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Measures of Sampling Error in POPLAB Demographic Surveys

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INTRODUCTION

Analysis in most sample surveys follows the same statistical steps. First, a population to be sampled is chosen and some numerical value to be estimated for that population is identified. Second, a sampling design, which dictates the manner in which a sample is to be selected from the population, is developed. Designs utilizing stratification and cluster sampling are common. Third, a sample is selected and appropriate data are collected from members of the survey population. Finally, analysis of data from the sample is performed by producing a numerical estimate from a mathematical formula called a survey estimator. Ideally, one hopes that the estimate will be close to the numerical value being estimated.

In reality, estimates from sample surveys are subject to sampling error which, for an estimate from a particular sample, is measured as the difference between the estimate and the value being estimated. The amount of sampling error varies among all possible samples that could be generated from the sampling design since different samples yield different estimates. Measures of sampling error, indicating the extent to which estimates might vary among the possible samples, are produced as part of good survey practice.

Presented here are several well-known measures of sampling error for estimates produced as part of three recent surveys in which the International Program of Laboratories for Population Statistics (POPLAB) of the University of North Carolina provided technical assistance: The 1980 Bolivia National Demographic Survey; The 1980 Baseline Round of the East Java (Indonesia) Population Survey; and The 1980 Somalia Fertility and Mortality Survey of Banadir, Bay and Lower Shebelle. Due to the technical nature of this report, some familiarity with the basic concepts of survey sampling is necessary. A concise and informative review of these concepts can be found in Moser and Kalton's *Survey Methods in Social Investigation* (1972) or in the World Fertility Survey's *Manual on Sampling Design* (1974).

MEASURES OF SAMPLING ERROR

Three measures of sampling error examined here are: (1) the standard error, (2) the square root of the design effect, and (3) the intraclass correlation coefficient. The standard error of an estimator measures the amount by which estimates of some population value vary among all possible samples. When the amount of variation among sample estimates is small, the estimator is said to be precise; conversely, when the amount of variation is larger, the estimator is said to be less precise. The magnitude of the standard error depends on the size of the sample, the sampling design, the nature of the estimator, and the amount by which the measurements used to produce the estimate vary among members of the population. A second measure of sampling error presented in this report is the square root of the "design effect" (see Kish, 1965). This measure, which we have denoted here by the symbol, Deft, is defined as the standard error of an estimator for the sampling design divided by the standard error of the same estimator as applied to a simple random sample of the same size. Thus Deft is a measure of the effect on statistical precision of the

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type of sampling design actually used relative to the most basic type of random sampling. The third measure of sampling error considered here is the intraclass (or intracluster) correlation coefficient which, when cluster sampling is used, measures the extent to which elementary units within individual clusters tend to be more similar than elementary units in the population as a whole. This measure is expressed more rigorously in Cochran (1977, 9.4) as the pairwise correlation among elementary units of the same cluster. The symbol used to denote the intraclass correlation coefficient in this report is Roh, which is a pneumonic for rate of homogeneity since intraclass correlation is also seen as a measure of the amount of homogeneity among members of individual clusters. Roh will be close to zero when the amount of within-cluster homogeneity is small and will be relatively large (i.e., in the range of 0.20 to 0.30) when within-cluster homogeneity is great.

Computing these measures of sampling error serves several useful purposes. First, the relative size of the standard error reveals the statistical quality of a survey estimate. Small standard errors indicate that the estimator used to produce this particular estimate generally produces precise estimates while large standard errors indicate less precise estimates which, therefore, should be used with caution. Second, standard errors may also be needed for statistical hypothesis testing and confidence intervals. For example, construction of a Student's t-statistic to test the hypothesis that the age-specific fertility rate for an age group equals some presumed value requires an estimate of the standard error of the rate obtained from the sample survey. Third, when both cluster sampling and stratification are used in a sampling design, the square root of the design effect, Deft, is a useful indicator of the joint impact of these two characteristics on the precision of survey estimates. Cluster sampling causes Deft to increase while stratification reduces the size of Deft. Values of Deft in the range 1.00 to 1.40 are thought to be desirable since larger values indicate a relatively severe effect of cluster sampling. Fourth, Deft and the intraclass correlation coefficient, Roh, may also be useful to determine sample sizes for future similar surveys. For example, in subsequent surveys designed to estimate a measure such as the proportion (P) of persons with their father currently alive, a suitable sample size (n) of persons can be determined by noting that the square of the standard error desired for the estimator (p) (i.e., the variance of p) can be written approximately as

$$\begin{aligned} SE^2(p) &= (\text{Deft})^2 P(1-P)/n \\ &= [1 + \text{Roh}(\bar{n}-1)]P(1-P)/n, \end{aligned} \tag{1}$$

where $\bar{n}$ is the average number of sample persons per selected cluster. Using appropriate values of Deft and Roh as reported here, equalities in Equation (1) can be solved for n to determine the appropriate sample size. Finally, using Equation (1) once again, either Deft or Roh from the present report can be used to compute expected standard errors or other related measures of sampling error during the planning stages of future similar surveys. For example, suppose we wish to determine for a planned survey, the expected half-width of a 95 percent confidence interval for an estimate of the proportion of persons with their father currently alive. If the proposed sampling design in that survey called for a sample of n individuals with $\bar{n}$ individuals selected per sample cluster, and we anticipated that the value of the proportion being estimated was about P, we would use the measure of Roh reported here for the proportion of persons with their father currently alive to determine $SE(p)$ from the second equality in Equation (1). Then, we would compute the expected half-width of a 95 percent confidence interval for

P as

$$d = 1.96\ SE(p), \tag{2}$$

where we interpret the result of Equation (2) to mean that we are 95 percent certain that the estimator (p) of the actual proportion (P) will produce estimates in the proposed sample survey that are within d of P.

SAMPLING DESIGN

The following is an examination of sampling designs for three POPLAB demographic surveys for which measures of sampling error are presented later in this report. In all three surveys a sample of households to be personally interviewed was selected in multiple stages where sampling units in the first stage, called PSUs (for primary sampling units), and occasionally in subsequent stages, were well-recognized administrative areas. Stratification was also used for selecting PSUs in each survey. Finally interview questionnaires and field protocols for obtaining the data used in this report are adequately comparable. Some differences among surveys regarding question wording and questionnaire format must be noted despite efforts to standardize these measurements.

The 1980 Bolivia National Demographic Survey

The self-weighting sample of 10,573 households interviewed in The 1980 Bolivia National Demographic Survey covered all but eight remote provinces comprising approximately 2 percent of the Bolivian population. Separate two-stage household samples were chosen in the urban and rural areas. A sample of 102 sectors, serving as PSUs in the urban areas, was chosen with selection probabilities proportional to measures of the number of households in each sector. One PSU was then independently chosen in each of 102 equal-sized zones constructed from a list of sectors that had been ordered by each of Bolivia's 98 urban population centers. A sample of 80 cantons, used as PSUs in the rural areas, was selected from a list ordered by region, by percent of population living in an urban population center, and by number of rural households. As with the urban PSU sample, one PSU was independently selected with a probability proportional to the number of households from each of 80 equal-sized zones. The average number of households per PSU in the entire sampling frame was about 250. Within selected PSUs, area segments of approximately 32 households in urban areas and 75 households in rural areas were constructed. One such segment was selected in each PSU with equal probability. All households in selected segments were then approached to participate in the survey. The final sample of 10,573 households contributing data to this report contained 47,810 men and women of all ages and 11,292 women 15-49 years of age.

Since estimating standard errors requires two or more selected PSUs per stratum, a series of pseudo-strata, each containing two selected PSUs to simplify computation of standard errors, was formed. This was done by combining pairs of neighboring zones in the original ordered PSU frame.

The 1980 East Java Population Survey

The nonself-weighting sample of 19,772 households interviewed in The 1980 Baseline Round of the East Java (Indonesia) Population Survey was selected in three stages with desas (i.e. villages), census blocks, and households as sampling units in the first, second, and third sampling stages, respectively. Desas (administrative areas existing in both urban and rural areas and containing an average of about 720 households) were stratified at two levels. First, all urban desas were stratified by kodamadya (municipality) and all rural desas were stratified by kabupaten (regency). Within each of these strata, desas were ordered by population density in constructing approximately equal-sized zones. In each of the resulting 1,038 rural zones, one desa was selected using a form of systematic sampling with a probability roughly proportional to the number of households (see Kish, 1965, Section 7.4c). Using a similar form of systematic sampling, two desas were selected independently in each of 100 urban zones. Thus the total number of selected PSUs was 1,238. Each desa selected as a PSU was subdivided into census blocks consisting of 60-75 households. One census block was then randomly selected in each sample desa. Sampling units in the third stage of the design were households. For purposes of sample selection, a list of households was prepared for each selected census block. Households chosen for the survey were selected from these lists by systematic sampling after a random start. Variation in household selection probabilities (making the sample nonself-weighting) was largely due to the use of different measures of size in the first two sampling stages and to the rounding of systematic sampling intervals to integral values in selecting the third-stage sample. The final sample of 19,772 households contributing data to this report contained 90,477 men and women of all ages and 19,111 women 15-49 years of age.

To meet the requirement of two PSUs per stratum for computation of standard errors, rural pseudo-strata were formed by combining neighboring pairs of zones which followed the original ordering of the first-stage sampling frame. Formation of pseudo-strata in urban zones was not required since two PSUs had been selected per zone.

The 1980 Somalia Fertility and Mortality Survey

The approximately self-weighting sample of 7,094 households from The 1980 Somalia Fertility and Mortality Survey which provided data for this report was selected in three stages. Various administrative areas served as sampling units in the first stage. Specially constructed area chunks and segments were used as sampling units in the second and third stages, respectively. The target population in this survey covered three southern regions of Banadir, Bay, and Lower Shebelle in Somalia. These three regions combined contain about one-third of the country's population. The first-stage sample was selected separately in three parts: the Banadir region (consisting mainly of the capital city of Mogadishu), urban areas in Bay and Lower Shebelle regions, and rural areas in Bay and Lower Shebelle regions. PSUs in these three parts of the sample were waaxda (local, well-defined administrative areas containing approximately 600 households), laanta (similar administrative areas containing an average of approximately 300 households), and groups of one or more small neighboring rural villlages (with groups of villages generally containing 50-100 households), respectively. The average number of households per PSU in the entire sampling frame was about 150. Stratification was applied separately in each part of the primary sample by a certain ordering of PSUs.

In Banadir the waaxda were ordered by geographic location and socioeconomic status. In the urban areas of Bay and Lower Shebelle, the laanta were alternatingly ordered in a serpentine manner from center to fringe area, and vice versa, to serve as a crude ordering on geographic proximity and socioeconomic status. Finally, in the rural areas of Bay and Lower Shebelle regions, neighboring village groups were ordered by geographic location within the 11 districts into which these two regions are divided. Data for this report were obtained from 184 PSUs which were selected, with probabilities proportional to a measure of the number of households, using a form of systematic sampling in which one PSU was selected from each of 184 equal-sized zones.

Pseudo-strata were formed once again by combining pairs of consecutive zones generally following the order of the primary frame. Two pseudo-strata were formed by combining pairs of similar nonconsecutive zones since not all selected PSUs provided data in the survey. The final sample of 7,094 households contributing data to this report contained 33,605 men and women of all ages and 8,030 women 15-49 years of age.

METHODS AND PROCEDURES

Estimates and corresponding measures of sampling error are presented later in this report for several measures commonly used or reported in the analysis of demographic survey data. The measures are as follows:

1. Urban-rural distribution of all persons;
2. Age distribution of all persons;
3. Marital status distribution of persons 15-49 years of age (by age and sex);
4. Proportion of all persons with their father currently living (by age);
5. Proportion of all persons with their mother currently living (by age);
6. Proportion of persons 15-49 years of age with a first spouse currently living (by age and sex);
7. Average total number of children ever born to women 15-49 years of age (by age);
8. Average number of children living among those ever born to women 15-49 years of age (by age);
9. Average number of children deceased among those ever born to women 15-49 years of age (by age);
10. Age-specific fertility rates;
11. Proportion of children deceased among those ever born to women 15-49 years of age (by age);

12. Crude birth rate;

13. Age-specific death rates;

14. Crude death rate; and

15. Infant mortality rate.

Definitions of these measures and a description of their utility in demography are presented in Appendix A.

