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**Demographic and  
Health Surveys**

**WORLD  
Conference**

August 5-7, 1981  
Washington, DC



**Executive Summary**

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# Demographic and Health Surveys

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## Executive Summary

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IRD/Macro International, Inc.  
Columbia, Maryland USA

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The Demographic and Health Surveys (DHS) is a nine-year project to assist government and private agencies in developing countries to conduct national sample surveys on population and health. DHS is funded by the U.S. Agency for International Development and administered by IRD/Macro International, Inc.

The main objectives of the DHS Program are: (1) to provide decisionmakers in survey countries with data and analyses useful for informed policy choices, (2) to expand the international population and health database, (3) to advance survey methodology, and (4) to develop in participating countries the skill and resources necessary to conduct demographic and health surveys.

For information about the Demographic and Health Surveys program, write to DHS, IRD/Macro International, Inc., 8850 Stanford Boulevard, Suite 4000, Columbia, MD 21045, USA (Telephone 410-290-2800; Telex 198116; Fax 410-290-2999).

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## Introduction



*Panel on Collection and Analysis  
of Demographic Data*

Since 1980, more than 100 sample surveys covering demographic and health topics have been conducted in 60 developing countries. These countries contain 3.6 billion people or 87 percent of the population of the developing world. In half of these countries, the most recent survey was carried out under the Demographic and Health Surveys Program (DHS) (Mauldin, 1991).

The DHS Program was initiated in 1984 with the following objectives:

- To provide survey countries with data and analysis useful for informed policy choices;
- To expand the international population and health data base;
- To develop in participating countries the technical skills and resources necessary to conduct demographic and health surveys;
- To advance survey methodology.

As of mid-1991, 36 surveys have been conducted in Africa, Asia, Latin America and the Caribbean under the DHS Program. More than 180,000 women of reproductive age in 32 countries have been interviewed. In addition, 4 surveys of husbands or males have been carried out (see Table 1). The program is ongoing and 21 more surveys will be completed by 1993. The DHS Program is funded by the Office of Population and the Office of Health of the U.S. Agency for International Development (USAID) and is administered by IRD/Macro International in Columbia, Maryland. Technical and administrative guidance is provided by Mr. Richard Cornelius of the Office of Population, Dr. Pamela Johnson of the Office of Health, and a Scientific Advisory Committee.

**Table 1: DHS Surveys, 1985 – 1990**

| Region and Country                | Year of Survey | Respondents                   | Sample Size |
|-----------------------------------|----------------|-------------------------------|-------------|
| <b>SUB-SAHARAN AFRICA</b>         |                |                               |             |
| Botswana                          | 1988           | All women 15-49               | 4368        |
| Burundi                           | 1987           | All women 15-49               | 3970        |
| Burundi                           | 1987           | Husbands                      | 542         |
| Ghana                             | 1988           | All women 15-49               | 4438        |
| Ghana                             | 1988           | Husbands                      | 943         |
| Kenya                             | 1988/89        | All women 15-49               | 7150        |
| Kenya                             | 1988/89        | Husbands                      | 1133        |
| Liberia                           | 1986           | All women 15-49               | 5239        |
| Mali                              | 1987           | All women 15-49               | 3200        |
| Mali                              | 1987           | Men 20-55                     | 970         |
| Nigeria                           | 1990           | All women 15-49               | 8768        |
| Ondo State, Nigeria               | 1986/87        | All women 15-49               | 4213        |
| Senegal                           | 1986           | All women 15-49               | 4415        |
| Sudan                             | 1989/90        | Ever married women 15-49      | 5860        |
| Togo                              | 1988           | All women 15-49               | 3360        |
| Uganda                            | 1988/89        | All women 15-49               | 4730        |
| Zimbabwe                          | 1988/89        | All women 15-49               | 4201        |
| <b>NEAR EAST/NORTH AFRICA</b>     |                |                               |             |
| Egypt                             | 1988/89        | Ever married women 15-49      | 8911        |
| Jordan                            | 1990           | Ever married women 15-49      | 8462        |
| Morocco                           | 1987           | Ever married women 15-49      | 5982        |
| Tunisia                           | 1988           | Ever married women 15-49      | 4184        |
| <b>ASIA</b>                       |                |                               |             |
| Indonesia                         | 1987           | Ever married women 15-49      | 11844       |
| Nepal (in-depth)                  | 1987           | Currently married women 15-49 | 1623        |
| Sri Lanka                         | 1987           | Ever married women 15-49      | 5865        |
| Thailand                          | 1987           | Ever married women 15-49      | 6775        |
| Pakistan                          | 1990/01        | Ever married women 15-49      | 6494        |
| <b>LATIN AMERICA/CARIBBEAN</b>    |                |                               |             |
| Bolivia                           | 1989           | All women 15-49               | 7923        |
| Bolivia (in-depth)                | 1989           | All women 15-49               | 7923        |
| Brazil                            | 1986           | All women 15-44               | 5892        |
| Colombia                          | 1986           | All women 15-49               | 5329        |
| Dominican Republic                | 1986           | All women 15-49               | 7649        |
| Dominican Republic (experimental) | 1986           | All women 15-49               | 3885        |
| Ecuador                           | 1987           | All women 15-49               | 4713        |
| El Salvador                       | 1985           | All women 15-49               | 5207        |
| Guatemala                         | 1987           | All women 15-44               | 5150        |
| Mexico                            | 1987           | All women 15-49               | 9310        |
| Paraguay                          | 1990           | All women 15-49               | 5827        |
| Peru                              | 1986           | All women 15-49               | 4999        |
| Peru (experimental)               | 1986           | All women 15-49               | 2534        |
| Trinidad & Tobago                 | 1987           | All women 15-49               | 3806        |



*“New skills must be developed to make management decisions and generate new policies based on the information provided by the data, bearing in mind the available resources, political sensitivities, and the ecology.”*

– Professor Olikoye Ransome-Kuti

Findings from the DHS surveys were presented at the *Demographic and Health Surveys World Conference*, a 3-day event held August 5-7, 1991 in Washington, D.C. More than 650 participants from 63 countries attended the conference. The participants included policymakers, program managers, representatives of survey implementing agencies and members of the international scientific community. In addition to funds provided under the DHS Program, the participation of numerous persons at the conference was made possible by the United Nations Population Fund, the Ministry of Foreign Affairs of the Netherlands, the Swedish International Development Authority, and the Overseas Development Administration of the United Kingdom.

The objectives of the conference were:

- To disseminate substantive, methodological and technical findings from the DHS Program;
- To consider the implications of these findings for population and health policies in developing countries;
- To provide an international forum for the interaction of researchers, program managers, and policymakers.

The purpose of this report is to summarize the major findings presented at the conference and to highlight specific important research results. The complete set of papers presented at the conference is contained in the conference proceedings which are available on request from the DHS Program.

The DHS World Conference was organized around three themes: *Demographic Trends in the 1980s*, *Components of Demographic and Health Patterns*, and *Policy Issues for the 1990s*. One of the themes was addressed at a plenary session each day of the conference. Specific findings from the DHS surveys were presented at 24 general sessions scheduled over the three-day conference. See page 25 for a list of authors and papers. The general sessions addressed such topics as: fertility preferences, contraceptive use dynamics, women’s reproductive health, child mortality, infant feeding, household and family structure, access to contraceptive services, policy implications of the DHS surveys, data quality, data processing, and survey sampling.

Following remarks by Martin Vaessen, DHS Project Director, Duff Gillespie, Director of the Office of Population (USAID), and Ann Van Dusen, Director of the Office of Health (USAID) at the opening plenary session, the keynote address was delivered by Professor Olikoye Ransome-Kuti, Honorable Minister of Health of the Federal Republic of Nigeria. In his address, Ransome-Kuti recalled the concern in the international population and health community in the early 1960s when it was recognized that a large proportion children in developing countries died before their fifth birthday. At the same time, there were calls to reduce the rate of population growth worldwide. In Nigeria, a study was conducted to examine “population dynamics and the social and economic development objectives of Nigeria and to explore the impact of varying rates of population growth on national development.” The report concluded that the rapid growth of population in Nigeria would frustrate attempts to achieve social and economic goals.

As a result, Nigeria adopted a national population policy in 1988 which sets targets in the areas of health, fertility, and population growth. Ransome-Kuti noted that data collection efforts, such as the Demographic and Health Surveys, have made it possible to evaluate the combined effects of governmental and international donor programs in these areas. Ransome-Kuti stressed that a “whole new culture” needs to be developed in which the goals and targets of population policy are kept in sight and information is used as a guide towards achieving them.



