



## Government of India Ministry of Home Affairs

Office of the Registrar General & Census Commissioner, India

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#### Introduction

Registration of births and deaths is an important source for demographic data for socio-economic development and population control in developing countries. The data on population growth, fertility and mortality serves as the starting point for population projections. Apart from these vital indicators, an adequate evaluation of a number of programs in the health sector, including family planning, maternal and reproductive health, immunization programs, is dependent upon the availability of accurate, up-to-date fertility and mortality data. In India, the need for dependable demographic data was felt soon after independence heralding the era of five year planning. The registration of births and deaths started on voluntary basis and there was no uniformity in statistical returns resulting in both under-registration and incomplete coverage. In order to unify the civil registration activities, the Registration of Births & Deaths Act, 1969 was enacted. Despite having the registration of birth & death compulsory under the statute, the level of registration of births and deaths under the Act has continued to be far from satisfactory in several states/UTs. With a view to generate reliable and continuous data on these indicators, the Office of the Registrar General, India, initiated the scheme of sample registration of births and deaths in India popularly known as Sample Registration System (SRS) in 1964-65 on a pilot basis and on full scale from 1969-70. The SRS since then has been providing data on regular basis.

The demographic scenario in the country has been undergoing a change since the inception of SRS; however, the profile and rate of change is not uniform in all the states. Overall, the crude birth rate in the country has come down from 36.9 per one thousand population in 1971 to 23.8 in 2005, whereas the crude death rate has declined from 14.9 to a low of 7.6 in the same period. The infant mortality rate, which is an important indicator of the health status of the country, has registered a significant decline from 129 per one thousand live births in 1971 to 58 in 2005. During the period, the total fertility rate of the country has declined from 5.2 to 2.9. To fulfill its objective of monitoring the changes in vital indicators, the SRS sampling units are retained for about ten years, making it a panel household survey

Various methods based on the application of sampling techniques have been tried and tested in many developing countries. Such methods include single and multi-round retrospective surveys and the dual record system. The SRS in India is based on a dual record system. The field investigation under Sample Registration System consists of continuous enumeration of births and deaths in a sample of villages/urban blocks by a resident part time enumerator, and an independent six monthly retrospective survey by a full time supervisor. The data obtained through these two sources are matched. The unmatched and partially matched events are re-verified in the field to get an unduplicated count of correct events. The advantage of this procedure, in addition to elimination of errors of duplication, is that it leads to a quantitative assessment of the sources of distortion in the two sets of records making it a self evaluating technique.

The revision of SRS sampling frame is undertaken in every ten years based on the results of latest census. While changing the sample, modifications in the sampling design; wider representation of population; overcoming the limitations in the existing scheme; meeting the additional requirements are taken into account. The first replacement was carried out in 1977-78 and the last being in 2004. Whereas the replacement of samples in earlier years was undertaken in phases spread over 2-3 years, the replacement in 2004 was done in one go within a year. The following table provides the sample size in different replacement period.

<b>Statement 1</b>					
<b>Number of sample units at different replacement period</b>					
<b>Residence</b>	<b>1969-70</b>	<b>1977-78</b>	<b>1983-85</b>	<b>1993-95</b>	<b>2004</b>
Rural	2432	3684	4176	4436	4433
Urban	1290	1738	1846	2235	3164
Total	3722	5422	6022	6671	7597

The earlier sample was based on the reliability of birth rate at the state level, whereas the 2004 sample is estimated using IMR

and reliability at natural division level. The present report 'SRS Statistical Report, 2005' is the second report of the new sample based on Census 2001 frame.

The main objective of SRS is to provide reliable estimates of birth rate, death rate and infant mortality rate at the natural division level for the rural areas and at the state level for the urban areas. Natural divisions are National Sample Survey (NSS) classified group of contiguous administrative districts with distinct geographical and other natural characteristics. It also provides data for other measures of fertility and mortality including total fertility, infant and child mortality rate at higher geographical levels.