All measures listed above have two things in common. One is that they are all prepared for certain domains, which will be defined here as the part of the total population for which estimates are prepared. A second characteristic of the above-listed measures is that they are all ratios and therefore can be expressed for a particular domain as,

$$R = \frac{Y}{X} = \frac{\sum_h \sum_\alpha \sum_\beta^{H\ A_h B_{h\alpha}} \lambda_{h\alpha\beta} Y_{h\alpha\beta}}{\sum_h \sum_\alpha \sum_\beta^{H\ A_h B_{h\alpha}} \lambda_{h\alpha\beta} X_{h\alpha\beta}} , \qquad (3)$$

where the following definitions are noted:

H = Number of pseudo-strata applied to the PSU sample;

h = Index of a particular pseudo-stratum;

A_h = Total number of PSUs in the h-th pseudo-stratum;

α = Index of a particular PSU;

$B_{h\alpha}$ = Total number of elementary units (i.e., households, persons, or females 15-49 years of age, depending on the measure) in the α-th PSU of the h-th pseudo-stratum.

β = Index of a particular elementary unit;

$$\lambda_{h\alpha\beta} = \begin{cases} 1 & \text{if the } \beta\text{-th elementary unit of the } \alpha\text{-th PSU in the } h\text{-th pseudo-stratum is a member of the domain,} \\ 0 & \text{if otherwise;} \end{cases}$$

$Y_{h\alpha\beta}$ = Numerator observation for the $h\alpha\beta$-th elementary unit; and

$X_{h\alpha\beta}$ = Denominator observation for the $h\alpha\beta$-th elementary unit.

The table presented in Appendix A indicates the relationship between the list of measures presented earlier and the formulation given above. By way of illustration, consider the matter of estimating the proportion of all persons 20-24 years of age with their fathers currently living. For this measure the elementary unit is the individual person; the domain is the group of all persons 20-24 years of age so that $\lambda_{h\alpha\beta} = 1$ when the $h\alpha\beta$-th person in the population is 20-24 years of age and $\lambda_{h\alpha\beta} = 0$ for all others; $X_{h\alpha\beta} = 1$ for

all persons in the population; $Y_{h\alpha\beta} = 1$ if the father of the $h\alpha\beta$-th person is currently living, and $Y_{h\alpha\beta} = 0$ if otherwise.

In each sampling design described previously we have $a_h = 2$ selected PSUs in the h-th pseudo-stratum and $b_{h\alpha}$ elementary units in the α-th selected PSU of the h-th pseudo-stratum. We also can determine for the $h\alpha\beta$-th elementary unit in the sample, a sampling weight, $W_{h\alpha\beta}$, defined generally as the reciprocal of the selection probability for that particular elementary unit. From the sample data we can estimate the ratio, R, as

$$\hat{R} = \frac{\hat{Y}}{\hat{X}} = \frac{\sum_h^H \sum_\alpha^{a_h} \sum_\beta^{b_{h\alpha}} W_{h\alpha\beta}\lambda_{h\alpha\beta}Y_{h\alpha\beta}}{\sum_h^H \sum_\alpha^{a_h} \sum_\beta^{b_{h\alpha}} W_{h\alpha\beta}\lambda_{h\alpha\beta}X_{h\alpha\beta}} . \tag{4}$$

Note that when R is a proportion to be reported as a percentage, $\hat{R}$ as given in Equation (4) is simply multiplied by 100.

The first measure of sampling error presented in this report is an estimate of the standard error of $\hat{R}$, computed by means of the Taylor series linearization method as

$$se(\hat{R}) = \left[\sum_h^H \left\{ \frac{a_h \sum_\alpha^{a_h} Z_{h\alpha}^2 - (\sum_\alpha^{a_h} Z_{h\alpha})^2}{a_h - 1} \right\} \right]^{1/2} , \tag{5}$$

where

$$Z_{h\alpha} = \sum_\beta^{b_{h\alpha}} W_{h\alpha\beta}\lambda_{h\alpha\beta}Z_{h\alpha\beta} \tag{6}$$

and

$$Z_{h\alpha\beta} = (Y_{h\alpha\beta} - \hat{R}X_{h\alpha\beta})/\hat{X}. \tag{7}$$

Note that $SE(\hat{R})$ is used to denote the actual standard error of $\hat{R}$ and that $se(\hat{R})$ has been used to denote the estimator of the actual standard error of $\hat{R}$.

Details of the Taylor series linearization method are presented in Appendix B. If the estimate of R is reported in percent, $se(\hat{R})$ can be reported in similar terms by multiplying Equation (5) by 100.

The second measure of sampling error reported here is the square root of the design effect, Deft, which can be estimated by noting that the actual standard error of $\hat{R}$ can be expressed (approximately) as

$$SE(\hat{R}) \cong Deft[S^2/n]^{1/2}, \tag{8}$$

where n is the sample size for the domain and S^2 is the simple variance of

$$Z_{h\alpha\beta} = (Y_{h\alpha\beta} - RX_{h\alpha\beta})/X \tag{9}$$

among elementary units in the domain. Using

$$\hat{S}^2 = \frac{\sum_h^H \sum_\alpha^{a_h} \sum_\beta^{b_{h\alpha}} W_{h\alpha\beta}(Z_{h\alpha\beta} - \bar{Z})^2}{\sum_h^H \sum_\alpha^{a_h} \sum_\beta^{b_{h\alpha}} W_{h\alpha\beta}} \tag{10}$$

to estimate S^2, where

$$\bar{Z} = \frac{\sum_h^H \sum_\alpha^{a_h} \sum_\beta^{b_{h\alpha}} W_{h\alpha\beta} Z_{h\alpha\beta}}{\sum_h^H \sum_\alpha^{a_h} \sum_\beta^{b_{h\alpha}} W_{h\alpha\beta}}, \tag{11}$$

we can estimate Deft as

$$deft = se(\hat{R})[n/\hat{S}^2]^{1/2} . \tag{12}$$

The final measure of sampling error considered is the intraclass correlation coefficient, Roh. A synthetic estimate of Roh can be produced by noting its approximate relationship to Deft as

$$Deft \cong [1 + Roh(n/a-1)]^{1/2}, \tag{13}$$

where the total number of sample PSUs is represented by the symbol, a. Using the estimate of Deft obtained from Equation (12), we have as our estimator of Roh,

$$roh = \frac{deft^2 - 1}{n/a - 1} . \tag{14}$$

Note that the symbols deft and roh have been used to represent sample estimators of Deft and Roh, respectively.

Computation of the three measures of sampling error for the demographic measures described earlier was completed in similar fashion for each of the three surveys. As a preliminary step, cleaned raw data files for the survey were prepared for those demographic analyses performed in producing an initial report of the survey's results. No measures of sampling error were generated in these early analyses. Next, specific survey questionnaire items required to generate estimates of the demographic measures were identified. After

identification of questionnaire items, three separate analysis workfiles were created to contain observations on persons of either sex, households and women 15-49 years of age. Required sampling measures, including the sampling weight, pseudo-stratum number, and PSU number, were also attached to each workfile. A computer program, named SESUDAAN, was used to complete the production runs which generated the estimated measures of sampling error presented below. This program was chosen because it uses the Taylor series approach to variance estimation and because it is particularly well-suited to generating large numbers of descriptive analyses with corresponding sampling error measures (see Appendix B for additional details on SESUDAAN). An estimate of the standard error and of deff, the estimated design effect measuring the ratio of the estimated variance to a comparable variance from a simple random sample, were computed directly by SESUDAAN. Finally, values of deft and roh were computed from SESUDAAN output by utilizing the relationship, deft = $(\text{deff})^{1/2}$ and Equation (14), respectively.

FINDINGS

Detailed findings of the comparison study of sampling errors for the POPLAB surveys in Bolivia, Indonesia, and Somalia are presented in Tables 1-14 which are located in the final section of this report. These detailed tables contain estimates and associated measurements of sampling error for several important demographic measures. To facilitate comparisons among surveys, the findings in each table are presented in three columns, one for each survey. In general, each table contains results for one of the fifteen demographic measures described in Appendix A. The only exceptions are the crude birth rates, which are presented with the age-specific fertility rates in Table 12, and the crude death rates and infant mortality rates, which are presented with the age-specific death rates in Table 14. Estimates for the total population and individual domains are presented in the rows of each table. Included in those tables containing domain estimates is an average value of deft (referred to as DEFT in the tables) and roh (referred to as ROH in the tables) among domains. For each demographic measure estimated in each survey, values for the following items are given:

1. ESTIMATE -- Value of the demographic measure as estimated from the sample data;

2. STD. ERROR -- Standard error of the estimate obtained from Equation (5);

3. SAMPLE SIZE -- Number of observational units in the sample that were used to produce the ESTIMATE and STD. ERROR;

4. DEFT -- Square root of the estimated design effect for the estimate; and

5. ROH -- Estimated intraclass correlation coefficient for the estimate.

It is important for users of Tables 1-14 to be mindful of several things. First, a "-" appearing in place of a value of roh for a domain estimate indicates that the value of roh has been suppressed since the average sample cluster size for the domain is thought to be too small (i.e., $\bar{n} < 2$) to

produce statistically useful estimates. Second, entries consisting of all zeros are not precisely zero but rather some value very nearly zero. For example, an entry of "0.00" for an estimated standard error is actually some value between zero and 0.005 which, when rounded to two decimals, is the entry given. Third, all measures of sampling error found in these tables are *estimates* from a sample and are thereby themselves subject to sampling error. In particular, measures produced from relatively small samples are subject to potentially large errors and should be used cautiously. Fourth, estimates of Deft and Roh (i.e., deft and roh, respectively) are derived from only approximate relationships. In particular, the relationship involving Deft in Equation (8) excludes the multiplicative factor, $1-f$, called the finite population correction, where f is the overall sampling rate. Because f is often nearly zero, the finite population correction is approximately equal to one and can therefore usually be ignored. More importantly, however, a strict interpretation of Roh as a coefficient of intraclass correlation in Equation (13) requires the assumption that sampling is done in two stages from equal-sized clusters and that simple random sampling with equal sampling rates is used in each stage. Because sampling in surveys is seldom done in this manner, estimates of Roh must be treated as somewhat artificial indicators of homogeneity within PSUs rather than as strict measures of intraclass correlation. Finally, when interpreting estimates of Roh, it is important to note the unit of observation to which the reported value applies since different units may lead to quite different values of Roh. An illustration of this point is made later in connection with the estimates of Roh presented for crude birth and death rates.

Judging from the size of the standard errors of estimates in Tables 1-14, we conclude that the general quality of estimates from the three surveys is quite good. Standard errors of most estimates are usually small, rarely exceeding 10 percent of the value of the demographic measures being estimated. Standard errors of estimated averages (e.g., total children ever born in Table 9) are almost always less than 0.2, while standard errors of less than 2 percent for estimated percentages are the rule rather than the exception. A comparison among surveys reveals that estimates from the Indonesia survey generally have the smallest standard errors, followed next by Bolivia and Somalia. The relative size of standard errors among surveys can be largely explained by differences in sample size--the size of the standard error being inversely related to the size of the sample. Household sample sizes in the Indonesia, Bolivia, and Somalia surveys were 19,772, 10,573, and 7,094, respectively.

The estimates of Deft reported in Tables 3-14 indicate that the loss in precision due to cluster sampling in the three demographic surveys was moderate and somewhat typical of estimates produced for the total population in surveys of this type. Table A demonstrates that the average deft for all estimates of the demographic measures in the total population varied from a low of 1.18 in Indonesia to a high of 1.59 in Bolivia, with an intermediate value of 1.27 in Somalia. The relative size of the average deft's is probably best explained by the average size of sample clusters (i.e., PSUs) in the three surveys. The average sample cluster sizes of 16, 39, and 58 households in Indonesia, Somalia, and Bolivia, respectively, are directly related to the average total population deft's. This result is reasonable when one notes that cluster samples become more similar to simple random samples (thus diminishing the loss due to cluster sampling) as average cluster sizes decrease toward unity. The average deft's for total population estimates of various demographic measures in the three POPLAB surveys were also found to fall within the range of comparable average deft's reported elsewhere. For

example, Kish *et al.* (1976) report average total population deft's between 1.47 and 2.35 for several recent demographic surveys done outside of the United States while Verma *et al.* (1980) report average total population deft's between 1.06 and 2.32 for 12 surveys of the World Fertility Survey.

Table A. Summary Measures for deft from the Detailed Findings in Tables 3-14

Summary Measure	Survey		
	Bolivia	Indonesia*	Somalia
deft for Total Population Estimates			
- Mean	1.59	1.18	1.27
- Standard Deviation	0.57	0.11	0.22
- Number of Estimates	20	16	20
deft for All Domain Estimates			
- Mean	1.15	1.07	1.09
- Standard Deviation	0.25	0.06	0.13
- Number of Estimates	140	106	140
Average Number of Sample Households Per PSU	58	16	39
Average Percent of Population in Age Domains	11	10	11

* There are fewer total population and domain estimates in the Indonesian survey since certain measures of household mortality were not included in the survey questionnaire.