*Conference participants*

## Demographic Trends in the 1980s

### Fertility Trends

Prior to about 1965, there was little evidence that fertility had declined in any developing region. Between the periods 1965-70 and 1980-85, however, total fertility rates in less developed countries as a whole declined by about 30 percent. This decline represents 47 percent of the difference between the TFR at the beginning of this period (6.01) and replacement level fertility (2.10). Thus, in 15 years, less developed countries moved almost halfway toward replacement level fertility (Freedman and Blanc, 1991). A change of this magnitude in so short a period of time is extraordinary because it involves fundamental changes in attitudes and behaviors concerning the roles of the family, of women, and of children in society.

Regional differentials in the rate of fertility decline over the last fifteen years have resulted in large disparities in current levels of fertility between regions (see Table 2). Data from 26 DHS surveys show that current levels of fertility range widely from a TFR of more than 7 in Uganda to slightly more than 2 in Thailand. In addition, fertility rates often vary widely between subgroups in a population; for example, educated women, those living in urban areas, and women whose husbands work in white-collar occupations generally have lower fertility than other women. Widespread adoption of the means to control fertility appears to begin in these groups thereby causing differentials between subgroups to widen during the course of the fertility transition. Eventually the differences decrease as fertility control spreads throughout the population (Rodríguez and Aravena, 1991).

In recent years, fertility has declined substantially in most of the countries shown in Table 2. In the period between 4-7 and 0-3 years preceding the survey, the total fertility rate declined by more than one child in Ecuador, Indonesia, Morocco, Peru, Senegal, Sudan, and Zimbabwe. Eight other

countries experienced declines of 0.8 children or more. The DHS data provide the first evidence of significant fertility decline in sub-Saharan Africa — specifically in Botswana, Kenya, and Zimbabwe. There is also evidence of continuing declines in Latin America and North Africa, and in some Asian countries — Indonesia, Sri Lanka, and Thailand.

**Table 2: Trends in the Total Fertility Rate, Demographic and Health Surveys, 1986-1990**

| Region and Country             | Year of Survey | Total Fertility Rate<br>(Women 15-44) |      | Percent Change |
|--------------------------------|----------------|---------------------------------------|------|----------------|
|                                |                | Years Preceding the Survey            |      |                |
|                                |                | 4-7                                   | 0-3  |                |
| <b>SUB-SAHARAN AFRICA</b>      |                |                                       |      |                |
| Botswana                       | 1988           | 5.56                                  | 4.78 | -14            |
| Burundi                        | 1987           | 7.42                                  | 6.50 | -12            |
| Ghana                          | 1988           | 6.43                                  | 6.06 | -6             |
| Kenya                          | 1988/89        | 7.09                                  | 6.46 | -9             |
| Liberia                        | 1986           | 6.79                                  | 6.39 | -6             |
| Mali                           | 1987           | 7.70                                  | 6.84 | -11            |
| Senegal                        | 1986           | 7.55                                  | 6.37 | -16            |
| Sudan                          | 1989/90        | 5.90                                  | 4.74 | -20            |
| Togo                           | 1988           | 7.17                                  | 6.22 | -13            |
| Uganda                         | 1988/89        | 7.11                                  | 7.18 | +1             |
| Zimbabwe                       | 1988/89        | 6.55                                  | 5.31 | -19            |
| <b>NORTH AFRICA</b>            |                |                                       |      |                |
| Egypt                          | 1988/89        | 4.94                                  | 4.58 | -7             |
| Morocco                        | 1987           | 5.63                                  | 4.58 | -19            |
| Tunisia                        | 1988           | 5.07                                  | 4.26 | -16            |
| <b>ASIA</b>                    |                |                                       |      |                |
| Indonesia                      | 1987           | 4.32                                  | 3.21 | -26            |
| Sri Lanka                      | 1987           | 3.31                                  | 2.72 | -18            |
| Thailand                       | 1987           | 2.94                                  | 2.25 | -24            |
| <b>LATIN AMERICA/CARIBBEAN</b> |                |                                       |      |                |
| Bolivia                        | 1989           | 4.50                                  | 3.63 | -19            |
| Brazil                         | 1986           | 5.52                                  | 4.92 | -11            |
| Colombia                       | 1986           | 4.04                                  | 3.20 | -21            |
| Dominican Republic             | 1986           | 4.55                                  | 3.69 | -19            |
| Ecuador                        | 1987           | 5.16                                  | 4.03 | -21            |
| Guatemala                      | 1987           | 6.53                                  | 5.55 | -15            |
| Mexico                         | 1987           | 4.52                                  | 4.01 | -11            |
| Peru                           | 1986           | 5.28                                  | 4.20 | -21            |
| Trinidad & Tobago              | 1987           | 3.39                                  | 3.12 | -2             |

Source: Freedman and Blanc, 1991

### **Child Spacing and Child Mortality**

The timing of births during a mother's life is strongly associated with the subsequent survival chances of her children. Teenage childbearing and close spacing of births substantially increase the risk of dying during childhood. Data from the DHS surveys show that delaying the first birth until a woman is at least 18 years of age can reduce the risk of dying before age five for first born children by up to 20 percent, on average. In addition, children born less than 18 months after a preceding birth are, on average, about twice as likely to die in the first five years of life as children born two to four years after the preceding birth. The DHS data also show that far fewer women want short birth intervals than actually experience them. If women were able to implement their expressed desires for child spacing, reductions in child mortality could potentially exceed 20 percent in 14 of the 25 countries considered in the analysis. In spite of increased emphasis on birth spacing in family planning programs, the excess risks associated with poor timing of births do not seem to have changed significantly in the past 15 years. Thus, the potential for reducing child mortality through improved timing of births, especially longer birth intervals, is still considerable (Hobcraft, 1991).

### **Mortality Trends**

Infant and child mortality rates have been reduced substantially in the developing world in recent decades. United Nations estimates show that between the periods 1965-70 and 1975-80, the under-five mortality rate fell from 184 to 149 deaths per 1000 births, an overall decline of 19 percent or about 2 percent per year for the ten-year period.

More recent estimates of child mortality can be calculated from DHS survey data. The under-five mortality rates for 28 DHS surveys are shown in Table 3 for two five-year time periods which cover the period from the mid- to late 1970s to the mid- to late 1980s. The declines in mortality over this period are considerable, reaching more than 40 percent in 6 countries and 20 percent or greater in 22 of 28 countries (Sullivan, 1991).

Concern has been expressed recently that the pace of decline in infant and child mortality in developing countries has slowed in the decade of the 1980s. This concern is based on a number of factors including economic crises, limited access of populations to public health interventions, a resurgence of resistant malaria strains, and the impact of AIDS. Research results presented at the DHS World Conference do not support this contention (Sullivan, 1991; Cleland et al., 1991). The DHS findings indicate an increase during the late 1970s and 1980s in the pace of decline in childhood mortality in Latin America and North Africa, and stable or increasing rates of decline in Asian countries where DHS surveys have been conducted. The picture varies in sub-Saharan Africa, where the pace of decline has probably slowed in Nigeria, and increased in Senegal and perhaps Sudan. In the remaining sub-Saharan countries, the trend is unclear.

In other results presented at the conference, differentials in child mortality rates by education, occupation, and residence were examined (Cleland et al., 1991). In general, the large inequalities in child mortality between different socioeconomic groups observed during the 1970s have persisted during the 1980s. In other words, despite large overall declines in mortality in most countries, the risk of dying has decreased by about the same percentage in all subgroups. For example, in the mid-1970s, children of uneducated mothers in the 12 countries included in the analysis were 1.46 times more likely to die before the age of five than children of mothers with primary education. The difference was almost identical (1.42) in the mid-1980s.

