE/TT/CONTRACEPTION				
Not pregnant	40	LMP	Reason for no date (#7)	-
Pregnancy occurrence	41	LMP	Reason for no date(#7)	-
Pregnancy outcome	42	DEV	Result(#8) Place(#9) Attendant(#10)	-
TT	43	-	TT stat.(#11)	-
Non-User	45	-	Reason(#13)	-
User	46	-	Method(#12)	-
Switcher	47	-	Method(#12) SW(#13)	-
Unsure	48	LMP	Reason for no date(#7)	-
Unknown	49	LMP	Reason for no date(#7)	-
5. BREASTFEED STATUS CHANGE				
* Nothing/sugar water/ honey only	000	-	-	-
Breastmilk only	500	-	-	-
Breastmilk + water(no bottle)	510	-	-	-
Breastmilk+liquid(no bottle)	520	-	-	-
Breastmilk+bottle feeding	530	-	-	-
Breastmilk+food(semi solid/solid)	540	-	-	-
Breastmilk+food+bottle feeding	550	-	-	-
Bottle feeding+food	560	-	-	-
Bottle feeding only	570	-	-	-
Liquid without bottle	571	-	-	-
Food only	580	-	-	-
Unknown	590	-	-	-

Event Coding Structure (Cont.)

Event Type(EV)	Date	# 1	# 2	# 3
6. EDUCATION AND OCCUPATION CHANGE				
Change in education	61	-	-	-
Change in occupation	62	-	-	-
7. EXIT FROM THE HOUSEHOLD				
Migration out	71	DEV	-	-
Internal Migration out	72	DEV	-	-
Split out	73	DEV	-	-
Death	74	DEV	-	-
Cluster demolition	78	LVDate	-	-
Cluster discontinue	79	LVDate	-	-
8. CHANGE IN RELATIONSHIPS				
Mother's sl.#	81	DEV	M_S_NO.	-
Father's sl.#	82	DEV	M_S_NO.	-
Husband's sl.#	83	DEV	H_S_No.	-
Relation to head	84	DEV	Rel_HH(#3)	-
9. MORBIDITY,VIT-A AND IMMUNIZATION INFORMATION				
2W Diarrhoea	91	-	# Days(#18)	Type(#19) ORT(#20)
3M Measles	92	-	Yes/No(#21)	-
3M Vitamin-A	93	-	Yes/No(#21)	-
DPT-1	94	DEV	Yes/No(#21)	-
DPT-2	95	DEV	Yes/No(#21)	-
DPT-3	96	DEV	Yes/No(#21)	-
Measles	97	DEV	Yes/No(#21)	-
BCG	98	DEV	Yes/No(#21)	SCR(#22)
10. FP/HEALTH WORKER/VOLUNTEERS VISITS				
	Date	#1	#2	#3
FP/Health worker	101	-	FP(#15) Diarr(#16)	Immn(#17)
Volunteer	102	-	FP(#15) Diarr(#16)	Immn(#17)
Unknown worker	103	-	FP(#15) Diarr(#16)	Immn(#17)

Note1: #s in brackets shown under data # 1,2,3 are sl # in attached code plan.
 Note2: '*' Indicate that these are not events.

Pregnancy/TT/Contraception Status Coding Structure

Event Type	Ev.date	#1	#2	#3
1. FOR NOT PREGNANT WOMEN:				
Not pregnant	40	LMP date	Reason for no date(#7)	-
Non-user	45	-	-	Reason(#13)
User	46	-	Method(#12)	-
Switcher	47	-	Method(#12)	SW Reason(#13)
2. FOR PREGNANT WOMEN:				
Pregnancy occurrence	41	LMP date	Reason for no date(#7)	-
3. FOR WOMEN REPORTING PREGNANCY OUTCOME:				
Pregnancy outcome	42	DEV	Result(#8)	Location(#9)
TT	43	-	TT status(#11)	Attendant(#10)
Not pregnant	40	LMP date	Reason for no date(#7)	-
Non-user	45	-	-	Reason(#13)
User	46	-	Method(#12)	-
4. FOR WOMEN WITH UNSURE PREG. STATUS:				
Unsure	48	LMP date	Reason for no date(#7)	-
Non-User	45	-	-	Reason(#13)
User	46	-	Method(#12)	-
Switcher	47	-	Method(#12)	SW Reason(#13)

Pregnancy status:

Eligible : Currently married and active marital relationship but husband absent for more than 2 months (code '31' and '38') and separated/divorced/widowed/deserted in the last 9 months.