The average deft's of estimates for the age domains reported in Table A were found to be smaller than corresponding average total population deft's. This difference in magnitude between average total population and domain deft's in the three POPLAB surveys is largely due to the smaller average cluster sizes of domains which, as shown in Table A, were subgroups representing 10-11 percent of the total population, on average. Average sample cluster sizes for domain estimates in the Indonesia, Somalia, and Bolivia surveys were in fact 1.6, 4.3, and 6.4, respectively. As was the case with the total population estimates, the relative size of the average deft for domain estimates in each of the three surveys was found to be directly related to the average cluster size of domains in that survey.

The amount of variation among values of deft for both total population and domain estimates in the detailed tables is also presented in Table A. Varia-

tion, measured as the standard deviation among values of deft in Tables 3-14, was found to be large relative to the average deft among estimates, especially in Bolivia. The amount of variation among values of deft is due to three factors: (1) the fact that deft is estimated from a sample and is thereby subject to variation due to sampling error; (2) variation in the nature of measurements made on observational units in producing different demographic measures; and (3) variation in the types of people who constitute the age groups for which different domain estimates are prepared.

Perhaps the most interesting findings of the present study deal with the relationship between domain and total population values of roh. The need to interpolate roh for domain estimates from values of roh as computed for total population estimates has sparked recent interest in this relationship. In one empirical study conducted for the World Fertility Survey (WFS), Kish *et al.* (1976) computed a quantity, which we shall call the *average domain ratio* (ADR), for several demographic measures in a number of fertility surveys. The ADR for a specific survey estimate is defined as the average value of roh for a group of related domain estimates divided by the average value of roh for the corresponding total population estimate(s). Nearly all of the ADRs reported in this WFS study fell in the range of 1.0 to 3.0. A similar range of ADR values can be inferred from the results of another empirical study of sampling errors in WFS surveys as presented in Verma *et al.* (1980, Table 6). Artificial values for ADR can be prepared for this second WFS study by dividing by 0.3 (the average proportion of the population in various domains considered) the ratio of the average of $deft^2-1$ for domain estimates and the average of $deft^2-1$ for total population estimates. By contrast, the ADRs as computed for the POPLAB surveys and presented in Table B are somewhat more variable and tend to be larger than those reported by the WFS studies. In Table B, one finds ADRs ranging from a low of -0.75 for one demographic measure in the Bolivia survey to a high of 18.17 for another demographic measure in the Somalia survey. One also finds in the Somalia and Indonesia surveys that a substantial number of ADRs exceed the largest values reported in the WFS studies. ADRs in the Bolivia and WFS surveys are more similar.

Differences in the ADRs in the POPLAB and WFS studies of sampling error may be best explained by four things. First, the demographic measures for which the ADRs were computed are not the same in the POPLAB and WFS studies. Thus, values of roh computed for domains are likely to differ, as would the resulting ADRs, since within-cluster homogeneity will vary depending on which demographic measure is being estimated. Second, the greater variation in the ADRs computed for the POPLAB surveys may also be due to the number of domains over which the value of roh for domain estimates was averaged. Most ADRs are computed from seven or fewer age domains making them susceptible to extreme values which contribute to variation. For example, in the Somalia survey, the large ADR for the average number of children living among those ever born to women aged 15-49 is partly due to the exceptionally large value of roh (i.e., 0.186) reported in Table 10 for the 45-49 year age group. The small value of roh for the total population estimate (i.e., 0.003) also contributes to the large ADR in this case. The ADRs reported in the first WFS study, on the other hand, were generally computed over a much larger number of domains (e.g., 20-25) and were thereby less affected by extreme values of roh for individual domain estimates. A third possible explanation for the generally smaller ADRs in the WFS studies is that these studies used a mixture of different characteristics to define domains (e.g., level of literacy, age, marriage duration, etc.), whereas the present POPLAB study used only age to define domains. Since age is often found to be one of the most important determinants in demographic analysis, it may be that clusters for domains

Table B. Values of the Average Domain Ratio (ADR) from the Detailed Findings for the Demographic Measures Presented in Tables 3-14

Demographic Measure	Bolivia		Indonesia		Somalia	
	Number of Domain Estimates*	ADR	Number of Domain Estimates*	ADR	Number of Domain Estimates*	ADR
Male Marital Status: Single	7	0.86	6	3.25	7	0.60
Married	7	0.76	6	5.19	7	1.30
Divorced/Separated	7	1.34	6	4.28	7	3.14
Widowed	7	1.55	6	2.19	7	1.86
Female Marital Status: Single	7	2.00	6	2.36	7	1.54
Married	7	1.77	6	2.97	7	1.61
Divorced/Separated	7	0.34	6	5.96	7	7.90
Widowed	7	-0.57	6	6.03	7	8.47
% Persons with Father Living	15	0.98	-	-	14	4.62
% Persons with Mother Living	15	1.48	13	5.49	14	10.75
% Males with First Spouse Living	6	3.53	-	-	6	2.34
% Females with First Spouse Living	6	-0.75	-	-	7	7.44
Average Total Children Ever Born	7	3.72	5	7.14	7	6.33
Average Living Children Ever Born	7	3.64	5	7.00	7	18.17
Average Deceased Children Ever Born	7	1.78	5	4.32	7	1.23
Fertility Rate	7	2.15	5	5.03	7	6.52
% Deceased Among Children Ever Born	7	1.51	5	3.86	7	1.65
Death Rate	4	0.42	-	-	4	0.73
Average Among Measures	-	1.47	-	4.65	-	4.79

*This value is determined as the number of domain estimates in which $\bar{n} \geq 2$.

consisting of persons of similar ages are more homogeneous than clusters consisting of persons who are similar with respect to some other, perhaps less important, determinant (e.g., level of literacy). Thus, one would expect values of roh (and the resulting ADRs) to be greater for domains defined by age than for domains defined by a mixture of different characteristics.

Finally, the somewhat larger ADRs reported for the POPLAB surveys in Indonesia and Somalia may be also attributed to differences in the criteria used to suppress values of roh for certain small domains. In the present POPLAB study, only those roh where $\bar{n}$, the average sample cluster size for the domain, was less than two, were suppressed and thereby not used to compute the ADR. Conversely, in the WFS studies, the ADRs were produced by the computer algorithm, CLUSTERS (see Verma and Pearce, 1978), which suppresses roh for domains where $\bar{n}$ is less than six. This difference in suppression criteria may partially explain the larger ADRs reported in the present POPLAB study since it can be noted in Table C that the average values of roh for domains where $2 \leq \bar{n} < 6$ are somewhat greater than the average values of roh when $\bar{n} \geq 2$. Thus, the ADRs reported in the WFS studies would have excluded values of roh for the smaller domains in which roh tends to be greater. Variation in suppression criteria as a partial explanation for differences in the ADRs reported in the POPLAB and WFS studies is given added credibility when recalling that of the three POPLAB surveys, the ADRs reported for the Bolivia survey are generally smaller and therefore more similar in size to the ADRs reported in the WFS studies. This greater similarity is undoubtedly due to the fact that the average sample cluster size in the Bolivia survey is largest among the three POPLAB surveys (see Table A), and therefore the Bolivia survey also has the smallest proportion of values of roh where $2 \leq \bar{n} < 6$. The effect of using different suppression criteria for roh was therefore the least important in the Bolivia survey, thus leading to ADRs for that survey which are similar to the ADRs reported in the WFS surveys.

We conclude our discussion of findings with two specific comments about some of the measures of sampling error presented in the detailed tables. The first comment deals with the fact that the values of deft and roh reported in Tables 9 and 10 are relatively higher than those reported in other tables, especially for the Bolivia survey. Estimates in these tables apply to the total number of children ever born to women 15-49 years of age and to the number of children living among those ever born to women aged 15-49. The literal interpretation of the large values of roh is that differences in the cumulative fertility experience for women of similar age can be substantially attributed to differences among PSUs which, in these surveys, were villages or local communities. The reason for the extraordinary values of roh and deft in these tables is not completely clear. On the one hand, these findings may indicate that age is a particularly important determinant of the cumulative fertility experience of women in the three countries; however, on the other hand, it may simply be an artifact of the data which is attributable to a relatively high interviewer effect (see Zarkovich, 1966, Chapter 10) on these two demographic measures since interviewing assignments in each PSU were often given to individual interviewers, especially in Bolivia and Indonesia where the largest values of roh were found. The latter explanation is not completely satisfactory since one might reasonably expect any interviewer effect to have increased values of roh for other demographic measures as well.

Table C. Summary Measures for roh from the Detailed Findings in Tables 3-14

Summary Measure	Survey		
	Bolivia	Indonesia	Somalia
roh for Total Population Estimates			
- Mean	0.016	0.021	0.015
- Standard Deviation	0.014	0.012	0.015
- Number of Estimates	20	16	20
roh for All Domain Estimates*			
- Mean	0.046	0.094	0.039
- Standard Deviation	0.079	0.070	0.059
- Number of Estimates	138	85	137
roh for Small Domain Estimates**			
- Mean	0.064	0.096	0.043
- Standard Deviation	0.124	0.072	0.071
- Number of Estimates	30	80	75

* Domains in this group are those in which $\bar{n} \geq 2$.

** Domains in this group are those in which $2 \leq \bar{n} < 6$.

The final comment about the reported measures of sampling error concerns the values of roh for the crude birth rate (CBR) and crude death rate (CDR) as reported in Tables 12 and 14, respectively. The values of roh reported here are found to be small, but nonetheless somewhat larger than those presented by Marks *et al.* (1974), and Adlakha *et al.* (1977). A closer examination reveals that the differences in these roh values is due to differences in the unit of observation used in making the computations. We discovered that estimates of roh from these prior studies used the individual as the observational unit, while the estimates of roh presented here used the household as the observational unit. The differences in roh can be largely reconciled by recomputing the values of roh reported in this study using the individual as the observational unit. The revised values of roh presented in column 3 of Table D were computed in this manner. Except for the CBR in Indonesia, all of the revised values of roh fall in the range of roh computed for individuals by Marks *et al.* (1974).

Table D. Comparison of the Effect of the Observational Unit on the Value of roh for Estimates of the Crude Birth and Death Rates

Demographic Measure:	Observational Unit	
Country	Household*	Individual
(1)	(2)	(3)
Crude Birth Rate:		
- Bolivia	0.0131	0.0015
- Indonesia	0.0188	-0.0050
- Somalia	0.0073	0.0003
Crude Death Rate:		
- Bolivia	0.0128	-0.0002
- Indonesia	-	-
- Somalia	0.0051	0.0010

* This is the unit used to compute the values of roh in Tables 12 and 14.

CONCLUDING SUMMARY

This paper has presented a brief descriptive profile of sampling errors associated with three recent fertility surveys involving POPLAB. The profile has included estimates of the standard error, design factor, and within-PSU homogeneity for several demographic measures in each survey. The standard errors reported in Tables 1-14 are generally small relative to the size of estimates, thereby indicating good statistical precision for the demographic estimates produced in these surveys. The joint effect of cluster sampling and stratification on estimates, as measured by the design factor, deft, was found to be typical for surveys of this type. The most interesting result of the profile was the unusually large average domain ratios for roh, the measure of within-PSU homogeneity.

APPENDICES

APPENDIX A

Demographic Measures of Interest

The purpose of this appendix is to discuss in some detail the demographic measures for which estimates of sampling error were produced in this report. All of the measures, as will be seen, are *direct* measures of the population in that only data obtained from survey questionnaires are used to estimate these measures. Estimates utilizing auxiliary information from outside sources to compensate for limitations in the existing data (e.g., via various indirect methods due to Brass, 1975) are not considered.

All measures considered here are ratios for various domains (i.e., subgroups) which take the form,

$$R = \frac{Y}{X} = \frac{\text{Sum of Numerator Observation Over All Units in Domain}}{\text{Sum of Denominator Observation Over All Units in Domain}} .$$

Associated with each ratio are four factors which uniquely identify it: the domain, the numerator observation, the denominator observation, and the unit in the domain on which observations are made. Table A.1 includes a description of these four factors for each measure as well as a brief description of how the measure is used by demographers. Additional discussion on many of these measures can be found in Shryock and Siegel (1973).