**Table 3: Trends in the Under-Five Mortality Rate,  
Demographic and Health Surveys, 1986-1990**

| Region and<br>Country          | Year of<br>Survey | Under-Five Mortality Rate     |     |                   |
|--------------------------------|-------------------|-------------------------------|-----|-------------------|
|                                |                   | Years Preceding<br>the Survey |     | Percent<br>Change |
|                                |                   | 10-14                         | 0-4 |                   |
| <b>SUB-SAHARAN AFRICA</b>      |                   |                               |     |                   |
| Botswana                       | 1988              | 89                            | 53  | -41               |
| Burundi                        | 1987              | 224                           | 152 | -32               |
| Ghana                          | 1988              | 191                           | 155 | -19               |
| Kenya                          | 1988/89           | 107                           | 89  | -17               |
| Liberia                        | 1986              | 274                           | 220 | -20               |
| Mali                           | 1987              | 362                           | 250 | -31               |
| Nigeria                        | 1990              | 203                           | 193 | -5                |
| Senegal                        | 1986              | 284                           | 191 | -33               |
| Sudan                          | 1989/90           | 143                           | 123 | -14               |
| Togo                           | 1988              | 203                           | 158 | -22               |
| Uganda                         | 1988/89           | 187                           | 179 | -4                |
| Zimbabwe                       | 1988/89           | 93                            | 75  | -19               |
| <b>NORTH AFRICA</b>            |                   |                               |     |                   |
| Egypt                          | 1988/89           | 203                           | 102 | -50               |
| Morocco                        | 1987              | 166                           | 102 | -38               |
| Tunisia                        | 1988              | 107                           | 65  | -39               |
| <b>ASIA</b>                    |                   |                               |     |                   |
| Indonesia                      | 1987              | 134                           | 101 | -25               |
| Sri Lanka                      | 1987              | 60                            | 35  | -41               |
| Thailand                       | 1987              | 70                            | 45  | -36               |
| <b>LATIN AMERICA/CARIBBEAN</b> |                   |                               |     |                   |
| Bolivia                        | 1989              | 159                           | 131 | -18               |
| Brazil                         | 1986              | 126                           | 85  | -32               |
| Colombia                       | 1986              | 89                            | 43  | -52               |
| Dominican Republic             | 1986              | 119                           | 88  | -26               |
| Ecuador                        | 1987              | 141                           | 82  | -42               |
| Guatemala                      | 1987              | 153                           | 110 | -28               |
| Mexico                         | 1987              | 93                            | 61  | -34               |
| Paraguay                       | 1990              | 64                            | 43  | -33               |
| Peru                           | 1986              | 142                           | 111 | -22               |
| Trinidad & Tobago              | 1987              | 55                            | 30  | -45               |

Source: Sullivan, 1991

## Components of Demographic and Health Patterns

### Contraceptive Use

Fertility declines in developing countries are primarily due to the increasing use of contraception. Between the periods 1960-65 and 1985-90, the contraceptive prevalence rate — the percentage of married women using contraception — increased from less than 10 percent to 48 percent. Growth in the use of contraception in developing countries is due primarily to increasing reliance on sterilization, oral contraceptives, and the IUD. Male and female sterilization currently account for about 45 percent of all contraceptive use in the developing world while IUDs account for 25 percent and oral contraceptives for 11 percent.

There are large differences in contraceptive prevalence between regions. The average level of use in North Africa is 31 percent compared with 13 percent in sub-Saharan Africa. In East Asia (China, Hong Kong, Republic of Korea) contraceptive prevalence is around 72 percent, whereas the rest of Asia averages 40 percent. The level of contraceptive use in Latin America is moderately high, 57 percent.

DHS surveys have been particularly useful in documenting contraceptive practice in sub-Saharan Africa (see Table 4). Although the level of use remains low in the region as a whole, the DHS surveys have established that contraceptive use is increasing in several sub-Saharan countries. The results also revealed some unexpected aspects of contraceptive behavior in sub-Saharan Africa. For example, the conviction that sterilization is unlikely to gain acceptance in the region is not borne out by DHS results from Botswana, Kenya, and Zimbabwe where between 9 and 16 percent of married women aged 40-44 are sterilized. In addition, in several surveys it was found that contraceptive prevalence is higher among women who are not in a marital union than among those who are currently married, a pattern which appears to be unique to this region (Weinberger, 1991).

#### Contraceptive Use in the Year 2000

The population of the developing world was 4.1 billion in 1990, including about 745 million married women of reproductive age. Slightly more than half of these women were contraceptive users in 1990.

According to the United Nations medium population projections, the total world population will increase to about 5.0 billion by the year 2000. At the same time, the number of married women of reproductive age in developing countries will increase by 211 million or 28 percent.

In order to keep population growth during the decade to no more than the 900 million projected, contraceptive prevalence would have to increase from 51 to 59 percent and approximately 186 million additional contraceptive users will be needed (Mauldin, 1991).

**Table 4: Percentage of Currently Married Women Using Contraception, Demographic and Health Surveys, 1986-1990**

| Region and Country             | Percentage of Married Women |                         |
|--------------------------------|-----------------------------|-------------------------|
|                                | Using Any Method            | Using Any Modern Method |
| <b>SUB-SAHARAN AFRICA</b>      |                             |                         |
| Botswana                       | 33.0                        | 31.7                    |
| Burundi                        | 8.7                         | 1.2                     |
| Ghana                          | 12.9                        | 5.2                     |
| Kenya                          | 26.9                        | 17.9                    |
| Liberia                        | 6.4                         | 5.5                     |
| Mali                           | 4.7                         | 1.3                     |
| Senegal                        | 11.3                        | 2.4                     |
| Togo                           | 33.9                        | 3.1                     |
| Uganda                         | 4.9                         | 2.5                     |
| Zimbabwe                       | 43.1                        | 36.1                    |
| <b>NORTH AFRICA</b>            |                             |                         |
| Egypt                          | 37.8                        | 35.5                    |
| Morocco                        | 35.8                        | 28.9                    |
| Tunisia                        | 49.8                        | 40.4                    |
| <b>ASIA</b>                    |                             |                         |
| Indonesia                      | 47.7                        | 43.9                    |
| Sri Lanka                      | 61.7                        | 40.6                    |
| Thailand                       | 55.5                        | 63.6                    |
| <b>LATIN AMERICA/CARIBBEAN</b> |                             |                         |
| Bolivia                        | 30.3                        | 12.2                    |
| Brazil                         | 66.2                        | 56.5                    |
| Colombia                       | 64.8                        | 52.4                    |
| Dominican Republic             | 49.8                        | 46.5                    |
| Ecuador                        | 44.3                        | 35.8                    |
| Guatemala                      | 23.2                        | 19.0                    |
| Mexico                         | 52.7                        | 44.6                    |
| Peru                           | 45.8                        | 23.0                    |
| Trinidad & Tobago              | 52.7                        | 44.4                    |

Source: Rutenberg et al., 1991

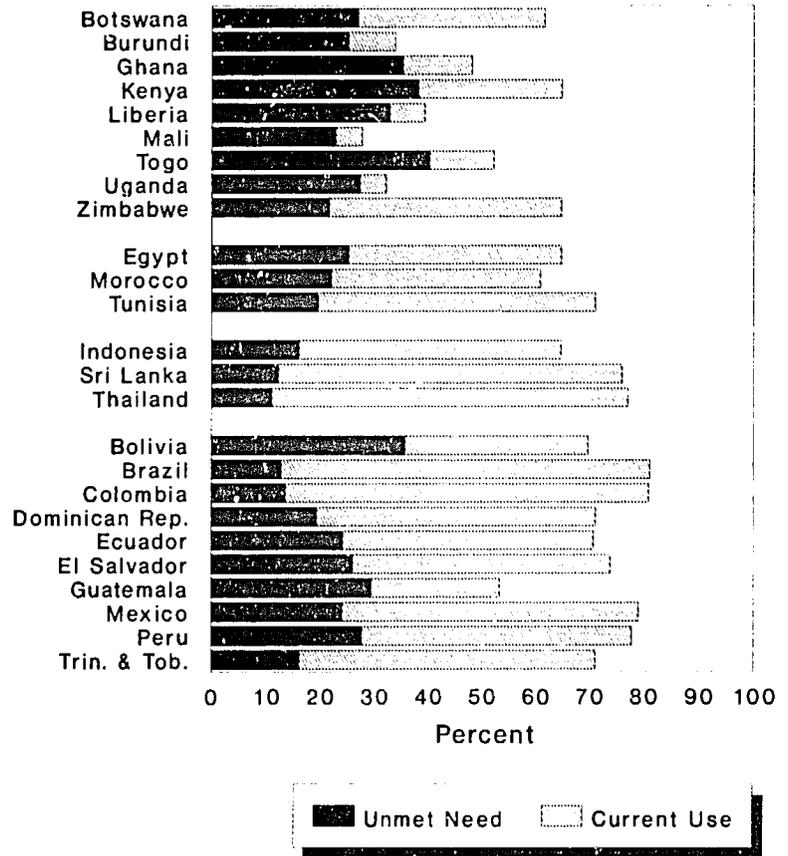
## **Demand for Family Planning**

As reproductive preferences change and the use of family planning rises in developing countries, information on the demand for services becomes increasingly important for program planning purposes. The total demand for family planning in a particular setting is defined as the sum of contraceptive prevalence and unmet need. The proportion of married women with unmet need are those who are not using contraception but who wish to either stop having children or to postpone their next birth. The total demand for family planning among married women varies widely across countries (see figure on following page), ranging from 28 to 35 percent in Burundi, Mali, Sudan, and Uganda to over 80 percent in Brazil and Colombia. In countries with very low demand, much of the demand that does exist is not being fulfilled. For example, in Mali, demand is estimated at 28 percent but only 5 percent of women are using contraception and 23 percent have unmet need; thus, only 18 percent of demand is being satisfied. In contrast, some countries, such as Brazil and Colombia, are quite successful in satisfying high levels of demand for family planning. Overall, in only 16 of 26 countries does the proportion of demand satisfied reach 50 percent (Westoff and Ochoa, 1991).