Respondent: Self (primary)
Adult female/spouse (secondary)

Contraception status:

Eligible : Currently married and active marital relationship but husband absent for more than 2 months (code '31' and '38')

Respondent: Self

TT status:

Eligible : a) Those who report a pregnancy outcome (live or still birth) in the current round

b) All in-migrants/inclusion
Respondent: Self

Urban Surveillance System Registration and Event Codes

1. Religion

- 1---Islam
- 2---Hindu
- 3---Other

2. Sex

- 1---Male
- 2---Female

3. Relation to head:

- 00---No relation to head
- 01---Self: this person is the head
- 02---Spouse of head
- 03---Son or daughter of head
- 04---Mother or father of head
- 05---Brother or sister of head
- 06---Brother or sister of parent of head
- 07---Grandfather or grandmother of head
- 08---Grandson or granddaughter of head
- 09---Brother or sister of spouse of head
- 10---Mother or father of spouse of head
- 11---Step-father or step-mother of head
- 12---Step-son or step-daughter of head
- 13---Adopted son or daughter of head
- 14---Step-brother or step-sister of head
- 15---Son-in-law or daughter-in-law of head
- 16---Nephew or niece of head
- 77---All other relationships not listed above
- 99---Unknown

4. Marital status:

- 30---Never married
- 31---Married (active marital relationship with spouse)
- 32---Divorced (formally divorced from spouse - no marital relationship with any spouse)
- 33---Widowed (the only spouse died - no marital relationship with any spouse)
- 34---Separated (spouse absent, no active marital relationship with spouse but has communication with spouse for last two months)
- 35---Deserted (no active marital relationship with any spouse and has no communication with spouse for last two months)
- 36---Reunion (active marital relationship after remaining separated or deserted)
- 37---Polygamously married (a male person has more than one active marital relationship and the wives may or may not live in the same household)
- 38---Married, husband absent (active marital relationship but husband absent for more than 2 months)

5. Birth place:

- 1---Same slum (bustee) as now living in
- 2---Outside current slum (bustee) but in another slum in Dhaka city.
- 3---In Dhaka city but not in a slum
- 4---In an urban area other than Dhaka city
- 5---In a rural area
- 6---Outside Bangladesh
- 9---Unknown

6. Source of migrants:

- 1---Same slum as now living in
- 2---Outside current slum but in another slum in Dhaka city
- 3---In Dhaka city but not in a slum
- 4---In an urban area other than Dhaka city
- 5---In a rural area
- 6---Outside Bangladesh
- 9---Unknown

7. Reason for absence of LMP:

- 1---Postpartum amenorrhea
- 2---Contraceptive amenorrhea
- 3---Menopause
- 4---Respondent (self) not present
- 7---Other
- 8---Not applicable

8. Result of pregnancy outcome:

- 01---Induced miscarriage
- 02---Spontaneous miscarriage
- 03---Single still birth
- 04---Twin still birth
- 05---Triple still birth
- 06---Single live birth
- 07---Twin birth, one live and other stillborn
- 08---Triple birth, one live and others stillborn
- 09---Twin birth, both live
- 10---Triple birth, two live and one stillborn
- 11---Triple birth, all live

9. Place of pregnancy outcome:

- 10---House, own
- 31---House (parents/siblings/others) in a slum in Dhaka city
- 32---House (parents/siblings/others) in a non-slum in Dhaka city
- 33---House (parents/siblings/others) outside Dhaka city, in a rural area
- 34---House (parents/siblings/others) outside Dhaka city, in an urban area
- 40---Maternity center/health clinic/hospital
- 77---Other places, 99---Unknown

10. Attendant of pregnancy outcome:

- 00---Not attendant
- 10---Untrained attendant - relatives, neighbors, etc
- 21---Untrained TBA, relative
- 22---Untrained TBA, non-relative
- 30---Trained TBA
- 40---Paramedic/midwife/nurse
- 50---Medical doctor (physician)
- 77---Others
- 99---Unknown