Table A.1 Description of Demographic

DEMOGRAPHIC MEASURES	DOMAIN	OBSERVATIONAL UNIT
1. Urban-rural distribution (in percent)	Entire population	Person
2. Age distribution (in percent)	Entire population	Person
3. Marital status distribution (in percent)	Sex by 5-year age groups	Person
4. Percentage of persons with their father currently living	5-year age groups	Person
5. Percentage of persons with their mother currently living	5-year age groups	Person
6. Percentage of persons 15-49 years of age with a first spouse who is currently living	Sex by 5-year age groups	Person 15-49 years of age who has had a first spouse
7. Average total number of children ever born to women 15-49 years of age	5-year age groups	Woman 15-49 years of age
8. Average number of children living among those ever born to women 15-49 years of age	5-year age groups	Woman 15-49 years of age
9. Average number of children deceased among those ever born to women 15-49 years of age	5-year age groups	Woman 15-49 years of age
10. Age-specific fertility rates	5-year age groups	Woman 15-49 years of age
11. Percentage of children deceased among those ever born to women 15-49 years of age	5-year age groups	Woman 15-49 years of age
12. Crude birth rate	Entire population	Household
13. Age-specific death rates	4 special age groups: 0-14, 15-49, 50-54, 65+	Household
14. Crude death rate	Entire population	Household
15. Infant mortality rate	Entire population	Household

NOTES: 1. All demographic measures can be expressed as ratios for a domain, i.e.,

$$R = \frac{\text{Sum of Numerator Observation Over All Units in Domain}}{\text{Sum of Denominator Observation Over All Units in Domain}}$$

2. When the demographic measure is a proportion presented as a percentage, R must be multiplied by 100.

3. Reference periods mentioned in the table were generally the twelve month period just prior to the survey.

4. "Age" refers to age in years as of the last birthday.

5. In the Indonesia survey, data from only ever-married women aged 15-49 years were used to produce estimates for demographic measures (7)-(11). Data from all women aged 15-49 years were used to produce these estimates in the Bolivia and Somalia surveys.

Measures Expressed as a Ratio for a Domain

	NUMERATOR OBSERVATION FOR MEMBERS OF THE DOMAIN	DENOMINATOR OBSERVATION FOR MEMBERS OF THE DOMAIN	USE IN DEMOGRAPHY
1.	Equals 1 when person resides in urban (or rural) area; equals 0 otherwise	Equals 1 for all persons	Population profile measure
2.	Equals 1 when person falls in one of several 5-year age groups; equals 0 otherwise	Equals 1 for all persons	Population profile measure
3.	Equals 1 when person falls in one of four marital status groups; equals 0 otherwise	Equals 1 for all persons	Population profile measure
4.	Equals 1 when person's father is currently living; equals 0 otherwise	Equals 1 for all persons	Measure required for indirect estimates of male adult mortality
5.	Equals 1 when person's mother is currently living; equals 0 otherwise	Equals 1 for all persons	Measure required for indirect estimates of female adult mortality
6.	Equals 1 when person's first spouse is currently living; equals 0 otherwise	Equals 1 for all persons	Measure required for indirect estimates of adult mortality
7.	Total number of children ever born to the woman	Equals 1 for all women	Measure of cohort cumulative fertility and also used in indirect methods to adjust current fertility
8.	Total number of children living among those ever born to the woman	Equals 1 for all women	Measure of net survivorship among children ever born
9.	Number of children deceased among those ever born to the woman	Equals 1 for all women	Measure of child mortality used with (7) to produce (11)
10.	Equals 1 when a child was born to the woman during the reference period; equals 0 otherwise	Equals 1 for all women	Basis for improved comparisons in fertility among populations since these rates are less affected by difference in age composition
11.	Number of children ever born to the woman, and currently deceased	Total number of children ever born to the woman	Measure required for indirect estimates of infant and child mortality
12.	Number of live births in the household during the reference period	Number of current household members	Simple and commonly used measure of natality
13.	Number of household members in the age group who died during the reference period	Number of current household members in the same age group as the numerator observation	Basis for improved comparisons in mortality among populations since these rates are less affected by difference in age composition
14.	Number of household members who died during the reference period	Number of current household members	Simple and commonly used measure of mortality
15.	Number of children in the household who were born and died during the reference period	Number of children born in the household during the reference period	Approximate measure of the probability of dying during the first year of life

APPENDIX B

Computation of Sampling Error Measures from SESUDAAN

Obtaining standard errors of survey estimates is often made difficult by the nature of the estimator and the nature of the sampling design. On the one hand, the estimator may be complex in that it is expressed as a nonlinear function of several random variables. The combined ratio-type estimator, $\hat{R} = \hat{Y}/\hat{X}$, considered in this report is a common example. A complex sampling design may also contribute to some difficulty in obtaining estimates of standard errors. Designs using stratification and multiple sampling stages yield complex expressions for the standard errors of even the simplest survey estimators. The problem then is to find an operationally efficient estimator of the standard error which handles these problems. The computer program, SESUDAAN (short for Standard Errors for Survey Data Analysis), that was used to prepare this report accomplishes this by utilizing the so-called Taylor series linearization (TSL) approach to estimating standard errors. The TSL approach is now briefly reviewed.

Following the procedure discussed in Chiang (1968) and as adopted for use in sample surveys by Tepping (1968) and Woodruff (1971), the first step in the TSL approach is to reduce the complex estimator to a simpler form. Suppose that the measure to be estimated can be expressed as

$$\theta = \phi(\underline{U}), \tag{B.1}$$

where $\underline{U} = (U_1, U_2, \ldots, U_t)$ is a t-dimensional vector of totals and $\phi(\underline{U})$ is some nonlinear function of $\underline{U}$. We might estimate θ as

$$\hat{\theta} = \phi(\hat{\underline{U}}), \tag{B.2}$$

where $\hat{\underline{U}} = (\hat{U}_1, \hat{U}_2, \ldots, \hat{U}_t)$ is the corresponding vector of estimated totals, and

$$\hat{U}_i = \sum_h^H \sum_\alpha^{a_h} \sum_\beta^{b_{h\alpha}} W_{h\alpha\beta} U_{ih\alpha\beta}, \qquad i = 1,2, \ldots, t. \tag{B.3}$$

$W_{h\alpha\beta}$ is the known sampling weight for the β-th elementary unit (among $b_{h\alpha}$ that were selected) in the α-th PSU (among a_h that were selected) in the h-th primary stratum, and $U_{ih\alpha\beta}$ is the survey observation used to estimate the i-th total (U_i) from the $h\alpha\beta$-th selected elementary unit. Note that $R = Y/X$ and $\hat{R} = \hat{Y}/\hat{X}$ would be one simple example of θ and $\hat{\theta}$, respectively, where $U_1 = X$, $U_2 = Y$, $\hat{U}_1 = \hat{X}$, and $\hat{U}_2 = \hat{Y}$. Using the first-order (i.e., linear) terms of a Taylor series expansion of $\phi(\hat{\underline{U}})$, we have

$$\phi(\hat{\underline{U}}) \cong \phi(\underline{U}) + \sum_i^t \phi_i^{(1)}(\underline{U})(\hat{U}_i - U_i), \tag{B.4}$$

where $\phi_i^{(1)}(\underline{U})$ is the first partial derivative of $\phi(\underline{U})$ with respect to U_i. Thus, the mean square error of $\phi(\hat{\underline{U}})$ can be approximated from Equation (B.4) as

$$\begin{aligned} \mathrm{MSE}[\phi(\hat{\underline{U}})] &= E[\phi(\hat{\underline{U}}) - \phi(\underline{U})]^2 \\ &\cong E[\sum_i^t \phi_i^{(1)}(\underline{U})(\hat{U}_i - U_i)]^2 \end{aligned}$$

$$= \mathrm{Var}[\sum_i^t \phi_i^{(1)}(\underline{U})\hat{U}_i]$$

$$= \mathrm{Var}[\sum_i^t \phi_i^{(1)}(\underline{U}) \sum_h^H \sum_\alpha^{a_h} \sum_\beta^{b_{h\alpha}} W_{h\alpha\beta} U_{ih\alpha\beta}]$$

$$= \mathrm{Var}[\sum_h^H \sum_\alpha^{a_h} \sum_\beta^{b_{h\alpha}} W_{h\alpha\beta} Q_{h\alpha\beta}], \tag{B.5}$$

where

$$Q_{h\alpha\beta} = \sum_i^t \phi_i^{(1)}(\underline{U}) U_{ih\alpha\beta} \tag{B.6}$$

is called the Taylor series linearization measure for the $h\alpha\beta$-th member of the sample.

Having reduced the problem to one of estimating the variance of the simple linear statistic given by the final equality of Equation (B.5), the second step in the TSL approach is to obtain an estimate of the variance of this linear statistic following the approach suggested by Hansen, Hurwitz, and Madow (1953; Vol. II, 9.4). By so doing we have as our estimator,

$$\mathrm{var}[\phi(\hat{\underline{U}})] = \sum_h^H \left[\frac{a_h \sum_\alpha^{a_h} Z_{h\alpha}^2 - (\sum_\alpha^{a_h} Z_{h\alpha})^2}{a_h - 1} \right], \tag{B.7}$$

where

$$Z_{h\alpha} = \sum_\beta^{b_{h\alpha}} W_{h\alpha\beta} Z_{h\alpha\beta} \tag{B.8}$$

and

$$Z_{h\alpha\beta} = \sum_i^t \phi_i^{(1)}(\hat{\underline{U}}) U_{ih\alpha\beta} . \tag{B.9}$$

$Z_{h\alpha\beta}$ is the linearization corresponding to $Q_{h\alpha\beta}$ of the Equation (B.6) using the vector of estimated totals $(\hat{\underline{U}})$ rather that the vector of actual totals $(\underline{U})$. The estimated standard error of $\phi(\hat{\underline{U}})$ is computed finally as

$$\mathrm{se}[\phi(\hat{\underline{U}})] = \{\mathrm{var}[\phi(\hat{\underline{U}})]\}^{1/2} . \tag{B.10}$$

Considering the present problem of obtaining the standard error of $\hat{R} = \hat{Y}/\hat{X}$, we note that $\phi_1^{(1)}(R) = -Y/X^2$ and $\phi_2^{(1)}(R) = 1/X$ so that the linearization used to produce $\mathrm{var}(\hat{R})$ from Equation (B.7) is

$$Z_{h\alpha\beta} = (Y_{h\alpha\beta} - \hat{R}X_{h\alpha\beta})/\hat{X}. \tag{B.11}$$

Two further points about the TSL approach are noteworthy. The first point relates to the rather loose use of terminology surrounding the problem of estimating measures of sampling error for survey estimates. Specifically, the result of Equation (B.7) is commonly called a "variance" estimator of $\phi(\underset{\sim}{U})$ when, in fact, we see from the first line of Equation (B.5) that the TSL approach yields an approximation to the "mean square error" of $\phi(\hat{\underset{\sim}{U}})$. This point may be made clear by recalling that the mean square error of $\phi(\hat{\underset{\sim}{U}})$ is defined as

$$\mathrm{MSE}[\phi(\hat{\underset{\sim}{U}})] = E[\phi(\hat{\underset{\sim}{U}}) - \phi(\underset{\sim}{U})]^2 \tag{B.12}$$

whereas the variance of $\phi(\hat{\underset{\sim}{U}})$ is defined as

$$\mathrm{Var}[\phi(\hat{\underset{\sim}{U}})] = E[\phi(\hat{\underset{\sim}{U}}) - E\{\phi(\hat{\underset{\sim}{U}})\}]^2 \tag{B.13}$$

The second point deals with the adaptability of the result of Equation (B.10) to the case where we are producing the standard error of an estimate obtained for a domain (i.e., subgroup) of the population. This point is needed since the results previously stated in this appendix apply only to estimates for the entire population. Adopting the above results to the problem of obtaining standard errors for domain estimates is easily done by multiplying the indicator variable,

$$\lambda_{h\alpha\beta} = \begin{cases} 1 & \text{if the } h\alpha\beta\text{-th elementary unit in the sample is a member of the domain} \\ 0 & \text{if otherwise,} \end{cases}$$

times $U_{ih\alpha\beta}$ whenever it appears.

SESUDAAN, a Statistical Analysis System (SAS) program developed by Shah (1981), is easily used by supplying the following variables as input from the data file:

1. A variable used to define the domain from which $\lambda_{h\alpha\beta}$ (when needed) is created;
2. A variable corresponding to the measures, $Y_{h\alpha\beta}$ and $X_{h\alpha\beta}$;
3. A variable corresponding to the sampling weight, $W_{h\alpha\beta}$;
4. A variable indicating the primary stratum (h) from which the data record was selected; and
5. A variable indicating the PSU (α) within primary stratum to which the data record belongs.

This program was found to have several useful features in applying the TSL approach. First, large numbers of ratio estimates, with accompanying standard errors, could be produced with relatively simple user input commands. Second, computations were relatively inexpensive since multiple tables could be generated from single passes of the data file. Third, the user's option to output the results to a SAS data file for subsequent table formation was found to be particularly useful.