*Conference participants*

**Total Demand for Family Planning:  
Unmet Need and Current Use of Contraception**



*Conference participants*

## **Child Health Interventions**

Most of the 14 million deaths of children under 5 years of age each year in developing countries are due to preventable causes. This has led the international health community to focus efforts in recent years on the implementation of a selected set of basic child health interventions, including childhood immunizations and the proper management of diarrheal diseases, acute respiratory infections, and malaria. In addition, the critical role of malnutrition as a risk factor in childhood mortality has led to an increased emphasis on growth monitoring and the promotion of breastfeeding and appropriate weaning foods (Black, 1991). In most DHS surveys, information is collected for children under five years of age on immunization coverage, prevalence and treatment of diarrheal diseases, breastfeeding and nutritional status.

The immunization of children is one of the most effective strategies for improving child survival. Recommended vaccinations for children during the first year of life are BCG, three doses of polio and diphtheria-pertussis-tetanus (DPT) vaccine, and one dose of measles vaccine. The percentage of children who have received all of these vaccines varies substantially across countries, from 10 percent or less in Mali and Senegal to more than 75 percent in Botswana, Tunisia, and Zimbabwe (see Table 5). DHS surveys also provide information on social and demographic differentials in immunization coverage, which can be used to identify high risk and underserved populations. For example, coverage is lower in rural areas than in urban areas in virtually all DHS countries. Mothers with no formal education generally have children with the lowest level of vaccination coverage while those with primary and secondary education have progressively higher levels of coverage. Children who are at higher birth orders are less likely to be immunized than other children (Boerma et al., 1990).

Developing countries all over the world have initiated efforts to promote the use of oral rehydration therapy (ORT) for the treatment of diarrheal diseases. In DHS surveys, the mothers of about two-thirds of the children have heard of the ORS packets used in oral rehydration therapy (Boerma et al., 1991). According to the World Health Organization, the percentage of diarrheal episodes among children which are now treated with ORT has

**Maternal and Child Health Indicators  
Demographic and Health Surveys 1986-1990**

| Survey                         | Nutritional Status                         | Maternal Care                          |   | Breastfeeding                              | Immunization                                 | Oral Rehydration Therapy                             |   |  |
|--------------------------------|--|--|---|--|--|--|---|--|
|                                | Percent of Children 3-35 mo Stunted<br>(1) | Percent Received Antenatal Care<br>(2) | Percent Received Delivery Assistance<br>(3) | Percent <4 mo Breastfed Exclusively<br>(4) | Median Duration of Any Breast-feeding<br>(5) | Percent of Children 12-23 mo Fully Vaccinated<br>(6) | Percent of Mothers Who Know of ORS Packets<br>(7) | Percent of Diarrhea Cases Given ORT<br>(8) |
| <b>SUB-SAHARAN AFRICA</b>      |  |  |   |  |  |  |   |  |
| Botswana                       | NA   | 92                                     | 77  | 41   | 17   | 81   | 91  | 67   |
| Burundi                        | 47   | 80                                     | 19  | 86   | 24   | 44   | 35  | 33   |
| Ghana                          | 29   | 82                                     | 40  | 2  | 21   | 31   | 56  | 36   |
| Kenya                          | NA   | 77                                     | 50  | 23   | 20   | 63   | NA  | 62   |
| Liberia                        | NA   | 83                                     | 58  | 15   | 15   | 14   | NA  | 10   |
| Mali                           | 24   | 31                                     | 32  | 10   | 19   | 4  | 12  | 3  |
| Nigeria                        | 44   | 57                                     | 31  | 2  | 20   | 28   | 14  | 27   |
| Senegal                        | 23 <sup>a</sup>                            | 64                                     | 49  | 6  | 19   | 10   | NA  | 6  |
| Sudan                          | NA   | 71                                     | 69  | NA   | 19   | 52   | 85  | 36   |
| Togo                           | 31   | 81                                     | 54  | 10   | 23   | NA   | 49  | 22   |
| Uganda                         | 44   | 87                                     | 38  | 64   | 19   | 31   | 45  | 15   |
| Zimbabwe                       | 30   | 91                                     | 70  | 12   | 19   | 79   | 98  | 70 <sup>b</sup>                            |
| <b>NORTH AFRICA</b>            |  |  |   |  |  |  |   |  |
| Egypt                          | 31   | 53                                     | 35  | 54   | 18   | 54   | 98  | 29 <sup>c</sup>                            |
| Morocco                        | 24   | 25                                     | 26  | 45   | 15   | 53   | NA  | 16   |
| Tunisia                        | 18   | 58                                     | 69  | 20   | 15   | 78   | 58  | 20   |
| <b>ASIA</b>                    |  |  |   |  |  |  |   |  |
| Indonesia                      | NA   | NA                                     | 36  | 39   | 23   | NA   | NA  | NA   |
| Sri Lanka                      | 27   | 97                                     | 87  | 14   | 21   | 65   | 67  | 35   |
| Thailand                       | 22   | 77                                     | 66  | 5  | 15   | 37   | 86  | 40   |
| <b>LATIN AMERICA/CARIBBEAN</b> |  |  |   |  |  |  |   |  |
| Bolivia                        | 38   | 45                                     | 42  | 56   | 16   | 18   | 67  | 32   |
| Brazil                         | 29   | 74                                     | 81  | 4  | 6  | 57   | NA  | 11   |
| Colombia                       | NA   | 82                                     | 94  | 37   | 9  | 68   | 95  | 40   |
| Dominican Republic             | 21 <sup>a</sup>                            | 95                                     | 90  | 14   | 7  | NA   | 89  | 42   |
| Ecuador                        | NA   | 69                                     | 61  | 28   | 13   | NA   | NA  | NA   |
| El Salvador                    | NA   | NA                                     | 51  | NA   | 17   | NA   | NA  | 26   |
| Guatemala                      | 58   | 34                                     | 29  | NA   | 20   | 18   | 57  | 16   |
| Mexico                         | NA   | 71                                     | 70  | 36   | 8  | 21   | NA  | 4 <sup>d</sup>                             |
| Paraguay                       | 18   | 84                                     | 66  | 7  | 11   | 18   | 91  | 51   |
| Peru                           | NA   | 55                                     | 49  | 31   | 16   | 36   | 63  | 4 <sup>d</sup>                             |
| Trinidad & Tobago              | 5  | 98                                     | 98  | 10   | 7  | NA   | 89  | 59   |

<sup>a</sup> Children 6-35 months    <sup>b</sup> Recommended home fluids only    <sup>c</sup> ORS only; Percent based on 7-day period    <sup>d</sup> ORS only

reached 36 percent. Although the use of ORT has increased, DHS surveys show that the use of unnecessary drugs, such as antibiotics, to treat diarrhea also remains high. Children of urban mothers and mothers with some education are more likely to receive ORT during an episode of diarrhea than children of rural and uneducated mothers.

The promotion of breastfeeding is an important element in most child survival programs. Breast milk can confer some immunity against infection, is nutritionally complete, and is preferable to bottle feeding because the risk of contamination is reduced. Breastfeeding may also indirectly affect child survival by prolonging the duration of postpartum amenorrhea, which contributes to the length of birth intervals. The median duration of breastfeeding in DHS countries varies from more than one and one-half years in most sub-Saharan countries and in Indonesia and Sri Lanka, to less than 9 months in some Latin American countries — Brazil, Dominican Republic, Mexico, and Trinidad and Tobago (Table 5). Internationally recognized guidelines for breastfeeding suggest that all children be breastfed exclusively for at least 4 months (Belsey, 1991). As shown in Table 5, in only 4 of 26 DHS countries does the percentage of children under 4 months of age being exclusively breastfed exceed 50 percent. These results suggest that breast milk substitutes, such as water or formula, are introduced very early in most countries. This practice may contribute to illness among infants if the milk substitutes are contaminated or given to infants in unsanitary bottles; in addition, milk substitutes may not provide sufficient nutrition.