To give more impetus covering both rural and urban areas and wider representation of sample villages and urban blocks for Causes of Death; the Survey of Causes of Deaths (Rural) has been merged with Sample Registration System from 1<sup>st</sup> January 1999. The primary objective of the survey is to build up statistics on "Most Probable Causes of Death" for rural and urban areas using "lay diagnosis reporting (Post Death Verbal Autopsy)" method through post death enquiry based on symptoms, conditions, duration and anatomical site of the disease as observed by family members of the deceased at the time of death. As the collection of causes of death requires knowledge on medical terminologies, symptoms of disease and interview techniques, the supervisors of SRS have been trained by medical professionals in the art of collection of data on causes of deaths. A well-designed VA instrument has been developed and introduced in SRS. Supervisors of all states have been trained with the new VA instrument. To enhance the objectivity of the system, the role of SRS supervisor is restricted to faithfully collect data on sign and symptoms by interviewing the close relative of the deceased. Apart from recording the responses for closed questionnaire, he has to fill up the narrative portion of the VA instrument. The data on causes of deaths through Verbal Autopsy will be brought out in a separate report.

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## Structure of the Sample Registration System

The main components of SRS are:

- Base-line survey of the sample units to obtain usual resident population of the sample areas
- Continuous (longitudinal) enumeration of vital events pertaining to usual resident population by the enumerator
- Independent retrospective half yearly surveys for recording births and deaths which occurred during the half year under reference and updating the Houselist, Household schedule and the list of women in the reproductive age group along with their pregnancy status by the Supervisor;
- Matching of events recorded during continuous enumeration and those listed in course of half-yearly survey
- Field verification of unmatched and partially matched events.
- Filling of Verbal Autopsy Forms for finalized deaths.

**Baseline Survey:** The base-line survey is carried out prior to the start of continuous enumeration. This involves preparation of a notional map of the area to be surveyed, house numbering and house listing and filling-in of a household schedule. Wherever a sound system of house numbering exists the same is adopted. Otherwise, the house numbering is done by the enumerator/supervisor with the help of chalk and tar, etc. at a conspicuous place near the entrance of the house. The supervisor prepares a notional map with the help of the enumerator showing important landmarks and location of the houses covered by the sample unit. He then prepares a list of houses/households covered by the sample in the House List (Form 1) and fills-in the Household Schedule (Form 2) wherein he records the residential status and demographic particulars of each individual residing in the household viz. name, sex, age, educational/marital status and relation to head of household, etc. The inmates of public institutions like hotels, inns, schools and hospitals and excluded, but households living permanently within the compound of such institutions are covered. A list of pregnant women (Form 3) is also prepared at the time of the base line survey.

**Continuous enumeration:** The enumerator maintains a Birth Record (Form 4) and a Death Record (Form 5) in respect of his area. The enumerator is expected to record all births and deaths occurring within the sample unit, as well as those of the usual residents occurring outside the sample unit. The events in respect of visitors occurring within the sample unit are also listed, but these are not taken into account while calculating rates. Thus the events to be enumerated by the enumerator are those pertaining to: (i) usual residents inside the sample unit; (ii) usual residents outside the sample unit; (iii) immigrants present; (iv) immigrants absent; (v) visitors inside the sample unit.

For ensuring complete netting, the enumerator uses different sources to get information of the occurrence of vital events in the sample unit. These include the help of the village priest, barber, village headman, midwife and such other functionaries. The enumerators maintain contact with these informants at frequent intervals and collects information about the occurrence of births and deaths. On being informed about the occurrence of an event, he visits the concerned household and records the prescribed particulars. He also keeps in touch with other socially important persons and visits local or nearby hospitals, nursing homes, cremation or burial grounds, at frequent intervals to keep himself updated about the occurrence of events. E maintains a list of pregnant women (Form 3) which helps him in netting of all the births. Despite all these efforts, the enumerator may miss out information about some of the events. Therefore, he is required to visit all the households once in each quarter (in rural areas) and once a month (in urban areas) so as to ensure that all the events have been recorded.