TABLES

TABLE 1. MEASURES OF SAMPLING ERROR FOR THE PERCENT URBAN-RURAL DISTRIBUTION OF ALL PERSONS

AREA OF RESIDENCE	MEASURE	BOLIVIA	INDONESIA	SOMALIA
URBAN	ESTIMATE	48.4	20.0	73.1
	STD. ERROR	1.68	0.72	1.68
	SAMPLE SIZE	47810	90477	33605
	DEFT	7.35	5.39	6.95
	ROH	0.203	0.389	0.260
RURAL	ESTIMATE	51.6	80.0	26.9
	STD. ERROR	1.68	0.72	1.68
	SAMPLE SIZE	47810	90477	33605
	DEFT	7.35	5.39	6.95
	ROH	0.203	0.389	0.260

TABLE 2. MEASURES OF SAMPLING ERROR FOR THE PERCENT AGE DISTRIBUTION OF ALL PERSONS

AGE GROUP	MEASURE	BOLIVIA	INDONESIA	SOMALIA
0-4	ESTIMATE	16.3	11.4	17.6
	STD. ERROR	0.27	0.11	0.21
	SAMPLE SIZE	47810	90458	33605
	DEFT	1.63	1.69	1.64
	ROH	0.006	0.003	0.000
5-9	ESTIMATE	13.4	13.3	14.1
	STD. ERROR	0.21	0.12	0.23
	SAMPLE SIZE	47810	90458	33605
	DEFT	1.37	1.04	1.21
	ROH	0.003	0.001	0.003
10-14	ESTIMATE	11.9	11.9	13.0
	STD. ERROR	0.20	0.11	0.21
	SAMPLE SIZE	47810	90458	33605
	DEFT	1.37	0.99	1.14
	ROH	0.003	-0.000	0.002
15-19	ESTIMATE	10.4	10.3	12.0
	STD. ERROR	0.22	0.10	0.24
	SAMPLE SIZE	47810	90458	33605
	DEFT	1.57	1.03	1.34
	ROH	0.006	0.001	0.004
20-24	ESTIMATE	8.7	8.3	9.0
	STD. ERROR	0.17	0.10	0.20
	SAMPLE SIZE	47810	90458	33605
	DEFT	1.33	1.11	1.27
	ROH	0.003	0.003	0.003
25-29	ESTIMATE	7.3	7.8	6.7
	STD. ERROR	0.14	0.09	0.16
	SAMPLE SIZE	47810	90458	33605
	DEFT	1.15	0.98	1.16
	ROH	0.001	-0.000	0.002
30-34	ESTIMATE	6.2	5.9	6.2
	STD. ERROR	0.15	0.07	0.12
	SAMPLE SIZE	47810	90458	33605
	DEFT	1.32	0.91	0.95
	ROH	0.003	-0.002	-0.001
35-39	ESTIMATE	5.2	6.5	4.2
	STD. ERROR	0.11	0.08	0.11
	SAMPLE SIZE	47810	90458	33605
	DEFT	1.09	1.03	0.97
	ROH	0.001	0.001	-0.000
40-44	ESTIMATE	4.4	5.9	4.9
	STD. ERROR	0.10	0.06	0.13
	SAMPLE SIZE	47810	90450	33605
	DEFT	1.01	0.98	1.12
	ROH	0.006	-0.000	0.001
45-49	ESTIMATE	4.0	5.3	2.3
	STD. ERROR	0.11	0.07	0.09
	SAMPLE SIZE	47810	90458	33605
	DEFT	1.26	0.97	1.05
	ROH	0.002	-0.001	0.001
50-54	ESTIMATE	3.5	4.3	3.5
	STD. ERROR	0.11	0.07	0.11
	SAMPLE SIZE	47810	90450	33605
	DEFT	1.30	1.07	1.10
	ROH	0.003	0.002	0.001
55-59	ESTIMATE	2.5	2.9	1.2
	STD. ERROR	0.10	0.06	0.07
	SAMPLE SIZE	47810	90458	33605
	DEFT	1.45	1.07	1.18
	ROH	0.004	0.002	0.002
60-64	ESTIMATE	2.1	2.5	2.5
	STD. ERROR	0.11	0.06	0.09
	SAMPLE SIZE	47810	90458	33605
	DEFT	1.61	1.11	1.10
	ROH	0.006	0.003	0.001
65-69	ESTIMATE	1.4	1.4	0.6
	STD. ERROR	0.06	0.04	0.06
	SAMPLE SIZE	47810	90458	33605
	DEFT	1.12	1.04	1.37
	ROH	0.001	0.001	0.005
70+	ESTIMATE	2.6	2.3	2.8
	STD. ERROR	0.14	0.06	0.12
	SAMPLE SIZE	47810	90458	33605
	DEFT	1.84	1.15	1.20
	ROH	0.009	0.005	0.004

TABLE 3. MEASURES OF SAMPLING ERROR BY AGE GROUP FOR THE PERCENT MARITAL STATUS DISTRIBUTION OF MALES 15-49 YEARS OF AGE

MARITAL STATUS	MEASURE	BOLIVIA	INDONESIA	SOMALIA
		15-19		
SINGLE	ESTIMATE	97.1	96.9	97.7
	STD. ERROR	0.30	0.29	0.34
	SAMPLE SIZE	2495	4662	1879
	DEFT	0.91	1.13	0.99
	ROH	-0.014	0.097	-0.003
MARRIED	ESTIMATE	2.7	2.7	2.0
	STD. ERROR	0.28	0.27	0.32
	SAMPLE SIZE	2495	4662	1879
	DEFT	0.85	1.11	0.98
	ROH	-0.022	0.087	-0.005
DIVORCED/ SEPARATED	ESTIMATE	0.2	0.3	0.2
	STD. ERROR	0.08	0.08	0.09
	SAMPLE SIZE	2495	4662	1879
	DEFT	1.05	1.00	1.01
	ROH	0.009	0.002	0.001
WIDOWED	ESTIMATE	0.0	0.1	0.1
	STD. ERROR	0.00	0.04	0.05
	SAMPLE SIZE	2495	4662	1879
	DEFT	1.00	1.01	1.00
	ROH	0.000	0.005	-0.001
		20-24		
SINGLE	ESTIMATE	63.3	63.7	71.3
	STD. ERROR	1.30	0.93	1.58
	SAMPLE SIZE	1978	3398	1365
	DEFT	1.20	1.13	1.29
	ROH	0.044	0.159	0.104
MARRIED	ESTIMATE	35.9	34.1	25.5
	STD. ERROR	1.28	0.92	1.49
	SAMPLE SIZE	1978	3398	1365
	DEFT	1.19	1.11	1.20
	ROH	0.041	0.132	0.093
DIVORCED/ SEPARATED	ESTIMATE	0.5	1.7	2.9
	STD. ERROR	0.15	0.22	0.57
	SAMPLE SIZE	1978	3398	1365
	DEFT	0.91	0.98	1.25
	ROH	-0.017	-0.022	0.089
WIDOWED	ESTIMATE	0.3	0.5	0.3
	STD. ERROR	0.11	0.13	0.15
	SAMPLE SIZE	1978	3398	1365
	DEFT	1.00	1.00	1.01
	ROH	-0.006	0.073	0.003

MARITAL STATUS	MEASURE	BOLIVIA	INDONESIA	SOMALIA
		35-39		
SINGLE	ESTIMATE	6.1	2.0	6.5
	STD. ERROR	0.81	0.27	0.96
	SAMPLE SIZE	1203	2617	665
	DEFT	1.03	1.03	1.00
	ROH	0.011	0.041	0.000
MARRIED	ESTIMATE	87.4	95.3	88.5
	STD. ERROR	0.98	0.42	1.42
	SAMPLE SIZE	1203	2617	665
	DEFT	1.02	1.00	1.15
	ROH	0.006	0.096	0.121
DIVORCED/ SEPARATED	ESTIMATE	2.2	1.5	4.2
	STD. ERROR	0.40	0.27	0.78
	SAMPLE SIZE	1203	2617	665
	DEFT	0.94	1.07	1.01
	ROH	-0.019	0.114	0.005
WIDOWED	ESTIMATE	2.3	0.9	0.7
	STD. ERROR	0.52	0.18	0.39
	SAMPLE SIZE	1203	2817	665
	DEFT	1.19	1.05	1.18
	ROH	0.076	0.076	0.152
		40-44		
SINGLE	ESTIMATE	3.7	1.1	4.7
	STD. ERROR	0.61	0.21	0.82
	SAMPLE SIZE	1014	2526	840
	DEFT	1.03	1.00	1.12
	ROH	0.013	-0.008	0.073
MARRIED	ESTIMATE	92.3	95.7	91.0
	STD. ERROR	0.61	0.42	0.91
	SAMPLE SIZE	1014	2526	840
	DEFT	0.97	1.05	0.92
	ROH	-0.014	0.090	-0.044
DIVORCED/ SEPARATED	ESTIMATE	1.1	1.5	3.5
	STD. ERROR	0.34	0.25	0.63
	SAMPLE SIZE	1014	2526	840
	DEFT	1.04	1.04	0.90
	ROH	0.017	0.073	-0.024
WIDOWED	ESTIMATE	2.9	1.7	0.0
	STD. ERROR	0.50	0.20	0.32
	SAMPLE SIZE	1014	2526	840
	DEFT	0.96	1.04	1.01
	ROH	-0.015	0.070	0.004

25-29

SINGLE	ESTIMATE	27.2	28.4	39.4
	STD. ERROR	1.55	0.76	1.66
	SAMPLE SIZE	1674	3435	1040
	DEFT	1.42	1.11	1.18
	ROH	0.125	0.132	0.044
MARRIED	ESTIMATE	70.5	76.2	54.4
	STD. ERROR	1.52	0.79	1.76
	SAMPLE SIZE	1674	3435	1040
	DEFT	1.36	1.09	1.15
	ROH	0.104	0.107	0.070
DIVORCED/ SEPARATED	ESTIMATE	1.9	2.9	5.5
	STD. ERROR	0.31	0.29	0.59
	SAMPLE SIZE	1674	3435	1040
	DEFT	0.91	1.01	0.64
	ROH	-0.020	0.015	-0.064
WIDOWED	ESTIMATE	0.4	0.5	0.7
	STD. ERROR	0.17	0.12	0.25
	SAMPLE SIZE	1674	3435	1040
	DEFT	1.17	0.95	0.96
	ROH	0.046	-0.054	-0.015

30-34

SINGLE	ESTIMATE	11.2	6.9	15.4
	STD. ERROR	0.84	0.49	0.96
	SAMPLE SIZE	1472	2568	982
	DEFT	1.03	1.04	0.83
	ROH	0.008	0.079	-0.071
MARRIED	ESTIMATE	85.7	91.1	78.0
	STD. ERROR	0.89	0.62	1.21
	SAMPLE SIZE	1472	2568	982
	DEFT	0.98	1.10	0.92
	ROH	-0.006	0.186	-0.036
DIVORCED/ SEPARATED	ESTIMATE	2.0	2.0	6.1
	STD. ERROR	0.35	0.30	0.82
	SAMPLE SIZE	1472	2568	982
	DEFT	0.96	1.05	1.09
	ROH	-0.012	0.185	0.042
WIDOWED	ESTIMATE	1.2	0.9	0.6
	STD. ERROR	0.30	0.19	0.26
	SAMPLE SIZE	1472	2568	982
	DEFT	1.07	1.01	1.02
	ROH	0.026	0.015	0.016

45-49

SINGLE	ESTIMATE	2.9	0.6	2.4
	STD. ERROR	0.51	0.16	0.76
	SAMPLE SIZE	924	2316	388
	DEFT	0.93	0.99	0.99
	ROH	-0.035	-	-0.021
MARRIED	ESTIMATE	96.6	96.2	93.0
	STD. ERROR	0.94	0.41	1.34
	SAMPLE SIZE	924	2316	388
	DEFT	0.96	1.03	1.03
	ROH	-0.011	-	0.061
DIVORCED/ SEPARATED	ESTIMATE	2.1	1.0	2.9
	STD. ERROR	0.49	0.21	0.91
	SAMPLE SIZE	924	2316	388
	DEFT	1.04	1.02	1.00
	ROH	0.020	-	0.112
WIDOWED	ESTIMATE	4.4	2.2	1.8
	STD. ERROR	0.69	0.35	0.67
	SAMPLE SIZE	924	2316	388
	DEFT	1.01	0.97	1.00
	ROH	0.007	-	-0.002