Malnutrition is a contributing factor in an estimated 60 percent of all child deaths in developing countries, according to UNICEF. The nutritional status of children in a population is influenced by feeding practices as well as by the prevalence and frequency of illness. Thus, monitoring the growth of children is an important element of programs which seek to reduce child mortality. The level of malnutrition in a population of children is assessed by measuring the extent to which the height and weight of the children deviates from that of a reference population. Findings from the DHS surveys show large variations between countries in the percentage of children age 3-35 months who are stunted (short for their age), an indicator of

chronic malnutrition. The percentage stunted reaches 44 percent in Nigeria and Uganda, 47 percent in Burundi, and 58 percent in Guatemala. Three countries have levels of stunting below 20 percent — Paraguay, Trinidad and Tobago, and Tunisia. The nutritional status of children is related to the characteristics of their mothers and the households in which they reside. For example, children who live in households with greater financial resources (as measured by the possession of consumer goods) or in households with flush toilets are less likely to be stunted relative to other children (Bicego and Boerma, 1991). Nutritional status is consistently better among urban than rural children and improves with increasing levels of maternal education (Sommerfelt, 1991).



*DHS software exhibit*



*Session on Contraceptive Use Dynamics*

## Policy Issues for the 1990s



*Duff Gillespie, Director, Office of Population, USAID*

One of the primary objectives of the DHS Program is to provide data and analysis useful for informed policy choices. Many of the DHS findings respond to the need for more and better information to aid health and family planning programs make the best use of available resources. Several priority areas for the decade of the 1990s were identified at the conference, including: concentrating USAID's family planning resources on developing countries with the largest populations (Gillespie, 1991), meeting the unmet need for family planning (Westoff and Ochoa, 1991), strengthening the infrastructure and management of health systems (Belsey, 1991; Ransome-Kuti, 1991), developing improved programs in maternal health and morbidity, perinatal infections, newborn care, and breastfeeding (Belsey, 1991), and identifying high-risk groups (Black, 1991).

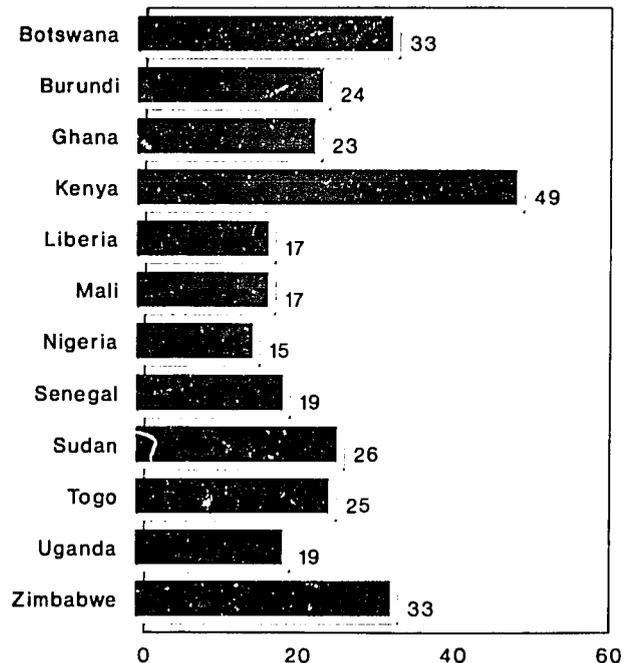
Many specific examples of ways in which DHS survey data may be used to draw policy and program implications were presented at the conference. Some of these examples are described in the following pages:

## KENYA

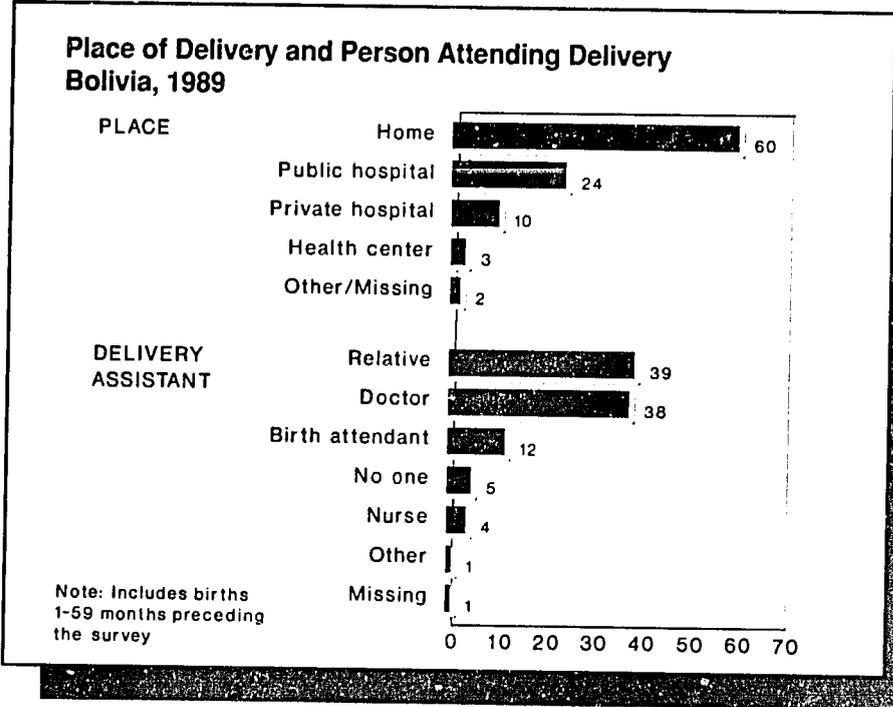
Kenya is a country which has consistently redesigned its population programs and policies based on findings from censuses and surveys. As early as 1962, the government expressed concern about the negative effects of population growth and Kenya was the first sub-Saharan country to adopt an official population policy favoring reduced fertility. Until recently, however, surveys indicated that fertility remained high. The 1989 DHS survey in Kenya (KDHS) provided the first evidence of significant fertility decline accompanied by increased use of family planning. The KDHS results also show that the trend toward lower fertility may accelerate in the future; half of married women report that they do not want any more children — a figure which is considerably higher than that found in any other sub-Saharan country with a DHS survey.

Kenya's demographic goals were revised based on the results of the KDHS survey. The new goals include targets for the further reduction of population growth, reduction of the birth and death rates, and increases in contraceptive prevalence. The KDHS results suggest that in order to achieve these goals, family planning programs should focus on satisfying the existing demand for contraceptive services rather than creating additional demand. Although knowledge and approval of family planning is widespread, 30 percent of married women say they already have more children than they desire and almost 40 percent do not want another child in the near future but are not using any contraceptive method. Filling this unmet need for services would go a long way toward meeting the demographic goals of the country (Obungu et al., 1991).

Percentage of Married Women Who Want No More Children Selected African Countries, 1986-1990



Demographic and Health Surveys



## BOLIVIA

Maternal and child health is an area of particular concern for the Government of Bolivia. The objectives of the 1989 Bolivian National Maternal and Child Health Plan include the reduction of infant mortality and maternal mortality by 50 percent, and perinatal and child mortality by 30 percent by 1993. The Bolivia Demographic and Health Survey (BDHS) provides important baseline data against which the objectives of the Plan can be evaluated, program needs identified, and resources allocated.

Despite indications that declines have occurred in recent decades, infant and under-five mortality rates in Bolivia are the highest in South America, at 96 and 142 deaths per 1000 births, respectively. Infant deaths account for about 70 percent of all deaths among children under age five. About 18 percent of deaths among children under age five occur in the first week of life. According to the BDHS, diarrhea and acute respiratory infections account for more than half of all deaths to children under age five, and diarrhea is the primary cause of death among children more than one month of age. The maternal mortality rate is estimated from BDHS data at 332 per 100,000 live births, a rate nearly 40 times greater than that found in the United States and among the highest in Latin America.