**Half-yearly survey:** Half-yearly survey is carried out independently in each sample unit by a full time supervisor. The supervisor belonging to the statistical cadre of the State Census Directorates (either a Compiler or a Sr. Compiler or Statistical Investigator or any suitable official) visits each household in the sample unit and records the particulars of births and deaths in Forms 9 & 10 respectively in respect of all the usual residents and visitors (only those occurring within the sample unit) which had occurred during the half yearly period (January-June or July-December) under reference. Simultaneously, he updates the house-list, the household schedule and the pregnancy status of women by making entries of changes, if any. While carrying out

this survey he does not have access to the birth and death records of the enumerator for the same periods which are withdrawn from the field before the supervisor's visit for the half yearly survey.

**Matching:** On completion of the half yearly survey, the Forms 9 & 10 filled in by the supervisors are compared with those in the Forms 4 & 5 (filled in by the enumerators). This is done at the office of Directorate of Census Operations for all states except for rural areas of Kerala and Maharashtra, where it is done at the office of Directorate of Economics and Statistics of the respective states. Selected important entries in the enumerator's and supervisor's record are matched item by item and events are classified as fully matched, partially matched and unmatched. The items generally considered for matching are: Identification code of the head of Household and mother, Relationship of the mother to head, date of live birth, month in case of still birth/abortion, sex in case of live birth /still birth(for birth) and identification code of the head of household and mother in infant death, relationship of the deceased to head, date of death and sex

**Field verification of unmatched and partially matched events:** Every unmatched or partially matched event is verified by a visit to the concerned household. This is done either by a third period or jointly by the supervisor and the enumerator, depending upon the availability of staff.

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## Sample design

The Sample design adopted for SRS is a uni-stage stratified simple random sample without replacement except in stratum II (larger villages) of rural areas, where two stages stratification has been applied. In rural areas of bigger states (population with ten million or more as per Census 2001), natural division is the first geographical stratification or in rural areas of a smaller states, the stratification has been done on size of villages with villages having population less than 2,000 forming Stratum I and villages with population 2,000 or more forming Stratum II. Smaller villages with population less than 200 were excluded from the sampling frame in a manner that the total population of villages so excluded did not exceed 2 per cent of the total population of the concerned natural division in the state. The number of sample villages in each state was allocated to the substrata proportionally to their size (population). The villages within each size stratum were ordered by the female literacy rate based on the Census 2001 data, and three equal size substrata were established. The sample villages within each substratum were selected at random with equal probability. In the case of villages of Stratum 2, each sample village with a population of 2,000 or more was subdivided into two or more segments in a way that none of the segments cut across the Census Enumeration Blocks (CEBs) and the population of each segment formed by grouping the contiguous CEBs was approximately equal and did not exceed 2000. A frame of segments was prepared and selection of one segment was done at random at the second sampling stage for the SRS enumeration.

In urban areas, the categories of towns/cities have been divided into four strata based on the size classes in contrast to the six strata in the earlier sampling frame. Towns with population less than one lakh have been placed under stratum I, towns/cities with population one lakh or more but less than 5 lakhs under stratum II, towns/cities with population 5 lakh or more under stratum III and four metro cities of Delhi, Mumbai, Chennai and Kolkata as separate strata viz. stratum IV. The sampling unit in urban area is a Census Enumeration Block. The Census Enumeration Block within each size stratum was ordered by the female literacy rate based on the Census 2001 data, and three equal size substrata were established. The sample Census Enumeration Block within each substratum was selected at random with equal probability. A simple random sample of these enumeration blocks have been selected within each sub-strata without replacement from each of the size classes of towns/cities in each State/Union Territory.

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## Sample size

The Infant Mortality is the decisive indicator for estimation of sample size at Natural Division, the ultimate level for estimation and dissemination of indicators for rural areas. The permissible level of error has been taken as 10 prse (percentage relative standard error) at Natural Division level for rural areas and 10 prse at state level for urban areas, in respect of major states having population more than 10 million as per Census 2001. For minor states, 15 prse has been fixed at the total state level. By and large, the above criteria has been followed, however, there have been a few exceptions, on account of operational constraints. Based on the above criteria, the number of units has been increased from 6671 to 7597 with 4433 in rural and 3164 in urban areas.