ALL AGES

SINGLE	ESTIMATE	41.4	35.0	48.2
	STD. ERROR	0.75	0.39	0.67
	SAMPLE SIZE	10760	21722	7159
	DEFT	1.57	1.19	1.47
	ROH	0.025	0.026	0.030
MARRIED	ESTIMATE	56.2	62.6	46.1
	STD. ERROR	0.69	0.38	0.85
	SAMPLE SIZE	10760	21722	7159
	DEFT	1.45	1.17	1.44
	ROH	0.019	0.022	0.020
DIVORCED/ SEPARATED	ESTIMATE	1.2	1.5	3.2
	STD. ERROR	0.10	0.09	0.23
	SAMPLE SIZE	10760	21722	7159
	DEFT	0.93	1.11	1.13
	ROH	-0.002	0.014	0.007
WIDOWED	ESTIMATE	1.2	0.8	0.5
	STD. ERROR	0.14	0.07	0.10
	SAMPLE SIZE	10760	21722	7159
	DEFT	1.31	1.11	1.20
	ROH	0.012	0.014	0.012

ALL DOMAINS

SINGLE	AVERAGE DEFT	1.08	1.06	1.05
	AVERAGE ROH	0.022	0.083	0.016
MARRIED	AVERAGE DEFT	1.05	1.08	1.06
	AVERAGE ROH	0.014	0.115	0.037
DIV./SEP.	AVERAGE DEFT	0.98	1.03	1.03
	AVERAGE ROH	-0.003	0.001	0.023
WIDOWED	AVERAGE DEFT	1.06	1.01	1.03
	AVERAGE ROH	0.019	0.031	0.022

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TABLE 4. MEASURES OF SAMPLING ERROR BY AGE GROUP FOR THE PERCENT MARITAL STATUS DISTRIBUTION OF FEMALES 15-49 YEARS OF AGE

MARITAL STATUS	MEASURE	BOLIVIA	INDONESIA	SOMALIA
		15-19		
SINGLE	ESTIMATE	87.1	68.1	71.7
	STD. ERROR	0.77	0.79	1.33
	SAMPLE SIZE	2477	4680	2134
	DEFT	1.14	1.17	1.36
	ROH	0.024	0.130	0.066
MARRIED	ESTIMATE	11.7	28.1	25.2
	STD. ERROR	0.71	0.75	1.31
	SAMPLE SIZE	2477	4680	2134
	DEFT	1.10	1.14	1.39
	ROH	0.017	0.112	0.066
DIVORCED/ SEPARATED	ESTIMATE	1.1	3.3	2.9
	STD. ERROR	0.24	0.29	0.35
	SAMPLE SIZE	2477	4680	2134
	DEFT	1.17	1.18	0.95
	ROH	0.030	0.074	-0.009
WIDOWED	ESTIMATE	0.1	0.4	0.1
	STD. ERROR	0.05	0.10	0.11
	SAMPLE SIZE	2477	4680	2134
	DEFT	0.90	1.10	0.99
	ROH	-0.015	0.076	-0.001
		20-24		
SINGLE	ESTIMATE	46.9	21.2	23.7
	STD. ERROR	1.53	0.61	1.05
	SAMPLE SIZE	2178	4185	1656
	DEFT	1.44	1.28	1.57
	ROH	0.097	0.267	0.185
MARRIED	ESTIMATE	46.9	70.6	67.5
	STD. ERROR	1.60	0.63	1.62
	SAMPLE SIZE	2178	4185	1656
	DEFT	1.49	1.19	1.41
	ROH	0.113	0.171	0.122
DIVORCED/ SEPARATED	ESTIMATE	5.4	6.7	7.9
	STD. ERROR	0.39	0.41	0.61
	SAMPLE SIZE	2178	4185	1656
	DEFT	0.99	1.05	0.92
	ROH	-0.002	0.046	-0.020
WIDOWED	ESTIMATE	0.7	1.3	0.9
	STD. ERROR	0.10	0.19	0.24
	SAMPLE SIZE	2178	4185	1656
	DEFT	0.86	1.09	1.01
	ROH	-0.021	0.076	0.004

MARITAL STATUS	MEASURE	BOLIVIA	INDONESIA	SOMALIA
		35-39		
SINGLE	ESTIMATE	7.8	1.2	1.1
	STD. ERROR	0.81	0.19	0.43
	SAMPLE SIZE	1302	3041	732
	DEFT	1.09	0.97	1.12
	ROH	0.030	-0.047	0.083
MARRIED	ESTIMATE	82.3	86.0	90.1
	STD. ERROR	1.17	0.64	1.64
	SAMPLE SIZE	1302	3041	732
	DEFT	1.11	1.02	0.95
	ROH	0.037	0.030	-0.035
DIVORCED/ SEPARATED	ESTIMATE	5.2	5.9	6.8
	STD. ERROR	0.53	0.44	0.95
	SAMPLE SIZE	1302	3041	732
	DEFT	0.66	1.04	1.03
	ROH	-0.042	0.050	0.018
WIDOWED	ESTIMATE	4.6	6.8	2.0
	STD. ERROR	0.62	0.45	0.52
	SAMPLE SIZE	1302	3041	732
	DEFT	1.06	0.99	0.99
	ROH	0.021	-0.008	-0.003
		40-44		
SINGLE	ESTIMATE	5.2	1.2	0.2
	STD. ERROR	0.67	0.21	0.17
	SAMPLE SIZE	1096	2828	805
	DEFT	1.00	1.00	1.00
	ROH	-0.001	-0.001	-0.000
MARRIED	ESTIMATE	88.1	81.0	85.3
	STD. ERROR	1.14	0.75	1.31
	SAMPLE SIZE	1096	2828	805
	DEFT	0.94	1.01	1.05
	ROH	-0.022	0.015	0.032
DIVORCED/ SEPARATED	ESTIMATE	5.6	5.8	8.5
	STD. ERROR	0.66	0.45	1.00
	SAMPLE SIZE	1096	2828	805
	DEFT	0.84	1.02	1.01
	ROH	-0.058	0.035	0.006
WIDOWED	ESTIMATE	8.9	12.0	6.0
	STD. ERROR	0.84	0.64	0.91
	SAMPLE SIZE	1096	2828	805
	DEFT	0.98	1.05	1.09
	ROH	-0.009	0.077	0.050

25-29

SINGLE	ESTIMATE	21.4	6.5	7.1
	STD. ERROR	1.14	0.42	0.92
	SAMPLE SIZE	1835	3653	1216
	DEFT	1.19	1.04	1.25
	ROH	0.045	0.039	0.096
MARRIED	ESTIMATE	73.2	85.1	84.1
	STD. ERROR	1.21	0.61	1.26
	SAMPLE SIZE	1835	3653	1216
	DEFT	1.17	1.03	1.14
	ROH	0.040	0.029	0.054
DIVORCED/ SEPARATED	ESTIMATE	4.3	6.5	7.0
	STD. ERROR	0.53	0.44	0.71
	SAMPLE SIZE	1835	3653	1216
	DEFT	1.12	1.08	0.94
	ROH	0.028	0.061	-0.022
WIDOWED	ESTIMATE	1.1	2.0	1.2
	STD. ERROR	0.24	0.24	0.33
	SAMPLE SIZE	1835	3653	1216
	DEFT	0.99	1.02	1.04
	ROH	-0.001	0.020	0.016

30-34

SINGLE	ESTIMATE	11.1	2.6	2.1
	STD. ERROR	0.87	0.32	0.52
	SAMPLE SIZE	1472	2760	1073
	DEFT	1.06	1.06	1.16
	ROH	0.019	0.105	0.080
MARRIED	ESTIMATE	80.4	88.6	66.1
	STD. ERROR	1.27	0.65	1.38
	SAMPLE SIZE	1472	2760	1073
	DEFT	1.23	1.08	1.30
	ROH	0.071	0.135	0.145
DIVORCED/ SEPARATED	ESTIMATE	5.6	5.6	10.2
	STD. ERROR	0.67	0.48	1.22
	SAMPLE SIZE	1472	2760	1073
	DEFT	1.11	1.09	1.32
	ROH	0.033	0.151	0.152
WIDOWED	ESTIMATE	2.8	3.2	1.6
	STD. ERROR	0.50	0.34	0.39
	SAMPLE SIZE	1472	2760	1073
	DEFT	1.18	1.02	1.03
	ROH	0.054	0.038	0.014

45-49

SINGLE	ESTIMATE	4.8	0.7	0.0
	STD. ERROR	0.73	0.16	0.00
	SAMPLE SIZE	1008	2462	398
	DEFT	1.09	0.99	1.00
	ROH	0.043	-	0.000
MARRIED	ESTIMATE	76.3	75.2	78.5
	STD. ERROR	1.42	0.85	2.24
	SAMPLE SIZE	1008	2462	398
	DEFT	1.06	0.98	1.09
	ROH	0.027	-	0.160
DIVORCED/ SEPARATED	ESTIMATE	6.3	5.5	11.0
	STD. ERROR	0.82	0.44	1.73
	SAMPLE SIZE	1008	2462	398
	DEFT	1.06	0.95	1.10
	ROH	0.028	-	0.186
WIDOWED	ESTIMATE	12.6	16.5	10.5
	STD. ERROR	0.94	0.79	1.67
	SAMPLE SIZE	1008	2462	398
	DEFT	0.90	1.00	1.09
	ROH	-0.041	-	0.154

ALL AGES

SINGLE	ESTIMATE	34.7	18.8	25.4
	STD. ERROR	0.65	0.32	0.85
	SAMPLE SIZE	11368	23609	8014
	DEFT	1.46	1.28	1.70
	ROH	0.018	0.035	0.049
MARRIED	ESTIMATE	56.1	78.3	65.7
	STD. ERROR	0.72	0.36	0.94
	SAMPLE SIZE	11368	23609	8014
	DEFT	1.55	1.22	1.77
	ROH	0.023	0.028	0.050
DIVORCED/ SEPARATED	ESTIMATE	4.0	5.5	7.0
	STD. ERROR	0.22	0.16	0.32
	SAMPLE SIZE	11368	23609	8014
	DEFT	1.19	1.11	1.11
	ROH	0.007	0.012	0.006
WIDOWED	ESTIMATE	3.2	5.3	1.9
	STD. ERROR	0.18	0.16	0.17
	SAMPLE SIZE	11368	23609	8014
	DEFT	1.09	1.07	1.06
	ROH	0.003	0.006	0.004

ALL DOMAINS

SINGLE	AVERAGE DEFT	1.14	1.07	1.21
	AVERAGE ROH	0.036	0.082	0.075
MARRIED	AVERAGE DEFT	1.16	1.06	1.19
	AVERAGE ROH	0.040	0.082	0.081
DIV./SEP.	AVERAGE DEFT	1.02	1.05	1.04
	AVERAGE ROH	0.062	0.073	0.045
WIDOWED	AVERAGE DEFT	0.98	1.04	1.04
	AVERAGE ROH	-0.002	0.047	0.034

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TABLE 5. MEASURES OF SAMPLING ERROR BY AGE GROUP FOR THE PERCENTAGE OF ALL PERSONS WITH THEIR FATHER CURRENTLY LIVING