According to the BDHS, during the period 1984-88 less than half of all pregnant women received antenatal care. About 55 percent of births during this period were delivered in the home without medical assistance. About 28 percent of children under age five had had diarrhea in the two weeks preceding the survey. Oral rehydration salts (ORS) from a packet were used to treat 26 percent of these children while 11 percent were given homemade sugar and salt solution. Lack of knowledge of oral rehydration therapy may be a barrier to its use in Bolivia as only 70 percent of mothers with children under age five had heard of ORS packets and only 61 percent had ever seen a packet.

Taken together, these results suggest that a major program effort in the areas of diarrheal disease control, antenatal care, and medical attention at birth would significantly influence mortality and improve the health status of women and their children in Bolivia (Gelbard and Barragán, 1991).

## INDONESIA

Information obtained from the 1987 National Indonesia Contraceptive Prevalence Survey (NICPS) shows that the demographic profile of Indonesia has changed rapidly in recent years. Indonesian women marry later and divorce less frequently than previously. The mean age at marriage increased from 19.1 years in 1976 to 21.2 years in 1985 and the proportion married more than once decreased among women age 15-39. The total fertility rate has declined by more than one-third since 1971 and by 16 percent since 1980, with larger declines in Java-Bali than in the Outer Islands. Significant declines in infant and child mortality have also occurred.

The primary factor contributing to the decline in fertility in Indonesia is a substantial increase in the use of family planning. Forty-eight percent of married women in Indonesia were using a method of contraception in 1987; almost all were using a modern method. The pill (16.1 percent), IUD (13.2 percent) and injectables (9.4 percent) are the most common methods.

The National Family Planning Program has recently instituted the KB Mandiri program which promotes reliance on the private sector and community-based institutions for delivery of family planning services. As of 1987, contraceptive services were still highly subsidized in Indonesia. The NICPS indicated that 84 percent of pills, 80 percent of IUDs, 28 percent of injectables, 50 percent of condoms, and 48 percent of sterilizations were provided to clients free of charge. Prices charged by private sector service providers tend to be considerably higher than public sector prices. Analysis of the NICPS shows that the adoption of private-sector prices for methods currently supplied at subsidized rates by the public sector could cause a substantial proportion of women to abandon the use of contraception. These results suggest that a gradual expansion, rather than rapid adoption of private-sector services and prices, would be a preferable strategy for the implementation of the KB Mandiri program (Sumarsono et al. 1991).



*Plenary Session I: Demographic Trends  
in the 1980s*

## Conclusion



*Martin Vaessen, Director,  
DHS Program*

More than 100 papers were presented at the DHS World Conference, covering a broad spectrum of population and health topics in the developing world. These papers report findings which augment the survey results presented in the final country reports and other DHS publications. Taken together, these findings constitute a large body of information about populations in the developing world. Yet, during the conference, numerous recommendations were made for the collection and analysis of additional data, including suggestions that information be collected on subjects not currently addressed in the standard DHS surveys, such as maternal mortality, AIDS, and the quality of family planning services. In addition, there is increasing demand for surveys to be conducted at more frequent intervals and for surveys to provide information about sub-national geographic units, such as regions and provinces (Vaessen, 1991).

As the “new culture” envisioned by Professor Ransome-Kuti in his keynote address becomes the norm in developing countries, decisions about population and health policies and programs will increasingly be guided by information provided by national sample surveys such as those conducted by the DHS Program, and the demand for such data and analysis will continue to grow.

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# DHS World Conference Program

**AUGUST 5, 1991**

## **Plenary I: Demographic Trends in the 1980s**

Chair: *Sarah Clark, Office of Population, USAID*

Welcome: *Martin Vaessen, DHS*

Opening Statement: *Duff Gillespie, Office of Population, USAID*  
*Ann Van Dusen, Office of Health, USAID*

Keynote Address: *Dr. Olikoye Ransome-Kuti, Honourable*  
*Minister of Health, Federal Republic of Nigeria*

Fertility Transition: An Update  
*Ronald Freedman, University of Michigan*  
*and Ann K. Blanc, DHS*

The Pace of Decline in Under-Five Mortality:  
Evidence from the DHS Surveys  
*Jeremiah M. Sullivan, DHS*

## **1A: Socioeconomic Determinants of Fertility**

Chair: *Sam Gaisie, University of Zambia*

Socio-economic Factors and the Transition to Low Fertility  
in Less Developed Countries: A Comparative Analysis  
*Germán Rodríguez, Princeton University, and*  
*Ricardo Aravena, Catholic University of Chile*

Social Class as a Determinant of Fertility: The Case of Bolivia  
*Juan Schoemaker, DHS*

Women's Economic Independence and Fertility Among the Yoruba  
*Mary M. Kritz and Douglas T. Gurak, Cornell University*

Contraceptive Use and Fertility in Brazil  
*Eduardo Rios Neto, Stephen D. McCracken, and*  
*Roberto do Nascimento Rodrigues, CEDEPLAR -*  
*Universidade Federal de Minas Gerais*

Discussant: *John Casterline, Brown University*

## **1B: Socioeconomic Determinants of Child Mortality**

Chair: *Nassour Ouaidou, CERPOD (Mali)*

Socio-economic Inequalities in Childhood Mortality:  
The 1970's Compared With the 1980's  
*John Cleland, London School of Hygiene and Tropical*  
*Medicine, George Bicego and Greg Fegan, DHS*

The Socio-economic and Cultural Context of Infant and  
Child Mortality in Sub-Saharan Africa  
*Magali Barbieri, Centre Français sur la Population*  
*et le Développement*

Maternal Education and Child Survival: A Comparative  
Analysis of DHS Data  
*George T. Bicego and J. Ties Boerma, DHS*

"Healthy Households" and Child Survival in Brazil  
*Diana Oya Sawyer, CEDEPLAR-Universidade*  
*Federal de Minas Gerais/Brasil and Kaizô*  
*Iwakami Beltrão, ENCE/IBGE/Brasil*

Discussant: *Meredith John, Princeton University*

## **1C: Fertility Preferences**

Chair: *James McCarthy, Columbia University*

Do Reproductive Intentions Matter?  
*John Bongaarts, The Population Council*

Sex Preference for Children and Its Demographic and  
Health Implications  
*Fred Arnold, DHS and East-West Population Institute*

The Wantedness Status of Births in Indonesia  
*Robert H. Weller, David F. Sly, A. Sukandi, and*  
*Rindang Ekawati, Florida State University*

Gender Differences in Reproductive Orientation in  
Ghana: A New Approach to Understanding Fertility  
and Family Planning Issues in Sub-Saharan Africa  
*Alex C. Ezeh, University of Pennsylvania*

Discussant: *Robert Lightbourne, United Nations*  
*Population Division*

## **2A: Understanding Fertility Change**

Chair: *Carmen Gomes, BEMFAM (Brazil)*

Consanguinity: A Major Variable in Studies on North  
African Reproductive Behavior, Morbidity and Mortality?  
*Alan H. Bittles, University of London*

Mexico: A Decade of Family Planning and Contraception  
*Silvia Llera, El Colegio de México*

Fertility Change in Bolivia  
*José Miguél Guzmán, CELADE, Hugo Torrez,*  
*Ministerio de Planeamiento y Coordinación*  
*(Bolivia), and Susana Schkolnik, CELADE*

Understanding Recent Changes in Contraceptive  
Prevalence in Kenya  
*Warren C. Robinson, The Population Council and*  
*Paul Kizito, National Council on Population and*  
*Development (Kenya)*

Discussant: *Paul Stupp, Centers for Disease Control*

## **2B: Determinants of Feeding Practices**

Chair: *Norge Jerome, Office of Nutrition, USAID*

Comparative Analysis of the Determinants of Infant  
Feeding Practices  
*Ravi Sharma, University of Pittsburgh and Shea*  
*Rutstein, DHS*

Infant Feeding Patterns in Peru 1977-1986  
*Irma T. Elo, University of Pennsylvania and Laurence*  
*Grummer-Strawn, Princeton University and Centers*  
*for Disease Control*

Early Feeding Patterns and Children's Health in Mexico  
*Marta Mier y Terán, Universidad Nacional Autónoma*  
*de México*

The Determinants of Breastfeeding Practices in Ghana  
*Kofi D. Benefo, University of North Carolina and*  
*Allan Parnell, Duke University*

Discussant: *Julie DaVanzo, Rand Corporation*

## **2C: Sample Design and Implementation**

Chair: *Chris Scott, Consultant*

Methodology for Small-Area Estimation with DHS Samples  
*Alfredo Aliaga and Thanh Le, DHS*

Sample Structure and Sampling Error  
*Alfredo Aliaga, DHS and Vijay Verma, Consultant*  
Programmatic Estimates for "Small" Geographic Areas  
*José García Nuñez, Esperanza Deigado, and Carlos E.*