11. TT immunization in last preg:

- 0---No
- 1---1 shot
- 2---2 shots
- 3---3 shots
- 8---No child born in last one year
- 9---Unknown

12. Contraceptive methods:

- 01---Oral pill
- 02---Injection
- 03---IUD
- 04---Condom
- 05---Diaphragm/foam/jelly
- 06---Female sterilization
- 07---Male sterilization
- 08---Periodic abstinence
- 09---Withdrawal
- 10---Herbal/massage
- 11---Implant
- 77---Other

13. Reasons for non-use/drop-out/switching:

No need

- 11---Wants a child
- 12---No need as husband absent
- 13---No need as menopausal/had hysterectomy
- 14---In postpartum amenorrhea
- 15---No need as infertile
- 16---Infrequent sex
- 17---No need (other reason)

Use related problems

- 21---Health concern
- 22---Menstrual disturbances (feared or experienced)
- 23---Side effects (feared or experienced)
- 24---Method failure in past

Personal reasons

- 31---Respondent doesn't approve of family
- 32---Husband/family objection
- 33---Lack of knowledge about methods

Logistic reasons

- 41---Supply problem
- 42---Cost much

Other reasons

- 77---Other, specify
- 99---No information

14. Workplace (occupation status):

- 1---Home
- 2---Outside home, accompanied by children
- 3---Outside home, not accompanied by children

15. FP inputs:

- 0---No visit
- 1---Visit, but no service
- 2---Education/motivation/referral
- 3---Method distribution
- 4---Both
- 5---Self
- 9---Don't know

16. Diarrhoea inputs:

- 0---No visit
- 1---Visit, but no service
- 2---Education/motivation/referral
- 3---ORS distribution
- 4---Both
- 5---Self
- 9---Don't know

17. Immunization:

- 0---No visit
- 1---Visit, but no service
- 2---Education/motivation/referral
- 3---Immunization provided
- 4---Both
- 5---Self
- 9---Don't know

18. # days (diarrhoea in last 2 weeks):

- 00---No diarrhoea
- 01---One day
- 02---Two days
- 14---14 days
- 99---Unknown

19. Diarrhoea type:

- 1----Loose/liquid/watery stool, no blood or mucous
- 2----Mucoid stool (even if mucous was seen only once)
- 3----Bloody stool (even if blood was seen only once)
- 4----Bloody and mucoid stool (even if blood and mucous were seen only once)
- 9----Unknown

20. ORT:

- 0----No ORT
- 1----Packet ORT
- 2----Home made
- 3----Packet+ Home made
- 7----Other (glucose water, sugar/sugar+lemon water green-coconut water, etc)
- 9----Don't know

21. 3 Months measles/3 months vitamin A; DPT/measles/BCG immunization:

- 0----No
- 1----Yes
- 9----Don't know

22. Scar present(BCG):

- 0----No
- 1----Yes
- 2----Child not present
- 3----Not sure

Codes for Verbal Autopsy

23. Place of death:

- 10----House, own
- 31----House (parents/siblings/others) in a slum in Dhaka city
- 32----House (parents/siblings/others) in a non slum in Dhaka city
- 33----House (parents/siblings/others) outside Dhaka city in a rural area
- 34----House (parents/siblings/others) outside Dhaka city in a rural area
- 40----Treatment center/health clinic/hospital
- 77----Other places
- 99----Unknown

24. Doctor attending death:

- 0----Not consulted
- 1----Licensed allopath (medical physician/paramedic)
- 2----Poli chikitsok (trained medical practitioner)
- 3----Quack allopath (uncertified allopath physician)
- 4----Homeopath
- 5----Kabiraj/Ayurvedi
- 7----Others
- 8----Unknown

Appendix-IV

Urban Surveillance System Personnel - 1993

USS Team:	Head, Research and Evaluation	- Abdullah Hel Baqui
	Demographer	- Kanta Jamil
	Research Investigators	- Quamrun Nahar Sarah Salway Shams El Arifcen
	Analyst Programmer	- NM Jahangir
	Data Management Coordinator	- Nazma Begum

Field and Computer Staff:

Field Staff:

Research Investigator
Quamrun Nahar

Senior Field Research Officers
Sanjida Nasreen, Hazera Nazrul,
Sufia Nurani

Field Research Officers
Hosne Ara Begum, Nilufar Begum,
Naseema Kareem, Nasima Khanam,
Shahida Khanam

Senior Interviewers
Shaheen Akhter, Monowara Begum,
Mahmuda Farooque,
Quamrunessa Mohiuddin, Saida Nilufa

Interviewers
Nasreen Akhter, Afsari Begum,
Jaeda Begum, Akhtara Begum,
Rehana Begum, Momtaz Begum,
Kawser Parveen, Kalpana Rani Ghosh
Nazia Zaman

Mapper
Habibur Rahman, Shahana Rahman

Systems and Data Management Staff:

Analyst Programmer
NM Jahangir

Data Management Coordinator
Nazma Begum

Programmers
Fokhruzzaman, Rafique-ul Islam,
Abu Yusuf

Data Management Officers
Habib Abdur Rashid, Nirod C. Saha

Senior Data Management Assistants
A.K.M. Fazlul Haque, Nurun Nahar,
Md. Mahbubur Rahman,
Md. Ashrafuddin Siddik

Data Management Assistants
Maksuda Akhter, Mahbuba Jahan,
Amina A. Jahan

Data Entry Technicians
Md. Rafiqul Islam,
Md. Shahabuddin Miah

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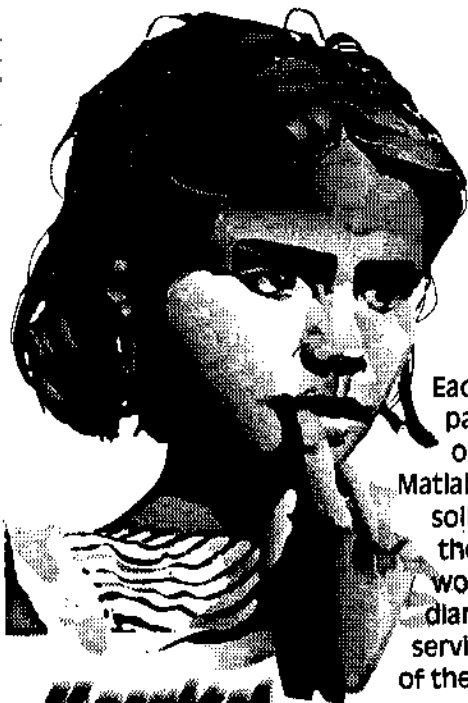
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An Appeal

Each year, ICDDR,B treats over 70,000 patients attending its two hospitals, one in urban Dhaka, the other in rural Matlab. Though they are planted in Bangladeshi soil, they grow because of the dedication of thousands of concerned people throughout the world. The patients are mostly children with diarrhoea and associated illnesses and the services are offered free to the poorer section of the community

Hospital Endowment Fund

Since these services are entirely dependent on financial support from a number of donors, now we at the ICDDR,B are establishing an entirely new endeavour: an ENDOWMENT FUND. We feel that, given securely implanted roots, the future of the hospitals can confidently depend upon the harvest of fruit from perpetually bearing vines.



To generate enough income to cover most of the patient costs of the hospitals, the fund will need about five million dollars. That's a lot of money, but look at it this way:

JUST \$150 IN THE FUND WILL COVER THE COST OF TREATMENT FOR ONE CHILD EVERY YEAR FOREVER!

We hope you will come forward with your contribution so that we can keep this effort growing forever or until the world is free of life-threatening diarrhoea. IT IS NOT AN IMPOSSIBLE GOAL.

Cheques may be made out to: ICDDR,B Hospital Endowment Fund.

For more information please call or write to:
Chairman, Hospital Endowment Fund Committee
GPO Box 128 • Dhaka, 1000, Bangladesh

Telephone: 600-171 through 600-178
Fax: (880-2) 833116



CENTRE
FOR HEALTH AND
POPULATION RESEARCH

Urban Health Extension Project (UHEP)
International Centre for Diarrhoeal Disease Research, Bangladesh
GPO Box 128, Dhaka 1000, Bangladesh
Telephone: 600171 (8 lines), Cable: CHOLERA DHAKA, Telex: 675612 ICDD BJ;
Fax: 880-2-883116 and 880-2-886050