AGE GROUP	MEASURE	BOLIVIA	INDONESIA	SOMALIA
0-4	ESTIMATE	97.8	-	98.2
	STD. ERROR	0.18	-	0.23
	SAMPLE SIZE	7698	-	5665
	DEFT	1.06	-	1.30
	ROH	0.003	-	0.023
5-9	ESTIMATE	94.9	-	95.6
	STD. ERROR	0.38	-	0.47
	SAMPLE SIZE	6321	-	4719
	DEFT	1.37	-	1.46
	ROH	0.026	-	0.049
10-14	ESTIMATE	90.4	-	68.4
	STD. ERROR	0.46	-	0.59
	SAMPLE SIZE	5617	-	4377
	DEFT	1.18	-	1.21
	ROH	0.014	-	0.020
15-19	ESTIMATE	64.4	-	79.5
	STD. ERROR	0.74	-	0.77
	SAMPLE SIZE	4911	-	4029
	DEFT	1.43	-	1.22
	ROH	0.040	-	0.023
20-24	ESTIMATE	75.9	-	68.5
	STD. ERROR	0.87	-	0.95
	SAMPLE SIZE	4121	-	3027
	DEFT	1.30	-	1.12
	ROH	0.032	-	0.016
25-29	ESTIMATE	65.4	-	58.2
	STD. ERROR	0.97	-	1.06
	SAMPLE SIZE	3474	-	2259
	DEFT	1.20	-	1.02
	ROH	0.024	-	0.004
30-34	ESTIMATE	53.3	-	45.1
	STD. ERROR	1.00	-	1.29
	SAMPLE SIZE	2913	-	2053
	DEFT	1.08	-	1.17
	ROH	0.012	-	0.037
35-39	ESTIMATE	40.9	-	31.9
	STD. ERROR	1.07	-	1.47
	SAMPLE SIZE	2470	-	1397
	DEFT	1.08	-	1.16
	ROH	0.013	-	0.006
40-44	ESTIMATE	29.0	-	23.2
	STD. ERROR	0.96	-	1.13
	SAMPLE SIZE	2083	-	1646
	DEFT	0.97	-	1.08
	ROH	-0.006	-	0.022
45-49	ESTIMATE	19.7	-	19.6
	STD. ERROR	0.75	-	1.49
	SAMPLE SIZE	1912	-	786
	DEFT	0.82	-	1.06
	ROH	-0.034	-	0.035
50-54	ESTIMATE	12.6	-	12.5
	STD. ERROR	1.09	-	0.99
	SAMPLE SIZE	1640	-	1158
	DEFT	1.34	-	1.02
	ROH	0.096	-	0.007
55-59	ESTIMATE	8.4	-	6.6
	STD. ERROR	0.92	-	1.21
	SAMPLE SIZE	1200	-	416
	DEFT	1.15	-	1.04
	ROH	0.057	-	0.002
60-64	ESTIMATE	4.1	-	3.8
	STD. ERROR	0.70	-	0.61
	SAMPLE SIZE	1006	-	853
	DEFT	1.13	-	0.93
	ROH	0.061	-	-0.037
65-69	ESTIMATE	4.4	-	2.8
	STD. ERROR	0.91	-	1.23
	SAMPLE SIZE	652	-	213
	DEFT	1.13	-	1.09
	ROH	0.103	-	-
70+	ESTIMATE	2.4	-	1.6
	STD. ERROR	0.45	-	0.44
	SAMPLE SIZE	1251	-	932
	DEFT	1.03	-	1.09
	ROH	0.010	-	0.045
ALL AGES	ESTIMATE	67.9	-	67.4
	STD. ERROR	0.04	-	0.36
	SAMPLE SIZE	47277	-	33530
	DEFT	3.00	-	1.42
	ROH	0.031	-	0.006
ALL DOMAINS	AVERAGE DEFT	1.15	-	1.13
	AVERAGE ROH	0.030	-	0.020

TABLE 6. MEASURES OF SAMPLING ERROR BY AGE GROUP FOR THE PERCENTAGE OF ALL PERSONS WITH THEIR MOTHER CURRENTLY LIVING

AGE GROUP	MEASURE	BOLIVIA	INDONESIA	SOMALIA
0-4	ESTIMATE	99.3	99.5	99.0
	STD. ERROR	0.11	0.07	0.16
	SAMPLE SIZE	7768	10322	5609
	DEFT	1.21	1.11	1.23
	ROH	0.011	0.033	0.017
5-9	ESTIMATE	97.2	98.4	97.2
	STD. ERROR	0.25	0.14	0.25
	SAMPLE SIZE	6392	11957	4722
	DEFT	1.21	1.27	1.65
	ROH	0.014	0.070	0.005
10-14	ESTIMATE	94.7	97.1	93.0
	STD. ERROR	0.37	0.19	0.41
	SAMPLE SIZE	5664	10703	4378
	DEFT	1.24	1.26	1.07
	ROH	0.018	0.057	0.006
15-19	ESTIMATE	91.4	95.1	68.2
	STD. ERROR	0.54	0.26	0.64
	SAMPLE SIZE	4966	9311	4030
	DEFT	1.36	1.16	1.26
	ROH	0.032	0.062	0.028
20-24	ESTIMATE	86.4	93.1	81.7
	STD. ERROR	0.66	0.32	0.62
	SAMPLE SIZE	4148	7551	3026
	DEFT	1.23	1.09	1.17
	ROH	0.024	0.037	0.024
25-29	ESTIMATE	78.7	88.1	72.6
	STD. ERROR	0.79	0.41	0.96
	SAMPLE SIZE	3498	7038	2262
	DEFT	1.14	1.07	1.02
	ROH	0.017	0.031	0.004
30-34	ESTIMATE	68.7	80.7	63.7
	STD. ERROR	0.93	0.59	1.23
	SAMPLE SIZE	2933	5301	2055
	DEFT	1.09	1.08	1.16
	ROH	0.012	0.053	0.034
35-39	ESTIMATE	58.7	68.5	53.8
	STD. ERROR	1.31	0.73	1.41
	SAMPLE SIZE	2497	5831	1397
	DEFT	1.33	1.20	1.06
	ROH	0.060	0.121	0.019
40-44	ESTIMATE	47.4	52.7	44.6
	STD. ERROR	1.81	0.75	1.23
	SAMPLE SIZE	2102	5329	1644
	DEFT	1.66	1.09	1.00
	ROH	0.168	0.060	0.001
45-49	ESTIMATE	33.4	40.1	38.8
	STD. ERROR	1.27	0.82	2.33
	SAMPLE SIZE	1925	4752	786
	DEFT	1.18	1.15	1.34
	ROH	0.041	0.114	0.242
50-54	ESTIMATE	22.7	27.4	28.4
	STD. ERROR	1.16	0.62	1.20
	SAMPLE SIZE	1603	3694	1150
	DEFT	1.13	1.15	0.91
	ROH	0.035	0.150	-0.033
55-59	ESTIMATE	14.5	20.0	16.6
	STD. ERROR	1.25	0.69	1.93
	SAMPLE SIZE	1209	2631	416
	DEFT	1.24	1.14	1.01
	ROH	0.094	0.276	0.018
60-64	ESTIMATE	6.4	11.3	10.8
	STD. ERROR	0.78	0.74	1.04
	SAMPLE SIZE	1014	2191	853
	DEFT	1.02	1.10	0.98
	ROH	0.067	-	-0.013
65-69	ESTIMATE	3.8	6.7	8.7
	STD. ERROR	0.71	0.76	1.76
	SAMPLE SIZE	660	1241	213
	DEFT	0.95	1.07	0.91
	ROH	-0.037	-	-
70+	ESTIMATE	1.3	5.0	3.4
	STD. ERROR	0.41	0.60	0.61
	SAMPLE SIZE	1257	2035	932
	DEFT	1.28	1.23	1.03
	ROH	0.109	-	0.013
ALL AGES	ESTIMATE	75.4	77.1	76.2
	STD. ERROR	0.56	0.21	0.28
	SAMPLE SIZE	47696	98098	33541
	DEFT	2.85	1.47	1.20
	ROH	0.027	0.016	0.002
ALL DOMAINS	AVERAGE DEFT	1.22	1.14	1.08
	AVERAGE ROH	0.040	0.089	0.026

TABLE 7. MEASURES OF SAMPLING ERROR BY AGE GROUP FOR THE PERCENTAGE OF MALES WITH A FIRST SPOUSE CURRENTLY LIVING

AGE GROUP	MEASURE	BOLIVIA	INDONESIA	SOMALIA
15-19	ESTIMATE	100.0	-	97.7
	STD. ERROR	0.00	-	2.32
	SAMPLE SIZE	72	-	43
	DEFT	1.00	-	1.01
	ROH	-	-	-
20-24	ESTIMATE	99.3	-	98.5
	STD. ERROR	0.30	-	0.61
	SAMPLE SIZE	725	-	393
	DEFT	0.98	-	0.99
	ROH	-0.010	-	-0.016
25-29	ESTIMATE	99.2	-	98.0
	STD. ERROR	0.29	-	0.55
	SAMPLE SIZE	1219	-	628
	DEFT	1.12	-	0.99
	ROH	0.043	-	-0.008
30-34	ESTIMATE	97.5	-	96.1
	STD. ERROR	0.49	-	0.81
	SAMPLE SIZE	1304	-	820
	DEFT	1.14	-	1.20
	ROH	0.049	-	0.127
35-39	ESTIMATE	94.9	-	91.3
	STD. ERROR	0.77	-	1.35
	SAMPLE SIZE	1099	-	610
	DEFT	1.16	-	1.18
	ROH	0.067	-	0.170
40-44	ESTIMATE	92.6	-	92.1
	STD. ERROR	0.82	-	1.00
	SAMPLE SIZE	972	-	791
	DEFT	0.97	-	1.05
	ROH	-0.012	-	0.028
45-49	ESTIMATE	88.6	-	88.1
	STD. ERROR	0.98	-	1.74
	SAMPLE SIZE	893	-	374
	DEFT	0.92	-	1.04
	ROH	-0.037	-	0.081
ALL AGES	ESTIMATE	95.6	-	94.2
	STD. ERROR	0.28	-	0.47
	SAMPLE SIZE	6284	-	3659
	DEFT	1.08	-	1.23
	ROH	0.005	-	0.027
ALL DOMAINS	AVERAGE DEFT	1.04	-	1.06
	AVERAGE ROH	0.017	-	0.064

TABLE 8. MEASURES OF SAMPLING ERROR BY AGE GROUP FOR THE PERCENTAGE OF FEMALES WITH A FIRST SPOUSE CURRENTLY LIVING

AGE GROUP	MEASURE	BOLIVIA	INDONESIA	SOMALIA
15-19	ESTIMATE	99.4	-	99.7
	STD. ERROR	0.39	-	0.23
	SAMPLE SIZE	318	-	600
	DEFT	0.88	-	1.00
	ROH	-	-	0.000
20-24	ESTIMATE	98.7	-	97.3
	STD. ERROR	0.29	-	0.49
	SAMPLE SIZE	1157	-	1259
	DEFT	0.88	-	1.06
	ROH	-0.042	-	0.023
25-29	ESTIMATE	98.2	-	95.2
	STD. ERROR	0.34	-	0.70
	SAMPLE SIZE	1438	-	1126
	DEFT	0.98	-	1.10
	ROH	-0.006	-	0.042
30-34	ESTIMATE	95.2	-	92.1
	STD. ERROR	0.70	-	0.88
	SAMPLE SIZE	1303	-	1045
	DEFT	1.18	-	1.05
	ROH	0.063	-	0.021
35-39	ESTIMATE	92.4	-	87.8
	STD. ERROR	0.80	-	1.23
	SAMPLE SIZE	1192	-	720
	DEFT	1.04	-	1.00
	ROH	0.016	-	0.003
40-44	ESTIMATE	87.5	-	80.4
	STD. ERROR	0.93	-	1.42
	SAMPLE SIZE	1035	-	801
	DEFT	0.90	-	1.01
	ROH	-0.040	-	0.008
45-49	ESTIMATE	83.8	-	73.6
	STD. ERROR	1.15	-	2.29
	SAMPLE SIZE	954	-	396
	DEFT	0.97	-	1.03
	ROH	-0.016	-	0.056
ALL AGES	ESTIMATE	93.5	-	91.2
	STD. ERROR	0.32	-	0.38
	SAMPLE SIZE	7397	-	5947
	DEFT	1.10	-	1.04
	ROH	0.006	-	0.003
ALL DOMAINS	AVERAGE DEFT	0.98	-	1.04
	AVERAGE ROH	-0.004	-	0.022

TABLE 9. MEASURES OF SAMPLING ERROR BY AGE GROUP FOR THE AVERAGE TOTAL NUMBER OF CHILDREN EVER BORN TO WOMEN 15-49 YEARS OF AGE

AGE GROUP	MEASURE	BOLIVIA	INDONESIA	SOMALIA
15-19	ESTIMATE	0.16	0.49	0.14
	STD. ERROR	0.01	0.02	0.01
	SAMPLE SIZE	2457	1439	2139
	DEFT	1.17	1.01	1.18
	ROH	0.029	-	0.037
20-24	ESTIMATE	1.05	1.28	1.19
	STD. ERROR	0.05	0.02	0.05
	SAMPLE SIZE	2158	3244	1659
	DEFT	1.76	1.09	1.41
	ROH	0.194	0.119	0.125
25-29	ESTIMATE	2.39	2.25	2.81
	STD. ERROR	0.07	0.03	0.08
	SAMPLE SIZE	1826	3386	1216
	DEFT	1.56	1.09	1.24
	ROH	0.159	0.107	0.097
30-34	ESTIMATE	3.72	3.14	4.14
	STD. ERROR	0.09	0.04	0.08
	SAMPLE SIZE	1466	2675	1073
	DEFT	1.47	1.09	0.96
	ROH	0.163	0.155	-0.016
35-39	ESTIMATE	4.91	3.90	5.94
	STD. ERROR	0.12	0.05	0.10
	SAMPLE SIZE	1301	2999	732
	DEFT	1.53	1.06	0.88
	ROH	0.218	0.090	-0.075
40-44	ESTIMATE	5.72	4.16	6.63
	STD. ERROR	0.15	0.06	0.13
	SAMPLE SIZE	1088	2787	805
	DEFT	1.57	1.11	1.07
	ROH	0.297	0.182	0.141
45-49	ESTIMATE	5.84	4.45	7.30
	STD. ERROR	0.16	0.07	0.20
	SAMPLE SIZE	996	2438	399
	DEFT	1.50	1.09	1.08
	ROH	0.278	-	0.135
ALL AGES	ESTIMATE	2.74	2.90	2.84
	STD. ERROR	0.06	0.02	0.04
	SAMPLE SIZE	11292	19000	8025
	DEFT	2.03	1.12	1.15
	ROH	0.051	0.018	0.008
ALL DOMAINS	AVERAGE DEFT	1.51	1.08	1.12
	AVERAGE ROH	0.191	0.131	0.049