*Aramburú, Pathfinder International, John W. Townsend,  
The Population Council, Yolanda Palma and Javier  
Suarez, Ministry of Health (Mexico)*  
Discussant: *David A. Marker, Westat, Inc.*

## AUGUST 6, 1991

### Plenary II: Components of Demographic and Health Patterns

Chair: *Richard Cornelius, Office of Population, USAID*

Recent Trends in Contraceptive Behavior  
*Mary Beth Weinberger, United Nations Population Division*

The Demand for Family Planning: Highlights from a  
Comparative Analysis  
*Charles F. Westoff, Princeton University and Luis H.  
Ochoa, DHS*

Current Status of Child Health Interventions  
*Robert Black, Johns Hopkins University*

### 3A: Contraceptive Use Dynamics

Chair: *Napaporn Chayovan, Chulalongkorn University*

Comparative Analysis of Contraceptive Method Choice  
*Iqbal Shah, World Health Organization*

Contraceptive Use Dynamics in Mexico: Following  
Some Reproductive Events  
*Juan-Guillermo Figueroa-Perea, Ricardo César  
Aparicio Jiménez, and Elba Aguilar Pérez, Dirección  
General de Planificación Familiar (Mexico)*

Use of and Demand for Sterilization: A Comparison of Re-  
cent Findings from the Demographic and Health Surveys  
*Naomi Rutenberg, DHS and Evelyn Landry, Association  
for Voluntary Surgical Contraception*

Differentials in Contraceptive Failure Rates in Developing  
Countries: Results from the DHS  
*Lorenzo Moreno, Princeton University*

Discussant: *Leo Morris, Centers for Disease Control*

### 3B: Child Morbidity and Treatment

Chair: *Atef Khalifa, Pan Arab Project for Child Development*

Child Immunization Trends and Determinants in Peru  
*Claudio Lanata and Joaquín Novara, Instituto de  
Investigación Nutricional (Perú)*

Prevalence and Treatment of Acute Respiratory Infection  
in Three Countries  
*Mark C. Steinhoff, Johns Hopkins University*

Childhood Diarrhoea Morbidity and Treatment Patterns:  
A Comparison of Results of DHS Surveys with  
Epidemiologic Surveys  
*Jeroen K. van Ginneken, Netherlands Interdisciplinary  
Demographic Institute*

Socio-economic and Behavioural Determinants of  
Diarrhoeal Morbidity in Sri Lanka  
*K.H.W. Gaminiaratne, The Australian National University*

Discussant: *Leila Bisharat, UNICEF*

### 3C: Panel on Collection and Analysis of Demographic Data

Chair: *Albert M. Marckwardt, DHS*

An Assessment of Data Quality in the Demographic and  
Health Surveys  
*Fred Arnold, DHS and East-West Population Institute*

Community Level Data Collection and Analysis  
*Thomas Pullum, University of Texas*

The Collection of Demographic Data Using an Events Calendar  
*Edilberto Loaiza, DHS*

Using the DHS Calendar History of Events to Study the  
Dynamics of Contraceptive Use

*Kathryn Kost, The Alan Guttmacher Institute*

New Estimates of Adult Mortality from DHS Data on  
the Timing of Cohort Relative to Marriage  
*Ian Timæus, London School of Hygiene and Tropical  
Medicine*

### Luncheon Sessions: Dissemination of Data and Use of DHS Data as a Policy Tool

Using the DHS Data for Family Planning Program  
Development and Evaluation

*Oleh Wolowyna and Kirsten Olsen, Research  
Triangle Institute, and Ellen Starbird, USAID*

Use of the Egyptian DHS Data for Family Planning IEC  
Strategy and Message Development  
*Michèle Lioy, Academy for Educational Development*

Communicating DHS Data to Policymakers  
*Elaine M. Murphy, Population Reference Bureau*

Strategic Use of DHS Data in Family Planning Program  
Development  
*Katrina Galway, The Futures Group*

### 4A: Proximate Determinants Other Than Contraception

Chair: *Karen Stonecki, USAID*

The Impact of Breastfeeding on Fertility  
*Shea Oscar Rutstein, DHS*

Coital Activity Among Married Thai Women  
*John Knodel, University of Michigan and Napaporn  
Chayovan, Chulalongkorn University*

The Role of Nuptiality in Fertility Decline:  
A Comparative Analysis  
*Arjun Adlakha, U.S. Bureau of Census, Sushil Kumar,  
and Mohamed Ayad, DHS*

Formal and Informal Marriage and Their Effects on  
Brazilian Fertility  
*Margaret E. Greene, University of Pennsylvania*

Discussant: *Anastasia Brandon, The Population Council*

### 4B: Determinants of Child Health and Nutrition

Chair: *Beverly Carlson, UNICEF*

Comparative Analysis of the Determinants of Children's  
Nutritional Status  
*A. Elisabeth Sommerfelt, DHS*

Children at Risk: The Role of Family Structure in Latin  
America and Africa  
*Sonalde Desai, The Population Council*

Fertility Change and Infant Survival in Brazil, 1970-75  
and 1980-85  
*Stephen D. McCracken, Roberto Nascimento Rodrigues,  
and Diana Oya R. Sawyer, CEDEPLAR-Universidade  
Federal de Minas Gerais*

The Effects of Breastfeeding on Child Mortality in Kenya  
*Akinrinola Bankole and David O. Olaleye,  
University of Pennsylvania*

Discussant: *Michel Garenne, ORSTOM/Harvard University*

#### **4C: Panel on Collection and Analysis of Health Data**

Chair: *Alan Lopez, World Health Organization*

Issues in the Collection, Analysis, and Interpretation of Anthropometric Data  
*David L. Pelletier, Cornell Food and Nutrition Policy Program*

The Mixture of Distributions as a Model for Analysing Anthropometric Data  
*Magued I. Osman, Cairo University*

Regression Analysis on Current-Status Data  
*Lawrence Grummer-Strawn, Princeton University and Centers for Disease Control*

An Assessment of Retrospective Data on Birthweight and Prematurity Status from the Dominican Republic Demographic and Health Survey  
*Jane E. Miller, Noreen Goldman, and Lorenzo Moreno, Princeton University*

Checking for Underestimation of Tetanus Immunization Coverage  
*Pierre Buckens, Free University of Brussels and Amy Tsui, Milton Kotelchuck, and Joseph DeGraft-Johnson, University of North Carolina*

#### **5A: Reproductive Behavior and Child Health**

Chair: *Maher Malran, The National Population Council (Egypt)*

Child Spacing and Child Mortality  
*John Hobercraft, London School of Economics*

Preceding Birth Intervals and Child Survival: Searching for Pathways of Influence  
*J. Ties Boerma and George T. Bivego, DHS*

Birth Interval Effects and Health Families in Brazil  
*Sián L. Curtis, Ian Diamond, and John McDonald, University of Southampton*

Institutional Effects on Fertility and Child Survival  
*Fátima Juárez, United Nations Population Division*

Discussant: *James Trussell, Princeton University*

#### **5B: Access to Contraceptive Services**

Chair: *Hetty Sarjeant, International Planned Parenthood Federation*

Availability and Use of Contraception: A Comparative Analysis  
*Marilyn I. Wilkinson, Noureddine Abderrahim, and Wanucii Njogu, DHS*

Contraceptive Availability in Four Latin American Countries  
*Luis H. Ochoa, DHS and Amy Tsui, University of North Carolina*

Proximity to Contraceptive Services and Fertility Transition in Rural Kenya  
*Charles R. Hammerslough, University of Michigan*

The Effect of Access on Contraceptive Use and Fertility in Colombia  
*Susan H. Cochrane, The World Bank and David K. Guilkey, University of North Carolina*

Discussant: *Rodolfo Bulatao, The World Bank*

#### **5C: Survey Data Processing**

Chair: *Julio Ortuzar, Serpro Ltda.*

DHS Data Processing Strategy: Advantages and Disadvantages  
*Jeanne Cushing, DHS*

Date Editing and Imputation  
*Trevor Croft, DHS*

Future Prospects for Survey Processing: Technologies for Data Collection  
*David Cantor and Guillermo Rojas, DHS*

Discussant: *Michael Strong, ICDDRDB (Bangladesh)*

#### **Informal Workshop: The Use of DHS Health Data with Statistical Packages for Microcomputers**

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## **AUGUST 7, 1991**

#### **6A: Programmatic Topics in Family Planning - I**

Chair: *Gabriel Ojeda, PROFAMILIA (Colombia)*

Contraceptive Use in the Year 2000  
*W. Parker Mauldin, The Rockefeller Foundation*