TABLE 10. MEASURES OF SAMPLING ERROR BY AGE GROUP FOR THE AVERAGE NUMBER OF CHILDREN LIVING AMONG THOSE EVER BORN TO WOMEN 15-49 YEARS OF AGE

AGE GROUP	MEASURE	BOLIVIA	INDONESIA	SOMALIA
15-19	ESTIMATE	0.14	0.43	0.11
	STD. ERROR	0.01	0.02	0.01
	SAMPLE SIZE	2457	1439	2139
	DEFT	1.14	1.03	1.18
	ROH	0.024	-	0.037
20-24	ESTIMATE	0.90	1.13	0.95
	STD. ERROR	0.04	0.02	0.03
	SAMPLE SIZE	2158	3244	1659
	DEFT	1.68	1.08	1.26
	ROH	0.168	0.107	0.072
25-29	ESTIMATE	1.96	1.96	2.22
	STD. ERROR	0.05	0.02	0.06
	SAMPLE SIZE	1828	3386	1216
	DEFT	1.54	1.05	1.17
	ROH	0.151	0.064	0.066
30-34	ESTIMATE	3.01	2.72	3.16
	STD. ERROR	0.08	0.03	0.06
	SAMPLE SIZE	1468	2675	1073
	DEFT	1.68	1.05	0.97
	ROH	0.256	0.097	-0.011
35-39	ESTIMATE	3.82	3.30	4.23
	STD. ERROR	0.11	0.04	0.09
	SAMPLE SIZE	1304	2999	732
	DEFT	1.72	1.08	0.99
	ROH	0.319	0.124	-0.007
40-44	ESTIMATE	4.34	3.42	4.56
	STD. ERROR	0.14	0.05	0.11
	SAMPLE SIZE	1091	2787	805
	DEFT	1.79	1.09	1.15
	ROH	0.444	0.144	0.093
45-49	ESTIMATE	4.27	3.55	4.95
	STD. ERROR	0.13	0.05	0.17
	SAMPLE SIZE	1003	2438	399
	DEFT	1.61	1.06	1.10
	ROH	0.353	-	0.186
ALL AGES	ESTIMATE	2.15	2.44	2.00
	STD. ERROR	0.05	0.02	0.03
	SAMPLE SIZE	11309	19000	8025
	DEFT	2.26	1.10	1.07
	ROH	0.067	0.015	0.003
ALL DOMAINS	AVERAGE DEFT	1.59	1.06	1.12
	AVERAGE ROH	0.245	0.107	0.062

TABLE 11. MEASURES OF SAMPLING ERROR BY AGE GROUP FOR THE AVERAGE NUMBER OF CHILDREN DECEASED AMONG THOSE EVER BORN TO WOMEN 15-49 YEARS OF AGE

AGE GROUP	MEASURE	BOLIVIA	INDONESIA	SOMALIA
15-19	ESTIMATE	0.01	0.05	0.03
	STD. ERROR	0.00	0.01	0.00
	SAMPLE SIZE	2457	1439	2139
	DEFT	1.01	1.00	1.12
	ROH	0.002	-	0.024
20-24	ESTIMATE	0.15	0.15	0.24
	STD. ERROR	0.01	0.01	0.02
	SAMPLE SIZE	2158	3244	1659
	DEFT	1.34	1.10	1.28
	ROH	0.074	0.130	0.079
25-29	ESTIMATE	0.43	0.29	0.58
	STD. ERROR	0.03	0.01	0.03
	SAMPLE SIZE	1826	3386	1216
	DEFT	1.24	1.18	1.18
	ROH	0.061	0.226	0.070
30-34	ESTIMATE	0.71	0.43	0.97
	STD. ERROR	0.04	0.02	0.04
	SAMPLE SIZE	1466	2675	1073
	DEFT	1.22	1.13	1.01
	ROH	0.069	0.238	0.003
35-39	ESTIMATE	1.10	0.60	1.71
	STD. ERROR	0.05	0.02	0.07
	SAMPLE SIZE	1301	2999	732
	DEFT	1.14	1.07	1.00
	ROH	0.050	0.107	-0.002
40-44	ESTIMATE	1.37	0.74	2.07
	STD. ERROR	0.06	0.03	0.06
	SAMPLE SIZE	1088	2787	805
	DEFT	1.15	1.13	1.05
	ROH	0.067	0.224	0.029
45-49	ESTIMATE	1.57	0.90	2.35
	STD. ERROR	0.07	0.03	0.10
	SAMPLE SIZE	996	2438	399
	DEFT	1.19	1.10	0.99
	ROH	0.094	-	-0.021
ALL AGES	ESTIMATE	0.59	0.46	0.76
	STD. ERROR	0.02	0.01	0.02
	SAMPLE SIZE	11292	19000	8025
	DEFT	1.74	1.27	1.38
	ROH	0.033	0.043	0.021
ALL DOMAINS	AVERAGE DEFT	1.19	1.10	1.09
	AVERAGE ROH	0.060	0.185	0.026

TABLE 12. MEASURES OF SAMPLING ERROR FOR THE CRUDE BIRTH RATE AND AGE-SPECIFIC FERTILITY RATES

AGE GROUP	MEASURE	BOLIVIA	INDONESIA	SOMALIA
	CRUDE BIRTH RATE (PER 1000)			
	ESTIMATE	38.5	25.9	40.6
	STD. ERROR	1.65	0.42	1.11
	SAMPLE SIZE	10236	19772	7094
	DEFT	1.31	1.13	1.13
	ROH	0.013	0.019	0.007
	AGE-SPECIFIC FERTILITY RATES (PER 1000)			
15-19	ESTIMATE	73.6	184.2	58.3
	STD. ERROR	6.19	7.26	5.35
	SAMPLE SIZE	2478	1473	2141
	DEFT	1.18	0.99	1.06
	ROH	0.032	-	0.011
20-24	ESTIMATE	230.8	236.5	238.1
	STD. ERROR	10.83	5.84	11.75
	SAMPLE SIZE	2179	3275	1659
	DEFT	1.20	1.11	1.12
	ROH	0.040	0.134	0.033
25-29	ESTIMATE	263.9	178.9	275.7
	STD. ERROR	10.15	4.87	13.64
	SAMPLE SIZE	1834	3404	1219
	DEFT	0.99	1.00	1.07
	ROH	-0.003	0.002	0.024
30-34	ESTIMATE	227.6	130.2	227.5
	STD. ERROR	12.95	5.01	13.67
	SAMPLE SIZE	1472	2685	1074
	DEFT	1.18	1.03	1.07
	ROH	0.057	0.057	0.029
35-39	ESTIMATE	181.7	72.1	186.2
	STD. ERROR	11.10	3.85	15.46
	SAMPLE SIZE	1304	3003	732
	DEFT	1.04	1.04	1.07
	ROH	0.013	0.064	0.052
40-44	ESTIMATE	73.9	30.6	123.4
	STD. ERROR	8.86	2.86	12.32
	SAMPLE SIZE	1096	2792	806
	DEFT	1.12	1.13	1.06
	ROH	0.051	0.221	0.039
45-49	ESTIMATE	19.8	9.8	80.6
	STD. ERROR	5.24	1.60	15.57
	SAMPLE SIZE	1008	2444	399
	DEFT	1.19	1.02	1.14
	ROH	0.093	-	0.261
ALL AGES	ESTIMATE	161.9	122.1	170.5
	STD. ERROR	5.07	2.02	5.00
	SAMPLE SIZE	11371	19111	8030
	DEFT	1.47	1.13	1.19
	ROH	0.019	0.019	0.016
ALL DOMAINS	AVERAGE DEFT	1.13	1.05	1.08
	AVERAGE ROH	0.040	0.096	0.064

TABLE 13. MEASURES OF SAMPLING ERROR BY AGE GROUP FOR THE PERCENTAGE OF CHILDREN DECEASED AMONG THOSE EVER BORN TO WOMEN 15-49 YEARS OF AGE

AGE GROUP	MEASURE	BOLIVIA	INDONESIA	SOMALIA
15-19	ESTIMATE	8.8	10.7	21.7
	STD. ERROR	1.40	1.22	2.76
	SAMPLE SIZE	2457	1439	2139
	DEFT	0.96	1.02	1.11
	ROH	-0.007	-	0.022
20-24	ESTIMATE	14.7	11.7	20.1
	STD. ERROR	0.89	0.60	1.06
	SAMPLE SIZE	2158	3244	1659
	DEFT	1.12	1.10	1.06
	ROH	0.023	0.123	0.016
25-29	ESTIMATE	17.9	12.7	20.8
	STD. ERROR	0.79	0.51	0.88
	SAMPLE SIZE	1826	3386	1218
	DEFT	1.14	1.17	1.09
	ROH	0.033	0.208	0.034
30-34	ESTIMATE	19.1	13.6	23.6
	STD. ERROR	0.85	0.52	0.79
	SAMPLE SIZE	1466	2675	1073
	DEFT	1.37	1.11	1.03
	ROH	0.124	0.205	0.011
35-39	ESTIMATE	22.3	15.3	28.8
	STD. ERROR	0.83	0.46	0.96
	SAMPLE SIZE	1301	2999	732
	DEFT	1.22	1.09	1.10
	ROH	0.081	0.136	0.067
40-44	ESTIMATE	24.0	17.6	31.2
	STD. ERROR	0.95	0.52	0.95
	SAMPLE SIZE	1088	2787	805
	DEFT	1.30	1.12	1.12
	ROH	0.138	0.196	0.073
45-49	ESTIMATE	26.9	20.3	32.1
	STD. ERROR	0.96	0.57	1.14
	SAMPLE SIZE	996	2436	399
	DEFT	1.22	1.07	1.01
	ROH	0.111	-	0.022
ALL AGES	ESTIMATE	21.6	15.9	26.7
	STD. ERROR	0.60	0.26	0.52
	SAMPLE SIZE	11292	19000	8025
	DEFT	1.98	1.28	1.38
	ROH	0.048	0.045	0.021
ALL DOMAINS	AVERAGE DEFT	1.19	1.10	1.07
	AVERAGE ROH	0.072	0.174	0.035

TABLE 14. MEASURES OF SAMPLING ERROR FOR THE INFANT MORTALITY RATE, CRUDE DEATH RATE, AND AGE-SPECIFIC DEATH RATES

AGE GROUP	MEASURE	BOLIVIA	INDONESIA	SOMALIA
	INFANT MORTALITY RATE (PER 1000)			
	ESTIMATE	54.3	71.0	86.8
	STD. ERROR	5.79	4.31	8.20
	SAMPLE SIZE	10236	19772	7094
	DEFT	1.10	1.04	1.07
	ROH	0.004	0.005	0.004
	CRUDE DEATH RATE (PER 1000)			
	ESTIMATE	9.3	-	9.2
	STD. ERROR	0.43	-	0.57
	SAMPLE SIZE	10236	-	7094
	DEFT	1.31	-	1.09
	ROH	0.013	-	0.005
	AGE-SPECIFIC DEATH RATE (PER 1000)			
0-14	ESTIMATE	9.3	-	13.1
	STD. ERROR	0.66	-	1.13
	SAMPLE SIZE	10236	-	7094
	DEFT	1.26	-	1.18
	ROH	0.011	-	0.011
15-49	ESTIMATE	4.4	-	3.4
	STD. ERROR	0.42	-	0.49
	SAMPLE SIZE	10236	-	7094
	DEFT	1.26	-	1.04
	ROH	0.011	-	0.002
50-64	ESTIMATE	17.3	-	10.1
	STD. ERROR	1.50	-	2.12
	SAMPLE SIZE	10236	-	7094
	DEFT	0.97	-	1.06
	ROH	-.001	-	0.003
65+	ESTIMATE	46.5	-	33.6
	STD. ERROR	3.72	-	5.07
	SAMPLE SIZE	10236	-	7094
	DEFT	1.04	-	0.98
	ROH	0.001	-	-.001
ALL DOMAINS	AVERAGE DEFT	1.13	-	1.07
	AVERAGE ROH	0.005	-	0.004

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