Comparative Look at Pill Compliance in Four DHS Countries  
*David Hubacher and Linda Potter, Family Health International*

Bolivia DHS – La Paz Oversample: Analysis of SOMARC-Specific Data  
*Sharon L. Tipping and Hubert A. Allen, The Futures Group*

Contraceptive Use and Needs Among Postpartum Women in 25 Developing Countries: Recent Patterns and Implications  
*Shyam Thapa, Family Health International, Sushil Kumar and Jeanne Cushing, DHS, and Kathy Kennedy, Family Health International*

Discussant: *Pramilla Senanayake, International Planned Parenthood Federation*

#### **6B: Programmatic Topics in Child Health**

Chair: *E.T. Maganu, Ministry of Health (Botswana)*

Maternal and Child Health Services in Eastern and Southern Africa: Progress and Prospects  
*F.M. Mburu, Consultant and J. Ties Boerma, DHS*

The Demographic Impact of Increased Immunisation: An Initial Evaluation

*Ian Diamond, University of Southampton, K.H.W. Gaminratne, Australian National University, John McDonald, and Zoe Matthews, University of Southampton, and Kim Streatfield, Australian National University*

A Comparison of the Health Effects of Water Supply and Sanitation in Urban and Rural Settings  
*Massee Bateman, Water and Sanitation for Health (WASH) and Shelley Smith, USAID*

Water, Sanitation and Nutritional Status of Young Children in Sri Lanka  
*Steven A. Esrey, McGill University, and A. Elisabeth Sommerfelt, DHS*

Discussant: *Ronald Gray, Johns Hopkins University*

#### **6C: Household and Family Structure**

Chair: *Martha Ainsworth, The World Bank*

Household Structure from a Comparative Perspective  
*Koffi Ekouevi, Mohamed Ayad, Bernard Barrère, and David C. Cantor, DHS*

Family Structure in Senegal  
*Salif Ndiaye, Awa Thiongane, and Ibrahima Sarr, Direction de la Prévision et de la Statistique (Senegal)*

Female Headed Households in Developing Countries: By Choice or by Circumstances?  
*Keiko Ono, United Nations Population Division*

Children's Living Arrangements in Comparative Perspective  
*Cynthia B. Lloyd and Sonalde Desai, The Population Council*

Discussant: *Hilary Page, Rijksuniversiteit Gent*

### **7A: Women's Reproductive Health**

Chair: *Mary Ann Anderson, Office of Health, USAID*

Utilization of Maternity Care Services: A Comparative Study Using DHS Data

*Kate Stewart and A. Elisabeth Sommerfelt, DHS*

Direct and Indirect Estimates of Maternal Mortality from the Sisterhood Method

*Naomi Rutenberg and Jeremiah Sullivan, DHS*

Female Circumcision: Attitudes and Practices in Sudan

*El-Haj Hamad M. Kheir, Sudan National Population Committee, Sushil Kumar, and Anne R. Cross, DHS*

Maternity Care Data in the Demographic and Health Surveys: What Can Be Achieved?

*Véronique G.A. Filippi, Wendy J. Graham, and Oona M.R. Campbell, London School of Hygiene and Tropical Medicine*

Discussant: *Heinz Berendes, NICHD*

### **7B: Selected Topics in Child Health**

Chair: *Pamela Johnson, Office of Health, USAID*

Sex Differentials in Health Status and Health Care Utilization in Mali

*Cheikh Mbacké, Institut du Sahel and Thomas LeGrand, Université de Montréal*

Family, Household and Utilization of Child Health Services: The Case of Mexico

*Carlos Javier Echarri Cánovas, Université Catholique de Louvain*

Intermediate and Underlying Factors Associated with Infant Mortality in Peru (1984-1986)

*Luis Tam, University of Michigan and Cayetano Heredia University*

Seasonality of Infant Deaths: An Assessment Based on 11 DHS Countries in sub-Saharan Africa

*John C. Chao and Gary Merritt, Bureau for Africa, USAID*

Discussant: *Allan Hill, IUSSP*

### **7C: Fertility Decline: Case Studies**

Chair: *Tom Merrick, The Population Reference Bureau*

Fertility Decline in Mexico

*Yolanda Palma, Dirección General de Planificación Familiar (Mexico)*

Fertility Decline in Indonesia: Analysis of Fertility Intentions

*Sri Poedjastoeti, DHS and Harijati Hatmadji, University of Indonesia*

Fertility Decline in Kenya: The Role of Timing and Spacing of Births

*Wamucii Njogu, DHS and Teresa Castro-Martin, United Nations Population Division*

Fertility Decline in Nigeria: Is It Real or Is It Memory Lapse?

*Kia Reinis and Shea Rutstein, DHS, O.O. Ajayi, Federal Office of Statistics (Nigeria)*

Discussant: *Kenneth Hill, Johns Hopkins University*

### **8A: Policy Implications of the DHS Findings for Specific Countries-I**

Chair: *Jorge Hernandez Isussi, Salvadoran Demographic Association*

Impact of the DHS Survey in Brazil

*Jose Maria Arruda, Consultant*

Dominican Republic: Implications of the DHS-86 for Health and Family Planning Policies and Programs

*Nelson Ramirez, Consultant, Development Associates, Inc.*

Policy Implications of the 1989 Bolivia DHS

*Alene Gelbard, Consultant, and Lieselotte de Barragán, Fundación San Gabriel*

Use of DHS Data for Population Policy and Family Planning in Peru

*Dina Li, Instituto Andino de Estudios en Población y Desarrollo (PerD)*

Policy Implications of the 1988 VNDHS for Vietnam's Population Program

*Vu Qui Nhan, Nguyen Minh Thang, National Committee on Population and Family Planning, Pham Bich San, Institute of Sociology, Vu Duy Man, Institute for Computer Science, and James Allman, National Committee on Population and Family Planning*

Discussant: *Juan Maria Carrón, CEPEP (Paraguay)*

### **8B: Policy Implications of the DHS Findings for Specific Countries-II**

Chair: *Taoufik Kilani, ONFP (Tunisia)*

Policy Implications of the DHS Findings for Kenya

*Walter Obungu, KANU Maendeleo ya Wanawake, Anne R. Cross and Wamucii Njogu, DHS*

Policy Implications of the DHS Findings for Morocco, Tunisia, and Egypt

*Mohamed Ayad, DHS, Ann Way, Office of Population, USAID, and Hussein Sayed, Cairo Demographic Center*

The LASA-DO Bridge: Linking Findings to Policies and Programs

*Richard B. Sturgis, Elizabeth Lule, Akin Akinyemi, Nigeria Family Health Services Project, and Koy Kuteyi, Federal Ministry of Health (Nigeria)*

Analysis of the 1987 Indonesian Contraceptive Prevalence Survey: Implications for Program Evaluation and Policy Formulation

*Sumarsono, Sudibyo Alimoeso, and Srihartati P. Pandi, National Family Planning Coordinating Board (BKKBN)*

The Utilization of Demographic and Health Survey Data for Planning

*E.T. Maganu and P. Khulumani, Ministry of Health (Botswana)*

Discussant: *John Stover, The Futures Group*

### **8C: Programmatic Topics in Family Planning-II**

Chair: *Elizabeth Maguire, Office of Population, USAID*

Use of Survey Data to Estimate Type, Duration and Effectiveness of Contraceptive Use

*Eric R. Jensen, College of William and Mary*

IUD and Pill Use Dynamics in Tunisia and Morocco

*Kamel Esseghairi, Ministry of Health (Tunisia), P.R.A. Hinde and John W. McDonald, University of Southampton*

Trends in the Demand for Family Planning in Indonesia 1976-1987: A Supply-Demand Approach

*Agus Dwiyanto, Gadjah Mada University*

Contraception Among Urban Youth in Nigeria

*Paulina Makinwa-Adebusoye, Nigerian Institute of Social and Economic Research*

Discussant: *Susheela Singh, The Alan Guttmacher Institute*

### **Plenary III: Policy Issues for the 1990s**

Chair: *Steven Sinding, The Rockefeller Foundation*

Priority Issues in Family Planning

*Duff Gillespie, Office of Population, USAID*

Priority Issues in Maternal and Child Health

*Mark Belsey, World Health Organization*

Data Needs for the Future

*Martin Vaessen, DHS*